

**APPLICATION OF GEOPHYSICAL METHODS TO LOCATE BURIED
TUNNEL CHANNELS BENEATH THE GLACIAL DRIFT DEPOSITS IN TEXAS
TOWNSHIP, KALAMAZOO COUNTY, MI**

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The objective of this research was to delineate and map the network of gravel and sand-filled channels beneath the glacial drift of Texas Township in SW Kalamazoo County, MI. These channels are excellent local aquifers that are prized by water agencies. The delineation was done by mapping the depth to the interface between the glacial drift and the much older Mississippian Coldwater Shale, which has higher density. Tunnel valleys produce gravity anomalies on the order of -0.2 to -0.4mGal. The gravity method was used to create a Bouguer gravity anomaly map of the township. A total of 360 stations were surveyed, mostly along roads, but did include off-road profiles. Station elevations were obtained using differential GPS techniques, and the data were reduced using an average crustal density of 2.67g/cm³. A regional trends map from a much larger area was subtracted from the Bouguer anomaly map to produce a residual Bouguer gravity map. The residual anomaly contour map revealed a low gravity anomaly trending NE-SW and another set of anomalies trending in the N-S direction. In general, the low gravity anomalies showed a complex network of tunnel channels but for the most part, corresponded strongly with the occurrence of a linear alignment of small lakes and wetlands. A seismic survey was conducted in the axis of the valley based on access and proximity to water wells for depth-to-bedrock control. The deepest reflector obtained by interpreting the seismic reflection data was located 120 meters below the surface, while the deepest adjacent production well (B-3) was 104 meters deep and does not make

contact with the shale bedrock. Careful mapping of the tunnel valleys is very important for future water supplies of the Kalamazoo-Portage urban area, as this area is totally dependent upon ground water.