FOREWORD TO 2007 ENGLISH STANDARD PLANS

Nevada Department of Transportation (NDOT) English Standard Plans are published every two years. All significant 2007 revisions to the 2005 Standard Plans will be shown in “RED” and new 2007 plan sheets will have the contents entirely in “RED”.


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 a continuous process to update the Standard Plans. Updates to Standard Plans will reflect the impetus of NCHRP Report 350 requirements, however approved products are shown in the Qualified Products List (QPL), included within each advertised project’s Special Provisions. If you find an error 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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## ENGLISH VERSION

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GENERAL NOTES:
1. SEE THE CURRENT ADOPTED EDITION OF THE AASHTO "POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" FOR FURTHER INFORMATION ON A1-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 BARS AS DIRECTED BY THE ENGINEER.

LEGEND:
* = ANGLE OF REPPOSE

APPROACH TYPES
Type 2A - Paved Base and Surface as Shown
Type 2B - Paved 6" Aggregate Base Course Only
Type 3 - Grace Approach Area Only

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

SIGNED ORIGINATING ENGINEER: [Signature]
GENERAL NOTES:

1. TRENCHES MORE THAN 4' DEEP SHALL BE SHORED, LAD 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 4' DEEP SHALL ALSO BE PROTECTED AS INDICATED IN GENERAL NOTE 1.

3. FOR THE PURPOSE OF PAYMENT, STRUCTURE EXCAVATION AND BACKFILL QUANTITIES ARE BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE FOR SHORING.

4. IF SHORING IS USED, PAYMENT WILL BE MADE FOR STRUCTURE EXCAVATION AND BACKFILL BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE FOR SHORING.

5. TRENCH EXCAVATION SHORING SHALL CONFORM TO OSHA REGULATIONS 29 CFR PART 1926, SUBPART P, APPENDIX C.

6. THE QUANTITY OF STRUCTURE EXCAVATION AND BACKFILL MEASURED FOR PAYMENT SHALL BE THE NUMBER OF CUBIC YARDS CALCULATED MINUS ANY DUPLICATION OF LIMITS WHICH OVERLAP.

7. THE LIMITS OF STRUCTURE EXCAVATION AND BACKFILL SHOWN HERIN SHALL BE USED FOR THE METHOD OF MEASUREMENT AND PAYMENT ONLY. THERE SHALL BE NO ADDITION OR COMPENSATION FOR ANY ADDITIONAL EXCAVATION OR BACKFILL REQUIRED FOR EXCAVATIONS TO MEET OSHA REGULATIONS.

8. SHEET B-20.1.B FOR EXCAVATION AND BACKFILL FOR PRECAST CONCRETE BOX CULVERTS.

9. BEDDING MATERIAL SHALL BE GRANULAR BACKFILL OR TYPE 2 CLASS B AGGREGATE MEETING THE RESISTIVITY REQUIREMENTS FOR GRANULAR BACKFILL. BEDDING MATERIAL WILL BE PAID FOR AS GRANULAR BACKFILL.

LEGEND:

- STRUCTURE EXCAVATION
- GRANULAR BACKFILL
- EMBANKMENT
- BEDDING

NEVADA DEPARTMENT OF TRANSPORTATION

STRUCTURE EXCAVATION
AND BACKFILL
(METHOD OF MEASUREMENT)

SIGNED ORIGINAL ON FILE 8-1-14 06:06:2017
CHEIF ROAD DESIGN ENG.
GENERAL NOTES:

1. TRENCHES MORE THAN 4' DEEP SHALL BE SHORED, LAD BACK TO AT LEAST THE ANGLE OF REPPOSE 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 4' DEEP SHALL ALSO BE PROTECTED AS INDICATED IN GENERAL NOTE 1.

3. FOR THE PURPOSE OF PAYMENT, STRUCTURE EXCAVATION AND BACKFILL QUANTITIES ARE BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE FOR SHORING.

4. IF SHORING IS USED, PAYMENT WILL BE MADE FOR STRUCTURE EXCAVATION AND BACKFILL BASED ON THESE STANDARD DRAWINGS AND NO ADDITIONAL PAYMENT WILL BE MADE FOR SHORING.

5. TRENCH EXCAVATION SHORING SHALL CONFORM TO OSHA REGULATIONS 29 CFR PART 1926, SUBPART P, APPENDIX C.

6. THE QUANTITY OF STRUCTURE EXCAVATION AND BACKFILL MEASURED FOR PAYMENT SHALL BE THE NUMBER OF CUBIC YARDS CALCULATED MINUS ANY DUPLICATION OF LIMITS WHICH OVERLAP.

7. GRANULAR BACKFILL SHALL BE PLACED FOR A MINIMUM DEPTH OF 6" ABOVE THE TOP OF THE PIPE FOR THE WIDTH OF THE TRENCH. COMPLETE THE TRENCH BACKFILL WITH GRANULAR BACKFILL OF ROADWAY EMBANKMENT.

8. THE LIMITS OF STRUCTURE EXCAVATION AND BACKFILL, SHOWN HEREIN SHALL BE USED FOR THE METHOD OF MEASUREMENT AND PAYMENT ONLY. THERE SHALL BE NO ADDITIONAL COMPENSATION FOR ANY ADDITIONAL EXCAVATION OR BACKFILL REQUIRED FOR EXCAVATIONS TO MEET OSHA REGULATIONS.

LEGEND:

- STRUCTURE EXCAVATION
- GRANULAR BACKFILL
- ROADWAY EMBANKMENT

DIAMETER IS 6 FEET OR LESS

DIAMETER IS GREATER THAN 6 FEET
GENERAL NOTES:
1. MINIMUM DEPTHS AS SPECIFIED IN "CULVERT INSTALLATION WITH UNSUITABLE FOUNDATIONS" ON SHEET R-1.11. NOTES NO. 6 & 8 WILL PREVAIL WHEN THESE CONDITIONS ARE ENCOUNTERED.

2. CONCRETE SHALL BE CLASS A OR AA. ADDITIONAL EXCAVATION FOR CLASS A BEDDING TO BE INCLUDED IN THE UNIT BID PRICE PER CUBIC YARD OF CONCRETE.

3. CLASS B BEDDING SHALL BE CAREFULLY SHAPED TO FIT PIPE PRIOR TO INSTALLATION.

LEGEND:
- LENGRANULAR BACKFILL

ALLOWABLE FILL HEIGHT FOR REINFORCED CONCRETE PIPE

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<td>B</td>
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**NOTE:** CONTACT HYDRAULIC ENGINEER FOR MATERIALS OR STEELS NOT LISTED.
WITHOUT HEADWALL

- Length of Culvert Shall Be Increased As Follows:
  - Consider Each Side Separately, Measure Pipe From Roadway Centerline to the intersection of the Top of Pipe and Fill Slope, to This Dimension Add 2' When Cover At Shoulder is 1' to 10' Add An Additional 6' For Each Succeeding 5' of Cover or Portion Thereof.

WITH CONCRETE HEADWALL

- Length of Culverts Shall Be Increased As Follows:
  - Consider Each Side Separately, Measure Pipe From Roadway Centerline to the intersection of the Top of Pipe and Fill Slope Plus Headwall Thickness, to This Dimension Add 1' When Cover At Shoulder is 5' to 10', Add An Additional 6' For Each Succeeding 5' of Cover or Portion Thereof.

PRECAST CONCRETE END SECTION

- Length of Culvert Shall Be Increased As Follows:
  - Consider Each Side Separately, Measure Pipe From Roadway Centerline to the intersection of the Top of Pipe and Fill Slope, to This Dimension Add 1' When Cover At Shoulder is 1' to 10' Add An Additional 6' For Each Succeeding 5' or Portion Thereof.

METHOD OF CONTOURING OVER CULVERTS

MINIMUM CULVERT INSTALLATION

- Contour This Area To Provide the Minimum Amount of Obstruction Exposure.
- RCP Use 10'- Minimum Where Possible. If Minimum Cover is Restrictive, Compromise By Utilizing Higher Class Pipe or Selective Roping As Recommended By the Hydraulics Section.

NOTE:

- If, After Extending the Culvert and/or Warping the Fill Slope, For Safety and/or Aesthetics, the Extension Does Not Fulfill the Requirements For a Clear Roadside Recovery Area Then Vehicular Traffic May Be Protected By Some Other Means, Such As Guardrail, Barrier Rail or Another Acceptable Safety Feature.

SECTION A-A
SAFETY CULVERT INSTALLATION

To Provide Obstruction Clearance
GENERAL NOTES:
1. SLAB 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 ELBOW PIPE.
3. LENGTH OF PIPE SHOWN ON THE DESIGN PLANS DOES NOT INCLUDE CONNECTOR SECTION LENGTH CI.
4. CONTACT HYDRAULICS ENGINEER FOR SIZES NOT LISTED.

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<th>B</th>
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* For Reference Only
### General Notes:
1. Concrete shall be Class A or AA.
2. Rebar shall be deformed bars with minimum spacing of 14" on 2" clear of surface of concrete except as noted. Bars shall not be bent or cut in field.
3. For sawing and drilling, reinforce assume a minimum depth and shall be extended if soil is unsuitable or likely to occur.
4. Culvert pipes should be set in a skew shall be wetted when headwalls are constructed. When headwalls are not constructed, the pipes shall not be wetted except on over-iron section.
5. For estimating headwall quantities on skewed culverts:
   - 27" to 32" - Use quantities for 32" skew.
   - 26" to 30" - Use quantities for 30" skew.
   - Over 30" - Calculate quantities required.
   - Culverts should be installed on 2" increments where it is feasible.

### Culvert Headwalls
**12" to 42" CMP**

#### Quantities Shown Are for Two Headwalls

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#### Quantities Shown Are for One Headwall

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GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DeFORMED BARS WITH MAXIMUM SPACING OF 18" SET AT 1 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FURTHER NOTES ARE ON SHEET 2 OF 20 SHEETS AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SLOPE.
4. CULVERT PIPES TO BE SET IN A SKEW SHALL BE NICKERD WHEN HEADDWALLS ARE CONSTRUCTED. WHEN HEADDWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE NICKERED EXCEPT IN OVERFLOW SECTION.
5. FOR ESTIMATING HEADDWALL QUANTITIES ON SKEMED CULVERTS:
   0° TO 30° = USE QUANTITIES FOR 0° SKEW
   15° TO 45° = USE QUANTITIES FOR 15° SKEW
   20° TO 30° = USE QUANTITIES FOR 20° SKEW
   40° TO 60° = USE QUANTITIES FOR 40° SKEW
   OVER 60° = CALCULATE QUANTITIES REQUIRED.
   CULVERTS SHOULD BE INSTALLED ON 1° INCREMENTS WHERE IT IS FEASIBLE.
6. DIMENSIONS X, Y, L, AND H TO REMAIN CONSTANT REGARDLESS OF MINOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.

QUANTITIES SHOWN BELOW ARE FOR TWO HEADDWALLS:

QUANTITIES SHOWN BELOW ARE FOR ONE HEADDWALL:

LENGTH OF REINFORCING BARS:

PLAN

ELEVATION

SECTION FOR ALL HEADDWALLS

0° SKEW

15° TO 45° SKEW
QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DESIGNATED BARS WITH MAXIMUM SPACING OF 18" SET 2" CLEAR OF SURFACE OF CONCRETE EXCEPT AT NOTCHES. BAR ENDS SHALL BE CUT & BENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSTABLE OR LACKS TO COHESION.
4. CULVERT PIPES TO BE SET ON A SKEW DEPTH W/Footings W/Headwalls. PIPES SHALL NOT BE WELDED EXCEPT IN OVERFLOW SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKEWED CULVERTS:
   - 0° TO 10° - USE QUANTITIES FOR 0° SKEW.
   - 11° TO 20° - USE QUANTITIES FOR 15° SKEW.
   - 21° TO 40° - USE QUANTITIES FOR 45° SKEW.
   - 41° TO 55° - USE QUANTITIES FOR 45° SKEW.
   - OVER 55° - CALCULATE QUANTITIES REQUIRED.
   CULVERTS SHOULD BE INSTALLED ON A SKEW DEPTH WHERE IT IS FEASIBLE.
6. DIMENSIONS X, Y, Z, AND H TO REMAIN CONSTANT REGARDLESS OF WHICH VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.

QUANTITIES SHOWN BELOW ARE FOR TWO HEADWALLS.

LENGTH OF REINFORCING BARS

SINGLE RCP

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<th>X</th>
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**NOTES:**

- **PLAN:**
  - O.D. (Outside Diameter)
  - Dia./Cos. S. Angle

- **ELEVATION:**
  - O.D. (Outside Diameter)
  - Dia./Cos. S. Angle

**NEVADA DEPARTMENT OF TRANSPORTATION**

**CULVERT HEADWALLS**

**DOUBLE RCP**

**0° TO 45° SKEW**

**SIGNED:**

[Signature]

[Title]

[Date]

[Engineer]
**Quantities shown below are for two headwalls**

<table>
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<tr>
<th>CMP Size</th>
<th>CMP Area</th>
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<th>Single CMP</th>
<th>Double CMP</th>
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<td>0° Skew</td>
<td>15° Skew</td>
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</table>

**General Notes:**
1. Concrete shall be Class A or B.
2. Reinforcing steel shall be deformed bars with maximum spacing of 16" unless clear of surface of concrete except as noted.
3. Footings shown are of minimum depth and shall be extended if soil is unacceptable or liable to scour.
4. Culvert pipes to be set on a skew shall be wetted when headwalls are constructed. When headwalls are not constructed the pipes shall not be wetted except in overflow section.
5. For estimating headwall quantities, use quantities for 0° skew.

**Quantities shown below are for one headwall.**

**Length of reinforcing bars**

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<tr>
<th>CMP Size</th>
<th>Single CMP</th>
<th>Single or Double CMP</th>
<th>Double CMP</th>
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</thead>
<tbody>
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<td>0° Skew</td>
<td>15° Skew</td>
<td>30° Skew</td>
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** Nevado Department of Transportation**

**Culvert Headwalls**

17" × 13" CMP to 83" × 57" CMP

Signed: Gregoring On File

Chief Hydraulics Engineer R2.6.1 (502)
QUANTITIES ShOWN BELOW ARE FOR TWO HEADWALLS.

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<tr>
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QUANTITIES ShOWN BELOW ARE FOR ONE HEADWALL.

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<td>2006</td>
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<td>2006</td>
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GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE BENT AT 45° TO 90° WITH MAXIMUM SPACING 24 IN. (600 MM) CENTER TO CENTER. ALL BARS SHALL BE LEFT IN PLACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN STEEL.
3. FOOTING SHALL BE OF MAXIMUM DEPTH AND SHALL BE EXTENDED BY 12 IN. (300 MM) AROUND THE OUTSIDE CENTER OF THE FOOTING.
4. CONCRETE SHALL BE 2800 PSI MINIMUM.
5. CONCRETE UNITS SHALL BE PLACED IN SUCH A MANNER TO REDUCE CONCRETE PLACEMENT COSTS.
6. FOR ESTIMATING HEADWALL QUANTITIES ON DRAWN OVALS, USE QUANTITIES FOR 30° SKEW.
7. FOR ORDERS FOR OVALS UNDER 15° SKEW, USE QUANTITIES FOR 15° SKEW.
8. FOR ORDERS FOR OVALS UNDER 30° SKEW, USE QUANTITIES FOR 30° SKEW.
9. FOR ORDERS FOR OVALS UNDER 45° SKEW, USE QUANTITIES FOR 45° SKEW.

LEGEND:
A. 1/10 X 1/10 Bar
B. 1/10 X 1/10 Bar
C. 1/10 X 1/10 Bar
D. 1/10 X 1/10 Bar
E. 1/10 X 1/10 Bar
F. 1/10 X 1/10 Bar
G. 1/10 X 1/10 Bar
H. 1/10 X 1/10 Bar
I. 1/10 X 1/10 Bar
J. 1/10 X 1/10 Bar
K. 1/10 X 1/10 Bar
L. 1/10 X 1/10 Bar
M. 1/10 X 1/10 Bar
N. 1/10 X 1/10 Bar
O. 1/10 X 1/10 Bar
P. 1/10 X 1/10 Bar
Q. 1/10 X 1/10 Bar
R. 1/10 X 1/10 Bar
S. 1/10 X 1/10 Bar
T. 1/10 X 1/10 Bar
U. 1/10 X 1/10 Bar
V. 1/10 X 1/10 Bar
W. 1/10 X 1/10 Bar
X. 1/10 X 1/10 Bar
Y. 1/10 X 1/10 Bar
Z. 1/10 X 1/10 Bar

NEVADA DEPARTMENT OF TRANSPORTATION
CULVERT HEADWALLS
68" X 43" OVAL RCP TO 91" X 58" OVAL RCP
Signed Grading Off File B-7-7 (502)
CHIEF HYDRAULICS ENGINEER
**ANNULAR COUPLING BAND**

**DIMENSIONS**

- **Pipe Size (inches)**: 1 1/2
- **Wall Thickness (inches)**: 3/16
- **Bolt Size (inches)**: 1/2
- **Connection Type**: 
  - Side View
  - End View

**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 DIAMETER.
3. FOR WATER-POOF AND SILOM J OINTS ON ALTERNATIVE ANNULAR COUPLING BAND - PLACE MASTIC SEALANT STRIP "1/4" THICK X "1/4" WIDE X 4" LONG IN LMB STEEL BANDS.
4. FOR ALTERNATIVE ANNULAR COUPLING BAND - 2 BAR AND STRAP ASSEMBLIES ARE REQUIRED FOR PIPE GREATER THAN 42" DIAMETER. OPTIONAL FOR SIZES LESS THAN 42".

**BAND DETAIL**

**FOR USE ON CMP THRU 36" INCLUSIVE**

- **Pipe Size (inches)**: 1 1/2
- **Wall Thickness (inches)**: 3/16

**COUPLING BAND FOR HELICAL WELD SEAM ONLY**

**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 DIAMETER.
3. FOR WATER-POOF AND SILOM J OINTS ON ALTERNATIVE ANNULAR COUPLING BAND - PLACE MASTIC SEALANT STRIP "1/4" THICK X "1/4" WIDE X 4" LONG IN LMB STEEL BANDS.
4. FOR ALTERNATIVE ANNULAR COUPLING BAND - 2 BAR AND STRAP ASSEMBLIES ARE REQUIRED FOR PIPE GREATER THAN 42" DIAMETER. OPTIONAL FOR SIZES LESS THAN 42".

**DILLE DETAIL**

**FOR USE ON CMP THRU 36" INCLUSIVE**

- **Pipe Size (inches)**: 1 1/2
- **Wall Thickness (inches)**: 3/16

**TWO PIECE INTEGRAL FLANGE**

**FOR USE ON 6", 8", AND 10" CMP**

- **Pipe Size (inches)**: 1 1/2
- **Wall Thickness (inches)**: 3/16
- **Coupling Band Size**: CMP THRU 36"

**NOTE:**

All dimensions are approximate and should be verified by calculation. All materials are to be determined by the manufacturer's specifications.
**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 PERIPHERY.

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

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

5. USE 1/16" GAGE LINE DIMENSION ON ATTACHED ANGLE LEG FOR RIVETS AND SPOT WELDS.

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

7. DIMENSIONS AND THICKNESS SHOWN ARE MINIMUM.

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

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

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**2-Spot Welds to Develop Strength of Set**

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[Diagram of SPIRAL CMP]

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**CHANNEL COUPLING BAND**

FOR USE ON FLANGED END CMP

Channel Coupling Band Shall Be Two Piece
CULVERT SIZE | A | 18" to 36" | 42" to 64" | 48" to 84" | 60" to 96" |
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<td>RAPR AND BEDDING CLASS</td>
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<td>C</td>
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**NOTES:**
1. HYDRAULIC SECTION APPROVAL MUST BE OBTAINED PRIOR TO INCORPORATION INTO PLANS.
2. WHEN NO END SECTION IS USED, ADDITIONAL RAPRAP 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 SHEET R-2.1.1.
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING BARS SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS. BARS TO BE EMBEDDED A MINIMUM OF 2" AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY 1 1/2".
3. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 1".
4. STRUCTURAL STEEL WEIGHT INCLUDES 2" PIPE AND THE 2 1/2" x 2 1/2" x 3/8" FRAME ANGLES.
5. STATION/OFFSET DISTANCE LISTED IN PLANS IS MEASURED TO THE CENTER OF GRATE.

NEVADA DEPARTMENT OF TRANSPORTATION
PIPE RISER INLET
TYPE 3

**QUANTITIES, FOR INFORMATION ONLY**
- CONCRETE: 0.36 Cu. Yd., 23 lbs., 170 lbs.
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE NO. 4 BARS WITH MAXIMUM SPACING AT 18" CENTERS, WIRE TIED TIGHTLY AT ALL INTERSECTIONS AND EMBEDDED 2" CLEAR OF ALL CONCRETE SURFACES.
3. EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1".
4. STRUCTURAL STEEL WEIGHT INCLUDES THE 2" NOMINAL DIAMETER PIPE STANDARD WEIGHT, 2" x 2" x 1/8" FRAME ANGLES, AND 3/4" x 1/8" BARS.
5. FOR 2" NOMINAL DIAMETER PIPE SEE ASME A36.
6. STATION/OFFSET DISTANCE LISTED IN THE PLANS IS MEASURED TO THE CENTER OF GRATE.

SECTION C-C

SECTION B-B

SECTION A-A

DETAIL A

PLAN

TYPE 2B DROP INLET

Nevada Department of Transportation

Signed Original On File: 04/22/2023

Chief Hydrologist/Engineer
**GENERAL NOTES:**

1. 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 FLOW LINE.
4. T = WALL THICKNESS.
GENERAL NOTES:
1. ALL CONCRETE SHALL BE CLASS 4 OR A.
2. REINFORCING STEEL SHALL BE NO. 4 1/2" Diameter, EXCEPT AS NOTED, WITH MAXIMUM SPACING AT 24" CENTERS, BLED UPTIL ALL INDEPOSITIONS, AND EMBEDDED AT LEAST 12" CLEAR OF CONCRETE SURFACE, EXCEPT AS NOTED.
3. EDGES OF CONCRETE SHALL BE CHAMFERED 1/2".
4. FOR STAKE AND FRAME DETAIL, SEE SHEET 9-4-2-3.
5. FOR VALUES OF "A" AND "C" SEE PLANS.
7. CURB OPENINGS LONGER THAN 2' SHALL HAVE ONE CURB SUPPORT FOR EACH 7' INCREMENT OR FUNCTIONAL GROUPING SPACING.
8. PIPE STEPS CAN BE PLACED IN ANY WALL.
9. ANGLE ANCHORS SHALL BE EMBEDDED HORIZONTAL IN EACH ENDLESS, EXACTLY SPACED, AND MAXIMUM SPACING OF 24".
10. FOR DROP INLET CONFIGURATION WITH 2 PIPE-LEVEL FLOW PIPE, INFILL ELEVATION SHALL BE 6" O.C. ABOVE GUTTER PIPE INFILL ELEVATION.
11. CURB BASIN FLOORS SHALL HAVE A MINIMUM SLOPE OF 1/8" FROM ALL DIRECTIONS TO OUTLET PIPE. IF BASIN IS USED AS A JUNCTION, SLICE FROM C通关 TO OUTLET PIPE AND PROVIDE A MINIMUM SLOPE OF 1/4" PER FOOT LINEAL.
12. CURB OPENING DIAMETER AS SHOWN ON PLAN IS MEASURED IN THE FACE OF CURB AT THE GUTTER PIPE LINE.

ELEVATION

SECTION A-A

SECTION B-B

SECTION C-C

* QUANTITIES

<table>
<thead>
<tr>
<th>SECTION</th>
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<th>PLAN</th>
<th>DETAILS</th>
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* ASSUMED MINIMUM 6" 15" DIA PIPE

DETAILED

NEVADA DEPARTMENT OF TRANSPORTATION

DROP INLET
TYPE 11

SIGNED: GRIGSON ON FILE 9-4-2-6 (609)

CHEF, HYDRAULICS ENGINEER
NEVADA DEPARTMENT OF TRANSPORTATION

TYPE 1 & 2
AND TYPE 1 & 2 MODIFIED
MANHOLES

GENERAL NOTES:
1. FOR CAST IN PLACE CONCRETE BASE ALL REINFORCING STEEL TO BE NO. 4 BARS AT 18" CENTERS TIGHTLY WOUND AT ALL INTERSECTIONS AND EMBEDDED IN CONCRETE AT LEAST 2" AND BAR ENDS MUST CLEAR CONCRETE SURFACES BY 1/2".
2. ALL CONCRETE SHALL BE CLASS A OR AA.
3. MANHOLE WITH MORE THAN ONE PIPE-INFLOW PIPE INVERT ELEVATIONS SHALL BE ≥ 0.1" ABOVE OUTFLOW PIPE ELEVATION.
4. FOR VALUES OF "H" SEE PLATES. "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 BE COVERED INSIDE, OUTSIDE, AND PERMANently. IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
7. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, LIDS, GRADE RINGS, AND STEPS SHALL CONFORM TO AASHO M 199 (ASTM C-478).
8. SHAPE FLOW LINE IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 1/16 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOW LINE.
9. T = PIPE WALL THICKNESS.

SECTION A-A
TYPE 1 MANHOLE
ECCENTRIC

SECTION B-B
TYPE 1 MANHOLE
CONCENTRIC

SECTION C-C
TYPE 1 & 2 MANHOLE
MODIFIED

SECTION D-D
TYPE 2 MANHOLE
CONCENTRIC

SECTION E-E
TYPE 2 MANHOLE
ECCENTRIC
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 0.1 FT ABOVE THE OUTFLOW PIPE INVERT ELEVATION.
3. FOR VALUES OF "H", SEE 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 AASHTO M 199 (ASTM C-678).
5. MANHOLE COVER SHALL BEAR ENTITY IDENTIFICATION AND SYSTEM FUNCTION IF APPLICABLE.
6. SHAPE FLOWING IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 10:1 MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOW LINE.

NEVADA DEPARTMENT OF TRANSPORTATION

TYPE 4 MANHOLE

SIGNED: [Signature]
[Date]

[Engineer's Name]
[Engineer's Title]
GENERAL NOTES:
1. THE WEIGHT OF FRAME SHALL BE 145 lbs. MINIMUM AND THE WEIGHT OF COVER SHALL BE 125 lbs. MINIMUM. TRAFFIC-STRENGTH MANHOLE FRAME & COVER SHALL COMPLY WITH AASHTO M 186 WHEEL LOADS, EQUIVALENT MANHOLE FRAMES & COVERS OTHER THAN SHOWN MAY BE USED UPON APPROVAL BY THE ENGINEER.

2. THE FRAME, SEAT AND COVER EDGE SHALL BE MACHINED TO A TRUE BEARING SURFACE ALL AROUND, THE FRAME & COVER SHALL BE COMPATIBLE TO THE MANUFACTURERS SPECIFICATIONS.

3. THE SURFACE SHOWN IS FOR ILLUSTRATION ONLY, ANY SURFACE DESIGN, OTHER THAN SMOOTH, MAY BE USED UPON APPROVAL.

4. FRAMES & COVERS SHALL CONFORM TO AASTM A 123, CLASS 40 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. CONCRETE SHALL BE CLASS A OR AA.

8. CONCRETE COLLARS MAY BE POURED ROUND OR ANY OTHER APPROPRIATE SHAPE WHEN APPROVED BY THE ENGINEER.

9. COMMERCIAL PREFABRICATED RING RINGS FOR MANHOLES SHALL CONFORM TO AASHTO M 189 (ASTM C-478).

10. MANHOLE COVER & FRAME SHOWN, OTHER SHAPES MAY APPLY TO UTILITY AND VALVE COVERS AND FRAMES.

NEVADA DEPARTMENT OF TRANSPORTATION
MANHOLE COVER, FRAME, & CONCRETE COLLAR

SECTION B-B
TRAFFIC-STRENGTH MANHOLE FRAME & COVER

SECTION A-A
See Note 10
GLUE DOWN CURBS

SECTION TYPE A
10.018 cu. yds. per ft.

SECTION TYPE B
10.0185 cu. yds. per ft.

* Omit Rounding When Curbs Are Back To Back (Epoxy Curb To Plantmix Surface)
Note: Epoxy Cement May Be Omitted When Installation Is Temporary.

** P.C.C. or Dense Graded

SECTION TYPE 1
10.0269 cu. yds. per ft.

SECTION TYPE 4
10.0269 cu. yds. per ft.

SECTION TYPE 5
10.0269 cu. yds. per ft.

SECTION TYPE 6
10.0269 cu. yds. per ft.

SECTION TYPE 7
10.0269 cu. yds. per ft.

GENERAL NOTES:
1. THIS LINE SHOULD BE USED TO DIMENSION OFFSETS.
2. WHEN DISTANCE BETWEEN BACK OF CURB AND ISLANDS IS A FEET OR LESS, USE CLASS A OR AA CONCRETE ISLAND PAVING AND 2" OF GRAVEL BASE.
3. CONCRETE SHALL BE CLASS A OR AA.
4. ALL CONCRETE UNIT VOLUME FOR INFORMATION ONLY.

CURB AND GUTTER

SECTION TYPE 2
10.0269 cu. yds. per ft.

SECTION TYPE 3
10.0269 cu. yds. per ft.

** P.C.C. or Dense Graded

SECTION TYPE 8
10.0269 cu. yds. per ft.

ELEVATION TYPICAL EXPANSION JOINT DETAIL

CURB & GUTTERS

NEVADA DEPARTMENT OF TRANSPORTATION

TYPICAL TRANSITION FROM ROLLED CURB TO VERTICAL FACE

All Edges Rounded 1/4" Radius
1/8" Expansion Joint
**GENERAL NOTES:**

1. ALL CURB RAMPS SHALL BE 12:1 OR FLATTER.
2. GRATING, MANHOLE, VALVE COVERS, OR SIMILAR ACCESSES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. TRANSITIONS FROM RAMPS TO GUTTERS OR ROADWAY SURFACE SHALL BE FLUSH AND FREE OF ABRUPT CHANGES.
4. PLANTMIX BITUMINOUS OPEN-GRATED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND WINGS, TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
6. CONCRETE SHALL BE CLASS A OR AA.
7. AVOID DRAINAGE DEVICES IN CROSS WALK AREAS.
8. DETECTABLE WARNING SHALL BE INSTALLED PER MANUFACTURERS GUIDELINES AND CONFORM TO ADAAC 4.29.2 "CONTRAST".

**LEGEND:**
- DETECTABLE WARNINGS

**TYPICAL ISLAND PAVING DETAILS**

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**
GENERAL NOTES:

1. ALL CURB RAMPS SHALL BE 12:1 OR FLATTER. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
2. GRAVING, MANHOLES, VALVE COVERS OR SIMILAR APPURTENANCES SHALL NOT BE LOCATED IN AREA AT THE BASE OF THE CURB RAMP OR LANDING AREA.
3. TRANSITIONS FROM RAMPS TO GUTTERS OR ROADWAY SURFACE SHALL BE FLUSH AND FREE OF ABRUPT CHANGES.
4. PLANTMIX RITINUMOS OPEN-GRADED SURFACE SHALL BE FLUSH WITH THE EDGE OF THE GUTTER PAN IN THE AREA OF THE CURB RAMP.
5. ROUGH BROOM TEXTURE ON CURB RAMPS AND GUTTERS. TEXTURE SHALL PROVIDE A VISUAL CONTRAST TO THE MEDIAN ISLAND.
6. CONCRETE SHALL BE CLASS A OR 44.
7. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
8. DETECTABLE WARNINGS SHALL BE INSTALLED PER MANUFACTURERS GUIDELINES AND CONFORM TO ADAAG 4.29.2 "CONTRAST".
GENERAL NOTES:
1. TYPE C DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SHEET R-5.3.3.
2. THE TOTAL WIDTH OF DRIVEWAY CURB OPENINGS SHALL NOT EXCEED 65% OF FRONT FOOTAGE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 60 OF A LIGHT POLE, FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX, OR BLOCK WALL HIGHER THAN 2.
4. THE CENTER INES OF DRIVEWAYS ON OPPOSITE SIDES OF THE STREET AT A MEDI An OPENING SHOULD BE 20 FROM EACH OTHER WHEN A PROPERTY LINE FALLS IN A MEDI An OPENING A J ON DRIVEWAY AGREEMENT SHALL BE REQUIRED. OR NO DRIVEWAY WILL BE ALLOWED.
5. HANDICAPPED ACCESSIBLE SIDEWALKS SHALL BE PROVIDED. SEE SHEETS R-5.2.1 TO R-5.2.2 & R-5.3.3.
6. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.
7. DRIVEWAY SPACING, CLEARANCES, AND RETURN RADIS SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

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

TYPE R, RESIDENTIAL DRIVEWAY GEOMETRICS
GENERAL NOTES:
1. ALL RAMPS SHALL BE 12:1 OR FLATTER.
2. CONCRETE DRIVEWAY CAN BE POURED MONolithically WITH CURB AND GUTTER.
3. ALL SLOPE RATES ARE RELATIVE TO LEVEL.
4. LENGTH VARIATES ACCORDING TO CURB AND GUTTER PROFILE. RETAINING CURBS AND ACQUISITION OF CONSTRUCTION EASEMENTS MAY BE NECESSARY.
5. IF THERE ARE R/A RESTRICTIONS, SIDEWALK WIDTHS CAN BE REDUCED TO 4' WITH PRIOR APPROVAL FROM ASSISTANT CHIEF ROAD DESIGN ENGINEER. A 5' X 5' PASSING ZONE IS REQUIRED EVERY 200' PER ADA. APPENDIX C, SECTION 4.3.4.
6. CONCRETE SHALL BE CLASS A OR AA.
7. SEE TABLE 1-10. ON SHEET R-5.2.1.
GENERAL NOTES:

1. SPACING OF NO. 4 BARS LESS THAN 18" 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 FUNDED 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 SHEETS R-5.2.1, R-5.2.2, AND R-5.3.1.

5. FOR GRADE CHANGES GREATER THAN 3%, VERTICAL CURVES OF AT LEAST 10' 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 SHEET R-5.2.2, FOR "A" AND "G".

9. AVOID DRAINAGE HOLES IN CROSS WALK AREAS.

10. DETECTABLE WARNINGS SHALL BE INSTALLED PER MANUFACTURERS GUIDELINES AND CONFORM TO ADAAG 4.29.2 "CONTRAS".
GENERAL NOTES:
1. MINIMUM 3' COVER DIVER TOP OF CONDUIT AT SHOULDER LINE.
2. 12 GAGE BARE COPPER DETECTION WIRE TO LAY IN FRENCH ADJACENT TO CONDUIT AND ATTACH TO LOCATION MARKER AT EACH END.
3. LOCATION MARKER SHALL BE 2" PVC OR 5' STEEL FENCE POSTS.
GENERAL NOTES:

1. STRESS PANELS SHALL BE PLACED EVERY 1200' ON TANGENTS.

2. STRESS PANELS SHALL BE PLACED EVERY 660' ON CURVES.

3. END PANELS SHALL BE USED WHEREVER A BREAK IN THE FENCE OCCURS I.E. GATES, CATTLE GUARDS, AND AT BEGINNING AND ENDING OF ALL CURVES.

4. SEE TABLE A FOR WOOD POST SPACING ON CURVES.

5. BARRIED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED BY NEVADA DEPARTMENT OF WILDLIFE OR BUREAU OF LAND MANAGEMENT.

6. WIRE ARE TO BE TIED OFF AT EXTREME POINTS, WRAP AND SPIKE TO SELF WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANELS.

7. WOOD POSTS SHALL BE 6" NOMINAL DIAMETER.

8. ADD ADDITIONAL STRANDS OF BARRIED WIRE AND/OR ROCK DEADMAN (MINIMUM WEIGHT 50 LBS.) WHEN SPACING BETWEEN BOTTOM WIRE AND ROCK EXCEEDS 25'.

9. STEEL POST DEADMAN DRIVEN APPROXIMATELY 3' INTO GROUND MAY BE USED IN LIEU OF ROCK DEADMAN.

TABLE A - WOOD POST SPACING ON CURVED FENCE LINES

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<tr>
<td>2,501 TO 10,000</td>
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<tr>
<td>&gt; 10,000</td>
<td>NO WOOD POST NEEDED, BETWEEN STRESS PANELS AT 660'</td>
</tr>
<tr>
<td>2 WOODS</td>
<td>TREAT CURVE AS TANGENT</td>
</tr>
</tbody>
</table>

NEVADA DEPARTMENT OF TRANSPORTATION

NEVADA 4-WIRE FENCE PANEL DETAILS (TYPE C-NV-4B)

SIGNED: (signature)

CHIEF ROAD DESIGN ENG.

Date: 6/6/22
GENERAL NOTES:
1. Hinge post shall be 8' in length and shall be buried 3' in ground.
2. Barbed wire shall be used for bottom strand when required by Nevada Department 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 posts shall be 6' nominal diameter.
5. Add additional strand of barbed wire and/or a rock deadman (minimum weight 50 lbs.) when space between bottom wire and ground exceeds 20'.
6. Steel post deadman driven approximately 6' into ground may be used in lieu of rock deadman.
7. Steel line posts at 8'-3' spacing to maintain bottom wire clearance.
GENERAL NOTES:
1. Spacing between wires on Missouri gate shall be the same as wires in adjacent fence.
2. Gate latch shall be lag bolted firmly to the gate post.
3. Wire posts, latch posts, and cattle guard wing attachment posts shall be 8" in length and shall be buried 3' in ground.
4. For end panel details, see sheet R-61-2.
5. Wire may be used in lieu of metal strap for connection of cattle guard wing to fence post.
6. Use rectangular mesh or 2" diamond mesh on metal drive gate.
DOUBLE BRACE END ASSEMBLY

CONSTRUCTION NOTES:
1. END POSTS AND LINE POSTS ARE RECOMMENDED TO BE MECHANICALLY DRIVEN INTO THE GROUND WHERE SOIL CONDITIONS PERMIT, TO BE DETERMINED BY THE ENGINEER.
2. MAXIMUM POST SPACING IS 10’ ON CENTER. ALL POSTS SHOULD BE DECORATED DUE TO THE STAMPED CONDITIONS. DEEPER SPACING WILL REMAIN ON 15’ MAX. CENTERS. MINIMUM LINE POST SPACING WILL BE 15’ CENTERS WITHOUT DRIPPERS. USE 4’ DIAMETER, SMALL END UP POSTS WHEN NEEDED.
3. PLACEMENT OF IN-LINE STRAINERS SHALL BE AS CLOSE TO THE CENTER OF THE FENCE RUN AS POSSIBLE. PLACEMENT OF TENSION INDICATOR SPRINGS SHALL BE ON THE SECOND ROW FROM THE TOP. COMPRESSION OF THE INDICATOR SPRING BY 1/4” WILL INDICATE A TENSION OF APPROXIMATELY 250 LBS. AT 10 LBS. /.
4. MAXIMUM LENGTH OF WIRE PER IN-LINE STRAINER ON CENTER, TERRAIN 100'-HORIZONTAL 1'-90 DEGREE CORNERS: 300’ 1 2-90 DEGREE CORNERS IS 250’ 3-90 DEGREE CORNERS IS 250’ 4-90 DEGREE CORNERS IS 150’ 5-90 DEGREE CORNERS IS 100’ USE UNLESS TERRAIN IS UNILATERAL IN A LINE PER 100’ FOR EACH MAJOR RISE AND DIP. 10’ DIAMETER POSTS SHALL BE A MINIMUM OF 4” DIAMETER SMALL END, 8” LONG, POSITIONS AT HIGH POINTS OF RIDGES AND LOW POINTS OF DULRIL.
5. EXCEPT FOR FASTENING LINE WIRE, WHICH HAS BEEN SHOWING THE ALTITUDES OF WOOD POSTS IN CORNERS AND CURVES. FENCE SHOULDS NOT BE DRIVEN VERTICALLY INTO WOOD POSTS. DRIVING STAPLES HISTORICAL AMERICAN NASH DURABLE POSTS WILL PROVIDE IMPROVEMENT IN RESISTANCE TO PULLOUT.
6. GROUND MUST BE GALVANIZED STEEL 1/8” WIRE, SHALL BE PLACED EVERY 9” IN DRY SOILS. ON EVERY POST IN WETTEN SOILS. SPECIFIC LOADING POSITIONS TO BE DETERMINED BY THE ENGINEER. FENCE UNDER MOUNTAIN SHALL BE ORDAINED AT 3 POINTS. ONE DIRECTLY UNDER POWER LINE AND ONE EACH SIDE 30” TO 90” AWAY.
7. IT IS RECOMMENDED FOR THE USE OF END POSTS TO USE TWO 1/4 INCH GROOVED SLEEPERS CAY. NO. 200-40-3 MANUFACTURED BY THE NATIONAL TELEPHONE SUPPLY COMPANY OR ACCEPTABLE EQUIVALENT.
8. IT IS RECOMMENDED FOR SPACING THE WIRE TO USE THREE 1/8 INCH GROUVED SLEEPERS OR 3 RELIABLE WIRE LINER MADE BY RELIABLE ELECTRIC COMPANY OR ACCEPTABLE EQUIVALENT.
9. PROPER TENSION ON THE BRACE WIRE IN THE END ASSEMBLY IS ACCOMPLISHED BY TWISTING THE BRACE WIRE A MINIMUM OF 6 TIMES. THE TWISTING VANCE OF THE I’/4” TENSION SPRING IS SEPARATELY FASCINATOR TO THE TOP-HORIZONTAL BRACE POST.
10. LINE WIRE SHOULD NOT STAPLED TO THE LINE POST OR LINES POST. DEEPER SPACING WILL REMAIN ON 15’ MAX. CENTERS. MINIMUM LINE POST SPACING WILL BE 15’ CENTERS WITHOUT DRIPPERS. USE 4’ DIAMETER, SMALL END UP POSTS WHEN NEEDED.
11. ADDITIONAL CONSTRUCTION NOTES MAY BE FOUND IN UNITED STATES STEEL CATALOG NO. 197590, "HOW TO BUILD FENCING WITH UNITED STATES STEEL 100-200 HIGH TENSION FENCE WIRE."
12. CONCRETE SHALL BE CLASS S OR AA.

8 WIRE FENCE DETAIL

DETAIL C
IN-LINE WIRE STRAINERS & TENSION INDICATOR SPRINGS

ALTERNATE FOUR POST CORNER ASSEMBLY
PLAN

DETAIT A
POST WITH CONCRETE FILL

HIGH TENSILE 8-WIRE RANGE FENCE

SIGNED:
CHIEF ROAD DESIGN ENG.
6/6/14
6/6/14

NEVADA DEPARTMENT OF TRANSPORTATION
DOUBLE SWING GATE

NOTE: \( \frac{3}{8} \)" Adjustable Tens Rods shall be installed in all Gates over 6' in Width. See Detail B, Sheet R-6, for Tens Tightener Detail.

FRAME CONSTRUCTION GATES THRU 12' OPENING

FRAME CONSTRUCTION GATES OVER 12' TO 32' OPENING

Tens Rods

Tens Rods or Tens Tightener

FRAME CONSTRUCTION GATES

FRAME CONSTRUCTION GATES

GATE POST

GATE OPENING IN FEET

 Gore opening

D.B. Dia.

MIN. WEIGHT

Pounds/lin. ft.

SINGLE GATE

DOUBLE GATE

SINGLE GATE

DOUBLE GATE

Up to 6

6.79

6.79

6.79

6.79

Up to 12

7 thru 15

4.00

4.00

16 thru 18

5.67

5.67

19 thru 22

6.25

6.25

23 thru 26

6.99

6.99

27 thru 30

8.97

8.97

GENERAL NOTES:

1. DIAMETER AND WEIGHT LISTED ABOVE ARE MINIMUMS.
   LARGER SIZES MAY BE USED ON APPROVAL OF ENGINEER.

2. 3/8", 1/2" TYPE 13 POST 14.45 LBS/PT CAN BE USED IN PLACE OF 2.75" O.D. ROUND GATE POST.

3. CONCRETE SHALL BE CLASS A OR AA.

SIGNED ORIGINAL ON FILE

NEVADA DEPARTMENT OF TRANSPORTATION

FENCE DETAILS

SWING GATE FOR UP TO 72' CHAIN LINK FENCE

CHIEF ROAD DESIGN ENGR

Chief Road Design Engineer
TYPICAL GUARDRAIL INSTALLATION

GENERAL NOTES:
1. FOR DETAILS AND DIMENSIONS NOT SHOWN SEE SHEETS R-8.1.2 THRU R-8.4.3.
2. SEE SHEET R-8.3.1.1 FOR SPECIAL GUARDRAIL TERMINAL END FOR RAILROAD CROSSING.
3. SEE SHEET R-8.2.2 FOR TRAILING END ANCHOR.
4. MINIMUM INSTALLATION:
   GUARDRAIL-BRIDGE RAIL CONNECTOR – 14'-4½".
   THREE BEAM SECTION – 12'-6".
   TRANSITION PANEL APPROVED 350° TERMINAL – 37'-6½".

      ANY OTHER VARIATION THAT REDUCES THE MINIMUM LENGTH
      SHALL REQUIRE APPROVAL OF THE CHIEF ROAD DESIGN ENGINEER.

5. NO DIRECT PAYMENT FOR THE ADDITIONAL GUARDRAIL PANEL.
6. THE LENGTH OF THE TRANSITION PANEL, 14'-4½" SHALL BE
   ADDED TO THE ESTIMATED LENGTH OF THE THREE BEAM
   GUARDRAIL. SEE SHEET R-8.4.1.
7. FOR GRADING DETAILS NOT SHOWN SEE SHEET R-8.2.1.
   REFER TO MANUFACTURER'S DRAWINGS.
8. FOR RETROFIT INSTALLATIONS IF MINIMUM CANNOT BE MET AND
   THE DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS
   LESS THAN 2', THE POST SHALL BE LENGTHENED 1' MIN.

9. WHEN GUARDRAIL IS PLACED AT NORMAL EDGE OF PAVEMENT, THE
   TANGENT END TREATMENT SHALL BE FLARED #501 TAPER TO GET
   HEAD PIECE CLEAR OF EDGE OF PAVEMENT.
10. APPROVAL GUARDRAIL TERMINALS SHALL BE "CHRP 350°", FMWA,
    AND MSTD APPROVALS.
11. A REFLECTORIZED OBJECT MARKER SHALL BE INSTALLED ON THE
    TOP EDGE OF THE APPROVED "350°" TERMINAL PER MANUFACTURERS
    RECOMMENDATIONS.
12. ALL WOOD/STEEL POSTS SHALL BE STAMPED WITH THE LENGTH ON OR
    NEAR THE TOP SURFACE IN A CONSPICUOUS PLACE. THE STAMPED
    LETTERING SHALL BE 1½ HIGH AND 1½ DEEP FOR WOOD AND 1½ TO
    2½ IN HEIGHT FOR STEEL. IF THE LETTERING IS DISTURBING
    DURING INSTALLATION IT SHALL BE RE-STAMPED.

NEVADA DEPARTMENT OF TRANSPORTATION
TYPICAL GUARDRAIL INSTALLATION

SIGNED ORIGINATING OFFICE R-8.1.1 (6/68)
CHIEF ROAD DESIGN ENG.
GENERAL NOTES:
1. FOR END TREATMENTS NOT SHOWN, REFER TO MANUFACTURER'S DRAWINGS.
2. SHOULDER DIES, DRAIN, AND CURB ARE NOT TO BE INSTALLED IN THESE AREAS.
3. SEE SHEET R-8.2.2 FOR DETAILS NOT SHOWN.
4. GALVANIZED GUARDRAIL (TRIPLE CORRUGATIONS): SEE SHEET R-8.4.1 AND R-8.4.1.1.
5. CRASH CUSHION OR TANGENT END TREATMENT (BI-DIRECTIONAL) CAN BE FLARED AT 50:1 TAPER.
6. RECOVERABLE SLOPES REQUIRED BEHIND EATING PORTION OF END TREATMENT OR CRASH CUSHION.
7. ON RETROFIT INSTALLATIONS WHEN DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS LESS THAN 2', THE POST SHALL BE LENGTHENED 1 minimum.
8. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE COVERED BY FINAL SURFACING HEIGHT.
9. REFERENCE: AASHTO ROADSIDE DESIGN GUIDE, CURRENT EDITION.
10. CLEAR ZONE SHOULD BE BASED ON DESIGN YEAR TRAFFIC VOLUMES.
11. RECOVERABLE SLOPES ARE 4:1 OR FLATTER.

LEGEND:
- PAVED AREAS

TYPICAL GUARDRAIL INSTALLATION

<table>
<thead>
<tr>
<th>Design Speed (MPH)</th>
<th>Flare Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>16:1</td>
</tr>
<tr>
<td>60</td>
<td>13:1</td>
</tr>
<tr>
<td>50</td>
<td>11:1</td>
</tr>
<tr>
<td>40</td>
<td>9:1</td>
</tr>
<tr>
<td>30</td>
<td>7:1</td>
</tr>
</tbody>
</table>

SIGNED: Orig. On File
R-8.1.2 (668)
CHIEF ROAD DESIGN ENG.
METHOD A
GUARDRAIL TERMINAL (TANGENTIAL)

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

METHOD C
GUARDRAIL TERMINAL (FLARED) (PARABOLIC)

METHOD D
GUARDRAIL TERMINAL (FLARED) (STRAIGHT)

GENERAL NOTES:
1. FOR TYPICAL GUARDRAIL INSTALLATION, SEE SHEET 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 TAILING END GUARDRAIL TERMINALS SHALL BE "NCHRP REPORT 350" TEST LEVEL 3 (TL-3), FHWA, AND NEVADA DOT APPROVED.
4. "X" IS THE CENTER OF POST; EXCLUDING POSTS 1 AND 2. USE TABLE 1 FOR BREAKAWAY POSTS WITH BLOCKS, EXCLUDING POSTS 1 AND 2.

TABLE 1

<table>
<thead>
<tr>
<th>Terminal Ends</th>
<th>W (Flare)</th>
<th>X (Widening)</th>
<th>Y (Sky)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method A</td>
<td>1-3&quot;/6&quot;</td>
<td>7-3/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Method B</td>
<td>1-3 1/4&quot;</td>
<td>6-3/4&quot; to 5-9/4&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Method C</td>
<td>1-3/4&quot;, to 2-9/4&quot;</td>
<td>7-3/4&quot;, to 6-9/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Method D</td>
<td>1-3/4&quot;, to 3-11/4&quot;</td>
<td>7-3/4&quot;, to 9-11/4&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

LEGEND:
- PAVED AREAS
Table A

<table>
<thead>
<tr>
<th>Radius</th>
<th>Number of CRT Posts</th>
<th>Clear Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot; - 10&quot;</td>
<td>3</td>
<td>25&quot; x 15&quot;</td>
</tr>
<tr>
<td>10&quot; - 12&quot;</td>
<td>6</td>
<td>30&quot; x 15&quot;</td>
</tr>
<tr>
<td>12&quot; - 15&quot;</td>
<td>8</td>
<td>40&quot; x 20&quot;</td>
</tr>
<tr>
<td>15&quot; - 20&quot;</td>
<td>11</td>
<td>50&quot; x 20&quot;</td>
</tr>
</tbody>
</table>

**State Highway**

**Guardsrail Barrier Rail Connector**

See Design Criteria Note 3

**Clear Area**

- **CLEARANCE**
  - 3 Spaces @ 6" - 3" O.C. (Point A)
  - 1 Space Min. 6" - 3" O.C.

**POINT A**

Bid Item

- Galvanized Guardrail (Tri-Corr.)
- Transition Guardrail
- Galvanized Guardrail

**Section A-A**

- 3/8" Bolt with Snug Fitting Insert, 3/8" w, 1/2" Long
- 1/4" Bolt
- Washer

**IDENTIFICATION PLATE DETAILS**

- See Note 3

**SPECIAL GUARDRAIL INSTALLATION CRT**

**GENERAL NOTES:**

1. **USE OF THIS DETAIL REQUIRES CHIEF RODWAY DESIGN ENGINEER APPROVAL. THIS INSTALLATION IS INTENDED FOR THE LEADING SIDE TO A BRIDGE END, ESPECIALLY WHERE INADEQUATE ROOM IS AVAILABLE TO INSTALL OTHER STANDARD INSTALLATIONS OF GUARDRAIL BRIDGE RAIL CONNECTORS, GUARDRAIL AND GUARDRAIL TERMINALS (FLARES) OR GUARDRAIL TERMINAL (TANGENTIAL) DUE TO A NEARBY CROSSROAD OR APPROACH.**

2. **SEE CONTRACT DOCUMENTS LIST AND STANDARD PLANS FOR TRANSITION AND TERMINAL CONNECTOR TYPE.**


4. **GUARDRAIL INSTALLATION SHALL BE W-BEAM GUARDRAIL WITH BREAKAWAY CRT POSTS AND WITHOUT BLOCKS.**

5. **GUARDRAIL TERMINAL SHALL HAVE A 90° CORNER WITH THE IDENTIFICATION PLATE DETAIL FOR Joints SHALL BE 1/2 MINIMUM HEIGHT AND 3/4 MAXIMUM WIDTH, PLATE SHALL BE GALVANIZED AFTER ETCHING.**

6. **ANCHOR TERMINAL TO BE USED ONLY WHEN THERE IS NOT ENOUGH ROOM TO ACCOMMODATE AN NOCH LP REPORT 350 TERMINAL.**

**DESIGN CRITERIA NOTES:**

A. **DESIGN CRITERIA IS FROM A FHWA TECHNICAL ADVISORY T 5040.32, DATED APRIL 13, 1992 CALLED "CURVED W-BEAM GUARDRAIL INSTALLATIONS AT MINOR ROADWAY INTERSECTIONS."**

B. **THIS INSTALLATION IS ACCEPTABLE FOR LOW-SPEED PURE AND EQUAL TO 50 MPH. LOW-VOLUME THROUGH ROADWAYS INTERSECTED BY LOW-SPEED, LOW-VOLUME CROSS ROADS AND/OR DRIVEWAYS.**

C. **A FLAT APPROACH TO THE CURVED GUARDRAIL INSTALLATION IS NECESSARY TO ENSURE PROPER PERFORMANCE.**

D. **IN TABLE A, RADIUS ARE NOT TO BE INTERPOLATED OR EXTRAPOLATED. THIS INSTALLATION IS BASED ON INTERSECTION ANGLES NEAR 90 DEGREES.**

E. **FOR THE "A" RADIUS LAYOUT, THE GUARDRAIL PANEL IS NOT BOLTED TO THE ONE CRT POST AT THE CENTER OF THE CURVED NOISE AREA.**

F. **FOR DHIN LAYOUTS USING LARGER RADIUS UP TO 25°, THE GUARDRAIL PANEL IS BOLTED TO THE CRT POSTS IN THE CURVED NOISE AREA.**

G. **ON CRT POSTS WITHIN THE ARC LENGTH, USE 3/8" DIAMETER BOLTS. EACH CRT POST WILL HAVE A HOLE WITH A SNUG FITTING INSERT, 3/8" ID x 1/2" LONG. USE 1/4" WASHERS ON THE BACKSIDE OF CRT.**

H. **CLEAR AREA SIZES ARE SHOWN IN TABLE A. THE CLEAR AREA MUST BE KEPT FREE OF FIXED OBJECTS. FOR EMBANKMENT SLOPES THE HINGE POINT SHOULD BE GREATER THAN 2' BEHIND THE BACK OF POSTS. EMBANKMENT SLOPES WILL BE FLATTER THAN OR EQUAL TO A 2:1 MAXIMUM.**

I. **USE THE ANCHOR TERMINAL WITH LOW-SPEED, LOW-VOLUME FACILITIES WITH A STOP CONDITION ON CROSS ROAD OR APPROACH.**

**LEGEND:**

- Clear Area
- CRT Posts, No Blocks, See Note 4.
GENERAL NOTES:
1. USE OF THIS DETAIL REQUIRES CHIEF ROADWAY DESIGN ENGINEER APPROVAL.
2. TO BE USED ONLY WITH SPECIAL GUARDRAIL INSTALLATION. SEE SHEET R-8.2.4.
3. OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT A MINIMUM OF 100 ft-lbs.
4. TOENAIL PLATE AT CORNERS WITH 100 NAILS.
GENERAL NOTES:

1. USE NESTED THREE BEAM. SEE DETAIL N SHEET R-8.1.1.

2. AN APPROVED GUARDRAIL TERMINAL SHALL 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 SHEET R-8.4.1.

4. FOR INFORMATION NOT SHOWN REFER TO THE MOST CURRENT AASHTO ROADSIDE DESIGN GUIDE.

5. IF GUARDRAIL SYSTEM IS NOT SATISFACTORY, USE CONCRETE BARRIER RAIL. CHECK FOR VEHICLE ROLL ANGLE (TOP OF TALLER VEHICLES HITTING THE OBSTRUCTIONS).

6. SPACER MATERIAL MAY BE 1-BEAM, WOOD BLOCK, OR FORMED STRUCTURAL TUNING BY PRIOR APPROVAL OF THE ENGINEER. FOR DETAILS OF A SPACER BLOCK SEE SHEET R-8.4.1. SPACING DISTANCE CAN BE ADJUSTED UPWARD TO FIT THE SPACER BLOCK.

NEVADA DEPARTMENT OF TRANSPORTATION

GUARDRAIL INSTALLATION DEFLECTIONS
AND BACK SPACING

CHIEF ROAD DESIGN ENGR. R-8.3.1 (688)
SIGNED ORIGIN: ON FILE
GENERAL NOTES:

1. THESE DETAILS ARE TO BE USED ONLY WHEN GUARDRAIL POST CANNOT BE INSTALLED TO AVOID UNDERGROUND OBSTRUCTIONS WITH GUARDRAIL POSTS.

2. SEE SHEET R-8.4.1 FOR DETAIL 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 AASHO ROADSIDE DESIGN GUIDE FOR DETAILS.

4. CHECK FEASIBILITY OF REMOVING OBSTACLE OR EXTENDING OUTSIDE CLEAR ZONE VS. COST OF REMOVAL.

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

SECTION A-A
NESTED BEAMS
GENERAL NOTES:
1. WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN 2, THE POST SHALL BE LENGTHENED TO MINIMUM.
2. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE COVERED BY F.R.A. SURFACING ELEVATIONS. HEIGHT MEASURED AT FACE OF RAIL ELEMENT.
3. ALL HARDWARE TO BE GALVANIZED.

LEGEND:
* AUXILIARY HOLE TO BE USED WHEN ROADWAY SURFACE TO RAIL BOTTOM IS LESS THAN 10".
**GENERAL NOTES:**

1. When distance between back of guardrail post and hinge point is less than 3', the post shall be lengthened 1' minimum.

2. Guardrail heights on state construction projects shall be governed by final surfacing elevations. Height measured at face of rail element.

3. Attach guardrail to wood block and steel post with two bolts on approaching traffic side of block and post web.

4. Top of guardrail to be 32" above ground line or shoulder surfacing.

5. For details of the cross section of thrie beam rail element, rail splice, transition section and backup plate, see Sheet R-8.4.1.

6. All hardware to be galvanized.

---

**SECTION A-A: STEEL POST BOLT HARDWARE AND WOOD BLOCK DETAIL**

- **Steel Post Bolt Hardware:** 
  - 1/2" Button Head Bolts, w/nut washers on both heads, fastened with hex nut and nut washer on threaded end of bolt. See Note 3.

- **Wood Block:** 
  - W8 x 5 or M5 x 8.5

---

**WOOD BLOCK FOR STEEL POST**

---

**STEEL POST ASSEMBLY**

---

**NEOVA DEPARTMENT OF TRANSPORTATION**

**GALVANIZED GUARDRAIL**

**TRIPLE CORRUGATION**

**STEEL POST**

---

**SIGNED**

**R.8.4.1**

**CHIEF ROAD DESIGN ENGR.**

**(668)**
6'-3" Standard Spacing

Steel Posts & Wood Block Shown, See Detail C

For 6" x 6" Post & Block (Wood), See Sheet R-8-9-1

3'-1/2" 3'-7/8" 3'-9/16" 3'-7/8" 3'-1/2" 3'-1/2"

For This Length the Tri-Beams to be Nested, See Detail C

Terminal Connector, See Detail A

Plan

Galvanized Guardrail (Triple Corrugation)

Guardrail-Bridge Rail Connection

 details, See Sheet R-8-4.1

Elevation

Top of Approach Slab of Bridge Deck

Legend:

* 1 1/8" DIA. O C DRILLED HOLES FOR 1/4" DIA. GALVANIZED HIGH STRENGTH HEX BOLTS & NUTS WITH 3" x 1/4" SQUARE GALVANIZED STEEL WASHER WITH 1/8" DIA. HOLE.

Spac e r Block Table

<table>
<thead>
<tr>
<th>Spac e r Block A</th>
<th>Spac e r Block B</th>
<th>Spac e r Block C</th>
<th>Spac e r Block D</th>
</tr>
</thead>
</table>

Spac e r Block 1 Details

Spac e r Blocks 2 and 3 Details

Detail A

Guardrail-Bridge Rail Connection (Triple Corrugation)

Details, See Sheet R-8-4.1

Neat Cross-Section

Top of Approach Slab Profile Grade

(For Barrier Rail Dimensions not shown See Section C-C)

SECTION A-A  SECTION B-B  SECTION C-C  DETAIL B  DETAIL C  R-8-9-1  (606)
**Section Thru Rail Element**

- Bolt Holes for Splice
- Sym. About C
- 3/16" R
- 11/32" x 3/16" x 1/8" Tolerance
- 31/4"

**Steel Post and Wood Block**

- 4/5" Wide x 3/6" Deep Groove Full Length of Block
- Use 2-20c Nuts to Prevent Block Rotation
- 5/8" Hex Nut
- 5/8" Steel Washer

**Wood Post & Block**

- 5/8" Hex Nut
- 5/8" Steel Washer
- Auxiliary Hole to be Used When Roadway Surface to Rail Bottom is Less than 1-2"

**Plan**

- 6" x 8" Wood Post and Block
- 2-20c Nuts

**General Notes:**

1. All holes 5/16" Dia.
2. For metal posts - rail mounts to block with bolt on approaching traffic side of block and post web.
3. On retrofit installations when distance between back of guardrail post and hinge point is less than 2", the post shall be lengthened 1" min.
4. Guardrail heights on staged construction projects shall be governed by final surfacing elevations.

**Typical Guard Rail Installation**

- Normal E.O.P.
- 6' Min.
- See Note 4

**Rail Splice**

- 5/8" x 10" Button Head Bolt
- 5/8" x 10" Splice Bolt Slot

**Plan**

- Metal Post and Wood Block
- 6" x 8" Block
- 8-3"
**LEGEND:**

1. Dimension Used When Barrier is Placed Against Rock or Solid Object Such as a Retaining Wall
2. Pavement (See Note 3)
3. Joint Sealer Typical (See Note 5)
4. Vertical Joint Sealer Typical (See Note 4)
   - 1" x 8" Steel Dowel @ 2' Centers (If Needed See Note 3)
   - No. 4 Bars Continuous

**TYPE A CONCRETE (INFORMATION ONLY)**
0.1208 yd³ Per Ft., Without Base Slab
0.1578 yd³ Per Ft., With Base Slab

**TYPE B CONCRETE (INFORMATION ONLY)**
0.0702 yd³ Per Ft.

**BITUMINOUS SECTION**

**BARRIER RAIL END ANCHOR DETAIL**

**CONCRETE SECTION**

**GENERAL NOTES:**

1. Concrete shall be Class A or AA. Reinforcing Steel: Use 4-No. 4 Bars Continuous in Type A and Type B Concrete Barrier Rail. Use 3-No. 4 Bars Continuous in Type B and Type C Concrete Barrier Rail.
2. 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.
3. Bituminous paving requirements: The barrier end anchors shall be constructed in the first and last 10' of the barrier rail run. At the contractors option, concrete base and barrier rail may be placed monolithically. In which case dowels may be eliminated. See barrier rail end anchor details.

4. Vertical joints shall have a single component hot applied sealant full depth of joint.
5. Joint sealer shall be a single component hot applied sealant 1" thick.
6. The height of the barrier rail shall be measured from the top of the plantmix bituminous surface or the top of concrete pavement.
7. For impact attenuator attachment details, see manufacturer's drawings. For guardrail energy absorbing terminal attachment, see Sheet R-6.11.1.
8. Depth of 6" base shall be checked and increased as needed for foundation stability. When barrier rail sits in pavement, the base can be eliminated. Barrier rail and anchors may be required.
9. For details not shown, see Type A.
10. B = 2/19 x h + 12
11. See contract plans for exact dimensions.

**Concrete Barrier Rail Lateral Friction Notes**

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Friction Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 MPH</td>
<td>2.54</td>
</tr>
<tr>
<td>70 MPH</td>
<td>2.01</td>
</tr>
<tr>
<td>60 MPH</td>
<td>1.71</td>
</tr>
<tr>
<td>50 MPH</td>
<td>1.41</td>
</tr>
<tr>
<td>40 MPH</td>
<td>1.11</td>
</tr>
<tr>
<td>30 MPH</td>
<td>0.81</td>
</tr>
</tbody>
</table>

**CONCRETE BARRIER RAIL**

SIGNED ORIGINAL ON FILE

Nevada Department of Transportation

**CHEF ROAD DESIGN ENG.**

Sheet: 503 (509)
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. MEDIAN BARRIER RAIL SHALL BE SCORED 1/2" DEEP VERTICALLY EVERY 15'.
3. ALL CONTACT JOINTS SHALL BE AT PLANNED SCORED JOINT LOCATIONS.
4. ALL JOINTS AND OTHER LOCATIONS NEEDING SEALING SHALL FOLLOW REQUIREMENT SET IN SHEET R-8.6.1.
5. FOR IMPACT ATTENUATOR ATTACHMENT DETAILS, SEE MANUFACTURER'S DRAWING. MEDIAN END TREATMENTS SHALL BE BI-DIRECTIONAL.
6. REFER TO THE CURRENTLY ADOPTED 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 3' MINIMUM OR LENGTH OF OBSTRUCTION, WHICHEVER IS GREATER, SEE CONTRACT PLANS FOR EXACT DIMENSIONS.
10. THE 42" TYPE FA BARRIER RAIL MAY ALSO BE CONSIDERED ON THE OUTSIDE CURVE NEXT TO SENSITIVE AREAS SUCH AS SCHOOLS, HOUSING DEVELOPMENTS, AND PROBLEM AREAS THAT NEED EXTRA PROTECTION.
11. FOR DETAILS NOT SHOWN SEE TYPE FA.
12. VARY = 2/19 X H + 12''.
13. FOR TRANSITIONS FOR HEIGHTS, SEE SHEET R-8.6.3.
14. FOR DETAILS NOT SHOWN, SEE SHEET R-8.6.1.
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 PLANTMIX BITUMINOUS SURFACE OR THE TOP OF CONCRETE PAVEMENT.
3. ROUGHEN CONTACT FACE OF EXISTING RAIL TO 1/2" RELIEF PRIOR TO POURING NEW RAIL TRANSITION.
4. AT THE INDICATED REINFORCING LOCATIONS, DRILL 5/16" HOLES IN CONTACT FACE OF EXISTING RAIL TO A MINIMUM DEPTH OF 12" AND INCLUDE 5 DEGREES FROM THE HORIZONTAL. SECURE NO. 4 REINFORCING BARS IN THE DRILLED HOLES WITH AN EPOXY CONFORMING TO SECTION 728 OF THE STANDARD SPECIFICATIONS.
5. PLACE STRAIGHT AND OR BENT NO. 4 REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED. SPLICES IN REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED (MINIMUM 12" LAP LENGTH).
6. FOR DETAILS NOT SHOWN, SEE SHEETS R-8.6.1 TO R-8.6.2.
GENERAL NOTES:
1. USE ONLY WHEN SPECIFIC CRITERIA ARE MET. THE CRITERIA FACTORS ARE THE CLEAR ZONE, DIRECTION OF TRAFFIC, OFFSET DISTANCE, AND SPEED ZONES. APPROACH AND TRAILING END CRITERIA ARE TREATED SEPARATELY.

APPROACH END CRITERIA — REQUIRES CHIEF HIGHWAY DESIGN ENGINEER APPROVAL. MAY ONLY BE USED FOR APPROACH ENDS WHEN OUTSIDE CLEAR ZONE OR SPEEDS ARE LESS THAN OR EQUAL TO 40 MPH.

TRAILING END CRITERIA — MAY BE USED FOR TRAILING END FOR ALL SPEEDS WHEN TRAFFIC IS ONE-WAY TRAFFIC AND BEYOND THE OPPRESSING DIRECTION CLEAR ZONE, E.G., SOME ON-RAPIDS, OFF-RAPIDS, AND DIVIDED HIGHWAYS.

2. CONCRETE SHALL BE CLASS A OR AAL. TRANSVERSE JOINTS WITH 1" PRECUTTED EXPANSION JOINT FILLER OR 1" 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. 6" DEEP BARRIER END ANCHORS SHALL BE CONSTRUCTED IN THE FIRST AND LAST 5 LINEAR FEET OF THE FULL HEIGHT BARRIER RAIL RUN. IF TRANSITIONS 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 SEALER SHALL BE A SINGLE COMPONENT HOT APPLIED SEALANT 1" THICK.


7. JOINT FILLER SHALL BE PLACED IN OPEN JOINTS IN THE BARRIER AS REQUIRED TO MATCH JOINTS IN THE APPROACH SLAB DETAIL.

8. Dowels and reinforcing steel to extend into end sections, adjust locations and terminate bars as necessary to maintain 2" minimum cover.

9. FOR DETAILS NOT SHOWN, REFER TO SHEET R-8.6.1.

TABLE A
20' Trailing End Length With 8 - 2'/8" Equal Spacings
80' Approach End Length With 8 - 10' Equal Spacings

LEGEND:
* 1" x 8" Steel Dowel @ 2' Centers
(If needed See Note 3)

NEVADA DEPARTMENT OF TRANSPORTATION
VERTICAL TAPER CONCRETE BARRIER RAIL
SIGNED ORIGINATING ENGINEER: R-8.6.1 (502)
CHIEF HIGHWAY DESIGN ENGINEER: R-8.6.5 (502)
GENERAL NOTES:
1. STRAIGHT HOLES 1/2" DIAMETER MAY BE USED IN LIEU OF THE TAPERED HOLES.
2. RESIN 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 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. 1/4" U-BOLTS MAY BE SUBSTITUTED FOR 1/2" DIAMETER BOLTS.
6. OPENINGS IN THE SCREEN AREA OF 3' SHALL BE PROVIDED AT 200' INTERVALS.

PORTABLE PRECAST BARRIER RAIL F-SHAPES

ANCHOR PLATE DETAIL (ALTERNATIVE A)

ALTERNATIVE A

ALTERNATIVE B

ALTERNATIVE C

SCREEN ANCHORAGE DETAILS
### TABLE 1

Maximum Spacing For Guideposts On Horizontal Curves Less Than Or Equal To 10,000' (1 mile).

All Distances Shown in Feet & Rounded To The Nearest 5'

<table>
<thead>
<tr>
<th>Radius of Curve (1,000')</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>20</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>150</td>
<td>35</td>
<td>55</td>
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<tr>
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<td>70</td>
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<td>75</td>
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<tr>
<td>400</td>
<td>60</td>
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<td>400</td>
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<tr>
<td>450</td>
<td>65</td>
<td>85</td>
<td>450</td>
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<tr>
<td>500</td>
<td>70</td>
<td>90</td>
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<td>550</td>
<td>75</td>
<td>95</td>
<td>550</td>
</tr>
<tr>
<td>600</td>
<td>80</td>
<td>100</td>
<td>600</td>
</tr>
</tbody>
</table>

TYPICAL INSTALLATIONS

- **Rigid Post/Reflector**
  - Without Curb & Gutter
  - As Specified

- **Flexible Post/Reflector**
  - With Curb & Gutter
  - Build Depth As Specified By Supplier and Approved By the Engineer

GENERAL NOTES:

1. **Guidepost Reflector Color** shall conform to the color of adjacent striped edge line.
2. **Guidepost Spacing**:
   - a. Tangent sections and Curves with Radius greater than 10,000', spacing shall be 400' both sides of roadway.
   - b. Curves with Radius of 10,000' or less spacing 20' minimum - 300' maximum.
   - c. Distance shall be measured along centerline of roadway and projected perpendicularly across to inside and outside of curve.
   - d. Guidepost shall be placed at beginning and end of curve with spacing transitioned within the tangents as shown in Table 1. "LIT" indicates guidepost nearest curve "STOP" is furthest away.
3. **Spacing within curve** as shown in Table 1.
4. **Accelerate/Decelerate Lanes & Ramps**: Spacing 100' maximum for tangents & curves.
5. **Guardrail & Barrier Rail Sections**: See Sheet R-9.2.
6. **Islands**: Curves & Shoulder Dikes spacing 20' minimum - 50' maximum.
7. **If normal spacing is interrupted by features such as driveways, approaches, etc., the guideposts may be moved a maximum of 1/4 of normal spacing. Guideposts falling within such features shall be eliminated.**
GENERAL NOTES:
1. ALL REFLECTORS SHALL BE SELECTED & INSTALLED PURSUANT TO THE PROJECT PLANS & SPECIFICATIONS OR AS 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. COLORS SHALL COMPLY WITH THE GUIDELINES ESTABLISHED BY THE CURRENTLY ADOPTED M.U.T.C.O. EDITION.

REFLECTOR PLACEMENT SPACING ON GUARDRAIL/BARRIER RAIL:
SPACING SHALL BE:
(a) 50' ON TANGENTS AND ON CURVES OF 300' RADIUS OR GREATER. IF LESS THAN 300' RADIUS SEE TABLE A.
(b) REFLECTORS SHALL BE OMITTED ON THE FLARED SECTIONS OF GUARDRAIL.
(c) NO DIRECT PAYMENT FOR REFLECTORS ON BARRIER RAIL.

<table>
<thead>
<tr>
<th>Radius of Curve</th>
<th>Reflector Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 50'</td>
<td>20'</td>
</tr>
<tr>
<td>150'</td>
<td>30'</td>
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<tr>
<td>200'</td>
<td>35'</td>
</tr>
<tr>
<td>250'</td>
<td>40'</td>
</tr>
<tr>
<td>&gt; 300'</td>
<td>50'</td>
</tr>
</tbody>
</table>

TYPICAL GUARDRAIL-GUIDE POST INSTALLATION
SURVEY COVER & RING  
(CAST IRON)

SURVEY MONUMENTS

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, MAPPING, OR GIS CONSULTANTS" MANUAL.
GENERAL NOTES:
1. ALL WEAKENED PLANE JOINTS SHALL BE SAWED PERPENDICULAR AS SHOWN, EXCEPT AS INDICATED IN THE STRUCTURE APPROVALS SHEET. WHEN ONLY ONE LANE IS CONSTRUCTED, JOINTS SHALL BE AT MANHOLE LOCATIONS. JOINTS SHALL BE SAWED AS DIRECTED BY THE ENGINEER.
2. JOINT SIZE SHALL BE 15" EXCEPT AT REINFORCED STRUCTURE APPROACHES.
3. TRANSVERSE WEAKENED PLANE JOINTS SHALL BE AT LEAST 6' FROM ANY CONTACT JOINT.
4. LONGITUDINAL WEAKENED PLANE JOINTS SHALL BE SAWN AT ALL LANE AND SHOULDER LINES EXCEPT WHERE LANE PLUS ADJACENT SHOULDER WIDTH IS LESS THAN OR EQUAL TO 15'.
5. ALL TRANSVERSE CONTACT JOINTS SHALL BE SAWED AND JOINT SEALANT USED PER RESPECTIVE TRANSVERSE CONTACT JOINT DETAIL SHEET THIS SHEET.
6. ALL TIE BARS TO BE EPOXY COATED EXCEPT IN CLARK CO. TIE BARS TO BE PLACED IN MIDDLE 1/3 OF SLAB THICKNESS. TIE BARS SHALL NOT BE PLACED WITHIN 1' OF BOWEL BARS.
7. TRANSVERSE CONTACT JOINTS WITH BOWEL BARS SHALL BE USED AT ALL CONSTRUCTION JOINTS AND ELSEWHERE IF DIRECTED BY THE ENGINEER.
8. FABRIC END ANCHORS SHALL BE CONSTRUCTED AS THE TERMINAL PANELS OF ALL PAVEMENT NOT ADJACENT EXISTING CONCRETE PAVEMENTS OR STRUCTURES, AND ELSEWHERE IF DIRECTED BY THE ENGINEER.
9. INITIAL 1/2 WEAKENED PLANE JOINT SAW Cuts TO BE DONE WITHIN SPECIFIED TIME LIMIT. RESERVOIR CUT SHALL BE DONE AT A LATER TIME.
10. RATIO OF TOP TO WIDTH OF JOINT SEALANT SHALL BE 1:1.
11. BOWEL BARS SHALL BE LOCATED 1' AT THE PLANNED TRANSVERSE AND DEPTH LOCATION AND WITHIN 2' OF THE PLANNED LONGITUDINAL LOCATION.
12. BOWEL BARS SHALL BE PARALLEL TO THE PAVEMENT SURFACE AND CENTERLINE WITHIN A TOLERANCE OF 1/2 IN 15'.
13. WIDE BARS SHALL NOT BE PLACED WITHIN 1' OF LONGITUDINAL JOINTS.
14. D = SLAB THICKNESS

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS</th>
<th>DOWEL BAR DIA.</th>
<th>TIE BAR SIZE</th>
<th>LENGTH OF TIE BAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1/4&quot;</td>
<td>No. 4</td>
<td>24</td>
</tr>
<tr>
<td>11</td>
<td>1 1/8&quot;</td>
<td>No. 5</td>
<td>30</td>
</tr>
<tr>
<td>12 &amp; 13</td>
<td>1 1/4&quot;</td>
<td>No. 5</td>
<td>30</td>
</tr>
</tbody>
</table>
WEAKENED PLANE JOINTS LOCATION
(DOWELED PAVEMENT ONLY)
Rumble Strip 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.
3. SEE CONTRACT PLANS SPECIAL DETAIL FOR CONCRETE RUMBLE STRIPS.

WEAKENED PLANE JOINTS LOCATION
Rumble Strip 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 4' 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 2' 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 PLAN.

3. RUMBLE STRIPS MAY BE CONTINUOUS THROUGH ALL MINOR APPROACHES, BUT SHALL BE OMITTED ACROSS PRINCIPAL INTERSECTING ROADS.

4. RUMBLE STRIPS CAN BE PLACED ON EXISTING ROLLED IN RUMBLE STRIPS IF PRESENT.

5. FOR RAMPS AND STRUCTURES, SEE SHEET R-10.1.5.

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

LEGEND:

- PLANTMIX BITUMINOUS SURFACE

RUMBLE STRIP DETAIL

SHOULDER SECTION

RUMBLE STRIP CORRUGATIONS
SECTION A-A

TYPICAL RUMBLE STRIP PLACEMENT
GENERAL NOTES:

1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE ≥1.5' 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 ≥2' 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 ROADS.

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 PAVEMENTS, 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 40' From Back Face of Structure
MAILBOX TURNOUT

TABLE 1: SUGGESTED GUIDELINES FOR LATERAL PLACEMENT OF MAILBOXES

<table>
<thead>
<tr>
<th>HIGHWAY TYPE</th>
<th>WIDTH (FT) OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX</th>
<th>DISTANCE (IN) ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURN OUT OR USABLE SHOULDER</th>
<th>DEPTH OF BASE AGGREGATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL HIGHWAY</td>
<td>PREFERRED (FT.) MINIMUM (FT.)</td>
<td>PREFERRED (INCH) MINIMUM (INCH)</td>
<td>ONSIDE</td>
</tr>
<tr>
<td>ADT = OVER 10000 VPD</td>
<td>&gt; 12</td>
<td>12</td>
<td>8 TO 12</td>
</tr>
<tr>
<td>ADT = 1,000 TO 10,000 VPD</td>
<td>12</td>
<td>10</td>
<td>8 TO 12</td>
</tr>
<tr>
<td>ADT = 100 TO 1500 VPD</td>
<td>10</td>
<td>8</td>
<td>8 TO 12</td>
</tr>
<tr>
<td>RURAL ROAD</td>
<td>ADT UNDER 100 VPD OR RESIDENT STREET WITHOUT CURB OF ALL WEATHER SHOULDER</td>
<td>8</td>
<td>6**</td>
</tr>
<tr>
<td>RESIDENTIAL STREET CURBED</td>
<td>N/A</td>
<td>N/A</td>
<td>8 TO 12</td>
</tr>
</tbody>
</table>

* IF TURNOUT IS PROVIDED, THIS MAY BE REDUCED TO ZERO.
** RESIDENTIAL STREET WITHOUT CURB MAY BE REDUCED TO ZERO.

MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOP AT INTERSECTIONS

<table>
<thead>
<tr>
<th>THROUGH SPEED</th>
<th>D1 (feet)</th>
<th>D2 (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.P.H.</td>
<td>Preferred</td>
<td>Minimum</td>
</tr>
<tr>
<td>40</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>70</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>110</td>
<td>110</td>
<td>60</td>
</tr>
</tbody>
</table>

GENERAL NOTES:
1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHO "A GUIDE FOR ERECTING MAIL BOXES ON HIGHWAYS," 1964 EDITION.
2. MAILBOXES WITHIN THE CLEAR ZONE SHALL BE THE STYLES SHOWN IN SHEETS R-12.1.2 AND R-12.1.3 OR AN APPROVED EQUAL.
3. ADT = AVERAGE DAILY TRAFFIC; VPD = VEHICLES PER DAY.
4. FOR MAILBOX SPACING AND VARIABLE LENGTH SEE SHEETS R-12.1.2 AND R-12.1.3.
5. TURNOUT QUANTITIES IN PLAN SUMMARY SHEETS.
6. WILTED MATERIAL MAY BE USED IN LIEU OF AGGREGATE BASE.
7. INSTALL MAIL BOXES ON FLAT SURFACE WITHOUT UNDULATIONS.
GENERAL NOTES:

1. FOR FURTHER INFORMATION ON MAILBOXES SEE AASHO "A GUIDE FOR ERECTING MAIL BOXES ON HIGHWAYS", 1984 EDITION.

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

3. THE DIRECTION OF THE MAILBOX OPENING IN RELATION TO THE TRAVEL Lanes SHALL BE SET BY THE U.S. POSTAL SERVICE.

4. 3" x 6" WHITE REFLECTORIZED SHEETING SHALL BE PLACED FACING TRAFFIC 35" +/- 3" FROM GROUND ON ALL MAILBOX SUPPORT STRUCTURES.

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

6. HEAVY GAUGE STEEL MAILBOXES (>11 lb) ARE NOT ALLOWED ON HIGH-SPEED HIGHWAYS.

7. INSTALL MAILBOXES ON FLAT SURFACE WITHOUT UNDULATIONS.
SIGNAL STANDARDS

1. For Pedestrian Push Button and Sign See Sheet T-30.1.1.
2. For Foundation Details See Sheet T-30.1.16.
3. Mounting heights of signal and pedestrian heads and Pedestrian Push Buttons shall be applicable to installations on Poles Types 2A, 10 & 15.
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 MINIMUM.
9. SAW CUT AS DIRECTED BY ENGINEER.
M-2 SIDE MOUNT

Notes:
1. All signal heads shall have backplates.
2. All signal heads shall have hooks. Hooks shall be tunnel type, open at the bottom.
3. T = thickness.

REAR VIEW BACKPLATE
No background light to show between plate and head. All mast arm backplates shall be louvered.

Special detail for mounting signal head
See detail for mounting signal head on Standard Plan T-30.1.15
Pedestrian Push Buttons Shall Be Installed on the Crosswalk Side of the Signal Pole, With the Proper Directional Arrow Positioned Correctly.

NOTE:
1. ARROW TO BE LEFT OR RIGHT OR BOTH AS REQUIRED.
2. PORCELAIN ENAMELED, 9" x 12" SIGN, BLACK SYMBOLS ON WHITE BACKGROUND.

TYPE 1: Position Pedestrian Push Buttons on Signal Pole When the Width of the Pole Allows 12 Pedestrian Heads to Be Mounted At the Same Height.

TYPE 2: Position Pedestrian Push Buttons on Signal Pole When the Width of the Pole Does Not Allow 12 Pedestrian Heads to Be Mounted At the Same Height.

SECTION A-A WITH PIPE

DETAIL E

Detailed View of the Pedestrian Push Button Post, Including Dimensions and Components.

Pedestrian Push Button See Detail E
2½" Galvanized Steel Pipe
Conduits Shall Protrude 2" Max. Above Finished Surface or Foundation
Base Cover
Base See Detail E
4½" Dia. x 12" Anchor Bolts
Section A-A with Pipe

NEVADA DEPARTMENT OF TRANSPORTATION
PEDESTRIAN PUSH BUTTON DETAILS
SCHOOL ZONE FLASHER

Multi-Directional Sign Base, See Standard Plan 1-31.3.2

Concrete Footing Shall Be Class A or AA

1 1/2" PVC Schedule 40

No. 3/4" Pull Box

Height Varies

1 1/2" Round Metal Post (13"-1 1/2" Shaft Length)

2' x 4' Standard Highway Sign No. SS-1

1WRC - 7" Amber Beacon (Two Per Installation)

FLAShING WARNING SIGN DETAIL

Locate NWF-1 Signal Sign Vertically On Most Arm. No Lower Than 18'-4 1/2" 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, 20' From Pole. Distance is Measured From the Middle of the Sign to the Perimeter of the Type 35 Modified Pole.

LEGEND:

Shop Drawings Shall Be Submitted On All Type 30 and Type 35 Modified Poles
GENERAL NOTES:
1. ALL PULL BOXES SHALL BE NO. 5. SEE SHEET T-30.1.16 FOR DETAILS NOT SHOWN.
2. PAYMENT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   - CONDUIT - DIAMETER VARIES
   - NO. 5 PULL BOX
   - 6 FOOT X 6 FOOT DETECTOR LOOPS
GENERAL NOTES:

1. ALL LOOPS SHALL BE 6" X 6" SQUARE WITH 4 TURNS OF WIRE OR 4 TURNS OF 6" ROUND LOOPS WITH 4 TURNS OF WIRE.
2. EACH LOOP SHALL BE A CONTINUOUS RUN TO THE SPECIAL M-1 CABINET WITH NO SPlices AND SHALL BE LABELED AT THE ENDS WITH LANE PLACEMENT ASSIGNMENT.
3. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 PULL BOX OR SPECIAL M-1 CABINET SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT.
4. LOOP WIRE PAIRS SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT FOR THE ENTIRE LOOP RUN.
5. LOOPS SHALL BE CENTERED IN ALL TRAVEL LANES.
6. LOOP CUTS SHALL BE 5/8" WIDE X 2 1/2" MAXIMUM DEPTH.
7. LOOP WIRE SHALL BE 14 STRANDED NO. 24 T.W.G.
8. FOR DIAGONAL SLOT CORNER OR PAVEMENT JOINT DETAIL SEE STANDARD PLAN SHEET T-30-1.4.
9. 2" SUNKER BOX SHALL BE PLACED IN ALL CORNERS OF THE LAYOUT AND EVERY 2' ALONG THE LOOP EDGE TO THE EDGE OF THE PAVEMENT.
10. LOOP WIRE TO PIEZOELECTRIC SENSOR CABLE WIRE SHALL BE EMBURNT AT LEAST 2' LONG TO NO. 5 PULL BOX SEE IMAGE SPECIAL M-1 CABLE DETAIL. THE LAYOUT FOR DETAIL PARTS IS SHOWn OUTSIDE THE LOOP DEFLECTIONS FOR CLARITY.
11. PIEZOELECTRIC SENSORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS UNLESS OTHERWISE MENTIONED HERE.
12. PIEZOELECTRIC SENSOR CABLE WIRE SHALL BE A CONTINUOUS RUN TO THE SPECIAL M-1 CABINET AND LABELED WITH LANE PLACEMENT ASSIGNMENT.
13. AVC DETECTOR CABINET INCLDUE ALL CONNECTORS AND CABLE CUTOFF NECESSARY FOR INSTALLATION.
14. IF SURFACE/PLACKET BOX IS PROVIDED, THE CABINET SHALL BE PLACED A MINIMUM OF 24" BEYOND TRAPEZ.
15. PAYMENT WILL BE MADE UNDER THE FOLLOWING ITEMS:
   - SPECIAL M-1 CABINET (EACH)
   - NO. 5 PULL BOX (EACH)
   - PIEZOELECTRIC SENSORS (EACH)
   - AVC DETECTOR LOOP PLACEMENT DETAIL

LEGEND:

- SPECIAL M-1 CABINET
- 36" PULL BOX
- 6" PIEZOELECTRIC SENSOR
- 12/4" DIP CONDUIT
- 3" PULL BOX
- 6" LOOP SENSOR
- 6" LOOP SENSOR (SEE SHEETS T-30-1.3 & T-30-1.4)
- SOLID WHITE LINE
- BROWN BROWN LINE
- BROKEN YELLOW LINE
- NORMAL EDGE OF PAVEMENT
- LANE DIVIDER LINE
- OUTSIDE CLEAR ZONE OR PROTECT OBJECTION

AVC DETECTOR LOOP PLACEMENT DETAIL

OPPOSITE LANE LOOPS NOT SHOWN FOR CLARITY

NEVADA DEPARTMENT OF TRANSPORTATION

AVC DETECTOR LOOP CONFIGURATION AND NOTES

SIGNED: Orig: 10-30-14.2 (623)
GENERAL NOTES:
1. ALL CONDUITS SHALL EXTEND ABOVE FOUNDATIONS A MINIMUM OF 2".
2. ALL CABINETS SHALL BE PAINTED WHITE THRO' INSIDE AND OUTSIDE UNLESS SPECIFIED IN THE SPECIAL PROVISIONS.
3. 1/2" x 96" GROUND ROOD MAY BE SUBSTITUTE IN LIEU OF COPPER WIRE.
4. CONCRETE SHALL BE CLASS A OR AA.

5. IF A CABINET IS TO BE INSTALLED IN OR NEAR A SIDEWALK AREA, THE HORIZONTAL AND VERTICAL CLEARANCE AS SHOWN IN H-9.2.1 "TYPICAL SIDEWALK VS. OBSTRUCTION CLEARANCE DETAIL", SHALL BE MET.

LEGEND:
1. MAIN SWITCH
2. PLUG FUSE
3. SIGNAL FLASH SWITCH INSIDE CABINET
4. FIELD WIRE TERMINAL BLOCKS
5. AUXILIARY ODOMETER SWITCH
6. AUXILIARY INTERFERENCE RECEPTABLE WITH GROUNDING CONTACT
7. RADIO INTERFERENCE SUPPRESSOR
8. WATER-PROOF SIGNAL FUSIBLE ELEMENTS (HEAT DETERMINES POLES CLEARANCE, UNLESS OTHERWISE SPECIFIED)
9. EXTERNAL LIGHT RELAYS
10. SHELF
11. THERMOSTAT-CONTROLLED PUMPS WITH VENT
12. NET UNIT
13. INSTRUMENT THERMAL STRIP
14. CONTROL RELAYS
15. DRIVER UNIT
16. INTERNAL INTERCONNECT TERMINAL STRIPS
17. MOUNT MOVEMENT UNITS
18. SLIDE PANEL
19. POLICE PANEL
20. INTERNAL POWER PANEL AND MEMORY SWITCHES FOR ALL DETECTORS PHASES

CABINET WIRING

NEVADA DEPARTMENT OF TRANSPORTATION
CONTROLLER CABINETS

Signed Original on File T-30.15 (623)

Chief Safety/Traffic Engineer
SERVICE PEDESTAL FOUNDATION

TYPICAL MOUNTING BASE DETAIL

Dimensions May Vary Depending On Manufacturer

SINGLE METER SERVICE PEDESTAL

GENERAL NOTES:
1. BARE COPPER GROUNDING CONDUCTOR SHALL BE LOOSED AROUND ANCHOR BOLTS ONE TIME AND CONNECTED TO EACH ANCHOR BOLT BEFORE CONTINUING DOWN TO THE GROUNDING PLATE.

2. CABLE COVERS SHALL BE PARALLEL WITH CURB.

3. IN AREAS WHERE R/W PERMITS, THE CONCRETE BASE SHALL BE PLACED AT THE BACK EDGE OF THE SIDEWALK.

4. CABLE COVERS SHALL OPEN TOWARDS THE STREET WHEN CABLES ARE LOCATED AT BACK OF CURB, CABLE COVERS SHALL OPEN PARALLEL TO THE SIDEWALK FACING THE DIRECTION OF TRAFFIC WHEN LOCATED WITHIN THE SIDEWALK.

5. GROUND PLATE SHALL BE MADE OF NONFERROUS MATERIALS (TYPICALLY BRASS OR COPPER).

BEHIND SIDEWALK (FOR WIDTHS 5 FT. OR LESS)
BACK PORTION OF SIDEWALK (FOR WIDTHS OF 5 FT. OR MORE)
OPEN AREA

SERVICE PEDESTAL SETBACK WITHIN R/W LIMITS

LEGEND:
* WHERE INSUFFICIENT PUBLIC RIGHT-OF-WAY IS AVAILABLE TO LOCATE PEDESTRIAN ACCESS MAY BE REDUCED TO 4' FOR A LENGTH OF 2'.
GENERAL NOTES:
1. BARRIER POSTS ARE TO BE USED ONLY WHERE PAD MOUNTED TRANSFORMERS ARE INSTALLED IN AREAS SUBJECT TO DAMAGE BY VEHICULAR TRAFFIC. THE CONTRACTOR SHALL COORDINATE INSTALLATION WITH THE SERVING UTILITY COMPANY TO DETERMINE THE EXACT NUMBER OF POSTS REQUIRED.

2. FOOTINGS TO BE DRILLED HOLES, AS SHOWN, AND FILLED WITH CLASS A OR AA CONCRETE.

3. POST CONSTRUCTED OF 6" STANDARD PIPE (WELL CASING) PRIMED AND PAINTED YELLOW, AND CONCRETE FILLED.
SAFETY BASE PLAN

SAFETY BASE ELEVATION

ISOMETRIC VIEW

TOP PLATE PLAN

TOP PLATE ELEVATION

SLIP BASE GASKET

SLIP BASE & SPACER PLATE PLAN

SAFETY BASE ELEVATION

GENERAL NOTES:
1. All base plate must be furnished with spacers plate or floating nuts on anchor bolts and furnished in place.
2. Top plate shall be furnished by light pole manufacturer as light pole base plate with dimensions as shown on plans.
3. All steel plate assemblies shall be hot-dip galvanized after fabrication.
4. All nuts, bolts and washers shall be electro-plated galvanized in accordance with ASTM D-665, Type II.
5. All contact areas of plates shall be free of contamination won’t made.
6. Safety edges shall be utilized on all steel, light pole except on structures or if placed behind another pole or structure.
7. Gruiting shall be done after light pole has been located in final position.
8. Anchor bolt shall not extend above slip base height.

1.1/4" Diameter Required
2. Observe all bolts to be fit, load.
3. Bolted to U-Bolt, torque using the following sequence:
   1. 1
   2. 4
   6. 5
   7. 3
   8. 2
   9. 1

20 Gage

Cement Base Flush in the ground

Concrete Base Gasket 2B Gage

Signed Original On File 7-30-19 (23)

SAFETY TRAFFIC ENGINEER
GENERAL NOTES:

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

2. If indicated in the plans, all poles shall be prime painted by manufacturer and finish painted by contractor. See standard specification section 714.05.01.

3. The distance from the roadway surface to the bottom of the mast arm signal heads shall be 17'.

4. See standard plan drawing 7-30.1.15 for pole base, handle, signal arm, and luminaire attachment details.
### Type 30 & 35

<table>
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<tr>
<th>Device</th>
<th>Description</th>
<th>Project Area (ft^2)</th>
<th>Weight (lbs)</th>
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<td>SIGNAL Base Frame</td>
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<tr>
<td>SIGNAL 12'-6 Sec. w/Backplates</td>
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<td>SIGNAL 12'-6 Sec. w/Backplates</td>
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<td>30</td>
<td></td>
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### Luminaires Arm Data

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<th>Free End</th>
<th>Gauge</th>
<th>Luminaires Arm Location</th>
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<tr>
<td>B</td>
<td>3.42</td>
<td>2.18</td>
<td>11</td>
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<tr>
<td>C</td>
<td>3.75</td>
<td>2.88</td>
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<td>31'-0&quot;</td>
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<td>D</td>
<td>6.14</td>
<td>4.16</td>
<td>11</td>
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<td>E</td>
<td>9.25</td>
<td>6.38</td>
<td>11</td>
<td>33'-0&quot;</td>
</tr>
<tr>
<td>F</td>
<td>6.01</td>
<td>4.03</td>
<td>11</td>
<td>33'-0&quot;</td>
</tr>
</tbody>
</table>

### Design Criteria:

- Basic Wind Speed = 90 MPH.

### Loading Information:

- Type 30-A & 35-A pole shall also support the alternate loading shown above.

---

Note: The table and diagram illustrate the dimensions and weights of different sign and luminaires arm configurations for Type 30 & 35 and Type 30-A & 35-A, with specified beam types and end loads for structural integrity and wind resistance.
SECTION A-A

pile foundation table

<table>
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<tr>
<th>pole type</th>
<th>mast arm</th>
<th><strong>d</strong></th>
<th><strong>e</strong></th>
<th>anchor bolts</th>
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<td>1/2</td>
<td>3/4 x 12 x 4</td>
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<td>1/2</td>
<td>3/4 x 12 x 4</td>
</tr>
<tr>
<td>30 &amp; 35</td>
<td>6  1/2</td>
<td>6</td>
<td>1/2</td>
<td>3/4 x 12 x 4</td>
</tr>
<tr>
<td>30A &amp; 35A</td>
<td>6  1/2</td>
<td>6</td>
<td>1/2</td>
<td>3/4 x 12 x 4</td>
</tr>
</tbody>
</table>

** unless otherwise shown on plans.
* not applicable when mounted on structures.
1 - when "W" = 2'-0" use 4-No.5 bars equally spaced.
   when "W" = 2'-6" use 8-No.5 bars equally spaced.

Note: Concrete Shall Be Class A or AA.

PILE FOUNDATION

POLE GROUNDING DETAIL

1. Completely Cover the Splice Area With An Electrical Insulating Coating and Allow To Dry.
2. Apply Electrical Filler Compound With Minimum Thickness 2'/4" Each Layer or 2 Layers, Half Lapped, Synthetic Oil Resistant, Self Fusing Rubber Tape.
3. Apply 3 Layers of Half Lapped PVC Tape.

TYPE B SPLICE METHOD
(TWO FREE ENDS)

1. Connect Bonding Wire to the Reinforcing Steel Cage Near the Midpoint of the Foundation or Anchor Bolt.
2. Ground Plate Shall Be Made of Nonferrous Material (Typically Brass or Copper). Install "N" Ground Plate or Equivalent.

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.
TYPICAL METHOD OF ATTACHMENT

MAST ARM SIGNAL AND SIGN PLACEMENT
"L" - AS SHOWN ON PLANS

4 3/8" Cadmium Plated Steel Bolts, Nuts & Fiber Washers
(12) 1/4" x 1" Straps
(12) 1/4" Cadmium Plated Steel Bolts, Nuts, & Fiber Washers
Signal Mast Arm

NEVADA DEPARTMENT OF TRANSPORTATION
TRAFFIC SIGNAL
SIGN PLACEMENT

Signed Original On File
T-30-17 (623)

SHEET SAFETY/TRAFFIC ENG
GENERAL NOTES FOR PULL BOXES:

1. TRAFFIC PULL BOX SHALL BE PROVIDED WITH STEEL COVER AND SPECIAL CONCRETE FOOTING. STEEL COVER SHALL HAVE EMBOSSSED NON-SLIP PATTERN.

2. STEEL REINFORCING SHALL BE AS REGULARLY USED IN THE STANDARD PRODUCTS OF THE RESPECTIVE MANUFACTURER.

3. TOP OF PULL BOXES SHALL BE FLUSH WITH SURROUNDING GRADE OR TOP OF ADJACENT CURB, EXCEPT THAT IN UNPAVED AREAS WHERE PULL BOX IS NOT IMMEDIATELY ADJACENT TO AND PROTECTED BY A CONCRETE FOUNDATION, POLE OR OTHER CONSTRUCTION, THE BOX SHALL BE PLACED WITH ITS TOP 1" ABOVE SURROUNDING GRADE. WHERE PULL BOXES ARE PULLED APART IN THE VICINITY OF CURBS, THE BOX SHALL BE PLACED ADJACENT TO THE BACK OF CURB, AND PULL BOXES SHOWN ADJACENT TO STANDARDS SHALL BE PLACED ON SIDE OF FOUNDATION FACING AWAY FROM TRAFFIC. UNLESS OTHERWISE NOTED, WHEN PULL BOX IS INSTALLED IN VARIOUS AREA, THE DEPTH OF THE PULL BOX SHALL NOT BE INCIDED SO THAT THE TOP OF THE PULL BOX IS FLUSH WITH THE TOP OF SIDEWALK.

4. BONDING JUMPER FOR METAL COVERS SHALL BE 1" x 4" LONG, MINIMUM APPLICABLE ONLY WHEN METAL COVER IS USED.

5. THE MINIMUM DIMENSIONS OF THE OPENING IN WHICH THE COVER SETS SHALL BE THE SAME AS THE COVERAGE DIMENSIONS EXCEPT THE LENGTH AND WIDTH DIMENSIONS SHALL BE 1" GREATER.

6. ALL COVERS AND BOXES SHALL BE INTERCHANGEABLE WITH NEVADA STANDARD BOX AND EMBALLAGE. WHEN INTERCHANGED WITH A STANDARD 6" BOX OR FEMALE CASE, THE TOP SURFACES SHALL BE FLUSH WITH 1" OF CURB. ALONG SIDE OF ALL CONCRETE COVERS AND PULL BOXES SHALL HAVE 1" MINIMUM RADIUS.

7. PULL BOX SHALL NOT BE INSTALLED WITHIN THE BOUNDARIES OF NEW OR EXISTING CURB RAMPS.

8. PULL BOXES FOR ELECTRICAL AND SIGNALS SHALL BE LOCATED AT THE SAME STATION (TS) AS THE ADJACENT ELECTRICAL OR SIGNAL STANDARD. PULL BOXES SHALL BE PLACED ADJACENT TO BACK OF CURB OR EDGE OF SHOULDER WHERE THIS IS IMPractical. A BOX MAY BE PLACED IN ANOTHER SUITABLE PROTECTED AND ACCESSIBLE LOCATION.

9. IN AREAS WHERE THE POSSIBILITY OF DAMAGE TO MANHOLE FROM AMDING THE FRAME RISER, THE PULL BOX SHALL BE PLACED IN EAVEN WITH THE CURB. FUTURE DEPTH ON EACH SIDE AND 17" DEPTH AS DIRECTED BY THE ENGINEER.

10. USE SPECIAL PULL BOXES ONLY WHEN INDICATED ON PLANS.

GENERAL NOTES FOR ELECTRICAL MANHOLE:

1. A COMPACTED BASE AND A CONCRETE FOOTING SUPPORT SHALL BE CONSTRUCTED PRIOR TO PLACEMENT OF THE CAST IRON FRAME AS DIRECTED BY THE ENGINEER.

2. ADJUSTMENTS TO ELEVATIONS SHALL BE MADE WITH COLLAR/RISERS AS REQUIRED. MINIMUM DEPTH 9".

3. REFR TO STANDARD PLAN R-4.7.3 FOR CONCRETE COLLAR DETAILS.

ELECTRICAL TRAFFIC RATED PULL BOX MINIMUM DIMENSION TABLE

<table>
<thead>
<tr>
<th>Pull Box</th>
<th>Concrete Box</th>
<th>Steel Cover</th>
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</thead>
<tbody>
<tr>
<td>No. 3/4</td>
<td>20&quot; W x 14&quot; D</td>
<td>20&quot; W x 14&quot; D</td>
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<tr>
<td>No. 5</td>
<td>24&quot; W x 18&quot; D</td>
<td>24&quot; W x 18&quot; D</td>
</tr>
</tbody>
</table>

ELECTRICAL TRAFFIC RATED ELECTRICAL PULL BOXES/ MANHOLE FRAME & COVER

SIGNED ORIGINATING ENG: 6-30-19 (623)
SHEET SAFETY/TRAFFIC END
GENERAL NOTES:
1. SEAM WELD CONSTRUCTION W/ 3/8" DIAMETER FILLET WELD OUTSIDE EDGES. TACK WELD CONSTRUCTION FOR INNER FRAME AND ANGLE 3/8" x 3/8" x 3/8" CENTERS.
2. GASKET MATERIAL, 1/8" x 2" NEOPRENE EPPM AND SUR SPONGE WITH PSA.
3. WHERE CAP SCREWS ARE USED TO ATTACH COVER TO BOX, EITHER ONE 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 1/4" x 3/8" x 8" BAR BENEATH FLANGE (TOTAL 2).
4. DO NOT CUT OR WELD TO BRIDGE RAIL REINFORCING STEEL.

SECTION A-A

TYPE 1

TYPE 2

INSTALLATION IN SLOPING PARAPETS

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

PULL BOX DETAIL

COVER DETAILS

DETAIL A

See Detail A

Conduit to Pole

Through Conduit

Drain to Low Side

1/8" Neoprene Gasket

Square Head Nut, Tack weld to Pull Box, See Note 3

Pull Box

1/8" Stainless Steel Hex Head Cap Screw

Total 4

1/8" Steel Cover

(Markings Per Specifications)

Drill Hole for 1/8" Cap Screw Total 4, See Cover Attachment Details in Section C-C

2/16" Hole for 3/8" 1/2" cap screw (Total 4)
GENERAL NOTES:

1. HORIZONTAL CLEARANCE (HC) SHOULD NOT BE LESS THAN 6' FROM THE EDGE OF PAVEMENT. IF NO SHOULDER, HC SHOULD NOT BE LESS THAN 12' FROM THE EDGE OF TRAVEL WAY. IN URBAN AREAS, A LESSER CLEARANCE MAY BE USED WHERE NECESSARY.

2. FOR SIGN PANEL BRACING DETAILS, SEE T-31.1.4.

3. ALL SIGN SUPPORTS SHALL BE OF BREAKAWAY DESIGN.

4. FOR DOUBLE POST BRACES SUPPORTS, MAINTAIN HC CLEAR ZONE WIDTH MAXIMUM OF 30', EXCEPT WHEN PROTECTED BY GUARDRAIL OR BARRIER RAIL. FOR CLEAR ZONE WIDTHS, REFER TO AASHTO ROADSIDE DESIGN GUIDE CURRENT EDITION.

5. SIGN ISLAND REQUIRED WHEN H015', OR SIGN SLOPE IS STEEPER THAN 6:1, OR WHEN REQUIRED IN CONTRACT PLANS.

6. SEE SHEET T-31.1.6 FOR SIGN ISLAND CONSTRUCTION.

7. FOR SIGN POSTS, SEE POST SELECTION CHARTS ON SHEET T-31.1.2.

8. FOR MATERIALS NOT DIRECTLY SPECIFIED, SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.

9. SIGN PANELS TO BE ALUMINUM SHEET CONSTRUCTION.

10. PREPAINT THE EXPOSED PORTION OF FASTENING HARDWARE ON THE FACE OF THE SIGN PANELS WITH BAKED ENAMEL TO MATCH THE SIGN FACE.

MINIMUM MOUNTING HEIGHTS (MH)

<table>
<thead>
<tr>
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<th>Single Signs</th>
<th>Double Signs</th>
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<tbody>
<tr>
<td>Freeways And Expressways</td>
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<td>Commercial, Residential</td>
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<td>Curb and Gutter</td>
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<tr>
<td>Rural Roads And Interchange Ramps</td>
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<td>Freeway Entrance Assembly</td>
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<td>2' (S)</td>
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<tr>
<td>Chevrons &amp; One Way</td>
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</table>

(M) MAJOR SIGN (S) SECONDARY SIGN

SIGN IN EXCAVATION

Minimum Corner Clearance (CC) = 1'
Maximum Vertical Clearance (VC) for Single Sign = 10', Double Sign = 11'
Maximum H = 15'
Special Design May Be Necessary If Given Limits Are Exceeded

SIGN IN EMBANKMENT
### POST SELECTION CHART

<table>
<thead>
<tr>
<th>SIGN AREA (SQ. FT.)</th>
<th>NFJ )</th>
<th>D&lt;9x10'</th>
<th>B&lt;10x12'</th>
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<td>E</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

### GENERAL NOTES:
1. SIGN AREA IS TOTAL OF MAJOR & SECONDARY SIGNS.
2. ALTERNATE POSTS MUST BE APPROVED BY TRAFFIC ENGINEERING.
3. FOR DOUBLE POST BRACED SUPPORTS, MAINTAIN HC >= CLEAR ZONE WIDTH MAXIMUM OF 3D, EXCEPT WHEN PROTECTED BY GUARDRAIL OR BARRIER RAIL. FOR CLEAR ZONE WIDTHS, REFER TO AASHTO ROADSIDE DESIGN GUIDE CURRENT EDITION.

### POST SELECTION CHART

<table>
<thead>
<tr>
<th>POST TYPE</th>
<th>DESCRIPTION</th>
<th>REFERENCE SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2½&quot; Square Metal Post (12 Gage)-Single Post</td>
<td>T-31.2.1</td>
</tr>
<tr>
<td>B</td>
<td>2½&quot; Square Metal Post (10 Gage)-Single Post</td>
<td>T-31.2.1</td>
</tr>
<tr>
<td>C</td>
<td>Single Post Unbraced 3½&quot; Dia Round Metal Post</td>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
<tr>
<td>D</td>
<td>Double Post Unbraced 3½&quot; Dia Round Metal Post</td>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
<tr>
<td>E</td>
<td>Double Post Braced (See Note 3) 3½&quot; Dia Round Metal Post</td>
<td>T-31.4.1 thru T-31.4.3</td>
</tr>
<tr>
<td>F</td>
<td>Special Design: Contact Traffic Engineering</td>
<td></td>
</tr>
</tbody>
</table>

NEVADA DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
GENERAL
POST SELECTION CHARTS
T-31.1, 2 (6/77)
SIGNED ORIG DRAFT
SIGNED OFF: M/P 2/22/77
SIGNED T/R 6/30/77
SIGNED C/R 7/21/77
C/O B. SMITH/LS ENT
GENERAL NOTES:
1. BRACE(S) REQUIRED IF W > 18”. INSTALL AS SHOWN.
2. BRACE: 3/8” x 1 1/2” 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

4 STRINGER MOUNTING

GENERAL NOTES:
1. STRINGERS: 3" x 2\³/₈" x 1/₂" OR 2\³/₄" x 2\³/₈" x 1/₂" ALUMINUM ALLOY Z-BAR.
2. STRINGERS REQUIRED ON ALL SIGNS REQUIRING MULTIPLE POSTS.
3. TUBULAR STIFFENERS REQUIRED WHEN W>10'.
4. COST FOR BRACING IS INCLUDED IN SIGN.
5. ONE VERTICAL JOINT IF W EXCEEDS 12'. TWO VERTICAL JOINTS IF W EXCEEDS 24'.
6. FOR ALTERNATE STEEL TUBE BRACING, SEE STANDARD PLAN T-31.15.

SUB PANEL ASSEMBLY & Z BAR BRACING

VERTICAL JOINT CLOSURE STRIP
STEEL TUBE BRACING ON ROUND METAL POSTS

STEEL TUBE BRACING ON WOOD POSTS

GENERAL NOTES:
1. FOR SUB-PANEL ASSEMBLY & VERTICAL JOINT CLOSURE

TABLE 1
<table>
<thead>
<tr>
<th>PIPE DIA</th>
<th>O.D.</th>
<th>A</th>
<th>B</th>
<th>CLAMP STOCK</th>
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</thead>
<tbody>
<tr>
<td>3&quot; Nom.</td>
<td>3/8&quot;</td>
<td>5/16&quot;</td>
<td>1/4&quot;</td>
<td>1/16&quot;</td>
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</tbody>
</table>

TABLE 2
<table>
<thead>
<tr>
<th>TUBING SIZE (IN)</th>
<th>SIGN WIDTH (IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot; x 2&quot; x 1/4&quot;</td>
<td>24&quot;</td>
</tr>
</tbody>
</table>

TABLE 3
<table>
<thead>
<tr>
<th>POST SIZE</th>
<th>D</th>
<th>BOLT SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; x 4&quot;</td>
<td>1/8&quot;</td>
<td>5/16&quot; x 6/4&quot;</td>
</tr>
<tr>
<td>4&quot; x 6&quot;</td>
<td>5/16&quot;</td>
<td>3/8&quot; x 6/4&quot;</td>
</tr>
<tr>
<td>6&quot; x 6&quot;</td>
<td>5/8&quot;</td>
<td>1/2&quot; x 8/4&quot;</td>
</tr>
<tr>
<td>6&quot; x 8&quot;</td>
<td>7/8&quot;</td>
<td>5/8&quot; x 10/4&quot;</td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. SIGN ISLANDS TO BE COMPACTED TO 95%.
2. PAYMENT FOR SIGN ISLAND WILL BE AS NOTED IN CONTRACT PLANS AND SPECIAL PROVISIONS.
4. USE 2:1 MAX FOR NARROW RIGHT-OF-WAYS OR 6:1 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.

Sign Panel/Bracing
As Required, See Standard Plan T-31.1.4

1/4" x 4" Round Head, Square Neck
Carriage Bolt (Bolt Head Colored to
Match Sign Face) Hex Nut W/ Flat
insert, Flat Washer Through Sign & Post

3/8" Dia. Hole

1 Center to Center

1/4" Dia. Holes
One Each Side of
Anchor Post

3/8" x 2 1/2"

Anchor Post

Footings
See Note 1

Anchor Post
See Note 2

3.5"

6"

1"

1"

NEVADA DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
SQUARE METAL POSTS

Signed Origin On File T-31.2.1 (6/27)

SAFETY/TRAFFIC ENG.

2008
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 T-311.1 THRU T-311.6.
3. INNER POSTS ARE THOSE CLOSEST TO ROADWAY, AND THE OUTER POSTS ARE THOSE FARthest AWAY.

Sign Hardware, Bracing, Vertical Joints, Vertical Joint Closure Strip & Stringers As Required. See Standard Plan T-311.4

0.6W

Post Length As Noted in Sign Summary Sheet

Post Length As Noted in Sign Summary Sheet

Multi-Directional Slip Base & Footing
See Standard Plan T-313.3

Multi-Directional Slip Base & Footing
See Standard Plan T-313.2

ROADSIDE SIGNS ROUND METAL POSTS UNBRACED

DOUBLE POST UNBRACED

SINGLE POST

NEVADA DEPARTMENT OF TRANSPORTATION

T-313.1

6/27

CHIEF SAFETY/TRAFFIC ENG.
GENERAL NOTES:
1. ALL PARTS AND HARDWARE SHALL BE GALVANIZED AS PER SECTION 716 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 2' 6" FROM THE BACK SIDE OF THE GUARDRAIL POST.
3. USE STANDARD WEIGHT PIPE FOR SIGN POST AND SLEEVE. SEE ASTM A 53.

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

SIGNED ORIGINAL ON FILE 11/30/05
(627.715)
CHEF SAFETY/TRAFFIC ENG.
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.
4. INNER POSTS ARE THOSE CLOSEST TO THE ROADWAY, AND THE OUTER POSTS ARE THOSE FARthest AWAY.
GENERAL NOTES:
1. ALL DRILLED HOLES IN TIMBER TO BE 1/4" DIAMETER UNLESS OTHERWISE NOTED.
2. BACK BRACE HOLE IN 4" x 4" POST TO BE DRILLED AND FITTED IN FIELD. ALL OTHER HOLES MAY BE SHIP DRILLED IN STANDARD POSITION.
3. FOOTINGS TO BE DRILLED 1-6" DIAMETER, 3-6" DEEP, FILLED WITH CLASS A OR CLASS AA CONCRETE.
4. FOR DETAILS ON SIGN LOCATION, POST TYPE, PANEL ENDING, AND SIGN SLEDGES, SEE STANDARD PLANS T-31.1 THRU T-31.5.

ELEVATION

BASE PLATE DETAIL

ANCHOR BOLTS DETAIL

PLAN

NEVADA DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
TIMBER GORE SIGNS
Signed: Origin On File T-31.5, (637)
### Advance Warning Sign Spacing

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Distance Between Signs (ft) A</th>
<th>Distance Between Signs (ft) B</th>
<th>Distance Between Signs (ft) C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>25-30</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>35-40</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>45-50</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>55-75</td>
<td>1000</td>
<td>1600</td>
<td>2640</td>
</tr>
</tbody>
</table>

### Taper Length and Channelizing Device Spacing

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Length for Merging Taper (L)</th>
<th>Device Spacing (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
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<tr>
<td>35</td>
<td>210</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>280</td>
<td>40</td>
</tr>
<tr>
<td>45</td>
<td>450</td>
<td>45</td>
</tr>
<tr>
<td>50</td>
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<td>700</td>
<td>70</td>
</tr>
<tr>
<td>75</td>
<td>750</td>
<td>75</td>
</tr>
</tbody>
</table>

### Buffer Length

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>115</td>
</tr>
<tr>
<td>25</td>
<td>155</td>
</tr>
<tr>
<td>30</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
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<tr>
<td>40</td>
<td>300</td>
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<td>45</td>
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<td>50</td>
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<td>55</td>
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<tr>
<td>60</td>
<td>500</td>
</tr>
<tr>
<td>65</td>
<td>550</td>
</tr>
<tr>
<td>70</td>
<td>600</td>
</tr>
<tr>
<td>75</td>
<td>650</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. For additional information refer to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and revisions.

### Advance Warning Arrow Panel

<table>
<thead>
<tr>
<th>Type</th>
<th>Minimum Size (Inches)</th>
<th>Posted Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>48 x 24</td>
<td>30 MPH or less</td>
</tr>
<tr>
<td>B</td>
<td>60 x 30</td>
<td>35 MPH to 50 MPH</td>
</tr>
<tr>
<td>C</td>
<td>96 x 48</td>
<td>55 MPH or more</td>
</tr>
</tbody>
</table>

### General Notes:

1. R2-1 and W3-5A may be used to reduce existing speed limit to 55 mph if existing speed limit is 65 mph thru 75 mph. Other speed reductions must be approved by the Director.

2. The W1-3 signs shall be used when the recommended speed on a curve is 30 mph or less. The W1-4 signs shall be used when the recommended speed is 35 mph or greater.

3. The W6-3 and R4-1 signs shall be installed alternately at 0.5 mile intervals when the lengths of crossovers exceed 0.5 mile.

4. All regulatory signs (R Series) shall be black on retroreflective orange.

5. All warning signs (W Series) shall be black on retroreflective white.

6. Warning signs shall be a minimum of 3' x 3' for speeds of 45 mph or less. R2-1 shall be 3' x 4'.

7. Warning signs shall be a minimum of 4' x 4' for speeds of 50 mph or greater. R2-1 shall be 4' x 5'.
LEGEND:

- WORK AREA
- CHANNELIZING DEVICES
- ARROW BOARD
> 45 MPH
= OPTIONAL
** - SEE GENERAL NOTE NO. 1.
*** - SEE GENERAL NOTE NO. 2.
See T-35.1-1 FOR TABLES and GENERAL NOTES
LEGEND:

- WORK ZONE
- CHANNELIZING DEVICES @ 6.0 ft. SPACING
- CHANNELIZING DEVICES
- FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- ARROW BOARD
- USE WHEN SPEEDS ARE ≥ 45mph
- LOCATION TO BE DETERMINED BY FIELD ENGINEER

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

See T-35.2-1.1 For TABLES and GENERAL NOTES.
LEGEND:

- WORK ZONE
- CHANNELIZING DEVICES @ 6.O FT SPACING
- CHANNELIZING DEVICES
- FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- USE WHEN SPEEDS ARE 2.45 mph

NOTE: REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY.

See T-35.1.1 For TABLES and GENERAL NOTES
LEGEND:

- WORK ZONE

- CHANNELIZING DEVICES @ 6.0 ft SPACING

- CHANNELIZING DEVICES

- ARROW BOARD

- USE WHEN SPEEDS ARE ≥ 45 mph

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

See T-35.1.1 For TABLES and GENERAL NOTES

NEVADA DEPARTMENT OF TRANSPORTATION
TYPICAL TRAFFIC CONTROL
FOR INTERSECTION WORK ONLY
NO FLAGGERS
(MEDIAN WITH NO ISLAND)

SIGNED ORIGINAL ON FILE T-35.1.17 (6/25)
CHEF SAFETY TRAFFIC ENGI
**GENERAL NOTES:**

1. **ALL BARRICADES USED MUST COMPLY WITH NCHRP REPORT 350.** SEE QUALIFIED PRODUCTS LIST FOR APPROVED PRODUCTS.

2. **TYPE III B BARRICADES USED FOR TEMPORARY SIGN SUPPORTS, SIGNS SHALL BE MOUNTED 1' MINIMUM FROM GROUND AND COMPLY WITH MUTCD CURRENT EDITION.**

3. **MARKINGS FOR BARRICADE RAILS SHALL BE RETROREFLECTIVE ORANGE AND WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION OF TRAFFIC AS SHOWN.**

---

**TYPE I BARRICADE**
- Traffic Side: 3" Min.
- Roadway/Ground Surface: 2" Min.
- Width: 8"-12"
- Angle of Stripes: 45°

**TYPE II BARRICADE**
- Traffic Side: 3" Min.
- Roadway/Ground Surface: 2" Min.
- Width: 8"-12"
- Angle of Stripes: 45°

**TYPE III B BARRICADE**
- Traffic Side: 4" Min.
- Roadway/Ground Surface: 4" Min.
- Width: 8"-12"
- Angle of Stripes: 45°

**ORANGE TRAFFIC CONES**
- Predominantly Orange
- Weighted Base
- White Retroreflective Band
- 3" Min.
- 4" Max.
- 6" Height
- 4" Diameter

**TRAFFIC DRUMS**
- Shall Have a Minimum of 2" White & 2 Orange Retroreflective Bands
- * 2" Max. Non-Retroreflective Material
- ** 4" Min. - 6" Max. Retroreflective Material

---

**TRAFFIC CONTROL BARRICADES**

[Diagram of traffic cones and drums]
GENERAL NOTES:

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

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

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

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

5. THE LEADING MODULE OF EACH ATTENUATOR SHALL BE DELINEATED. THE BLACK STRIPE SHALL BE SLOPED DOWN TOWARD THE SIDE WHICH TRAFFIC WILL PASS. THE BACKGROUND SHALL BE RETROREFLECTIVE YELLOW. ADDITIONALLY, A MARKER PANEL SHALL BE PLACED WITH SHEETING APPROXIMATELY 30" SQUARE. THE PANEL IS COVERED WITH YELLOW RETROREFLECTIVE SHEETING WITH BLACK STRIPES 3" WIDE. BLACK STRIPES SHALL BE AT 45 DEGREES WITH 4" SPACE BETWEEN STRIPES.

6. THE MAXIMUM LATERAL AND LONGITUDINAL SLOPE THAT SAND MODULES MAY BE INSTALLED ON SHALL NOT EXCEED 2%.

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

LEGEND:

1. THE CIRCLED NUMBER INDICATES THE WEIGHT x 100 IN POUNDS OF THAT SAND FILLED MODULE.

2. PPCBR = PORTABLE PRECAST CONCRETE BARRIER RAIL. \( V_d = \) DESIGN VELOCITY.
TYPICAL SIGN & MARKING PLAN

GENERAL NOTES:
1. ONE RAILROAD CROSSING KIT (DETAIL A) PER TRAVEL LANE.
2. IF NEEDED, SUPPLEMENTAL RAILROAD PAVEMENT MARKING SYMBOL(S) MAY BE PLACED BETWEEN THE FIRST RAILROAD PAVEMENT MARKING SYMBOL AND THE RAILROAD CROSSING, BUT SHOULD BE AT LEAST 50' FROM THE STOP BAR.
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 MULTI-LANE ROADS, THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH TRAVEL LANES, AND INDIVIDUAL R/R 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 THE CURRENT MUTCD, PART VII.
7. STOP BARS SHALL BE PERPENDICULAR TO ROADWAY AND SHALL BE WHITE.
9. THE DISTANCE X SHALL BE NOTED IN THE PLANS AND/OR STRUCTURE LIST.

LEGEND:
- R/R CROSSING SIGNAL OR SIGN
- R/R CROSSING SIGNAL AND GATE (TYPICAL)
- STOP BAR (TYPICAL) (24" SOLID WHITE)

NEVADA DEPARTMENT OF TRANSPORTATION
RAILROAD CROSSING:
SIGN & GATE PLACEMENT
PAVEMENT MARKINGS

RAILROAD CROSSING KIT

DETAIL A
(70 ft², includes (2)R's & (1)X)

DETAL B

Table for Minimum Spacing of Advance Warning Sign

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>SPACING (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>150</td>
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<tr>
<td>25</td>
<td>150</td>
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<tr>
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<td>70</td>
<td>400</td>
</tr>
<tr>
<td>75</td>
<td>400</td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. MOUNTING HEIGHT TO BOTTOM OF "AUTHORIZED VEHICLES ONLY" SIGN SHALL BE 6 FROM ORIGINAL GROUND.
2. TYPE III REFLECTIVE SHEETING SHALL BE USED ON SIGN INSTALLATIONS AND TYPE 2 (MODIFIED) OBJECT MARKERS.
3. PLACE (6) TYPE 2 (MODIFIED) MARKERS ONE 500' IN ADVANCE OF MEDIAN CROSSED OVER AND ONE ON EACH SIDE OF CROSSED OVER AS SHOWN ON DRAWING.
### Table X

<table>
<thead>
<tr>
<th>Span</th>
<th>25' Panel Depth</th>
<th>30' Panel Depth</th>
<th>35' Panel Depth</th>
<th>40' Panel Depth</th>
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<tbody>
<tr>
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<td>2</td>
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<tr>
<td>5</td>
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<td>2</td>
<td>2</td>
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<td>10</td>
<td>2</td>
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### Table XI

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<tr>
<td>15</td>
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### Table XII

<table>
<thead>
<tr>
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<th>25' Panel Depth</th>
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<tr>
<td>25</td>
<td>2</td>
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**RANGE OF STRUCTURE SIZES**

NOTE: Sign Panel Depths 110" and 120" will project above top of frame.
**Splice Notes:**

**Specifications:**
The bolted splice shall conform to current "Specifications for Structural Joints Using ASTM A325 Bolts".

**Location of Splices:**
The splice shall be located so as not to interfere with mounting the roadway brackets or the clip anchors for the removable sign panel frame. The Wind Bracing in the area of the Spliced Chord Splice can be bolted to the Chord Angles with a Shanked Bolt, with Hex Head and Nut, 2 Cotter Washers and Lock Washer.

**Bolts:**
The A325 bolts shall be high strength with an interference type body and torque to the required amount as stated in the above specifications.

**Filler Plates:**
The plates welded to the angle legs on the inside shall be 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 1/2 of the cantilever length from the post. Alternative splice details may be used if approved by the Engineer.

---

**Typical Section J-J**

*Note: Diagonal of in Plane of Truss, Nomenclature Showing as At All Vertical 4's of Truss.*

**Welded Chord Splice**

*Note:*
1. Prepare Edges By Beveling to Angle Shown.
2. Weld to 100% Full Penetration.
3. Grind Flush With Base Metal.

**Bolted Chord Splice**

<table>
<thead>
<tr>
<th>Bolted Chord Splice</th>
<th>Nominal Bolt Diameter (In.)</th>
<th>Chord 4 (In.)</th>
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<tbody>
<tr>
<td><strong>Two Post Signs</strong></td>
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<tr>
<td>5/8 x 3/4</td>
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<tr>
<td>B6x3/4</td>
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<td><strong>Single Post Signs</strong></td>
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<td>5/8 x 3/4</td>
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---

**Overhead Signs Structural Frame Details**

Signed Grinnell T 3-16.6 (6221)

Chief Bridge Engineer
STEEL REMOVABLE SIGN PANEL FRAMES

SECTION C-C

ALTERNATIVE CONNECTIONS AT TOP CHORD

SECTION D-D

NOTES:
1. FOR STEEL REMOVABLE SIGN PANEL FRAME DETAILS, SEE STANDARD PLAN T-36.1B.
2. MINIMUM FILLET WELD IS 1/4" FOR CLIP ANGLES WELDED TO CHORD MEMBER OF TRUSS.
3. MAXIMUM SPACING OF BOTTOM CLIP ANGLE IS 5'-8".
4. TOP CLIP REQUIRED FOR EACH VERTICAL MEMBER OF REMOVABLE SIGN PANEL FRAME.
NOTES:

1. WELD-O-TYPE GRATING SHALL HAVE 1/2"x1/4" BEARING BARS @ 3/8" CENTERS WITH 1/4" DIAMETER (OR EQUAL) CROSS BARS @ 4" CENTERS. SEE DETAIL 12. IF MECHANICAL LID GRATING IS USED IT SHALL BE EQUAL IN STRENGTH TO THE WELD-O-TYPE. ALTERNATE HOLD-DOWN CLIPS MAY BE SUBMITTED FOR APPROVAL.

2. FOR SPACING OF LIGHTING FIXTURES SEE TABLE OF SPACINGS ON "SIGN LIGHTING FIXTURES" SHEET T-30.1-16.1.

3. WALKWAY GRATING AND LIGHT FIXTURE MOUNTING CHANNELS TO BE CONTINUOUS (NO SPLICES) OVER AS MANY WALKWAY BRACKETS AS PRACTICABLE CONSISTENT WITH FABRICATION, EASE OF HANDLING AND ASSEMBLING. ALL CONTRACT PLANS TO DOCUMENT IF WALKWAY GRATING AND SAFETY RAILING IS REQUIRED.

4. BOLTS, NUTS, WASHERS, ETC. TO BE GALVANIZED.
SIDE VIEW - SINGLE FACED SIGN TYPE A

LIGHT FIXTURE MOUNTING DETAIL

DETAIL A
### PILE FOUNDATION

<table>
<thead>
<tr>
<th>POST SIZE</th>
<th>PILE DIAMETER</th>
<th>PILE DEPTH</th>
<th>REINFORCEMENT</th>
<th>PED Da.</th>
<th>PED Ht.</th>
<th>PED DIA.</th>
<th>PED W.</th>
<th>PED T.</th>
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<th>FOOT Ht.</th>
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### NOTES:

1. BACKFILL SHALL BE IN PLACE PRIOR TO ERECTION OF POST.
2. GROUT PROTECTION REQUIRED WHEN INDICATED ON THE PLANS.
3. PILE PEDESTAL SHALL BE FORMED 6" MINIMUM BELOW GROUND SURFACE. REMAINDER SHALL BE PLACED AGAINST UNDISTURBED MATERIAL.
SOLID WHITE LINE OR SOLID YELLOW LINE

BROKEN YELLOW LINE OR BROKEN WHITE LINE

10' 10' 10' 10' 8''

BROKEN YELLOW W/SOLID YELLOW LINE

DOTTED WHITE LINE

DOUBLE SOLID YELLOW LINE

DOTTED WHITE LINE (CAT TRACKS)
PLACEMENT OF MERGE ARROWS

TYPICAL LANE REDUCTION
For further details on "LANE REDUCTION" see Part 8 of the MUTCD

TYPICAL PARALLEL ACCELERATION LANE
For further details on "PARALLEL ACCELERATION LANE" see Part 7 of the MUTCD

MERGE ARROW

HOV LANE
LEFT/Straight Arrow
LEFT/Straight/Right Arrow

BICYCLE

EXIT ARROW
Wrong Way Arrow

STRAIGHT Arrow

TURN Arrow

PERMANENT PAVEMENT MARKINGS
BICYCLE/HOV/ARROWS

NEVADA DEPARTMENT OF TRANSPORTATION

SIGNED ORIGINAL ON FILE 10/28/04 (6034)

DEPARTMENT OF SAFETY/TRAFFIC ENGINEER
GENERAL NOTES:
1. START WITH AN ARROW AT THE ENTRANCE OF THE STORAGE LANE.
2. THE ARROW ONLY CLOSEST TO CROSSWALK SHALL BE INSTALLED 8 FEET PRIOR TO THE STOP BAR.
3. THE STORAGE LINE IS EQUAL TO THE STORAGE LENGTH PLUS THE DECELERATION LENGTH.
4. WHEN CALCULATING DISTANCE BETWEEN MARKINGS, ROUND TO THE NEAREST WHOLE NUMBER.

MARKING & PLACEMENT DETAILS

LEGEND:
* RIGHT ARROWS WHERE APPLICABLE.
** RAISED PAVEMENT MARKERS WHERE APPLICABLE.
FOR DETAILS SEE STANDARD PLAN 1-3/1-2.
Crosswalk Bar Spacing: (Placed Parallel to Travel Lanes)

As Required

PERMANENT (TYPICAL) NON-SIGNALIZED, NON-STOP CONTROLLED CROSSWALK

DISTRICT 1

Crosswalk Bar Spacing: (Placed Parallel to Travel Lanes)

As Required

E.O.P.

40'.

50'

PERMANENT (TYPICAL) NON-SIGNALIZED, NON-STOP CONTROLLED CROSSWALK

DISTRICT 2 & 3

Stop Bar

Crosswalk Bars

Curb

Curb

Sidewalk

Crosswalk Bars

STOP BAR 2'

4'

10'

NEVADA DEPARTMENT OF TRANSPORTATION

PERMANENT/TEMPORARY PAVEMENT MARKINGS: CROSSWALKS

LEGEND:

# - CENTER OF CURB RAMP TO BE CENTER OF CROSSWALK

SHEET: 1-38-3.13 11-34

SIGNED ORIGINATED: 1-36-1.3 06-34

SHEET: SAFETY/TRAFFIC ENG
TYPICAL MARKINGS

- AHEAD: 28.5 ft²
- EXIT: 17.0 ft²
- MPH: 18.5 ft²
- FED: 17.3 ft²
- SCHOOL: 32.5 ft²
- STOP: 21.0 ft²
- XING: 20.5 ft²
- YIELD: 22.0 ft²
- HOV: 16.5 ft²
SPACING TABLE

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<tr>
<th>Wm</th>
<th>Number of Type D Raised Pavement Markers Per Median Nose</th>
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<td>&gt;2' to 3'</td>
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<td>&gt;3' to 4'</td>
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<tr>
<td>&gt;4'</td>
<td>1 Each For Every 1' of Curb Length</td>
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</table>

* (1) Raised Pavement Marker Each Shall Be Placed On The P.C. and The P.T. Of The Median Nose. All Others Spaced Equally Between P.T. & P.C.

LEGEND:

PERMANENT PAVEMENT STRIPING (VARIES)

GENERAL NOTES:
1. THE ENTIRE MEDIAN SHALL BE PAINTED FROM THE MEDIAN NOSE BACK 5' OR TO THE FIRST P.C., WHICH EVER IS GREATER.
2. SEE STANDARD PLAN SHEET T-37.1.1 FOR TYPE D RAISED PAVEMENT MARKER.
3. SEE STANDARD PLAN SHEET R-9.2.1 FOR TYPE 2 OBJECT MARKER.

SECTION A-A
SNOw REMOVAL AREA

SECTION A-A
NON-SNOW REMOVAL AREA

PLAN
MULTILANE

TWO LANE - TWO WAY

MARKING & PLACEMENT DETAIL
(Airplane 11.5 ft²)

GENERAL NOTES:
1. CONTACT NEVADA HIGHWAY PATROL PRIOR TO THE APPLICATION OF THE MARKINGS.
   CONTACT: N.H.P, HEADQUARTERS - (775) 684-4867
   CHIEF PILOT - (775) 721-9044

2. ALL PAVEMENT MARKINGS SHALL BE WHITE.
GENERAL NOTES:
UNLESS NOTED OTHERWISE ON THE DRAWINGS, CONSTRUCT THE SIGN STRUCTURE TO CONFORM WITH THE FOLLOWING REQUIREMENTS:

1. CONSTRUCTION SPECIFICATIONS: STATE OF NEVADA STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT EDITION; AND THE SPECIAL PROVISIONS THEREOF.

2. DESIGN SPECIFICATIONS: ASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 4TH EDITION, 2007.

3. LOADING
   A. IMPORTANCE FACTORS (1.0 x 1.0):
   B. DRAG COEFFICIENT (C_D):
   C. MAXIMUM DEAD LOAD OF DSM:
   D. MAXIMUM WIND LOAD:
   E. LIVE LOAD:
   F. NATURAL WIND VELOCITY:
   G. GALLIPATING:
   H. TRUCK BLOWING:
   I. WALKWAY LOAD:
   J. WIND SPEED:
   K. ICE LOAD:
   L. SEISMIC ACCELERATION COEFFICIENT:

4. STRUCTURAL STEEL
   A. STRUCTURAL STEEL PLATES AND SHADES SHALL CONFORM TO ASHTO M50 GRADE 36 OR ASTM A36.
   B. STEEL RODS SHALL CONFORM TO ASTM A615 TYPE 1, GRADE 60.
   C. HOT DIP GALVANIZED STRUCTURAL STEEL AFTER FABRICATION IN ACCORDANCE WITH ASTM A615.

5. UNIT STRESSES
   A. STRUCTURAL STEEL:
      \( \sigma = 36 \text{ksi} \)
   B. CONCRETE PREGRESSED CLASS A Writing:
      \( \sigma = 4000 \text{psi} \)
   C. REINFORCING STEEL:
      ASTM A615 GRADE 60

6. BOLTED CONNECTIONS
   A. ACHIEVE ALL STRUCTURAL HIGH STRENGTH BOLTING, EXCEPT ANCHOR BOLTS. USE ASHTE BOLTS.
   B. USE A HARDENED FLAT WASHER BETWEEN THE NUT AND THE CONNECTED PART.
   C. USE HIGH STRENGTH BOLTS WITH CTS OR TENSION CONTROL.
   D. USE BOLTS AS INSTALLED PER SUBSECTION 506.01.01.07 OF THE STANDARD SPECIFICATIONS.
   E. HOT DIP GALVANIZED ALL STEEL PARTS IN ACCORDANCE WITH ASTM A653. EXCEPT FOR ONLY THE TOP 1/2 FOR ANCHOR BOLTS AND AS SPECIFIED FOR TENSION CONTROL.
   F. USE Afers BOLTED CONNECTIONS, MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM A653, CLASS 2 OR MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM A653, CLASS 4, WHEN NUTS AND BOLTS IN ANY ASSEMBLY, SHALL BE GALVANIZED BY THE SAME PROCESS. LUBRICATE THREADS WITH A Liec ORGANIZED.

7. WELDED CONNECTIONS
   A. WELDS SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED ON THE PLANS.
   B. WELDS IN ACCORDANCE WITH SECTION 210 OF THE STANDARD SPECIFICATIONS.
   C. USE ONLY WELDERS SUBMITTED ACCORDING TO AGENT-ASSISTED WELDING SPECIFICATIONS FOR WELDING QUALIFICATION.
   D. USE ONLY QUALIFIED PERSONNEL.
   E. USE ONLY QUALIFIED PERSONNEL.
   F. USE ONLY QUALIFIED PERSONNEL.
   G. USE ONLY QUALIFIED PERSONNEL.
   H. USE ONLY QUALIFIED PERSONNEL.
   I. USE ONLY QUALIFIED PERSONNEL.
   J. USE ONLY QUALIFIED PERSONNEL.
   K. USE ONLY QUALIFIED PERSONNEL.
   L. USE ONLY QUALIFIED PERSONNEL.

8. GROUNING
   A. USE WIRE PLATES TO FINISH ELEVATION AND COMPLETELY FILL PLATE AREA WITH A HIGH STRENGTH, NON-FERROUS, NON-CONDUCTIVE GROUND.
   B. COMPLETE GROUND TO COMPARE WITH THE ASTM C470.

9. REFER TO ESTIMATED STANDARDS SPECIFICATIONS SECTION 506.01.08.01 FOR ADDITIONAL INFORMATION.

10. WHENEVER STRUCTURAL CLEARANCE IS LESS THAN 18 FEET TO THE BOTTOM OF THE STRUCTURAL FRAME AND WALKWAY BRACKETS.

11. CONSTRUCT SIGN STRUCTURES TRUE TO DIMENSIONS, FREE FROM KINKS, TWISTS OR WOOG, AND UNIFORM IN APPEARANCE.

12. ALL FITTINGS, EYES, OR REMOVABLE BRACKETS TO ALL SIGNS AND BRACKETS AS NECESSARY TO DELIVER THE SIGN DURING SHIPMENT AND FOR LIFTING AND MOVING DURING INSTALLATION. SHOW DETAILS TO PREVENT DAMAGE TO THE FINISHED GALVANIZED OR PAINTED SURFACES NO BRACKETS ON SIGNS AND BRACKETS SHOWN AFTER INSTALLATION.


14. FABRICATE ALL SIGN STRUCTURES INTO THE LARGEST PRACTICAL SECTIONS PRIOR TO GALVANIZING.

15. GROUND ALL STRUCTURES IN ACCORDANCE WITH APPLICABLE ELECTRICAL CODES.

16. NPS = NOMINAL PIPE SIZE.

17. 30 DAYS PRIOR TO FABRICATION, SUBMIT TO NDOT 10.1231 SETS OF SHOP DRAWINGS, WHICH MUST COMPLY WITH THE REQUIREMENTS OF SUB SECTION 105.02 OF THE STANDARD SPECIFICATIONS.

18. PROVIDE A SUPPLIER'S ENGINEERED CONNECTION FOR THE DMS SIGN TO THE OVERALL SIGN STRUCTURE. THE DESIGN, INCLUDING MATERIAL SPECIFICATIONS, IS TO BE STAMPED BY A NEVADA REGISTERED PROFESSIONAL CIVIL OR STRUCTURAL ENGINEER.
NOTES:
1. FIELD VERIFY ELEVATIONS AND CONTROLLING DIMENSIONS PRIOR TO ORDERING OR FABRICATING ANY MATERIALS.
2. VERIFY ALL POST HEIGHTS AND SPAN LENGTHS PRIOR TO ORDERING THE FABRICATION OF POSTS AND TRUSS ASSEMBLIES.
3. SEE VENDOR REQUIREMENTS FOR DMS MOUNTING BRACKET DETAILS. CONTRACTOR IS RESPONSIBLE FOR FABRICATION AND INSTALLATION OF DMS ATTACHMENT VERTICAL BRACKETS.
4. PLACE TOP OF PEDESTAL ELEVATION BETWEEN 2'-6" AND 4" BELOW BOTTOM OF BASE PLATE ELEVATION. SEE SHEET T-39.18 FOR FOUNDATION DETAILS.
5. DETAIL FOUNDATION OR MAINTENANCE PAD FOR 3:15\% SLOPE OR STEEPER. SEE SHEET T-39.10 FOR DETAILS.

ELEVATION
Barrier Rail Shown

ELEVATION
Guardrail Shown
DETAIL 1

DETAIL 2

WELDED CHORD SPlice
Prepare Edges By Scribing To Angles Shown. Weld To 100% Full Permeation & Grind Flush With Base Metal.

DETAIL 3

DETAIL 4

DETAIL 5
**SECTION C-C**

- Base Plate
- Weld 2" NPS coupling or 3/4" and tap for 2" NPS short nipple and plug with recessed pipe plug. Same size as sign post.

**SECTION D-D**

- Post 30" O.D. 4" 1/2" wall thickness
- Weld 2" NPS coupling or 3/4" and tap for 2" NPS short nipple and plug with recessed plug. Place perforated 1/2" pipe away from approaching traffic.

**NOTES:**

1. For general notes see "Instructions and Examples" Standard Plan T-3611.
2. Set base plates and lower side of pedestals normal to axis of sign.
3. Place backfill in place prior to erection of post.
4. Thread upper 8" of anchor bolts and galvanize upper 12".
5. For reinforcement, reinforcement is clear to outside of bar and is 2" to the main reinforcement, except as noted.
6. Retain anchor plates with hex nut or formed head.
7. Rack the post out of plumb with the use of the leveling nuts to make the bottom of the sign frame level.
8. At final position of post tighten all top and bottom nuts against base plate.

**ELEVATION**

- Handhole & Cover detail
- Anchor type
- 5" x 1" Plate
- 4" Topcoat & 10% Type
- 6" x 19" Plate
- 4" Topcoat & 10% Type

**ANCHORAGE DETAILS**

- Anchor Type
- 5" x 1" Plate
- 4" Topcoat & 10% Type
- 6" x 19" Plate
- 4" Topcoat & 10% Type

**PLAN**

- Cover plate not shown
- 1/4" Neoprene gasket, cemented to cover plate
- 10 gauge cover plate

**SINGLE POST DMS OVERHEAD SIGN POST DETAILS**

Signed Original On File: T-39.1.1 (423)
Chef Bridge Engineer

NEVADA DEPARTMENT OF TRANSPORTATION
DMS PEDESTAL BENT BARS

NOTES:
1. FOR ANCHOR BOLT LAYOUT, SEE SHEET T-39.1.9
2. FOR TOP OF BASE PLATE ELEVATION, SEE SHEET T-39.1.2
3. USE CLASS A OR AA CONCRETE (F'c = 4000 psi)
4. LONGER SIDE OF BASE PLATES, PEDESTALS AND FOOTINGS SHALL BE ORIENTED PERPENDICULAR TO THE SIGN AXIS
5. PLACE BACKFILL EQUIVALENT TO THE SURROUNDING MATERIAL PRIOR TO ERECTION OF THE POST
6. FORM PEDESTAL 6" MINIMUM BELOW GROUND SURFACE

SECTION E-E

SECTION D-D

DETAIL B
NOTES:
1. REFER TO DMS ELEVATION SHEETS FOR INSTALLATION LOCATIONS.
2. FOR PILE PEDESTAL AND PILE DETAILS, SEE SHEET T-391.1.4.
3. FOR POST AND BASE PLATE DETAILS, SEE SHEET T-391.5.
4. FOR DMS CONTROL CABINET INSTALLATION DETAILS, SEE SHEET VENDOR REQUIREMENTS.
5. INSTALL RAILING PER "PEDESTRIAN RAIL TYPE "ST" (MODIFIED)" DETAILS ON SHEET T-351.1.11.
6. INSTALL A FOUNDATION CAP MAINTENANCE PAD AT ALL LOCATIONS WHERE A DMS CONTROL CABINET IS ABOVE A 2% OR STEEPER SLOPE.
   INSTALL A 48" x 48" x 4" CONCRETE PAD IN FRONT OF DMS CONTROL CABINET ON SLOPES FLATTER THAN 2%. PAD SHALL SLOPE 2% IN DIRECTION OF EXISTING DRAINAGE.
NOTES:
1. INSTALL GROUND ROD WIRE CONDUIT IN ALL CABINET FOUNDATIONS. GROUND ROD WIRE CONDUIT TO BE USED WHEN AN ADDITIONAL GROUND ROD IS REQUIRED.
2. BONDING AND GROUNDING SHALL MEET THE NATIONAL ELECTRIC CODE AND NDOT STANDARDS.
3. VENDOR WILL PROVIDE DMS CABINET.
NOTES:

1. NOTES ON 1, 2, 3 & 7 OF SHEET B-20.1.3 SHALL APPLY.

2. WHEN THE ADDITION OF CELLS CAUSES THE LENGTHS OF THE "g", "f" AND "c" BARS TO EXCEED 60 FEET, THE BARS WILL REQUIRE SPlicing. SPliceS FOR THE "c" BARS SHALL BE CENTERED ABOUT THE CENTER LINE OF THE INTERIOR WALLS. SPliceS FOR THE "g" BARS SHALL BE CENTERED ABOUT THE CENTER OF THE CELLS. SPliceS FOR THE "f" BARS SHALL BE DONE AT THE 45 DEGREE LEG AND CONFORM TO THE SPlice DETAIL SHOWN. SPlice LOCATIONS SHALL BE ALTERNATED FROM BAR TO BAR. SEE DETAIL SHOWN. SPlice LENGTHS FOR THE "g" AND "c" BARS SHALL BE AS FOLLOWS:
   - No. 4 BARS - 16 INCHES
   - No. 6 BARS - 24 INCHES
   - No. 8 BARS - 31 INCHES
   - No. 8 BARS - 40 INCHES

3. FOR DIMENSIONS, BAR SIZES, BAR SPACING, AND ROOF SECTION SPACING DETAIL, SEE SHEET B-20.1.3. FOR GENERAL NOTES, SEE SHEET B-20.1.1.

LEGEND:

- CONCRETE FOR THIS PORTION IS INCLUDED IN QUANTITIES OF ADJOINING CELLS.
- REINFORCING STEEL INCLUDED IN PREVIOUS CELLS QUANTITIES.
### Cubic Yards of Concrete and Pounds of Reinforcing for Two Type II Headwalls

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<th>15° Skew</th>
<th>30° Skew</th>
<th>45° Skew</th>
<th>0° Skew</th>
<th>15° Skew</th>
<th>30° Skew</th>
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#### Triple Box

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<td>15.4</td>
<td>30.6</td>
<td>61.5</td>
<td>105.5</td>
</tr>
</tbody>
</table>

---

**Quantities for Additional Cells**

Concrete for Two Type II Headwalls for Each Additional Cell (cu. yards)

Add this quantity to the quantity for a double box.

For height of less than 1211 (3.56 m) or span of 11.0 (0.67 m) / COS skew angle

For height of equal to 1211 (3.56 m) or span of 11.0 (0.67 m) / COS skew angle

Reinforcing for Two Type II Headwalls for Each Additional Cell (Pounds)

Add this quantity to the quantity for a double box.

For height of less than or equal to 7 (2000 m) / (16.69 m / 11.0 span x 0.67 m) / COS skew angle

For height of equal to 8 (2000 m) / (12.4 m / 11.0 span x 0.67 m) / COS skew angle

For height of equal to or greater than 1211 (3.56 m) / (42.72 m / 11.0 span x 0.67 m) / COS skew angle

---

**角度**

0°

15°

30°

45°

---

**RCD Culverts**

**Type II Headwalls**

Signed: Engineer (Name) Date: 3/20
### Cubic Yards of Concrete and Pounds of Reinforcing for Two Type I Headwalls

<table>
<thead>
<tr>
<th>SINGLE BOX</th>
<th>DOUBLE BOX</th>
<th>TRIPLE BOX</th>
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</thead>
<tbody>
<tr>
<td><strong>QTY</strong>:</td>
<td><strong>QTY</strong>:</td>
<td><strong>QTY</strong>:</td>
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<tr>
<td><strong>SPANS</strong></td>
<td><strong>SPANS</strong></td>
<td><strong>SPANS</strong></td>
</tr>
<tr>
<td><strong>HEIGHT</strong></td>
<td><strong>HEIGHT</strong></td>
<td><strong>HEIGHT</strong></td>
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<tr>
<td><strong>0° SKEW</strong></td>
<td><strong>0° SKEW</strong></td>
<td><strong>0° SKEW</strong></td>
</tr>
<tr>
<td><strong>15° SKEW</strong></td>
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<td><strong>15° SKEW</strong></td>
</tr>
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<tr>
<td>15</td>
<td>29.6</td>
<td>2220</td>
</tr>
</tbody>
</table>

---

1: Quantities shown are for headwalls at the inlet and outlet.

**NEVADA DEPARTMENT OF TRANSPORTATION**

**ESTIMATE OF QUANTITIES TYPE I HEADWALLS**

**Signed:** Grading & Design

**Engineer:** Nevada Bridge Engineer

**Date:** 10/20/6 (503)
NOTES:
1. FOR GENERAL NOTES SEE SHEET B-20.1.1.
2. DOWEL HOLES SHALL BE DRILLED 1/2" INTO EXISTING CONCRETE, DIAMETER OF HOLE SHALL BE 1/4" LARGER THAN DIAMETER OF BAR. HOLE MAY BE INCLINED NO MORE THAN 5° OFF THE HORIZONTAL. DOWELS SHALL BE EPOXYED INTO CLEAN HOLES. EPOXY SHALL CONFORM TO THE REQUIREMENT OF SECTION 728 OF THE STANDARD SPECIFICATIONS.
**CONCRETE PAVING**

**MINIMUM COVER CONDITIONS**

- **No. 4 Bars @ 18" Both Ways**
- **Phenix Bluestone Paving**
- **6" Min. Aggregate Base**

**BITUMINOUS PAVING**

- **3/4" Min. Average Gap at Each Joint for Spans Up to 12'**
- **1" Min. Average Gap at Each Joint for Spans Over 12'**

**General Notes:**

1. **Concrete shall be as specified in AASHTO M259 or M273 (ASTM C1433), as modified in subsection 520.03.04.**

2. **Reinforcing steel shall be AASHTO M37 (ASTM A616) Grade 50. Welded wire fabric shall be AASHTO M65 (ASTM A168) Smooth Wire, or AASHTO M22 (ASTM A470) Deformed Wire. Reinforcing steel in the top slab shall have an epoxy coating conforming to AASHTO M204 (ASTM D3356) when there is 6" or less of cover on the RCB (Clark County excluded).**

3. **Reinforcement details shall be as shown in the standard plans. Exposed reinforcements to tie cast-in-place headwall to precast box shall consist of either No. 4 bars at 12" spacings or exposure of the precast box welded wire fabric. The No. 4 bars shall be cast a minimum of 6" into the precast box segment; both the No. 4 bar or welded wire fabric shall extend into headwall to 2" clear of the headwall face.**

4. **Joint material shall be a preformed joint material meeting AASHTO M198 Type B. The material shall be installed in accordance with the manufacturer's recommendations.**

5. **In addition to the markings required by the AASHTO and ASTM specifications, mark each box section with the appropriate NDOT contract number.**

6. **Reinforcing steel shall extend full width of concrete pavement and shall have a minimum clearance of 1" on the bottom. In areas of the state where road salts are used, the reinforcing shall be epoxy coated. Reinforcing is to be placed parallel to the centerline of road for longitudinal reinforcement and parallel to the precast box for transverse reinforcement.**

8. **Fill cylindrical lifting holes located by manufacturer with an approved epoxy non-shrink grout. Hole with an approved conical shape for the bottom 1" may be filled with a concrete grout composed of one part by volume of cement to two parts by volume of sand with only enough water to permit placing and tamping. An approved custom plug may be used. An optional method of lifting may be used with approval.**

---

** Culvert End **

**Multiple Culvert Installation**

**Typical Culvert Installation**

**Limits of Precast RCB Sides, Headwall**

- **#4 Bar @ 12"**
- **#4 Bar @ 24"**
- **#4 Bar @ 36"**

**Precast Concrete Box Inner Walls**

- **3" Space Between Adjacent Boxes To Be Filled With Grout**

**Precast Concrete Box Culvert**

**Signed Grading On File**

**Designer To Investigate Availability Of The Required Box Size.**

**Nevada Department of Transportation**

**Precast Concrete Box Culvert**

**Signed Grading On File**

**Chief Bridge Engineer**

**(530)**

**Approved**

**(530)**

**(530)**

**(530)**
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 A325 GRADE 65-35 UNLESS NOTED OTHERWISE.
4. WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

Complete Joint Penetration Weld (See Welding Details for Approved Welds)

PILE SPlice NOTES: 
1. Pile Splice Welds Shall Conform to ANSI D1.1.
2. Pile Must be Stopped at Least 3'-0" above ground prior to splicing.

SINGLE VEE-GROOVE BUTT WELD 
Permitted for all Positions

SINGLE BEVEL-GROOVE BUTT WELD 
Permitted in Horizontal Position Only
1. End Redwood Strips at Top of Racial Section When Their Intermediate Distance From Each Other Reaches 3 Feet

PLAN VIEW

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

2"x4" Redwood
Saw as Shown & Reassemble, Remove Upper Portion After Concrete Cures

SECTION F-F

SECTION A-A WITH SIDEWALK

SECTION A-A WITH DITCH

SECTION B-B AT PIER

SECTION C-C AT ABUTMENT

SECTION D-D AT WINGWALL

SECTION E-E EDGE OF SLOPE

Concrete Slope Pavement

1/4" Preformed Expansion Joint Material

Concrete Slope Paving

3" Concrete Slope Paving

6" Ditch

Concrete Slope Paving

50-1

3" Slope

3" Concrete Slope Paving

50-1

3" Concrete Slope Paving

NOTES:

Slope shall be 50:1 Min. or roadway grade Max. Unless shown otherwise in plans.

CONCRETE SLOPE PAVING DETAILS

Signed Grading On File 8-26-11
CHEF BRIDGE ENGINEER

NEVADA DEPARTMENT OF TRANSPORTATION
DISTRIBUTION OF PRESTRESSING FORCE:

UNLESS OTHERWISE NOTED THE PRESTRESSING FORCE, P JACK OR PF, SHALL BE DISTRIBUTED WITH AN APPROXIMATELY EQUAL AMOUNT IN EACH GIRD AND SHALL BE PLACED SYMMETRICAL ABOUT THE CENTERLINE OF THE STRUCTURE. IN ABSENCE OF THE PRESTRESSING FORCE SHALL BE UNIFORMLY DISTRIBUTED ACROSS THE SLAB.

STRESSING SEQUENCE:

NO MORE THAN 1/3 OF THE PRESTRESSING FORCE IN ANY GIRD 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 EQUATIONALLY about the CENTERLINE OF THE STRUCTURE.

GIRD STEM SHALL BE FLANGED 20FT away FROM THE FLANGE TO PROVIDE A MINIMUM OF 1 1/2” CONCRETE CONCRETE ON EACH SIDE OF THE GIRD STEM. EREIFLING INTERFERING WITH THE PRESTRESSING TENDON ALIGNMENT SHALL BE ADJUSTED AS REQUIRED BY THE DESIGN.

NO BARS MARKED "X" Are TO BE INCLUDED IN THE COST OF Prestressing CAST-IN-PLACE CONCRETE.

Bearing Seat Concrete XX

Concrete Gap Varies According to Type of Post-Tensioning

72" Embedment From Line of Backwall

Concrete Gap Varies According to Type of Post-Tensioning

Abutment Reinforcing Continuous Through Anchorage

Bear Wall Concrete XX

Clearance Requirements for Ducts

1. Duct Patterns Shown are for 12" Wide Gird Stem. For Other Widths the Minimum Clearances Must be Maintained.

2. Vertical Dimensions at Tenth Points to be Shown in Order to Facilitate the Placing of the Ducts Accurately.

3. Approval of the Engineer is Required for Deviations.

Nevada Department of Transportation

CAST-IN-PLACE PRESTRESSED GIRD DETAILS

Signed Originating File B-26.11

Chef Bridge Engineer

Typical Bearing Seat Illustrations

Ext. Sloping Girder

No. 6 Deformed 8" Embedment From Line of Backwall

Vertical Girder

Note: Details May Be Modified to Suit Specific Anchor Or Type of Post-Tensioning

Ext. Sloping Girder

No. 6 Deformed 12" Embedment From Line of Backwall

Common Bearing Plate

PRESTRESSING PATH

Ducts Over 4 1/2" D.D.

2 3/4" Min. O.C. Except 1 5/8" Min. Clear. (1) At Anchorages

Ducts Over 3" D.D. to 4 1/2" D.D.

2 3/4" Min. O.C. Except 1 5/8" Min. Clear. (1) At Anchorages

Ducts 3" D.D. & Less

Clearing Requirements for Ducts

1. Duct Patterns Shown Are for 12" Wide Gird Stem

Other Widths the Minimum Clearances Must Be Maintained.

2. Vertical Dimensions at Tenth Points to Be Shown in Order to Facilitate the Placing of the Ducts Accurately.

3. Approval of the Engineer is Required for Deviations.
## REINFORCED CONCRETE RETAINING WALL TYPES 1A & 1B

<table>
<thead>
<tr>
<th>Backfill Condition</th>
<th>Wall Type Required for Seismic Acceleration 0.05g 0.45g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level backfill w/ surcharge</td>
<td>1A</td>
</tr>
<tr>
<td>Sloping backfill w/ surcharge</td>
<td>1A</td>
</tr>
<tr>
<td>3:1 &lt; Slope ≤ 2:1</td>
<td>1B</td>
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*Special design required*

### TYPE 1A - REINFORCED CONCRETE RETAINING WALL

**TABLE OF DIMENSIONS AND REINFORCING STEEL**

<table>
<thead>
<tr>
<th>Design</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>11</th>
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<th>18</th>
<th>20</th>
<th>22</th>
<th>24</th>
<th>26</th>
<th>28</th>
<th>30</th>
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</thead>
<tbody>
<tr>
<td>Lc (ft)</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>Lg (ft)</td>
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<td>-</td>
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<td>-</td>
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<td>-</td>
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</tr>
<tr>
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<td>18.1</td>
<td>23.7</td>
<td>29.3</td>
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<td>58.0</td>
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<td>70.6</td>
<td>77.4</td>
<td>84.2</td>
<td>91.0</td>
<td>97.8</td>
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<tr>
<td>Reinforced concrete n/ft²</td>
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<td>96.0</td>
<td>137.5</td>
<td>179.2</td>
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<td>304.3</td>
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<td>637.9</td>
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<td>721.3</td>
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</tr>
</tbody>
</table>

### TYPE 1B - REINFORCED CONCRETE RETAINING WALL

**TABLE OF DIMENSIONS AND REINFORCING STEEL**

| Design | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
|--------|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Lc (ft) | - | - | - | - | - | - | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| Lg (ft) | - | - | - | - | - | - | -  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| Concrete n/ft² | 8.9 | 15.5 | 22.1 | 28.7 | 35.3 | 41.9 | 48.5 | 55.1 | 61.7 | 68.3 | 74.9 | 81.5 | 88.1 | 94.6 | 101.2 | 107.8 | 114.4 |
| Reinforced concrete n/ft² | 54.0 | 96.0 | 137.5 | 179.2 | 220.9 | 262.6 | 304.3 | 346.0 | 387.7 | 429.4 | 471.1 | 512.8 | 554.5 | 596.2 | 637.9 | 679.6 | 721.3 |

### TYPICAL SECTION

**NOTES:**
1. FOR GENERAL NOTES SEE B-30.1.2
2. FOR DETAILS NOT SHOWN AND DRAINAGE REQUIREMENTS SEE SHEETS B-30.1.3 THRU 350.1-1.5.
3. POUDRED CONSTRUCTION JOINT SURFACE TO 1/4" AMPLITUDE.
4. GEOFELINEESEH NYLON STENTS VERIFY MAXIMUM ALLOWABLE BEARING PRESSURES FOR ACTUAL SITE SOIL CONDITIONS.

---

**NEVADA DEPARTMENT OF TRANSPORTATION**

**TYPES 1A & 1B CANTILEVER CONCRETE RETAINING WALLS**

Signed: George On File 8-30-11 (502)

CIVIL ENGINEER
REINFORCED CONCRETE
RETAINING WALL TYPE 2

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<th>Wall Type Required for Seismic Acceleration</th>
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</tr>
<tr>
<td>Sloping backfill w/ surcharge</td>
<td>2</td>
</tr>
<tr>
<td>Slope ≤ 3:1</td>
<td>2</td>
</tr>
<tr>
<td>3:1 ≤ Slope ≤ 2:1</td>
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* Special design required

STANDARD BAR LAPS

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<td>82&quot;</td>
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</table>

TYPE 2 - REINFORCED CONCRETE RETAINING WALL
TABLE OF DIMENSIONS AND REINFORCING STEEL

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<th>Height (H)</th>
<th>Thickness (T)</th>
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<tbody>
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<td>4&quot;</td>
<td>5-1/2&quot;</td>
<td>6-3/8&quot;</td>
</tr>
<tr>
<td>B</td>
<td>6&quot;</td>
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<td>7-1/8&quot;</td>
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<tr>
<td>C</td>
<td>7-3/8&quot;</td>
<td>8-3/4&quot;</td>
<td>9-1/8&quot;</td>
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<tr>
<td>D</td>
<td>8-3/8&quot;</td>
<td>10-1/8&quot;</td>
<td>11-3/4&quot;</td>
</tr>
</tbody>
</table>

Concrete Mix:
- Water: 9.5 ft³
- Sand: 3.3 cu ft
- Gravel: 4.5 cu ft
- Concrete: 17.9 cu ft
- Gravel: 23.6 cu ft
- Concrete: 33.9 cu ft

NOTES:
1. FOR GENERAL NOTES SEE B-30.1.1.
2. FOR DETAILS NOT SHOWN AND DRAINAGE REQUIREMENTS SEE SHEETS B-30.1.2 THRU B-30.1.3.
3. RODDING CONSTRUCTION JACKET SURFACE TO 1/2" AMPLITUDE
4. GEOTECHNICAL ENGINEER WILL VERIFY MAXIMUM ALLOWABLE BEARING PRESSURES FOR ACTUAL SITE SOIL CONDITIONS.

TYPICAL SECTION
FOOTING STEP

APPROXIMATE WALL OFFSET VALUES

Values for offsetting forces to be determined by the engineer.

STEM HAUNCH FOR BARRIER RAIL

Dimension (b) at base of haunch to be determined as shown.

GENERAL NOTES:

2. LOADING: LIVE LOAD SURCHARGE PRESSURE EQUAL TO 2 FEET OF EARTH. SEISMIC ACCELERATION = 0.15g & 0.4g, WHERE "g" THE PEAK GROUND ACCELERATION IS USED IN THE DESIGN.
3. CONCRETE: ALL CONCRETE SHALL BE CLASS A OR A MODIFIED (AAR) WITH F'c = 4000 psi AT 28 DAYS.
4. REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 OR A706.
5. DETAIL DESIGN: CANTILEVER WALLS ARE DESIGNED BASED ON THE FOLLOWING PARAMETERS:

SOIL PROPERTIES:

INTERNAL ANGLE OF FRICTION = 35°
UNIT WEIGHT = 120 lb/ft³

EQUIV. ACTIVE FLUID PRESS. = 56 psi (LEVEL BACKFILL)
EQUIV. ACTIVE FLUID PRESS. = HANKIN METHOD (SLOPING BACKFILL)
EQUIV. PASSIVE FLUID PRESS. = 560 psi (TOP OF FOSTING DOWN)

COEFFICIENT OF FRICTION BETWEEN SOIL AND CONCRETE = 0.45

WALL PROPERTIES:

STATIC DESIGN BASED ON ALLOWABLE STRESS DESIGN
f_c = 1.2 ksf
f_y = 8 ksf

SEISMIC DESIGN BASED ON LOAD FACTOR DESIGN
f_c = 4 ksf
f_y = 60 ksf

FACTORS OF SAFETY APPLIED:
STATIC OVERTURNING = 2.0
STATIC SLIDING = 1.0
SEISMIC OVERTURNING = 1.5
SEISMIC SLIDING = 1.1

6. RETURN WALLS: RETURN WALL NOT REQUIRED UNLESS SHOWN IN PLANS.
7. DRAINAGE: DRAINAGE SYSTEM (GUTTER, DRAIN, PIPE) NOT REQUIRED UNLESS SPECIFIED IN THE PLANS.

NEVADA DEPARTMENT OF TRANSPORTATION
CANTILEVER CONCRETE RETAINING WALL DETAILS No. 1

Signed Gring On File B-30.1.3 (502)
CHIEF BRIDGE ENGINEER N/A

PLAN
For Return Wall Type A
Omit when waterstop is not required

PLAN
For Return Wall Type B
Omit when waterstop is not required

PLAN
For Return Wall Type C
Omit when waterstop is not required

PLAN
For Return Wall Type D
Omit when waterstop is not required

ELEVATION
Use where H=1'-6" or Less

ELEVATION
Use where H=10'-0" or More on Offset Walls

ELEVATION
Use where H=10'-0" or More on Straight Walls

ELEVATION
Use where H=6'-0" or Less

Return Wall Type A
Return Wall Type B
Return Wall Type C
Return Wall Type D
WEEP HOLE NOTES:
1. 4" Dia. Orings At 2'S Maximum Center to Center - Exposed Orings Shall Be Located 3" Above Finish Grade.
2. 2 Cubic Feet of Type 2 Coke Rock (Encapsulated in a Geotextile Fabric Security Tied) Geotextile Shall Meet the Following:
   a) Meet At Least Class 2 Strength Requirement Per M288 Test Method.
   b) Have An ADS Not Greater Than U.S. Sieve no. 40.
   c) Have a Permeability of At Least 0.001
3. 6" Square Aluminum or Galvanized Stiffening Mesh Hardware Cloth 1/4" Openings Per Inch and Minimum Wire Diameter 0.033.  

WATERSTOP NOTES:
Holes Will Be Permitted in the Outer 1/2" of the Web For Wire Ribs, etc. Tie Web to No.3 Reinforcing Bars @ 16" Maximum Intervals to Support the Waterstop in Proper Position During Concrete Placement. Alternative Detail May Be Submitted For Approval of the Engineer.
Waterstop to Have 5 or More Pairs of Raised Ribs To Provide 0.1 Square Inches Minimum Ribs Cross-Section Area On Each Half of the Waterstop.

CANTILEVER CONCRETE RETAINING WALL DETAILS No. 2
SIGNED: Gringley On File 9-30-14 (503)
CHIEF BRIDGE ENGINEER

NEVADA DEPARTMENT OF TRANSPORTATION
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