

**Ewbank**  
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GEO SYSTEMS PROFESSIONALS

Thermal Conductivity Test  
Marion County  
Justice Center  
Jasper, Tennessee

Earth Energy Engineering

Earth Energy Engineering, Inc.

Drill Logs  
Marion County Justice Center  
Jasper, Tennessee

Test Hole No. 1 ( at residence )

Set casing to 23 ft. – pulled

Static water level – 100 ft.

Backfilled hole with #9 gravel and hole plug

0 - 20 ft.	Surface - clay, silt and gravel	
20 - 244 ft.	Limestone	2 to 3 gpm.
244 -	12 ft. cavern	200 + gpm.

Drilled August 25, 1999

Thermal Cond. Test August 26, 1999

Test Hole No. 2 ( near Attorney's Office )

Set casing to 23 ft. – pulled

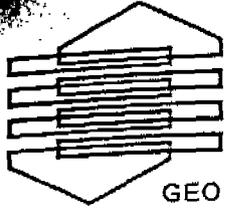
Static water level – 100 ft.

Backfilled with #9 gravel and hole plug.

0 - 20 ft.	Surface – clay, silt and gravel	
20 - 300 ft.	Limestone	15 gpm.

Drilled August 26, 1999

Driller Miller Drilling Co. Hayesville, NC.



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**Thermal Conductivity Test Results  
Marion County Justice Center  
Jasper, Tennessee**

Earth Energy Engineering performed a thermal conductivity test at the Marion County Justice Center in Marion, Tennessee on August 30, 1999. Testing was done by Bill Nagle with a Ewbank portable test unit.

The test borehole was 240 feet in depth and 6" in diameter. A 1" inch loop was installed and the borehole was backfilled with #9 stone. Static water level was reported at 100 feet. The formations encountered were primarily limestone.

The thermal conductivity (k) value for this borehole is **1.7 btu/degree F-hr-foot**. This is an average conductivity per foot for the borehole. This value represents the rate at which the borehole and rock will transfer heat.

To accurately measure the thermal conductivity of the formation a borehole should be drilled and grouted with a bentonite grout to prevent any flow of water through the borehole.

All test equipment, methods, procedures, calculations, and interpretation is done in accordance with the recommendations and guidelines of the International Ground Source Heat Pump Association.