Industry

Grand River Aseptic Manufacturing (GRAM) Plant

UNITED STATES

Grand Rapids, MI

Owner
Grand River Aseptic Manufacturing

Engineer
Engineering Design Solutions (Structural), Materials Testing Consultants (Geotechnical)

General contractor
CRB

Dates of work
02/2019 to 03/2019

Main figures

Controlled Modulus Columns (CMC)®
681 EA.

Description

Grand River Aseptic Manufacturing (GRAM) in Grand Rapids, MI, is a parenteral Contract Development Manufacturing Organization (CDMO) with a decade of pharmaceutical manufacturing experience in biologics and small molecules, delivering high-quality services for clinical and commercial products. The company proposed the construction of a two-story, 60,000 sq-ft facility equipped with industry leading technologies that support projects using high-speed, state-of-the-art manufacturing and packaging equipment. The new large-scale, fill-finish facility would accommodate customer and industry-wide demand for Current Good Manufacturing Practice regulations parenteral drug manufacturing, analytical testing and regulatory filling services.

Due to the scope of the project, and the existence of loose soils and voided karstic bedrock at the site, Menard Group USA and sister company Nicholson Construction Company (NCC) were contracted to provide ground improvement – the selected techniques were Controlled Modulus Column (CMC)® rigid inclusions and low-mobility grouting (LMG).

Ground conditions

The soil generally consisted of 10-15 ft of fill over sand and gravel outwash, which increased in density with depth. Shale and gypsum bedrock were encountered approximately 50 ft below grade. Because of voids in the gypsum bedrock layers due to karstic weathering, it was necessary to both remediate the voids and fracture in the bedrock and to reinforce the soft overburden.

Solution

Micropiles were originally considered for foundation support. However, the owner sought a second opinion and the geotechnical engineer, Material Testing Consultants (MTC), contacted Menard and its sister company Nicholson Construction Company (NCC) about a CMC and low mobility grouting (LMG) solution. (MTC had worked previously with the companies on two projects close to the Grand Rapids site). This alternate solution proved to be both economical and time saving for the owner.

NCC performed LMG to fill voids at select locations across the site within the weathered bedrock. This technique is proven to prevent further void development and settlement in the Grand Rapids area. Menard installed CMC rigid inclusions that terminated in the dense sand layer that was present above the weathered bedrock. This combined design of CMC rigid inclusions and LMG was not only more economical than a deep foundation system that would have extended into the bedrock, but also offered substantial savings in the foundation itself by allowing the client to eliminate grade beams, pile caps, and structural slabs and utilize shallow foundations. Menard's solution included the use of 681 CMCs that were installed beneath the spread and strip footings to a maximum depth of 60 ft. The design provided for 1 in of post-construction settlement with less than a ½-in of differential settlement, meeting the performance criteria for the new building.