STANDARD SPECIFICATIONS
FOR
HIGHWAY AND BRIDGE
CONSTRUCTION

NEW MEXICO STATE
DEPARTMENT
OF
TRANSPORTATION

2014 EDITION

502.1 DESCRIPTION

This Work consists of constructing drilled shafts. Drilled shaft construction, with or without under-reamed bottoms ("bell bottoms"), includes excavation, bottom hole cleaning, reinforcing steel placement and concrete.

502.1.1 Work Experience

Demonstrate to the State Geotechnical Engineer that the Contractor is able to perform the Work in accordance with the Contract. Provide evidence of two (2) Projects within two (2) years of the Bid date involving drilled shaft construction for the conditions expected and use a Superintendent with experience from one (1) of those Projects who will provide all oversight responsibility of all aspects of drilled shaft construction covered in Section 502. Provide the latest NMDOT drilled shaft inspection form of each drilled shaft element signed by the Drilled Shaft Superintendent indicating drilled shaft construction completed in accordance with Section 502 requirements.

502.1.2 Submittals

Submit construction and field designs to the Project Manager for review and approval by the State Geotechnical Engineer.

502.2 MATERIALS

502.2.1 General

Provide Materials in accordance with Table 502.2.1:1, "Applicable Bearing Pile Standards."

Table 502.2.1:1
Applicable Bearing Pile Standards

Material description	Standard
Portland cement concrete, Class G	Section 510, "Portland Cement Concrete"
Reinforcing steel cage	Section 540, "Steel Structures"
Reinforcing steel HP pile	ASTM A 572, Grade 50
Steel pipe (longitudinal or continuous spiral welded) piles and columns	ASTM A 252, Grade 3

502.2.2 Additional Requirements

502.2.2.1 Concrete

For Class G concrete requirements see Section 509, "Portland Cement Concrete Mix Designs."

502.2.2.2 Temporary Casings

Provide temporary steel casings with an inside diameter equal to or greater than the shaft size in accordance with the Contract. Ensure the casings are smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses, pressures of concrete, and the surrounding soils.

502.2.2.3 Permanent Casings

Provide permanent casing with a wall thickness that is at least the thickness specified for the shaft construction. Provide a greater wall thickness if necessary to withstand handling and installation stresses. The casing dimensions are subject to the American Pipe Institute tolerances applicable to regular steel pipe. If approved by the Project Manager, the Contractor

1. Overdrilling to a larger diameter to permit reinforcing steel placement with the required minimum cover;
2. Overreaming sidewalls of the shaft;
3. Increasing steel reinforcement bar number and size; or
4. Enlarging the underream within allowed tolerance.

502.3.4.3 Reinforcing Steel Unit Placement

The reinforcing steel unit consists of longitudinal bars and circular ties or a Structural Steel shape. Place the structural shape or the reinforcing steel cage as a unit immediately after the Certified Drilled Shaft Inspector approves the shaft excavation and before placing concrete. Tie and support the reinforcing steel unit in the shaft so that it remains within allowable tolerances given in Section 502.3.5, "Location and Alignment Tolerances." Use concrete spacers or other approved non-corrosive spacing devices at sufficient intervals, near the bottom and at maximum intervals of ten (10) ft up the shaft, to ensure concentric spacing for the entire reinforcement unit length. Use spacers equal in quality and durability to the concrete specified for the shaft. Inspect the bottom of the shaft immediately before placing of the cage to ensure that there is no sloughing.

Check the top elevation of the reinforcement unit before and after placing the concrete. If the reinforcement unit is not maintained within the specified tolerances, make corrections. Do not construct additional shafts before modifying the reinforcement unit support to the satisfaction of the Project Manager. Maintain the reinforcement unit at the proper elevation and orientation with an approved support mechanism at the ground surface. Place shaft concrete immediately after installing the cage. If more than 24 h elapses between the placement of the cage and concrete placement, remove the cage and inspect the shaft for sloughing or other damage.

502.3.4.4 Concrete Placement

Place concrete in accordance with Section 511, "Concrete Structures." Place concrete as soon as possible after placing reinforcing steel.

Ensure that the time from when the concrete is batched at the plant to placement does not exceed 2 h. The Project Manager may approve a longer time period if the concrete mixture remains workable and plastic. Use admixtures for the job conditions so the concrete remains in a workable plastic state through the approved placement limit.

502.3.4.4.1 Concrete Placement by Free Fall

Use free fall placement in relatively dry holes where the maximum water depth does not exceed three (3) inches. Ensure that free fall-placed concrete falls directly to the base without contacting either the rebar cage or hole sidewall. Use a hopper at the top of the shaft or a rigid pipe extension from the hopper. Ensure that free fall placement does not exceed 60 ft below the bottom of the hopper or the rigid pipe extension. Do not use free fall in slurry displacement shafts. If the Project Manager determines that concrete cannot be placed using the free fall method, use either a tremie or pumping to accomplish the pour.

502.3.4.4.2 Concrete Placement with Tremie or by Pumping

Use rigid tremie pipe or concrete pumps for concrete placement in either dry or slurry displacement shafts. Place plug within tremie or pump line to ensure concrete does not segregate prior to developing concrete pressure head within tremie or pump line and that plug does not discharge from tremie or pump line prior to concrete developing continuous flow. Do not begin underwater placement before placing the tremie or pump line within one (1) tremie or pump line diameter of the shaft base elevation. Remove plugs from the excavation if the Project Manager does not specifically approve them to remain in the shaft. Keep the discharge end continually immersed at least five (5) ft in concrete after starting the flow of concrete. Keep the concrete flow continuous. Maintain the concrete in tremies or pump lines continuously at a positive pressure differential to prevent water or slurry intrusion into the shaft