# PROJECT PROFILE

## CHICKAMAUGA LOCK REPLACEMENT — LANDWARD COFFERDAM

D'Appolonia provided geotechnical consulting and Independent Technical Review services to the Bergmann Associates and Ben C. Gerwick Joint Venture in executing feasibility studies for innovative "In-the-Wet" alternatives for the new 110-foot-wide by 600-foot-long replacement lock on the Tennessee River near Chattanooga. Concepts designed and evaluated for constructing the new lock included lift-in and float-in construction, cofferbox and various staged in-coffercell options. Specific project tasks included:

- Development of four innovative lock designs to the concept level.
- Evaluation of designs in comparison to full perimeter cellular cofferdam associated with a conventionally constructed lock.
- Performance of cost comparisons with MCACES software.
- Assessment of constructability issues, generation of schedules, evaluation of risk, and development of advantages and disadvantages for each alternative.
- Preparation of a comprehensive feasibility level report with findings and recommendations.

The project scope of work also included providing preconstruction planning services to the Nashville District to assist development of the sequence of construction activities and to develop potential site layouts for efficient construction operations:

- Assessment of contractor work areas, construction site logistics, personnel, and material and equipment transport issues.
- Development and evaluation of a broad range of potential alternatives for staging and laydown areas, batch plant locations, concrete transport and control, fabrication areas, and decommissioning scenarios for the existing lock.
- Generation of network diagrams to portray construction sequence and to develop recommendations for preferred site planning alternatives.

The project team developed and evaluated concept designs for innovative cofferdam and lock wall options for overcoming potential difficulties associated with the landward arm of a conventional cofferdam. Concepts were developed to address: (1) potential clearance issues between the new construction and existing operational lock and (2) new construction and foundation design issues associated with difficult geotechnical conditions at the site.

*Chickamauga Lock on the Tennessee River.*

The study provided key data on innovative cofferdam/lock wall concepts and a landward lock wall concept supported wholly/partially on drilled shaft foundations and provided a basis for comparison of conventional and innovative cofferdam, lock wall, and foundation options. Key aspects of the work included:

- A design study of an innovative landward cofferdam from its connection to the existing dam to the downstream bend of the cofferdam using both float-in and lift-in cofferdam options. Cofferdam foundation options included both a prepared rock surface and drilled shafts. Locations where each foundation type would be most advantageous to the design were identified.
- Design studies for the landward lock wall section that accompanied the completed landward innovative cofferdam, either float-in or lift-in, with foundation options matching the adjacent innovative cofferdam.
- Stability analyses, alternative foundation designs, risk and constructability assessments, quantity and cost estimate preparation, review of site development impacts, coordination with the USACE geotechnical design consultant, assessment of dam and cellular cofferdam tie-ins, and performance of related innovative cofferdam and lock studies.