Road and Bridge Construction

Revised 2003
FOREWORD TO 2003 METRIC STANDARD PLANS

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**Conditional Use of Certain Sheets**

Certain sheets will have “Requires Chief Road Design Engineer Approval” referenced in the General Notes—this means that the Chief Road Design Engineer must approve the use of the information depicted on that sheet. Another condition would be “For Repair Only, not NCHRP 350 Approved for Test Level 3”—this means that the information on that sheet is not to be used for new or retrofit construction and is for repair work only, check with the Designer.

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 advertized project’s Special Provisions. If you find an error/omission or want to make a comment, make a copy of that sheet marked with your comments and mail to Dennis Coyle, Standards and Manuals Engineer, 1263 S. Stewart Street, Carson City, Nevada 89712, (775)-888-7598, Fax (775)-888-7401, Email: dcoyle@dot.state.nv.us.

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GENERAL NOTES:
1. See the current edition of the AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" for further information on at-grade intersections and design vehicles.
2. Details for the special approaches will be shown on the plans when they are required.
3. Paved approaches shall have a seal coat unless otherwise noted.
4. Approaches to be paved to the throat or right-of-way, whichever occurs first, unless otherwise noted on the plans.
5. Approaches may require the standard stop signs and stop bollards as directed by the engineer.

LEGEND:
- Angle of Repose

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METRIC NDOT

TYPE 1, 2, 3, 4 AND 5 APPROACH ROADS

SIGNED ORIGINAL ON FILE
R.000 9/2005

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
PRECAST CONCRETE END SECTIONS

PREFabRiCATED METAL END SECTION
(Type 3 Connection)

SLOPE PAVEMENT
WITH CUTOFF WALL
(Width and Depth to be specified)

CHANNEL LINING
(Width and Depth to be specified)
1. Roadway, Channel Excavation or Drainage Excavation.
2. Payment for backfill and structure excavation to be included in price paid for slope paving or channel lining.

CONCRETE APRON
(Width and Depth to be specified)

STRUCTURAL PLATE PIPE

DROP INLETS IN EMBANKMENT
(Type 3 Drop Inlet Illustrated)

CHANNEL LINING AND SLOPE PAVEMENT

CULVERT HEADWALLS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
STRUCTURE EXCAVATION
AND BACKFILL
(METHOD OF MEASUREMENT)

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

SIGNED ORIGINAL ON FILE
ADOPTED: 7/86
REVISED: 9/02

35 but not to exceed 6.3 m Arch Pipe
30 but not to exceed 5.3 m Round Pipe

Normal Roadway Slope

Normal Roadway Slope

Standard Bond Coupling

Limit of payment for pipe
Structure excavation and backfill (See Sheet R-1.11)

Limit of payment for pipe
Structure excavation and backfill (See Sheet R-1.11)

Flow Line

NEW EMBANKMENT

NEW EMBANKMENT

75 mm Min Class A or AA Concrete Colter

Existing

NEW EMBANKMENT

NEW CHANNEL EXCAVATION

ORIGINAL GROUND or FILL

Limit of payment for pipe
Structure excavation and backfill (See Sheet R-1.11)

Classification and payment as specified

LEGEND

Granular Backfill
Structure Excavation
Limits of Existing
Roadway Embankment

S. for Arch Pipe
D for Round Pipe

D for Round Pipe

MINIMUM HEIGHT OF COVER 300 mm

D for Round Pipe

S. for Arch Pipe

S. for Arch Pipe

D for Round Pipe

MINIMUM HEIGHT OF COVER 300 mm

SUBGRADE

Varies

Varies

Varies

Varies

Varies
GENERAL NOTES:

1. Trenches more than 1.2 m deep shall be shored, lagged back to at least the angle of repose for existing field 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 sharing.

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


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 1900 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.

8. If diameter is greater than 1900 mm, 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 roadway embankment.

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
**CLASS A BEDDING**

Payment for excavated area below the bottom of the pipe should 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 unsuitable foundations or sheet piles are not suitable conditions. When conditions are encountered, the concrete shall be Class A or AA.

**BEDDING FOR CONCRETE CULVERT**

**ALLOWABLE FILL HEIGHT IN METERS FOR REINFORCED CONCRETE PIPE 600 mm to 2100 mm**

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<th>Class C</th>
<th>Class D</th>
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**CULVERT BEDDING & ALLOWABLE FILL HEIGHT FOR R.C.P.**

State of Nevada
Department of Transportation

Signed

[Signature]

[Date]

[Department of Transportation Logo]
### Corrugated Aluminum Pipe

**48 mm x 12 mm Corrugations**

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<th>MINIMUM COVER</th>
<th>PLATE THICKNESS (mm)</th>
<th>MIN. SPAN (m)</th>
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**50 mm x 20 mm Corrugations**

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<th>MIN. SPAN (m)</th>
<th>MAX. SPAN (m)</th>
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**65 mm x 20 mm Corrugations**

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**75 mm x 25 mm Corrugations**

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**80 mm x 25 mm Corrugations**

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## RIVETED OR FELTED-TO-FABRICATION

**75 mm x 25 mm Plate Pipe**

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**75 mm x 25 mm Plate Pipe**

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**75 mm x 25 mm Plate Pipe**

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## Maximum Height Cover for Structural Aluminum Plate Pipe (Meters)

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## Maximum Height Cover for Structural Aluminum Plate Pipe (Meters)

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**Notes:**
- To determine proper metal thickness, (mm) select the span in left hand column that is next larger to size structure required.
- Example: If you need a 3.25" span x 2.25" rise structure, use the line for span 3.4".
- Contact Hydraulics Engineer for materials or sizes not listed.
### Corrugated Steel Pipe

#### Corrugated Steel Pipe

**Pipe Dimensions**
- **Diameter (mm)**: 300, 350, 400, 500, 600, 750, 900, 1100, 1250, 1500, 1750, 2000, 2375, 2675, 3000, 3500, 4375, 5000
- **Cover (mm)**: 68 mm × 12 mm

**Maximum Cover**
- **Thickness (mm)**: 3.0, 3.4, 3.7, 4.0, 4.4, 4.8

**Maximum Height of Cover**
- **Span (mm)**: 250, 350, 450, 550, 650, 750, 850, 950, 1050, 1150, 1250, 1350, 1450
- **Rise (mm)**: 250, 350, 450, 550, 650, 750, 850, 950, 1050, 1150, 1250, 1350
- **Cover (mm)**: 68, 88, 108, 128, 148, 168

**Maximum Bearing Pressure**
- **Span (mm)**: 250, 350, 450, 550, 650, 750, 850, 950, 1050, 1150, 1250, 1350
- **Rise (mm)**: 250, 350, 450, 550, 650, 750, 850, 950, 1050, 1150, 1250, 1350
- **Cover (mm)**: 68, 88, 108, 128, 148, 168

**Allowable Fill Heights**
- **Height: 0 to 2.8 mm**
- **Height: 2.8 to 7.7 mm**

### Corrugated Steel Pipe Arch

**Pipe Dimensions**
- **Span (mm)**: 125, 175, 225, 275, 325, 375, 425, 475, 525, 575, 625, 675, 725, 775, 825, 875, 925, 975, 1025, 1075, 1125, 1175

**Maximum Cover**
- **Thickness (mm)**: 2.5, 3.0, 3.5, 4.0, 4.5

**Maximum Height of Cover**
- **Span (mm)**: 150, 250, 550, 750, 850, 950, 1050, 1150, 1250, 1350, 1450, 1550, 1650, 1750, 1850, 1950, 2050, 2150, 2250, 2350, 2450, 2550, 2650, 2750, 2850, 2950, 3050
- **Rise (mm)**: 150, 250, 550, 750, 850, 950, 1050, 1150, 1250, 1350, 1450, 1550, 1650, 1750, 1850, 1950, 2050, 2150, 2250, 2350, 2450, 2550, 2650, 2750, 2850, 2950, 3050
- **Cover (mm)**: 68, 88, 108, 128, 148, 168

**Maximum Bearing Pressure**
- **Span (mm)**: 150, 250, 550, 750, 850, 950, 1050, 1150, 1250, 1350, 1450, 1550, 1650, 1750, 1850, 1950, 2050, 2150, 2250, 2350, 2450, 2550, 2650, 2750, 2850, 2950, 3050
- **Rise (mm)**: 150, 250, 550, 750, 850, 950, 1050, 1150, 1250, 1350, 1450, 1550, 1650, 1750, 1850, 1950, 2050, 2150, 2250, 2350, 2450, 2550, 2650, 2750, 2850, 2950, 3050
- **Cover (mm)**: 68, 88, 108, 128, 148, 168

**Allowable Fill Heights**
- **Height: 0 to 2.8 mm**
- **Height: 2.8 to 7.7 mm**

---

**NOTICE:** Contact Hydraulics Engineer for materials or sizes not listed.

**WATER OR HELICAL FABRICATION**
- Top of pipe to top of finished grade at shoulder line for 192 kPa
- Shall be used only after foundation investigation
- For field straining C.A.P. detail see Standard Sheet No. 2.1.1

---

**Metric NDOT**

**Department of Transportation**

**Allowable Fill Heights for Steel Culverts**

---

**Signed Original:** On File

**Adopted:** 7/5/11

---

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

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**Copyright Design:** 12.1.12

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**3-10-95**

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**METRIC**

---

**METRIC Conversion:**

- **Feet** and **Inches** to **Metric**
- **1 inch =** 25.4 **mm**
- **1 foot =** 305 **mm**
- **1 yard =** 914 **mm**

---

**NOTE:** All dimensions are in millimeters unless otherwise noted.
### TABLE OF SEPARATION FOR MULTIPLE INSTALLATIONS

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*NOTE:* When Y distance exceeds 1.5 m, structure excavation and backfill quantities shall be calculated for each culvert. *When headwalls are used, anticipate for future use space as per headwalls standard.*

### FIELD STRUTTING CMP

*Note for strut, cap, sill size and spacing use manufacturers recommendations. Struts, caps and sills to be the same dimension. For maximum fill heights, see standard sheet R-1.3.1.2 under columns designated "E".*

### CONCRETE COLLAR

*Class A or A1 Concrete*

Mesh reinforcement 400 mm wide with 200 x 200 25.4 x 25.4 mesh wrapped around previously grounded (joint).
GENERAL NOTES:
1. Drain pipe seams may be continuous helical lock seam or helical weld seam.
2. Drain sections shall be assembled with the coupling band shown.
3. The cross bar spacer shall be welded to the bearing bars in such a manner as to develop a minimum tensile strength of 55,000 lb normal to the longitudinal axis of the bearing bars.
4. The maximum variance from a straight line between the extreme top corners of the bearing bars shall be 12 mm in 6.0 m.
5. For continuous runs of S-C.M.P. in excess of 60 m, cleatwash or standard flushing inlets shall be installed as shown on the plans.
6. Spot weld shall develop minimum required strength of 300 lb.
7. Dimensions shown are minimums.
8. Contractor to provide an adequate method of keeping the A.C. out of pipe during paving operations.
9. Design shall be in accordance with the latest edition of the American Standard Specification for Highway Bridges Section 12 Minimum Live Load to be 120 k.
10. Concrete shall be Class A or AA.
11. Hydraulics engineer will state pipe size.
12. The spacer plates shall be welded on both sides to each bearing bar with four 30 mm - long 5 mm fillet welds.
13. H = height of bearing bar (65 mm or 150 mm) - 15 mm corrugation thickness of pipe in mm.
14. The grate shall be welded with a 5 mm fillet weld minimum 25 mm long to the corrugated steel pipe on each side of the grate at every other corrugation.
WITHOUT HEADWALL

1. Length of culvert shall be increased as follows: consider each side separately. Measure pipe from roadway centerline to the intersection of the pipe flow line and fill slope. To this dimension add 0.5 mm 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.

2. Normal roadway slope

3. Shoulder line

WITH CONCRETE HEADWALL

4. Length of culvert shall be increased as follows: consider each side separately. Measure pipe from roadway centerline to the intersection of the top of the pipe and fill slope plus headwall thickness. To this dimension add 0.3 m when cover at shoulder is 1.5 m to 3.0 m and an additional 150 mm for each succeeding 1.5 m of cover or portion thereof.

5. Normal roadway slope

6. Shoulder line

MINIMUM CULVERT INSTALLATION

- Use 450 mm wide, where possible. If minimum cover is restrictive, compensate by utilizing higher class pipe or selective bedding as recommended by the "Correlation Section.

- Aluminum culverts: see standard sheet R-1.3.1.

- Steel culverts: see standard sheet R-1.3.1.2.

- ** For informational purposes only

- Contour this area to provide the minimum amount of obstruction exposure.

PRECAST CONCRETE END SECTION

METAL END SECTION

EDGE OF TRAVEL LANE

ROADSIDE RECOVERY AREA

SHOULDER VARIES

NORMAL PLAN SLOPE

EXTENDED SAFETY SLOPE

0.6 m MIN

0.3 m

CONTOURED SLOPE

NOTE: 1. If, after extending the culvert and/or raising the fill slope for safety and/or aesthetics, the extension does not fulfill the requirements for a clear roadside recovery area, then vehicular traffic may be protected by a safety grate or by some other means, such as guardrail, barrier rail, or another acceptable safety feature.

2. Normal structure excavation and backfill limits.

STATE OF NEVADA

DEPARTMENT OF TRANSPORTATION

CULVERT INSTALLATION

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

METRIC NDOT

ELEVATION OR ROADWAY ELEV.

SECTION A-A

SAFETY CULVERT INSTALLATION

(TO PROVIDE OBSTRUCTION CLEARANCE)
### GENERAL NOTES:

1. **Class 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 design plans does not include connector section (length E).**

4. **Contact Hydraulics Engineer for sizes not listed.**

<table>
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<th>C (cm)</th>
<th>L (mm)</th>
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*For Reference Only*

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**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 4 IN. ON CENTER AND CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 40 IN. CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND RENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSATURATED OR LIABLE TO SLOP.
4. DRAINAGE TIES TO BE SET ON A 90 DEGREE CURVE SHOWN ON CROSS SECTION SHOWN ON CROSS SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CURVES:
   30° TO 45° - USE QUANTITIES FOR 30° SKEW.
   45° TO 60° - USE QUANTITIES FOR 45° SKEW.
   OVER 60° - CALCULATE QUANTITIES REQUIRED.
   CURVES SHOULD BE INSTALLED ON 5° INCREMENTS WHERE IT IS FEASIBLE.

LENTH OF REINFORCING BARS

QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL.

SINGLE CMP ** DOUBLE CMP **

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<td>25</td>
<td>13</td>
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<td>0.35</td>
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<td>0.40</td>
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<td>8</td>
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<td>0.50</td>
<td>36</td>
<td>20</td>
<td>12</td>
<td>10</td>
<td>8</td>
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</tbody>
</table>
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR A-1.
2. REINFORCING STEEL SHALL BE DETEMINED BARS WITH MAXIMUM SPACING OF 650 MM. SET 45 MM CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 45 MM CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSTABLE OR LIABLE TO SOIL.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE WITERS HEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE WITERS EXCEPT IN FOLLOWING SECTION.
5. FOR ESTIMATING MAXIMAL QUANTITIES ON SHOWN CULVERTS: 0° TO 15° USE QUANTITIES FOR 0° SKEW, 15° TO 25° USE QUANTITIES FOR 15° SKEW, 25° TO 45° USE QUANTITIES FOR 25° SKEW, 45° TO 60° USE QUANTITIES FOR 45° SKEW. OVERSIZED EqT QuTIES REQUIRED. CULVERTS SHOULD BE INSTALLED ON 3M INCREMENTS WHERE IT IS FLEXIBLE.
6. DIMENSIONS X, Y, L AND T TO REMAIN CONSTANT REGARDLESS OF MAJOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CULVERT HEADWALLS
300 mm RCP TO 900 mm RCP

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

SIGNED ORIGINA ON FILE
R.D. L.
JUN 2005

METRIC NDOT
UPTIPL DATE DESIGN ENG.
MTIMET MIER
QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

<table>
<thead>
<tr>
<th>RCP Dia.</th>
<th>Cty.</th>
<th>Single</th>
<th>Double</th>
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<tbody>
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QUANTITIES SHOWN BELOW ARE FOR ONE HEADWALL.

LENGTH OF REINFORCING BARS (mm)

<table>
<thead>
<tr>
<th>RCP Dia.</th>
<th>Cty.</th>
<th>Single</th>
<th>Double</th>
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</table>

GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR A1.
2. REINFORCING STEEL SHALL BE OXIDIZED WITH MAXIMUM SPACING OF 400 mm. 75 mm CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BARS AT ENDS SHALL BE LEFT A 60 mm CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT ON SITE.
3. FOOTINGS SHALL BE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSAFE OR LIABLE TO SLOPE.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE WITNESSED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE WITNESSED EXCEPT IN OVERFLOW SECTION.
5. FOR ESTIMATING HEADWALL MATERIAL ON SPANED CULVERTS: 0° TO 10° USE QUANTITIES FOR SPANED SKEW.
6. 10° TO 25° USE QUANTITIES FOR 2% SKEW.
7. 26° TO 40° USE QUANTITIES FOR 3% SKEW.
8. 41° TO 60° USE QUANTITIES FOR 4% SKEW.
9. FOR CALCULATING QUANTITIES REQUIREMENTS CULVERTS SHOULD BE INSTALLED ON 15° IN INCREMENTS USE IT IS PRACTICAL.
10. DIMENSIONS X, Y, L, AND H TO REMAIN CONSTANT REGARDLESS OF WIDTH VARIATIONS TO WALL THICKNESS DUE TO CLASS OF PIPE USED.
### General Notes:
1. Concrete shall be Class A or AA.
2. Rebar shall be deformed bars with maximum spacing of 400 mm in clear of surface of concrete except as noted. Bars under slab shall be kept 40 mm clear of surface of concrete. Rebar may be cut and bent in field.
3. Fittings shown are of minimum depth and shall be extended if soil is unsuitable or liable to scour.
4. Culvert pipes to be set on a skew shall be watered when headwalls are constructed. When headwalls are not constructed, the pipes shall not be watered except in overflow section.
5. For estimating headwall quantities on skewed Culverts:
   - Design for a 1/4 to 1/3 skew quantities for 1/3 skew.
   - Design for a 2/8 to 2/3 skew quantities for 2/3 skew.
   - Design for a 2/4 to 1 skew quantities for 1 skew.
   - Culverts should be installed on 5° increments where it is feasible.

### Quantities Shown Below are for One Headwall

### Single or Double CMAP

<table>
<thead>
<tr>
<th>CMP Size</th>
<th>N</th>
<th>N</th>
<th>N</th>
<th>N</th>
<th>M</th>
<th>M</th>
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<tr>
<td>CMP Area</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>L</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
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</tr>
</tbody>
</table>

### Single CMAP

### Double CMAP

### Quantities Shown Below are for Two Headwalls

<table>
<thead>
<tr>
<th>CMP Size</th>
<th>CMP Area</th>
<th>L</th>
<th>N</th>
<th>M</th>
<th>N</th>
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<th>N</th>
<th>M</th>
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<td>10</td>
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</tbody>
</table>

### Length of Reinforcing Bars (mm)

<table>
<thead>
<tr>
<th>CMP Size</th>
<th>Single CMAP</th>
<th>Single or Double CMAP</th>
<th>Double CMAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
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</tbody>
</table>

### State of Nevada

**Department of Transportation**

**Culvert Headwalls**

425 mm X 325 mm CMAP to 2075 mm X 1425 mm CMAP
ANNULAR COUPLING BAND

SIDE VIEW

END VIEW

ANNULAR COUPLING BAND

SECOND ANGLE CONNECTION ASSEMBLY IS OPTIONAL FOR PIPE 900 mm DI OR LESS, REQUIRED FOR PIPE GREATER THAN 900 mm DI.

INTERNAL FILLET WELD AT CORSET OF CORRUGATION AT HEEL AND TOE OF ANGLE

CONNECTION ANGLE DETAIL

BAR & STRAP DETAIL

ALTERNATIVE ANNULAR COUPLING BAND FOR HCMPTHRU 2100 mm

SPOT WELD LOOP IN STRAP

1.6 mm THICK GALV BAND

SPOT WELD (OR ARC WELD) STRAP TO BAND

SPOT WELD

3.5 mm DIAMETER ROPE

END DETAIL

SECOND ANGLE CONNECTION ASSEMBLY

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 SPHINX JOINTS ON ALTERNATIVE ANNULAR COUPLING BAND, PLASTIC SEALANT 518B-3: 3.5 mm THICK X 40 mm WIDE X 305 mm LONG IN LAY BETWEEN BANDS.

4. FOR ALTERNATIVE ANNULAR COUPLING BAND, 2 BAR & STRAP ASSEMBLIES ARE REQUIRED FOR PIPE GREATER THAN 950 mm DI, OPTIONAL FOR SIZES LESS THAN 950 mm.

CONNECTING BAND FOR HELICAL WELD SEAM ONLY

1. THIS ANGLE BAND IS TO BE USED FOR EXISTING HELICALLY CORRUGATED PIPE.
### Table: Coupling Dimensions

<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</th>
<th>Bolts (Dia.)</th>
<th>Bar (Dia.)</th>
<th>Bar Yield Strength (M Pa)</th>
<th>Dimensions</th>
<th>Rivets to Band</th>
<th>Spot Welds Angle to Band</th>
<th>Spots Welds</th>
<th>Wedge &amp; Strap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Piece Integral Flange</td>
<td>38 x 6.5</td>
<td>150 thru 250</td>
<td>38</td>
<td>1.8 - 2.0</td>
<td>1.6</td>
<td>2.6</td>
<td>2.6</td>
<td>2.2</td>
<td>220</td>
<td>15</td>
<td>3 - 15</td>
<td>3 - 15</td>
<td>2 - 10</td>
<td>2.0</td>
</tr>
<tr>
<td>Universal</td>
<td>68 x 13</td>
<td>200 thru 300</td>
<td>68</td>
<td>2.0 - 2.6</td>
<td>2.2</td>
<td>2.6</td>
<td>3.0</td>
<td>2.2</td>
<td>220</td>
<td>15</td>
<td>3 - 12</td>
<td>3 - 15</td>
<td>2 - 10</td>
<td>3.0</td>
</tr>
<tr>
<td>Annular</td>
<td>68 x 13</td>
<td>250 thru 400</td>
<td>68</td>
<td>2.6 - 3.0</td>
<td>2.6</td>
<td>3.0</td>
<td>3.0</td>
<td>2.2</td>
<td>220</td>
<td>15</td>
<td>3 - 10</td>
<td>3 - 15</td>
<td>2 - 10</td>
<td>3.0</td>
</tr>
<tr>
<td>Channel</td>
<td>68 x 3</td>
<td>300 thru 450</td>
<td>68</td>
<td>2.8 - 3.4</td>
<td>2.8</td>
<td>3.4</td>
<td>3.4</td>
<td>2.2</td>
<td>220</td>
<td>15</td>
<td>3 - 10</td>
<td>3 - 15</td>
<td>2 - 10</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### General Notes:

1. **All coupling band connection hardware shall be galvanized or electroplated in accordance with standard specifications.**
2. **For pipe arches, use same width band as for round pipe of equal perimeter.**
3. **Two piece band is required for pipe greater than 1500 mm diameter.**
4. **Tension strap may be connected to band or sheet with either spot welds or fillet welds that develop minimum required strength of strap.**
5. **Use 15 mm gage line dimension on attached angle leg for rivets and spot welds.**
6. **Band thickness shall not be less than 3 standard thicknesses lighter than the thickness of the pipe.**
7. **Dimensions and thickness shown are minimum.**
8. **Angle 50 mm long with 1.5 mm x 50 mm strap.**
9. **Fillet welds of equivalent strength may be substituted for spot welds or rivets.**

### Diagram: Channel Coupling Band

- **FOR USE ON FLANGED END CMP**
- **(CHANNEL COUPLING BAND SHALL BE TWO PIECE)**

### NOMINAL DIMENSIONS

- **A**: 13 mm carriage bolt
- ** nominal 51 mm x 51 mm x 4.8 mm**

### SPIRAL CMP

Referred to accept universal, annular, and channel couplers.

---

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**CMP COUPLING BAND DETAILS**

**Signed Original On File: B-2-8-2 W241**

1994 ROAD DESIGN ENGINEER 1300170  2001
NOTE:
1. WHEN FULL LACED TOGETHER
2. PLACE UP THIS DIRECTION ALL LIFTS
3. BEON & END ONLY

PLAN
LACING: SINGLE BASKET
NOTE: OPTIONAL WIRE RING FASTENERS ALLOWED AS PER SPECIAL PROVISIONS.

SECTION C-C

RIPRAP APRON
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.

CULVERT SIZE [mm]
- 450 mm to 900 mm: 30
- 1050 mm to 2150 mm: 40

RIPRAP AND BEDDING CLASS [mm]
- 50 mm
- 100 mm
- 200 mm
- 300 mm
- 400 mm
- 500 mm
- 600 mm
- 800 mm
- 900 mm

BASKET HEIGHT [mm]
- 900 mm - 1/8H
- 1200 mm - 1/8H & 2/3H
- 1500 mm - 2/3H

WIRE MESH LACING DETAIL
INTERNAL CONNECTING WIRE DETAIL
FOR WIRE MESH GABIONS
GABIONS LACING DETAIL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
RIPRAP APRON
GABIONS LACING DETAIL
MILE 0.346 MILE 0.357

SIGNED ORIGINAL ON FILE 8/14/2003
SIGNED FOR COMPLIANCE 8/14/2003

CERTIFIED DRAWING 2003
INCHES (UNLESS OTHERWISE NOTED)
1/8" = 1'-0"
GENERAL NOTES:
1. All concrete shall be Class A or AA.
2. Reinforcing bars shall be No. 13 bars with maximum spacing at 450 mm centers. Bars to be embedded a minimum of 50 mm and bar ends must be 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 ASTM A53.
6. Station/Offset distance listed in plans is measured to the center of grate.

QUANTITIES:

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

PLAN VIEW

VIEW C-C

SECTION B-B
WEDGE LOCK HOLD DOWN

SECTION A-A
WEDGE LOCK HOLD DOWN

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DROP INLET
TYPE 10

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED
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 EMBEDDED 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 2’ 30” 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 GRADE.

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, LIDS, GRADE RINGS, AND STEPS SHALL CONFORM TO ASPHALT M 188M (ASTM C-478M).

8. SHAPE FLOWLINE IN MANHOLE TO OUTLET PIPE AND PROVIDE A 1:10 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOWLINE.

9. THICKNESS PIPE WALL.

E = Flow
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS A OR CLASS AA.
2. MANHOLES WITH MORE THAN ONE PIPE, THE INFLOW PIPE INVERT ELEVATIONS SHALL BE GREATER THAN OR EQUAL TO 30 MM ABOVE THE OUTFLOW PIPE INVERT ELEVATION.
3. FOR VALUES OF "P", SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST IN CONTRACT PLANS. "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 ASST 61975 (ASTM C-1515).
5. MANHOLE COVER SHALL BEAR ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
6. SHAPE FLOWLINE IN MANHOLE TO OUTFLOW PIPE, AND PROVIDE A 1100 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOWLINE.
GENERAL NOTES:

1. The weight of frame shall be 65 kg. Minimum and the weight of cover shall be 66 kg. Minimum. Traffic-strength manhole frame & cover shall conform to AASHTO M 199M for manhole frames. The frame shown in the drawing may be used upon approval by the Engineer.

2. The frame seat and cover edges shall be machined to a true bearing surface all around. The frame & cover shall be compatible with the manufacturer's specifications.

3. The surface shown in the drawing is for illustration only. Any surface design, other than smooth, may be used upon approval.

4. Frames & covers shall conform to ASTM A48M, 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 around, or any other appropriate shape when approved by the Engineer.

9. Commercial prefabricated grade rings for manholes shall conform to AASHTO M 199M (A574 C-487M).

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
MANHOLE COVER, FRAME & CONCRETE COLLAR
GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 1:12 OR FLATTER.
2. GRATING, MANHOLES, VALVE COVERS, OR SIMILAR ACCESSS SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMPS.
3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER PAN.
4. PLANTER BUMPOUTS OPEN-GRATED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH ETCH TEXTURE ON CURB RAMPS AND WINDS.
6. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
7. CONCRETE SHALL BE CLASS A OR AA.
8. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
9. DETECTABLE WARNING PAVING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING AS INSTRUCTIONS INSTALLATION GUIDELINES AND CONFORM TO ADAAG 14.29.4 "CONTRAST".
10. DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND PAID FOR AS THE APPROPRIATE SIDEWALK AND CURB RAMP - 810 ITEM.

LEGEND:

- DETECTABLE WARNING PAVER

X ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

TYPICAL ISLAND PAVING DETAILS

DETECTABLE WARNING PAVER (Nominal 200 mm x 100 mm)
NEW ISLAND

EXISTING ISLAND

SECTION A-A

SECTION C-C

SECTION C-C MODIFIED

SECTION B-B

SECTION D-D

LEGEND

DETECTABLE WARNING PAVERS, SEE NOTE B.

1. ADDITIONAL DEPTH MAY BE REQUIRED UNDER DETECTABLE WARNING PAVERS FOR SAND BEDDING FOR MANUFACTURERS INSTALLATION GUIDELINES.

GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 1/2 OR FLATTER. ALL SLOPE RATES ARE RELATIVE TO LEVEL.

2. DRAINAGE MANIFOLD, VALVE COVERS AND SIMILAR APPARATUSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANING AREA.

3. NO LIP SHALL BE PERMITTED AT THE CURB RAMP SLOPE TO GUTTER LINE.

4. PLANTER BITUMINOUS OPEN-GRADED SURFACE SHALL BE FINISH WITH THE EDGE OF THE GUTTER IN THE AREA OF THE CURB RAMP.

5. ROUGH MICRO TEXTURE ON CURB RAMPS AND WINDSHEILD TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.

6. CONCRETE SHALL BE CLASS A OR AAB.

7. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.

8. DETECTABLE WARNING SHALL BE CONSTRUCTED WITH CONCRETE PAVERS AND BEDDING PER MANUFACTURERS INSTALLATION GUIDELINES.

9. DETECTABLE WARNING PAVERS AND REQUIRED BEDDING WILL BE MEASURED AND TAILORED AS THE APPROPRIATE SIDEWALK AND CURB RAMP BID ITEM.
**GENERAL NOTES:**

1. **TYPE C** DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWING R-5.3.3.
2. THE TOTAL WIDTH "W" OF DRIVEWAY CURB OPENINGS SHALL NOT EXCEED 65% OF FRONT FOOTAGE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 1.8 M OF A LIGHT POLE, FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX OR BLOCK WALL HIGHER THAN 0.6 M.
4. THE CENTERLINES OF DRIVEWAYS ON OPPOSITE SIDES OF THE STREET AT A MEDIAN OPENING SHOULD BE NO LESS THAN 1.8 M APART.
5. HANDICAPPED ACCESSIBLE SIDEWALKS SHALL BE PROVIDED. SEE STANDARD DRAWINGS R-5.2.1 TO R-5.2.2 AND R-5.3.3.
6. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.
7. DRIVEWAY SPACING, CLEARANCES, AND RETURN RADII SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

**TYPE C**
COMMERCIAL, INDUSTRIAL, AND MULTI-FAMILY DRIVEWAY GEOMETRICS

**GENERAL NOTES:**

1. ALL RESIDENTIAL PROPERTIES MAY HAVE ONLY ONE CURB OUT TO THE STREET 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 BE A MAXIMUM OF 7.5 M. A JOINT DRIVEWAY AGREEMENT SHALL BE REQUIRED.
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 RADII SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

**TYPE R**
RESIDENTIAL DRIVEWAY GEOMETRICS

**STATE OF NEVADA**
DEPARTMENT OF TRANSPORTATION

DRIVEWAY GEOMETRICS
TYPE C AND TYPE R
GENERAL NOTES:
1. ALL RAPMS SHALL BE 11:12 OR FLATTER.
2. CONCRETE DRIVEWAY CAN BE POURED MONOLITHICALLY WITH CURB AND GUTTER.
3. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
4. LENGTH VARIES ACCORDING TO CURB AND GUTTER PROFILE.
   RETAINING CURBS AND AQUISITION OF CONSTRUCTION EASEMENTS MAY BE NECESSARY.
5. IF THERE ARE R/M RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 1.22 m. WITH PRIOR APPROVAL FROM ASSISTANT CHEF ROAD DESIGN ENGINEER. A 1.52 m x 1.52 m PASSING ZONE IS REQUIRED EVERY 61 m PER ADA APPENDIX C, SECTION 4.3.4.
6. CONCRETE SHALL BE CLASS A OR AA.
7. SEE TABLE 1-10, ON STANDARD DRAWING R-5.2.1.
GENERAL NOTES:
1. SPACING OF NO. 3 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 REBAR END 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-5.2.7 AND R-5.3.1.
5. FOR GRADE CHANGES GREATER THAN 3%,
   VERTICAL CURVES MUST BE USED.
6. DRIVEWAY GEOMETRICS SHALL GO TO THE P.C.
7. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.
8. SEE TABLE 1-12, ON DRAWING R-5.2.2, FOR "A" AND "B".
9. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.

SECTION A-A

SECTION A-A WITH RETAINING CURB

SECTION B-B

TYPICAL CROSS SECTION

MULTI-FAMILY,
COMMERCIAL & INDUSTRIAL
DRIVEWAY DETAILS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METRIC

NOTED

COMMERCIAL & INDUSTRIAL
DRIVEWAY DETAILS

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED.

SIGNED ORIGINAL ON FILE
R-5.2.1
ADPTED 7/9/98
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, CROSSGATES AND AT THE BEGINNING AND ENDING OF ALL CURVES.
4. SEE TABLE A FOR WOOD POST SPACING ON CURVES.
5. BARRED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED
   BY NV DEPT OF WILDLIFE OR DEPT OF LAND MANAGEMENT.
6. WIRE IS TO BE TIED OFF AT STRETCH POINTS WRAP AND SPICE
   TO SELF WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANELS.
7. WOOD POSTS SHALL BE 150 mm Nominal Diameter.
8. NO ADDITIONAL STRAND OF BARRED WIRE AND/OR A ROCK DEADMAN (MIN. MASS 25 kg)
   WHEN SPACE BETWEEN BOTTOM WIRE AND GROUND EXCEEDS 500 mm.
9. STEEL POST DEADMAN DRIVEN APPROXIMATELY 1 m INTO GROUND MAY BE USED
   IN LIEU OF ROCK DEADMAN.

---

**TABLE A: WOOD POST SPACING ON CURVES FENCE LINES**

<table>
<thead>
<tr>
<th>STRESS PANEL</th>
<th>STAKE POST</th>
<th>WOOD POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT CURVE</td>
<td>AT TANGENT</td>
<td></td>
</tr>
<tr>
<td>200 to 400</td>
<td>300 to 700</td>
<td></td>
</tr>
<tr>
<td>400 to 1400</td>
<td>700 to 2200</td>
<td></td>
</tr>
<tr>
<td>1500 to 5000</td>
<td>2200 to 7000</td>
<td></td>
</tr>
<tr>
<td>2500 to 7000</td>
<td>3000+</td>
<td></td>
</tr>
</tbody>
</table>

---

**3- POST CORNER PANEL**

**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. Barbed wire shall be used for bottom strand when required by Nev. Dept. of Wildlife or Bureau of Land Management.
3. Wires are to be tied off at stretch points, wrap and splice to self with at least 4 turns at opposite end of panels.
4. Wood post's shall be 150 mm nominal diameter.
5. Add additional strands of barbed wire and/or a rock deadman (min. mass 25 kg) when space between bottom wire and ground exceeds 500 mm.
6. Steel post deadman driven approximately 1 m into ground may be used in lieu of rock deadman.
7. Steel line posts at 2.5 m spacing to maintain bottom wire clearance.
MISSOURI GATE

METAL DRIVE GATE

CATTLE GUARD

TYPICAL GATE LATCH

GENERAL NOTES:
1. SPACING BETWEEN WIRES ON MISSOURI GATE SHALL BE THE SAME AS WIRES ON ADJACENT FENCE.
2. GATE LATCH SHALL BE LAD BOLTED FLATLY TO THE GATE POST.
3. HINGE POSTS, LATCH POSTS, AND CATTLE GUARD WING ATTACHMENT POSTS SHALL BE 2.4 m IN LENGTH AND SHALL BE SURED I m IN GROUND.
4. FOR END PANEL DETAILS, SEE SHEET R-6.12.
5. WIRE MAY BE USED IN LIE OF METAL STRAP FOR CONNECTION OF CATTLE GUARD WING TO FENCE POST.
6. USE RECTANGULAR MESH OR 50 mm SQUARE MESH ON METAL DRIVE GATE.
SINGLE

Metal Drive Gates 150x200 Post

Missouri Gate

Wood Stays 40 to 75 dia.

See Detail "A"

Detail "A"

Walk Gate

Metal Drive Gate in Timber Fence

General Notes:
1. Standard gates, chain link gates, and walk gates shall be constructed as specified in the standard specifications.
2. Braced Posts 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.

Estado de Nevada
Ministerio de Transporte
Gates and Fence Details

Todo el contenido fue extrayendo de forma independiente.
DOUBLE BRACE END ASSEMBLY

NOTE: FARM GATE DUE IN OR LOSS MAY BE INSTALLED ON POST AFTER FINAL WIRE TENSIONING.

CONSTRUCTION NOTES:
1. END POSTS AND LINE POSTS ARE RECOMMENDED TO BE MECHANICALLY DRIVEN INTO THE GROUND WITHOUT DRILLING HOLE TO BE DRIVEN MANUALLY. POSTS MAY BE INSTALLED OR SET IN CRUSHED GRAVEL, PLASTER, OR CONCRETE AS REQUIRED.
2. MAXIMUM POST SPACING IS 15.0 m ON CENTER, EXCEPT WIRE SPACINGS OF 1.2 m CENTERS, POSTS MAY BE SET IN CRUSHED GRAVEL, PLASTER, OR CONCRETE AS REQUIRED.
3. CONCRETE MIXTURE 3:1 IS RECOMMENDED TO BE USED FOR ALL CONCRETE MIXTURES. CONCRETE SHALL BE DUMPED AT THE BASE OF THE STRUCTURE AND REFINISHED AT THE TOP OF THE STRUCTURE.
4. CONCRETE BACKFILL FULL DEPTH OF HOLE FOR END & CORNER ASSEMBLY POST WHERE SITE CONDITIONS REQUIRE.

DETAIL A
POST WITH CONCRETE FILM

ALTERNATE FOUR POST CORNER ASSEMBLY

WIRE FENCE DETAIL

DESCRIPTOR:
1. WIRE FENCE IS TO BE FABRICATED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
2. ALL WIRE FENCE COMPONENTS ARE TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
3. ALL WIRE FENCE COMPONENTS ARE TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
4. ALL WIRE FENCE COMPONENTS ARE TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.

DESCRIPTOR:
1. WIRE FENCE IS TO BE FABRICATED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
2. ALL WIRE FENCE COMPONENTS ARE TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
3. ALL WIRE FENCE COMPONENTS ARE TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
4. ALL WIRE FENCE COMPONENTS ARE TO BE MANUFACTURED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) FOR WIRE FENCE.
DOUBLE SWING GATE

SINGLE SWING GATE

NOTE: 8.5 mm ADJUSTABLE TRUSS RODS SHALL BE INSTALLED ON ALL GATES OVER 1.8 m IN WIDTH
(SEE DETAIL B SHEET R-513 FOR TRUSS TIGHTENER DETAIL.)

FRAME CONSTRUCTION GATES
THRU 3.7 m OPENING

TRUSS RODS
FRAME CONSTRUCTION GATES
OVER 3.7 m TO 9.7 m OPENING

TURNBUCKLE OR TRUSS TIGHTENER

A Lock Keeper

GENERAL NOTES:
1. Dimension and notes listed above are minimums. Larger gates may be used on approval of Engineer.
2. 40 x 60 type 1 post if required can be used in place of 15 mm OD ROUND GATE POST.
3. Concrete shall be class A or M.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
FENCE DETAILS
SWING GATES FOR UP TO 1.83 m
HEIGHT CHAIN LINK US FENCE
**BILL OF MATERIALS**

**REINFORCING**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Size</th>
<th>Qty</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P.C.C. Impact Buffer Block</td>
<td>-</td>
<td>300s</td>
<td>64.4 x 100 x 2855 Steel</td>
</tr>
<tr>
<td>2</td>
<td>No.13 Bars</td>
<td>-</td>
<td>660a</td>
<td>for 3.6 m Cattle Guards</td>
</tr>
<tr>
<td>3</td>
<td>No.13 Bars</td>
<td>-</td>
<td>600a</td>
<td>for 3.6 m, 4.9 m, 6.1 m Cattle Guards</td>
</tr>
<tr>
<td>4</td>
<td>22 mm x 300 mm Galvanized Anchor Bolts w/ Nut &amp; Washer</td>
<td>-</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

**STRUCTURAL STEEL**

**GENERAL NOTES:**

1. All concrete is to be class A or B.
2. Where shown, bolted connections shall be constructed using bolts and washers as shown on the drawings.
3. Where shown, grout shall be placed within the specified dimensions.
4. All rebar shall be placed within the specified dimensions.
5. All steel shall be painted white per standard specifications.

**TYPICAL CONNECTION**

<table>
<thead>
<tr>
<th>Section A-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 No.13x2m</td>
</tr>
<tr>
<td>2 No.13x1m</td>
</tr>
<tr>
<td>2 No.13x1m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section B-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 No.13 Bars #180 Ctr.</td>
</tr>
<tr>
<td>1 No.13 Bars #450 Ctr.</td>
</tr>
</tbody>
</table>

**ELEVATION**

- 3.6 m to 6.1 m Cattle Guard
- 4.3 m Cattle Guard
- 3.6 m, 4.9 m, 6.1 m Cattle Guards
- 3.6 m to 6.0 m Roadbed

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**STEEL CATTLE GUARD**

3.6 m TO 6.0 m ROADBED
TYPICAL CATTLE GUARD INSTALLATION ON CROWNED ROADWAYS

NOTES:
- ALL CATTLE GUARD INSTALLATIONS ON CROWNED ROADWAYS SHALL BE INSTALLED USING AN EVEN NUMBER OF UNITS AS SHOWN ABOVE, AND AS INDICATED IN THE TABLE BELOW.

- METHOD OF PATCHING AT PRECAST CATTLE GUARDS

- LIMITS OF EXCAVATION & GRANULAR RACKFILL

- 100 mm Plantable Ballast Surface

- Precast Cattle Guard

- Excav Surface

- 150 mm (Typ)

- 450 mm (Typ)

ALTERNATE ARMOR DETAIL

NOTE: The above alternate armor detail may be substituted for the 50 mm x 50 mm x 6 mm armor angles at the contractor's option.

MATERIAL LIST FOR WINDS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REQ'D</th>
<th>SIZE (mm)</th>
<th>LENGTH (mm)</th>
<th>MASS (kg)</th>
</tr>
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<td>44 x 4.8</td>
<td>580</td>
<td>2</td>
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<td>800</td>
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<tr>
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<td>44 x 4.8</td>
<td>725</td>
<td>4</td>
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<td>BRACES</td>
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<td>50 x 50 x 3.5</td>
<td>400</td>
<td>5</td>
</tr>
<tr>
<td>BRACES</td>
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<td>50 x 50 x 3.5</td>
<td>375</td>
<td>6</td>
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<td>BRACES</td>
<td>3</td>
<td>50 x 50 x 3.5</td>
<td>100</td>
<td>6</td>
</tr>
<tr>
<td>END BARRIER</td>
<td>4</td>
<td>50 x 50 x 3.5</td>
<td>1000</td>
<td>9</td>
</tr>
<tr>
<td>BARRIER PLATES</td>
<td>2</td>
<td>64 x 64 x 6</td>
<td>125</td>
<td>9.5</td>
</tr>
<tr>
<td>BARRIER ANGLES</td>
<td>4</td>
<td>54 x 64 x 6</td>
<td>255</td>
<td>6</td>
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<tr>
<td>UPRIGHT POSTS</td>
<td>2</td>
<td>75 x 75 x 4.8</td>
<td>2135</td>
<td>44</td>
</tr>
</tbody>
</table>

HARDWARE

<table>
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<tr>
<th>LOCATION</th>
<th>ITEM</th>
<th>REQ'D</th>
<th>SIZE (mm)</th>
<th>LENGTH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WINDS</td>
<td>BOLTS</td>
<td>6</td>
<td>13</td>
<td>200</td>
</tr>
<tr>
<td>WINDS</td>
<td>WASHERS</td>
<td>.36</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>WINDS</td>
<td>NUTS</td>
<td>.19</td>
<td>10</td>
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</tr>
<tr>
<td>PED UNIT CONNECTION</td>
<td>BOLTS</td>
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<td>20</td>
<td>9</td>
</tr>
<tr>
<td>PED UNIT CONNECTION</td>
<td>WASHERS</td>
<td>.36</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>PED UNIT CONNECTION</td>
<td>NUTS</td>
<td>.2</td>
<td>20</td>
<td>9</td>
</tr>
</tbody>
</table>
TANGENT END TREATMENT

FLARED END TREATMENT

TYPICAL GUARDRAIL INSTALLATION

GENERAL NOTES:
1. FOR DETAILS AND DIMENSIONS NOT SHOWN, SEE SHEETS R-8.4.1 TO R-8.4.3.
2. SEE SHEET R-8.4.2 FOR SPECIAL GUARDRAIL TERMINAL END FOR RAILROAD CROSSING.
3. SEE SHEET R-8.4.2 FOR TRAILING END ANCHOR FOR ONE-WAY ROADS.
4. GUARDRAIL INSTALLATION:
   - GUARDRAIL-BRIDGE CONNECTOR: 4.35 m
   - NESTED BEAM SECTION: 3.61 m
   - TRANSITION PANEL: 1.60 m
   - APPROVED GUARDRAIL TERMINAL: 11.43 m
5. ANY OTHER VARIATION THAT REDUCES THE MINIMUM LENGTH SHALL REQUIRE APPROVAL OF THE CHEF ROAD DESIGN ENGINEER.
6. THE LENGTH OF THE TRANSITION PANEL, 1.60 m, SHALL BE ADDED TO THE ESTIMATED LENGTH OF THE THRESH BEAM GUARDRAIL. SEE SHEET R-8.4.1.
7. FOR GRADING DETAILS NOT SHOWN, SEE R-8.2.1.
8. ON RETROFIT INSTALLATIONS, IF WIND IS NOT SHOWN ON MANUFACTURER’S DRAWINGS, THE DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS LESS THAN 0.6 M, THE POST SHALL BE LENGTHENED 0.3 M MIN.
9. WHEN GUARDRAIL IS PLACED AT NORMAL EDGE OF PAVEMENT, THE TANGENT END TREATMENT SHALL BE FLARED 600 mm TAPER TO GIVE HEAD PRECIP CLEAR OF EDGE OF PAVEMENT.
10. APPROACH GUARDRAIL TERMINALS SHALL BE "NO-RIP 350", FTWA, AND NEVADA 30" APPROVED.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
TYPICAL GUARDRAIL INSTALLATION

SIGNED ORIGINAL ON FILE
METRIC INDOT
TYPICAL GUARDRAIL INSTALLATION
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED
GUARDRAIL TERMINALS

**METHOD A**
GUARDRAIL TERMINAL (TANGENTIAL)

**METHOD B**
Terminal at 1:50 Straight Taper
GUARDRAIL TERMINAL (TANGENTIAL)

**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. "Y" is to the center of post, excluding Posts 1 and 2. Use Table 1 for breakaway posts with blocks, excluding Posts 1 and 2.

**TABLE 1 SECTIONS**

<table>
<thead>
<tr>
<th>Terminal Ends</th>
<th>W (Flare)</th>
<th>X (Widening)</th>
<th>Y (Sway)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method A</td>
<td>390 mm</td>
<td>2.22 m</td>
<td>0.6 m</td>
</tr>
<tr>
<td>Method B</td>
<td>390 mm</td>
<td>1.61 m to 1.76 m</td>
<td>0 to 0.2 m</td>
</tr>
<tr>
<td>Method C</td>
<td>390 mm to 845 mm</td>
<td>2.22 m to 2.87 m</td>
<td>0.8 m</td>
</tr>
<tr>
<td>Method D</td>
<td>390 mm to 1200 mm</td>
<td>2.22 m to 3.03 m</td>
<td>0.6 m</td>
</tr>
</tbody>
</table>

**LEGEND:**
- Paved Areas

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
GUARDRAIL TERMINALS
GRADING PLAN

Signature: On File
Date: 6-21-16
Note: Metric/English System Notes
PL 13 mm x 130 mm x 130 mm Center
34 mm Dia. Hole For Rod
32 mm Dia. Galv. Rod
No. 25 Bars

OPTIONAL ANCHOR ROD END DETAILS
(Single Anchors Only)

CABLE CLIP INSTALLATION

"U" Bolts of Clip on Short End of Cable
"U" Bolts Tightened To 50 FT-LBS Torque

ELEVATION
DETAIL "A"

2-No. 25 Bar As Shown

4-A305525 Bars Eq.Spa

GENERAL NOTES:
1. Anchor cable to be parallel to guard rail for straight runs of rail. Anchor cable may have angle point at anchor plate if guard rail is curved.
2. Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
3. Cable clip connection (DETAIL A) or clevis and bolt connection (DETAIL B) to be used with steel post guard railing installation. For steel post guard railing installations, clevis and bolt connection (DETAIL B) is to be used. Other alternatives for attaching cable to anchor rod must be approved by the engineer.
4. For trailing end anchor concept, refer to Elevation view shown on Standard Drawing R-6.1.2 and R-6.3.1.
5. Concrete shall be Class A or AA.
6. The trailing end anchor shall be installed outside the clear zone for opposing traffic.
7. Cable shall be restrained from moving during tightening.
W-BEAM INSTALLATION

GENERAL NOTES:

1. USE OF THIS DETAIL REQUIRES CHIEF ROADWAY DESIGN ENGINEER APPROVAL.

2. TO BE USED ONLY WITH SPECIAL GUARDRAIL INSTALLATION. SEE STANDARD PLAN SHEET R-8.1.3.

3. OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT A MINIMUM OF 136 Nm.

4. TOENAIL PLATE AT CORNERS WITH 120 NAILS.

5. SEE STANDARD PLAN SHEET R-8.1.3 FOR DETAILS NOT SHOWN.

THREE BEAM INSTALLATION

ANCHOR TERMINAL PAY LIMIT

ANCHOR RAIL WASHER (45 x 75) (4.27 mm THICKNESS)

END SECTION (SEE NOTE 1)

STANDARD 50 mm O.D. PIPE SLEEVE (60 mm OD)

BEARING PLATE 125 x 225 x 1.6 STEEL PLATE WITH 25 mm DIAM. HOLE (SEE NOTE 3)

THREE 25 mm NUTS AND WASHERS (SEE NOTE 2)

ANCHOR POST ASSEMBLY

SECTION B-B

ANCHOR TERMINAL

ANCHOR CABLE

25 mm x 180 mm Stud-threaded full length (TYP)

ANCHOR PLATE - ELEVATION

SPICE BOLT 25 mm x 30 mm

END SECTION

THREE BEAM GUARDRAIL

ANCHOR TERMINAL PAY LIMIT

ANCHOR RAIL WASHER (45 x 75) 4.72 mm THICKNESS

END SECTION (THREE BEAM) (SEE NOTE 1)

STANDARD 50 mm O.D. PIPE SLEEVE (60 mm OD)

BEARING PLATE 225 x 225 x 1.6 STEEL PLATE WITH 25 mm DIAM. HOLE

SPICE BOLT 25 mm x 30 mm

END SECTION

METRIC NDOT

DEPARTMENT OF TRANSPORTATION

STATE OF NEVADA

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

PROJECT NO. 2012-1-003

SIGNED ORIGINAL DATE

ADOPTED: SEPTEMBER 2013

AUTH: JSP
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 corrugation guardrail see Standard Plan Drawing R-8.4.1.
5. If guardrail system is not satisfactory, use concrete barrier rail. Check for vehicle rollover (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-8.4.1. Any 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 H.4.1 FOR DETAILS ON GALVANIZED GUARDRAIL (TRIPLE CORRUGATION) NOT SHOWN.

3. GUARDRAIL LENGTHS OF NEED SHALL BE BASED ON DESIGN YEAR TRAFFIC VOLUMES SEE CURRENT EDITION OF THE AMERICAN HIGHWAY DESIGN GUIDE FOR DETAILS.

4. CHECK FEASIBILITY OF REMOVING OBSTACLE OR EXTENDING GUARDRAIL OUTSIDE CLEAR ZONE VERSUS COST OF GUARDRAIL.

5. IF THE GUARDRAIL SPACE OCCURS ON THE POSTS WHICH ARE ADJACENT TO THE MODIFIED POST THEN THREE GUARDRAIL POSTS ARE REQUIRED WITH THE MIDDLE SECTION BEING CENTERED AT THE LOCATION OF THE MODIFIED POST.

NESTED BEAMS
SECTION "A-A"

ELEVATION
TYPE 2
(2 Posts Modified)

ELEVATION
TYPE 1
(1 Post Modified)
SECTION A-A
STEEL POST BOLT OUT HARDWARE AND WOOD BLOCK DETAIL

16 mm x 250 mm button head bolts, no washers on bolt heads, washer threaded end of bolts. See Note 3.

NOTCHED WOOD BLOCK FOR STEEL POST

GENERAL NOTES:
1. WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN 0.5 m THE POST SHALL BE LENGTHENED 0.3 m MIN.
2. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE CONFORMED BY FINAL SURFACING ELEVATIONS. HEIGHT MEASURED AT FACE OF RAIL ELEMENT.
3. ATTACH GUARDRAIL TO WOOD BLOCK AND STEEL POST WITH TWO BOLTS ON APPROXIMATE CENTRIC LINE OF BLOCK AND POST WEB.
4. TOP OF GUARDRAIL TO BE 800 mm ABOVE GROUND LINE OR SHOULDER SURFACING.
5. FOR DETAILS OF THE CROSS SECTION OF THREE BEAM RAIL ELEMENT, RAIL SPICE, TRANSITION SECTION, AND BACKPLATE SEE STANDARD PLAN SHEET R-8.4.8.
6. ALL HARDWARE TO BE GALVANIZED.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GALVANIZED GUARDRAIL
(TRIPLE CORRUGATION)
STEEL POST/WOOD BLOCK

150 mm x 200 mm x 560 mm
NOTCHED WOOD BLOCK

STEEL POST

TYPICAL GUARDRAIL INSTALLATIONS
GENERAL NOTES:
1. Wood spacer blocks (all the proper dimensions) may be substituted for the detailed steel blocks.
2. NPS = Nominal Pipe Size Designator. See ASTM A53.

LEGEND:
* Uses some bolt hole pattern as DETAIL "C".
** 28 mm Dia. core drilled holes for 22 mm Dia. galvanized high strength hex bolts & nuts with 75 mm x 6.4 mm square galvanized steel washer with 25 mm Dia. hole.

SECTION A-A
SECTION B-B
SECTION C-C

DETAL "A"

SPACER BLOCKS 2 AND 3 DETAIL

DETAL "B"

Method of Tapering Barrier Rail
For Guardrail Connections

GUARDRAIL-BRIDGE RAIL CONNECTION (TRIPLE CORRUGATION)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

Signed Original On File

2/3/93

A.D. 120

A. D. 2000

A. D. 2000
GENERAL NOTES:
1. Wood spacer blocks (of the proper dimensional) may be substituted for the detailed steel blocks.
2. NPS - Nominal Pipe Size designator. See ASTM A 53.

LEGEND:
- Uses some bolt hole pattern as DETAIL "C" (22 mm. drilled holes for 16 mm. button head bolts with hex nuts and flat plate washers)
- 28 mm Dia. core drilled holes for 22 mm. Dia. galvanized high strength hex bolts & nuts with 75 mm x 6.4 mm square galvanized steel washer with 35 mm Dia. hole.
- Dense Graded or Profile Grade

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
GUARDRAIL-BARRIER RAIL CONNECTION
(TRIPLE CORRUGATION)

SIGNED ORIGINAL ON FILE
12-8-05
ADOPTED DATE 12-8-05

DRAWN: J. M. HERING
CHECKED: WARD B. CUTS

SCALE: 1" = 10 FEET
GENERAL NOTES:

1. Concrete shall be Class A or A4.
2. Reinforcing Steel: Use 4 No. 13 bars continuous in Type A and Type D. Concrete Barrier Rail. Use 3 No. 13 bars continuous in Type B and Type C. Concrete Barrier Rail.
3. 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.
4. Bituminous paving materials: the barrier end anchors shall be made of the first and last 3.0 m of the barrier rail run. The concrete barrier shall be clean prior to placement of the barrier rail. At the contractor's option, concrete pavement and barrier rail may be placed monolithically, in which case dowels may be eliminated. See barrier rail and anchor details.
5. Concrete paving materials: dowels shall be required in the first and last 3.0 m of the barrier rail run. The surface of the concrete shall be cleaned prior to placement of the barrier rail. At the contractor's option, concrete pavement and barrier rail may be placed monolithically, in which case dowels may be eliminated. See concrete section for dowels in barrier rail and anchor.
6. Vertical joint shall have a single component hot applied sealant 25 mm thick.
7. The height of the barrier rail shall be measured from the top of the jointline bituminous surface or the top of concrete pavement.
8. For details not shown, see Type A.
9. For details not shown, see Type C.
10. B = 2/19 x m + 306
11. See contract plans for exact dimensions.
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 SCORED JOINT LOCATIONS.
4. ALL JOINTS AND OTHER LOCATIONS NEEDING SEALING SHALL FOLLOW REQUIREMENT SET IN DRAWING R-8.6.1.
5. FOR IMPACT ATTENUATION ATTACHMENT DETAILS, SEE MANUFACTURES 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. LENGTH IN MINIMUM OR LENGTH OF OBSTRUCTION, WHICHER IS GREATER. 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 NEEDED FOR FOUNDATION STABILITY. WHEN BARRIER RAIL SITS ON PAVEMENT, THE BASE CAN BE ELIMINATED. BARRIER RAIL END ANCHORS SHALL BE REQUIRED. SEE DRAWING R-8.6.4.
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 = 2/19 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 PAVEMENT SURFACE OR 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 15 mm HOLES IN CONTACT FACE OF EXISTING RAIL TO A MINIMUM DEPTH OF 300 mm AND INCLINED 5 DEGREES FROM THE HORIZONTAL. SECURE #13 REINFORCING BARS IN THE DRILLED HOLES WITH AN EPOXY COMPLYING TO SECTION 729 OF THE STANDARD SPECIFICATIONS.

5. PLACE STRAIGHT AND/OR BENT #13 REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED. SPLICED REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED (MINIMUM 300 mm LAP LENGTH).

6. FOR DETAILS NOT SHOWN, SEE R-8.61 TO R-8.62.
**TABLE A**

- **6.0 m TRAILING END LENGTH WITH B - 762 mm EQUAL SPACES**
- **24.38 m APPROACH END LENGTH WITH B - 3.0 m EQUAL SPACES**

**GENERAL NOTES:**

1. Use only when specific criteria are met. The criteria factors are the clear zones, direction of traffic, pointed distances, and speed zones. Approach and trailing end criteria are treated separately.

**APPROACH END CRITERIA:**

- Requires 40% roadway design engineer approval. May not be used for approach ends with outside clear zones or speeds less than or equal to 60 km/h.

**TRAILING END CRITERIA:**

- May be used for trailing end for all points with the same clear zones, same on-ramps, off-ramps, and divided highways.

2. Concrete shall be Class A or A2. Transverse joints with 35 mm reveal expansion joint filler or 25 mm open transverse joints shall be placed at structures. Joints in barrier rail over a structure shall be at the same location and of the same dimension as those in the structure.

3. 156 mm deep barrier end anchor shall be constructed in the first and last 3.0 m of the full height barrier rail. If transverse joints are used, the anchor shall be extended under the transition section.

4. Vertical joints shall have a single component hot applied sealant full depth of joint.

5. Joint sealant shall be a single component hot applied sealant 25 mm thick.

6. The height of the barrier rail shall be measured from the top of the surface grade (except horizontal surfaces if the top of the finish grade P.C.C. P.1).

7. Joint filler shall be placed in open joints in the barrier as required to match joints in the approach end detail.

8. Dowels and reinforcing steel to extend into end sections. Adjust locations and terminate bars as necessary to maintain 50 mm minimum cover.

9. For details not shown, refer to standard plan R-8.6.1.

**LEGEND:**

- 150 x 150 x 600 mm steel dowel
- 0.6 m centers (if needed see note 3)
GENERAL NOTES:

1. Straight holes 40 mm diameter of the depth shown may be used in lieu of the tapered holes.

2. Reain capsule-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 B-8 box nails may be substituted for screws. The nails shall be clinched on the work area side of the screen where traffic will only be on one side of the temporary railing.

5. B-8 mm u-bolts may be substituted for 6 mm diameter bolts.

6. Openings in the screen area of 1 m shall be provided at 60 m intervals.

7. NPS = Nominal Pipe Size.
GENERAL NOTES:

1. Use of these details requires Chief Road Design Engineer approval. Minimum requirements for use in median - median must be at least 7.2 m wide and graded smooth with 1% or flatter slopes.

2. Cable shall be 19 mm Dia. wire rope and shall conform to AASHTO M39, Type I, Class A coating. Posts shall meet the requirements of AASHTO M270 Grade 250 and shall be galvanized in accordance with AASHTO M11.

3. When barrier is in median, install 2 yellow reflectors every fifth post on both sides of post facing traffic. When barrier is on the right side of traffic install a white reflector every sixth post on traffic side only.

4. Stagger Spring Cable End Assemblies for allowance between units.

5. See Setting Temperature/Spring Compression Table and reference Special Provisions for additional tensioning requirements.

6. Post tensioning on a tangent shall be 3.6 m min. to 4.8 m Max. Post tensioning on a curve shall be as follows:

<table>
<thead>
<tr>
<th>Curve Radius</th>
<th>Span</th>
</tr>
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<tbody>
<tr>
<td>214 m or more</td>
<td>4.8 m</td>
</tr>
<tr>
<td>67 m to 213 m</td>
<td>3.6 m</td>
</tr>
<tr>
<td>33 m to 66 m</td>
<td>1.8 m</td>
</tr>
<tr>
<td>Less than 33 m</td>
<td>Use Not Recommended</td>
</tr>
</tbody>
</table>

7. Distance from tangent of barrier run to notch for top cable on roadway shall be 1.2 m.

8. Where the cable is connected to a socket or a wedge type connector, one wire of the cable shall be gripped over the base of the wedge to hold it firmly in place during tensioning.

9. All holes shall be 2 mm larger than the bolt diameter unless otherwise noted.

10. Concrete shall be Class A or A9 with 4000 psi. Place concrete terminal and backfill at least 2 weeks prior to tensioning the cables. The bottom of the terminal shall have full and even bearing on the surface under it.

11. Welding per AWS D1.1, Reconditioning steel: A615M Grade 420 and A706M Grade 420 as noted.

12. Payment will be made under CABLE BARRIER Lin. Meter.

ELEVATION

<table>
<thead>
<tr>
<th>Setting Temperature / Spring Compression Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree C</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>43 to 50</td>
</tr>
<tr>
<td>38 to 42</td>
</tr>
<tr>
<td>32 to 37</td>
</tr>
<tr>
<td>27 to 31</td>
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<tr>
<td>21 to 25</td>
</tr>
<tr>
<td>15 to 20</td>
</tr>
<tr>
<td>10 to 15</td>
</tr>
</tbody>
</table>

CABLE BARRIER
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
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 "REFLECTOR 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.A.T.C.D., 1988 EDITION AND REVISIONS THERETO.

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 (in Meters)</th>
<th>Reflector Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 15</td>
<td>6 m</td>
</tr>
<tr>
<td>45</td>
<td>9 m</td>
</tr>
<tr>
<td>60</td>
<td>11 m</td>
</tr>
<tr>
<td>75</td>
<td>12 m</td>
</tr>
<tr>
<td>≥ 90</td>
<td>15 m</td>
</tr>
</tbody>
</table>

TYPICAL GUARDRAIL-GUIDE POST INSTALLATION

GUARDRAIL-GUIDE POST LOCATION
GENERAL NOTES:

1. CONCRETE SHALL BE CLASS A OR AA.
2. MONUMENTS MAY BE Poured SQUARE OR ROUND.
3. MONUMENT STAMPING SHALL BE DONE ACCORDING TO LOCATION DIVISION’S “SPECIAL INSTRUCTIONS FOR SURVEY OR MAPPING CONSULTANTS” MANUAL.

SURVEY COVER & RING
(CAST IRON)

SURVEY MONUMENTS

ALTERNATE PLACEMENT
(CAST IRON)
ALL MEASUREMENT 12 mm TOLERANCE

TRANSVERSE WEAKENED PLANE JOINT DOUBLE SAW CUT

SECTION B-B
TRANSVERSE WEAKENED PLANE JOINT

GENERAL NOTES:
1. ALL TRANSVERSE PLANE JOINTS SHALL BE SAWS AT 90° EXCEPT AS INDICATED IN THE STRUCTURE APPROACH DETAILS. WHEN ONLY ONE LANE IS BEING CONSTRUCTED ALONGSIDE EXISTING LANES, JOINTS SHALL BE SAWS AS DIRECTED BY THE ENGINEER.
2. SPACING OF WEAKENED PLANE JOINTS SHALL BE 4.5 m APART EXCEPT AT REINFORCED STRUCTURE APPROACHES.
3. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE AT LEAST 1.8 m FROM ANY CONTACT JOINT.
4. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE CUT AT ALL LANE AND SHOULDER LINES EXCEPT WHERE LANE PLUS ADJACENT SHOULDER WIDTH IS LESS THAN 4.8 m.
5. ALL TRANSVERSE CONTACT JOINTS SHALL BE SAWED AND JOINT SEALER USED WHERE REQUIRED.
6. ALL TIE BARS TO BE EPOXY COATED EXCEPT IN CLARK COUNTY, TIE BARS TO BE PLACED IN MIDDLE 1/3 OF SLAB THICKNESS. TIE BARS SHALL NOT BE PLACED WITHIN 300 mm OF DOVETAIL BARS.
7. TRANSVERSE CONTACT JOINTS WITH DOVETAIL BARS SHALL BE USED AT ALL CONSTRUCTION JOINTS AND (E) POINTS WHERE REQUIRED.
8. PAVEMENT END ANCHORS SHALL BE CONSTRUCTED AS THE TERMINAL PANELS OF ALL CONSTRUCTION JOINTS AND (E) POINTS, WITH OR WITHOUT A TRANSVERSE AND DEPTH OF 300 mm.
9. INITIAL 3 mm WEAKENED PLANE JOINT SAW CUT TO BE DONE WITHIN SPECIFIED TIME LIMITS.
10. RATIO OF DEPTH TO WIDTH OF JOINT SEALANT SHALL BE 1:1.
11. DOVETAIL BARS SHALL BE LOCATED WITHIN 25 mm OF THE PLANNED TRANSVERSE AND DEPTH LOCATION AND WITHIN 50 mm OF THE PLANNED TRANVERSE LOCATION.
12. DOVETAIL BARS SHALL BE PARALLEL TO THE PAVEMENT SURFACE AND CENTERLINE WITHIN A TOLERANCE OF 13 mm in 4.5 m.
13. DOVETAIL BARS SHALL NOT BE PLACED WITHIN 300 mm OF TRANSVERSE JOINTS.
14. C = SLAB THICKNESS

PAVEMENT END ANCHOR DETAIL

See Note B

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METRIC NDOT

DOWELED CONCRETE PAVEMENT DETAILS

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

Signed Original On File

SIGNED:

IN CHARGE:

DRAWN:

CHECKED:

DATE:

CIPAL CODE

NOTE:
WEAKENED PLANE JOINTS LOCATION
(DOWELED PAVEMENT ONLY)
(Rumble strips shall not be used in urban areas)
For details not shown See Standard Plan Drawing R-10.1.2

GENERAL NOTES:
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.

WEAKENED PLANE JOINTS LOCATION
(Rumble strips shall not be used in urban areas)
For details not shown See Standard Plan Drawing R-10.1.1
GENERAL NOTES:

1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE 1.2 m 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-10.15.

6. CONCRETE PAVEMENTS, DUE TO TRANSVERSE JOINS, RUMBLE STRIPS WILL REQUIRE A SPECIAL DETAIL.

LEGEND:

- PLANTMIX BITUMINOUS SURFACE

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 on 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 rural non-freeway highways, see standard plan sheet R-10.1.4.

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

**DIVIDED HIGHWAY LAYOUT**
- Shoulder width
- Travelled way
- Shoulder width

**TYPICAL RUMBLE STRIP PLACEMENT**
- Entrance and exit ramps
- No rumble strips
MAILBOX TURNOUT

**TABLE 1**

<table>
<thead>
<tr>
<th>HIGHWAY TYPE AND TRAFFIC CONDITIONS</th>
<th>WIDTH X1 OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDERS AT MAILBOX</th>
<th>DISTANCE X1 SIDEWALK FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURNOUT OR USEFUL SHOULDER</th>
<th>DEPTH BASE AGREGGATE</th>
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<tr>
<td>RURAL HIGHWAY</td>
<td>PREferred MINIMUM (m)</td>
<td>MINIMUM (m)</td>
<td>MINIMUM (m)</td>
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<td>ADT = OVER 10000 vpd</td>
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<td>200 TO 500</td>
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<td>200 TO 300</td>
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<td>ADT = 100 TO 1500 vpd</td>
<td>2.4</td>
<td>2.4</td>
<td>200 TO 300</td>
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<tr>
<td>RURAL ROAD</td>
<td>UNDER 100 vpd</td>
<td>2.4</td>
<td>200 TO 300</td>
</tr>
<tr>
<td>RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER</td>
<td>2.4</td>
<td>2.4</td>
<td>200 TO 300</td>
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<tr>
<td>RESIDENTIAL STREET CURBED</td>
<td>N/A</td>
<td>N/A</td>
<td>200 TO 300</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**

1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHTO "A GUIDE FOR CREATING MAILBOXES ON HIGHWAYS," 1994 EDITION.
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. MAILBOX SPACING AND VARIABLE LENGTH SEE SHEETS R-12.1.2 AND R-12.1.3
5. TURNOUT QUANTITIES IN PLAN SUMMARY SHEETS.
6. MILLED MATERIAL MAY BE USED IN LIEU OF AGGREGATE BASE.

**MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS**

**MAILBOX TURNOUTS**

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

SIGNED ORIGINAL ON FILE

[Signature]

[Date]

[Hello Road Design Name]

[Phone Number]
SINGLE AND DOUBLE MAILBOX ASSEMBLIES

TYPE A - WOODEN POST OR PIPE POST

8 mm x 11 mm Long Hex Bolt, 2 Washers, 1 Lockwasher, 1 Nut

GENERAL NOTES:
1. H = 1050 mm Min., 1200 mm Max.
2. NPS - Nominal Pipe Size Designator, See ASTM A53.
3. See Structure List For Wallbox Type.
4. Refer To Standard Plan Sheet R-12.31 Table 1 For Suggested Guidelines For Lateral Placement Of Mailboxes.

SINGLE AND DOUBLE MAILBOX ASSEMBLIES

TYPE B - METAL POSTS

8 mm x 56 mm Long Hex Bolt, 2 Washers, 1 Lockwasher, 1 Nut

8 mm x 56 mm Flanged Channel

2 kg/m Steel

8 mm x 18 mm Long Hex Bolt, 2 Washers, 1 Lockwasher, 1 Nut

6 mm x 18 mm Long Slotted Hd-4d Bolt (Slave Bolt) 2 Washers, 1 Lockwasher, 1 Nut

10 mm x 35 mm 4-SLOT

4 mm x 27 mm 10-5.0T

50 mm O.D.

40 mm O.D.

10 mm OD 3-SLOT

13 mm O.D.

6 mm O.D.

NOMINAL 13 mm PVC W.Pipe

POST MOUNTING ANGLE

FOR MOUNTING MAILBOARDS TO POST

(3 BOXES PER POST)
GENERAL NOTES:

1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHTO "A GUIDE FOR ERECTING MAIL BOXES ON HIGHWAYS", 1934 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 TRAFFIC LANE SHALL BE SET BY THE UNITED STATES POSTAL SERVICE.

4. 75 mm x 200 mm WHITE REFLECTORIZED SHEETING SHALL BE PLACED FACING ROADWAY ON ALL MAILBOX SUPPORT STRUCTURES.

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

6. HEAVY GAUGE STEEL MAILBOXES (3kg) ARE NOT ALLOWED ON HIGH-SPEED HIGHWAYS.
<table>
<thead>
<tr>
<th>NEW</th>
<th>EXISTING</th>
<th>DESCRIPTION</th>
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</tr>
<tr>
<td><img src="image" alt="Underpass Luminare" /></td>
<td><img src="image" alt="Underpass Luminare" /></td>
<td>Underpass Luminare</td>
</tr>
<tr>
<td><img src="image" alt="Traffic Signal Head, 3 Section, 300 mm, Red, Yellow, and Green Sections, Unless Indicated Otherwise" /></td>
<td><img src="image" alt="Traffic Signal Head, 3 Section, 300 mm, Red, Yellow, and Green Sections, Unless Indicated Otherwise" /></td>
<td>Traffic Signal Head, 3 Section, 300 mm, Red, Yellow, and Green Sections, Unless Indicated Otherwise</td>
</tr>
<tr>
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<td>Traffic Signal Head With Bock Plate</td>
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<tr>
<td><img src="image" alt="Traffic Signal Head with 300 mm Green, Yellow, and Red Arrow Sections, With Bock Plate" /></td>
<td><img src="image" alt="Traffic Signal Head with 300 mm Green, Yellow, and Red Arrow Sections, With Bock Plate" /></td>
<td>Traffic Signal Head with 300 mm Green, Yellow, and Red Arrow Sections, With Bock Plate</td>
</tr>
<tr>
<td><img src="image" alt="Traffic Signal Head With Optical Detector Unit" /></td>
<td><img src="image" alt="Traffic Signal Head With Optical Detector Unit" /></td>
<td>Traffic Signal Head With Optical Detector Unit</td>
</tr>
<tr>
<td><img src="image" alt="M-5 (Cluster Type Head) 300 mm Green, Yellow And Red Lamps with 300 mm Green And Yellow Arrows" /></td>
<td><img src="image" alt="M-5 (Cluster Type Head) 300 mm Green, Yellow And Red Lamps with 300 mm Green And Yellow Arrows" /></td>
<td>M-5 (Cluster Type Head) 300 mm Green, Yellow And Red Lamps with 300 mm Green And Yellow Arrows</td>
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<tr>
<td><img src="image" alt="Internally Illuminated Sign" /></td>
<td><img src="image" alt="Internally Illuminated Sign" /></td>
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<tr>
<td><img src="image" alt="Pedestrian Signal" /></td>
<td><img src="image" alt="Pedestrian Signal" /></td>
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</table>

<table>
<thead>
<tr>
<th>NEW</th>
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<tr>
<td><img src="image" alt="Flashing Signal/Flashers (&quot;R&quot; Indicates Red Lens)" /></td>
<td><img src="image" alt="Flashing Signal/Flashers (&quot;R&quot; Indicates Red Lens)" /></td>
<td>Flashing Signal/Flashers (&quot;R&quot; Indicates Red Lens)</td>
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<tr>
<td><img src="image" alt="Flashing Signal/Flashers (&quot;Y&quot; Indicates Yellow Lens)" /></td>
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<td>Flashing Signal/Flashers (&quot;Y&quot; Indicates Yellow Lens)</td>
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<td><img src="image" alt="Pull Box" /></td>
<td><img src="image" alt="Pull Box" /></td>
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<tr>
<td><img src="image" alt="Controller Cabinet" /></td>
<td><img src="image" alt="Controller Cabinet" /></td>
<td>Controller Cabinet</td>
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<td><img src="image" alt="Electrical Cabinet" /></td>
<td><img src="image" alt="Electrical Cabinet" /></td>
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<td><img src="image" alt="Service (120-240 V.A.C. Unless Otherwise Specified)" /></td>
<td><img src="image" alt="Service (120-240 V.A.C. Unless Otherwise Specified)" /></td>
<td>Service (120-240 V.A.C. Unless Otherwise Specified)</td>
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<td><img src="image" alt="Transformer Pad" /></td>
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<td><img src="image" alt="Power Source" /></td>
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<td><img src="image" alt="Consult" /></td>
<td><img src="image" alt="Consult" /></td>
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<td><img src="image" alt="Conduit (Hacked)" /></td>
<td><img src="image" alt="Conduit (Hacked)" /></td>
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<td><img src="image" alt="Junction Box" /></td>
<td><img src="image" alt="Junction Box" /></td>
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<td><img src="image" alt="Wood Power Pole" /></td>
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<td><img src="image" alt="Sign or Light Pole" /></td>
<td><img src="image" alt="Sign or Light Pole" /></td>
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<td><img src="image" alt="Special Junction Cabinet (For Interconnect Cables)" /></td>
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<td><img src="image" alt="Vehicle Detector Inductive Loop Unless Otherwise Indicated" /></td>
<td><img src="image" alt="Vehicle Detector Inductive Loop Unless Otherwise Indicated" /></td>
<td>Vehicle Detector Inductive Loop Unless Otherwise Indicated</td>
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<tr>
<td><img src="image" alt="Quadrupole Detector Loop" /></td>
<td><img src="image" alt="Quadrupole Detector Loop" /></td>
<td>Quadrupole Detector Loop</td>
</tr>
<tr>
<td><img src="image" alt="Video Detection Camera" /></td>
<td><img src="image" alt="Video Detection Camera" /></td>
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<tr>
<td><img src="image" alt="Video Surveillance Camera" /></td>
<td><img src="image" alt="Video Surveillance Camera" /></td>
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<tr>
<td><img src="image" alt="Microwave Antenna" /></td>
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<table>
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<tr>
<th>FEATURE</th>
<th>CODE</th>
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<tr>
<td>Pole Designation</td>
<td>A</td>
<td>Pole Designation</td>
</tr>
<tr>
<td>Note Designation</td>
<td>S</td>
<td>Note Designation</td>
</tr>
<tr>
<td>Conduit Run</td>
<td>△</td>
<td>Conduit Run</td>
</tr>
<tr>
<td>Portable Traffic Signal (Floor/Wall Mounted)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portable Traffic Signal (Wiper Wound)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Signal Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian Push Button</td>
<td>Ø8PPB</td>
<td>Pedestrian Push Button</td>
</tr>
</tbody>
</table>

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**SIGNAL AND LIGHTING SYMBOLS**

All dimensions are in meters unless otherwise noted.

Signed Original On File

[Signature]

Date: [Date]

[Name]

[Position]

[Agency]
**OPTICAL DETECTOR**

**FRONT VIEW SIDE VIEW**

**MOUNTING DETAIL**

**OPTICAL DETECTOR**

**SECTION B-B WITH PIPE**

**DETAIL "F"**

**TYPE 1-A**

**TYPE 1-B**

**SIGNAL STANDARDS**

1. For Pedestrian Push Button and Sign See Sheet T-30-1.3
2. For Foundation Details See Sheet T-30-1.16
3. Mounting Heights of Signal and Pedestrian Heads and Pedestrian Push Button Shown are Applicable to All Conditions on Poles Types 28, 30 & 35.

**TERMINAL COMPARTMENTS**

**POST TOP MOUNTED**

**SIDE BRACKET MOUNTED**
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 bedding.
8. 2 conduit diameters min.
9. Saw cut as directed by engineer.
**VIHICULAR SIGNALS AND MOUNTINGS**

200mm on post mounting
140mm on mast arm

**Cutout and backplate**

50 mm R. Typ.

**Mounting brackets (Typ.)**
- All signal heads and attach backplates with 10-20 x 1 Min. size, self-tapping and locking stainless steel machine screws

**REAR VIEW**

NOTE: No background light to show between plate and head. Almost arm backplates shall be louvered.

**BACKPLATE**

T= THICKNESS

See detail for mounting signal head on Standard Plan Drawing T-30.1.16

**M-2 SIDE MOUNT**

**SPECIAL DETAIL FOR MOUNTING SIGNAL HEAD**

- 13 mm T or heavier 3003-H14 aluminum sheet

- 60mm 0.0 Std. pipe tenon

- 10mm Dia. thru hole

**PEDESTRIAN SIGNALS AND MOUNTINGS**

**SIDE MOUNTINGS**

**CLAMSHELL MOUNT**

**PEDESTRIAN SIGNAL INTERNATIONAL SYMBOL**

*To be used unless otherwise specified*

**PEDESTRIAN MOUNTING HARDWARE (CS)**

*To be used only when specified*
Pedestrian push buttons shall be installed on the crosswalk side of the signal pole, with the proper directional arrow positioned correctly.

**TYPE 1** - Position pedestrian push buttons on signal pole when the width of the pole allows (2) pedestrian heads to be of 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**

**NOTE**: 1. Arrow to be left or right or both as required.

2. Porcelain enameled, 230 mm x 300 mm sign, black symbols on white background.

3. NPS = Nominal Pipe Size. Designator. See ASTM A53
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 photoelectric (PE) control for the luminaire or electrical service will operate the internally illuminated sign.

3. The bolt/wire will be, high output, "Valmont No. 6G9394W" or equivalent. Bolts shall be threaded and pointed.

4. Fluorescent lighting will be provided by 2-B-800WA standard lamps. Flourescent sockets will be die-cast 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 a drip loop sufficient enough to allow sign movement. Use watertight rubber grommet or bushing at pole entry.

7. Clamp-on details shall be used for internally illuminated Street Name Sign support arm assembly.

8. Pin bolts shall be A325M with threads excluded from the shear plane. Pin bolt and -19 mm dia pipe shall have 3 mm dia holes for a 3 mm dia galvanized cotter pin. Back clamp plate shall be furnished w/ a 19 mm dia hole for each pin bolt. An 17 mm dia hole for each pin bolt shall be field drilled through the pole after arm orientation has been approved by the Engineer.

INSTALLATION METHOD 1

INSTALLATION METHOD 2
SCHOOL ZONEFLASHER

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

600 mm X 1200 mm Standard
Highway Sign No. S5-1.

NPS 3 round metal
sign post
(4 m shaft length)

Multi-directional slip base,
See Standard Plan Drawing
T-31.5.2

Height varies

Concrete footing shall
be Class A or AA

460

No. 3-1/2 pullbox

40 mm PVC Schedule 40

FLASHING WARNING SIGN DETAIL

Locate NWF-1 sign 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 travel lane surface. Locate the
sign horizontally on most arm 7.6 m from pole.
Distance is measured from the middle of the sign to the perimeter of the Type 35 Modified Pole.

LEGEND

Shop drawings shallbe submitted on all Type 30 and Type 35 Modified Poles.
PAVEMENT JOINT CROSSING DETAILS
(NO DIRECT PAYMENT)

GENERAL NOTES:
1. ALL PULL BOXES SHALL BE NO. 5
   SEE SHEET T-30.1.18 FOR DETAILS NOT SHOWN
2. PAYMENT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   CONDUIT - DIAMETER VARIES
   NO. 5 PULL BOX
   1.8 m x 1.8 m DETECTOR LOOPS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

No. 5 PULL BOX &
PAVEMENT JOINT
LOOP CROSSING DETAILS

A A
Conduit Against Side

Concrete or Plantmix
Concrete or Plantmix
Concrete or Plantmix
Concrete or Plantmix

32 mm Sawcut
6 mm Sawcut
32 mm Sawcut
6 mm Sawcut

Loop Wire
Loop Wire
Loop Wire
Loop Wire

19 mm (Min.) Flexible Tubing
19 mm (Min.) Flexible Tubing
19 mm (Min.) Flexible Tubing
19 mm (Min.) Flexible Tubing

SECTION A-A

Conduit-Diameter Varies
Conduit-Diameter Varies
Conduit-Diameter Varies
Conduit-Diameter Varies

A A
Conduit Against Side

Concrete
Concrete
Concrete
Concrete

ELEVATION

PLAN

100
100
100
100

Extension
Drain Backfill Type I
Extension
Drain Backfill Type I

A A
Conduit Against Side

Concrete
Concrete
Concrete
Concrete

NO. 5 PULL BOX

CONDUIT LOCATION (SEE GENERAL NOTES 1 AND 2)
**GENERAL NOTES:**

1. ALL LOOPS SHALL BE 1.6 m x 1.8 m SQUARE WITH 4 TURNS OF WIRE OR 1.6 m ROUND LOOPS WITH 8 TURNS OF WIRE.
2. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 PULL BOX OR SPECIAL W/M CONDUCTOR SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT.
3. LOOP WIRE PAIRS SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT FOR THE ENTIRE RUN.
4. LOOP CUTS SHALL BE TO MINIMUM 1.750-1.900 MM MAXIMUM DEPTH.
5. 50 MM DEXCHER ROD SHALL BE PLACED ON ALL CORNERS OF THE LOOPS AND PLACES IN ALONG THE EDGES OF THE EDGE OF THE PAVEMENT.
6. LOOPS SHALL BE CENTERED IN ALL TRAFFIC AND TURN LANES.
7. LOOP WIRE SHALL BE ANSI/STAE 14 STANDARD (AWG-12).
8. EACH INDIVIDUAL CONDUCTOR SHALL BE A CONTINUOUS RUN WITH NO JOINTS AND SHALL BE LONED AT EACH END WITH THE LANE ASSIGNMENT.
9. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE LOOP PLACEMENT IS NOT IN CONFLICT WITH OTHER ITEMS OF WORK.
10. PRIOR TO PLACEMENT OF LOOP DETECTORS THE RESIDENT ENGINEER SHALL NOTIFY THE TRAFFIC SECTION OF THE PLANNING DIVISION (866-7383) FOR ASSISTANCE IN ESTABLISHING THE EXACT LOCATION.
11. DETECTORS SHALL BE INSTALLED AFTER DENSE GRADE PAVING OR PROFILE GRADE IS ESTABLISHED.
12. LOOP LOCATION SHALL BE MARKED ON THE EDGE OF THE PAVEMENT BY PAINTING THE WORD "LOOP" IN WHITE.
13. FOR DIAGONAL SLOT AT CORNERS DETAIL SEE STANDARD SHEET 1-30-1.4.1 FOR PAYMENT JOIN DETAILS.
14. PAYMENT WILL BE MADE UNDER THE FOLLOWING ITEMS:
   - NO. 5 PULL BOX (EACH)
   - 1.6 m x 1.8 m LOOPS (EACH)
   - 80 mm DIA. CONDUIT (LINE)

**LEGEND:**

- No. 5 Pull Box

**SPEED DETECTOR LOOP PLACEMENT DETAIL**

OPPOSITE LANE LOOPS NOT SHOWN FOR CLARITY!

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**SPEED DETECTOR LOOP CONFIGURATION AND NOTES**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

Signed Origin On File: 6-05-14.5

SILVER STATE TRAFFIC DIVISION:

APPROVED BY: [Signature]

PRINTED BY: [Signature]
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. Posts constructed of 150 mm Standard Pipe (Well Casing) primed and painted yellow, and concrete filled.

TRANSFORMER PAD BARRIER POST

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**Metric**

---

**State of Nevada**

**Department of Transportation**

**Transformer Pad Barrier Post**

---

**Sized Original On File:**

---

**30.1.6.2**

---

**Revised:**

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**All dimensions are in millimeters unless otherwise noted.**

---

**NDOT**

---

**Bi-Directional Flow**

---

**Bi-Directional Flow**
GENERAL NOTES:

1. ISLANDS SHALL BE PLACED ONLY ON SLOPES GREATER THAN 1:10.

2. WHEN USING SAFETY BARRAGES THE TOP OF THE FOUNDATION SHALL BE PLACED 8 INCHES BELOW THE TOP OF THE FOUNDATION ISLAND.

3. CONCRETE SHALL BE CLASS A OR AA.

4. WHERE DETECTOR LOOPS ARE CUT INTO PAVEMENT, 1.5 m square loops may be used in lieu of 1.5 m x 1.5 m square loop detectors.

7.5 m AND SMALLER RADIUS CURVE RETURN
AND MEDIAN LOCATION

>7.5 m AND LARGER RADIUS CURVE RETURN
AND MEDIAN LOCATION

FOUNDATION ISLAND

PLAN

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SIGNAL POLE AND
LOOP DETECTOR
LOCATIONS

FOUNDATION ISLAND

METRIC

NDOT

All dimensions are in meters, unless otherwise noted.
NOTE: TYPE 30 & 35 ARE 6" X 12" PILES SHALL ALSO SUPPORT THE ALTERNATE LOADING SHOWN ABOVE.
**POLE FOUNDATION TABLE**

<table>
<thead>
<tr>
<th>POLE TYPE</th>
<th>MAST ARM LENGTH</th>
<th>&quot;C&quot;</th>
<th>&quot;D&quot;</th>
<th>ANCHOR BOLTS OF EACH</th>
</tr>
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<tbody>
<tr>
<td>1A &amp; 1B</td>
<td>N/A</td>
<td>0.92 m</td>
<td>815 mm</td>
<td>105/150/100</td>
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<tr>
<td>16</td>
<td>ALL</td>
<td>1.52 m</td>
<td>760 mm</td>
<td>105/150/100</td>
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<tr>
<td>28</td>
<td>ALL</td>
<td>3.66 m</td>
<td>915 mm</td>
<td>105/150/100</td>
</tr>
<tr>
<td>30 &amp; 35</td>
<td>0.127 m</td>
<td>3.66 m</td>
<td>915 mm</td>
<td>45/52/55/150</td>
</tr>
<tr>
<td>30A &amp; 35A</td>
<td>0.137 m</td>
<td>3.66 m</td>
<td>915 mm</td>
<td>50/87/75/150</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**

1. All dimensions are minimal.
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 insulating, self fusing rubber tape.
3. Apply 3 layers of half lapped PVC tape.

**CONDUCTOR SPLICING METHODS**
MAST ARM SIGNAL AND SIGN PLACEMENT

"L" AS SHOWN ON PLANS

TYPICAL METHOD OF SIGN ATTACHMENT

2-25 mm x 3.2 mm T Straps
4-10 mm: Cad Plated STL Bolts, Nuts & Fiber Washers
2-13 mm: Cad Plated STL Bolts, Nuts & Fiber Washers

SIGNAL MAST ARM

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED
T = THICKNESS
GENERAL NOTES:
1. SEAM WELD CONSTRUCTION W/ 5 DIA. FILLET WELD OUTSIDE EDGES.
   TACK WELD CONSTRUCTION FOR INNER FRAME AND ANGLE 6 mm x 16 mm x 12.7 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 .8 mm x 16 mm x 200 mm BAR BENEATH FLANGE (TOTAL 2).
4. DO NOT CUT OR WELD TO BRIDGE RAIL REINFORCING STEEL.

INSTALLATION IN SLOPING PARAPETS

SECTION C-C

COVER DETAILS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
BRIDGE / BARRIER RAIL JUNCTION BOX TYPE 1 AND 2
**GENERAL NOTES:**

1. HD should not be less than 1.8 m from the shoulder line.
   If no shoulder, HD should not be less than 3.6 m from the edge of traveled way, in urban areas, a lesser clearance may be used where necessary.

2. For sign paneling details, see T-31.1.4.

3. All sign supports shall be breakaway design.

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

5. Sign island required when h> 4.5 m, or sign slope is steeper than 16.67° when required in contract plans.


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

8. For materials not directly specified, see Standard Specifications, & Special Provisions.

9. Sign panels to be aluminum sheet construction.

10. CC-Corner clearance
    HD-Horizontal clearance
    VC-Vertical clearance

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

<table>
<thead>
<tr>
<th>SIGN AREA (m²)</th>
<th>0.0&lt;2.4</th>
<th>2.4&lt;3.0</th>
<th>3.0&lt;3.6</th>
<th>3.6&lt;4.2</th>
<th>4.2&lt;4.5</th>
<th>4.5&lt;5.0</th>
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</thead>
<tbody>
<tr>
<td>0.6&lt;0.8</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>0.8&lt;1.0</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>1.0&lt;1.2</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>1.2&lt;1.4</td>
<td>A</td>
<td>C</td>
<td>C</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>1.4&lt;1.6</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>D</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td>1.6&lt;1.8</td>
<td>C</td>
<td>C</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td>1.8&lt;2.0</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>2.0&lt;2.2</td>
<td>C</td>
<td>E</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>2.2&lt;2.4</td>
<td>C</td>
<td>E</td>
<td>E</td>
<td>F</td>
<td>F</td>
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<td>E</td>
<td>F</td>
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<td>2.6&lt;2.8</td>
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<td>F</td>
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</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 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.

### POST SELECTION CHART

<table>
<thead>
<tr>
<th>POST TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>64mm. Square Metal Post (2.8 mm)-single post</td>
</tr>
<tr>
<td>B</td>
<td>64mm. Square Metal Post (3.5 mm)-single post</td>
</tr>
<tr>
<td>C</td>
<td>Single Post Unbraced NPS3 Round Metal Post</td>
</tr>
<tr>
<td>D</td>
<td>Double Post Unbraced NPS3 Round Metal Post</td>
</tr>
<tr>
<td>E</td>
<td>Post-NPS3 Round Metal Post Brace-NPS3 Round Metal Post</td>
</tr>
<tr>
<td>F</td>
<td>Special Design contact Traffic Engineering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REFERENCE SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-31.2.1</td>
</tr>
<tr>
<td>T-31.2.2</td>
</tr>
<tr>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
<tr>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
<tr>
<td>T-31.4.1 thru T-31.4.3</td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. Braces required if W \times H > 900 mm, install as shown.
2. Brace: 9.5 mm x 32 mm aluminum alloy.
3. Cost for bracing is included in sign.

TYPICAL SINGLE PANEL BRACING

TYPICAL MULTIPLE PANEL BRACING

TYPICAL ROUTE MARKER ASSEMBLY

TYPICAL FREEWAY ENTRANCE
2 STRINGER MOUNTING

3 STRINGER MOUNTING

NOTE: To obtain desired panel width, max. of 2 panels may be cut less than 1200 mm, 1450 mm Min. each.

4 STRINGER MOUNTING

GENERAL NOTES:
1. Stringers: 75 mm X 68 mm X 6.4 mm or 68 mm X 58 mm X 6.4 mm aluminum alloy z-bar.
2. Stringers required on all signs requiring multiple posts.
3. Tubular stiffeners required when W>3.0m
4. Cost for bracing is included in sign.
5. One vertical joint if W exceeds 3600 mm.
   Two vertical joints if W exceeds 7200 mm.
6. For alternate steel tube bracing, see Standard Plan Drawing T-3115.

SUB PANEL ASSEMBLY & Z BAR BRACING

VERTICAL JOINT CLOSURE STRIP
**DETAILED "A"**

(Steel tube bracing on round metal posts)

**DETAILED "B"**

(Steel tube bracing on wood posts)

**GENERAL NOTES:**
1. For sub-panel assembly, & vertical joint closure strip details, see Standard Plan Drawing T-31.4.

---

**TABLE - 1**

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>O.D.</th>
<th>A</th>
<th>B</th>
<th>CAMPSTOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPS 3</td>
<td>89</td>
<td>132</td>
<td>17.3</td>
<td>6 x 38</td>
</tr>
</tbody>
</table>

**TABLE - 2**

<table>
<thead>
<tr>
<th>SIGN WIDTH (W)</th>
<th>TUBING SIZE (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2 m or Less</td>
<td>76 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>&quot;D&quot;</th>
<th>BOLT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x 150</td>
<td>9.0</td>
<td>10 Dia. x 160</td>
</tr>
<tr>
<td>150 x 150</td>
<td>9.0</td>
<td>10 Dia. x 160</td>
</tr>
<tr>
<td>150 x 200</td>
<td>16.0</td>
<td>10 Dia. x 210</td>
</tr>
<tr>
<td>150 x 250</td>
<td>19.0</td>
<td>10 Dia. x 260</td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. Sign islands to be compacted to 95%.
2. Pavement for sign island will be as noted in contract plans and Special Provisions.
3. Undivided routes use 1:10. All divided routes use 1:8.
4. Use 1/2 max for narrow right-of-ways or 1:8 preferred for all 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.
3. For details on sign location, post type, panel bracing, and sign island, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
GENERAL NOTES:

1. Anchor post included in cost of sign post.

2. 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.

3. Inner posts are those closest to roadway, and the outer posts are those farthest away.

10 mm x 100 mm round head, square neck carriage bolt (bolt head colored to match sign face); hex nut with fiber insert, flat washer through sign & post (1 typ).

DOUBLE POST UNBRACED

SINGLE POST

Roadside Signs
Round Metal Posts
Unbraced
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 7-31.1.1 through 7-31.1.6.

ASSEMBLY ELEVATION VIEW

- 16 mm -11 x 80 mm Bolt, Type 1 ASTM A 325 or Type 1 ASTM A 449 (grade 511) Each With Three USS Through-Hardened Washers ASTM F 436M Type 11 And One Nylon Insert Stop Nut. ASTM A 563M DH. All items shall be galvanized as per manufacturer's specifications. Torque within the range of 33 – 39 N-m. See BOLT DETAIL below.

PLAN VIEW

- TOP/BOTTOM PLATE
- Plate Thickness = 16 mm

FOOTING DETAIL

- Slip Base Support
- 1500 mm Dia. Drilled And Filled With Class A or AA Concrete

BOLT DETAIL

- Type 1 ASTM A449
- Type 1 ASTM A325
- 16 mm x 80 mm bolt
- 16 mm x 80 mm bolt

FOOTING DETAIL

- Slip Base Support
- 1500 mm Dia. Drilled And Filled With Class A or AA Concrete
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 location, see Standard Plan Drawings T-311.1 through T-311.6.
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.

SINGLE SIGN

- Detail A (See T-314.3)
- Detail B (See T-314.3)
- Detail C (See T-314.3)
- Detail D (See T-314.2)
- Detail E (See T-314.2)
- Tubular Stiffener (See T-313.4)
- Stringer (See T-313.1.4)
- Brace (See T-314.3)
- Post length as noted in sign summary
- Footing (See Note 1)

EXIT PANEL ATTACHMENT

- Detail B (See T-314.3)
- NPS 2 ø pipe

SINGLE SIGN

- 0.2W1
- 0.2W1
- 0.6W1
- 100
- 75 mm x 68 mm x 6.4 mm or 68 mm x 68 mm x 6.4 mm aluminum alloy z bar stringers

DOUBLE SIGN

- Sign panel
- Detail A (See T-314.3)
- Detail B (See T-314.3)
- Detail C (See T-314.3)
- Detail D (See T-314.3)
- Detail E (See T-314.2)
- Detail F (See T-314.3)
- Post
- Panel
- 0.577h Less 50 mm

ROADSIDE SIGNS
ROUND METAL POSTS
BRACED

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED

METRIC
NDOT

SIGNED ORIGINAL ON FILE
1/10/04
18271

DESIGNED BY:...
DETAII "D" (BRACE)

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.

DETAII "E" (POST)

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.
19 mm x 64 mm hex head bolt, hex nut with fiber inserts, 2 flat washers

CLAMP ASSEMBLY

10 mm x 50 mm hex head bolt, hex nut with fiber inserts, 2 flat washers (4 required per bracket).

7 mm x 21 mm split tapered hole in 2 bar at 100 mm spacing

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

10 mm x 85 mm machine bolt with flat washer

75 mm x 68 mm x 6.4 mm or 68 mm x 68 mm x 6.4 mm aluminum alloy 2 bar

NPS 1 tubular stiffener

Head pre-painted with baked enamel to match sign face.

GENERAL NOTES:
1. For details on sign location, post type, panel bracing, and sign stands, see Standard Plan Drawings 1-31.1 through 131.6.
2. NPS = Nominal Pipe Size. See ASTM A 335.
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-311.1 through T-311.6.
3. "2" 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 farthest away.

RECTANGULAR TIMBER POST SELECTION

<table>
<thead>
<tr>
<th>W x Sign Width (m)</th>
<th>Sign Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

TABLE of HOLE DIAMETERS (mm)

<table>
<thead>
<tr>
<th>Post Size (mm)</th>
<th>Hole Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 x 100</td>
<td>No Hole</td>
</tr>
<tr>
<td>300 (typ)</td>
<td>30</td>
</tr>
</tbody>
</table>

 najbli. See note 3.

Field Drilled Holes (See Table)

Sign Post Embedments

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Embedment (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 (typ)</td>
<td>100 (typ)</td>
</tr>
</tbody>
</table>

76 mm x 68 mm x 6.4 mm or 68 mm x 68 mm x 6.4 mm aluminum alloy 2 bar or suitable alternate. (Hole length to be W = 200 mm)

3/8" hex head bolt and nut with fiber insert, two flat washers and a lock washer. (Length of bolt to be as required by post dimension.)

5 mm x 20 mm round head, square neck carriage bolt, hex nut with fiber inserts, at 200 mm spacing.

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

9.5 mm x 32.2 mm Aluminum alloy strap with 13 mm carriage bolt, hex nut with fiber insert, 2 flat washers through sign, post and strap. (For W x 900 mm)

DETAIL "A"
**SPEED CONVERSION**

<table>
<thead>
<tr>
<th>mph</th>
<th>km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>35 &amp; 40</td>
<td>56</td>
</tr>
<tr>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>50</td>
<td>80</td>
</tr>
<tr>
<td>55</td>
<td>90</td>
</tr>
<tr>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>65 &amp; 70</td>
<td>110</td>
</tr>
</tbody>
</table>

**ADVANCE WARNING SIGN SPACING**

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

**TAPE 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>6</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>50</td>
<td>63</td>
<td>9</td>
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<td>60</td>
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<td>11</td>
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<tr>
<td>70</td>
<td>154</td>
<td>14</td>
</tr>
<tr>
<td>80</td>
<td>165</td>
<td>15</td>
</tr>
<tr>
<td>90</td>
<td>187</td>
<td>17</td>
</tr>
<tr>
<td>100</td>
<td>209</td>
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<tr>
<td>110</td>
<td>231</td>
<td>21</td>
</tr>
<tr>
<td>120</td>
<td>253</td>
<td>23</td>
</tr>
</tbody>
</table>

**BUFFER LENGTH**

<table>
<thead>
<tr>
<th>SPEED (km/h)</th>
<th>LENGTH (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>40</td>
<td>16</td>
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<tr>
<td>50</td>
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<td>70</td>
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</tr>
<tr>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>90</td>
<td>102</td>
</tr>
<tr>
<td>100</td>
<td>133</td>
</tr>
<tr>
<td>110</td>
<td>168</td>
</tr>
<tr>
<td>120</td>
<td>207</td>
</tr>
</tbody>
</table>

**TYPICAL APPLICATIONS**

NDOT STANDARD SHEETS T-35.1.2 THRU T-35.1.17 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 2000 MUTCD AND REVISIONS SHOULD BE GIVEN PRIORITY OVER THE EXAMPLES GIVEN HERE.

**ROAD WORK SIGNS**

NRW-1

ROAD WORK
NEXT X MILES
PLACE AT BEGINNING AND END OF PROJECT WHEN PROJECT LENGTH ≥ 3.22 km

G20-2A

END ROAD WORK

**GENERAL NOTES**

1. R2-1 AND R2-5A MAY BE USED TO REDUCE EXISTING SPEED LIMIT TO 90 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 25 KM/H MAX. IF ADDITIONAL SPEED LIMIT SIGNS (NOT SHOWN) ARE REQUIRED PLACE AT VCA.

2. THE W1-3 SIGNS SHALL BE USED WHEN THE RECOMMENDED SPEED ON A CURVE IS 50 KM/H OR LESS. THE W1-4 SIGNS SHALL BE USED 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 EXCEEDS 0.8 KM.

4. ALL REGULATORY SIGNS (R SERIES) SHALL BE BLACK ON RETROREFLECTIVE WHITE.

5. ALL WARNING SIGNS (W SERIES) SHALL BE BLACK ON RETROREFLECTIVE ORANGE.

6. WARNING SIGNS SHALL BE 900 MM X 900 MM. FOR SPEEDS OF 70 KM/H OR LESS, R2-1 AND R2-5A SHALL BE 900 MM X 1200 MM.

7. 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.
MULTI-LANE

See T-35.11 For TABLES and GENERAL NOTES

TWO LANE — TWO WAY

LEGEND:
- Work Area
- Channeling Devices
- Arrow Board
- 70 km/h
- Optional
- See GENERAL NOTE No. 1.
- Fopper Locations to be determined by the Field Engineer.

PILOT CAR IN USE DO NOT PASS

Use Only in Approved Absence of Channeling Devices.

Channeling Devices Used Unless Otherwise Approved.

Use Only in Approved Absence of Channeling Devices.

ALL DIMENSIONS ARE IN MILLIERS UNLESS OTHERWISE NOTED

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
TYPICAL TRAFFIC CONTROL FOR ONE LANE CLOSURES

METRIC
NDOT

3/21/20
DPS/PE/285
1/28/20
REV 2/23

Original Draft
See T-35.1.1 For TABLES and GENERAL NOTES

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

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
TYPICAL TRAFFIC CONTROL
FOR HALF ROAD CLOSURE
(MULTILANE UNDIVIDED)

SIGNED ORIGINALLY ON FILE
ACCEPTED 5/78
PRINTED 5/3
EXISTING PAVEMENT MARKINGS MAY REQUIRE REMOVAL IN THE CROSSTOWN AREA AND NEW MARKINGS INSTALLED.

See T-35.1.1 For TABLES and GENERAL NOTES

LEGEND
- Work Area
- Channelizing Devices
- Arrow Board
- > 70 km/h
- Optional
- - See GENERAL NOTE No. 1.
- - See GENERAL NOTE No. 2
- - See GENERAL NOTE No. 3
- Temporary Striping

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
TYPICAL TRAFFIC CONTROL
FOR MEDIAN Crossover
(Multiline Divided)

All dimensions are in MILLIMETERS
UNLESS OTHERWISE NOTED

METRIC NOTATION

MILLENIUM TRANSPORTATION

Signed Original On File
ADAPTED 7/06
MILLENNIAL TRANSPORTATION
EXIT RAMP OPENING

SHOULDER WORK

LEGEND:

- Channelizing Devices (See Table)
- Channelizing Devices (10m Spacing)
- Arrow Board
- ≥ 70 km/h
- See GENERAL NOTE No. 1
- Truck Mounted Attenuator
- (Optional) See Std. Sheet
- 35.14 For Spacing

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

LEGEND

- SAFETY ZONE AREA
- Channelizing Devices
- Arrow Board
- Optional
- Flogger Locations to be Determined by the Field Engineer.

MULTI LANE

TWO LANE – TWO WAY
TYPICAL PLACEMENT OF SHOULDER DROP OFF SIGNS
(PLACED WHEN SHOULDER DROP OFF EXIST DURING NON-WORKING HOURS)

NOTE: ND-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: ND-1 AND ND-2 SHALL BE USED IN ALL CASES WHERE THERE IS A VERTICAL
DIFFERENCE OF 25 MM TO 75 MM BETWEEN THE TRAVEL LANES.

TYPICAL PLACEMENT OF LOOSE GRAVEL/DUST HAZARD SIGNS

See T-35.11 For TABLES and GENERAL NOTES
See T-35.1 for TABLES and GENERAL NOTES.
LEGEND:

- WORK ZONE
- CHANNELIZING DEVICES @ 1.8 m SPACING
- CHANNELIZING DEVICES
- FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- USE WHEN SPEEDS > 70 km/h

NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY

See T-35.3.1 For TABLES and GENERAL NOTES
See T-35.1.1 for TABLES and GENERAL NOTES
See T-35.1.1 For TABLES and GENERAL NOTES
BARRICADE CHARACTERISTICS

<table>
<thead>
<tr>
<th>TYPE I BARRICADE</th>
<th>TYPE II BARRICADE</th>
<th>TYPE III B BARRICADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>W: Width of Roll</td>
<td>200 mm Min. - 300 mm Max.</td>
<td>200 mm Min. - 300 mm Max.</td>
</tr>
<tr>
<td>L: Length of Rail</td>
<td>0.6 m Min.</td>
<td>0.6 m Min.</td>
</tr>
<tr>
<td>Width of Stripes</td>
<td>Roll length &lt; 0.9 m x 100 mm</td>
<td>Roll length &lt; 0.9 m x 100 mm</td>
</tr>
<tr>
<td>H: Height</td>
<td>0.9 m Min.</td>
<td>0.9 m Min.</td>
</tr>
<tr>
<td>Number of Retroreflective Rails</td>
<td>2 (One each Direction)</td>
<td>4 (Two each Direction)</td>
</tr>
</tbody>
</table>

GENERAL NOTES:

1. ALL BARRICADES USED MUST COMPLY WITH NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350.
3. CABLE(S) THREADED THROUGH ALL PIPES.
4. Markings for barricade rails shall be retroreflective orange and white stripes sloping downward at an angle of 45 degrees in the direction of traffic.
5. BARRICADE HAZARD PANELS (0.6 mm ANODIZED ALUMINUM) ATTACHED WITH 25 mm NO. 14 PAN HEAD METAL SCREW OR 3.2 mm POLYETHYLENE PLASTIC RIVETS.
TRAFFIC DRUMS

1. 50 mm MAX. NON RETROREFLECTIVE MATERIAL
2. 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

TRAFFIC CONES

1. CONES TO BE PREDOMINATELY ORANGE.
2. CONES TO BE USED DURING HOURS OF DARKNESS SHALL BE RETROREFLECTIVE AS SHOWN ABOVE.
3. CONES SHALL HAVE WEIGHTED BASES.
GENERAL NOTES:

1. SHAPE 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 MANUALS ENGINEER.

5. THE LEADING MODULE OF EACH ATTENUATOR SHALL BE DELINEATED. THE BLACK STRIPES SHALL BE SLOPED DOWN TOWARD THE SIDE WHICH TRAFFIC WILL PASS. THE BACKGROUND SHALL BE RETRO-REFLECTIVE YELLOW. ADDITIONALLY A MARKER PANEL SHALL BE PLACED WITH SHEETING APPROXIMATELY 750 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 IN-COMING TRAFFIC.

LEGEND:

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

2. PPCBR = PORTABLE PRECAST CONCRETE BARRIER RAIL, \( V_d \) = DESIGN VELOCITY.

TYPICAL LAYOUTS (SEE LEGEND)
GENERAL NOTES:

1. **RAILROAD PAVEMENT MARKING SYMBOL** INCLUDES THE TWO TRANSVERSE BANDS PLUS THE RAILROAD CROSSING KIT.


3. A THREE-LANE ROADWAY SHOULD BE MARKED WITH A CENTERLINE FOR TWO-LANE APPROACH OPERATION ON THE APPROACH TO A RAILROAD CROSSING.

4. ON MULTIPLE ROADS, THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH TRAVEL LANES, AND INDIVIDUAL RXXR SYMBOLS SHOULD BE USED IN EACH APPROACH TRAVEL LANE.

5. **PAVEMENT MARKINGS FOR STOP BARS**, **TRANSVERSE BANDS** AND CENTER LINES ARE REQUIRED IN ADDITION TO PAVEMENT MARKINGS AS SHOWN IN DETAIL A.

6. ADDITIONAL INFORMATION ON RAILROAD GRADE CROSSINGS CAN BE FOUND IN MUTCD, PART VII.

7. STOP BARS SHALL BE PERPENDICULAR TO ROADWAY AND SHALL BE WHITE.


9. REFER TO **METRIC ALPHABET FOR HIGHWAY SIGNS AND MARKINGS FOR RXXR SYMBOL DETAILS**.

10. THE DISTANCE X SHALL BE NOTED IN THE PLANS AND/OR STRUCTURE LIST.

**RAILROAD CROSSING KIT**

One Set of Markers Per Travel Lane (6.5 m²)

See Note 5

---

**STATE OF NEVADA**
**DEPARTMENT OF TRANSPORTATION**
**RAILROAD CROSSING:**
**SIGNAL & GATE PLACEMENT**
**PAVEMENT MARKINGS**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
**Splice Notes:**

Specifications:
The Splice Shall Conform To Current "Specifications For Structural Steel Using ASTM A375 Bolt Set".

Location of Splice:
The Splice Shall Be Located So As Not To Interfere With Mounting the Highways Bridges Or The Sign Frame. For Splice J-J, Mark As Per The Design. For The End Frame, The Splice Shall Be Brought Into The Chord Angle With a 10 mm Unfinished Bolt, With One Washers And One Nut, 2 Cut Washers And Lock Washers.

Bolts:
The A325 Bolts Shall Be High Strength With An Interference Type Body With Torque To The Required Amount As Stated In The Above Specifications. The Plating Welded To The Inside Of The Inside Splice Welded Before Punching The Bolt Holes, They Shall Be The Same Length As The Cover Plates. The Plates Are Not Necessary. On The Single Post Signs If The Splice Is Located Over 1/3 Of The Cantilever Length, The Post Alternative Splice Details May Be Used If Approved By The Engineer.

**Typical Section J-J**

Note:
- Diagonal gusset plates at Trusses, Not Shown By WAY shown is At All Vertices of 61/2 Trusses.

**Section T-T**

**Bolted Chord Splice**

**Welded Chord Splice**

**Optional Chord Splice**
STEEL REMOVABLE SIGN PANEL FRAMES

SECTION "B"-"B"

ELEVATION VIEW

NOTES:
2. Minimum fillet weld is 1/8" mm for clips attached to chord member of truss.
3. Maximum spacing of bottom clip angle is 1750 mm.
4. Top clip required for each vertical member or removable sign panel frame.

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

Signed Original On File
12-9-01
ADDITIONAL SHEETS 5000
LIGHT FIXTURE MOUNTING DETAIL

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

DETAIL "A"

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
OVERHEAD SIGNS
LIGHTWEIGHT

METRIC

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

SIGNED: Grajek-On File: 7/6/15

Drafted: 2/2/15

200 MILE MARKER PROJECT 2015-2016

Not Located:
Donaway, Arizona
Boulder City, Nevada
Great Basin National Park, Nevada
Reno, Nevada
Sparks, Nevada

7/20/15
**Broken Yellow Line**

- **Type A** 1.0 m
- **Type D** 3.0 m
- **Type B**

**Broken White Line (Urban)**

- **Type A** 3.0 m
- **Type D** 9.0 m
- **Type B**

**Passing/No Passing Zone**

- **Type A** 6.0 m
- **Type D** 3.0 m

**Double Yellow Center Line**

- **Type A** 3.0 m
- **Type D**

**Two Way Left Turn Lane**

**Red Side Shal Face** Wrong Way Traffic

**Exit Ramp (Gore)**

- **Type E** 3.0 m
- **Type B** 50 mm Solid White Line
- **Type D** 3.0 m

**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

**Reflectors**

**Permanent Raised Pavement Markers**

**State of Nevada Department of Transportation**
PLACEMENT OF MERGE ARROWS

**Typical Lane Reduction**
For further details on "Lane Reduction" See Part II of the MUTCD

**Taper Length**

**Advance Warning Distance (D)**

**Paralleled Acceleration Lane**
For further details on "Paralleled Acceleration Lane" See Part II of the MUTCD

**Merge Arrow**

**Wrong Way Arrow**

**HOV Lane**

**Left/ Straight Arrow**

**Left/ Straight/ Right Arrow**

**Straight Arrow**

**Turn Arrow**

**Exit Arrow**

**Permanent Pavement Markings:**

**Bicycle/HOV Arrows**
PERMANENT STORAGE LAKES, TURN ARROWS & ONLY'S

LEGEND:
* Right Arrows Where Applicable
** Raised Pavement Markers Where Applicable,
   for Details See Standard Plan Sheet T-37.1.2.

TEMPORARY CROSSWALK

NOTE:
For TEMPORARY STRIPING Exclude
PAVEMENT WORDS And SYMBOL MARKINGS
(i.e. TURN ARROWS, ONLY'S, etc.)
GENERAL NOTES:
1. FOR SPACING OF CROSSWALK BARS, SEE NDOT STANDARD PLAN SHEET T-381.2.
2. CENTER OF CURB RAMP TO BE CENTER OF CROSSWALK.
GENERAL NOTES:

1. DESIGN SPECIFICATIONS: AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES," 1995, EXCEPT AS NOTED BELOW.
2. CONSTRUCTION SPECIFICATIONS: STATE OF NEVADA DEPARTMENT OF HIGHWAYS "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION," CURRENT EDITION AND SPECIAL PRELIMINARY DIRECTIVES.
3. LOADS: LIVE LOAD - STANDARD HUNTSVILLE OR ALTERNATE PURSUIT MILITARY LOADING.
   IMPACT FOR TOP SLAB IS 50 MPH TO 150 MPH STREET. 25 MPH TO 60 MPH COVER. NO IMPACT FOR COVER. NO SURFACE LOADS FOR WALLS. EARTH LOADS, EQUIVALENT LIQUID FLOODED PRESSURE, FOR TWO CONDITIONS:
   1) 2250 psi VERTICAL, 670 psi HORIZONTAL.
   2) 2250 psi VERTICAL, 2250 psi HORIZONTAL.
   LOAD FACTORS: 1.50, 1.50, 2.5, 2.5, 1.1.
4. CONCRETE: THE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2500 psi. MINIMUM ALLOWABLE SHEAR: 35 psi. 1 1/2" G F PUMP TAKEN AT A DISTANCE 3' FROM THE SUBSURFACE MOLD.
5. REINFORCING STEEL: ALL REINFORCING STEEL TO BE AASHTO GRADE 60. ALL MAIN REINFORCEMENT IS TO BE PLACED IN THE TRANSVERSE DIRECTION. STAGE 2 REINFORCEMENT SHALL FEATURIZE 4" 6MM CLEARANCE IN BOTTOM FLOOR SLAB AND 10" 6MM CLEARANCE ON REMAINDER OF STRUCTURE AND ITS APPURTENANCES, UNLESS OTHERWISE NOTED ON THE PLANS. REINFORCING STEEL IN THE TOP SLAB SHALL HAVE AN APPROPRIATE COATING WHERE THERE IS 1000 MM OR LESS OF COVER ON THE RCS.
6. FOUNDATION PRESSURES: THE ROB CULVERTS ARE DESIGNED TO THE FOLLOWING SOIL BEARING PRESSURES:

COVER HEIGHTS: 3000 mm, 6000 mm

<table>
<thead>
<tr>
<th>ROB HEIGHT</th>
<th>kPa</th>
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<tbody>
<tr>
<td>300 mm</td>
<td>60</td>
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<tr>
<td>1000 mm</td>
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<td>4000 mm</td>
<td>160</td>
</tr>
<tr>
<td>5000 mm</td>
<td>160</td>
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7. SPECIAL DESIGN: CULVERTS WITH CONDITIONS LOADING OR SIZES UNSTATED TO THOSE GIVEN ON THESE ROB CULVERT SHEETS MAY REQUIRE A SPECIAL DESIGN.
8. DESIGNATION: BOX CULVERTS ARE SHOWN ON PLANS AS SPAN TIMES HEIGHT TIMES LENGTH (3000 mm x 3400 mm x 7500 mm ROB).
9. ADDITIONAL LENGTH: LENGTH OF CULVERT SHALL BE INCREASED AS FOLLOWS: ADD 400 mm TO EACH END WHEN COVER AT SUBSOIL IS 1000 TO 1500 mm. ADD AN ADDITIONAL 300 mm TO EACH END FOR EACH SUCCEEDING 1500 mm OF COVER OR PORTION THEREOF.
10. HEADWALLS: ALL ROB CULVERTS SHALL HAVE TYPE 1 HEADWALLS UNLESS OTHERWISE NOTED ON THE PLANS.
11. QUANTITIES: QUANTITIES DO NOT INCLUDE "G" BARS OR NON SPIKED BARS. NON TEMPERATURE BARS FOR EXPOSED TOP SLAB, NON CONCRETE OR REINFORCEMENT FOR PARAPETS OR PAYING LUGGAGE.
12. THREE OR MORE CELLS: FOR CULVERTS WITH MORE THAN TWO CELLS, USE DIMENSIONS AND REINFORCEMENT FOR THE "DOUBLE BOX CULVERT" AND ADJUST THE QUANTITIES ACCORDINGLY.

PARAPET DETAILS:

COPING REINFORCING INCLUDED IN THE HEADWALL QUANTITIES.

METRIC

R.C.B. CULVERTS, GENERAL NOTES

ALL DIMENSIONS ARE IN MILLI METERS UNLESS OTHERWISE SHOWN.
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS, WITH THE EXCEPTION OF CLEARANCES.

2. OUTSIDE DIMENSIONS OF CELL ARE TO BE CONSIDERED FOR DETAILS.

3. SUPPORTS ARE TO BE PROVIDED IN ALL Cell WALLS.

4. ADDITIONAL ELEVATIONS TO BE PROVIDED FOR ALL Cell WALLS.

5. CLEARANCES ARE TO BE CONSIDERED.

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48. ALL CLEARANCES ARE TO BE CONSIDERED.
### Cubic Meters of Concrete and Kilograms of Reinforcing for Two Type II Headwalls

<table>
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<tr>
<th>Span (m)</th>
<th>Single Box</th>
<th>Double Box</th>
<th>Triple Box</th>
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<td>1.2</td>
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### Quantities for Additional Cells

**Concrete for Two Type II Headwalls for Each Additional Cell (Cu. Meters):**

Add this quantity to the quantity for a double box.

- For height (H) less than 3.7 meters: 0.80 / (span (m)) + 0.21 / cos skew angle
- For height (H) equal to or greater than 3.7 meters: 0.86 / (span (m)) + 0.21 / cos skew angle

**Reinforcing for Two Type II Headwalls for Each Additional Cell (Kilograms):**

Add this quantity to the quantity for a double box.

- For height (H) less than or equal to 2.1 meters: 26.11 / (span (m)) + 0.21 / cos skew angle
- For height (H) greater than 2.1 meters: 38.67 / (span (m)) + 0.21 / cos skew angle

**Note:** All dimensions are in millimeters unless otherwise shown.
<table>
<thead>
<tr>
<th>SPAN</th>
<th>SINGLE BOX</th>
<th>DOUBLE BOX</th>
<th>TRIPLE BOX</th>
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<tr>
<td></td>
<td>0° SKEW</td>
<td>15° SKEW</td>
<td>30° SKEW</td>
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<td>CONC. REINF.</td>
<td>CONC. REINF.</td>
<td>CONC. REINF.</td>
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<td>3</td>
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<tr>
<td>10</td>
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- Quantities shown are for headwalls at the inlet and outlet.

<table>
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<th>STATE OF NEVADA</th>
<th>DEPARTMENT OF TRANSPORTATION</th>
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<tbody>
<tr>
<td>ESTIMATE OF QUANTITIES</td>
<td>TYPE I HEADWALLS</td>
</tr>
</tbody>
</table>

Length of Span | 5' to 10' | 10' to 15' | 15' to 20' | 20' to 25' | 25' to 30' | 30' to 35' | 35' to 40' |

- roadway design considerations
NOTES:
1. FOR GENERAL NOTES SEE SHEET B-20.1.1.
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 EPOXIED 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

SECTION

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

METHOD OF EXTENDING R.C.B. CULVERTS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METRIC NOTATION

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

8-20-11
SIGNED ORIGINAL ON FILE

R.C.B. CULVERTS
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 A572 GRADE 490-24D UNLESS NOTED OTHERWISE.
4. WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

COMPLETE FUSION WELD (SEE WELDING DETAILS FOR APPROVED WELDS)

HP PILE SPLICE DETAIL

COMPLETE FUSION WELD (SEE WELDING DETAILS FOR APPROVED WELDS)

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 ASSEMBLY EXCEPT CHAIN LINK FABRIC TO BE GALVANIZED AFTER FABRICATION.

2. RAILING SHALL CONFORM TO HORIZONTAL AND VERTICAL ALIGNMENTS. POSTS SHALL BE VERTICAL. TOP, INTERMEDIATE AND BOTTOM PIPES SHALL BE BENT IF THE RADIUS IS 45000 mm OR LESS. MAY BE ON 2400 mm CHORDS IF RADIUS IS OVER 45000 mm.

3. SPACE POSTS TO CLEAR EXPANSION JOINTS JOURNEYS BY 150 mm MIN. TO CENTERLINE POSTS.

4. ALL EXPOSED CORNERS TO BE SMOOTH.

5. PEEN ALL 10 mm BOLTS.

6. WHEN FENCE IS ON SLOPE THE 3000 mm FABRIC SHALL BE PLACED PARALLEL TO THE SLOPE.

7. ALTERNATIVE DETAILS MAY BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEERS APPROVAL.

8. NPS – NOMINAL PIPE SIZE DESIGNATION.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PEDESTRIAN RAIL
TYPE "M"
ENDD REDWOOD STRIPS AT TOP OF RADIAL SECTION WHEN THEIR INTERMEDIATE DISTANCE FROM EACH OTHER REACHES 1000 mm.

Typical Cut-Off When Slope Paving Terminates At Toe Of Slope

PLAN VIEW

NOTES:
1. SLOPE PAVING IS TO BE DIVIDED INTO EQUALLY SPACED PANELS. THE WIDTH OF EACH PANEL IS TO BE AS NEARLY 3000 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.

SECTION A-A (WITH SCAFFOLD)

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)

SECTION E-E (EDGE OF SLOPE)

SECTION F-F

38X89 Redwood Saw As Shown & Reassemble. Remove Upper Portion After Concrete Cures.
DISTRIBUTION OF PRESTRESSING FORCE:
UNLESS OTHERWISE NOTED THE PRESTRESSING FORCE, P, JACK OR P,R, SHALL BE DISTRIBUTED WITH AN APPROXIMATELY EQUAL AMOUNT IN EACH GIRDERS AND SHALL BE PLACED SYMMETRICALLY ABOUT THE CENTERLINE OF THE STRUCTURE. IN SLABS, THE PRESTRESSING FORCE SHALL BE UNIFORMLY DISTRIBUTED ACROSS THE SLAB.

STRESSING SEQUENCE:
NO MORE THAN 1/2 OF THE PRESTRESSING FORCE IN ANY GIRDERS MAY BE STRESSED BEFORE AN EQUAL FORCE IS STRESSED IN THE ADJACENT GIRDERS. AT NO TIME DURING THE STRESSING OPERATIONS WILL MORE THAN 1/4 OF THE TOTAL PRESTRESSING FORCE BE APPLIED INDIVIDUALLY ABOUT THE CENTERLINE OF THE STRUCTURE.

GIRDERS SHALL BE FLARED NEAR ANCHORAGE TO PROVIDE A MINIMUM OF 40 MM CONCRETE COVERING THE REBAR. FLARE MAY BE ON ONE SIDE OF THE GIRDERS ONLY. BAR REINFORCEMENT INTERFERENCE WITH THE PRESTRESSING TENDON ALIGNMENT SHALL BE ADJUSTED AS APPROVED BY THE ENGINEER.

**X** BARS MARKED THUSLY ARE TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.

**X** CONCRETE USED IN THE BEARING SEATS IS TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.

**X** ADDITIONAL NO.-13 STIRRUP BARS, IN PAIRS, ARE NECESSARY TO MAINTAIN A 200 MM STIRRUP SPACING. SEE PLANS FOR STIRRUP BENDING DIMENSIONS AND COVERING REQUIREMENTS. ADDITIONAL NO.-13 STIRRUP BARS TO BE INCLUDED IN COST OF PRESTRESSING.

CLEARANCE REQUIREMENTS FOR DUCTS

1. DUCT PATTERNS SHOWN ARE FOR 300 MM WIDE GIRDERS OF 1080 MM WIDTH.
2. For other widths the minimum clearances must be maintained.
3. APPROVAL OF THE ENGINEER IS REQUIRED FOR DEVIATIONS.

STIRRUP REINFORCEMENT AT FLARE OF GIRDER STEM

NOTE: CONCRETE CAP FOR ANCHORAGE TO PROVIDE A MINIMUM OF 50 MM COVER OVER STRESSING HEADS.

CONCRETE CAP VARY DEPENDING ON TYPE OF POST-TO-TENSIONING.

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.

BEARING SEAT FOR PRESTRESSED ANCHORAGE AT DIAPHRAGM TYPE ABUTMENTS

15 mm DUCT TE

NOTE: PLACE CLOSER END OF DUCT IN DIRECTION OF FLARE

PLAN

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.

BEARING SEAT CONCRETE

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.

BEARING SEAT CONCRETE

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.

CONCRETE CAP VARIES ACCORDING TO TYPE OF POST-TENSIONING.
### TABLE 1 - REINFORCED CONCRETE RETAINING WALL

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### TYPICAL SECTION

1. For General Notes see B-10.1.3
2. For drains and suspended and requirements see sheets B-10.1.3 thru B-30.1.3.
3. Rigid construction joint surfaces to 6 mm. (1/4")
4. NDOT Geotechnical section with maximum allowable bearing pressures for allowable earth conditions.
WALL EXPANSION JOINTS AND WEAKENED PLANES

WEPP HOLE

WEPP HOLE NOTES:
1. 200 mm (8") slab drains at 7600 mm (10"") maximum center to center.
2. Drains shall be located 75 mm above finish grade.
3. 0.06 cubic meters of Type 2 Drain Rockfill incorporated in a geotextile fabric securely tied. Geotextile shall meet the following:
   a) meet at least Class 2 strength requirement per AASHTO V88-97
   b) have an AOS not greater than U.S. S. E. No. 40
   c) have a permeability of at least 0.5 sec. - Amoco 2016,
   d) No. 60 geotextile 500 mm wide and Geotextile 500 mm wide
   e) The above for pavement requirements.
3. 150 mm (6") square aluminum or galvanized wire mesh
   "hardware cloth" minimum wire diameter 0.75 mm.

WATERSTOP NOTES:
Holes will be permitted in the concrete slab. Any concrete slab with a diameter of 150 mm (6") or more shall be bonded with a strip of 3 mm (1/8") thick sheet metal. All other holes shall be filled with a suitable sealing compound.

WATERSTOP

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