# SATURATED SOIL CONDITION

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| W-5510 | Sig. M8 |

| | | STANDARD STRAIN POLES | | | | | | STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) – Feet | | | | | | | Reinforcement | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Reactions at the Pole Base | | | Clay | | | | Sand | | | Longitudinal | | Stirrups | |
| | | Case No. | Pole Height (Ft.) | Base Plate BC (In.) | Axial (kip) | Shear (kip) | Moment (ft-kip) | Medium N-Value 4-8 | Stiff N-Value 9-15 | Very Stiff N-Value 16-30 | Hard N-Value >30 | Loose N-Value 4-10 | Medium N-Value 11-30 | Dense N-Value >30 | Bar Size (#) | Quantity | Bar Size (#) | Spacing (in.) |
| WIND ZONE 1 | LIGHT | S26L3 | 26 | 25 | 2 | 11 | 270 | 19 | 13 | 9 | 8 | 17 | 14.5 | 12.5 | 8 | 13 | 4 | 12 |
| | | S30L3 | 30 | 25 | 2 | 11 | 300 | 20 | 13.5 | 9 | 8 | 17.5 | 15 | 13 | 8 | 14 | 4 | 12 |
| | | S35L3 | 35 | 25 | 3 | 11 | 320 | 20 | 13.5 | 9.5 | 8 | 17.5 | 15 | 13 | 8 | 15 | 4 | 12 |
| | HEAVY | S30H3 | 30 | 29 | 3 | 16 | 450 | 24.5 | 17 | 13 | 11 | 21 | 17.5 | 15 | 8 | 18 | 4 | 12 |
| | | S35H3 | 35 | 29 | 4 | 16 | 515 | 26 | 17.5 | 12 | 8.5 | 22 | 18.5 | 16 | 8 | 20 | 4 | 12 |
| WIND ZONE 2 | LIGHT | S26L2 | 26 | 23 | 2 | 10 | 245 | 18 | 12.5 | 8.5 | 8 | 16.5 | 14 | 12 | 8 | 13 | 4 | 12 |
| | | S30L2 | 30 | 23 | 2 | 10 | 270 | 19 | 12.5 | 9 | 8 | 16.5 | 14 | 12.5 | 8 | 13 | 4 | 12 |
| | | S35L2 | 35 | 23 | 3 | 10 | 300 | 19.5 | 13 | 9 | 8 | 17 | 14.5 | 13 | 8 | 14 | 4 | 12 |
| | HEAVY | S30H2 | 30 | 29 | 3 | 15 | 415 | 25.5 | 15.5 | 11 | 8 | 20 | 17 | 14.5 | 8 | 17 | 4 | 12 |
| | | S35H2 | 35 | 29 | 4 | 15 | 475 | 25 | 16.5 | 11.5 | 8 | 21 | 17.5 | 15.5 | 8 | 19 | 4 | 12 |
| WIND ZONE 3 | LIGHT | S26L2 | 26 | 23 | 2 | 10 | 245 | 18 | 12.5 | 8.5 | 8 | 16.5 | 14 | 12 | 8 | 13 | 4 | 12 |
| | | S30L2 | 30 | 23 | 2 | 10 | 270 | 19 | 12.5 | 9 | 8 | 16.5 | 14 | 12.5 | 8 | 13 | 4 | 12 |
| | | S35L2 | 35 | 23 | 3 | 10 | 300 | 19.5 | 13 | 9 | 8 | 17 | 14.5 | 13 | 8 | 14 | 4 | 12 |
| | HEAVY | S30H2 | 30 | 29 | 3 | 15 | 415 | 25.5 | 15.5 | 11 | 8 | 20 | 17 | 14.5 | 8 | 17 | 4 | 12 |
| | | S35H2 | 35 | 29 | 4 | 15 | 475 | 25 | 16.5 | 11.5 | 8 | 21 | 17.5 | 15.5 | 8 | 19 | 4 | 12 |
| WIND ZONE 4 | LIGHT | S26L1 | 26 | 22 | 2 | 8 | 190 | 16 | 11 | 8 | 8 | 15 | 12.5 | 11 | 8 | 12 | 4 | 12 |
| | | S30L1 | 30 | 22 | 2 | 8 | 205 | 16.5 | 11.5 | 8 | 8 | 15 | 13 | 11.5 | 8 | 12 | 4 | 12 |
| | | S35L1 | 35 | 22 | 3 | 8 | 230 | 17 | 12 | 8 | 8 | 15.5 | 13.5 | 11.5 | 8 | 12 | 4 | 12 |
| | HEAVY | S30H1 | 30 | 25 | 3 | 12 | 320 | 20.5 | 14 | 9.5 | 8 | 18 | 15 | 13.5 | 8 | 15 | 4 | 12 |
| | | S35H1 | 35 | 25 | 4 | 12 | 350 | 21 | 14.5 | 10 | 8 | 18.5 | 15.5 | 13.5 | 8 | 16 | 4 | 12 |
| WIND ZONE 5 | LIGHT | S26L2 | 26 | 23 | 2 | 10 | 245 | 18 | 12.5 | 8.5 | 8 | 16.5 | 14 | 12 | 8 | 13 | 4 | 12 |
| | | S30L2 | 30 | 23 | 2 | 10 | 270 | 19 | 12.5 | 9 | 8 | 16.5 | 14 | 12.5 | 8 | 13 | 4 | 12 |
| | | S35L2 | 35 | 23 | 3 | 10 | 300 | 19.5 | 13 | 9 | 8 | 17 | 14.5 | 13 | 8 | 14 | 4 | 12 |
| | HEAVY | S30H2 | 30 | 29 | 3 | 15 | 415 | 25.5 | 15.5 | 11 | 8 | 20 | 17 | 14.5 | 8 | 17 | 4 | 12 |
| | | S35H2 | 35 | 29 | 4 | 15 | 475 | 25 | 16.5 | 11.5 | 8 | 21 | 17.5 | 15.5 | 8 | 19 | 4 | 12 |

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

## Fabrication Design Notes:

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Min. base plate thickness (T) is 2.0 inches.

## Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case.
   The foundation depth is the value where the column and the row intersect.
6. Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c
S30H2 - Hard Clay-Stirrup Spacing: 6 in. c/c
S30H3 - Hard Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c
S35H1 - Hard Clay - Stirrup Spacing: 6 in. c/c
S35H2 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
- Hard Clay- Stirrup Spacing: 6 in. c/c
- Dense Sand- Stirrup Spacing: 6 in. c/c
S35H3 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c

Standard Strain Pole Foundation–Saturated Soil Condition

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

Standard Strain Pole Foundation for Saturated Soil Condition

PLAN DATE: SEPTEMBER 2013 | DESIGNED BY: C.B COGDELL
PREPARED BY: N. BITTING | REVIEWED BY: D. SARKAR

SCALE: 0 NA None

| REVISIONS | INIT. | DATE |
|---|---|---|
| | | |

SEAL
NORTH CAROLINA
PROFESSIONAL
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ENGINEER
DEBDESH C. SARKAR

DocuSigned by: Debdesh C. Sarkar 8/26/2014
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