Noland Warehouse

Case Study

Deep Excavation

One challenge was to access the footings of the structure. In the discovery process we found the footings were deep and we needed a temporary shoring system to access the footings for stabilization.

Helical Piers

45 helical piers with retro brackets were used to underpin the foundations and attempt to lift the structure back into place. The helical capacities varied from 20K to 45K ultimate pounds.

Compaction Grouting

Compaction Grouting was performed to fill voids and stabilize soils deep in the ground. Bedrock varied in depth from 85 to 105 feet below grade.

50-YEAR-OLD structure

Noland warehouse is a plumbing supply warehouse in Chattanooga Tennessee. The building was built in 1969 and over the last 10-20 years has been experiencing settlement in the office and warehouse spaces. Amount of settlement is about 6 inches as measured.

Deep Excavation

A speed shore system was installed in order to access the footings

Access

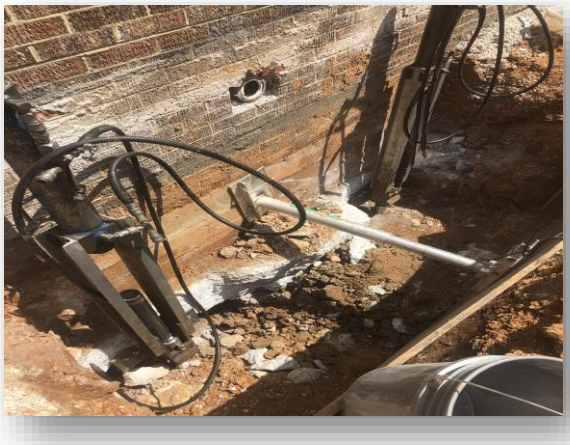
Access to the bottom of the footings was required to install the helical pier. The helical pier retro bracket is a mechanical attachment to the footing. The bottom of the footing was 12 feet below grade. This speed shore system is installed without ever entering the excavation. Once it is secured it can be entered safely, which is important on every job where excavations are deeper than 4 ft.

Helical installation

Ideal Helical Piers

A total of 45 2-7/8" x 12" inch diameter helical piers were installed to 20-40 ft in depth. Each pier was loaded greater than the safety factor of 2.

When lifting a structure of this much size and load, we decided it best to convert to our heavy-duty lifting ram assemblies. This system is fully hydraulic with 80K pounds of lifting capacity out of each ram. Once the assembly is mounted the structure is lifted with the push of a button.



During the lifting process a series of lasers and monitoring devices are being used to watch the lifting process. During lifting there are times that adverse reactions occur to prevent lifting successfully like rotation of the wall which is why we stopped at only 2 inches of lift. Ultimately the foundation is stabile and cosmetic repairs will be made to the structure.

Compaction Grouting

A cap and compaction grouting process was completed in order to stabilize a large sinkhole under the structure.

Bedrock Depths

We were tasked with drilling inside the building in a low headroom scenario, so we used our electric powered rotary track drill to auger and case the grout injections to bedrock. Bedrock varied from 85’ to 105’ ft. The Zone of influence began at 65’ to 70’ ft down to bedrock. This zone of influence consisted of a very soft and wet clay or “muck”. The capping process limited us to only inject 5 yds on top of bedrock and let set for 24 hrs. in hopes of “capping” the top of bedrock. This would create a seal for us to build up on. The compaction grouting process took about 45 days with 21 total injections inside and outside. The final grout quantities injected to remediate the sinkhole was 635 cu yds. All injections were re-drilled in order to verify they were completely full no other voids were present.