



Both photos taken at Pier P2, with a view to the west. At left: Vibratory probe grid prior to the start of the densification. Note the close proximity to existing bridge. At right: Densification of the subgrade using vibratory probes.

Metro North's Croton Point Avenue Bridge Replacement

Croton-on-Hudson, New York

Project Highlights:

- ▶ Geotechnical Investigation
- ▶ Evaluation of foundation alternatives for Bridge-Type Study and design of final foundation
- ▶ Design of surcharge scheme for approach embankment
- ▶ Design of spread foundations for bridge piers
- ▶ Prepared contract drawings for earthwork, soil densification and monitoring of adjacent structures
- ▶ Resident engineering services during testing

Mueser Rutledge Consulting Engineers (MRCE) performed a geotechnical investigation, evaluated the foundation types for a Bridge-Type Study, and provided preliminary and final foundation design for this vehicular bridge spanning Amtrak's main line and Metro North's rail yard, and adjacent to the existing bridge. The bridge alignment is underlain by loose sand deposits that become denser with depth. There is an old organic silt and peat filled channel extending beneath the west approach embankment. The firm considered shallow and deep foundations for bridge and pier abutment support. The final design includes shallow foundations over sands densified by vibratory probes and proof-rolling, and provides an economical foundation that meets recent FHWA seismic design criteria. MRCE designed a surcharge scheme for the approach embankment to preload the organic silt and peat filled channel and minimize post construction settlement.

MRCE designed the spread foundations for the bridge piers and prepared contract documents for the earthwork, soil densification and monitoring of adjacent structures. Soil densification procedures specified included vibratory probe test sections with monitoring of ground surface subsidence and cone penetration testing to aid in optimizing the probe spacing.

During construction, MRCE provided a geotechnical engineer to oversee the densification test section work. MRCE evaluated the results of the test sections and selected the final probe spacing. MRCE made periodic site visits during production densification and reviewed the settlement data for each pier. As the work progressed, MRCE modified probe spacing as local utilities were exposed to avoid intolerable settlement.