



# Emergency I-696 abutment wall repair • Southfield, Mich.

## CHALLENGES

- Emergency repair timeframe and conditions
- Maintain traffic on service-drive and expressway at all times
- Vibrationless installation required due to existing structure's instability

## SOLUTIONS

- Innovative use of reinforced earth technology for retaining wall backfill provided all reconstruction
- Design a temporary earth support system with components that could be installed with minimum levels of vibration

## SERVICES

- Geotechnical investigations
- Geotechnical engineering
- Earth retention system design
- Construction engineering services

## G2 Consulting Group engineers emergency repair to I-696 abutment wall

G2 Consulting Group provided geotechnical engineering design and construction engineering services vital to the emergency stabilization of a south abutment wall along eastbound I-696 at Evergreen Road in Southfield, Mich.

Regular inspections conducted by the Michigan Department of Transportation (MDOT) detected a severe incline in the abutment wall. After analyzing geotechnical and survey data from MDOT, G2 engineers and technicians – in conjunction with Posen Construction Company of Shelby Township, Mich. – developed a plan to investigate, evaluate and stabilize the 27-foot high concrete gravity retaining wall.

G2 designed a temporary and economical earth retention system of vertical earth-anchor-supported wide-flange steel soldier piles and horizontal timber lagging. The design provided multiple benefits. It created a safe environment for excavating soil from behind the unstable retaining wall. In turn, the excavation unloaded the existing wall and also let the G2/Posen/MDOT team investigate the problem wall and develop a corrective action.

Earth anchors incorporated in G2's design minimized lateral movement of the compromised wall, which allowed vehicle traffic to continue along the service drive during construction and helped stabilize nearby subsurface utilities.

Once the wall was exposed, MDOT's investigation determined that it had rotated and had not structurally failed. G2 developed a corrective plan to unload the existing retaining wall by placing backfill behind it using reinforced earth methods. Engineered granular soils were compacted and placed along with geotextile fabric at specific intervals. The result is a freely draining backfill that is self supporting and minimizes the amount of lateral load on the existing retaining wall structure.