



UNITED STATES

Project Sophia Wilmington, DE



Owner
Amazon

Engineer
Langan Engineering

General contractor
Clayco Corporation

Dates of work
February 2020 May 2020

Main figures

Controlled Modulus Columns
4,603 EA.



Description

As part of its ever-expanding footprint, Amazon proposed the development and construction of a five-story, 823,000 sq-ft warehouse in Wilmington, DE. The proposed location, which once served as a General Motors Assembly Plant, is at 1025 Boxwood Road in Wilmington, which is two miles from the I-95 corridor. The new facility would be the third such Amazon fulfillment center in Delaware. Small items such as books, electronics, household goods and toys would be shipped from the location. Amazon planned to hire upwards of 1,000 employees upon completion of the structure.

Due to the variability in soil stiffness/type over the warehouse footprint, ground improvement was required to prevent differential settlement and improve bearing capacity for the foundations. To further identify the soil properties at each footing location and design a unique ground improvement solution that fit the loading condition and soil profile, Menard proposed an additional investigation that included a series of Cone Penetrometer Tests (CPT). Controlled Modulus Column (CMC)[®] rigid inclusions were ultimately selected to support the new warehouse.



Ground conditions

The site soil consists of miscellaneous deposits of dense/loose granular fills, stiff clays, silty/loose sands and miscellaneous fills. The water table ranged from approximately 9- to 10-ft deep.

Solution

Ground improvement utilizing stone columns or rigid inclusions was recommended for foundation support. Given the variability in soil conditions, the "one size fits all" approach was not economical or technically sound. Given this challenge, Menard's CPT investigation included every column location. This was done to properly identify the soil profile. Evaluation of the CPT results concluded a robust ground improvement program would be required. CMCs were chosen as the solution. Menard classified each soil profile as "good" or "bad." A pre-design footing analysis for both soil conditions determined the amount of CMC support required for each individual footing. This ensured that each footing would receive the correct amount of CMC support, while alleviating concerns for differential settlement between the column bays. While the CPT investigation and CMC installation were being performed, close coordination was required between Menard design engineers and the field crew to ensure CMC locations and depths were communicated in a timely manner to prevent delays.

This project highlights Menard USA's ability to not only adapt to a fluid project, but a geotechnically challenging environment. With an abbreviated bid timeline and incomplete information, a plan was developed to ensure the client's schedule and technical obligations were met in a fast-paced environment. Menard successfully installed 4,600 CMCs to support a new Amazon warehouse in Wilmington, DE.