STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES
ZONE 1 – 140 mph (63m/s) SPECIAL WIND ZONE

OUTER BANKS REGIONS OF CURRITUCK, DARE, AND HYDE COUNTIES IN DIVISION 1.

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

INDEX OF PLANS

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig.SP 1-2</td>
<td>Standard Strain Pole Notes</td>
</tr>
<tr>
<td>Sig.SP 3-7</td>
<td>Statewide Wind Zones</td>
</tr>
<tr>
<td>Sig.SP 8</td>
<td>ZONE 1 140 MPH</td>
</tr>
<tr>
<td>Sig.SP 9</td>
<td>ZONE 2 130 MPH</td>
</tr>
<tr>
<td>Sig.SP 10</td>
<td>ZONE 3 110 MPH</td>
</tr>
<tr>
<td>Sig.SP 11</td>
<td>ZONE 4 90 MPH</td>
</tr>
<tr>
<td>Sig.SP 12</td>
<td>ZONE 5 80 MPH</td>
</tr>
</tbody>
</table>

NCDOT CONTACTS:

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Designed in conformance with the latest
2015 Interim to the
6th Edition 2013
AASHTO
Standard Specifications for
Structural Supports for
Highway Signs, Luminaires,
and Traffic Signals

Standard Strain Pole Notes
Statewide Wind Zones
ZONE 1   140 MPH
ZONE 2  130 MPH
ZONE 3  110 MPH
ZONE 4   90 MPH
ZONE 5  80 MPH

Published by:
NCDOT METAL POLE STANDARDS

130 / 58 mph m/s
140 / 63 mph m/s
8/2/2016

8/2/2016
GENERAL

1. THESE NOTES PROVIDE INFORMATION AND REQUIREMENTS FOR THE DESIGN, FABRICATION, AND INSTALLATION OF METAL STRAIN POLES. THEY ARE TO BE USED TO DESIGN, MANUFACTURERS, CONTRACTORS, AND POLE MANUFACTURERS IN THE BID, MANUFACTURING, AND INSTALLATION OF METAL TRAFFIC SIGNALS IN NORTH CAROLINA. THE NOTES ARE CATEGORIZED INTO THE AASHTO WIND ZONE SPECIFICATIONS. THESE CORRESPOND TO THE SPECIFICATIONS THAT ARE SPECIFIC TO A PARTICULAR SITUATION. DESIGN DETAILS OR REQUIREMENTS ARE SHOWN ON THE DRAWINGS.

2. THE FOLLOWING STANDARD DESIGN ARE BASED ON THE NCDOT HIGHWAY STANDARD DRAWINGS OF 2016. THE NOTES ARE CATEGORIZED INTO THE AASHTO WIND ZONE SPECIFICATIONS. THESE CORRESPOND TO THE SPECIFICATIONS THAT ARE SPECIFIC TO A PARTICULAR SITUATION. DESIGN DETAILS OR REQUIREMENTS ARE SHOWN ON THE DRAWINGS.

3. THESE METAL POLE STANDARDS ARE DESIGNATED TO THE NCDOT "ROADWAY STANDARD DRAWINGS" DATED JANUARY 2012 AND "NORTH CAROLINA HIGHWAY" DATED JANUARY 2012 FOR MANUFACTURERS IN THE SELECTION, FABRICATION, AND INSTALLATION OF METAL TRAFFIC SUPPORTS IN NORTH CAROLINA. THE NOTES ARE CATEGORIZED INTO THE AASHTO WIND ZONE SPECIFICATIONS. THESE CORRESPOND TO THE SPECIFICATIONS THAT ARE SPECIFIC TO A PARTICULAR SITUATION. DESIGN DETAILS OR REQUIREMENTS ARE SHOWN ON THE DRAWINGS.

4. POLE CASES PREPARED ON THE AASHTO SPECIFICATION INFORMATION AND DRAWING SHEET NO. 123 WILL NOT REQUIRE MANUFACTURER'S CALCULATIONS. HOWEVER, CERTIFICATION OF COMPLIANCE WITH THE MANUFACTURER'S PREPARED SHOP DRAWING IS REQUIRED. ANY VARIATION TO A CASE STANDARD HAS BEEN APPROVED, MANUFACTURER'S SHOP DRAWING SHALL BE REQUIRED.

POLE FABRICATION

1. ALL OTHER STEEL HARDWARE MATERIAL REQUIRED NOT SPECIFIED ABOVE SHALL COMPLY WITH SECTIONS 1072 AND 1098 OF THE NCDOT "ROADWAY STANDARD DRAWINGS" DATED JANUARY 2012 AND LATEST APPROVED INTERIM SPECIFICATIONS. DESIGN DETAILS OR REQUIREMENTS ARE SHOWN ON THE DRAWINGS.

2. POLE ASSEMBLIES SHALL BE PERMANENTLY TAGGED OR ENGRAVED WITH THE FOLLOWING:

3. POLE MATERIALS

1. THE METAL POLE DESIGN SHALL COMPLY WITH THE "2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS" AND "NORTH CAROLINA HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS" AND LATEST APPROVED INTERIM SPECIFICATIONS. DESIGN DETAILS OR REQUIREMENTS ARE SHOWN ON THE DRAWINGS.

2. PLY POLES ARE NOT ACCEPTABLE, EXCEPT ON DESIGN PARAMETER WILL BE DUE TO THE USE OF DECORATIVE POLES.

3. THESE STRAIN POLE STANDARDS ALLOW FOR SIGNAL HEADS TO BE PLACED ANYWHERE ALONG THE SPACER. THE MOST CRITICAL LOCATIONS ARE SHOWN IN THE TYPICAL INTERSECTION LAYOUT CASES SHOWN ON DRAWING SP-10-12 (LARGE CASE AND DESIGN DETAILS SHEET) OF THESE STANDARDS. FOR POLE PLACEMENTS, USE A 4" X 4" FOR THE SPACER. RADIAL DESIGN CLEARANCE FRAME FROM BOTTOM OF HEAD, HEAD TO PAYMENT 17 FEET.

4. PROVISIONS SHALL BE MADE FOR DRAINAGE OF WATER FROM THE METAL POLE.

INDEX OF PLANS

<table>
<thead>
<tr>
<th>No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig.SP 1-2</td>
<td>Standard Strain Pole Notes</td>
</tr>
<tr>
<td>Sig.SP 3-7</td>
<td>Standard Strain Pole Notes</td>
</tr>
<tr>
<td>Sig.SP 8-12</td>
<td>Standard Strain Pole Notes</td>
</tr>
</tbody>
</table>

INDEX OF PLANS

<table>
<thead>
<tr>
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</tr>
</tbody>
</table>

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD NOTES FOR METAL STRAIN POLES

1. THE FOUNDATION SIZE FOR POLES IN THESE METAL POLE STANDARDS IS DETERMINED BY CONDUCTING A SOIL SUBSURFACE INVESTIGATION. FOR DETAILS OF THE SUBSURFACE INVESTIGATION, AND PROPER SELECTION/DETERMINATION OF THE METAL POLE FOUNDATIONS, REFER TO AND COMPLY WITH THE "METAL POLE STANDARD FOUNDATION" SPECIAL PROVISION WHICH IS TO BE CONSIDERED AN INTEGRAL PART OF THESE METAL POLE STANDARDS.

2. TO DETERMINE THE CORRECT STANDARD STRAIN POLE FOUNDATION DEPTH, PLEASE ADHERE TO THE FOLLOWING REQUIREMENTS IN CONJUNCTION WITH THE STANDARDS BEING APPLIED:
   a. USING THE STATEWIDE COUNTY WIND ZONE CHART, DETERMINE THE APPROPRIATE WIND ZONE SELECTED.
   b. SELECT THE SOIL TYPE THAT BEST DESCRIBES THE SOIL CHARACTERISTICS (EITHER CLAY OR SAND).
   c. REFERENCE THE FOUNDATION SELECTION CHART TO OBTAIN "N" VALUE. (NUMBER OF FEET PER FOOT FROM STANDARD FOUNDATION TEST).
   d. GET THE APPROPRIATE PILE CASE LOAD NUMBER FROM THE PLANS OR FROM THE DIVISION TRAFFIC ENGINEER.
   e. USING THE PREVIOUSLY DETERMINED SOIL TYPE AND "N" VALUE, SELECT THE APPROPRIATE COLUMN IN THE CHART. SELECT THE CORRECT DEPTH OF THE FOUNDATION IS THE VALUE THAT IS SHOWN WHERE THE COLUMN AND THE LINE INTERSECT.
   f. FILL OUT AND SUBMIT THE "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION LOCATION.
   g. THE "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION IS REQUIRED TO BE SUBMITTED AND APPROVED PRIOR TO ANY CONCRETE IN THE FIELD. THIS FORM AS WELL AS THE STANDARD FOUNDATION SPECIAL PROVISIONS CAN BE OBTAINED AT THE FOLLOWING WEBSITE:


3. THE "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION IS REQUIRED TO BE SUBMITTED AND APPROVED PRIOR TO ANY CONCRETE IN THE FIELD. THIS FORM AS WELL AS THE STANDARD FOUNDATION SPECIAL PROVISIONS CAN BE OBTAINED AT THE FOLLOWING WEBSITE:


4. COMPLY WITH THE PROVISIONS OF SECTION 1742 OF THE STANDARD SPECIFICATIONS FOR INSTALLATION.

5. REFER TO STANDARD DRAWING 1742-01 FOR FOUNDATION INSTALLATION DETAILS.

6. REINFORCING STEEL SHALL BE DEFERRAL AND CONFIRM TO A302 GRADE B, NO. TIES MAY BE DEFERRAL OR PLAIN.

7. COLLAR AND THE REINFORCING RINGS MAY BE VERTICALLY ADJUSTED BY +/- 3" AT A DEPTH BETWEEN 2'-0" AND 3'-0" TO FACILITATE THE INSTALLATION OF ELECTRICAL, CONDUIT ENTERING THE PILE.  THE CONCRETE SHALL BE AIR-ENTRAINED PLAIN CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS IN ACCORDANCE WITH SECTION 1000 OF THE NORTH CAROLINA STANDARD SPECIFICATIONS FOR DETAILS, SEE SPECIAL PROVISIONS.

8. THE TRAFFIC SIGNAL SUPPORT STRUCTURE SHALL NOT BE ERECTED BEFORE THE CONCRETE IN THE FOUNDATION HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.  THE "STANDARD FOUNDATION SELECTION FORM" FOR EACH PROPOSED FOUNDATION LOCATION.

9. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS AND DRAWINGS.

10. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS AND DRAWINGS.

11. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS AND DRAWINGS.

12. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS AND DRAWINGS.

13. FOR OTHER DETAILS REGARDING CONSTRUCTION OF CONCRETE FOUNDATION, SEE PROJECT SPECIAL PROVISIONS AND DRAWINGS.

14. WHEN ATTACHING POLE TO FOUNDATION, THE DISTANCE BETWEEN THE BOTTOM OF THE LEVER ARM UP TO THE TOP OF THE CONCRETE FOUNDATION SHALL NOT BE GREATER THAN THREE ANCHOR BOLT SHOULDER TO NUT LENGTH ADDING TOP NUT TO FACILITATE THE INSTALLATION OF A THREADLESS NUT.

15. THE "STANDARD FOUNDATION SELECTION FORM" TO DETERMINE THE CORRECT STANDARD STRAIN POLE FOUNDATION DEPTH, PLEASE ADHERE TO THE FOLLOWING REQUIREMENTS IN CONJUNCTION WITH THE STANDARDS BEING APPLIED:

16. FOR OTHER DETAILS REGARDING METAL POLE INSTALLATION, SEE LATEST PROJECT SPECIAL PROVISIONS.

https://connect.ncdot.gov/resources/Safety/Pages/ITS-Design-Resources.aspx

INDEX OF PLANS

DRAWING No. DESCRIPTION
Sig.SP 1 2 Standard Strain Pole Notes
Sig.SP 2 3-7 Statewide Wind Zones
Sig.SP 8 8 ZONE 1 140 MPH
Sig.SP 9 9 ZONE 2 150 MPH
Sig.SP 10 10 ZONE 3 160 MPH
Sig.SP 11 11 ZONE 4 170 MPH
Sig.SP 12 12 ZONE 5 180 MPH

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8/2/2016
# ZONE 1 (140 MPH) SPECIAL WIND ZONE

## Light Loading

### (For One Pole and One Foundation)

<table>
<thead>
<tr>
<th>CASE No.</th>
<th>No. of Metal Pole</th>
<th>DIAMETER X TOTAL LENGTH (CU. YDS.)</th>
<th>NO. OF BASE PLATES</th>
<th>DIAMETER X TOTAL LENGTH (CU. YDS.)</th>
<th>NO. OF ANCHOR BOLTS</th>
<th>DIAMETER X TOTAL LENGTH (CU. YDS.)</th>
<th>CONCRETE FOOTING</th>
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</tbody>
</table>

*See Note 1 and 2 “Soil Testing and Standard Soil Foundations” on Sheet Sig.SP2 of the Standard Notes.*

### Typical Intersection

- 2 O:\ Span Max. (60° to 60°)
- 3 Section Vehile Signal Head
- 3 Section Vehicle Signal Head

## Heavy Loading

### (For One Pole and One Foundation)

<table>
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<th>No. of Metal Pole</th>
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<th>CONCRETE FOOTING</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

*See Note 1 and 2 “Soil Testing and Standard Soil Foundations” on Sheet Sig.SP2 of the Standard Notes.*

### Typical Intersection

- 200' Span Max.

## COUNTY WIND ZONE 1

140 mph / 63 m/s

- Currituck
- Hyde

### Wind Zone 1

**Load Case and Design Details**