

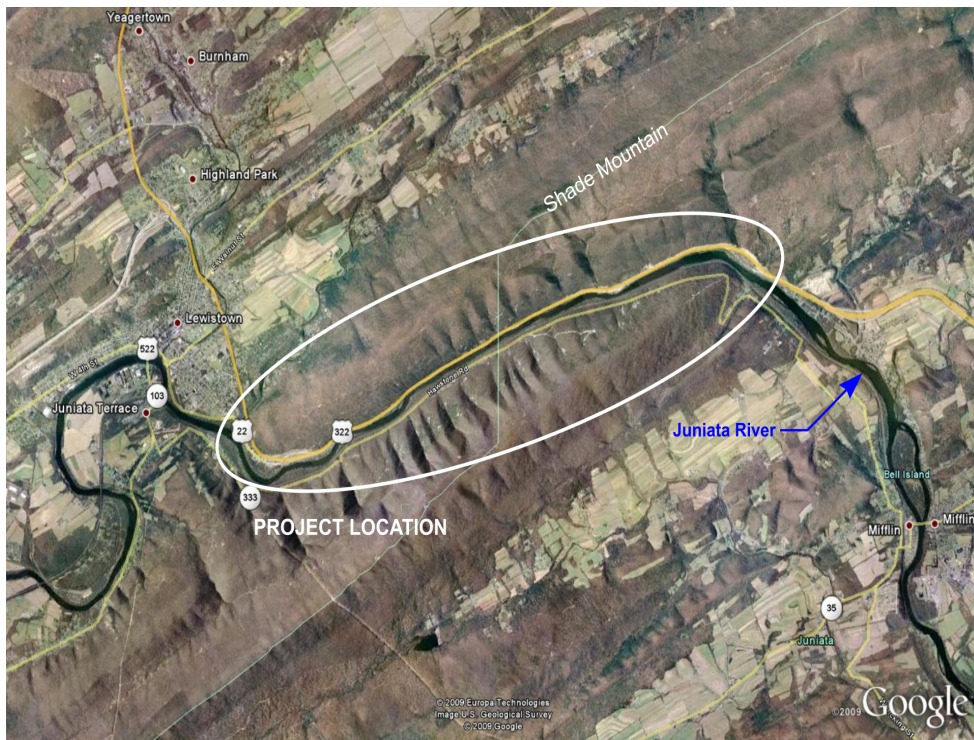
PROJECT PROFILE

RETAINING WALLS AND SLOPE STABILIZATION AT LEWISTOWN NARROWS

D'Appolonia was retained as part of a multi-firm team to provide engineering services through the Pennsylvania DOT Central Office Bureau of Design, Bridge Quality Assurance Division under an open-end agreement for a period of four years. D'Appolonia's involvement as a subconsultant under the agreement related to evaluation of special bridge foundations, earth retaining structures, and soil-structure interaction systems.

D'Appolonia's first two work orders under this agreement involved the development of design procedures for and general consultation and design review services related to the use of micropiles to stabilize marginally stable slopes and retaining walls on the Lewistown Narrows road reconstruction project along U.S. Route 22/322 in Juniata and Mifflin Counties, Pennsylvania. This project involved widening of 6.65 miles of the highway to four lanes using a side-hill cut and fill on a steep slope above the Juniata River and at the foot of Shade Mountain. The construction included steep cuts and retaining-wall-supported fills on steep, marginally stable, talus-covered slopes.

D'Appolonia supported the engineering design team in developing a design phi-



Aerial photo showing project location in Mifflin and Juniata Counties, Pennsylvania.

losophy and analysis procedures for geotechnical and structural design of micropile, drilled-shaft and driven-pile foundations to improve the stability of talus slopes to acceptable levels of global stability and to support retaining walls used for grade separation between opposing highway lanes. The use of micropiles offered substantial cost and construction time savings over the

originally proposed drilled-shaft foundations. D'Appolonia developed recommendations for analyses, using a variety of computer programs (COM624P, STAAD, FB-Pier and PASTABLM) to assess loads on and reactions and capacities of micropiles in resisting potential deep-seated landslide forces. The final design required nearly 43 linear miles of micropiles to achieve satisfactory factors of safety for global stability of the road reconstruction area.

When completed well ahead of schedule in late 2007, this highway project included more than four miles of retaining walls, with two mechanically stabilized earth walls, one of which was more than two miles long. In addition, the project included nine reinforced-concrete retaining walls totaling approximately 8,300 feet in length. There were also more than 46 linear miles of pipe piles and 15 linear miles of H-piles in project walls and bridge foundations.

The completed highway has two 12-foot-wide lanes in each direction with 10-foot-wide outside shoulders. Inside shoulders vary from four to nine feet.



PADOT photo of retaining wall construction along the Juniata River.