Road and Bridge Construction

Nevada Department of Transportation
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Revised 2003
FOREWORD TO 2003 ENGLISH STANDARD PLANS

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

This edition is part of an continuous process to update the Standard Plans. Updates to Standard Plans will reflect the impetus of NCHRP Report 350 requirements, however approved products are shown in the Qualified Products List (QPL), included within each 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: deoyle@dot.state.nv.us.

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OPEN ABUTMENT BRIDGES WITH SPREAD FOOTING
FOOTING WIDTH IS 6 FEET OR LESS

OPEN ABUTMENT BRIDGES WITH SPREAD FOOTING
FOOTING WIDTH IS GREATER THAN 6 FEET

RETAINING WALLS
FOOTING WIDTH IS 5 FEET OR LESS

RETAINING WALLS
FOOTING WIDTH IS GREATER THAN 6 FEET

CLOSED ABUTMENT BRIDGES
FOOTING WIDTH IS 6 FEET OR LESS

CLOSED ABUTMENT BRIDGES
FOOTING WIDTH IS GREATER THAN 6 FEET

OPEN ABUTMENT BRIDGES ON PILES
FOOTING WIDTH IS 6 FEET OR LESS

OPEN ABUTMENT BRIDGES ON PILES
FOOTING WIDTH IS GREATER THAN 6 FEET

GENERAL NOTES:
1. Trenches more than 4 feet deep shall be shored, laddered, braced, or otherwise protected as required to avoid injury to personnel, as specified in Nevada Department of Transportation standards.
2. If hazardous soil conditions indicate ground movement may be expected, trenches more than 4 feet deep shall be protected as indicated in note 1.
3. For the purpose of payment, structure excavation and backfill quantities are based on these standards and no additional payment will be made for excavation.
4. If shoring is used, payment will be made for structure excavation and backfill based on these standards and no additional payment will be made for excavation.
5. Trench Excavation shall conform to the Standards of the Division of Highways, Nevada Department of Transportation.
6. The quantity of structure excavation and backfill measured for payment and that number of cubic yards calculated minus any duplication of items which overlap.
7. The limits of structure excavation and backfill shown herein shall be used for the work of excavation and backfill required for excavations to meet DOT specifications.

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

Signed Original On File
GENERAL NOTES:

1. Trenches more than 4 feet deep shall be shored, tied back to at least the angle of repose for existing soil conditions or some other means of protection shall be provided.

2. If hazardous soil conditions indicate ground movement may be expected, trench less than 4 feet deep shall also be protected as indicated in Appendix D.

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 showing Subgrade conform to OSHA Regulations 29 CFR Part 1926, Appendix C.

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

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

8. See Sheet D-201.8 for excavation and backfill for precast concrete box culverts.

---

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

STRUCTURE EXCAVATION AND BACKFILL

METHOD OF MEASUREMENT

SIGNED: Original On File

DESIGNATED BY: GEO. F. WATROUS

DATED: 11/14/2007

REV: 05/13/2013
GENERAL NOTES:

1. Trenches more than 4 feet deep shall be shored, braced, or braced and laced 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 feet deep shall also be protected as indicated in note 1.

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

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

5. Trench Excavation sharing 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. If diameter is 6' or less, 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 or roadway embankment. If diameter is greater than 6', 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 roadway embankment.

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

LEGEND:

- Structure Excavation
- Granular Backfill
- Roadway Embankment

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION

STRUCTURE EXCAVATION AND BACKFILL (METHOD OF MEASUREMENT)

Signed Original On File

DATE: DEC 1972

DEPT. HEAD DESIGN ENG.

REVISED: 4/81

Original Draft: 4/81
CLASS A BEDDING

Payment for excavated area below the bottom of the pipe shall be included in the unit bed price per cubic yard of concrete.

CLASS B BEDDING

Bedding shall be carefully shaped to fit pipe prior to installation, no direct payment for shaping the trench.

BEDDING FOR CONCRETE CULVERT

CLASS C BEDDING

Granular Backfill

GENERAL NOTES:

1. Minimum depths as specified in "Culvert Installation with In-Situ Concrete and Rebar" will not be paid if the conditions are encountered.

2. Concrete shall be Class A or AA.

BEDDING FOR C.M.P. OR C.M.A.P.

ALLOWABLE FILL HEIGHT FOR REINFORCED CONCRETE PIPE 24" TO 84"

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### 2 1/4" x 1/2" Round Corrugated Aluminum Pipe

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

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

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### Corrugated Aluminum Alloy Pipe Arch 2 1/4" x 1/2" Corrugations

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### Maximum Cover for Structural Aluminum Plate (Feet)

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### Maximum Height Cover for Aluminum Structural Plate Pipe Arch 5 1/8" Corner Radius

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**Note:** To determine proper metal thickness, select the span in left-hand column that is next larger to size structure required. Example—If you need a 10'-0" span x 7'-0" rise structure, use the line for span 11'-0".
### Round Corrugated Steel Pipe

#### Dimensions in Inches

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#### Weight in Lbs/Lineal Foot

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#### Allowable Fill Heights

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### Maximum Height of Cover

#### For Structural Steel Plate Pipe Arch With 31" Corner Radii

<table>
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#### For Structural Steel Plate Pipe Arch With 19" Corner Radii

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<tbody>
<tr>
<td></td>
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</table>
**Embankment Protector & Slotted Drain**

For details not shown see R-3-1.2 and R-3-1.3.

**Cross Bar Spacers**
- At 6" Ctrs. Typ.
- Bearing Bars
- 20'-0" + 1/2'
- 20'-0" + 1/2'
- Coupling Band
- 3" Max.
- 10'/4"
- Coupling Band

**Elevation View**

**SECTION B-B**

**Plan View**

**Slotted Drain**
- Concrete Barrier Roll
- Coupling Band
- Slotted Drain

**Slotted Drain & Concrete Barrier Rail**
(Can be used with Shoulder Dike)

**General Notes:**
1. Drain pipe seams may be continuous helical lock seam or helical weld seam.
2. Drain sections shall be assembled with the coupling band shown.
3. The cross bar spacers shall be welded to the bearing bars in such a manner as to develop a minimum tensile strength of 12,000 lbs. (avg. at each end) of the bearing bars.
4. The maximum variance from a straight line between the extreme top corners of the bearing bars shall be 1/2" in 20 ft.
5. For continuous runs of S.C.M.P. in excess of 200 ft, cleanout D1 or standard fluming inlets shall be installed as shown on the plans.
6. Spot weld shall develop minimum required strength of strap.
7. Dimensions shown are minimums.
8. Contractor to provide an adequate method of keeping the A.C. out of pipe during paving operations.
9. Design shall be in accordance with the latest edition of the AASHO Standard Specifications for Highway Bridges, Section 12. Minimum live load to be 100 k.p.s.
10. Concrete shall be Class A or AA.
11. Hydraulics engineer will state pipe size.
12. The spacer plates shall be welded on both sides to each bearing bar with four 1/2" long 5/8" fillet welds.
13. H = Height of bearing bar (2 1/2" or 6") + 1/2" corrugation + gope of pipe in inches.
14. The grate shall be welded with a 5/8" fillet weld minimum 1" long to the corrugated steel pipe on each side of the grate at every other corrugation.

**Bedding Detail**

**Concrete Barrier Roll**
- Concrete
- Slotted Drain
- Coupling Band
- Slotted Drain
- Concrete
- Base

**Section A-A**

**Section C-C**

**STATE OF NEVADA**

**Department of Transportation**

**Slotted C.M.P. Drain Details**

Signed Original On File: R-4-1.3

WITHOUT HEADWALL

- Length of culvert shall be increased as follows: Consider each side separately. Measure pipe from roadway centerline to the intersection of pipe flow line and fill slope. To this dimension add 2.0' when cover at shoulder is 1.0' to 10.0', and an additional 0.5' for each succeeding 5.0' of cover or portion thereof.

WITH CONCRETE 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 plus headwall thickness. To this dimension add 1.0' when cover at shoulder is 1.0' to 10.0', and an additional 0.5' for each succeeding 5.0' of cover or portion thereof.

MINIMUM CULVERT INSTALLATION

- Use 1.5' min. where possible. If minimum cover is restricted, compensate by utilizing higher class pipe or selective bedding as recommended by the Hydraulics Section.
- Aluminum Culverts: See Standard Sheet R-1.3.1.
- Steel Culverts: See Standard Sheet R-1.3.1.2.

- for informational purposes only

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 1.0' when cover at shoulder is 1.0' to 10.0', and an additional 0.5' for each succeeding 5.0' of cover or portion thereof.

METAL 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 1.0' when cover at shoulder is 1.0' to 10.0', and an additional 0.5' for each succeeding 5.0' of cover or portion thereof.

EDGES OF TRAVEL LANE

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

SAFETY CULVERT INSTALLATION

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

NOTES

1. IF, after extending the culvert and/or warping the fillslope for safety and/or aesthetics, the extension does not fulfill the requirements for a clean roadside recovery area, then vehicular traffic may be protected by some other means, such as guardrail, barrier rail or another acceptable safety feature.

2. Normal structure excavation and backfill limits.
GENERAL NOTES:

1. CLASS AND TYPE OF CONCRETE SHALL BE AS SPECIFIED FOR REINFORCED CONCRETE PIPE.

2. STRUCTURAL DESIGN OF END SECTION SHALL CONFORM TO THAT OF STANDARD REINFORCED CONCRETE CULVERT PIPE.

3. LENGTH OF PIPE SHOWN ON THE DESIGN PLANS DOES NOT INCLUDE CONNECTOR SECTION (LENGTH C).

4. CONTACT HYDRAULICS ENGINEER FOR SIZES NOT LISTED.
GENERAL NOTES:

1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" SET 1/8" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1 1/4" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND RENT IN FIELD.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSATURATED OR LIABLE TO SPOUR.
4. DELIVERY PIPES TO BE SET ON A SKWAL SHALL BE REINFORCED WITH HEADWALLS. HEADING WALLS ARE CONSTRUCTED WHEN HEADING WALLS ARE NOT CONSTRUCTED THE PIPES SHALL BE WIPPED EXCEPT IN DOWNTOWN SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON CREEDER (4) 10" USE QUANTITIES FOR 8" SKWAL. 10" USE QUANTITIES FOR 9" SKWAL. 11" USE QUANTITIES FOR 10" SKWAL. 12" USE QUANTITIES FOR 11" SKWAL. OVER 12" USE QUANTITIES REQUIRED. CIVERAL SHOULD BE INSTALLED ON 8" INCREMENTS WHERE IT IS FEASIBLE.

LENGTH OF REINFORCING BARS

Quantaies shown above are for two headwalls.
## Length of Reinforcing Bars

### Single CMP

<table>
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<th>K</th>
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Note: Anchor bolts to be installed on inlet end only. See Note 6.

## Typical Section

1. Concrete shall be Class A or AA.
2. Reinforcing steel shall be deformed bars with maximum spacing of 18" set 1/3. Clear of surface of concrete except as noted. Bar ends shall be kept 1 1/2" clear of surface of concrete. Reinforcing bars may be cut and bent in field.
3. Footings shown are of minimum depth and shall be extended if soil is unsuitable or liable to scour.
4. Culvert pipes to be set on a skew shall be fitted when headwalls are constructed and extended only if headwalls are not constructed. The pipes shall not be fitted except in downstream section.
5. For estimating headwall quantities, see skew Culverts.
6. No direct payment for anchor bolts.

---

**State of Nevada**

**Department of Transportation**

**Culvert Headwalls**

48" CMP to 72" CMP

Signed Original on File

[Signature]

[Date]
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR A2.
2. REINFORCING STEEL SHALL BE Deformed BARS WITH MAXIMUM SPACING OF 1½" SET 1½" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BAR ENDS SHALL BE KEPT 1½" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT ON SITE.
3. FOOTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSTABLE OR LIABLE TO SLOPE.
4. CULVERT PIPES TO BE SET ON A SKEW SHALL BE WITNESSES WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE WITNESSED EXCEPT IN THE SKEW SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKewed CULVERTS:
   - 0° TO 15° - USE QUANTITIES FOR 0° SKEW.
   - 15° TO 30° - USE QUANTITIES FOR 15° SKEW.
   - 30° TO 45° - USE QUANTITIES FOR 30° SKEW.
   - OVER 45° - USE QUANTITIES FOR 45° SKEW.
   CROSS SECTION QUANTITIES TO BE MODIFIED WHERE NECESSARY. CAN BE ADJUSTED TO FIT.
6. DIMENSIONS X, Y, L, AND H MUST BE CONSTANT REGARDLESS OF MAJOR VARIATIONS IN WALL THICKNESS DUE TO CLASS OF PIPE USED.
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. REINFORCING STEEL SHALL BE DEFORMED BARS WITH MAXIMUM SPACING OF 18" OC TO 1 1/2" CLEAR OF SURFACE OF CONCRETE EXCEPT AS NOTED. BARS ENDS SHALL BE KEPT 1 1/2" CLEAR OF SURFACE OF CONCRETE. REINFORCING BARS MAY BE CUT AND BENT IN FIELD.
3. FITTINGS SHOWN ARE OF MINIMUM DEPTH AND SHALL BE EXTENDED IF SOIL IS UNSUITABLE OR LIABLE TO SOAK.
4. CULVERT PIPES TO BE SET ON A SKREW SHALL BE WATERED WHEN HEADWALLS ARE CONSTRUCTED. WHEN HEADWALLS ARE NOT CONSTRUCTED THE PIPES SHALL NOT BE WATERED EXCEPT IN OXIDATION SECTION.
5. FOR ESTIMATING HEADWALL QUANTITIES ON SKREW CULVERTS:
   1" X 10" — USE QUANTITIES FOR 1" SKREW.
   1 1/2" X 20" — USE QUANTITIES FOR 1 1/2" SKREW.
   2" X 30" — USE QUANTITIES FOR 2" SKREW.
   2 1/2" X 40" — USE QUANTITIES FOR 2 1/2" SKREW.
   3" X 50" — USE QUANTITIES FOR 3" SKREW.
CULVERTS SHOULD BE INSTALLED ON 5' INCREMENTS WHERE IT IS FEASIBLE.

R-22

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CULVERT HEADWALLS
17" x 13" CMP TO 83" x 57" CMP

SIGNED ORIGINAL ON FILE
APPROVED: 5/28/69
DEPT. OF TRANSPORTATION
6/1/69
ANNULAR COUPLING BAND

BAR & STRAP DETAIL

ALTERNATIVE ANNULAR COUPLING BAND FOR HCMPTHRU 84"

GENERAL NOTES:

1. ALL COUPLING BAND CONNECTING HARDWARE SHALL BE GALVANIZED.
2. FOR PIPE ARCHES USE SAME WIDTH BAND AS FOR ROUND PIPE
3. FOR WARTER/WUTHER AND SPIN JOINT ON ALTERNATIVE ANNULAR COUPLING BAND, PLACE MASTIC SEALANT STRIP 3/8" THICK X 1 1/2" WIDE X 5" LONG IN LAY BETWEEN BANDS.
4. FOR ALTERNATIVE ANNULAR COUPLING BAND, 2 BAR AND STRAP ASSEMBLY ARE REQUIRED FOR PIPE GREATER THAN 42" DIA., OPTIONAL FOR SIZES LESS THAN 42".

** Universal Coupling Band for Use on CMP Thru 36" Inclusive

** Universal Coupling Band for Use on CMP Thru 36" Inclusive

** Two Piece Integral Flange Die Formed for Use on 6", 8", and 10" HCMR

** Universal Coupling Band for Use on CMP Thru 36" Inclusive

** Universal Coupling Band for Use on CMP Thru 36" Inclusive

** Universal Coupling Band for Use on CMP Thru 36" Inclusive

** Universal Coupling Band for Use on CMP Thru 36" Inclusive

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** Universal Coupling Band for Use on CMP Thru 36" Inclusive

** Universal Coupling Band for Use on CMP Thru 36" Inclusive
GENERAL NOTES:

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

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

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 FALLET WELDS THAT DEVELOP MINIMUM REQUIRED STRENGTH OF STRAP.

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

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

7. DIMENSIONS AND THICKNESS SHOWN ARE MINIMUM.

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

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

Spiral CMP

RETURNED TO ACCEPT UNIVERSAL, ANNULAR, AND CHANNEL COUPLERS
NOTE:

1. When full laced together

PLATE UP THIS DIRECTION ALL LIFTS

SECTION C-C

RIPRAP APRON

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

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<td>CONCRETE</td>
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* For Information Only
GENERAL NOTES:
1. All concrete shall be A or AA.
2. Forming of the base will not be required.
3. Station/Offset Distance listed in Plans is measured to curb finished.

PLAN VIEW

VIEW C-C

SECTION A-A

SECTION B-B
WEDGE LOCK HOLD DOWN
SECTION A-A

TYPE I MANHOLE
ECCENTRIC

GENERAL NOTES:

1. FOR CAST IN PLACE CONCRETE BASE ALL REINFORCING STEEL TO BE NO. 4 BARS AT 18” CENTERS.

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 “n” SEE STORMRAIN SCHEDULE OR STRUCTURE LIST. “n” IS THE DIFFERENCE IN ELEVATION BETWEEN THE INFLOW PIPE INVERT ELEVATION AND THE TOP OF SANITARY ELEVATION AT STREET GRADE.

5. DO NOT PLACE PIPES IN TAPERED SECTION.

6. MANHOLE COVER SHALL BEAR ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).

7. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, LIDS, GRADE RINGS, AND STEPS SHALL CONFORM TO AASHTO M195 (ASTM C-468).

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

9. THICKNESS PIPE WALL
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 0.5" ABOVE THE OUTFLOW PIPE INVERT ELEVATION.
3. FOR VALUES OF "H", SEE STORM DRAIN SCHEDULE OR STRUCTURE LIST IN CONTRACT PLANS. "H" IS THE DIFFERENCE IN ELEVATION BETWEEN THE OUTFLOW PIPE INVERT ELEVATION AND THE TOP OF MANHOLE ELEVATION AT STREET GRADE.
4. PRECAST CONCRETE PIPE SECTIONS, TAPERED SECTIONS, ELDS, RING GADES, AND STEPS SHALL CONFORM TO ASHOT M 199 (ASTM C-478).
5. MANHOLE COVER SHALL BE ENTITY IDENTIFICATION AND SYSTEM FUNCTION (IF APPLICABLE).
6. SHAPED FLOWLINE IN MANHOLE TO OUTLET PIPE, AND PROVIDE A 1" MINIMUM SLOPE FROM ALL DIRECTIONS TOWARD FLOW LINE.

SECTION A-A

(For Variable Height Situations)

SECTION B-B

(For Minimum Height Situation)

NOTE: HYDRO ENGINEER WILL LOOK AT OTHER OPTIONS FOR EXTREME MINIMUM COVER SITUATIONS.
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 AASHO M 198, MINIMUM LOADS, EQUIVALENT MANHOLE FRAMES 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 MANUFACTURER'S SPECIFICATIONS.
3. THE SURFACE SHOWN IS FOR ILLUSTRATION ONLY. ANY SURFACE DESIGN, OTHER THAN SMOOTH, MAY BE USED UPON APPROVAL.
4. FRAMES & COVERS SHALL CONFORM TO ASTM A48, 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. ALL CONCRETE SHALL BE CLASS A OR AA.
8. CONCRETE COLLARS MAY BE Poured ROUND, OR ANY OTHER APPROPRIATE SHAPE WHEN APPROVED BY THE ENGINEER.
9. COMMERCIAL PREFABRICATED GRATE RINGS FOR MANHOLES SHALL CONFORM TO AASHO M 198 (ASTM C-478).
10. MANHOLE COVER & FRAME SHOWN, OTHER SHAPES MAY APPLY TO UTILITY AND VALVE COVERS AND FRAMES.

SECTION B-B
TRAFFIC-STRENGTH MANHOLE FRAME & COVER

SECTION A-A
(SEE NOTE 10)
GLUE DOWN CURBS

SECTION TYPE A
(0.0048 cu. yd. per lin. ft.)

SECTION TYPE B
(0.0048 cu. yd. per lin. ft.)

- Unit Rounding When Curb Are Back To Back (Epoxy Curb To Pneumatic Surfcool Notes: Epoxy Cement May Be Omitted When Installation Is Temporary.

** P.C.C. or Dense Graded

CURB

SECTION TYPE 1 (0.0035 cu. yd. per lin. ft.)

SECTION TYPE 2 (0.0043 cu. yd. per lin. ft.)

- Unit Rounding When Curb Are Back To Back.

** P.C.C. or Dense Graded

SECTION TYPE 3 (0.0039 cu. yd. per lin. ft.)

SECTION TYPE 4 (0.0027 cu. yd. per lin. ft.)

SECTION TYPE 5 (0.0029 cu. yd. per lin. ft.)

SECTION TYPE 6 (0.0035 cu. yd. per lin. ft.)

SECTION TYPE 7 (0.0039 cu. yd. per lin. ft.)

SECTION TYPE 8 (0.0047 cu. yd. per lin. ft.)

GENERAL NOTES:
1. This Line Should Be Used To Dimension Offsets.
2. When Distance Between Back of Curb on Islands Is 4 feet or Lees, Use 4" Class A or All Concrete (island Rounding) and 2" of gravel Base.
3. Concrete Shall Be Class A or A.A.
4. All Concrete Unit Volume For Information Only.

Curb and Gutter

ELEVATION
TYPICAL EXPANSION JOINT DETAIL

All Edges Rounded ½" Radius
½" Expansion Joint

TYPICAL TRANSITION FROM ROLLED CURB TO VERTICAL FACE
GENERAL NOTES:
1. ALL RESIDENTIAL PROPERTIES MAY HAVE ONLY ONE CURB CUT EXCEPT CIRCULAR DRIVEWAYS AS SHOWN.
2. NO DRIVEWAY SHALL BE LOCATED, WHOLLY OR PARTIALLY, ON OR OVER A UTILITY EASEMENT WHICH RUNS PERPENDICULAR TO THE CURB LINE.
3. NO DRIVEWAY SHALL BE LOCATED WITHIN 6 FEET OF A LIGHT POLE, FIRE HYDRANT, MAIL BOX, ABOVE-GROUND ELECTRICAL TRANSFER BOX, BLOCK WALL HIGHER THAN 2 FEET, OR THE CURB RETURN AT A STREET INTERSECTION OR ALLEY.
4. COMMON DRIVEWAY CONSTRUCTION MAY BE PERMITTED AT ANY TWO RESIDENTIAL PROPERTIES OF 60 FEET IN WIDTH OR LESS. THE WIDTH OF THE JOINT DRIVEWAY SHALL BE A MAXIMUM OF 24 FEET. A JOINT DRIVEWAY AGREEMENT SHALL BE REQUIRED.
5. MULTI-FAMILY RESIDENTIAL AND ALL NON-RESIDENTIAL DRIVEWAYS SHALL CONFORM TO THE COMMERCIAL DRIVEWAY STANDARDS.
6. ALL DRIVEWAY LOCATIONS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.
7. FOR CURB RAMPS AND DRIVEWAY APRON DETAIL, SEE STD.DWGS. NO. R-5.2.1 TO R-5.2.2 AND R-5.3.2.
8. DRIVEWAY SPACING, CLEARANCES, AND RETURN RADIUS SHALL BE IN ACCORDANCE WITH THE DEPARTMENT'S ACCESS MANAGEMENT STANDARDS.

TYPE R
RESIDENTIAL DRIVEWAY GEOMETRICS

TYPE C
COMMERCIAL, INDUSTRIAL, AND MULTI-FAMILY DRIVEWAY GEOMETRICS
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 Poured MONOLITHIC TO P.C. LINE IN WHICH CASE THE BARS SHALL BE CONTINUOUS. IF OPTIONAL SECTIONAL POUR IS USED, EXPANSION JOINTS AND REBAR END CLEARANCE SHALL BE AS SHOWN.

3. CONCRETE SHALL BE CLASS A DR AA.

4. CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD DRAWINGS R-5.2.11 TO R-5.2.2 AND R-5.3.1.

5. FOR GRADE CHANGES GREATER THAN 3%, VERTICAL CURVES OF AT LEAST 10 FEET MUST BE USED.

6. DRIVEWAY GEOMETRIES SHALL GO TO THE CURB.

7. FOR ACTUAL DIMENSIONS SEE STRUCTURE LIST.

8. SEE TABLE 1-2, ON DRAWING R-5.2.2, FOR "A" AND "B".

9. AVOID DRAINAGE POCKETS IN CROSS WALK AREAS.
**GENERAL NOTES:**

1. **MINIMUM 3.0' COVER OVER TOP OF CONDUIT AT SHOULDER LINE.**
2. **12 GAUGE BARE COPPER DETECTION WIRE TO LAY IN TRENCH ADJACENT TO CONDUIT AND ATTACH TO LOCATION MARKER AT EACH END.**
3. **LOCATION MARKER SHALL BE 2" P.V.C. OR 5.0' STEEL FENCE POSTS.**
GENERAL NOTES:

1. HINGE POST SHALL BE 8 IN. LENGTH AND SHALL BE BURIED 3 IN. IN GROUND.
2. BARBED WIRE SHALL BE USED FOR BOTTOM STRAND WHEN REQUIRED.
   BY NEV. DEPT. OF WILDLIFE OR BUREAU OF LAND MANAGEMENT.
3. WIRE ARE TO BE TIED OFF AT STRETCH POINTS, WRAP AND SPICE
   TO SELF WITH AT LEAST 4 TURNS AT OPPOSITE END OF PANEL.
4. WOOD POSTS SHALL BE 6" NOMINAL DIAMETER.
5. ADDITIONAL STRAND OF BARBED WIRE AND/OR A ROCK DEADMAN (MIN. WEIGHT 50 LBS.)
   WHEN SPACE BETWEEN BOTTOM WIRE AND GROUND EXCEEDS 20".
6. STEEL POST DEADMAN DRIVEN APPROXIMATELY 1M INTO GROUND MAY BE USED
   IN LIEU OF ROCK DEADMAN.
7. STEEL LINE POSTS AT 8'-3" SPACING TO MAINTAIN BOTTOM WIRE CLEARANCE.
MISSOURI GATE

TYPICAL GATE LATCH

GENERAL NOTES:
1. SPACING BETWEEN WIRES ON MISSOURI GATE SHALL BE THE SAME AS WIRE ON AGENT FENCE
2. GATE LATCH SHALL BE LAD BOLTED FIRMLY TO THE GATE POST
3. HINGE POSTS, LATCH POSTS, AND CATTLE GUARD WING ATTACHMENT POSTS SHALL BE 8 FT. IN LENGTH AND SHALL BE BURIED 3 FT. IN GROUND.
4. FOR END PANEL DETAILS, SEE SHEET R-6.1.
5. WIRE MAY BE USED IN LIE OF METAL STRAP FOR CONNECTION OF CATTLEGUARD WING TO FENCE POST.
6. USE RECTANGULAR WIRE OR 2" DIAMOND MESH ON METAL DRIVE GATE.
DOUBLE BRACE END ASSEMBLY

CONSTRUCTION NOTES:

1. TWO POSTS AND ONE POST ARE RECOMMENDED TO BE ADJUSTABLE IN LENGTH INTO THE GROUND. WIRE TENSIONING DEPENDS ON THE LENGTH ADJUSTABLE POSTS.

2. MAXIMUM POST SPACING IS UP TO 100 FT. WITH DROPPERS OR 60 FT. CENTERS POST SPACING MAY BE GREATER THAN 30 FT. CONSTRUCTIONS AFFECTING TENSIONING ARE NOT PERMITTED IN THE AREA.

3. ALL DELAYED SPECIFICATIONS MUST BE ATTACHED TO THE PLANS.

4. MAXIMUM LENGTH OF 200 FT. FOR STRAINERS ON LEVEL TERRAIN.

5. BEYOND THE LENGTH OF POSTS, THE LENGTH OF THE END ASSEMBLY WILL BE LIMITED TO 20 FT. FOR EACH ADDITIONAL FT. OF LENGTH.

6. MAXIMUM LENGTH IS 500 FT. FOR STRAINERS ON LEVEL TERRAIN.

7. TO REACH A TENSION OF 45 FT. A MAXIMUM OF 10 FT. OF HORSE BODY LENGTH IS ALLOWED.

8. TOTAL LENGTH IS 1000 FT. FOR STRAINERS ON LEVEL TERRAIN.

9. ELECTRICAL LINE STRAINERS MUST BE PLACED AT A MAXIMUM OF 8 FT. OF INTERSECTION.

10. STRAINERS ARE NOT TO BE PLACED UNDER POWER LINES OR ENAMEL NUDE 50 FT. OF WATER.

11. IT IS RECOMMENDED FOR TRUCK AND COWS TO USE THE END ASSEMBLY INSTEAD OF THE MECHANICAL UNITS.

12. ALL WIRE MUST BE AT LEAST 8 IN. IN DIAMETER.

13. CONCRETE SHALL BE C30X2.4 IN.

14. CONCRETE SHALL BE C20X1.4 IN.
Bench Fence Notes:
1. All posts and braces shall be 50 pound crane rail or 4" x 4" x 3/8" round wire flare, 8 ft. long.
2. Install line braces at intervals not exceeding 270°.
3. All posts shall be at 16 centers.
4. Posts and braces to be set in concrete as shown except in rock they may be grouted in drill hole.
5. 3 galvanized crossbar clips or equal and 1 galvanized wire rope thimble shall be used to attach wire rope to eye bars.
6. Cut grooves in flange of braces for wire rope and eye bar.
7. Secure mesh to line posts with 7 wire ties per post, and to each wire rope with 1 wire tie per 3 ft. feet.
8. Concrete shall be class A or AA.

Section A-A

Section B-B

Section C-C

Section D-D

Cattle Pass Fencing (616)
**BILL OF MATERIALS**

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<th>ITEM</th>
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**SECTION A-A**

1. **PLAN VIEW**
2. **SECTION B-B**
3. **DETAILS "C" & "D"**
4. **DETAIL "I"**

**NOTES:**
- This design is not for use on mainlines, ramps, or crossroads.
- Notes: A welded or bolted unit of equivalent design loading capacity may be submitted to the Engineer for approval in place of a 2 3/4"x3 1/2" tubing.

**GENERAL NOTES:**
1. **CONCRETE:**
2. **ALTERNATIVE MATERIAL MAY BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL.**
3. **LIVE LOADING:**
4. **CATTLE-CROSS BARING:**
5. **GRUB-SPIKE CONSTRUCTION MAY BE USED TO TRANSFER THE DESIGN LOADING WIDTH OF INCREASED CONTACT.**
6. **ALL MOUNTS SHALL BE PAINTED WHITE FOR IDENTIFICATION.**

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**STEEL CATTLE GUARD (TYPE B)**

**CONTRACTOR:**

**SIGNED:**

**DATE:**

**RECEIVED:**

**ADJUSTED:**

**SIGNED:**

**DATE:**
GENERAL NOTES:
1. FOR END TREATMENTS NOT SHOWN, REFER TO MANUFACTURER'S DRAWINGS.
2. THESE AREAS MAY REQUIRE PAVING IF SHOULDER DYES AND/OR DRAIN GRAINS ARE USED.
3. SEE STANDARD DRAWING R-8-2.2 FOR DETAILS NOT SHOWN.
4. GALVANIZED GUARDRAIL (TRIPLE CORRUGATIONS):
   SEE STANDARD DRAWING R-8-A-1.
5. CUSHION OR TANGENT END TREATMENT (R-1-DIRECTIONAL):
   CAN BE FASTED AT 521 TAPER.
6. RECOVERABLE SLOPES REQUIRED BEHIND GATING PORTION OF END TREATMENT OR CRUSH CUSHION.
7. ON HINT INSTALLATIONS, WHEN DISTANCE BETWEEN BACK OF POST AND HINGE POINT IS LESS THAN 2 FEET,
   THE POST SHALL BE LENGTHENED 1 FOOT MINIMUM.
8. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE GOVERNED BY FINAL SURFACING HEIGHT.
9. REFERENCE: ASHTO ROADSIDE DESIGN GUIDE, CURRENT EDITION.
10. CLEAR ZONE SHOULD BE BASED ON DESIGN YEAR TRAFFIC VOLUMES.
11. RECOVERABLE SLOPES ARE 4:1 OR FLATTER.
12. APPROACH GUARDRAIL TERMINALS SHALL BE NCHRP 350,
   FINA, AND NEVADA DOT APPROVED.

LEGEND:
- PAVED AREAS

TYPICAL GUARDRAIL INSTALLATION
### GENERAL NOTES:

1. For typical guardrail installation, see R 8.1.1.

2. For details not shown, including heights of posts for soil tube installation on posts ① and ②, see manufacturer’s drawings.

3. Approach end trailing end guardrail terminals shall be "NOHRP Report 350" Test Level 3 (TL-3), FHWA, and Nevada DOT approved.

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

### TABLE 1

<table>
<thead>
<tr>
<th>Terminal Ends</th>
<th>W (Flare)</th>
<th>X (Widening)</th>
<th>Y (5396)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method A</td>
<td>1-3/4&quot;</td>
<td>1-3/4&quot;</td>
<td>2-0&quot;</td>
</tr>
<tr>
<td>Method B</td>
<td>2-3/4&quot;</td>
<td>5-3/4&quot; to 8-9/16&quot;</td>
<td>0-0&quot;</td>
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<tr>
<td>Method C</td>
<td>2-3/4&quot; to 2-9/16&quot;</td>
<td>7-3/8&quot; to 8-9/16&quot;</td>
<td>2-0&quot;</td>
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<tr>
<td>Method D</td>
<td>2-3/4&quot; to 3-1/8&quot;</td>
<td>7-3/8&quot; to 9-1/8&quot;</td>
<td>2-0&quot;</td>
</tr>
</tbody>
</table>

### LEGEND:

- Paved Areas

---

**GUARDRAIL TERMINALS**

**GRADING PLAN**

Signed Original On File

\[\text{STATE OF NEVADA DEPARTMENT OF TRANSPORTATION}\]
PLAN
Direction of Traffic

ELEVATION
DETAIL "A"

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

SINGLE ANCHOR

OPTIONAL ANCHOR ROD END DETAILS (Single Anchors Only)

CABLE ANCHOR ASSEMBLY STEEL POST GUARD RAIL

ANCHOOR PLATE DETAILS

GENERAL NOTES:
1. Anchor cable to be parallel to guard rail for straight runs of rail. Anchor cable may have angle point at anchor plate if guard rail is curved.
2. Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
3. Cable clip connection (DETAIL A) or clevis and bolt connection (DETAIL B) to be used with wood post guard railing installation. For steel post guard railing installations, clevis and bolt connection (DETAIL B) is to be used. Other alternatives for attaching cable to anchor rod must be approved by the engineer.
4. For trailing end anchor concept, refer to plan view shown on Standard Drawing R-8.1.2 and R-8.3.1.
5. Concrete shall be Class A or AA.
6. The trailing end anchor shall be installed outside the clear zone for opposing traffic.
7. Cable shall be restrained from moving during tightening.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TRAILING END ANCHOR (FOR ONEWAY ROADWAYS ONLY)

Signed Origin On File
W-BEAM INSTALLATION

GENERAL NOTES:
1. USE OF THIS DETAIL REQUIRES CHIEF ROADWAY DESIGN ENGINEER APPROVAL.
2. TO BE USED ONLY WITH SPECIAL GUARDRAIL INSTALLATION. SEE STANDARD PLAIN SHEET R-8.1.3.
3. OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT A MINIMUM OF 100 FT-LBS.
4. TOE NAIL PLATE AT CORNERS WITH 10D NAILS.
5. SEE STANDARD PLAIN SHEET R-8.1.3 FOR DETAILS NOT SHOWN.

THREE BEAM INSTALLATION

ANCHOR TERMINAL - PAY LIMIT

ANCHOR RAIL WASHER (1 1/4" X 3" B GAGE MIN.)

END SECTION

STANDARD 2" ID PIPE SLEEVE (2 3/4" OD)

BREAKING PLATE (2 1/4" X 8" X 2/3 STEEL PLATE WITH 7/16" HOLE) (SEE NOTE 3)

ANCHOR POST ASSEMBLY

ANCHOR CABLE

6'-6"

1/2" 5/8" 3/4" Cable Swage

1" x 7" Stud threaded full length (Typ)

B

ANCHOR PLATE - ELEVATION

3/8" hole (light required)

3" x 2 1/2" x 1/2" end plate

ANCHOR TERMINAL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

THREE BEAM INSTALLATION

ANCHOR TERMINAL PAY LIMIT

ANCHOR RAIL WASHER (1 1/4" X 3" B GAGE MIN.)

END SECTION

STANDARD 2" ID PIPE SLEEVE (2 3/4" OD)

BREAKING PLATE (2 1/4" X 8" X 2/3 STEEL PLATE WITH 7/16" HOLE) (SEE NOTE 3)

ANCHOR POST ASSEMBLY

ANCHOR CABLE

6'-6"

1/2" 5/8" 3/4" Cable Swage

1" x 7" Stud threaded full length (Typ)

B

ANCHOR PLATE - ELEVATION

3/8" hole (light required)

3" x 2 1/2" x 1/2" end plate

ANCHOR TERMINAL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

THREE BEAM INSTALLATION

ANCHOR TERMINAL PAY LIMIT

ANCHOR RAIL WASHER (1 1/4" X 3" B GAGE MIN.)

END SECTION

STANDARD 2" ID PIPE SLEEVE (2 3/4" OD)

BREAKING PLATE (2 1/4" X 8" X 2/3 STEEL PLATE WITH 7/16" HOLE) (SEE NOTE 3)

ANCHOR POST ASSEMBLY
GENERAL NOTES:


2. A "INCHR 350", FHWA, and Nevada DOT approved guardrail terminal should be used if the one way facility is to be used as a two way detour. The terminal should be left in place once the detour is removed.

3. For details of triple corrugation guardrail see Standard Pion Drawing R-8.4.1.


5. If guardrail system is not satisfactory, use concrete barrier rail. Check for vehicle rollover (top of taller vehicles hitting the obstruction).

6. Spacer material may be "I" beam, wood block or formed structural tubing by prior approval of the engineer. For details of a spacer block see Standard Pion Drawing R-8.4.1. Spacing can be adjusted upward to fit the spacer block.
GENERAL NOTES:

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

2. SEE SHEET R-4.A.3 FOR DETAILS ON GALVANIZED GUARDRAIL (TRIPLE CORRUGATION) NOT SHOWN.

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

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

5. IF THE GUARDRAIL SPACE OCCURS ON THE POSTS WHICH ARE ADJACENT TO THE MODIFIED POST THEN THREE FEET OF GUARDRAIL POST MAY BE REVERSED SAFE SIDE OUT AND REQUIRED WITH THE MIDDLE SECTION BEING CENTERED AT THE LOCATION OF THE MODIFIED POST.

NESTED BEAMS
SECTION "A-A"
SECTION A-A
STEEL POST BOLT-HARDWARE
AND WOOD BLOCKOUT DETAIL

GENERAL NOTES:
1. WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN 2' THE POST SHALL BE LENGTHENED 1 FT.
2. GUARDRAIL HEIGHTS ON STAGE CONSTRUCTION PROJECTS SHALL BE DETERMINED BY FINAL SURFACING ELEVATIONS. HEIGHT MEASURED AT FACE OF RAIL ELEMENT.
3. ATTACH GUARDRAIL TO WOOD BLOCK AND STEEL POST WITH TWO BOLTS ON APPROXIMATELY 24" CENTER OF BLOCK AND POST WEB.
4. TOP OF GUARDRAIL TO BE 32½" ABOVE GROUND LINE OR SHOULDER SURFACING.
5. FOR DETAILS OF THE CROSS SECTION OF SINGLE BEAM RAIL ELEMENT, RAIL SPlice, TRANSITION SECTION, AND JOINTS SEE SUB-SECTION GENERAL PLAN SHEET R-6.4.
6. ALL HARDWARE TO BE GALVANIZED.

STEEL POST/WOOD BLOCK

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

GALVANIZED GUARDRAIL
(TRIPLE CORRUGATION)

NOTCHED WOOD BLOCK
FOR STEEL POST

SINGLE THRE BEAM BARRIER

ELEVATION

PLAN

7.5' x 8.5" x 14-10"
NOTCHED WOOD BLOCK

STEEL POST
W6 x 9 or W6 x 8.5

TYPICAL GUARDRAIL INSTALLATIONS
GENERAL NOTES:
1. Wood spacer blocks (of the proper dimensions) may be substituted for the detailed steel blocks.

LEGEND:
* Use same bolt hole pattern as DETAIL "C".

(1/8" drilled holes for 1/4" button head bolts with hex nuts and flat plate washers)

** 1/4" Dia. core drilled holes for 1/4" Dia. galvanized high strength hex bolts
& nuts with 3" x 1/2" square galvanized steel washer with 1 1/8" Dia. hole.

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

Signed Original Date: [Date]

ADOTED: [Date]
GENERAL NOTES:
1. Wood spacers blocks (of the proper dimensions) may be substituted for the detailed steel blocks.

LEGEND:
★ Uses some bolt hole pattern as DETAIL "C".
(13/16" drilled holes for 5/8" button head bolts with hex nuts and flat plate washers)
★** 1⅛" Dia core drilled holes for 5/8" Dia galvanized high strength hex bolts
k nuts with 3" x ⅛" square galvanized steel washer with 1" Dia hole.
★*** Dense Graded or Profile Grade

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
GUARDRAIL-BARRIER RAIL
CONNECTION
(TRIPLE CORRUGATION)
Signed Original On File: 7-8-96
REvised 7-96
A003
GENERAL NOTES:

1. ALL HOLES 5/8" DIA.

2. FOR METAL POSTS - RAIL MOUNTS TO BLOCK WITH BOLT IN APPROACHING TRAFFIC SIDE OF BLOCK AND POST WEB.

3. IN RETROFIT INSTALLATION WHEN DISTANCE BETWEEN BACK OF GUARDRAIL POST AND HINGE POINT IS LESS THAN "H" 2-1/2", THE POST SHALL BE LENGTHENED 1-1/2" MIN.

4. GUARDRAIL HEIGHTS IN STAGE CONSTRUCTIONS PROJECTS SHALL BE GOVERNED BY FINAL SURFACING ELEVATIONS.
**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, 6" concrete base and barrier rail may be placed monolithically, in which case dowels may be eliminated. See barrier rail end anchor details.
   Concrete paving requirements: Dowels shall be required in the first and last 10' of the barrier rail run. The surface of the barrier rail may be placed monolithically, in which case dowels may be eliminated. See concrete section for dowels in barrier rail end anchor.

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

5. Joint sealers shall be a single component not applied sealant 1" thick.

6. The height of the barrier rail shall be measured from the top of the 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 Standard Drawing R.8.1.1.

8. Depth of 6" base shall be checked and increased as needed for foundation stability. When barrier rail sits on 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.

---

**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 6" Steel Dowel @ 2'-0" Centers (If Needed See Note 3)
   - No. 4 Bars Continuous

---

**Concrete Barrier Rail Lateral Flare Rates**

<table>
<thead>
<tr>
<th>Design Speed (MPH)</th>
<th>Flare Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>22:1</td>
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<td>70</td>
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<tr>
<td>40</td>
<td>11:1</td>
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<tr>
<td>30</td>
<td>8:1</td>
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</tbody>
</table>

**State of Nevada**

**Department of Transportation**

**Concrete Barrier Rail**

---

**Normal Roadway Detail**

(1/4" Scored Joints @ 15'-0")

**Barrier Rail End Anchor Detail**

(First and Last 10')
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. MEDIAN BARRIER RAIL SHALL BE SCORED 1/4" 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 DRAWING R-8-6.1.
5. FOR IMPACT ATTENUATOR ATTACHMENT DETAILS, SEE MANUFACTURES DRAWINGS. MEDIAN END TREATMENTS SHALL BE BI-DIRECTIONAL.
6. REFER TO THE 1996 ROADSIDE DESIGN GUIDE FOR FURTHER DESIGN INFORMATION NOT SHOWN HERE.
7. EXPANSION JOINTS AT ALL STRUCTURES. JOINTS IN BARRIER RAIL OVER A STRUCTURE SHALL BE AT THE SAME LOCATION AND OF THE SAME DIMENSIONS AS THOSE IN THE STRUCTURE. JOINT FILLER NOT REQUIRED IN EXPANSION JOINT IN BARRIER RAIL.
8. LENGTH 3'-0" MINIMUM OR LENGTH OF OBSTRUCTION, WHICHEVER IS GREATER. SEE CONTRACT PLANS FOR EXACT DIMENSIONS.
9. THESE 42" BARRIER RAILS ARE CONSIDERED INNOVATIVE.
11. 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.
12. FOR DETAILS NOT SHOWN SEE TYPE FA.
13. NTS = NOT TO SCALE.
14. VARIES = 2/10 x H + 12".
15. FOR TRANSITIONS FOR HEIGHTS, SEE STANDARD PLAN SHEET R-8.6.3.
General Notes:
1. CONCRETE SHALL BE CLASS A OR AA.
2. THE HEIGHT OF THE BARRIER RAIL SHALL BE MEASURED FROM THE TOP OF THE PLANTMAX BITUMINOUS SURFACE OR THE TOP OF CONCRETE PAVEMENT.
3. ROUGHEN CONTACT FACE OF EXISTING RAIL TO 1/4-INCH RELIEF PRIOR TO POURING NEW RAIL TRANSITION.
4. AT THE INDICATED REINFORCING LOCATIONS, DRILL 3/8-INCH HOLE IN CONTACT FACE OF EXISTING RAIL TO A MINIMUM DEPTH OF 3 INCHES AND REINFORCE AS INDICATED. HORIZONTAL SECTIONS #2 AND #3 MUST MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.
5. PLACE STRAIGHT ANGLED OR BENT #4 REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED. SPACING IN REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED (MINIMUM 12-INCH LENGTH).
6. FOR DETAILS NOT SHOWN, SEE R-8.6.1 TO R-8.6.2.
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS A OR AA.
2. THE HEIGHT OF THE BARRIER RAIL SHALL BE MEASURED FROM THE TOP OF THE PLANT MIX BITUMINOUS SURFACE OR THE TOP OF CONCRETE PAVEMENT.
3. BRUSH OR CONTACT FACE OF EXISTING RAIL TO 1/4-INCH RELIEF PRIOR TO INSTALLING NEW RAIL TRANSITION.
4. AT THE INDICATED REINFORCING LOCATIONS, DRILL 3/4-INCH HOLES IN CONTACT FACE OF EXISTING RAIL TO A MAXIMUM DEPTH OF 12 INCHES, AND INCULDE D DEGREES FROM THE HORIZONTAL, SECURE 4 BAR (REINFORCING) BARS IN THE DRILLED HOLES WITH AN EPOXY CONFORMING TO SECTION 729 OF THE STANDARD SPECIFICATIONS.
5. PLACE STRAIGHT AND/OR BENT BAR (REINFORCING BARS IN RAIL TRANSITIONS AS INDICATED). SPACED IN REINFORCING STEEL AT TRANSITION ENDS ARE PERMITTED (MINIMUM 2" LAP LENGTH).
6. FOR DETAILS NOT SHOWN, SEE R-8.6.1 TO R-8.6.3.

ELEVATION

SECTION A-A
(EXISTING TYPE A)

SECTION B-B
(F-SHAPE, TYPE A)

SECTION C-C
NEW TYPE A
GENERAL NOTES:

1. Use only when specified criteria are met. The criteria factors are the clear zone, direction of traffic, offset distances, and speed limits. Approach and trailing end criteria are treated separately.

Approach End Criteria: Requires sight distance (design engineer determines minimum levels). Approach end criteria apply when outside clear zones or speeds are less than 40 MPH.

Trailing End Criteria: May be used for trailing end for all divided and divided by traffic and beyond the opposing direction clear zone. G.C. side on ramps, off ramps, and divided highways.

2. Concrete shall be class C or A4. Transverse joints on 1/4" prewetted or extension joint filler in 9" 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 10 linear feet of the full height barrier rail. If transverse ends are used, the anchor shall be extended under the transverse section.

4. Vertically, joints shall have a single component not 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 open grade in asphalt or concrete or the top of the finished grade in other materials.

7. Joint filler shall be placed in open joints in the barrier as required to withstand joints in the approach ramp details.

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

9. For details not shown, refer to standard plan R-8-6-1.

TABLE A

| Foot trailering end length with 8 = 2'6" Equal Spaces |
| Foot approach end length with 8 = 10' Equal Spaces |

LEGEND:

* = 1" x 8" Steel Dowel @ 2'-0" centers

(IF NEEDED SEE NOTE 3)
GENERAL NOTES:
1. Straight holes 1 1/4" diameter may be used in lieu of the tapered holes.
2. Ream capsule-type anchorage devices may be substituted for threaded rods.
3. Place screen on work area side of temporary railing where traffic will enter 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 bolt box rails may be substituted for screws. The rails 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 1/4" diameter bolts.
6. Openings in the screen area of 3"-0" diameter shall be provided at 200' intervals.
GENERAL NOTES:

1. Use of these details requires Chief Road Design Engineer approval. Minimum requirements for use in a median vane must be at least 24" wide and grooved smooth with 61t or flatter slopes.

2. Cable shall be 3/8" dia. wire rope and shall conform to AASHTO M30, Type I Class A coating. Posts shall meet the requirements of AASHTO M270 Grade 56 and shall be galvanized in accordance with AASHTO M111.

3. When barrier is in medians, install 2 yellow reflectors every 500 ft on both sides of post facing traffic. When barrier is on the right side of traffic install a white reflector every 6ths post on traffic side only.

4. Snaggle spring cable end assemblies for clearance between units. Installation of cable and assemblies shall be as follows:

   LENGTH OF CABLE RUNS:
   - Up to 500' - Use the Spring Cable End Assembly on one end, and turnbuckle only on the other end of each cable.
   - Over 500' to 1500' - Use the Spring Cable End Assembly on each end of each cable.

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

   Post spacing on a tangent shall be 12’ Min. to 16’ Max.
   Post spacing on a curve shall be as follows:

   CURVE RADIUS
   - 1500' or more
   - 609' to 2200'
   - 219' to 110'
   - Less than 110' Use Not Recommended

   7. Distance from tangent of barrier run to notch for top cable on breakaway anchor shall be 4'.

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

   9. All holes shall be 1/8" larger than the bolt diameter unless otherwise noted.

10. Concrete shall be Class AA with f'cu=4000 psi. Place concrete terminal and post fill at least 2' prior to tensioning the cables. The bottom of the terminal shall have full and even bearing on the surface under it.

11. Welding per AWS D1.1. Reinforcing steel A615 Grade 60 and A706 Grade 60 as noted.

12. Payment will be made under:
   - Cable Barrier
   - Lin. Foot
   - Cable Barrier Terminal Each

---

PLACING CABLE BARRIER AND CABLE BARRIER TERMINAL:

Cable barrier tensioning shall be installed by properly seating the spring compensation device and then permanently marking the unloaded position. Complete assembly of the cable barrier and set the compensating devices to a spring compression of 3.5". Leave the springs at this setting for at least 2 weeks then set the proper setting as listed in the Temperature Spring Compression Table!

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ELEVATION

<table>
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<th>Setting Temperature / Spring Compression Table</th>
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<tbody>
<tr>
<td>Degrees F</td>
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<tr>
<td>110 to 120</td>
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<td>100 to 109</td>
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TABLE 1

<table>
<thead>
<tr>
<th>3&quot;x3&quot; WHITE OR YELLOW REFLECTORIZED MATERIAL FACING TRAFFIC</th>
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<td>2&quot;x2&quot; WHITE OR YELLOW REFLECTORIZED MATERIAL FACING TRAFFIC</td>
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<table>
<thead>
<tr>
<th>TYPE 1 REFLECTORS (ROADWAY - RAMPS)</th>
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<td>TYPE 2 REFLECTORS (APPROACHES 1)</td>
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<td>TYPE 3 REFLECTORS (ISLANDS, CURBS, SHOULDER DYES)</td>
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<tr>
<td>TYPICAL INSTALLATION</td>
</tr>
</tbody>
</table>

GENERAL NOTES:
1. GUIDE POSTS SHALL BE INSTALLED AT THE BEGINNING AND END OF EACH CURVE AND THE SPACINGS SPECIFIED IN TABLE 1. REARVIEW MIRRORS MAY BE PLACED IN THE CURVES WHERE SPACING NEARER TO THAT SPECIFIED THAN IN TABLE 1.
2. WHEN INSTALLING DEMI-CURVES OR A CURVE THROUGH AN INTERSECTION, CURB AND GUTTER POSTS MAY BE MOVED 5 FEET BUT NOT EXCEEDING 10 FEET IN THE CURVE OR 5 FEET OUTSIDE THE CURVE IF THEY STILL FALL WITHIN CURVE AREAS. THE SPACING SHOWN IN TABLE 1 MAY BE ELIMINATED.
3. TYPE OF REFLECTORS ACCORDING TO LOCATION: COLOR TO MATCH ALONGSIDE EDGE LINE
4. FOR DESIGN NOT SHOWN, REFER TO FULL-WIDTH, FULL EDITION.

GUIDE POST SPACING NOTES:
1. MULTI-LANE DIVIDED - ONE WAY RAMPS - POSTS SHALL BE INSTALLED ON BOTH SIDES OF THE RAMPS WITH THE APPROPRIATE COLORED REFLECTORS.
2. Cycles shall be placed no closer than 100 FEET.
3. SPACING SHALL BE AS SHOWN IN TABLE 1.
4. POSTS ON THE MIDDLE SIDE SHALL FACE YELLOW REFLECTORS AND SHALL BE PLACED DIRECTLY OPPOSITE POSTS ON THE OUTSIDE SIDE. THE POSTS ON THE OUTSIDE SIDE SHALL FACE WHITE REFLECTORS. THE SPACING IN THE MIDDLE SIDE SHALL BE ADJUSTED WHERE ALLOGRAPHS ARE PLACED TO MATCH THE SPACING USED ON THE OUTSIDE POSTS.
5. SPACING BETWEEN THE MIDDLE AND CURBS WITH DISTANCES GREATER THAN 10,000 FEET.
6. SPACING SHALL BE 800 FEET FOR POSTS ON THE MIDDLE SIDE AND THE MIDDLE CURVES ON THE MIDDLE POSTS PER THE SPECIFICATION REFLECTORS. SPACING OF 300 FEET FOR POSTS ON THE OUTSIDE CURVES SHALL HAVE WHITE REFLECTORS.
7. CASING AND CONNECTION SCREW ARE 1/2" or 3/8".
8. ALLOCATIONS IN THE SPACING TABLES INCLUDE CURVES AND NON-CURVES.
9. LARGE SPACINGS BETWEEN POSTS AND CURVES WITH DISTANCES GREATER THAN 10,000 FEET.

GUIDE POSTS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

METAL POST DETAILS
10 OR 11 GAGE THICKNESS

SHEET NO.
A-1-1

DATE
AUG 20

REVISION
A-7

ADDITION
2009
GENERAL NOTES:
1. ALL REFLECTORS SHALL BE SELECTED & INSTALLED PURSUANT TO THE PROJECT PLANS & SPECIFICATIONS OR AT THE DIRECTION OF THE ENGINEER. THE DEPICTED REFLECTORS ARE FOR MOUNTING LOCATION INFORMATION ONLY.
2. SPACING: SEE "REFLECTOR PLACEMENT ON GUARDRAIL" NOTES AND TABLE "A" OF THIS SHEET.
3. REFLECTORS SHALL BE MOUNTED AT THE ANGLE SPECIFIED BY THE MANUFACTURER OR AS DIRECTED BY THE ENGINEER.
4. COLORS SHALL COMPLY WITH THE GUIDELINES ESTABLISHED BY THE M.U.T.C.O.D., 1988 EDITION AND REVISIONS THERETO.

REFLECTOR PLACEMENT SPACING ON GUARDRAIL/BARRIER RAIL

SPACING SHALL BE:
(a) 5D FEET ON TANGENTS AND ON CURVES OF 300 FEET RADIUS OR GREATER. IF LESS THAN 300 FOOT RADIUS SEE TABLE "A".
(b) REFLECTORS SHALL BE OMITTED ON THE FLARED SECTIONS OF GUARDRAIL.
(c) NO DIRECT PAYMENT FOR REFLECTORS ON BARRIER RAIL.

<p>| TABLE &quot;A&quot; |</p>
<table>
<thead>
<tr>
<th>Radius of Curve (In Feet)</th>
<th>Reflector Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 50</td>
<td>20 FT.</td>
</tr>
<tr>
<td>150</td>
<td>30 FT.</td>
</tr>
<tr>
<td>200</td>
<td>35 FT.</td>
</tr>
<tr>
<td>250</td>
<td>40 FT.</td>
</tr>
<tr>
<td>≥ 300</td>
<td>50 FT.</td>
</tr>
</tbody>
</table>

TYPICAL GUARDRAIL-GUIDE POST INSTALLATION

GUARDRAIL-GUIDE POST LOCATION

GUARDRAIL POSTS

FACE OF GUARDRAIL

ACCEPTABLE RANGE FOR GUIDEPPOST PLACEMENT

TRAFFIC

8" MIN. TYP.
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 DIVISIONS' SPECIAL INSTRUCTIONS FOR SURVEY OR MAPPING CONSULTANTS' MANUAL.

SURVEY COVER & RING
(CAST IRON)

ALTERNATE PLACEMENT
(CAST IRON)

SURVEY MONUMENTS
GENERAL NOTES:

1. ALL WEAKENED PLANE JOINTS SHALL BE SAWED DIAGONALLY AS SHOWN, EXCEPT AS INDICATED IN THE END ANCHOR AND STRUCTURE APPROACH DETAIL. WHEN ONLY ONE LANE IS BEING CONSTRUCTED ALONGSIDE EXISTING LINES, JOINTS SHALL BE SAWED EITHER DIAGONALLY OR AS DIRECTED BY THE ENGINEER OFFSET IS 1/8" AND SHOWN COUNTERCLOCKWISE.

2. SPACING OF WEAKENED PLANE JOINTS SHALL BE SUCCESSIVELY 15'-0", 12'-0", 10'-0", 8'-0", 6'-0" AND REPEAT, EXCEPT FOR THE FIRST JOINT AT PAVEMENT END ANCHORS AND AT REINFORCED STRUCTURE APPROACHES.

3. TRANSVERSE CONTACT JOINTS SHALL BE CONSTRUCTED AT LEAST 6'-0" FROM ANY TRANSVERSE WEAKENED PLANE JOINT.

4. LONGITUDINAL WEAKENED PLANE JOINTS SHALL BE CUT AT ALL LANE AND SHOULDER LINES EXCEPT WHERE LANE PLUS ADJACENT SHOULDER WIDTH IS LESS THAN OR EQUAL TO 16'-0".

5. ALL TRANSVERSE WEAKENED PLANE CONTACT JOINTS SHALL BE SAWED AND JOINT SEALER USED AS PER RESPECTIVE TRANSVERSE CONTACT JOINT DETAIL ON THIS SHEET.

6. ALL TIE BARS TO BE EPOXY COATED EXCEPT IN CLARK CO. TIE BARS TO BE PLACED IN MIDDLE 1/4 OF SLAB THICKNESS.

7. TRANSVERSE CONTACT JOINTS WITH DOWEL BARS SHALL BE USED AT ALL CONSTRUCTION JOINTS AND ELSEWHERE IF DESIRABLE BY THE ENGINEER.

8. PAVEMENT END ANCHORS SHALL BE CONSTRUCTED AS THE TERMINAL PANELS OF ALL PAVEMENT NOT ABUTTING EXISTING CONCRETE PAVEMENTS OR STRUCTURES, AND ELSEWHERE IF ORDERED BY THE ENGINEER.

9. INITIAL 1/2" WEAKENED PLANE JOINT SAW CUT TO BE DONE WITHIN SPECIFIED TIME LIMIT. RESERVOIR CUT SHALL BE DONE AT A LATER TIME.

10. RATIO OF DEPTH TO WIDTH OF JOINT SEALANT SHALL BE 1:1.

11. DOWEL BARS SHALL BE LOCATED WITHIN 1" OF THE PLANNED TRANSVERSE AND DEPTH LOCATION AND WITHIN 2" OF THE PLANNED LONGITUDINAL LOCATION.

12. THE DOWEL BARS SHALL BE PARALLEL TO THE PAVEMENT SURFACE AND CENTERLINES WITHIN A TOLERANCE OF +/- 1/16" IN 15'.

13. DOWEL BARS SHALL NOT BE PLACED IN 1/4" OF LONGITUDINAL JOINTS.

14. D = SLAB THICKNESS.
WEAKENED PLANE JOINTS LOCATION
(DOWELED PAVEMENT ONLY)

(Rumble strips shall not be used in urban areas)

For details not shown See Standard Plan Drawing R-10.1.2

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

1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE 4'-0" 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'-0" OR MORE.

2. RUMBLE STRIPS WILL NOT BE PLACED IN URBAN LOCATIONS, NOR ON RAMP SHOULDERS, BRIDGES, OR BRIDGE APPROACH SLABS, UNLESS SPECIFICALLY DESIGNATED IN THE PLANS.

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

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

5. FOR RAMPS AND STRUCTURES, SEE STANDARD PLAN SHEET R-10.15.

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

LEGEND:

- PLANTMIX BITUMINOUS SURFACE

SHOULDER SECTION

RUMBLE STRIP DETAIL

RUMBLE STRIP CORRUGATIONS

SECTION A-A

TYPICAL RUMBLE STRIP PLACEMENT
GENERAL NOTES:

1. RUMBLE STRIPS SHALL BE USED ON ALL OUTSIDE SHOULDERS THAT ARE 4'-0" 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'-0" OR MORE.

2. RUMBLE STRIPS WILL NOT BE PLACED IN URBAN LOCATIONS, NOR ON RAMP SHOULders, BRIDGES, OR BRIDGE APPROACH SLABS, UNLESS SPECIFICALLY DESIGNATED IN THE PLANS.

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

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

5. FOR RURAL NON-FREeways HIGHWAYS, SEE STANDARD PLAN SHEET R-101.4.

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

LEGEND:

- PLANTmix BITUMINOUS SURFACE

RUMBLE STRIP CORRUGATIONS

SECTION A-A

DIVIDED HIGHWAY LAYOUT

* IF NO APPROACH SLAB THEN 45° FROM BACK FACE OF STRUCTURE
SLOPING AREAS
PLANTHOLE & SOAKER
IRRIGATION DETAILS

SECTION
LEVEL AREAS

PLAN
TYPICAL LOOP INSTALLATION
SHRUB

- Install One Soaker Valve per Shrub. Set Valve Above Mulch.
- Loops Shall Be on Opposite Side of Plant From Travel Way

PLAN
TYPICAL LOOP INSTALLATION
TREE

- Install Two Soaker Valves Per Tree. Set Valves Above Mulch.

SOIL SCHEDULE
BARKFILL MATERIAL SHALL CONSIST OF TWO
PARTS NATIVE SOIL AND ONE PART HUMUS.

PLANT TABLET SCHEDULE
FOR TREES, SHRUBS AND GROUNDCOVERS

<table>
<thead>
<tr>
<th>No.</th>
<th>TABLET</th>
<th>TABLETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>2 TABLETS</td>
<td>2 TABLETS</td>
</tr>
<tr>
<td>15</td>
<td>3 TABLETS</td>
<td>3 TABLETS</td>
</tr>
<tr>
<td>24</td>
<td>1 BOX</td>
<td>5 TABLETS</td>
</tr>
</tbody>
</table>

SECTION
STAKING DETAILS

NOTE: TOP OF ROOT BALL TO BE 1' ABOVE GRADE.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

PLANTING DETAILS
TOP VIEW VALVE BOX

SECTION

VALVE BOX
One for Each Soaker Irrigation Control Unit
Electric Control Valve
Gate Valves 1" & Larger
Filter Unit

TOP VIEW VALVE PROTECTOR

SECTION

VALVE PROTECTOR
One for Each 1/2" Gate Valve

DRAIN DETAIL
(Delete in Los Vegas Area)

2 cu. ft. Gravel Sump

SOAKER IRRIGATION CONTROL UNIT
WITH QUICK COUPLER VALVE

Quick Coupler Valve
Pressure Reducer Valve
PVC Union

NOTE: All Fittings to be PVC.
All Piping to be Threadded Schedule 80 PVC to 1.5".
Outside Valve Box Extent in Brass Nipple between the Valve & Pressure Reducer.

ELEVATION

AIR RELIEF VALVE UNIT

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

SOAKER CONTROL AND VALVE BOX DETAILS
Concrete Shall Be Class A or Aa

* Bury Depth. See Special Provisions
** Delete in Las Vegas Area

Electric Control Valve
Place Gravel 16" Depth
for Drainage or Bottom
of Valve Box.

1/2 Gate Valve (Drain) **
Schedule 80 PVC
Gate Valve

NOTE: All Fittings to be PVC,
All Fittings to be Predrilled
Schedule 80 PVC to 12"
Outside Valve Boxes &
Protections Except Backflow
Preventer Assembly (See Detail)

Bury Depth

1/2 Gate Valve (Drain) **
Gate Valve

CLASS 200 PVC

Concrete Pad
C1084 6" AA

Reduced Pressure Backflow Preventer

PVC Pipe 1/2"

Valve Protector

PVC Pipe 1/2"

To Top & Meter

Concrete Pad

Bury Depth

1/2 Gate Valve (Drain) **
Gate Valve

PVC Pipe 1/2"

To Top & Meter

Concrete Pad

Backflow Preventer Cover

Backflow Preventer Assembly

NOTE: All Fittings to be PVC,
All Fittings to be Predrilled
Schedule 80 PVC to 12"
Outside Valve Boxes &
Protections Except Backflow
Preventer Assembly (See Detail)

PVC Tee

Street Ell

Automatic Drain Valve To
Be Installed At Low Points
Of The System

Grave Sump 30" Sufficient Size
To Drain The System (2 Cu. Ft. Min.)

SECTION
AUTOMATIC DRAIN VALVE & SUMP
(Delete in Las Vegas Area)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
BACKFLOW PREVENTER
AND VALVE COMPLEX DETAILS

R-11.1.3 (213)
06/11/12
10/02
10/04/94
**MAILBOX TURNOUT**

**TABLE 1  SUGGESTED GUIDELINES FOR LATERAL PLACEMENT OF MAILBOXES**

<table>
<thead>
<tr>
<th>HIGHWAY TYPE AND TRAFFIC CONDITIONS</th>
<th>WIDTH 1W1: OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX</th>
<th>DISTANCE 1X1: ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURNOUT OR USABLE SHOULDER</th>
<th>DEPTH BASE AGGREGATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL HIGHWAY</td>
<td>PREFERRED (FT.) MINIMUM (FT.)</td>
<td>PREFERRED (INCH) MINIMUM (INCH)</td>
<td></td>
</tr>
<tr>
<td>AADT&lt; 1000,000 VPD</td>
<td>&gt; 12</td>
<td>12</td>
<td>8 TO 12</td>
</tr>
<tr>
<td>AADT&lt; 1,000 TO 10,000 VPD</td>
<td>12</td>
<td>10</td>
<td>8 TO 12</td>
</tr>
<tr>
<td>AADT&lt; 100 TO 1,500 VPD</td>
<td>10</td>
<td>8</td>
<td>8 TO 12</td>
</tr>
<tr>
<td>RURAL ROAD</td>
<td><strong>8</strong></td>
<td><strong>8</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>AADT&lt; UNDER 100 VPD OR RESIDENT STREET WITHOUT CURB OR ALL WEATHER SHOULDER</td>
<td><strong>8</strong></td>
<td><strong>8</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>RESIDENTIAL STREET CURVED</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**

1. *For further information on mailboxes see AASHTO "A GUIDE FOR ERECTING MAILBOXES ON HIGHWAYS," 1994 EDITION.
2. MAILBOXES WITHIN THE CLEAR ZONE SHALL BE THE TYPES SHOWN IN SHEETS R-12.1-2 AND R-12.1-3 OR AN APPROVED EQUAL.
3. AADT = AVERAGE DAILY TRAFFIC, VPD = VEHICLES PER DAY
4. FOR MAILBOX SPACING AND VARIABLE LENGTH SEE SHEETS SHEETS R-12.1-3 AND R-12.1-3
5. TURNOUT QUANTITIES IN PLAN SUMMARY SHEETS.
6. WILLED MATERIAL MAY BE USED IN LIEU OF AGGREGATE BASE.
GENERAL NOTES:

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

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

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

4. 3" X 8" WHITE REFLECTORIZED SHEETING SHALL BE PLACED FACING TRAFFIC 36" +/- 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 (Type C) ARE NOT ALLOWED ON HIGH-SPEED HIGHWAYS.

NOTE:
OPPOSITE ORIENTATION WITH WEDGE ON TRAFFIC APPROACH SIDE OF POST IS ALLOWABLE BUT NOT PREFERRED.

SUPPORT FRAME AND FOUNDATION ARE PROPRIETARY PRODUCTS COMMERCIALLY AVAILABLE.
**SIGNAL STANDARDS**

1. For Pedestrian Push Button and Sign See Sheet T-30.1.3
2. For Foundation Details See Sheet T-30.1.16.
3. Mounting Heights of Sign and Pedestrian Heads and Pedestrian Push Buttons Shall Be Applicable to Installation on Pole Types 2A, 3A & 3B.
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. Recompress existing base.
5. All new surface and concrete material shall be approved by engineer.
6. New material and trenching shall not be paid for directly but included in the price for the conduit.
7. Sand bedding.
8. 2 conduit diameters min.
9. Saw cut as directed by engineer.
SIDE BRACKET MOUNTINGS

MAST ARM MOUNTINGS

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

VEHICULAR SIGNALS AND MOUNTINGS

TOP MOUNTINGS

8" on post mounting 5/8" on mast arm

REAR VIEW

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

BACKPLATE T-THICKNESS

SPECIAL DETAIL FOR MOUNTING SIGNAL HEAD

PEDESTRIAN SIGNALS AND MOUNTINGS

TOP MOUNTINGS

SIDE MOUNTINGS

CLAMSHELL MOUNT

CLAMSHELL MOUNTING HARDWARE (CS)

PEDESTRIAN SIGNAL-INTERNATIONAL SYMBOL

(To be used unless otherwise specified)

SLOT FOR MOUNTING BOLTS

POLE PLATE

TERMINAL COMPARTMENT

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

**TYPE 1** - Position pedestrian push buttons on signal pole when the width of the pole allows (2) pedestrian heads to be of the same mounting height. **TYPE 2** - Position pedestrian push buttons on signal pole when the width of the pole does not allow (2) pedestrian heads to be mounted at the same height.

**PEDESTRIAN PUSH BUTTON POST**

1. Arrow to be left or right or both as required.
2. Porcelain enameled, 9" x 12" sign, black symbols on white background.

**SECTION A-A WITH PIPE**

**DETAIL "E"**

**DETAIL "B"**

**DETAIL "C"**
GENERAL NOTES:
1. All fasteners and associated hardware shall be stainless steel.
2. Two (2) No. 12 AWG conductors shall be installed between the internally illuminated street name sign and the pole luminaire. The photoelectric (PE) control for the luminaire or electrical service will operate the internally illuminated sign.
3. All bolsters will be high output, "Valmont No. 603934W" or equivalent. Bolts shall be coated and sealed.
4. Fluorescent lighting will be provided by 2-B8004A standard lamps. Fluorescent sockets will be drite snap-in type sockets with a gasket and a rubber gasket on the lamp mating surface to prevent possible water damage.
5. Wire connections will be made with insulated compression wire nuts.
6. Street name sign wiring to run through two (2) water-tight fittings with flexible conduit. Use a drip loop sufficient enough to allow sign movement. Use watertight rubber grommet or bushing at pole entry.
7. Clamp on details shall be used for internally illuminated Street Name Sign support arm assembly.
8. Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have ¾" dia holes for a ½" dia galvanized cotter pin. Rack clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An ½" dia hole for each pin bolt shall be drilled through the pole after arm orientation has been approved by the Engineer.
SCHOOL ZONE FLASHER

18W/C - 1'-0" amber beacon
(2 per installation)

2'-0" X 4'-0" Standard Highway Sign No. 25-1.

3/8" round metal sign post
(13'-1/2" shaft length)

Multi-directional slip base,
See Standard Plan Drawing T-313.2

Height varies

Concrete footing shall be Class A or AA

No. 3-1/2 pull box

1/2" PVC Schedule 40

FLASHER WARNING SIGN DETAIL

Locate NWF-1 signal sign vertically on mast arm no lower than 18'-4/2" 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 mast arm 20'-0" 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.
Detector Layouts, Dimensions & Wiring Patterns

Section A-A

Section B-B

Plan View of Diagonal Slot at Corners

Loop Detectors

State of Nevada
Department of Transportation

Loop Detectors

Signed Original: 11/30/16

1633

12/7/16

11/30/16

3, 4 & 5 Turn Copper Wire No. 2 AWG
PAVEMENT JOINT CROSSING DETAILS

(NO DIRECT PAYMENT)

GENERAL NOTES:

1. ALL PULL BOXES SHALL BE NO. 5.
   SEE SHEET 7-30.1/8 FOR DETAILS NOT SHOWN.

2. PAYMENT SHALL BE MADE UNDER THE FOLLOWING ITEMS:
   - CONDUIT - DIAMETER VARI
   - 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 DR.
   ALL LOOPS SHALL BE AT LEAST 6 INCHES FROM A CURB OR SIDEWALK.
2. EACH LOOP SHALL BE A CONTINUOUS RUN TO THE SPECIAL M-1 CABINET
   WITH NO SPLICES AND SHALL BE LABELED AT THE END WITH WIRE
   IDENTIFICATION.
3. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 FULL BOX ON 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 LENGTH.
5. LOOPS SHALL BE CENTERED IN ALL TRAFFIC LANES.
6. LOOP CUTOFF SHALL BE 1/8" WIDE X 2'-4" MAXIMUM DEPTH.
7. THE WIRE SIZE SHALL BE 94 STRANDED (WSG-51)-11.
8. FOR RIDING SIDE CURB OR PAVEMENT JOINT DETAIL SEE STANDARD
   PLAN SHEET T-30-11.
9. 2'-4" BACKER RED SHALL BE PLACED ON ALL CORNERS OF THE LOOPS AND
   EVERY 3'-4" ALONG THE LOOP TO THE EDGE OF THE PAVEMENT.
10. LOOP WIRE AND PIEZOELECTRIC SENSOR CABLE WIRE SHALL BE
    CARRIED IN SEPARATE CONDUIT TO NO. 5 FULL BOX AND/OR SPECIAL
    M-1 CABINET. CONDUIT GIVING UNDER PAVEMENT ARE SHOWN
    OUTSIDE THE LOOP DEPICTIONS 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 WIRE IDENTIFICATION.
13. ALL DETECTOR SHALL INCLUDE ALL CONDUCTORS AND 54" CUTTING
    NEEDED FOR INSTALLATION.
14. IF GUARDRAIL/RAILROAD RAIL IS PROVIDED, SPECIAL M-1 CABINET
    SHALL BE A MINIMUM OF 24" BEHIND THE RAIL.
15. PAYMENT WILL BE MADE UNDER THE FOLLOWING:
   6'-0" LOOP (EACH) PIEZOELECTRIC SENSORS (EACH)
   SPECIAL M-1 CABINET (EACH) NO. 5 FULL BOX (EACH)
   1' CONDUIT (EACH)

LEGEND:
* Special M-1 Cabinet

AVC DETECTOR LOOP
CONFIGURATION AND NOTES

AVC DETECTOR LOOP PLACEMENT DETAIL
(Opposite lane loops not shown for clarity)
GENERAL NOTES:
1. ALL LOOP SHALL BE 6" X 6" SQUARE WITH A TURING OF WIRE ON ALL LOOPS SHALL BE 6" ROUND LOOPS WITH A TURING OF WIRE.
2. LOOP WIRE PAIRS FROM LOOP PROPER TO NO. 5 FULL BOX OR SPECIAL W/1 CONDUCTOR SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT.
3. LOOP WIRE PAIRS SHALL BE TWISTED NO LESS THAN FOUR TIMES PER FOOT FOR THE ENTIRE HOME RUN.
4. LOOP CUTS SHALL BE 6" X 6" X 3'-0" MAXIMUM DEPTH.
5. 27 BANGER COUPLER CAN BE PLACED ON ALL CORNERS OF THE LOOPS AND EVERY 3' ALONG THE LOOP TO THE EDGE OF THE PAVEMENT.
6. LOOPS SHALL BE CENTERED IN ALL TRAFFIC AND NON TRAFFIC LINES.
7. LOOP WIRE SHALL BE NO. 14 STRANDS (USA-511).
8. EACH INDIVIDUAL CONDUCTOR SHALL BE A CONTINUOUS RUN WITH NO ASSOCIATIONS IN THE LOOP IS METERED AT EACH END WITH THE MAIN.
9. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ASSURE THAT THE LOOP PLACEMENT IS NOT IN CONFLICT WITH OTHER ITEMS OF WORK.
10. PRIOR TO PLACEMENT OF LOOP DETECTORS THE RESIDENT ENGINEER SHALL NOTIFY THE PLANNING SECTION OF THE PLANNING DIVISION (888-1333) FOR ASSISTANCE IN ENSURING THE X-LOCATION.
11. DETECTORS SHALL BE INSTALLED AFTER DÉNITÉ GRADE PAVING OR PREP-PAVE GRADE IS ESTABLISHED.
12. LOOP LOCATION SHALL BE MAPPED FOR THE EDGE OF THE PAVEMENT BY PAINTING THE WORD "LOOP" IN WHITE.
13. FOR DIAGONAL SLOT AT CORNERS DETAIL SEE STANDARD SHEET T-30-1.4.
14. SEE STANDARD SHEET T-30-1.4.1 FOR PAVEMENT JOINT DETAILS.
15. PAINTING WILL BE MADE UNDER THE FOLLOWING ITEMS:
   - NO. 5 FULL BOX (EACH)
   - 6" X 6" LOOPS (EACH)
   - 3' DIA. CONDUCT CIRCLE

LEGEND:
- #5 Pull Box
- No. 5 Pull Box

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

TRANSFORMER PAD BARRIER POST
GENERAL NOTES:

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

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

3. The distance from the roadway surface to the bottom of the mast arm signheads shall be 17'-0".

NOTE: TYPE 30-A & 30A PILE SHALL ALSO SUPPORT THE ALTERNATE LOADING SHOWN ABOVE.
**POLE FOUNDATION**

**PILE FOUNDATION TABLE**

<table>
<thead>
<tr>
<th>POLE TYPE</th>
<th>MAST ARM LENGTH</th>
<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
<th>ANCHOR BOLTS (4 EACH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A &amp; 1S</td>
<td>N/A</td>
<td>5'-0&quot;</td>
<td>2'-0&quot;</td>
<td>7/8&quot; x 16&quot; x 4&quot;</td>
</tr>
<tr>
<td>7</td>
<td>ALL</td>
<td>5'-0&quot;</td>
<td>2'-6&quot;</td>
<td>7/8&quot; x 18&quot; x 4&quot;</td>
</tr>
<tr>
<td>14</td>
<td>ALL</td>
<td>5'-0&quot;</td>
<td>2'-6&quot;</td>
<td>7/8&quot; x 20&quot; x 4&quot;</td>
</tr>
<tr>
<td>28</td>
<td>ALL</td>
<td>5'-0&quot;</td>
<td>2'-0&quot;</td>
<td>7/8&quot; x 60&quot; x 6&quot;</td>
</tr>
<tr>
<td>30 AND 35</td>
<td>5'-45&quot;</td>
<td>12'-0&quot;</td>
<td>3'-0&quot;</td>
<td>12'-0&quot; x 60&quot; x 6&quot;</td>
</tr>
<tr>
<td>30A AND 35A</td>
<td>&gt;45&quot;</td>
<td>12'-0&quot;</td>
<td>3'-0&quot;</td>
<td>12'-0&quot; x 60&quot; x 6&quot;</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**

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

**STATE OF NEVADA**

**CONDUCTOR SPLICE METHODS**

1. Completely cover the splice area with an electrical insulating coating and allow to dry.
2. Apply layers of electrical insulating pad with minimum thickness of 1/8" each layer or 2 layers, half lapped, synthetic insulating, self-fusing, rubber tape.
3. Apply 3 layers of half lapped PVC tape.

**TYPE A SPLICE METHOD**

1. Completely cover the splice area with an electrical insulating coating and allow to dry.
2. Apply electrical insulating pad with minimum thickness of 1/8".
3. Apply 3 layers of half lapped PVC tape.

**TYPE B SPLICE METHOD**

1. Connect bonding wire to the reinforcing steel near the midpoint of the foundation or anchor bolts.
2. Ground plate shall be made of nonferrous material (typically brass or copper). Install "NSI" ground plate or equivalent.

**ELECTRICAL FILLER COMPOUND**

1. Electrode filler compound, insulating film or rubber tape.
2. Insulating tape.
3. Flexible pressure connector.

**POLE GROUNDING DETAIL**

1. No. 4 spiral 6" pitch, ending with a 180° hook. Lap shall overlap 1/2 turns and end with a 180° hook.
2. No. 7 bars equally spaced.

**NOTE:** Concrete shall be Class A or AA.
MAST ARM SIGNAL AND SIGN PLACEMENT
"L" as shown on plans
GENERAL NOTES:
1. SEAM WELD CONSTRUCTION W/ 1/8" DA FILLET WELD OUTSIDE EDGES.
   TACK WELD CONSTRUCTION FOR INNER FRAME AND ANGLE 1/4" x 1/4" x 3" CENTERS.
2. GASKET MATERIAL 1/16" x 2" NEOPRENE EPDM AND SBR SPONGE WITH PSA.
3. WHERE CAP SCREWS ARE USED TO ATTACH COVER TO BOX, EITHER OF THE FOLLOWING METHODS OF PROVIDING ADEQUATE THREADING MAY BE USED:
   A. TACK WELD SQUARE NUT TO BOTTOM OF FLANGE (TOTAL 4), OR
   B. TACK WELD A 1/8" x 1/8" x 8" BAR BENEATH FLANGE (TOTAL 2).
4. DO NOT CUT OR WELD TO BRIDGE RAIL REINFORCING STEEL.

TYPE 1

TYPE 2

SECTION C-C

Cover

Drill hole for 3/8" cap screw (Total 4).

1/4 Go. Neoprene gasket

1/4" Steel cover (markings per specifications)

Cover Attachment Details Section C-C

SECTION C-C

Cover

Drill hole for 3/8" cap screw (Total 4).
**GENERAL NOTES:**

1. HC should not be less than 6’ from the shoulder line. 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, see T-311.4

3. All sign supports shall be of breakaway design.


5. Sign sizes required when h/75’<0.0”, or sign slope is steeper than 1:6, or when required in contract plans.

6. See sheet T-311.5 for Sign island construction.

7. For sign posts, see Post Selection charts, sheet T-311.2.

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

9. Sign panels to be aluminum sheet construction.

10. CC-Corner clearance

11. VC - Vertical clearance

12. Prepaint the exposed portion of fastening hardware on the face of the sign panels with baked enamel to match the sign face.

**NOTES:**

1. Min CC: 10’

2. Max VC for single sign: 10’

3. Max VC for double sign: 11’

4. Min H: 10’

5. Special design may be necessary if given limits are exceeded.
### POST SELECTION CHART

<table>
<thead>
<tr>
<th>SIGN AREA (SQ. FT.)</th>
<th>NFT 1 (Q)</th>
<th>8&quot;x12&quot;</th>
<th>10&quot;x14&quot;</th>
<th>12&quot;x16&quot;</th>
<th>14&quot;x18&quot;</th>
<th>16&quot;x20&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 x 6.5</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>6.5 x 6.5</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>8.5 x 11</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>11 x 13</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>13 x 15</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>15 x 17</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>17 x 19.5</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
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<tr>
<td>19.5 x 21.5</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>21.5 x 23.5</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>23.5 x 24.3</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>25 x 25</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</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 30’, except when protected by guardrail or barrier rail. For clear zone widths, refer to AASHTO Roadside Design Guide 1996 Ed. Chapter 3.

### POST SELECTION CHART

<table>
<thead>
<tr>
<th>POST TYPE</th>
<th>DESCRIPTION</th>
<th>REFERENCE SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2½&quot; Square Metal Post (1/2 gage)-single post</td>
<td>T-31.2.1</td>
</tr>
<tr>
<td>B</td>
<td>2½&quot; Square Metal Post (1 gage)-single post</td>
<td>T-31.2.1</td>
</tr>
<tr>
<td>C</td>
<td>Single Post Unbraced 3&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 3&quot; Dia Round Metal Post</td>
<td>T-31.3.1 thru T-31.3.2</td>
</tr>
</tbody>
</table>
| E         | Post-3" Dia Round Metal Post  
|           | Brace-3" Dia Round Metal Post | T-31.4.1 thru T-31.4.3 |
| F         | Special Design contact Traffic Engineering | |

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

Signed: Original On File: 1-31-12 (627)
GENERAL NOTES:
1. Braces required if WxH=0'-1" Install as shown.
2. Braces 3/16" x 1/4" 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

NOTE: To obtain desired panel width, Max. of 2 panels may be cut less than 4'-0". (1'-6" Min. each)

SUB PANEL ASSEMBLY & Z BAR BRACING

VERTICAL JOINT CLOSURE STRIP

GENERAL NOTES:
1. Stringers: 3" X 2 5/8" X 1/4" or 2-11/16" X 2 5/8" X 1/4" aluminum alloy z-bar.
2. Stringers required on all signs requiring multiple posts.
3. Tubular stiffeners required when W>3.0m
4. Cost for bracing is included in sign.
5. One vertical joint if W exceeds 12'; Two vertical joints if W exceeds 24'.
6. For alternate steel tube bracing, see Standard Plan Drawing T-31.15.
STEEL TUBE BRACING ON ROUND METAL POSTS

DETAIL "A"

STEEL TUBE BRACING ON WOOD POSTS

DETAIL "B"

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

<table>
<thead>
<tr>
<th>TABLE - 1</th>
<th>TABLE - 2</th>
<th>TABLE - 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp Sizes</td>
<td>Tubing Sizes</td>
<td>Post Size</td>
</tr>
<tr>
<td>PIPE DIA.</td>
<td>O.D.</td>
<td>A</td>
</tr>
<tr>
<td>3&quot; Nom.</td>
<td>3½&quot;</td>
<td>5⅛&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
GENERAL SIGN PANEL BRACING
DOUBLE POST BRACED

DOUBLE POST UNBRACED

SINGLE POST

GENERAL NOTES:
1. Sign islands to be compacted to 95%.
2. Payment for sign island will be as noted in contract plans and Special Provisions.
3. Undivided routes use 1001. All divided routes use 801.
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.
3. For details on sign location, post type, panel grading, and sign frames, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
GENERAL NOTES:
1. Anchor post included in cost of sign post.
2. For details on sign location, post type, panel bracing, and slip joints, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
3. Inner posts are those closest to roadway, and the outer posts are those farthest away.

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

0.6W

Post length as noted in sign summary sheet

Roadway

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

Multi-Directional slip Base and footing

0.6W

Post length as noted in sign summary sheet

Sign face

1/4" x 4" round head, square neck carriage bolt (bolt head colored to match sign face), hex nut with fiber insert, flat washer through sign & post (1typ)

Detail B
See Standard Plan Drawing T-31.4.3

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
ROADSIDE SIGNS
ROUND METAL POSTS
UNBRACED

T-31.3.2

Sign summary sheet

DOUBLE POST UNBRACED

SINGLE POST
GENERAL NOTE:
1. All parts and hardware shall be galvanized as per Section 715 of the Nevada DOT Standard Specifications, except as noted.
2. Multi-directional slip bases are not required behind concrete barrier rail or behind guardrail where the sign post is greater than 2'-6" from the back side of the guardrail post.
3. Use standard weight pipe for sign post and sleeve. See ASTM A 53.
4. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.

PLAN VIEW
TOP/BOTTOM PLATE
Plate Thickness = 5/8"
SINGLE SIGN

GENERAL NOTES:
1. Footings to be drilled holes as shown, & filled with Class A or Class AA concrete.
2. Anchor post & bracing included in cost of sign post.
3. For details on sign location, post type, panel bracing, and sign isometrics, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
4. Inner posts are those closest to the roadway, and the outer posts are those farthest away.

 ausgezeichnet
**GENERAL NOTES:**

1. For details on sign location, post type, panel bracing, and sign islands, see Standard Plan Drawings 1-31.1 through 131.16.
GENERAL NOTES:
1. All posts with cross sectional area larger than 4" x 4" are to be drilled as shown.
2. For details on sign location, post type, panelbracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
3. "Z" bars will be used on signs requiring two posts.
4. For double post installations, inner posts are those closest to roadway, and outer posts are those farthest away.

RECTANGULAR TIMBER POST SELECTION

<table>
<thead>
<tr>
<th>Post Size (D)</th>
<th>Hole Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; x 4&quot; or 6&quot; x 6&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Posts</th>
<th>N</th>
<th>Sign Height (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
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<tr>
<td>12</td>
<td></td>
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<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table of Hole Diameters**

<table>
<thead>
<tr>
<th>Post Size (D)</th>
<th>Hole Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; x 4&quot; or 6&quot; x 6&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

**Detail "A"**

3" x 2-11/16" x 7/8" aluminum alloy "Z" bar or suitable alternate. (For length to be W = 8")

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

1/2" hex head bolt, square neck carriage bolt, hex nut with fiber inserts, at 300 mm spacing

1/2" x 1-1/4" aluminum alloy strap with 1/2" carriage bolt, hex nut with fiber insert, 2 flat washers through sign, post and strap. (For W = 3-0")
GENERAL NOTES:
1. All drilled holes in timber to be \( \frac{3}{4} " \) 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 shop 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 bracing, and sign islands, see Standard Plan Drawings T-31.1.1 through T-31.1.6.
## Taper Length and Channelizing Device Spacing

### Advance Warning Sign Spacing

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Distance Between Signs (ft)</th>
<th>Length for Merging Taper (ft)</th>
<th>Device Spacing (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>10.0 ft</td>
<td>11.0 ft</td>
</tr>
<tr>
<td>0-20</td>
<td>200</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>25-30</td>
<td>300</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>35-40</td>
<td>400</td>
<td>150</td>
<td>180</td>
</tr>
<tr>
<td>45-50</td>
<td>500</td>
<td>210</td>
<td>245</td>
</tr>
<tr>
<td>65-75</td>
<td>1000</td>
<td>280</td>
<td>320</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>40</td>
</tr>
<tr>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>30</td>
<td>90</td>
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<tr>
<td>35</td>
<td>140</td>
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<td>60</td>
<td>420</td>
</tr>
<tr>
<td>65</td>
<td>520</td>
</tr>
<tr>
<td>70</td>
<td>560</td>
</tr>
<tr>
<td>75</td>
<td>675</td>
</tr>
</tbody>
</table>

### Typical Applications:

NDOT Standard Sheets T-35.1.1 thru T-35.1.17 include a variety of traffic control methods, but do not include a layout for every conceivable work situation. Typical applications should be altered, when necessary, to fit the conditions of a particular temporary traffic control zone. Standards presented in Part VI of the 2000 MUTCD and revisions should be given priority over the examples given here.

### Road Work Signs:

- **MRW-1**
- **G20-2A**

Road Work Next X Miles

Place at beginning and end of project when project length 2.0 miles.

### General Notes:

1. R2-1 and R2-5A 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. Speed limit may be reduced by 10 mph min. to 15 mph max. if additional speed limit signs (not shown) are required at IGA.

2. The W-1-5 signs shall be used when the recommended speed on a curve is 30 mph or less. The W-1-4 signs shall be used when the recommended speed is 35 mph or greater.

3. The W-6-3 and R4-1 signs shall be installed alternately at 0.5 mile intervals when the lengths of crossovers exceeds 0.5 mile.

4. All regulatory signs (R series) shall be black on retroreflective white.

5. All warning signs (W series) shall be black on retroreflective orange.

6. Warning signs shall be 3' x 3' for speeds of 45 mph or less. R2-1 and R2-5A shall be 3' x 4'.

7. Warning signs shall be 4' x 4' for speeds of 50 mph or greater, R2-1 and R2-5A shall be 4' x 5'.

---

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TABLES/NOTES
FOR TRAFFIC CONTROL SHEETS
T-35.1.1 thru T-35.1.17

Paper Original Date 10-1-97  Adopted 8-15-98
See T-35.1.1 For TABLES and GENERAL NOTES
EXISTING PAVEMENT MARKINGS MAY REQUIRE REMOVAL IN THE Crossover AREA AND NEW MARKINGS INSTALLED.

See T-35.1.1 For TABLES and GENERAL NOTES

LEGEND

- Work Area
- Channelizing Devices
- Arrow Board
- ≥ 45 mph
- Optional
- See GENERAL NOTE No. 1.
- See GENERAL NOTE No. 2.
- See GENERAL NOTE No. 3.
- Temporary Striping

STATES OF NEVADA
DEPARTMENT OF TRANSPORTATION
TYPICAL TRAFFIC CONTROL FOR MEDIAN CROSSOVER (MULTILANE DIVIDED)

Signed Original On File
A Do. 7/19
Revised 2/13
LEGEND

- Work Area
- Channelizing Devices
- 20 mph
- See GENERAL NOTE No. 1
- See GENERAL NOTE No. 2
- See GENERAL NOTE No. 3
- Temporary Stripping
TYPICAL PLACEMENT OF SHOULDER DROP OFF SIGNS
(PLACED WHEN SHOULDER DROP-OFF EXIST DURING NON-WORKING HOURS)

NOTE: ND-1 shall be used in all cases where there is a vertical difference of 2.0" or greater at the shoulder.

See T-35.1.1 for TABLES and GENERAL NOTES

LEGEND

° - Optional
* - See GENERAL NOTE No. 1.

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

NOTE: NL-1 and NL-2 shall be used in all cases where there is a vertical difference of 1.0" to 3.0" between the travel lanes.

TYPICAL PLACEMENT OF LOOSE GRAVEL/DUST HAZARD SIGNS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL SIGNAGE
FOR SHD DROP OFF/UNEVEN LANES/LOOSE GRAVEL & DUST HAZARD/BUMP
NOTE - REMOVE MEDIAN TRAFFIC CONTROL SIGNS ON A TWO LANE FACILITY

LEGEND:

- WORK ZONE
- CHANNELIZING DEVICES # 6.0 11 SPACING
- CHANNELIZING DEVICES
- FLAGGER (LOCATIONS TO BE DETERMINED BY THE FIELD ENGINEER)
- ARROW BOARD

- USE WHEN SPEEDS ARE ≥ 45 mph

See T-35.1.1 For TABLES and GENERAL NOTES
LEGEND:

- WORK ZONE
- CHANNELIZING DEVICES @ 6.0' SPACING
- CHANNELIZING DEVICES
- ARROW BOARD
- USE WHEN SPEEDS ARE 24-45 mph
- LOCATION TO BE DETERMINED BY FIELD ENGINEER

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

See T-35.11 For TABLES and GENERAL NOTES
BARRICADE CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>TYPE I BARRICADE</th>
<th>TYPE II BARRICADE</th>
<th>TYPE III B BARRICADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of Roll (W)</td>
<td>8&quot; Min. - 12&quot; Max.</td>
<td>8&quot; Min. - 12&quot; Max.</td>
<td>6&quot; Min. - 12&quot; Max.</td>
</tr>
<tr>
<td>Length of Roll (L)</td>
<td>2' Min.</td>
<td>2' Min.</td>
<td>4' Min.</td>
</tr>
<tr>
<td>Width of Stripes (W)</td>
<td>Roll Length 3' = 4&quot;</td>
<td>Roll Length 3' = 4&quot;</td>
<td>Roll Length 3' = 6&quot;</td>
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<tr>
<td>Height (H)</td>
<td>3' Min.</td>
<td>3' Min.</td>
<td>5'</td>
</tr>
<tr>
<td>Number of Retroreflective Roll faces</td>
<td>2 (one each direction)</td>
<td>4 (two each direction)</td>
<td>3 (one direction only)</td>
</tr>
</tbody>
</table>

GENERAL NOTES:

1. ALL BARRICADES USED MUST COMPLY WITH NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350.

2. TYPE III B BARRICADES USED FOR TEMPORARY SIGN SUPPORTS, SIGNS SHALL BE MOUNTED 1'-0" MIN. FROM GROUND AND COMPLY WITH M.U.T.C.O. 2000. SEE NOTE 5.

3. CABLES TO BE THREADED THROUGH ALL PIPES.

4. Markings for barricade rails shall be retroreflective orange and white stripes sloping downward at an angle of 45 degrees in the direction of traffic.

5. BARRICADE HAZARD PANELS (0.025 ANODIZED ALUMINUM) ATTACHED WITH T-NOS. 54 PAN HEAD METAL SCREW OR 0.125" POLYETHYLENE PLASTIC RIVETS.

TRAFFIC CONES

1. Cones to be predominately orange.
2. Cones to be used during hours of darkness shall be retroreflective as shown above.
3. Cones shall have weighted bases.

TRAFFIC DRUMS

1. -2" max. non-retroreflective material
2. -6" min. - 6" max. retroreflective material

Note: Drums/barrels shall have a min. of 2 white and 2 orange retroreflective bands and 18" width regardless of orientation.

SECTION A-A

DETAIL "B"

POST DETAILS

1/4" x 2" BOLT
WASHER
1/4" x 2" BOLT
WASHER

VERTICAL PANEL

ELECTROPLATED BOLTS AND NUTS AND
PREVENTIVE FLAT NONMETALLIC WASHERS

SILVER OR WHITE RETROREFLECTIVE BAND
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 STRIPES SHALL BE SLOPED DOWN TOWARD THE SIDE WHICH TRAFFIC WILL PASS. THE BACKGROUND SHALL BE RETRO-REFLECTIVE YELLOW. ADDITIONALLY, A MARKER PANEL SHALL BE PLACED AT SHEETING APPROXIMATELY 30° SQUARE. THE PANEL IS COVERED WITH YELLOW RETROREFLECTIVE SHEETING WITH BLACK STRIPES 5” WIDE. BLACK STRIPES SHALL BE AT 45 DEGREES WITH A 4” SPACE BETWEEN STRIPES.

6. THE MAXIMUM LATERAL AND LONGITUDINAL SLOPE THAT SAND MODULES MAY BE INSTALLED ON SHALL NOT EXCEED 5%. 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. PPOM = PORTABLE PRECAST CONCRETE BARRIER RAIL. V₀ = DESIGN VELOCITY.

DELINEATION FOR LEADING MODULE
(USE CORRECT PANEL)

(See Note 5)
TYPICAL SIGN & MARKING PLAN

GENERAL NOTES:
1. RAILROAD PAVEMENT MARKING SYMBOL INCLUDES THE TWO TRANSVERSE BANDS PLUS THE RAILROAD CROSSING KIT.


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

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

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

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

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


9. REFER TO STANDARD ALPHABET FOR HIGHWAY SIGNS AND MARKINGS FOR RXR SYMBOL DETAILS.

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

1. Ring type guardrail may be installed to provide protection for the signal assembly in industrial or other areas involving only low-speed highway traffic and where signals are vulnerable to damage by turning truck traffic. Use of ring type guardrail requires approval by the Chief Safety Engineer or the Chief Roadway Design Engineer.

2. For railroad-highway grade crossings marking details refer to Standard Plan Drawing 1-55.5.

3. For "W" beam guardrail details see Standard Plan Drawing R-8.5.1.

4. For triple corrugation guardrail details see Standard Plan Drawing R-8.4.1.

5. Special guardrail terminal end to be installed on guardrail end nearest to railroad.

6. No post holes shall be drilled next to the signal apparatus without first notifying the railroad inspector.

7. For signals with less than 7 feet, refer to Drawing R-8.3.1 and 1996 AASHO Roadside Design Guide TABLE 5.3 for alternate post spacing.

8. For triple corrugation terminal connector details not shown refer to standard highway barrier hardware by AASHTO-AGC-ARTBA Report May 1995.

9. For concrete around 6" x 8" post wrapped with layer of 1/4" to 5/8" thick expanded polystyrene foam sheathing. Don’t nail polystyrene foam to post.

URBAN INSTALLATION

DETAIL "A"

SPECIAL GUARDRAIL TERMINAL END
ALTERNATIVE CONNECTIONS AT TOP CHORD

SECTION "C"-"C"

SECTION "D"-"D"

NOTES:
2. Minimum Flange Width is 3/4" For Clip Angles Welded To Chord Member Of Truss.
3. Maximum Spacing Of Bottom Clip Angle Is 5'-0".
4. Top Clip Required For Each Vertical Member On Removable Sign Panel Frame.
SIDE VIEW - SINGLE FACED SIGN TYPE A

LIGHT FIXTURE MOUNTING DETAIL

DETAIL "A"

Photoelectric Control Unit
3 Wire, 12 Volt, NO Contact, Normal Open, Non-Hazardous

Light Fixture Mounting Channel
1 1/2" x 7/8" O.D. Square Structural Tubing,
Max. A - 4.4". See Detail "A"

3/8" x .187" D Stainless Steel Machine Bolt, Nuts, Washers

2" x .375" Long Round Head Machine Screw, Hex Nut, Flat Washer, Beveled Washer & Lock Washer

3/4" x 3' x 3' x 1/4"

3" Dia. Hole

Drill 1/8" For Mounting Screws.
Position 1/8" x 1/2" Machine
Screws Through Holes

NOTE: Square Structural Tubing
May Be Used In Place Of 2" Bar.
NOTES:
1. Footings shall be placed with long dimensions normal to axle of sign.
2. On single post signs, the post shall be recessed out of plume with the top of the leveling nut not more than 12" below the bottom of the sign frame level.
3. 2" x 12" anchor bolts may be substituted for 2 1/2" bolts.

GENERAL NOTES:

CONSTRUCTION: Standard Specifications for Road and Bridge Construction, Current Edition and Supplements There To.

WELDING: All welding continuous unless otherwise noted on the plans. All welding to be done in accordance with the standard specifications.
**BROKEN YELLOW LINE**

- Type A
- Type B
- Type D

**BROKEN WHITE LINE (URBAN)**

- Type A
- Type B
- Type D

**PASSENGER/NO PASSING ZONE**

- Type A
- Type D

**DOUBLE YELLOW CENTER LINE**

- Type A
- Type D

**EXIT RAMP (GORE)**

- Type E

**BROKEN WHITE LINE (RURAL)**

- Type A
- Type C

**REFLECTOR**

- Type B

**NON-REFLECTIVE & REFLECTIVE MARKERS**

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

**STATE OF NEVADA**

**DEPARTMENT OF TRANSPORTATION**

**PERMANENT RAISED PAVEMENT MARKERS**

- Signed Original On File: 1-31-11
- Adopted: 1-0-11
- Revision: 11-01-10
PLACEMENT OF MERGE ARROWS

TYPICAL LANE REDUCTION
For further details on "LANE REDUCTION" See Part II (of the MUTCD)

TYPICAL PARALLEL ACCELERATION LANE
For further details on "PARALLEL ACCELERATION LANE" See Part II (of the MUTCD)

MERGE ARROW
(42.0 ft²)

TAPER LENGTH
END BROKEN WHITE LINE (L/21)

LENGTH OF COMBINED LANE
L = LENGTH OF FULL WIDTH ACCELERATION LANE

BICYCLE
(5.5 ft²)

END BROKEN WHITE LINE (L/21)

MERGE ARROW
WIDE OF TAPER (10)
DIRECTIONS OF VIEW

HOV LANE
(12.0 ft²)

LEFT/STRAIGHT
(27.0 ft²)

LEFT/STRAIGHT/RIGHT ARROW
(36.0 ft²)

STRAIGHT
(12.5 ft²)

TURN ARROW
(15.5 ft²)

EXIT ARROW
(31.0 ft²)

WRONG WAY ARROW
(33.0 ft²)
PERMANENT (TYPICAL)
SIGNALIZED, STOP
CONTROLLED CROSSWALK INTERSECTION

DISTRICT 1

NOTE: For additional crosswalk/stop bar details, see Standard Plan Sheet T-38.1.2 & T-38.1.3.

DISTRICT 2 & 3

PERMANENT (TYPICAL)
SIGNALIZED, STOP
CONTROLLED CROSSWALK INTERSECTION

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

Crosswalk Bar Spacing:
Place on Travel Lane Lines, Shoulder Lines and Centered Between Travel Lane Lines (Typ.)
(placed parallel to travel lanes)

2'-0" Stop Bar (Typ.)
10'-0" Min.
50'-0"

2'-0" X-Walks (Typ.)

As Required
2'-0" X-Walks (Typ.)

24' 24' 24'

PERMANENT CROSSWALK MARKINGS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

10'-0" Min.

2'-0" Stop Bar (Typ.)

2'-0" X-Walks (Typ.)

Signed Digital On Film
1-79-11-4-1 12/28/01
DEPARTMENT OF TRANSPORTATION

2'-0" Stop Bar (Typ.)

2'-0" X-Walks (Typ.)

2'-0" Stop Bar (Typ.)

2'-0" X-Walks (Typ.)

2'-0" Stop Bar (Typ.)

2'-0" X-Walks (Typ.)

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2'-0" X-Walks (Typ.)

2'-0" Stop Bar (Typ.)

2'-0" X-Walks (Typ.)
NOTES:

1. **NOTES ON 1, 2, 3 & 4 OF SHEET B-20.1.3 SHALL APPLY.**

2. **WHEN THE ADDITION OF CELLS CAUSES THE LENGTHS OF THE "Q" OR "F" AND "G" BARS TO EXCEED 60 FEET, THE BARS WILL REQUIRE SPACING. SPACES FOR THE "Q" BARS SHALL BE CENTERED ALONG THE CENTER LINE OF THE INTERIOR WALL. SPACES FOR THE "Q" BARS SHALL BE CENTERED ALONG THE CENTER LINE OF THE GM. SPACES FOR THE "F" BARS SHALL BE DONE AT THE 45 DEGREE LEG AND CONFORM TO THE SPACING DETAIL SHOWN. SPACES FOR THE "Q" BARS SHALL BE ALTERNATED FROM BAR TO BAR. SEE DETAIL SHOWN. SPICE LENGTHS FOR THE "Q" AND "G" BARS SHALL BE AS FOLLOWS:**

   - **NO. 4 BARS** - 16 INCHES
   - **NO. 6 BARS** - 24 INCHES
   - **NO. 7 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.**

---

**TYPICAL SECTION - SPANS 5' THRU 8'**

- **CONCRETE FOR THIS PORTION IS INCLUDED IN QUANTITIES OF ADJOINING CELLS.**
- **REINFORCING STEEL INCLUDED IN PREVIOUS CELLS QUANTITIES.**

---

**TYPICAL SECTION - SPANS 10' THRU 14'**
<table>
<thead>
<tr>
<th>SPAN</th>
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<td>30</td>
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</table>

- QUANTITIES SHOWN ARE FOR HEADWALLS AT THE INLET AND OUTLET

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

ESTIMATE OF QUANTITIES
TYPE I HEADWALLS

| Effective Date: 2023-04-24 | Edition 11: 2023-04-24 | 79 CONSTRUCTION MANUAL P. 672 | 79 CONSTRUCTION MANUAL P. 672 |
PART LONGITUDINAL SECTION

NOTES:
1. FOR GENERAL NOTES SEE SHEET B-20.11.
2. DOWELING: DOWEL HOLES SHALL BE DRILLED 12" 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 EPOXIED INTO CLEAN HOLES. EPOXY SHALL CONFORM TO THE REQUIREMENT OF SECTION 728 OF THE STANDARD SPECIFICATIONS.

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

METHOD OF EXTENDING R.C.B. CULVERTS
HP PILE POINT ATTACHMENT NOTES:
1. HP PILE POINT ATTACHMENTS ARE REQUIRED ONLY WHEN SHOWN ON THE PLANS OR IN THE SPECIAL PROVISIONS.
2. THE PILE POINT CONFIGURATION SHALL BE AS SHOWN ON PLANS.
3. PILE POINT ATTACHMENTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325 GRACE 65-35 UNLESS NOTED OTHERWISE.
4. WELDS FOR ATTACHMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

TYPICAL HP PILE POINT DETAIL

COMPLETE GROOVE PENETRATION WELD (SEE WELDING DETAILS FOR APPROVED WELD)

HP PILE SPlice DETAIL

PILE SPlice NOTES:
1. PILE SPlice WELDS SHALL CONFORM TO ANSI 01.1.
2. PILE MUST BE STOPPED AT LEAST 3'-0" ABOVE GROUND PRIOR TO SPlicing.

SINGLE VEE-GROOVE BUTT WELD

PERMITTED FOR ALL POSITIONS

SINGLE BEVEL-GROOVE BUTT WELD

PERMITTED IN HORIZONTAL POSITION ONLY

PILE SPlice WELDING DETAILS
GENERAL NOTES:
1. RAILING ASSEMBLY EXCEPT CHAIN LINK FABRIC, TO BE GALVANIZED AFTER FABRICATION.
2. RAILING SHALL CONFORM TO HORIZONTAL AND VERTICAL ALIGNMENTS. POSTS SHALL BE VERTICAL. TOP, INTERMEDIATE AND BOTTOM PIPES SHALL BE BENT IF THE RADIUS IS 150° OR LESS. MAY BE ON 8° CHORDS IF RADIUS IS OVER 150°.
3. SPACE POSTS TO CLEAR EXPANSION JOINTS JOINTS BY 6° MIN. TO CENTERLINE POSTS.
4. ALL EXPOSED CORNERS TO BE SMOOTH.
5. SCREW ALL 3/8 BOLTS.
6. WHEN FENCE IS ON SLOPE THE 10'-0" FABRIC SHALL BE PLACED PARALLEL TO THE SLOPE.
7. ALTERNATIVE DETAILS MAY BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEERS APPROVAL.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
PEDESTRIAN RAIL
TYPE "M"

ANCHORAGE DETAILS

BASE PLATE
END REDWOOD STRIPS AT TOP OF RADIAL SECTION WHEN THEIR
INTERMEDIATE DISTANCE FROM EACH OTHER REACHES THREE (3') FEET.

NOTES:
1. SLOPE PAVING IS TO BE DIVIDED INTO EQUALLY SPACED
   PANELS. THE WIDTH OF EACH PANEL IS TO BE AS NEARLY 10'
   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

Concrete Slope Paving

SECTION F-F

SECTION A-A
(WITH SIDEWALK)

SECTION A-A
(WITH DITCH)

SECTION B-B
(AT PIER)

SECTION A-A
(Toe Of Slope)

SECTION C-C
(AT ABUTMENT)

SECTION D-D
(AT WINGWALL)

SECTION E-E
(EDGE OF SLOPE)

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CONCRETE SLOPE
PAVING DETAILS

Signed Original On File

6/28/03
DISTRIBUTION OF PRESTRESSING FORCE:
UNLESS OTHERWISE NOTED THE PRESTRESSING FORCE, P, JUMP OR PI, SHALL BE DISTRIBUTED WITH AN APPROXIMATELY EQUAL AMOUNT IN EACH GIRDER AND SHALL BE PLACED SYMMETRICAL ABOUT THE CENTERLINE OF THE STRUCTURE. IN SLABS, THE PRESTRESSING FORCE SHALL BE UNIFORMLY DISTRIBUTED ACROSS THE SLAB.

STRESSING SEQUENCE:
NO MORE THAN 1/2 OF THE PRESTRESSING FORCE IN ANY GIRDER MAY BE STRESSED BEFORE AN EQUAL FORCE IN STRESSES IN THE ADJACENT GIRDER. AT NO TIME DURING THE STRESSING OPERATIONS WILL MORE THAN 1/4 OF THE TOTAL PRESTRESSING FORCE BE APPLIED SYMMETRICALLY ABOUT THE CENTERLINE OF THE STRUCTURE. GIRDER STEM SHALL BE PLACED NEAR ANCHORAGE TO PROVIDE A MINIMUM OF 1 1/2" CONCRETE COVERING THE PEANUT FLARE MAY BE ON ONE SIDE OF THE GIRDER ONLY. BARS INTERFERING WITH THE PRESTRESSING TENDON ALIGNMENT SHALL BE ADJUSTED AS APPROVED BY THE ENGINEER.

X X BARS MARKED THEO ARE TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.
X X CONCRETE USED IN THE BEARING SEATS IS TO BE INCLUDED IN THE COST OF PRESTRESSING CAST-IN-PLACE CONCRETE.

X X ADDITIONAL 4" STIRRUP BARS, IN PAIRS, AS NECESSARY TO MAINTAIN A 12 INCH STIRRUP SPACING. SEE PLANS FOR STIRRUP BONDING DIMENSIONS AND EPOXY COATING REQUIREMENTS. ADDITIONAL 4" STIRRUP BARS TO BE INCLUDED IN COST OF PRESTRESSING.

CLEARANCE REQUIREMENTS FOR DUCTS:
1. DUCT PATTERNS SHOWN ARE FOR 12" WIDE GIRDER 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.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CAST-IN-PLACE PRESTRESSED GIRDER DETAILS

SIGNATURE BLOCK: [Signature]
DATE: [Date]
[Stamp]
[Stamp]
GENERAL NOTES:

1. The concrete shall be "C30, F14500 psi" or "C30, F14000 psi" as indicated in the plans. When "C30 concrete is required, the reinforcing steel shall be in contact with the concrete.

2. A. The contact joint between the concrete pavement and the approach slab shall be parallel. The back face of the structure for slopes of 20 degrees or less for slopes greater than 20 degrees, the contact joint shall be normal to the roadway alignment control line. Joints shall be staggered on lane lines for staggered structures. Staggered lines shall be at each lane line for slopes of 45 degrees or more.

B. The contact joint between the concrete pavement and approach slab shall be parallel. The back face of the structure.

3. For slopes greater than 20 degrees, the distance measured normal to and from the back face of the structure to the end of the approach slab shall be a minimum of 12 feet.

4. Longitudinal construction joints in the approach slab may be located on lane lines when permitted by the engineer.

5. Place 1/4" expansion joint material between the concrete pavement and the longitudinal face of the approach slab. The expansion joint material is to be properly sealed to the surface of the slab. The joint is to be sealed to the surface of the slab. The joint is to be sealed to the surface of the slab. The joint is to be sealed to the surface of the slab.

6. The length of the steps must be 12"-0" minimum to 15"-0" maximum slab and curb. Intervening 12"-0" min. to 30"-0" max. to maintain a 12"-0" minimum to 15"-0" maximum spacing of the transverse approach slab joints in the concrete pavement. See section 125-03-09 of the Special Provisions and Sheet R-76 of the Standard Plans for saw-cutting details.

7. Complete full material under approach slab to not less than ninety-five (95) percent of the maximum density. See section 125-03-11 of the Standard Specifications for Special Provisions for specific test methods.

8. See plans for expansion joint details.

9. See plans for expansion joint details.

SECTION A-A

(A) When the approach slab extends beyond the mainlane, extend the expanded polystyrene 2 inches beyond the mainlane end. Adjust the approach slab to its full depth, and eliminate the 3000 bars.

SECTION B-B

(A) When the approach slab extends beyond the mainlane, extend the expanded polystyrene 2 inches beyond the mainlane end. Adjust the approach slab to its full depth, and eliminate the 3000 bars.

BENT BARS

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

APPROACH SLAB

SIGNAGE DEPTH 51/2" 2 3/8" 1 1/2" 1 1/4"

APPENDIX B - C & S-37-33
## Reinforced Concrete Retaining Wall Types 1A & 1B

### Standard Deflection

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### Table of Dimensions and Reinforcing Steel

#### Type 1A - Reinforced Concrete Retaining Wall

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#### Typical Section

TYPICAL SECTION

NOTES:
1. For General Notes see B-30.1.3
2. For details not shown and drainage requirements see sheets B-30.1.3 thru B-32.1.3
3. Roughen construction joint surface to 1/4" amplitude.
4. NDOT Construction Section will verify minimum allowable bearing pressures for actual sub-condition.

### State of Nevada Department of Transportation

**Types 1A & 1B**

Cantilever Concrete Retaining Walls

**Structural Design:** B-30.1.3

**Construction:** B-30.1.3 thru B-32.1.3

**Roughness:** Construction joint surface to 1/4" amplitude.

**NOTICE:** NDOT Construction Section will verify minimum allowable bearing pressures for actual sub-condition.
REINFORCED CONCRETE RETAINING WALL TYPE 2

Wall Type Required for Seismic Acceleration

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* Special design required

STANDARD BAR LAPS

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TYPE 2 - REINFORCED CONCRETE RETAINING WALL
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Material:

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TYPICAL SECTION

NOTES:
1. For General Notes see B-30.1.1.3
2. For details not shown and drainage requirements see sheets B-30.1.2 thru B-30.1.5.
3. Roughened construction joint to 1/4" amplitude.
4. NUDI. Geotechnical section will verify maximum allowable bearing pressures for actual site conditions.
WALL EXPANSION JOINTS AND WEAKENED PLANES

1. 4" dia. drain at 20' maximum center to center. Drains shall be located 3' above baseline.
2. 2 cubic feet of Type 2 Drain Rock. Drain rock shall be placed in geotextile fabric securely tied. Geotextile shall meet the following:
   a) Meet at least Class 2 strength requirement per AASHTO Web Method.
   b) Have an AOS not greater than 0.6. See Table No. 40.
   c) Have a permeability of at least 0.5, sec-1. Amoco 2016, National Weather 200 and Geotex 65 meet the above requirements.
3. 6" square aluminum or galvanized steel wire mesh "hardware cloth" (minimum wire diameter 0.027")

PLAN OF WALL WITH EXPANSION JOINT ONLY

PLAN OF WALL WITH EXPANSION JOINT AND WATERSTOP

WATERSTOP NOTES:
Holes will be permitted in the outer 1/8" of the web for wire, rings, etc. Tie web to #3 reinforcing bars @ 18"
minute maximum intervals to support the waterstop in proper position during concrete placement. Alternate detail:
may be submitted for approval of the engineer.
Waterstop to have 5 or more pairs of threaded ribs to provide 0.1 square inches minimum net cross section:area on each half of the waterstop.

WATERSTOP

WEAKENED PLANES

SECTION DETAIL A

DETAIL C

WEEP HOLE NOTES:
1. 4" dia. drain at 20' maximum center to center.
2. Drains shall be located 3' above baseline.
3. 2 cubic feet of Type 2 Drain Rock. Drain rock shall be placed in geotextile fabric securely tied. Geotextile shall meet the following:
   a) Meet at least Class 2 strength requirement per AASHTO Web Method.
   b) Have an AOS not greater than 0.6. See Table No. 40.
   c) Have a permeability of at least 0.5, sec-1. Amoco 2016, National Weather 200 and Geotex 65 meet the above requirements.

[Diagram showing wall expansion joints and weakened planes with waterstop details]
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