# Index 455-154 54" Prestressed / CFRP & SS Post-Tensioned Concrete Cylinder Pile

## Design Criteria

***AASHTO LRFD Bridge Design Specifications***; ***Structures Detailing Manual (SDM)***; ***Structures Design Guidelines (SDG)***; ***Fiber Reinforced Polymer Guidelines (FRPG)***

## Design Assumptions and Limitations

Standard piles are designed to have 1000 psi uniform compression after prestress losses without any applied loads.

The piles are designed to have 0.0 psi tension using a load factor of 1.5 times the pile self weight during pick-up, storage and transportation as shown in the "Table of Maximum Pile Pick-Up and Support Lengths" on the standard.

## Plan Content Requirements

In the Structures Plans:

Show and label the piles on the Foundation Layout, End Bent, Intermediate Bent, Pier, Footing, Typical Section and other sheets as required.

Complete the following "Data Table" in accordance with ***SDG*** 3.5 and ***SDM*** 11.4 and include it in the contract plans with the "Foundation Layout" sheets. Modify table and notes as required to accommodate the required number of piles, piers and/or bents and use of Test Piles. When not enough space is available on one plan sheet, continuations of the Data Table and/or separate pile cut-off elevation tables are acceptable. See ***FDM*** **115** for more information regarding use of Data Tables.

For projects without Test Piles change column heading "TEST PILE LENGTH (ft.)" to "PILE ORDER LENGTH (ft.)".

| PILE DATA TABLE | | | | | | | | | | | | | | | | | | | | | | Table Date 01/01/16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INSTALLATION CRITERIA | | | | | | | | DESIGN CRITERIA | | | | | | | | PILE CUT-OFF ELEVATIONS | | | | | | |
| PIER or BENT NUMBER | PILE SIZE (in.) | NOMINAL BEARING RESISTANCE (tons) | NOMINAL UPLIFT RESISTANCE (tons) | MINIMUM TIP ELEVATION (ft.) | TEST PILE LENGTH (ft.) | REQUIRED JET ELEVATION (ft.) | REQUIRED PREFORM ELEVATION (ft.) | FACTORED DESIGN LOAD (tons) | FACTORED DESIGN UPLIFT LOAD (tons) | DOWN DRAG (tons) | TOTAL SCOUR RESISTANCE (tons) | NET SCOUR RESISTANCE (tons) | 100-YEAR SCOUR ELEVATION (ft.) | Ø COMPRESSION | Ø UPLIFT | PILE 1 | PILE 2 | PILE 3 | PILE 4 | PILE 5 | PILE 6 | PILE 7 |
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$$\frac{\text{Factored Design Load} + \text{Net Scour Resistance} + \text{Down Drag}}{\text{Ø}} \leq \text{Nominal Bearing Resistance}$$

UPLIFT RESISTANCE – The ultimate side friction capacity that must be obtained below the 100 year scour elevation to resist pullout of the pile (Specify only when design requires uplift capacity).

TOTAL SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the scourable soil.

NET SCOUR RESISTANCE – An estimate of the ultimate static side friction resistance provided by the soil from the required preformed or jetting elevation to the scour elevation.

100-YEAR SCOUR ELEVATION – Estimated elevation of scour due to the 100 year storm event.

**PILE INSTALLATION NOTES (Notes Date 11-01-20):**

Contractor to verify location of all utilities prior to any pile installation activities.

Minimum Tip Elevation is required for lateral stability.

When a required jetting elevation is shown, the jet shall be lowered to the elevation ____ and continue to operate at this elevation until the pile driving is completed. If jetting or preforming elevations differ from those shown on the table, the Engineer shall be responsible for determination of the required driving resistance.

No jetting will be allowed without the approval of the Engineer.

The Contractor should not anticipate being allowed to jet piles below the 100-year scour elevation or required jet elevation, whichever is deeper.

For pile groups, pile driving is to commence at the center of the group and proceed outward.

When using embedded guages for dynamic testing, tip guages are required in 10% of the piles, minimum 1 per bent or pile footing.

## Payment

| Item number | Item Description | Unit Measure |
|---|---|---|
| 455-36-AB | Concrete Cylinder Piles, Furnished & Driven (54" Diameter CFRP or SS) | LF |