



Geosyntec provided engineering and seismic studies to determine that the Sylvan Lake Dam in Rome City, Indiana is safe and stable.

Client: Confidential

Services Provided:

- Slope stability analysis
- Site seismicity evaluation and liquefaction analysis
- Formal technical dam inspection
- Uplift stability analysis
- Pore pressure monitoring and interpretation
- Dam inspections and reports
- Emergency Action Plan implementation assistance

Project Objective

Sylvan Lake Dam is a high hazard dam located in Rome City, Indiana. The dam was originally constructed in 1837, and failed twice before 1860. Since that time, the dam has been stable. Today, Rome City's economy relies on the tourist attraction of Sylvan Lake as a prime source of income.

In 1994, the Indiana Department of Natural Resources (IDNR) required the dam's owners, the Rome City Conservancy District (RCCD) and the State, to implement specific remedial design measures including clearing and re-grading the downstream slope and significantly increasing spillway capacity with the addition of two overflow weirs and a tainter gate. Seepage on a localized area of the downstream slope was mitigated by the construction of a cutoff wall in the area of seepage. RCCD retained Geosyntec in 2004 to address concerns in a report prepared by the U.S. Army Corps of Engineers (USACE) which indicated that Sylvan Lake Dam may require substantial remedial measures to meet safety and performance requirements for a high hazard dam in Indiana.

Geosyntec's Scope of Services

The USACE's concerns included the potential for: (1) instability resulting from a seismic event; (2) excessive uplift pressures near the toe of the dam; (3) instability resulting from apparent clogging of a downstream face drain; and (4) overtopping of the dam during a Probable Maximum Flood (PMF) event. To address these concerns, Geosyntec performed formal technical inspections that included a comprehensive review of all historical data, including pore pressure data for five years obtained from 50 piezometers in the dam, and a visual inspection of the dam and all appurtenant facilities. The visual inspection included testing the operational capabilities of the tainter gate emergency overflow system. Geosyntec also performed extensive static and dynamic slope stability analyses using the available data and made estimates of the total spillway capacity. Geosyntec has continued with bi-annual dam inspections in 2006 and 2008 and monitored some of the maintenance work as a result of these inspections.

Geosyntec concluded that the downstream slope is stable for both static and dynamic design cases. Calculations indicated that the slope would be sufficiently stable during an extreme loading case resulting from a high water level during the PMF. Pore pressure measurements from five years of historical data were used to show that the toe drain and geocomposite slope drain are functioning properly. As a result of the review, Geosyntec recommended a modest suite of additional remedial measures for the dam including modification of the existing fuse plug emergency spillway and installation of pore pressure relief wells in the downstream toe area of the dam. IDNR reviewed Geosyntec's recommendations IDNR in 2007, and some of these recommendations were subsequently implemented in 2007 and 2008. Others are planned contingent on receiving adequate funding.

Notable Accomplishments

Completion of Geosyntec's stability assessment and inspection report submittals has provided time for the RCCD to proceed with repair and monitoring recommendations, as well as preparation of the Sylvan Lake Dam Emergency Action Plan (EAP). The EAP has since been completed and Geosyntec is RCCD's On-call Engineer. Geosyntec is currently in the process of preparing an updated O&M Manual.