



Bayside Power Plant Tampa, Florida

DeWaal Piles • Design-Build • Load Test

DEEP FOUNDATIONS CONTRACTORS SINCE 1969

CONSTRUCTION PERIOD:

April 2001 to August 2001

OWNER:

Tampa Electric Company (TECO)

CLIENT:

Tampa Electric Company (TECO)

STRUCTURAL ENGINEER:

Sargent and Lundy

GEOTECHNICAL ENGINEER:

PSI

SCOPE OF WORK:

DeWaal Piles (Drilled Displacement Piles)

14" diameter test piles: compression,
tension and lateral load tests: 4 sets

14" diameter DeWaal Piles: 4500

Summary:



The construction of seven new GE combustion turbines and heat recovery steam generators at the existing Tampa Electric Company (TECO) Bayside Plant in Tampa, Florida required foundations to meet extremely tight total and differential settlement criteria. The subsurface geology comprised a variable sequence of very soft silty and clayey soils overlying a pinnacled weathered limestone.

Morris-Shea Bridge Company proposed and installed a design build foundation option that met all specification criteria, while providing significant cost and schedule saving over the precast pile base bid.

Introduction:

The TECO Bayside expansion included a total of seven turbines and steam recovery generators, with associated building structures and pipe racks. A geotechnical evaluation of the project site disclosed a sequence of very loose to loose sands and silts, interlayered with very soft silty clays, overlying a highly variable weathered limestone.

Due to the occurrence of laterally and vertically extensive deposits of very soft soils, augercast piles were discounted due to concerns over pile integrity. The geotechnical report recommended the use of 12-inch precast concrete piles driven into the pinnacled and variable weathered limestone at depths of 45 to 60 feet below grade, with working loads of 50 tons.

To minimize the risk of excess pile wastage resulting from the variable bearing layer, and potential delays splicing precast piles, Morris-Shea proposed and subsequently installed a DeWaal pile design-build alternate.

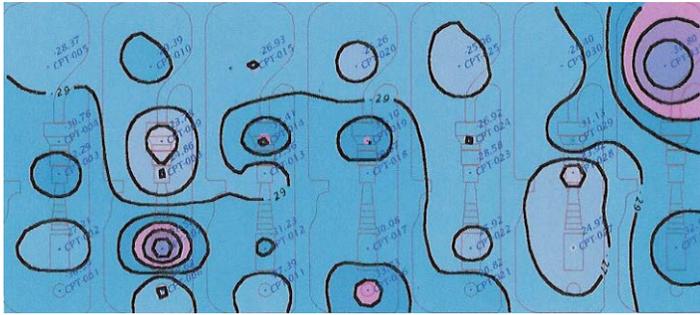


Design Build Option:

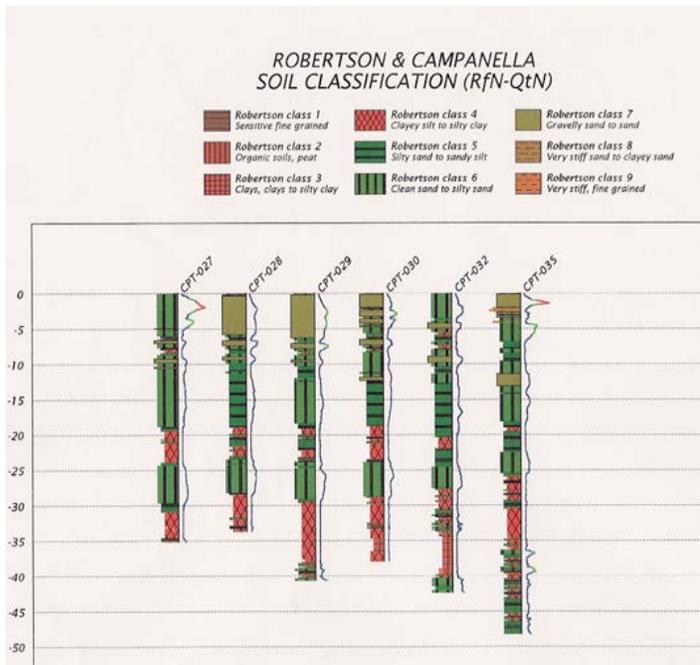
The DeWaal pile alternate was subjected to a technical review by Sargent and Lundy, the project design engineer, and subsequently approved subject to satisfactory field testing. To supplement the existing geotechnical study, Morris-Shea performed an extensive program of cone testing to allow a better evaluation of the soft soils, and variability of the limestone bearing layer.

Load Test Program:

To verify the acceptability of the DeWaal pile alternate, an extensive load test program was performed on 14", 16" and 18" piles. A total of 4 compression tests, 4 tension tests, and 7 lateral load tests were successfully completed. All ultimate capacities and load-deflection values exceeded specification requirements, and the DeWaal system was approved for production pile installation by Sargent and Lundy. Load test results were used to optimize pile diameter and reinforcement design in addition to establishing installation criteria.



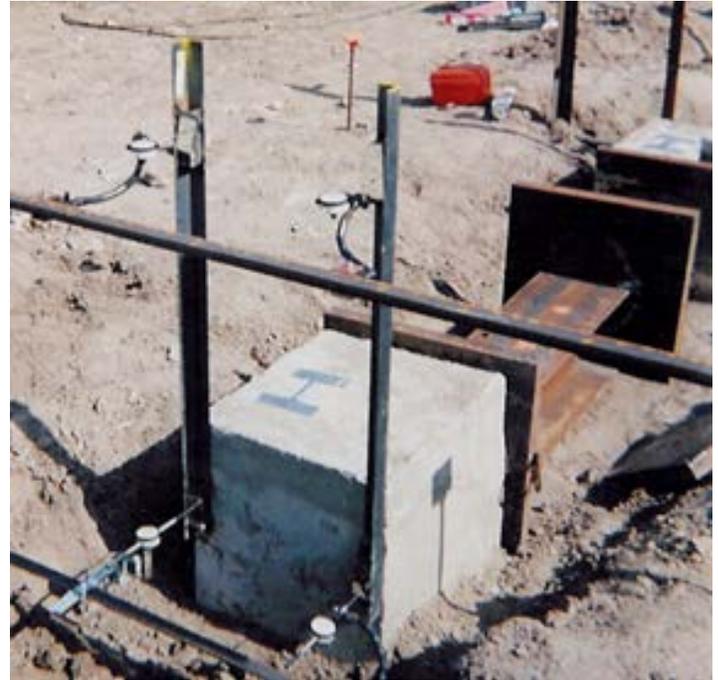
Profiles along the axis of each unit allowed an indication of both anticipated depth to bedrock, and potential variability. Additional cones were located along pipe racks and at building locations, giving a comprehensive understanding of the subsurface geology when combined with existing borings.



Production Pile Installation:

To install production piles, Morris-Shea used two Hitachi base rigs with high torque masts and hydraulic turntables. Average production was approximately 30 piles per rig per day, allowing installation of the approximately 3100 piles

6 weeks ahead of the initial contract schedule, even after the supplemental site evaluation and load testing.



Where pile cut off was above working grade, piles were built up using steel forms, and conversely, where cut off was below grade concrete was dipped to the required elevation. The ability to cast piles to cut off elevation prevents the need to splice or cut piles. In areas with variable bearing layer elevation, such as the Bayside site, considerable splicing and wastage can occur, resulting in considerable cost, schedule delay and the need to cut and remove off site pile cut offs.

The vibration-less installation method of DeWaal piles allowed capping of piles as soon as areas were completed, allowing schedule advantages over precast piles, where concrete cannot be poured within a specified distance of pile driving. Because the DeWaal pile is a displacement pile, with all soils being pushed laterally as the pile is installed, no surface water or spoil is present. This results in no costs associated with spoil handling and disposal, and allows a clean and safe work surface.

The success of design-build projects requires an experienced contractor, able to fit the right foundation option to the site soil conditions and foundation requirements. Morris-Shea, as a full service deep foundation contractor, has both the resources and experience.

Good communication openness and cooperation between the owner, engineering design company and contractor is also essential for a successful design-build project. At the Bayside site, this was achieved and resulted in a successful project in terms of engineering performance, cost and schedule.



Summary Of DeWaal Design-Build Option Benefits:

1. The DeWaal pile alternate, which was a lump sum priced option, produced cost savings in excess of \$1 million over the base bid option.
2. The lump sum bid negated all owner risk associated with pile length overage, splicing costs and cut off and disposal of undriven pile length above cut off.
3. The use of a plastic concrete with the DeWaal system reduces risk of bleed resulting from high pore pressures in fine grained soils.
4. No surface water or spoil is developed with the DeWaal pile, as would be the case with an augercast or drilled shaft option.
5. No lay down areas were needed for storage of precast piles.
6. No delays occurred between test pile completion and start of production pile installation to allow curing of precast production piles piles.
7. The combination of piles cast to the appropriate cut off, and a vibration-less installation allowed immediate access for capping of piles.
8. The high production associated with DeWaal piles produced considerable schedule savings, saving in excess of 6 weeks over the base bid schedule.

More Information:

For more information on The Bayside Power Plant Project, Design-Build or DeWaal Piles, please contact:

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