



Geophysics  
International

## CASE HISTORY - SINKHOLE DELINEATION

Petro-Sonde Survey - Civil Engineering

**LOCATION.** Lake County, Florida, U.S.A.

**OBJECTIVE OF THE PETRO-SONDE SURVEY.** To delineate the areal extent of subsidence caused by a sinkhole directly beneath a residential structure, and determine the volume of the depression. With this data, more accurate repair cost estimates can be made.

**GEOLOGY.** The interval studied (0-150') is composed of the semi-consolidated Hawthorn group sediments (argillaceous sand, clay, and dolomite) and is overlain by approximately 75' of unconsolidated sands. The low permeability of the Hawthorn group strata creates a perched aquifer in the overlying sands and forms a confining unit for the water in the underlying limestone. When the clay layer is breached by erosional piping, the surface sands flow quickly into the void creating the sinkhole.

**INFORMATION AVAILABLE.** TB-1, TB-2 (drill holes located beyond the depression). A large visible depression under the porch of the residence.

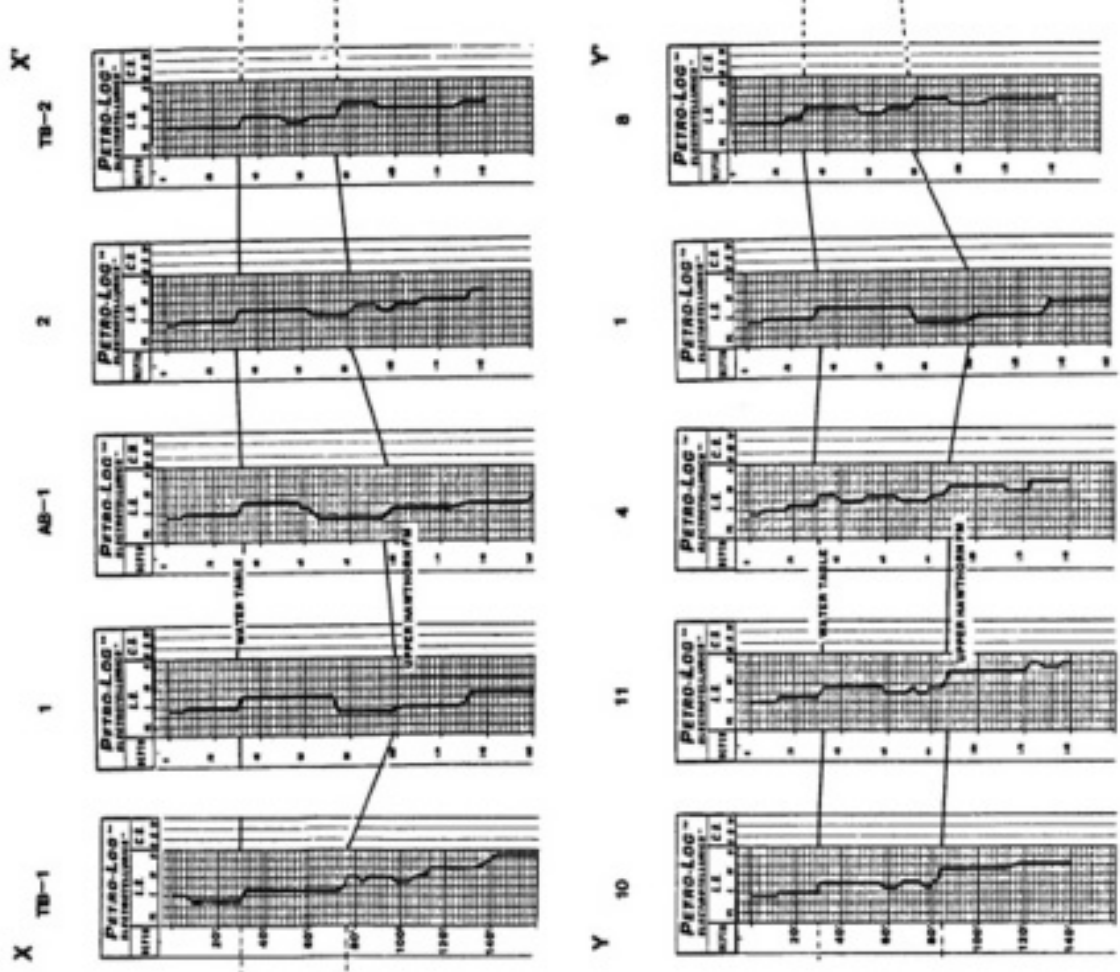
**CALIBRATION STATIONS.** TB-1, TB-2.

**PETRO-SONDE SURVEY STRATEGY.** Calibrate to drill hole TB-1 to determine characteristic electro-telluric responses of the Hawthorn formation and overlying sediments.

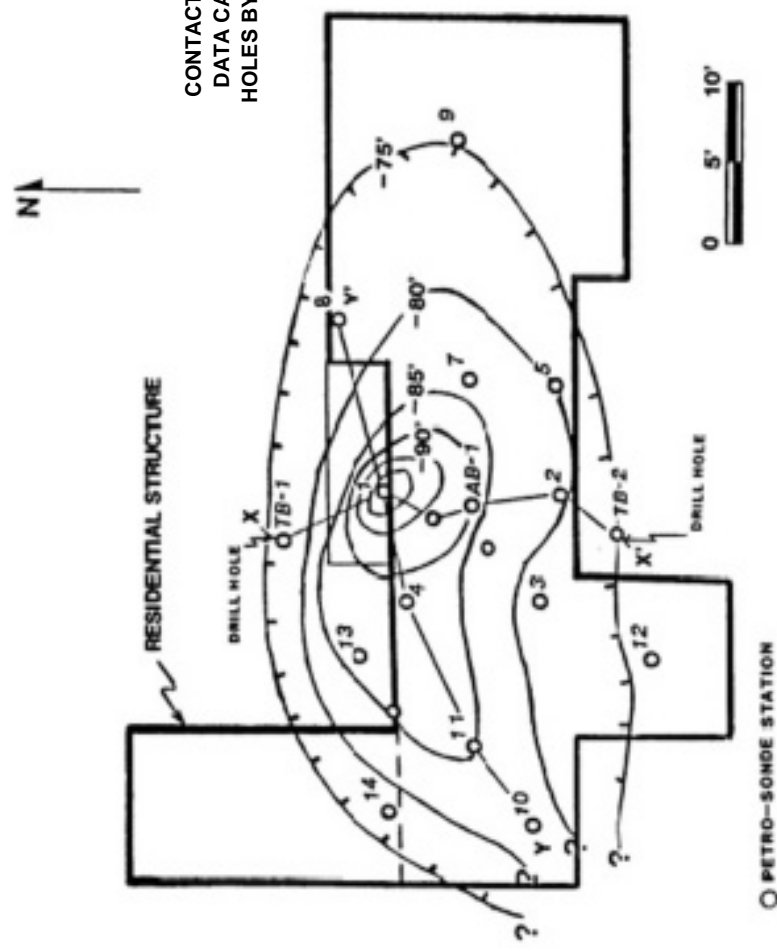
At the calibration site it was determined that the top of the Hawthorn formation and the top of the water table caused a distinct and correlatable electro-telluric response and would serve as structural markers. Petro-Logs were generated in and about the residence at 14 stations from 0 to 140'.

**CONCLUSIONS AND COMMENTS.** The two drill holes TB-1 and TB-2 were beyond the affected sinkhole area, and were utilized mainly for determining the marker horizon responses. The PetroSonde survey shows an elongate depression in the clay layer approximately 22' deep by 5' wide at the center. The southwest extension of the main depression may be an active channel through which transportation of sediments is occurring. There is a slight depression in the perched aquifer directly over the sinkhole supporting the location of the main depression.

Based on the Petro-Sonde survey the volume of the subsided sediments above the sinkhole including the side channel is approximately 160-180 cubic yards.



CONTACTS CONFIRM  
DATA CALIBRATION  
HOLES BY CORE DATA



LOCATION MAP STRUCTURE MAP (TOP OF)  
HAWTHORN FM.  
CONTOUR INTERVAL = 5' LAKE COUNTY,  
FLORIDA, USA.

FIGURE 2.  
CROSS SECTIONS X-X', V-V' REVEALING  
SUBSIDENCE OF THE HAWTHORN FM

FIGURE 1