# Index 20600 Series Concrete Piles (Rev. 01/16)

#### **Design Criteria**

#### AASHTO LRFD Bridge Design Specifications; Structures Design Guidelines (SDG); Structures Detailing Manual (SDM)

#### **Design Assumptions and Limitations**

Index 20600 is the lead standard for the Square Prestressed Concrete Pile standard series which includes Indexes 20600 through 20631. Use this standard with Indexes 20601, 20602, 20612, 20614, 20618, 20620, 20624, 20630 and 20631.

Standard piles are designed to have 1000 psi uniform compression after prestress losses without any applied loads to offset tensile stresses that occur during typical driving.

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, use of Test Piles and instrumentation. 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 Introduction I.3 for more information regarding use of Data Tables.

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

								PILE D	ΘΑΤΑ ΤΑΒ	LE											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.)	PREFORM	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

#### Factored Design Load + Net Scour Resistance + Down Drag ≤ Nominal Bearing Resistance UPLIFT RESISTANCE - The ultimate side friction capacity that must be obtained below

UPLIFY RESISTANCE - The durinate side friction (capacity that must be obtained by the 100 year sour 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.

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#### PILE INSTALLATION NOTES [Notes Date 7-01-13]:

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 Inversed 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.

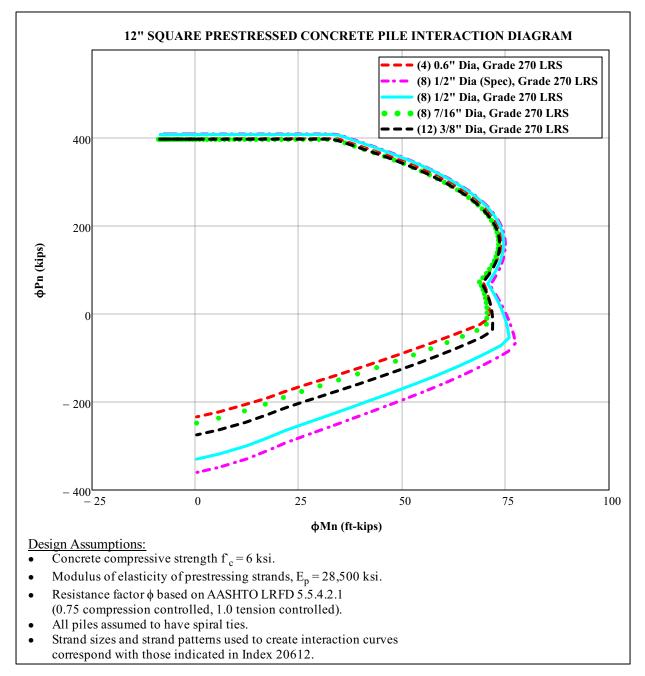
The Contractor should not anticipate being allowed to jet piles below the 100-year scour elevation or required jet elevation, whichever is deeper.

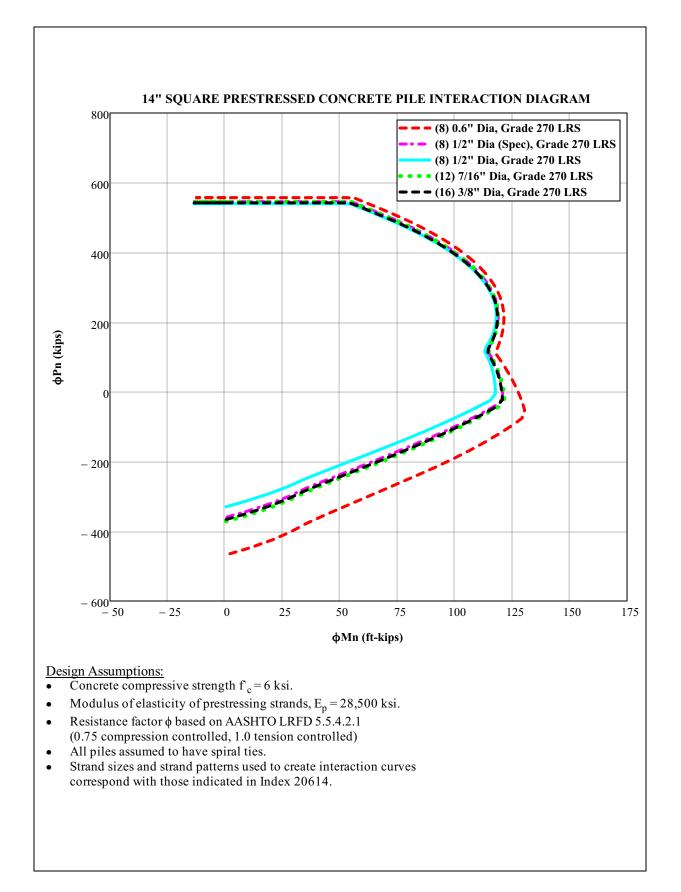
At each Bent, pile driving is to commence at the center of the Bent and proceed outward.

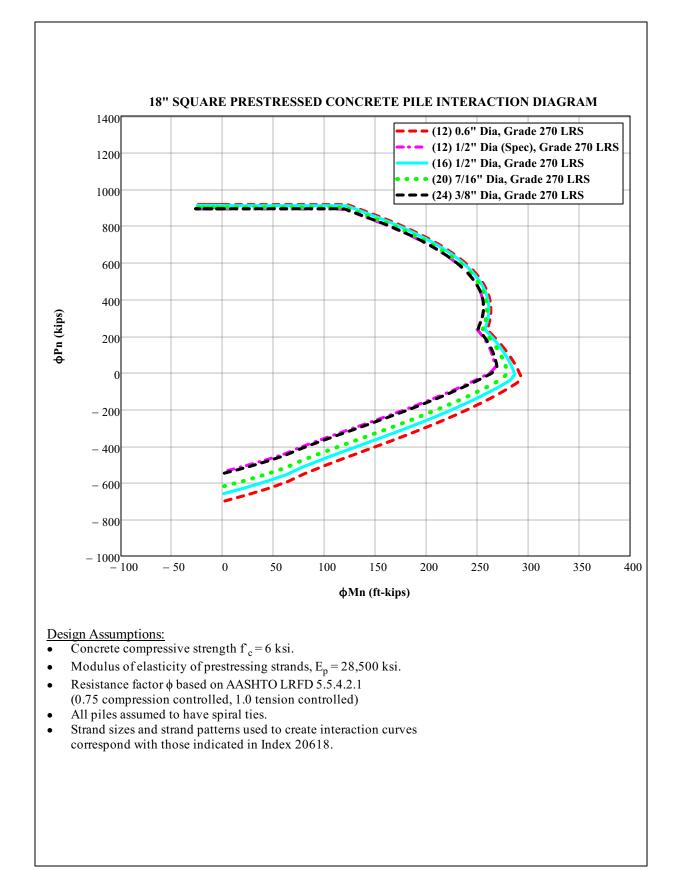
## Payment

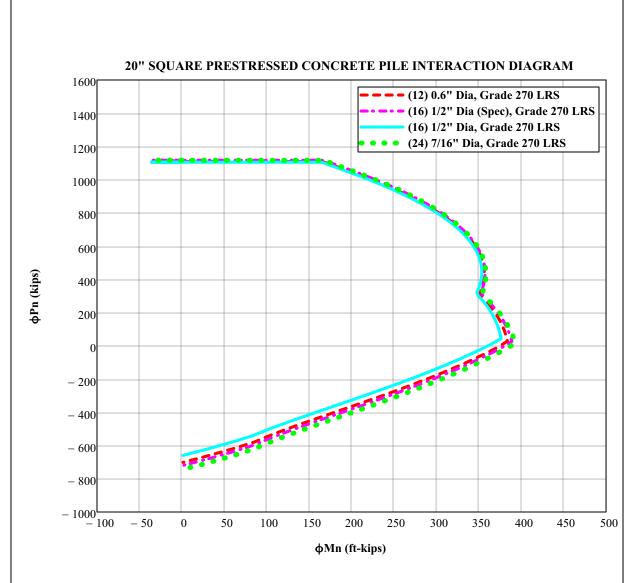
Item number	Item description	Unit Measure
455-34-AA	Prestressed Concrete Piling	LF

### **Design Aids**



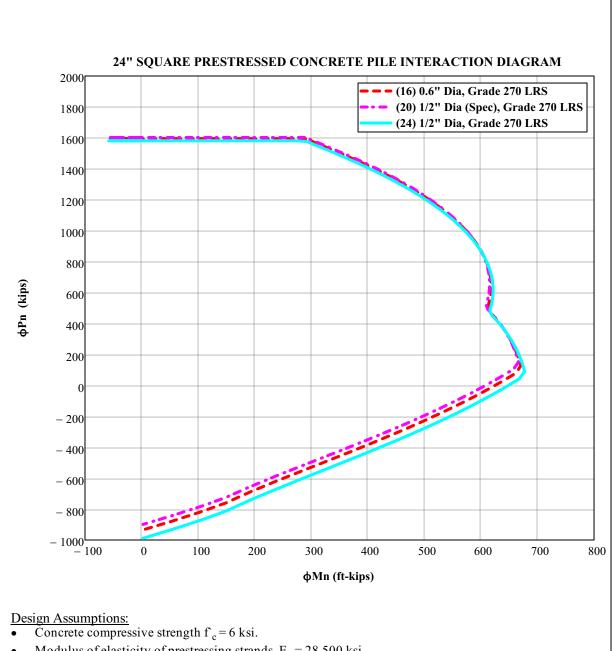




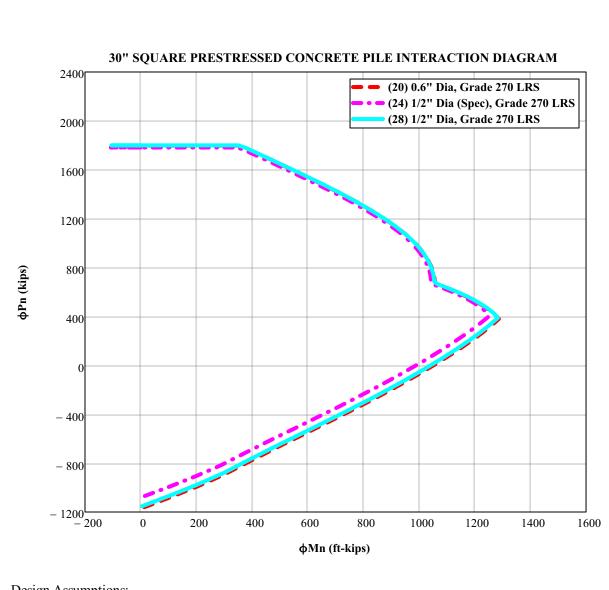


Design Assumptions:

- Concrete compressive strength  $f_c = 6$  ksi.
- Modulus of elasticity of prestressing strands,  $E_p = 28,500$  ksi.
- Resistance factor φ based on AASHTO LRFD 5.5.4.2.1 (0.75 compression controlled, 1.0 tension controlled)
- All piles assumed to have spiral ties.
- Strand sizes and strand patterns used to create interaction curves correspond with those indicated in Index 20620.



- Modulus of elasticity of prestressing strands,  $E_p = 28,500$  ksi. •
- Resistance factor  $\phi$  based on AASHTO LRFD 5.5.4.2.1 • (0.75 compression controlled, 1.0 tension controlled)
- All piles assumed to have spiral ties.
- Strand sizes and strand patterns used to create interaction curves correspond with those indicated in Index 20624.



- <u>Design Assumptions:</u>
  Concrete compressive str
- Concrete compressive strength  $f_c = 6$  ksi.
- Modulus of elasticity of prestressing strands,  $E_p = 28,500$  ksi.
- Resistance factor φ based on AASHTO LRFD 5.5.4.2.1 (0.75 compression controlled, 1.0 tension controlled)
- All piles assumed to have spiral ties.
- Strand sizes and strand patterns used to create interaction curves correspond with those indicated in Index 20630.

