

6-General Methods and Equipment: The Contractor shall perform the excavations required for shafts through whatever materials are encountered, to the dimensions and elevations shown in the plans or otherwise required by the specifications and special provisions. The Contractor's methods and equipment shall be suitable for the intended purpose and materials encountered. The permanent casing method shall be used only at locations shown on the plans or when authorized by the Engineer in writing. Blasting shall only be permitted if specifically stated on the plans or authorized in writing by the Engineer.

7-Uncased Construction Method: This method consists of using water or slurry (mineral or polymer) to maintain stability of the borehole perimeter while advancing the excavation to final depth, placing the reinforcing cage, and concreting the shaft. Where drilled shafts are located in open water areas, exterior casings shall be extended from above the water elevation into the ground to protect the shaft concrete from water action during placement and curing of the concrete. The exterior casing shall be installed in a manner that will produce a positive seal at the bottom of the casing so that no piping of water or other materials occurs into or from the shaft excavation.

8-Casing Construction Method: The casing method may be used either when shown on the plans or at sites where the uncased construction methods are inadequate to prevent hole caving or excessive deformation of the hole. In this method the casing may be either placed in a predrilled hole or advanced through the ground by twisting, driving or vibration before being cleaned out.

9-Excavation and Drilling Equipment: The excavation and drilling equipment shall have adequate capacity, including power, torque and down thrust to excavate a hole of both the maximum diameter and to a depth of 20 percent beyond the depths shown on the plans.

The excavation and overreaming tools shall be of adequate design, size and strength to perform the work shown in the plans or described herein. When the material encountered cannot be drilled using conventional earth augers with soil or rock teeth, drill buckets, grooving tools, and/or underreaming tools, the Contractor shall provide special drilling equipment, including but not limited to: rock core barrels, rock tools, air tools, blasting materials, and other equipment as necessary to construct the shaft excavation to the size and depth required. Approval of the Engineer is required before excavation by blasting is permitted.

10-Excavation: Shaft excavations shall be made at locations and to the top of shaft elevations, estimated bottom of shaft elevations, shaft geometry and dimensions shown in the contract documents. The Contractor shall extend drilled shaft tip (base) elevations when the Engineer determines that the material encountered during excavation is unsuitable and/or differs from that anticipated in the design of the drilled shaft.

The Contractor shall maintain a construction method log during shaft excavation. The log shall contain information such as: the description and approximate top and bottom elevation of each soil or rock material encountered, seepage or ground water, and remarks, including a description of the tools and drill rigs used and any changes necessitated by changing ground conditions.

Excavated materials that are removed from shaft excavations shall be disposed of by the Contractor in accordance with the applicable specifications for disposal of excavated materials and