1. Use the number and size of supports shown on the support chart in project plans.
2. Fabricate sign panel sections with sheets 4'-0" wide. When fabricating signs which are not multiples of 4'-0" in width, do not cut more than two sheets to less than 4'-0" in width. These panels shall not be less than 1'-0" in width. See NCDOT standard specifications for roads and structures, for type of material to be used for sign panels, hanger assemblies, and supports.
3. See NCDOT standard specifications for roads and structures, for type of material to be used for sign panels, hanger assemblies, and supports.
4. Use galvanized steel for backing plates and mounting bolts.
5. See roadway standard 904.20 when type "B" secondary sign mounting is required.
6. Details for type "A" secondary signs shall be the same as for type "A" signs.
7. The vertical dimension between primary and secondary signs is two (2) inches.
8. Adjust stiffeners to avoid conflict with supports.
9. See roadway standard 901.70 for support and "Z" bar spacing.
10. Fabricate signs taller than 12'-0" as two separate signs with a horizontal splice. Locate stringers on each section of the sign by the sign stringer chart. (See roadway standard 901.70)
11. Fabricate signs taller than 12'-0" but shorter than 14'-6" with a horizontal splice located 7'-0" from bottom of sign.
12. Fabricate signs 14'-6" tall and taller with a horizontal splice. Locate the splice at least half of the sign height from the bottom and at least 7'-0" from the top.
13. There shall only be a ½" gap between the vertical backing strip and the "Z" bar.
14. See roadway standard 901.80 for details showing sign mounting to supports.
15. Place nylon washer under head of 3" thru bolts.
16. Fabricate each sign with 3" dia. thru bolt, 4" from each end of each "Z" bar thru sign panel and "Z" bar. See details A & C.
17. Fabricate each sign with 3" dia. thru bolt centered in each panel thru the top and bottom "Z" bar. Center thru bolt required in end panels greater than 2'-0" wide. See details A & C.
18. Thru bolts will have a minimum ½" to maximum 3" gap.
Section A-A

- **Minimum 3/8" Maximum 3/8" Gap**
- (1) 3/8" DIA. BOLT WITH
  (1) NYLON WASHER 3/8" I.D., 3/8" O.D., 3/16" THICK
  3/16" Sign Face
- "2" Bar

**Detail A**

Thru-Bolt Connection

- (1) Flat Washer
- (1) 3/8"-16 NYLON INSERT LOCK NUT
- 3/16" Dia. Hole

**Section B-B**

- 1/2" WELDED STUD
- "2" Bar
- 3/8"Dia. Thru Bolt (See Note 16)

**Detail B**

Typical Horiz. Joint Hole Pattern

- 5 BOLTS PER PANEL MAX., (2 BOLTS PER PANEL, SEE NOTE 16)

**Detail C**

Thru-Bolt Locations

- 8" W
- O.H. Sign End Panel
- 6" W/2
- O.H. Sign Int. Panel
- 2 1/2" Width

**Detail D**

Backing Strip Hole Pattern

- "Z" Bar Location, TYP
  (6 Bolts per panel, See Note 16)
- Center Bolt Required for End Panels Greater Than 2'-0" in Width

- 5 BOLTS PER PANEL MAX., (2 BOLTS PER PANEL, SEE NOTE 16)

- "Z" Bar Location, TYP
  (6 Bolts per panel, See Note 16)
- Center Bolt Required for End Panels Greater Than 2'-0" in Width
TYPE `B' SIGNS

WELDED STUD CONSTRUCTION

RALEIGH, N.C.
DIVISION OF HIGHWAYS
DEPT. OF TRANSPORTATION
NORTH CAROLINA
STATE OF

SHEET OF

ALUMINUM STIFFENER BAR
1" X …" ALUMINUM STIFFENER BAR

1. See Roadway Standard 901.70 for support and "Z" bar spacing.
2. Project Plan Sheets.
3. Use number and size of supports shown on support chart in See NCDOT Standard Specifications for Roads and Structures for the type of material to be used for Sign Panels, Hanger Assemblies and Supports.
4. Furnish all mounting hardware.
5. Use galvanized steel for backing plates and mounting bolts.
6. The vertical dimension between primary and secondary signs is two (2) inches.
7. Adjust stiffeners to avoid conflict with supports.
8. Fabricate each sign with a 3g" dia. bolt 4" from each end of each "Z" bar thru sign panel and "Z" bar.
9. See Roadway Standard 901.70 for support and "Z" bar spacing.
10. See Roadway Standard 901.80 for details showing sign mounting to supports.
11. Place nylon washer under head of 3g" thru bolt.
12. Thru bolts will have a minimum ½g" to maximum 3g" gap.

NOTES:

SECTION A-A
STIFFENER DETAIL

SECTION B-B

See Detail A
See Detail B

1'-0" typ.
1'-0"
3g" dia. thru bolt

NOTE # 7
…'' dia. thru bolt
3g" dia. hole

NOTE # 7
3g" dia. hole

1.00"
1.00"

3g" dia. hole
1.00"

1.00"

3g" dia. hole
1.00"

1.00"

1.00" x 3g" aluminum stiffener bar
1.00" x 2g" x 1.00" x 2.33 lb/ft

ALUM. "Z" Bar Support

NOTE # 6
(See Note 6)

NOTE # 6
(See Note 6)

1.50" THICK

3g" dia. hole

1.50" THICK

3g" dia. hole

1.50" THICK

1.50" THICK

1.50" THICK

1.50" THICK

1.50" THICK
ARROWS AND SHIELDS

INTERSTATE TYPE "A" ARROW

INTERSTATE TYPE "B" ARROW

DETAIL OF INTERSTATE ARROW

LETTER SIZE (upper-case)

Arrow Dimensions in Inches

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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15 CAPS 20 UC 22.57 17 .530 1.75 25 1.10 6.19

DETAIL OF DIAGONAL INTERSTATE ARROWS

INTERSTATE TYPE "A" ARROW

INTERSTATE TYPE "B" ARROW

LETTER SIZE (upper-case)

Arrow Dimensions in Inches

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<tr>
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<th>D</th>
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15 CAPS 20 U.C. 22.57 17 .530 1.75 25 1.10 6.19

DETAIL OF TYPE "C" ARROW

INTERSTATE TYPE "A" ARROW

INTERSTATE TYPE "B" ARROW

LETTER SIZE (upper-case)

Arrow Dimensions in Inches

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15 CAPS 20 U.C. 22.57 17 .530 1.75 25 1.10 6.19

DETAIL OF TYPE "C" ARROW

TYPE "C" ARROWS

Arrow Dimensions in Inches

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<tr>
<th>ARROW SIZE</th>
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<th>D</th>
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RIVET SPACING FOR OVERLAYED SIGNS

IF OVERLAYING SIGN OVERLAPS SIGN ON TOP ONLY
DETAIL NO. 1

IF OVERLAYING SIGN OVERLAPS SIGN ON TOP AND SIDES
DETAIL NO. 2

IF OVERLAYING SIGN OVERLAPS SIGN ON TWO SIDES
DETAIL NO. 3

IF OVERLAYING SIGN OVERLAPS SIGN ON ONE SIDE
DETAIL NO. 4

IF OVERLAYING SIGN OVERLAPS SIGN ON TOP AND ONE SIDE
DETAIL NO. 5

TYPICAL RIVET SPACING FOR OVERLAY SIGNS
DETAIL NO. 6

IF EXISTING SIGN OVERLAPS OVERLAYING SIGN
DETAIL NO. 7

NOTES:

1. A COMPLETE OVERLAY OF AN EXISTING O.H. SIGN IS NOT PERMISSIBLE

OVERLAPPING EXISTING SIGN IS TO BE TRIMMED FLUSH TO OVERLAYING SIGN

NOT TO BE USED ON OVERHEAD SIGNS

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR OVERLAY SIGNS

901.60

SHEET 1 OF 1

RALEIGH, N.C.
SUPPORT SPACING
SIGN STRINGERS AND
901.70

NOTES:
1. FABRICATE SIGNS TALLER THAN 12'-0" AS TWO SEPARATE SIGNS WITH A HORIZONTAL SPLICE.
2. FABRICATE SIGNS TALLER THAN 12'-0" BUT SHORTER THAN 14'-6" WITH A HORIZONTAL SPLICE LOCATED 7'-0" FROM BOTTOM OF SIGN.
3. FABRICATE SIGNS TALLER THAN 14'-6" WITH A HORIZONTAL SPLICE. LOCATE THE SPLICE AT LEAST HALF THE SIGN HEIGHT FROM THE BOTTOM AND AT LEAST 7'-0" FROM THE TOP.
4. SUPPORT SPACING NOT APPLICABLE TO OVERHEAD SIGNS.

SECTION HEIGHTS FOR SIGNS TALLER THAN 12'-0"

<table>
<thead>
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<th>BOTTOM SECTION</th>
<th>HEIGHT</th>
<th>BOTTOM SECTION</th>
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<td>19' - 6&quot;</td>
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<tr>
<td>15' - 6&quot;</td>
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<td>20' - 6&quot;</td>
<td>10' - 0&quot;</td>
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<td>16' - 6&quot;</td>
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<td>17' - 6&quot;</td>
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<td>18' - 6&quot;</td>
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<td>19' - 6&quot;</td>
<td>9' - 6&quot;</td>
<td>24' - 0&quot;</td>
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NUMBER OF STRINGERS REQUIRED
0.080 AND 0.125 FACE SIGNS

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<th>NUMBER OF STRINGERS</th>
<th>MAXIMUM SIGN HEIGHT</th>
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<td>0.080 FACE</td>
<td>0.125 FACE</td>
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| 2 | 4' 0" | 7' 0"
| 3 | 7' 0" | 12' 0"
| 4 | 10' 0" | 14' 0"
| 5 | 12' 0" | 14' 6"
| 6 | 14' 0" | 24' 0"
<p>| 7 | 17' 0&quot; | |
| 8 | 20' 0&quot; | |
| 9 | 22' 0&quot; | |
| 10 | 24' 0&quot; | |</p>
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<th>Δ 3 Supports</th>
<th>Δ 4 Supports</th>
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<td>3 - 7.5 10.3</td>
<td>2 - 6.5 6.2 4.8</td>
</tr>
</tbody>
</table>

VALUES HAVE BEEN ROUNDED TO NEAREST 1/8 INCH.

* THESE VALUES HAVE BEEN ADJUSTED TO BALANCE SPACING.

# MAXIMUM WIDTH FOR 2 SUPPORTS. 2ND SQ. FT. MAX. AREA FOR 2 SUPPORTS.

Δ SUPPORTS SPACING NOT APPLICABLE TO OVERHEAD SIGNS.
NOTES:

1. THE SUPPORT MOUNTING DETAIL SHOWS A "W" OR "S" BEAM. THIS DETAIL IS ALSO USED FOR MOUNTING SIGNS TO WOOD OR SQUARE TUBE SUPPORTS.
2. USE A36 STEEL FOR BACKING PLATES GALVANIZED IN ACCORDANCE WITH ASTM A123.
3. SEE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR TYPE OF MATERIAL TO BE USED FOR SIGN HANGER ASSEMBLIES AND SUPPORTS.
4. USE GALVANIZED STEEL FOR MOUNTING BOLTS AND THREADED RODS IN COMPLIANCE WITH ASTM A307 AND ASTM F2329.
GROUND MOUNTED SIGN SUPPORTS

ROADWAY STANDARD DRAWING FOR

STATE OF

NORTH CAROLINA

DEPT. OF TRANSPORTATION

DIVISION OF HIGHWAYS

RALEIGH, N.C.

9603.00

1-18
NOTES:

1. DESIGN CONFORMS WITH THE SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS - AASHTO.
2. USE MATERIALS, FABRICATE AND ERECT SIGNS AND SUPPORTS THAT CONFORM TO THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
3. USE HIGH STRENGTH BOLTS, NUTS AND WASHERS THAT CONFORM TO ASTM A-325 AND THAT ARE GALVANIZED IN ACCORDANCE WITH ASTM F2329 OR B695 CLASS 55.
4. USE BACKING PLATES, SLIP BASE PLATES, FRICTION PLATES, AND HINGE PLATES THAT CONFORM TO ASTM A-36 AND THAT ARE GALVANIZED IN ACCORDANCE WITH ASTM A-123 PRIOR TO GALVANIZING, GRIND SMOOTH ANY METAL PROJECTION BEYOND THE PLATE FACE. KEEPER PLATES SHALL BE MANUFACTURED FROM 28 GAUGE SHEET STEEL THAT CONFORMS TO ASTM A-36 AND IS GALVANIZED IN ACCORDANCE WITH ASTM A-123.
5. ASSEMBLE HINGE CONNECTIONS IN THE SHOP. THE SHOP SHALL TIGHTEN BOLTS BY USE OF EITHER A CALIBRATED POWER WRENCH OR A MANUAL TORQUE WRENCH. TIGHTEN EACH HINGE CONNECTION BOLT TO 1/3 PAST SNUG.
6. BASE PLATES DETAILS ARE FOR INSTALLATIONS ON THE RIGHT SHOULDER AND IN GORE AREAS.
7. ASSEMBLE UPPER SUPPORT TO STUB AS SHOWN IN DETAIL. SLIP BASE PLATES SHALL BE FILLET WELDED ONTO POSTS ALL AROUND THE STRUCTURAL SHAPE SO AS TO INSURE NO LOSS OF STRENGTH. ASSEMBLE IN EITHER SHOP OR FIELD. 28 GAUGE KEEPER PLATE IS PLACED BETWEEN SLIP BASE PLATES TO PREVENT BOLT SLIPPING. TIGHTEN BOLTS TO THE FOLLOWING PRESCRIBED TORQUE:

<table>
<thead>
<tr>
<th>BOLT DIAMETER</th>
<th>TORQUE (LB. FT.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;</td>
<td>9</td>
</tr>
<tr>
<td>5/32&quot;</td>
<td>22</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>37</td>
</tr>
<tr>
<td>1&quot;</td>
<td>48</td>
</tr>
</tbody>
</table>

COMPLETELY ASSEMBLE B/A POSTS PRIOR TO ERECTION. B/A POST TO BE SET IN ONE PIECE. AFTER SUPPORT HAS BEEN ERECTED AND THE CONCRETE FOOTINGS HAS CURED AT LEAST 48 HRS., CLEAN CONCRETE FROM BASE CONNECTION BOLTS THEN LOOSEN AND RE TIGHTEN EACH BOLT IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE. DO NOT OVER TIGHTEN. BURR ALL BOLT THREADS OF BASE CONNECTIONS TO PREVENT LOOSENING.
8. USE REINFORCED FOOTINGS WITH DIMENSIONS AS SHOWN IN PLANS. WHERE SOLID ROCK IS ENCOUNTERED, THE ENGINEER DIRECTS WHETHER TO PLACE THE FOOTING AT THE PRESCRIBED DEPTH OR EXTEND IT AT LEAST TWO FEET INTO THE ROCK. CONSTRUCT ALL FOOTINGS OF CLASS A CONCRETE.
9. FORM TOP 6" OF FOOTINGS. ENGINEER APPROVES THE METHOD USED.
10. THE FINAL FLAT TURN OF SPIRAL OR HOOPS NO. 3 OR LARGER PLACED 3" FROM TOP AND BOTTOM OF FOOTING MAY BE WELDED TO VERTICAL REINFORCING BARS. NO OTHER WELDING WILL BE PERMITTED.
11. ELIMINATE HINGE CONNECTION FOR ALL SINGLE SUPPORT SIGNS.
12. DETAIL IS FOR ONE DIRECTION BREAKAWAY. WHEN PLANS REQUIRE A TWO DIRECTION BREAKAWAY, TWO FRICTION PLATES SHALL BE USED IN LIEU OF ONE FRICTION PLATE AND ONE HINGE PLATE.
13. SHAPE THE TOPS OF THE FOOTINGS TO CONFORM WITH FINISHED GROUND ELEVATIONS SUCH THAT WATER WILL NOT COLLECT AGAINST THE SUPPORTS.
14. IF THE GROUNDWATER IS ENCOUNTERED AT AN DEPTH SHALLOWER THAN 7 FEET, THE SIGN FOUNDATION MUST BE REDESIGNED BASED UPON THE ACTUAL FIELD CONDITIONS. THE FOUNDATION DESIGN DOES NOT APPLY TO VERY SOFT OR LOOSE SOIL, MUCK, WEATHERED ROCK, OR HARD ROCK.
NOTES:
1. USE THE SIZE, NUMBER, LENGTH AND TYPE OF SUPPORTS SHOWN IN THE PLANS. USE WOOD POSTS THAT CONFORM TO SECTIONS 1082-2 AND 1082-3 OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
2. MOUNT ALL WOOD POSTS THAT DO NOT HAVE DRILLED HOLES BEHIND GUARDRAIL, EXCEPT THE 4' x 4' WOOD POSTS.
3. FOR WOOD POSTS, DRILL THE BOTTOM HOLE 4" ABOVE THE GROUND AND THE TOP HOLE 18" ABOVE THE GROUND (SEE DETAIL "B"). SEE CHART FOR POST SIZES AND DRILLED HOLE SIZES. DRILL HOLES PERPENDICULAR TO THE DIRECTION OF TRAVEL. DUAL SUPPORTS MUST BE AT LEAST 7 FEET APART.
4. LOCATE ALL WOOD POSTS THAT ARE 8" X 8" EITHER BEHIND GUARDRAIL OR LOCATED SO THAT THE POSTS COULD NOT BE HIT BY TRAFFIC.
5. FURNISH ALL MOUNTING HARDWARE.
6. USE GALVANIZED STEEL BACKING PLATES AND MOUNTING BOLTS.
7. ADJUST STIFFENERS TO AVOID CONFLICTS WITH SUPPORTS.
8. DRILL HOLES IN THE CENTER OF THE SUPPORTS.
9. IF SIGN ASSEMBLIES REQUIRE MORE THAN TWO WOOD SUPPORTS, THE SUPPORTS SHALL BE PLACED A MINIMUM OF 4 FT. BETWEEN POSTS. NO MORE THAN TWO POSTS SHALL FALL WITHIN 7 FT. PATH, OR THE SIGN ASSEMBLY MUST BE PLACED BEHIND BARRIER PROTECTION.
### Mounting of Type 'D', 'E', and 'F' Signs on Wood Posts

**ATTACHMENT METHODS**

**POST SIZE AND DRILLED HOLE SIZE**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>HOLE SIZE</th>
<th>EMBEDMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0''</td>
<td>4.0''</td>
<td>N/A</td>
<td>3.5 FT.</td>
</tr>
<tr>
<td>4.0''</td>
<td>6.0''</td>
<td>1.5''</td>
<td>4.5 FT.</td>
</tr>
</tbody>
</table>

---

**NOTES:**

1. **4" X 4"** Wood posts are acceptable undrilled, and can be used at any location without guardrail protection.
2. **4" X 6"** Wood posts must be used with guardrail protection or drilled to make them breakaway. (Drilled with 1 1/2" holes, perpendicular to the direction of travel, located 4" and 18" above the ground)
3. Use **"U"** Channel posts for cross-bracing signs supported by dual wood posts.

**WOOD POST WIDTH PLUS 2 1/2"**

**WOOD SUPPORT**

**WASHER**

**LOCK WASHER**

**NUT**

**"U" CHANNEL CROSS -BRACING**

**ALUMINUM SHIMS (3 1/2" x 3 1/2" x 1/8")**

(FOR TYPE "D", "E" and "F" SIGNS)
NOTES:

1. MAXIMUM SIGN SIZE IS 9.0 SQUARE FEET IN MAXIMUM WIND VELOCITY OF 80 MPH.

2. ERECT TYPE "E" AND "F" SIGNS WITH THE SAME SPECIFICATIONS AS "TYPICAL INSTALLATION OF SIGNS MOUNTED ON "U" CHANNEL POSTS.

3. ERECT MILE MARKERS WITH THE SAME SPECIFICATIONS AS "MILEPOST DETAILS AND PLACEMENT". SEE ROADWAY STANDARD NUMBER 904.40.

4. APPLICABLE SECTIONS OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SHALL BE IN EFFECT.

5. ATTACH THE BRACE TO THE BARRIER BY MEANS OF 1/2" DIAMETER, 2" LONG CONCRETE ANCHORS WITH LOCK WASHERS. USE CONCRETE ANCHORS THAT ARE STAINLESS STEEL OR GALVANIZED IN ACCORDANCE WITH ASTM A-152. INSTALL IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATIONS.
ALUMINUM SHIM DETAIL

NOTE:
1. FURNISH ONE SET OF SIGN SUPPORTS FOR EACH SIGN.
2. SEE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SIGN SPECIFICATION SUPPLEMENT FOR THE TYPE OF MATERIAL TO BE USED FOR SIGN SUPPORTS.
3. FURNISH ALL MOUNTING HARDWARE.
4. THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION WILL FURNISH SIGNS.
6. USE ASTM A-36 ANCHOR BOLTS, GALVANIZED IN ACCORDANCE WITH ASTM A-153. OVERALL LENGTH OF ANCHOR BOLTS IS 27". ANCHOR BOLT PROJECTION, EMBEDMENT, AND HOOK TO BE AS SHOWN ON PLANS.
   OR
   USE 3/8" x 7-5/8" DRILLED ADHESIVE ANCHOR GALVANIZED TO ASTM A-153. EACH ANCHOR SHALL BE PROVIDED WITH TWO (2) NUTS, ONE (1) FLAT WASHER, AND ONE (1) LOCK WASHER.
DETAIL "A"

FURNISH ALL TUBE OR PIPE SUPPORTS WITH A CAP. USE EITHER GALVANIZED STEEL OR A CAST ALUMINUM CAP TO MATCH THE MATERIAL OF THE POLE. USE FOUR SET SCREWS FOR ATTACHMENT TO SUPPORT.

DETAIL "B"

CONCRETE MEDIAN BARRIER

5/8" x 201/2" x 61/2" HOOKED, ANCHOR BOLT (27" OVERALL LENGTH) WITH 4" THREADED END. (TYPICAL)

CONCRETE MEDIAN BARRIER SCREEN (WHERE APPLICABLE)

CONCRETE GLARE SCREEN

WITH ANCHOR BOLT DETAIL

SHEET 2 OF 2
903.40

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

MEDIAN BARRIER SIGN SUPPORT AND ANCHORAGE

ROADWAY STANDARD DRAWING FOR

1-18

903.40
ORIENTATION OF GROUND MOUNTED SIGNS

X = (60 FT. PER IN.) (HEIGHT OF LOWER CASE LETTER IN INCHES)
IF SIGN HAS NO LOWER CASE LETTERS, USE HEIGHT OF
UPPER CASE OR CAPITAL LETTERS IN MAJOR LINE OF COPY.

LINE OF SIGHT

X

LINE OF SIGHT
**ATTACHMENT METHOD ONE RIGHT (1-R) OR ONE LEFT (1-L)**

(EXIT PANEL OR OTHER SECONDARY SIGN ATTACHED TO VERTICAL Z SUPPORTS)

**SECTION "A-A"**

**ATTACHMENT METHOD TWO (II)**

(EXIT PANEL OR OTHER SECONDARY SIGN ATTACHED TO PRIMARY SIGN SUPPORTS)

**SECTION "B-B"**

**NOTES:**

1. FABRICATE VERTICAL AND HORIZONTAL Z'S OF ALUM.
2. ATTACH VERTICAL Z SUPPORT TO TOP TWO HORIZONTAL STRINGERS ON BACK OF PRIMARY SIGN.
3. DO NOT PERMIT SLOTS IN HORIZONTAL STRINGERS FOR ATTACHMENT OF VERTICAL Z SUPPORTS.
SECTION "A-A"

Z STRINGERS
SIGN SUPPORTS
PRIMARY SIGN

HINGE CONNECTION
SEE ROADWAY STD. DWG 903.10

SECTION "B-B"

MOUNTING METHOD I

SIGN SUPPORTS
primary sign

See detail "B" see note 2

SECTION "A-A"

HORIZONTAL Z STRINGER
VERTICAL Z SUPPORT

DETAIL "A"

Connection of Horizontal Z stringer and Vertical Z support.

Back-up plate. See detail "C".

DETAIL "B"

Connection of Horizontal Z stringer.

MOUNTING METHOD II

SIGN SUPPORTS
primary sign

See detail "B", see note 2

NOTES:

1. Fabricate Vertical and Horizontal "Z"'s.
2. Attach Vertical "Z" support to bottom two horizontal stringers on back of primary sign.
3. Slots are not allowed in horizontal stringers for attachment of vertical "Z" supports.
4. The hinge connection is located at the bottom of the supplemental panel for breakaway supports.

DETAIL "C"

BACKING PLATE

6" x 1½" SLOTS REGD. IN HORIZONTAL Z STRINGER

HORIZONTAL Z STRINGER

3½" X 1½" SLOTS REGD. IN HORIZONTAL Z STRINGER

9½" DIA. HEX. BOLT WITH STD. PLAIN FLAT WASHERS, LOCK WASHER AND HEX. NUT.

3½" DIA. HEX. BOLT WITH STD. PLAIN FLAT WASHERS, LOCK WASHER AND HEX. NUT.

SUPPLEMENTAL PANEL

SUPPLEMENTAL SIGN

VAR.

6" X 1½" SLOTS REGD. IN HORIZONTAL Z STRINGER

6" X 1½" SLOTS REGD. IN HORIZONTAL Z STRINGER

BACKING PLATE.

3½" DIA. HEX. BOLT WITH STD. PLAIN FLAT WASHERS, LOCK WASHER AND HEX. NUT.
MILEPOST PLACEMENT

ROADWAY WITH CURB

ROADWAY WITH PAVED SHOULDER

POST DETAILS

2-LB U-CHANNEL

3-LB U-CHANNEL

FASTENER

NOTE:

1. A MILEPOST SIGN SHALL CONSIST OF ONE (1) 12" X 24", 12" X 36", OR 12" X 48" SIGN PANEL. AN ENHANCED REFERENCE LOCATION SIGN SHALL CONSIST OF ONE (1) 18" X 54" SIGN PANEL. AN INTERMEDIATE ENHANCED REFERENCE LOCATION SIGN SHALL CONSIST OF ONE (1) 18" X 60" SIGN PANEL.

2. FABRICATE SIGNS FROM .080" SHEET ALUMINUM. EACH SIGN SHALL HAVE WHITE STUCK-ON MESSAGE AND BORDER ON GREEN BACKGROUND. MESSAGE, BORDER AND BACKGROUND TO BE REFLECTORIZED.

3. MILEPOST LOCATION SIGNS REQUIRE ONE (1) 2-LB GALVANIZED STEEL U-CHANNEL POST AND ENHANCED REFERENCE LOCATION SIGNS REQUIRE ONE (1) 3-LB GALVANIZED STEEL U-CHANNEL POST. THE POST'S LENGTH MUST MEET THE REQUIREMENTS SHOWN IN THESE STANDARDS.

4. POSTS SHALL BE DRIVEN. THE TOP OF POST SHALL NOT PROJECT ABOVE THE TOP OF SIGN.

5. ATTACH EACH SIGN TO THE WIDE FACE (FLANGES) OF THE POST BY MEANS OF THE FOLLOWING COMBINATION- 5/16" HEX HEAD BOLT, NYLON WASHER, SHIM, FLAT WASHER, LOCK WASHER, HEX NUT. FULL CONTACT BETWEEN THE SIGN AND THE POST SHALL BE ACHIEVED. NO BUCKLING OF THE SIGN WILL BE PERMITTED.

6. PLACE MILEPOST SIGNS AT THE SHOULDER POINT UNLESS THE ENGINEER DIRECTS OTHERWISE.
Framing and Cross-Bracing Details

Type "F" Signs

Typical Sign Shapes and Combinations

Type "E" Signs

Type "D" Sign

For combination Type "D" & "F" Signs

1. ERECT TYPE "D", "E", AND "F" SIGNS ON FREEWAYS WITH THE NEAR EDGE OF THE SIGN 20 FT. FROM THE TRAVEL LANE. ERECT ALL OTHER "D", "E", AND "F" SIGNS WITH THE NEAR EDGE OF THE SIGN AT 7 FT. MINIMUM CLEARANCE FROM THE EDGE OF TRAVEL LANE, OR AS DIMENSIONED ON PLAN SHEETS.

2. ERECT TYPE "D", "E", AND "F" SIGNS WITH THE BOTTOM OF SIGN ASSEMBLY AT LEAST 7 FT. ABOVE THE TRAVEL LANE. ERECT "D", "E", AND "F" SIGNS ON ROADS WITH 2 OR MORE LANES AND AT LEAST 5 FT. ON OTHER ROUTES. THE VERTICAL CLEARANCE IS 7 FT. WHERE REQUIRED FOR PEDESTRIAN TRAFFIC AND/OR PARKED VEHICLES.

3. THE VERTICAL DIAMETER BETWEEN MOUNTING HOLES ON ALL TYPES "D", "E," AND "F" SIGNS IS 30" MAXIMUM. THE VERTICAL AND HORIZONTAL DIMENSIONS BETWEEN MOUNTING HOLES IS TO THE WHOLE INCH. EACH SIGN PANEL HAS A MINIMUM OF 2 BOLTS PER SUPPORT.

4. ATTACH SIGN W/ 5/16" HEX HEAD BOLT, NYLON WASHER, FLAT WASHER, LOCK WASHER, HEX NUT NO BUCKLING OF THE SIGN WILL BE PERMITTED. SEE ASSEMBLY DETAIL SHEETS # 2 OF 904.50.

5. FOR COMBINATION TYPE "D" & "E" SIGNS, THE WIDE SIDE OF CROSS BRACE GOES TO BACK OF "F" SIGN.

6. INSTALL POST AND CROSS-BRACING WITH THE WIDE SIDE OF FLANGE TOWARD THE BACK OF SIGN, OR AS DIMENSIONED ON PLAN SHEETS.

7. THE SHIELD HEIGHTS IN THESE ASSEMBLIES CAN NOT BE LARGER THAN 24".

8. IF SIGN ASSEMBLIES REQUIRE MORE THAN TWO "U"-CHANNEL SUPPORTS, THE SUPPORTS SHALL BE POSITIONED AT LEAST 7 FT. APART. NO MORE THAN TWO SIGNS SHALL FALL WITHIN 7 FT. PATH, OR THE SIGN ASSEMBLY MUST BE PLACED BEHIND BARRIER PROTECTION.

NOTES:

1. ERECT TYPE "D", "E", AND "F" SIGNS ON FREEWAYS WITH THE NEAR EDGE OF THE SIGN 20 FT. FROM THE TRAVEL LANE. ERECT ALL OTHER "D", "E", AND "F" SIGNS WITH THE NEAR EDGE OF THE SIGN AT THE EDGE OF THE SHOULDER BREAK (4 FT. MINIMUM CLEARANCE, 12 FT. DESIRABLE, FROM THE EDGE OF TRAVEL LANE), OR AS DIMENSIONED ON PLAN SHEETS.

2. ERECT TYPE "D", "E", AND "F" SIGNS WITH THE BOTTOM OF SIGN ASSEMBLY AT LEAST 7 FT. ABOVE THE TRAVEL LANE. ERECT "D", "E", AND "F" SIGNS ON ROADS WITH 2 OR MORE LANES AND AT LEAST 5 FT. ON OTHER ROUTES. THE VERTICAL CLEARANCE IS 7 FT. WHERE REQUIRED FOR PEDESTRIAN TRAFFIC AND/OR PARKED VEHICLES.

3. THE VERTICAL DIAMETER BETWEEN MOUNTING HOLES ON ALL TYPES "D", "E," AND "F" SIGNS IS 30" MAXIMUM. THE VERTICAL AND HORIZONTAL DIMENSIONS BETWEEN MOUNTING HOLES IS TO THE WHOLE INCH. EACH SIGN PANEL HAS A MINIMUM OF 2 BOLTS PER SUPPORT.

4. ATTACH SIGN W/ 5/16" HEX HEAD BOLT, NYLON WASHER, FLAT WASHER, LOCK WASHER, HEX NUT NO BUCKLING OF THE SIGN WILL BE PERMITTED. SEE ASSEMBLY DETAIL SHEETS # 2 OF 904.50.

5. FOR COMBINATION TYPE "D" & "E" SIGNS, THE WIDE SIDE OF CROSS BRACE GOES TO BACK OF "F" SIGN.

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8. IF SIGN ASSEMBLIES REQUIRE MORE THAN TWO "U"-CHANNEL SUPPORTS, THE SUPPORTS SHALL BE POSITIONED AT LEAST 7 FT. APART. NO MORE THAN TWO SIGNS SHALL FALL WITHIN 7 FT. PATH, OR THE SIGN ASSEMBLY MUST BE PLACED BEHIND BARRIER PROTECTION.
**TYPE "E" SIGNS**

- 36" x 36" Sign
- 30" x 30" Sign
- 24" x 24" Sign

**TYPE "D" SIGNS**

- 22" x 22" Sign
- 20" x 20" Sign
- 18" x 18" Sign

**TYPE "E" AND "F" SIGNS**

- 48" x 48" Sign
- 16" x 16" Sign

**HOLE PUNCHING DETAIL**

- Units on Attached Sheet
- Minimum 4 ft. between channel posts

**DETAIL FOR INSTALLATION OF CHANNEL POST IN CONCRETE**

- "U" Channel Post
- 2" Joint Sealer
- Island Pavement
- Soil

**HOLE PUNCHING DETAIL**

- Hole Drilled, Cored, Formed or Air
- Hammered and Back Filled with Soil

**ASSEMBLY DETAIL**

- 5/16" Hex Head Hot Dipped Galvanized Bolt
- Nylon Washer
- 7/8" O.D., 3/8" I.D.,
- 1/16" Thick.
- Aluminum Shim
- (3 1/2" x 3 1/2" x 1/8")

**VALIDATION STICKER**

- Supplied by Sign Plant

**DETAIL FOR INSTALLATION OF CHANNEL POST IN CONCRETE**

- "U" Channel Post
- 2" Joint Sealer
- Island Pavement
- Soil

**HOLE PUNCHING DETAIL**

- Hole Drilled, Cored, Formed or Air
- Hammered and Back Filled with Soil

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- Nylon Washer
- 7/8" O.D., 3/8" I.D.,
- 1/16" Thick.
- Aluminum Shim
- (3 1/2" x 3 1/2" x 1/8")

**VALIDATION STICKER**

- Supplied by Sign Plant
NOTES:

1. USE TABLES 2B-1, 2C-2 AND 7B-1 IN MUTCD FOR SIGN SIZES.
2. WHEN GEOMETRY DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.
3. R1-1 MAY BE USED IN PLACE OF R1-2 WHEN AN ENGINEERING STUDY WARRANTS ITS USE.
4. AT ALL HIGHWAY-RAIL GRADE CROSSINGS WHERE YIELD SIGNS OR STOP SIGNS ARE INSTALLED, STOP AHEAD (W3-1) OR YIELD AHEAD (W3-2) SIGNS SHALL ALSO BE INSTALLED IF THE CRITERIA FOR THEIR INSTALLATION IN SECTION 2C.36 IS MET.

LEGEND

- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
NOTES:

1. USE TABLES 2B-1, 2C-2 AND 7B-1 IN MUTCD FOR SIGN SIZES.
2. WHEN GEOMETRY DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.
3. R1-1 MAY BE USED IN PLACE OF R1-2 WHEN AN ENGINEERING STUDY WARRANTS ITS USE.
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LEGEND

- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
NOTES:

1. USE TABLES 2B-1, 2C-2 AND 7B-1 IN MUTCD FOR SIGN SIZES.

2. WHEN GEOMETRIC DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.

**LEGEND**
- PROPERTY LINE
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW

---

**THE SCHOOL ZONE.**

FOR THE AREA OUTSIDE THE LEGAL SPEED LIMIT THIS SIGN IS TO DISPLAY

- 600' MIN.
- 100' MIN.
- 500' MAX.

---

**SCHOOL ZONE**

WHERE SPEED REDUCTION IS REQUIRED

MARKED CROSSWALK IS REQUIRED

SCHOOL BLDG.

LIMITS OF RESTRICTED SCHOOL ZONE

MARKED CROSSWALK

SIGNING SCHOOL ZONE WITH SPEED LIMIT IS REQUIRED

APPROPRIATE SIGNING.

REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE

2. WHEN GEOMETRIC DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.
NOTES:

1. USE TABLES 2B-1, 2C-2 AND 7B-1 IN MUTCD FOR SIGN SIZES.

2. WHEN GEOMETRIC DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.
NOTES:

1. USE TABLES 2B-1, 2C-2 AND 7B-1 IN MUTCD FOR SIGN SIZES.

2. WHEN GEOMETRIC DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.
NOTES:

1. USE TABLES 2B-1, 2C-2 AND 7B-1 IN MUTCD FOR SIGN SIZES.

2. WHEN GEOMETRIC DOES NOT PERMIT THE USE OF ALL REQUIRED SIGNS AN ENGINEERING STUDY WILL DETERMINE APPROPRIATE SIGNING.

LEGEND

- PROPERTY LINE
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
NOTES:
1. If median stop sign is used, locate sign so that it does not obstruct the view of the motorist when looking left.
2. Typically located near beginning of taper.

ROADWAY STANDARD DRAWING FOR
SIGNING UNSIGNALIZED SUPERSTREET

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.
NOTES:
1. TYPICALLY LOCATED NEAR BEGINNING OF TAPER.
2. OPTIONAL SIGNS ARE TO BE INSTALLED AT THE DISCRETION OF THE DIVISION ENGINEER.
3. ALL SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER.
4. FOR REGULATORY SIGN AND PLAQUE SIZES USE TABLE 2B-1 IN MUTCD.
### POSTED SPEED \( D \)

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>( D )</th>
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<tbody>
<tr>
<td>&lt; 40 MPH</td>
<td>100'</td>
</tr>
<tr>
<td>40 MPH</td>
<td>125'</td>
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<tr>
<td>45 MPH</td>
<td>175'</td>
</tr>
<tr>
<td>50 MPH</td>
<td>250'</td>
</tr>
<tr>
<td>55 MPH</td>
<td>325'</td>
</tr>
</tbody>
</table>

**NOTES:**

1. The MUTCD provides minimum sign sizes in Table 2B-1 (Regulatory), 2C-2 (Warning), and 2D-1 (Guide).
2. The MUTCD provides guidance for dimension "D" in Table 2C-4 and should be applied with engineering judgment.
3. Site background and legend colors shall conform with the MUTCD and NCDOT standard practice.
4. Refer to associated typical drawings for pavement markings at roundabouts.
5. Refer to RSD 1267.01 for flexible delineator installation guidelines.
6. W11-2, W16-7PL, and R1-6 shall use fluorescent yellow-green sheeting in place of yellow sheeting.
7. Optional signs that could be installed with W2-6 would also include W13-1P, W16-17P, and W16-12P. Optional signs shall be installed at the discretion of the engineer.
8. Right side post-mounted yield signs shall be angled to form an extension of the yield line.
## Roadway Standard Drawing for Two Lane Roundabout Signing, with Pedestrians

### Posting Speeds

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>D</th>
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</thead>
<tbody>
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<td>&lt; 40 MPH</td>
<td>100'</td>
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<tr>
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<td>175'</td>
</tr>
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<td>55 MPH</td>
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### Notes:
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3. Sign background and legend colors shall conform with the MUTCD and NCDOT standard practice.
4. Refer to associated typical drawings for pavement markings at roundabouts.
5. Refer to RSD 1267.01 for flexible delineator installation guidelines.
7. Optional signs that could be installed with W2-6 would also include W13-1P, W16-17P, and W16-12P. Optional signs shall be installed at the discretion of the engineer.
8. Right side post-mounted yield signs shall be angled to form an extension of the yield line.
9. Advance lane control arrow markings shall match the lane controls depicted in R3-8 sign which shall match the lane controls of the roundabout and shall utilize fishhook arrows.

### Legend
- **Star**: Optional
- **Vertical Line**: Stationary sign on one support
- **Horizontal Line**: Stationary sign on two supports

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NOTES:

1. USE TABLES 2B-1 AND 2C-2 IN MUTCD FOR SIGN SIZES.

2. SIGNS INDICATING A REDUCTION IN SPEED LIMIT SHALL BE DUAL MOUNTED ON MULTILANE DIVIDED FACILITIES WITH MEDIANS.

3. IF USED, REDUCED SPEED LIMIT AHEAD (W3-5) SIGN SHALL BE INSTALLED AT LEAST 600 FEET IN ADVANCE OF THE BEGINNING OF THE SPEED ZONE, INDICATING A CHANGE IN THE SPEED LIMIT.

LEGEND

\[ \begin{array}{c}
\text{\# STATIONARY SIGN} \\
\text{\# DIRECTION OF TRAFFIC FLOW}
\end{array} \]