

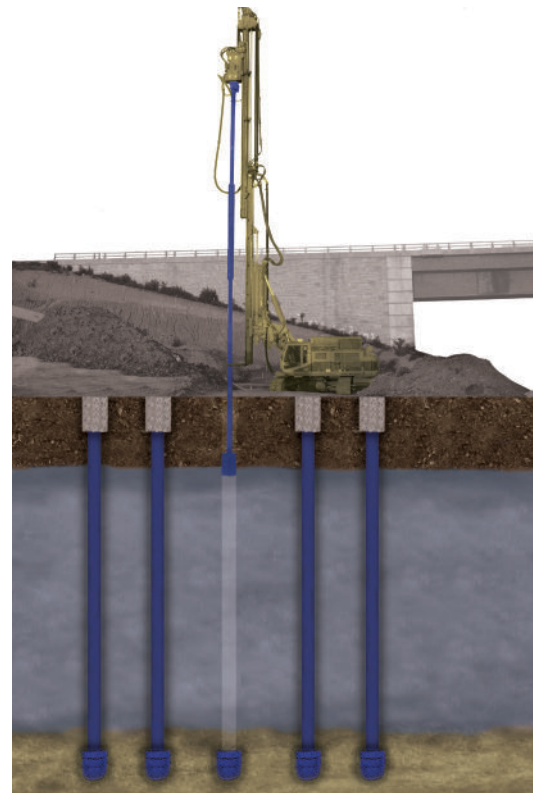
GEOPIER GEOCONCRETE® COLUMNS

INTERMEDIATE FOUNDATION® SOLUTIONS



Geopier GeoConcrete® columns (GCC's) provide a cost-effective solution to support heavy applied loads and control settlement at sites with weak and compressible cohesive and organic soils overlying dense soils or rock. The system provides this reinforcement by matching high modulus elements with the low modulus soil to control settlements. GCC's are installed through a patented displacement process by driving a hollow mandrel to the design depth while simultaneously pumping concrete. The process forms an enlarged concrete base to efficiently develop resistance. Unlike Geopier's Rammed Aggregate Pier® systems, GeoConcrete® Columns are only rammed at the base; following the creation of the bottom bulb, the mandrel is extracted while continually pumping concrete under pressure.

The GCC's then support engineered footing pads and high-bearing pressure shallow footings or mat foundations to provide settlement control. GeoConcrete Columns are an effective replacement for deep foundations including driven piles, drilled shafts or augercast-in-place piles or time-consuming surcharging.



ADVANTAGES OF GEOCONCRETE® COLUMNS

- ▷ **STRONG AND STIFF** The high modulus, rigid concrete element with an expanded bottom bulb transfer heavy loads through weak soils layers and into a suitable dense bearing layer to effectively control settlement.
- ▷ **QUALITY** The GCC system allows for robust quality control monitoring during the construction process, ensuring the installation of a high quality ground-improvement product.
- ▷ **DEPTH** Treatable depths greater than 40-ft.
- ▷ **FAST** Rapid Installation process means shorter schedules.
- ▷ **ECONOMIC** Often results in cost savings compared to traditional deep foundation alternatives.
- ▷ **ENGINEERED** Projects are engineered in-house by Geopier Professional Engineers, allowing for rapid response when design.

THE CONSTRUCTION PROCESS

1. A specially designed proprietary closed-system mandrel and tamper foot is driven into the ground using a strong static force augmented by dynamic vertical impact energy. The GCC's are typically installed to depths ranging between 10 to 50 feet. The mandrel includes a sacrificial cap or the provision of internal flow restrictors to prevent soil from entering the tamper foot and mandrel during driving. The process displaces soils laterally, resulting in densification and reinforcement.
2. During driving, concrete is pumped through the closed-system mandrel into the driving head. Once reaching design depth, concrete pumping continues while the mandrel is raised approximately four feet and then driven back down within one foot of the original design depth. The driving head engages the concrete and forces it downward and outward to form a bottom bulb. The bulb is enlarged by repeating the process using a site-specific driving cycle until the bottom bulb meets the design requirements. This process results in the creation of an enlarged base that affords significant composite load transfer to competent lower materials. The mandrel is then raised to the top of the column's elevation while continuously pumping concrete under pressure to form the GCC shaft.
3. Because of their stiffness, GeoConcrete Columns attract high stresses that must be transferred from the supported structure to the installed elements. This typically results in the design and construction of a gravel pad between the tops of the GCCs and the bottom of supported footings or other structural elements.
4. After the GeoConcrete Columns are constructed, the engineered fill pad is then placed over the ground to provide a suitable interface between the tops of the GCC elements and the bottom of the shallow foundation.

APPLICATIONS

Geopier systems have become preferred replacements for massive over-excavation and replacement or deep foundations, including driven piles, drilled shafts or augered cast-in-place piles. Local Geopier engineers and representatives work with you and your specific soil conditions and loads to engineer a project-specific practical solution to improve your ground. With multiple systems we are able to engineer support for virtually any soil type and groundwater condition across many applications, including:

- ▶ Foundations
- ▶ Floor Slabs
- ▶ Industrial Facilities
- ▶ Storage Tanks
- ▶ Liquefaction Mitigation
- ▶ MSE Walls/Embankment Support
- ▶ Slope Stabilization
- ▶ Transportation
- ▶ Wind Turbines
- ▶ Uplift & Lateral Load Resistance



11th Street Bridge
Washington, D.C.



The Grand Condo
Cambridge, Ontario



South Dundas Wind Project
Brinston, Ontario



North Hartford Minor League Ballpark
North Hartford, Connecticut

Geopier Foundation Company developed the Rammed Aggregate Pier (RAP) system to provide an efficient and cost effective Intermediate Foundation® solution for the support of settlement sensitive structures. Through continual research and development we've expanded our system capabilities to offer you more. Our design-build engineering support and site specific modulus testing combined with the experience of providing settlement control for thousands of projects provides an unmatched level of support and reliability to meet virtually all of your ground improvement challenges.

Work with regional engineers worldwide to solve your ground improvement challenges.

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