

AQUIFER TEST
BEACH CLUB CONDOMINIUMS
LUMMI ISLAND
WHATCOM COUNTY, WASHINGTON

by Peder Grimstad

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M E M O R A N D U M

January 26, 1979

To: Herman Huggins
Northwest Regional Office

From: Pete Grimstad 
Water Resources Investigations Section

Subject: Aquifer Test, Beach Club Condominiums, Lummi Island

As previously requested, a second pumping test was conducted at the Beach Club Condominiums which are under construction by John Stewart near Migley Point at the north end of Lummi Island. The purpose of this test was to determine possible hydraulic continuity between the pumped well, the previously tested well (memorandum of July 25, 1978), and other nearby wells.

The pumped well (Stewart #2) is 100 feet deep and drilled entirely in sandstone of the Chuckanut Formation. This unit has little, if any, primary permeability; therefore, transmission and storage of water is dependent upon secondary permeability such as interconnected fractures. The Stewart No. 1, Austin and Stewart (house) wells are developed in the same lithology.

With the assistance of Steve West and Jim Gavin of the Northwest Regional Office, pumping of the Stewart #2 well started at 1005 hours, January 9, 1979. A pumping rate of 22 gallons per minute (gpm) was attempted but with the rapid drawdown the rate dropped to 16 gpm after two and one-half hours, to ten (10) gpm after eight (8) hours, to eight (8) gpm after ten (10) hours, and to six (6) gpm near the end of the twenty-five hour test.

A totalizing water meter was installed to determine the pumping rate; however, this became inoperative near the end of the test because of freezing and possibly the low rate of flow.

As seen in Figure 1, the water in the pumped well dropped from the initial level of 18.84 feet below top of casing to 60 feet in one hour and to 80+ feet (reportedly the depth of the pump intake) in two hours. Water level measurements at this depth proved difficult because of water entering the well above the pumping water level.

When the pumping ceased, the water level rebounded, but the rate of recovery was much less than the rate of drawdown and after 24 hours of recovery, the water level was still 23 feet below that measured at the beginning of the test.

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The Stewart #1 well (677 feet from the pumped well) was affected almost immediately and after one hour the level had dropped 0.6 foot, and after two hours about two feet. When the pump was turned off, the drawdown measured nearly nine feet. This is a conservative figure because the well is undoubtedly affected by the tides and, if the lag time for the well is similar to that observed at the Stewart (home) and Austin wells, removal of the tidal effects of the incoming tide which causes the water in the wells to rise, would drop the water level in the Stewart #1 even more. Shutting off the pump had no obvious effect other than a leveling off of the decline and 24 hours later the water level remained nearly seven feet below that measured before the beginning of the pumping test.

The data collected at the Stewart (house) and Austin wells show tidal influence and no discernable drawdown because of the pumping.

The elevation of the casing top at Stewart #1 has been surveyed and determined to be 47.0 feet above mean sea level. The top of the casing of the pumped well is 79.5 feet above mean sea level. To avoid sea water contamination of the aquifer, it is recommended that the pump intakes be set above mean sea level. The specific capacity of the Stewart #1 is 0.3 gpm/ft. of drawdown as determined in the earlier test and a withdrawal of 12 gpm will result in a drawdown of 40 feet. The average pumping rate of the Stewart #2 well was $10 \pm$ gpm for the 25-hour test; this caused a drawdown of about 10 feet in the Stewart #1 well. Simultaneous pumping of both wells at the above rates would have resulted in a total drawdown of 40 feet + 10 feet or to a level below mean sea level.

It should be noted that the final nine hours of pumping of the Stewart #2 which was at 6 to 7 gpm did not result in a rise in the pumping water level. This indicates that the inflow to the well at the point of intake and above is no more than 6 to 7 gpm. Given the conditions encountered during the test, it is suggested that the combined pumpage from the two wells not exceed 15 to 20 gpm.

PG:cp

cc: Steve West

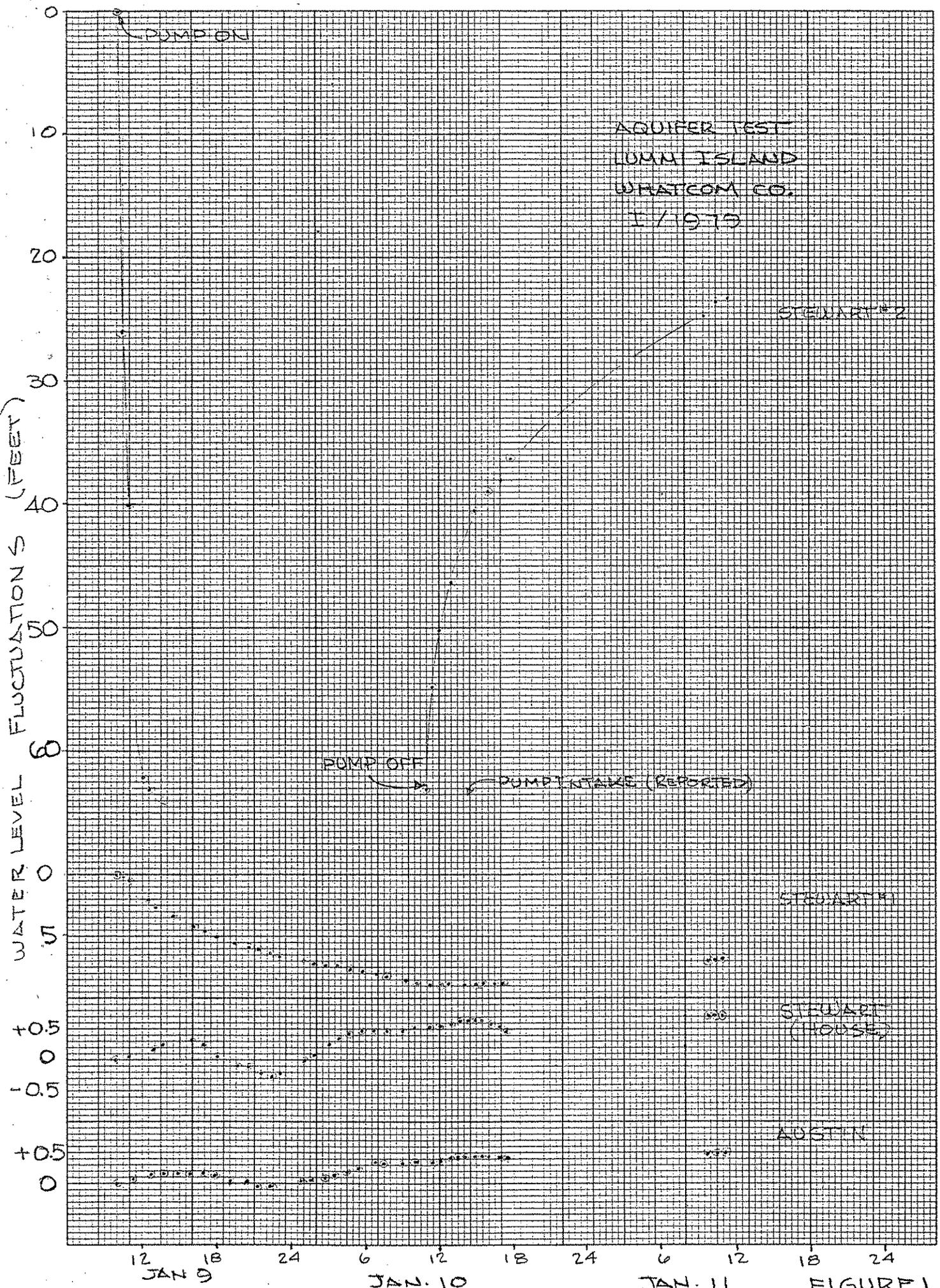


FIGURE 1