

# Cairo Bridge Replacement

Cairo, West Virginia



Shaft Profile and Verticality using the SHAPE

Project Information
Owner: West Virginia Department of Highways
Client: Burgess & Niple
Project Name: Cairo Bridge Replacement over the North Fork Hughes River
Test Foundation Type & Size: SHAPE 36" in-Dia. Drilled Shaft SQUID 36" in-Dia. Drilled Shaft
Testing Completion Date: February 2019

  

GRL Services Provided
<ul style="list-style-type: none"><li>▪ Shaft Base Cleanliness Evaluation (SQUID)</li><li>▪ Drilled Shaft Profile and Verticality Evaluation (SHAPE)</li><li>▪ Cross-Hole Sonic Logging</li></ul>

  

<b>GRL OFFICE: OHIO</b>
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A study performed in 2015 proved the 18'-5" wide bridge in Cairo, West Virginia to be insufficient for the ADT that the city needed. When it was first built in 1925, the bridge was able to sustain the small city and its people. Placed on a major road, the bridge connects route 31 over the North Fork Hughes River and is considered a pertinent structure. After rehabilitation to the bridge in 1976 as well as 1989, the need for a new structure grew as the old bridge withstood a considerable amount of deterioration. The growing need for truck traffic was due to the growth of the oil and gas industry in Cairo.

Burgess and Niple were called upon to tackle the project. The landscape, embedded with sandstone, siltstone, shale, limestone and coal, demonstrated the need to address the geotechnical variables in the design. Once the coal bed mapping determined there were no active mining permits, the risk of active mining diminished. The river also had a susceptibility to flooding, due to the surrounding valley walls and the steep hillside. Scour at the pier locations was also of concern. All of these factors were considered and incorporated into the new design.

GRL Engineers collected data for shaft verticality and profile for each shaft with the [Shaft Area Profile Evaluator \(SHAPE\)](#). Once deployed into the shaft, the SHAPE device provided a 360-degree view of the shaft, within ten minutes. Additionally, the shaft bottom cleanliness was evaluated using [the Shaft Quantitative Inspection Device \(SQUID\)](#). The SQUID was deployed to check the cleanliness of the bottom of the bore hole just prior to rebar and concrete placement. Working quickly and efficiently, the shaft data was available for evaluation. Upon successful completion of the tests, concrete was poured and the bridge formation was underway.

Once the concrete was cured, GRL performed [Cross-Hole Sonic Logging \(CSL\)](#) on each shaft using the CHAMP-Q. Satisfactory CSL results provided the final approval of the foundations and for bridge construction to continue.



Drilled shaft profile / verticality evaluation being performed



Drilled shaft base cleanliness evaluation being performed

For additional information, please contact: [info@grlengineers.com](mailto:info@grlengineers.com)

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