

CARL E. NORMAN, PH.D.
HOUSTON, TEXAS 77024
P.G. 1772; CPG 6831

12625 MEMORIAL DRIVE #77
713-401-6980 Mobile
dod895@aol.com

CONSULTING GEOLOGIST

**SPECIALIZING IN ACTIVE GEOLOGIC
FAULTS ON THE GULF COASTAL PLAIN**

May 31, 2018

SAN JACINTO RIVER AUTHORITY, GRP OFFICE
6627 Longmire Road, Building 1
Conroe, Texas 77304

Attention: Mark Smith, GRP Division Director
Copy to: Lance McLeod, PE, PMP, Brown & Gay

**SUBJECT: REPORT ON THE SIXTH RE-MEASURE OF WATERLINE W1A AND W2A
BENCHMARK ELEVATIONS IN THE WOODLANDS, TEXAS IN MARCH 2018.**

This report addresses changes in elevations of 47 benchmarks placed in 4 lines in The Woodlands in March 2015. Two of the lines cross the Egypt Fault in the northwestern part of The Woodlands, one crosses the Big Barn Fault in central Woodlands, and the fourth is located in an apparently stable area between the Panther Branch Fault and an unnamed fault that closely approaches Research Forest Drive from the south near Cat's Cradle Drive.

The 6th re-measure shows no convincing evidence of fault movement at any of the 4 lines of benchmarks since March 2015. During those three years, 16 of the 47 benchmarks show no elevation change, 26 show a loss of -0.01 feet (0.12 inch), and 4 a loss of -0.02 feet.

Benchmark No. 11, at the mid-point of the line of the 20 benchmarks that crosses the west end of the Egypt Fault, showed a loss of -0.06 feet (0.72 inch) over the past 3 years. The remaining 19 benchmarks (10 on the high side of the fault, 9 on the low side) showed elevation changes ranging from 0.00 to -0.01 feet over the past 3 years. Obviously the cause of such a highly localized and unusual amount of change in elevation (compared to the others on the line) cannot be attributed to fault movement. Rather it would seem to be due to slow, progressive compaction of soil localized over a small area beneath it.

The lack of any significant change in elevation of any of the benchmarks on the line between the Panther Branch Fault and the unnamed fault southwest of it, together with the lack of any surface evidence of a fault at that location, suggest no fault exists there. Such spatial gaps between faults are common occurrences throughout the Gulf Coastal area.

Considering only elevation changes that have taken place over the past 6 months, 37 of the 47 benchmarks showed no change, 4 showed an increase in elevation of +0.01 feet, and 6 a decrease of -0.01 feet. All these amounts are within the range of measurement error.

The 7th re-measure of the benchmarks is scheduled for September 2018.

Respectfully submitted,


Carl E. Norman, Ph.D.
Consulting Geologist
P.G. 1772; CPG 6831

