

## Port Everglades Fuel Storage Tanks

Port Everglades, Florida

Marshy subsurface conditions required ground improvement for the construction of eleven new fuel storage tanks.



### The project

Eleven new 60-foot tall fuel storage tanks, with diameters of 125 feet and 100 feet, were planned for construction on ringwall foundations on a former coastal marsh area reclaimed for industrial development in Port Everglades, Florida.

## The challenge

The site was underlain by soft clayey silt with peat lenses from a depth of 7 to 15 feet. The soft, organic-laden silt layer would experience significant short-term and long-term compression, resulting in excessive settlement of the tanks.

## The solution

Keller designed an innovative mass stabilization program that created a stiff soil matrix beneath each tank. The stiff soil matrix transferred the tank compression loads through the improved soils and to the upper limestone formation at a depth of 15 feet. Soil mixing was also more economical compared to the other options of excavate-and-replace, or deep foundations.

Each tank pad was divided into strips, which were then subdivided into individual mixing cells. Keller first used excavators to temporarily remove several feet of overlying granular fill material, which did not require treatment. Keller used an excavator-mounted mixing tool to complete the blending of the soil mass while special shuttles pneumatically delivered the binder to the head of the mixing tool and into the mix zone.

After mixing, but prior to the initial set of the soil-cement mass, a geo-fabric separator was placed and the granular fill material was replaced over the freshly mixed soil mass. Placing of the fill material compressed the freshly treated soil mass and forced out air pockets that may have formed during mixing.

Keller's design/build mass stabilization provided the owner with an economical foundation completed ahead of schedule. Since construction, the tank foundations over the improved soils have performed well.

## Project facts

### Owner(s)

Vecenergy

### Keller business unit(s)

Keller

### Main contractor(s)

Ranger Construction-South

### Engineer(s)

Dunkelberger Engineering & Testing, Inc.

### Solutions

Ground improvement

### Markets

Tanks

### Techniques

Dry soil mixing

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