

Faraday Launching Tunnel Shaft

Carlsbad, California

During shaft construction, water and soil inflow resulted in a sinkhole at the surface. Keller repaired the leak using jet grouting and densified the loosened soils with compaction grouting.



The project

The Carlsbad Desalination Plant was excavating a 55 foot deep, 18-foot diameter secant pile-supported shaft, installed by another contractor when soil and water leakage occurred due to insufficient pile overlap. The leakage resulted in a sinkhole opening near the perimeter of the shaft.

The challenge

The subgrade surrounding the shaft consisted of 25 feet of fill underlain by 25 feet of alluvium and the bedrock surface at a depth of 50 feet. The groundwater-surface was at a depth of about 27 feet. During the excavation of the shaft, soil and water leakage between the secant piles was encountered and a sinkhole adjacent to the shaft exterior occurred. Additionally, the project site was congested.

The solution

Keller performed compaction grouting to stabilize the sinkhole and jet grouting to restore the continuity of the shaft and seal the perimeter of the excavation stopping the soil and water seepage. Compaction grouting involves the injection of low-slump, low-mobility sand/cement grout to fill voids and stabilize loose soils through displacement. The purpose of the compaction grouting for this project was to stabilize the sinkhole conditions by filling possible subsurface voids and stabilizing the raveled soils.

Once the area was stabilized and made safe, Keller mobilized jet grouting equipment to the shaft. Jet grouting creates soil/cement (soilcrete) geometries in the ground by using high-velocity jets to erode and mix the in situ soil with cement grout. Keller performed jet grouting from a depth of 22 feet to 10 feet below the bedrock surface to construct soilcrete columns adjacent to the exterior of the shaft perimeter to seal any openings between the secant piles. Jet grouting below the bedrock surface targeted fractures or irregularities in the bedrock. Compact equipment was used to safely navigate the congested project site.

Project facts

Owner(s)

Poseidon Resources LP

Keller business unit(s)

Keller

Main contractor(s)

N/A

Engineer(s)

Kiewit Shea Desalination

Solutions

Groundwater control
Support of excavation

Markets

Infrastructure
Tunnels and shafts

Techniques

Low mobility (compaction) grouting
Jet grouting

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