
Well Pump Test Guidelines in Water Scarce Areas

PURPOSE

These Guidelines will apply to well pump tests performed for the purpose of demonstrating compliance with minimum water quantity requirements of the Sonoma County Code for residential construction in water scarce areas or second dwelling units in marginal water availability areas of Sonoma County.

GENERAL

Pump tests conducted on or after the effective date of this policy will remain valid for a period of 3 years or as long as aquifer conditions remain substantially the same as established by a Registered Geologist or Registered Civil Engineer. [Grandfather clause: Pump tests accepted by the County prior to this Policy's initial implementation date of 06-08-04 will remain valid for 3 years from the date of the test.]

AUTHORITY

Sections 7-12, 25-17, 25-56 and 26-88-060H of the Sonoma County Code.

DEFINITIONS

“Discharge rate” means the rate at which the well discharges water (usually expressed in gallons per minute).

“Draw down” means the difference measured in feet between the static and dynamic water levels.

“Dynamic water level or stabilized pumping level” means the level of water in the well during the pump test.

“Post-test static water level” means the level of water seventy-two hours after the pump test.

“Recovery” means the difference in feet between the post test static water level and the pumping level (dynamic water level)

“Specific capacity” means the discharge rate divided by the draw down (usually expressed as gallons per minute per foot of draw down).

“Static water level” means the level of water in the well before the pump test.

PROCEDURE

A. Pump Test Requirements

1. General Conditions

The Sonoma County Code requires demonstration of at least one gallon per minute per dwelling unit for new or replacement dwellings located in water scarce areas and for second dwelling units in marginal water availability areas. The code specifies a sustained

yield, metered pump test from a well or wells for a specified time period of 8-12 hours for water systems with 1-2 connections, 16-24 hours for water systems with 3-4 connections and 72 hours for systems with 5 or more connections. The 72 hour test may be modified by the administrative authority but in no case shall be less than 48 hours. Note: Also refer to Section 64563 of the California Code of Regulations for systems with 5 or more connections.

Testing to meet the above yield requirements shall be conducted from July 15 to October 1 each year or as extended by the Project Review and Advisory Committee. This time period is referred to as the dry weather pump test period. The Permit and Resource Management Department shall be notified 24 hours in advance of any testing. Pump tests may be performed by or under the direction of a licensed drilling contractor (C57), pumping contractor (C61/D21), a Registered Civil Engineer or a Registered Geologist.

2. A copy of the previously completed State of California Department of Water Resources Well Completion Report, if available, shall be submitted with the completed Permit and Resource Management Department's form, Certification of Water Yield in Water Scarce Areas - WLS-010.
3. If multiple wells are being used to meet the minimum water production requirements, then all wells must be pumped simultaneously.

B. Pre-Test Requirements

1. Identify the location of the well, by either the NAD83 California State Plane II or WGS 84 lat./long. or by the measured distance reference to a fixed landmark. Record this information on the WLS-010 form. Include the estimated elevation of the well head.
2. Measure and record the static (non-pumping) water level in the well. If well is operational, so note on the WLS-010 form. Provide information on measuring points (top of casing, surface seal, access port, etc.) Measurements should be taken relative to ground level. The measuring point above ground level should be measured and noted on the WLS-010 form. In order to establish the static level, the well must not be pumped for at least 12 hours prior to measurement of the static water level.
3. Record the type of discharge measurement method. Indicate the type and model of flow meter or provide an accurate description of weir or orifice plate set up.

C. Twelve-Hour Pump Test Method

1. Record the static level.
2. Calculate the volume of water stored in the well.

3. Remove a volume of water equivalent to the calculated volume stored in the well.
4. Select a dynamic water level for the test. Lower the water level to the selected dynamic water level as quickly as possible. Maintain the dynamic water level for the duration of the test by adjusting the discharge rate. Pump at a rate of no less than one gallon per minute and continue pumping for twelve hours.
5. If it is not feasible to use a water level sensing device (probe), a stable pumping rate must be maintained for a period of 3 hours prior to the start of the sustained yield test. This condition may require pulling the pump to determine the static water level prior to conducting the test, reinstalling the pump to conduct the test, and pulling the pump again to read the 72 hour recovery.
6. If a low water yield pump protector device is used and the dynamic water level is not established above the pump setting, the dynamic water level will be assumed to be at the pump.
7. Record the dynamic water level and discharge rate according to the following schedule:

Time since pumping began (including pumping to remove stored volume)	Time Interval
0-5 minutes	1 minute
5-60 minutes	5 minutes
60-100 minutes	20 minutes
100 minutes to establish the dynamic water level	30 minutes

Once the stabilized dynamic water level has been reached for a minimum period of 3 hours, the water level must be read a minimum of every 12 hours to the end of the test.

8. At the end of the pumping test, measure, and record the final discharge rate and dynamic water level.

D. Alternative Eight-Hour Pump Test Method

1. An alternative eight-hour pump test method can be used instead of the twelve-hour pump test method for systems of 1 or 2 connections if, after 4 hours of pumping, the specific capacity is greater than 0.05. While conducting the alternative eight-hour pump test the dynamic water level and discharge rate are to be recorded in accordance with the time intervals specified in Section C above.

E. Alternative Sixteen-Hour Pump Test Method

1. An alternative sixteen-hour pump test method can be used instead of the twenty-four hour

pump test method for systems of 3 or 4 connections if, after 4 hours of pumping, the specific capacity is greater than 0.05. While conducting the alternative sixteen-hour pump test the dynamic water level and discharge rate are to be recorded in accordance with the time intervals specified in Section C above.

F. Post Test Measurement

1. Measure and record the static level in the well seventy-two (72) hours after the final dynamic water level measurement.

G. Calculate the Well Recovery

1. Determine the water level draw down by subtracting the initial static water level measurement from the stabilized dynamic pumping level. Record this result as the well draw down.
2. Next determine the water level recovery by subtracting the post test (72 hour) static water level from the stabilized dynamic pumping level. Record this result as the well recovery.
3. Next determine the percent recovery of the well. Divide the water level recovery by the water level draw down and multiply by 100. Record this result as the percent well recovery.

Example:

- a. Initial static water level: _____ (Measured value)
- b. *Post test static water level: _____ (Measured value)
- c. **Stabilized Pumping level: _____ (Measured value)
- d. Draw down: _____ (Calculate by subtracting A from C)
- e. Recovery: _____ (Calculate by subtracting B from C)
- f. Percent recovery: _____ (Calculate by dividing E by D and multiplying the results by 100)

Well percent recovery (F) must be 90% or greater within a 72 hour period.

* The static water level after 72 hours or less post pump test.
** Kleinfelder refers to this as the dynamic pumping level.

ATTACHMENTS

None

Approved by:

/s/ Pete Parkinson

Pete Parkinson, Director

Lead Author: Kleinfelder Associates

Revisions:

06-08-04 03/25/05

07-13-04

09-02-04

Intranet Intranet and Internet