Northwest School

Seattle, Washington

Modernization of the historic Northwest School required tight access earth retention and shoring from inside of the existing structure.

The project

The Northwest School on Seattle's First Hill is a four-level brick-clad building, constructed in 1905. Interior renovations and construction of a new three-level addition were planned to modernize the building to current educational needs.

The challenge

The close tolerances of the addition did not permit traditional excavation support and shoring techniques. All strip footings were founded on dense, well-graded sand that ravels upon excavation.

The modernization program required special attention to excavation both outside and inside the building. The plans required the removal of portions of the strip footings due to limited site constraints. Interior and exterior excavation depths ranged from 5- to 12-feet. Excavations were required to allow the facility to meet ADA standards.

The solution

Keller provided a shoring design that utilized permeation grouting techniques with microfine cement. Permeation grouting produces sandstone-like masses strong enough to support and protect structures and utilities during nearby excavation. The permeation process is less disruptive and often more economical than conventional shoring, and can be performed in limited access situations.

To provide excavation support of both interior and exterior strip footings in addition to a heavily loaded footing adjacent to a planned 10- to 12-foot deep elevator pit, Keller installed sacrificial sleeve port grout pipes vertically within the interior and battered underneath the building from the exterior. Microfine cement grout was then injected in a primary/secondary fashion utilizing various mix ratios, additives, and injection flow rates to generate a sandstone-like mass beneath all exposed footings and cuts.

The absence of additional shoring and excavation support measures traditionally required for this work allowed for minimal disturbance to the existing structure. Completed on schedule, the use of microfine cement permeation grout caused only minimal impact to the existing school and provided a smooth, clean, and secure shored surface where vertical excavation was required.

Project facts

Owner(s)
Northwest School

Keller business unit(s)
Keller

Main contractor(s)
Lease Crutcher Lewis

Engineer(s)
Zipper Zeman Associates Inc.

Solutions
Support of excavation

Markets
Institutional
Education

Techniques
High mobility (cement slurry) grouting

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