

***The loads imposed by a new dormitory for Kutztown University would have created significant settlement due to the loose soil and fill beneath the surface. Based on Menard's assessment of the ground conditions, Controlled Modulus Columns™ (CMCs) offered the client an alternative technology that provided an economical solution, met performance criteria, and met scheduling requirements for the project.***



*Menard installed 256 CMCs to depths ranging from 11 to 14 feet. The CMCs were installed via a displacement auger that generated virtually no spoil.*

**Owner:** Kutztown University  
**General Contractor:** Quandel Group  
**Owner's Geotechnical Engineer:** GeoScience Engineering Company  
**Ground Improvement Contractor:** Menard

### Project Summary

The proposed Kutztown University dormitory building was to be built on a site with soils that were unsuitable for the construction of such a structure. The building is a 3-story masonry shearwall dormitory on 2-foot-wide strip footings and slab on grade. The loads imposed by the dormitory would have created unacceptable settlement of the uncontrolled fill soils at depth. Although several ground improvement options were available to the client, Menard was able to develop an alternate approach that saved the client both time and money.

The footing elevations were below the proposed working surface and set at varying elevations. Accordingly, the ground improvement design and installation would need to accommodate the low cutoff of ground improvement elements or inclusions.

### Ground Conditions

This site is underlain by silty sand with gravel and very loose fill material of variable thickness throughout. The fill material consisted of a very loose sand and gravel and ranged from 2 to 14 feet in thickness. Based upon the geotechnical analysis, the native soils and fill material were not suitable for direct bearing due to the likelihood of unacceptable total and differential settlement.

### Ground Improvement Solution

The Controlled Modulus Columns (CMCs) elements were designed using proprietary software developed by Menard, creating a solution that reduced settlement to within design specifications.

Menard installed 256 CMCs to depths ranging from 11 to 14 feet. The CMCs were installed via a displacement auger that generated virtually no spoil. The auger displaces the soil laterally to improve the soil.

Menard was able to accommodate the client's requirement to cut the elements off at depths up to 5 feet below working surface. This was accomplished by employing specially developed tools and auguring techniques that left the top of each element at the client's desired elevation.



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