

BRANDEIS UNIVERSITY SHERMAN HALL ADDITION

Location: Waltham, MA

Project Type: School



DUROTERRA



DUCTILE IRON PILE ADVANTAGES

- Rapid installation
- Cost-savings compared with helical anchors
- Low vibrations

INTRODUCTION

The existing 1- to 2-story Sherman Hall on the campus of Brandeis University was slated for expansion with a 1-story building addition. The building addition was lightly-loaded but immediately adjacent to the existing building.

GEOTECHNICAL CONDITIONS

The subsurface conditions encountered in the explorations were highly variable. Soils present in the eastern portion of the building footprint included shallow granular fill underlain by very dense glacial till. The central and western portion of the site encountered loose to medium dense sand fill underlain by up to 7 feet of very soft peat and organics followed by glacial outwash sand and silt and then dense glacial till. Groundwater was encountered at about 5 feet below ground surface.

PROJECT CHALLENGES

Construction of the building addition on a highly-variable site with a rapid summer schedule between semesters.



DESIGN & CONSTRUCTION SOLUTION

Construction was scheduled to occur during the summer months and required rapid installations to complete the work. Original plans required building foundations bear on shallow glacial till on the east end of the site, and helical piles in the area of deep fill and organics on the west end. An alternate approach using Ductile Iron Piles as an alternative to the helical piles was proposed and accepted by the design team due to the cost and schedule advantages.

The alternative design used 15 ton Ductile Iron Piles consisting of a 118/7.5 series pile (118 mm diameter pile with a 7.5 mm wall thickness). The low vibration, modular pile system is driven using a high frequency percussion hammer that generates vibrations of less than 0.5 inches / second during driving, allowing for installations in close proximity to the existing building. The piles were designed to penetrate through the fill, organics and outwash sand to terminate on the glacial till. Piles developed geotechnical capacity by achieving "set" on the dense conditions when the rate of installation was less than 1 inch of penetration in 50 seconds or more.

Helical Drilling rapidly installed a total of 20 Ductile Iron Piles in one production day at the site. The interior of the piles were then grouted and the piles were cut and capped – ready for incorporation into the pile caps.



PROJECT TEAM

DIP Design/Build Partner: Helical Drilling, Inc.
Geotechnical Engineer: McPhail Associates, LLC
General Contractor: Sodexo North American Solution Center
Structural Engineer: Simpson Gumpertz & Heger, Inc.