

Annual Summary Project

Surficial Geologic and Liquefaction Susceptibility Mapping in Shelby County, Tennessee

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Investigation Untaken During Year One

This is the first year of a two year geologic and liquefaction susceptibility-mapping program. We are mapping the Germantown, Memphis Northeast, and the Ellendale 7.5 minute's quadrangle in the city of Memphis and Shelby County, Tennessee([Fig.1](#)). In a previous study we mapped the Collierville and Memphis Northwest 7.5' quadrangles (Van Arsdale et al., 1998; Broughton et al., 1999; in press) These five quadrangles align along a generally east-west line through Shelby County and contain the Wolf River. Results from our previous work have resulted in identifying earthquake liquefaction induced sand dikes exposed in cut banks of the Wolf and Loosahatchic rivers in the Memphis NW and Collierville quadrangles. The first year of this current two-year project involved geologic and liquefaction reconnaissance in the Memphis NE, Ellendale, and Germantown quadrangles. The Wolf River was floated and sand dikes were found along the Wolf River in the Memphis NE and Germantown quadrangle([Fig.1](#)). A second focus for this year one has been the acquisition and interpretation of 428 boring logs and well data for the three quadrangles. Geotechnical boring logs from Hwang et al. (1990; 1999), new engineering company boring logs, and boring logs from the Tennessee Department of Transportation were obtained and geologically interpreted. In addition, water well logs were obtained from the USGS and Shelby County Health Department.

Results of Year One

A total of 165 subsurface boring and well logs were interpreted for the Germantown quadrangles (Fig.2), 124 in the Ellendale quadrangles (Fig.3), and 139 in the Memphis NE quadrangle (Fig.4). Structure contour maps will be used in constructing cross section upon completion of the surface geologic mapping and will be very important in making the liquefaction susceptibility maps since these data reveal the important in making the liquefaction susceptibility maps since these data reveal the distribution and allow thickness determines of the shallow subsurface strata.

Non-Technical Summary for Year One

The purpose of this project is to make geologic and liquefaction susceptibility maps of the Memphis Northeast, Ellendale, and Germantown 7.5 minute quadrangles in the city of Memphis and Shelby County, Tennessee. During year one, of this two-year project, reconnaissance geologic and liquefaction mapping was undertaken along the Wolf River in these three quadrangles. During this reconnaissance, earthquake -induced sand dikes were found in the Memphis NE and Germantown quadrangles, In addition, subsurface geologic data were interpreted from total of 428 geotechnical boring logs and water wells obtained from numerous sources within the three quadrangles. With this subsurface data, maps of the tops of subsurface data, maps of the tops of subsurface strata were constructed. These maps are very important in constructing geologic cross sections and illustrating strata that are susceptible to liquefaction in future earthquakes.

Reference Cited

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