The graph we use to calculate hydrant flow was created by Oklahoma State University. It is called the Water Flow Test Summary Sheet. The y-axis of the graph charts the pressure in pounds per square inch (PSI) and the x-axis charts the volume in gallons per minute (GPM). It uses the following factors to calculate the available flow at a standard pressure (20PSI is standard):

The static pressure of the hydrant - The pressure in the water system when water is not moving (in PSI)

The pitot reading - The pressure of the water as it is exiting the hydrant (in PSI)

The residual pressure - The pressure left over in the water system once a hydrant is opened and flowed (in PSI)

The flow - Based on a flow chart supplied by the company who manufactures our testing equipment, Hose Monster (in GPM).

The initial point is drawn on the graph at the intersection of the static pressure and zero GPM. The flow value is found by using the pitot reading and its corresponding GPM value from the Hose Monster Flow Chart. A mark is then placed on the graph based on the intersection of the residual pressure (y-axis) and the flow based on the pitot reading from the Hose Monster chart (x-axis). A line is then drawn from the static value through the residual/flow value. The total available GPM of the hydrant is based on a standard flow pressure 20 PSI, per NFPA 291. The intersection of the drawn line and 20 PSI on the graph is the total GPM output of the hydrant.

The issue with the majority of the hydrants in North Davis Meadows is that since the pitot reading was so low, less than 10 PSI, the calculated GPM flow is inaccurate. This is because the lowest approved and certified pressure on the Hose Monster flow chart is 10 PSI. Even if a pitot measurement is less than 10 PSI, the value for 10 PSI is used because a lower pitot number is not available on the chart. Some of the pitot pressures at North Davis Meadows were as low as 7 PSI but the value for 10 PSI had to be used on the graph. If the calculated value at 7 PSI was 1050 GPM, the actual GPM was certainly significantly less.

I phoned Hose Monster and asked why 10 PSI was the lowest number available. They told me that at very low flow pressures (less than 10 PSI), the gauge becomes exponentially less accurate. Their gauges are calibrated and certified at a minimum of 10 PSI.

Please let me know if you have any questions,

Patrick Sandholdt
Fire Marshal
City of Davis
FIRE PREVENTION SECTION
23 Russell Boulevard, Davis, CA 95616