

# Central Corridor Railroad Grade Separation Wichita, Kansas

Geopier® Rammed Aggregate Piers™

## Project Team

**Geotechnical Engineer:** HNTB

**Structural Engineer:** HNTB

**Owner:** City of Wichita

**General Contractor:** Dondlinger & Sons Construction

**Geopier Installer:** Peterson Contractors, Inc.

**Geopier Designer:** GFC – Midwest

**All construction was performed while maintaining railroad operations through the area and reducing the impact of construction on both rail operations and city traffic.**

## Project Overview

### Description:

Construction of approximately 20,000 feet of precast concrete (T-Wall) retaining wall ranging from 3 to 25 feet with approximately 5,000 feet of wall 25 feet or more in height along with 9,000 feet of temporary Mechanically Stabilized Earth (MSE) wall ranging in height from 3 to 25 feet.

### Subsurface Conditions:

Highly variable thicknesses of uncontrolled sand fill overlying variable thicknesses of compressible silt and clay soils, up to approximately 27 feet below grade. These unsuitable bearing zones were underlain by generally medium to dense native fine to coarse sands subsequently underlain by shale bedrock. The design groundwater level was established at 13 feet below grade.

### Geopier Solution:

The Geopier Intermediate Foundation System design consists of Geopier Rammed Aggregate Pier (RAP) spacings of approximately 7.5 feet and 8 feet on-center along the lengths of the alignments directly beneath the T-Walls and temporary MSE walls, respectively. Slightly wider spacings are incorporated in limited areas where the lower zone sands



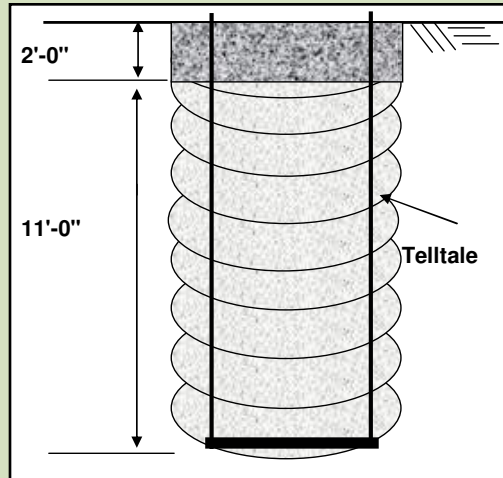
are shallow and/or shorter walls heights are planned. The design solution was incorporated to meet and exceed bearing capacity, global stability, and settlement requirements set forth in the project specifications. The Geopier System resulted in lower cost compared to conventional deep foundations or overexcavation and replacement, provided a faster construction schedule, eliminated the need for extensive temporary shoring, and reduced groundwater impacts. Approximately 7,700 RAPs were designed for support of the extensive retaining walls and heavy rail loading.



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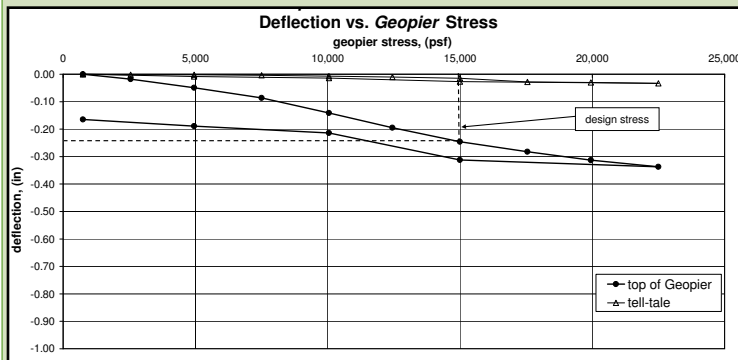
## Modulus Test Pier Setup



The non-production RAP used for modulus testing was installed through the fill to a depth of 11 feet. A steel telltale plate with sleeved rods extending to the ground surface was installed at a depth of two feet above the bottom of the RAP. Deflection measurements of the telltale assembly located at a depth of 11 feet in the RAP were taken during the modulus test. The results of the telltale deflection provided an indication of the amount of stress dissipation within the RAP. A two foot thick concrete cap was poured over the top of the RAP for testing purposes.

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## Modulus Test Results



The results of the modulus test indicate that a deflection of 0.246 inches was observed at the maximum top-of-RAP design stress of 14,996 psf. The corresponding RAP stiffness modulus of 423 pci exceeded the assumed design stiffness of 150 pci by more than triple. At the 150% design stress level of 22,495 psf, a deflection of 0.337 inches was noted. The corresponding RAP stiffness value was 464 pci. The results of the modulus test provided confirmation of the assumed design parameter values and indicated superior performance.

**FOR MORE INFORMATION**

Contact Geopier Foundation Company at **800-371-7470**

or at **www.geopier.com**



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*The Intermediate Foundation System*