

Technical Engineering Services

Geotechnical Services (written to consultant CEI)

a. General

Monitor the progress and quality of foundation work to determine that the foundations are constructed at the correct location and elevation, identify discrepancies, submit monthly progress reports to the District Geotechnical Office (DGO), and direct the Contractor to correct such observed discrepancies. Attend the preconstruction conference and/or special geotechnical meeting for the construction contract.

All services under this section will be performed in accordance to FDOT Specification Section 455.

Establish and maintain communication with the Department's geotechnical personnel doing this contract so all action items will be completed in a timely manner.

b. Minimum Qualifications

Provide qualified personnel for geotechnical services with the following minimum qualifications. Such personnel shall be approved by the Construction Project Administrator/Manager with input from the District Geotechnical Engineer.

1. GEOTECHNICAL ENGINEER:

The Consultant Geotechnical Engineer (CGE) shall be registered as a Professional Engineer in the State of Florida.

The CGE shall have experience with drilled shaft/pile foundations constructed by the FDOT on three highway bridges at a minimum. The CGE shall be knowledgeable in drilled shaft installation methods, coring inspections and construction and in the use and provisions of the PDA system, WEAP and CAPWAP computer programs to analyze. The Geotechnical Engineer shall have at least one letter of reference from a DGE.

2. GEOTECHNICAL TECHNICIAN

The Consultant Geotechnical Technician (CGT) shall be knowledgeable in drilled shaft installation methods, coring inspections and construction and in the use and provisions of the PDA system to analyze concrete/steel/timber on at least two highway bridges constructed by the FDOT.

The CGE will provide the following services with the assistance of a qualified inspector who has completed the FDOT Drilled Shaft/Pile Driving Qualification Courses.

c. Foundations:

1. Drilled Shaft Foundations:

- i. Review the drilled shaft installation plan submitted by the Contractor for materials, methods, equipment, etc., and provide recommendations to the Department within 5 working days of the Contractor's submission.
- ii. Observe installation of test shaft(s) to ensure that construction methods and cleaning procedures are satisfactory. Report on the adequacy of the Contractor's methods and propose any changes within one week of completion of the test methods shaft(s) construction.
- iii. Observe construction of test shafts and production shafts. This includes review of testing of drilling slurry, core drilling and core logs, and other procedures as required.
- iv. Inspect the bottom of the shafts for cleanliness using manual soundings and/or shaft inspection device.
- v. Provide all necessary forms and keep a log of all inspections made of the shafts. These logs made during the shaft inspections shall be turned over to the Department within 5 working days after completion of any shaft. Logs shall be signed and sealed by the Geotechnical Engineer.
- vi. Provide to the DGO a written report of all test shaft installations within 5 working days of shaft completion.
- vii. When conditions occur that are different from those indicated on the plans, the CGE shall be responsible for ensuring that the authorized depths are adjusted as necessary to assure the shaft capacity.
- viii. Perform Pile Integrity Testing as required to verify shaft uniformity and to detect shaft defects.

2. Pile Foundations:

- i. Perform WEAP runs to determine suitability of hammer driving system for the project. Provide results (Check stresses, design capacity, and ultimate capacity) to the FDOT within 5 working days of the Contractor's submittal.
- ii. Review Contractor's Pile Installation Plan and provide comments to the Senior Project Engineer and to the DGO within 5 working days of the Contractor's submittal.
- iii. Instrument test piling and production piling (when deemed necessary by the District Geotechnical Engineer) during initial driving and re-drives.
- iv. When monitoring the test pile driving process, determine proper fuel settings, thickness of pile cushions and when they need changing. Record all pertinent information that is needed to determine the driving criteria

such as jetting, performing, pre-drilling, reference elevation, hammer serial number hammer cushion material and thickness, pile cushion material and thickness, etc. This information shall be provided to the DGO within 24 hours after the test pile driving process is completed. In most cases this information will be requested immediately following test pile completion.

- v. Perform Case Pile Wave Equation Analysis (CAPWAP) on selected blows, using the latest version. At a minimum, CAPWAP shall be performed at the end of drive, before and after set-checks, and where the anticipated tip for the production piles is expected to occur. If requested, the end of drive CAPWAP will be performed in the field upon completion of the drive, otherwise it shall be completed within 24 hours of driving each pile.
- vi. Perform all required WEAP analysis, using the latest version, to provide proof of compliance with the plans and specifications for production pile driving. This includes evaluation of all design loads, evaluation of soil parameters, assistance with cushion selection and stroke selection for driving stress control. The final wave equation analysis required for production driving shall be provided to the DGO within 5 working days after the test pile program is completed, unless requested sooner.
- vii. Analyze the test data and available soils data as required to establish production pile lengths and driving criteria. Submit recommended lengths to the DGO for approval within 3 working days and driving criteria within 5 working days after the test pile program is completed, unless requested sooner. The data submitted with recommended pile lengths and criteria shall include CAPWAP and WEAP printed & plotted outputs, and all raw data obtained by the PDA and CAPWAP solutions (i.e. file 18's) on 100MB Zip Drive or CD computer disks.
- viii. Furnish final written letters, signed and sealed, in the agreed format for production pile lengths and the driving criteria.