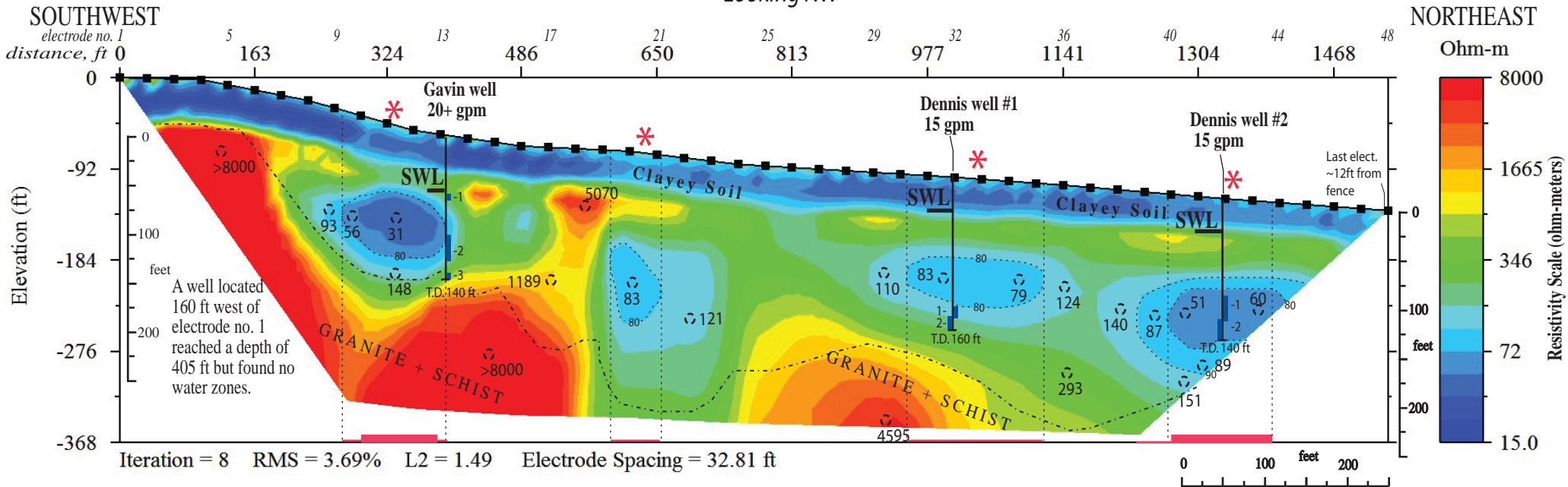
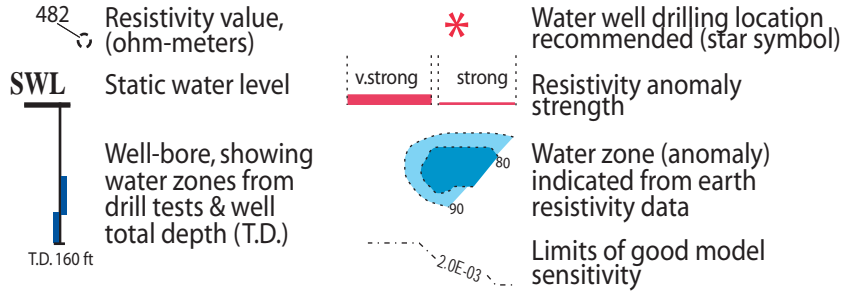


Earth Resistivity Profile Showing Water Zone Targets & Drill Results

Looking NW



EXPLANATION



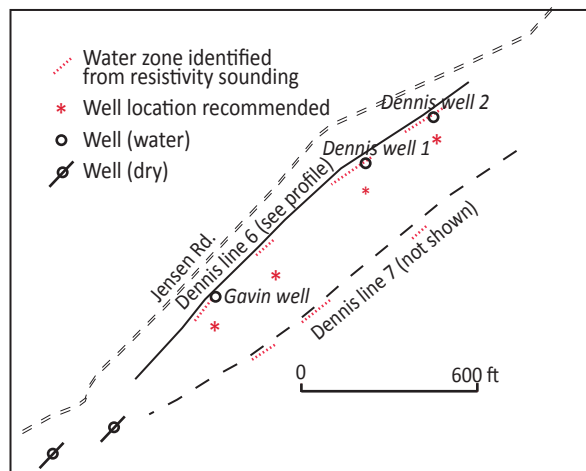
WELL DRILLING RESULTS:

Gavin well:	Dennis well #1:	Dennis well #2:
0 - 61 ft, clay, brown	0 - 65 ft, clay, brown	0 - 50 ft, clay, brown
61 - 68 ft decomp. granite	65 - 160 ft, granite broken	50 - 96 ft, granite, soft
68 - 140 ft granite, b/w, fract'd.	Water tests:	96 - 127 ft, granite, water, fract'd.
140 ft total depth (TD)	Static water level @30 ft	127 - 140 ft, granite, hard
Water tests:	1. 135 - 145 ft, fractured, water	Water tests:
Static water level @ 60ft	2. test 15 gpm, 2 hrs., @ 140-160ft	Static water level @30 ft
1. 8-10 gpm @65 ft		1. 96 - 127 water
2. 10+ gpm @100-130 ft		2. test 15 gpm, 2 hrs., @120-140 ft
3. test 20+ gpm, 2 hrs. @ 140 ft		

Survey specifications data:

Profile inversion using 1,616 data points (cmd=36cex), recorded in roll-along arrangement with 48 electrodes spaced at 10 m (32.5 ft) apart, and using 470 m (1532 ft) length line, recorded using dipole-dipole ext./ Inverted Schlumberger array; instrument-Supersting R1/IP; processing software-EarthImager 2D v2.4.0; data collected Nov. 4, 2009; RMS = root mean square error; LS = lease squares error

LOCATION MAP



Earth Resistivity Profile

Dennis Line 6
Spokane County, Wa.

Hydro Imaging, Inc. www.hydro-imaging.com
Spokane, Washington (509) 468-9062
D. Boleneus 10/2016

Earth Resistivity Profile Showing Water Zone Targets & Drilling Results (Dennis line 6)

Explanation: This explanation accompanies the illustration “Earth Resistivity Profile Showing Water Zone Targets & Drill Results”. An earth resistivity geophysical survey was conducted by Hydrolmaging, Inc. at the client’s site in Spokane County, Washington. The purpose was to locate a water zone below ground prior to hiring a drill contractor. The resistivity survey method—which is closely allied with Ohms Law—is particularly well suited for finding a water zone from electrical sounding data before drilling the well. The client was motivated to use the Hydrolmaging method to locate drilling sites as two dry wells had been drilled without finding water.

Advantages: The resistivity survey method is more economical than choosing a well site without data capable to map subsurface features. The sounding data produced from the earth resistivity survey saves money and headache in three ways. It is capable of locating a drill site where water is to be found, estimating the drilling depth to the water zone and avoiding dry wells.

Photo: Water well completed at Dennis #1 drill site to depth of 160 feet. Site is located near 977 ft distance mark on “Earth Resistivity Profile Showing Water Zone Targets & Drill Results” (Dennis well #1, 15 gallons per minute). Wells are for use of a single private residence.

Method: Collecting the sounding data at the site required two days in the field and one day to interpret the data and to provide results to the client. Two profile lines were occupied with resistivity recording equipment. Recording data for each of line Dennis 6 and line Dennis 7 required one day each to complete which includes set-up, testing, recording, surveying by GPS and retrieving equipment (see location map). A second or sometimes a third line is

always completed during a survey in order to confirm results. Length of lines 6 & 7 were each 1,532 ft long and approximately 1,616 data points were recorded for each line. See specification data.

Interpretation of earth resistivity profile: The earth resistivity profile shows location of favorable water-bearing rock strata by the blue-colored zones. Low values of resistivity ranging from 30 ohm-meters to 90 ohm-meters indicate water in the subsurface. Values greater than 120 ohm-meters are not usually favorable locations to find water. Water zones give lower values of resistivity because salts dissolved in water more easily conduct electrical signal. Targeted drill sites were identified by the star symbol (red) and ranked by very strong or strong indicator bars (red). Rocks with very high resistivity values are identified as granite and schist on this profile. Such highly resistivity rocks do not contain water, are dense and impermeable and so act as boundaries of water zones identified.

Drilling results: Using the resistivity data and survey markers remaining at surface, either Hydrolmaging Inc. or the client can direct the well drilling contractor to optimum sites for drilling wells. They also instruct the contractor to drill to a specified depth as indicated by the earth resistivity profile. Three wells were drilled successfully on three of the four anomalies indicating water while one remains untested. Compare well drilling results to profile. Water was located as shallow as 96-127 ft in Dennis #2 well and as deep as 135-145 ft in the Dennis #1 well as shown by the blue rectangular symbol beside each well bore symbol. Flow quantities up to 15 gallons per minute were found in each of the Dennis wells and with 20 gallons per min found in the Gavin well.

