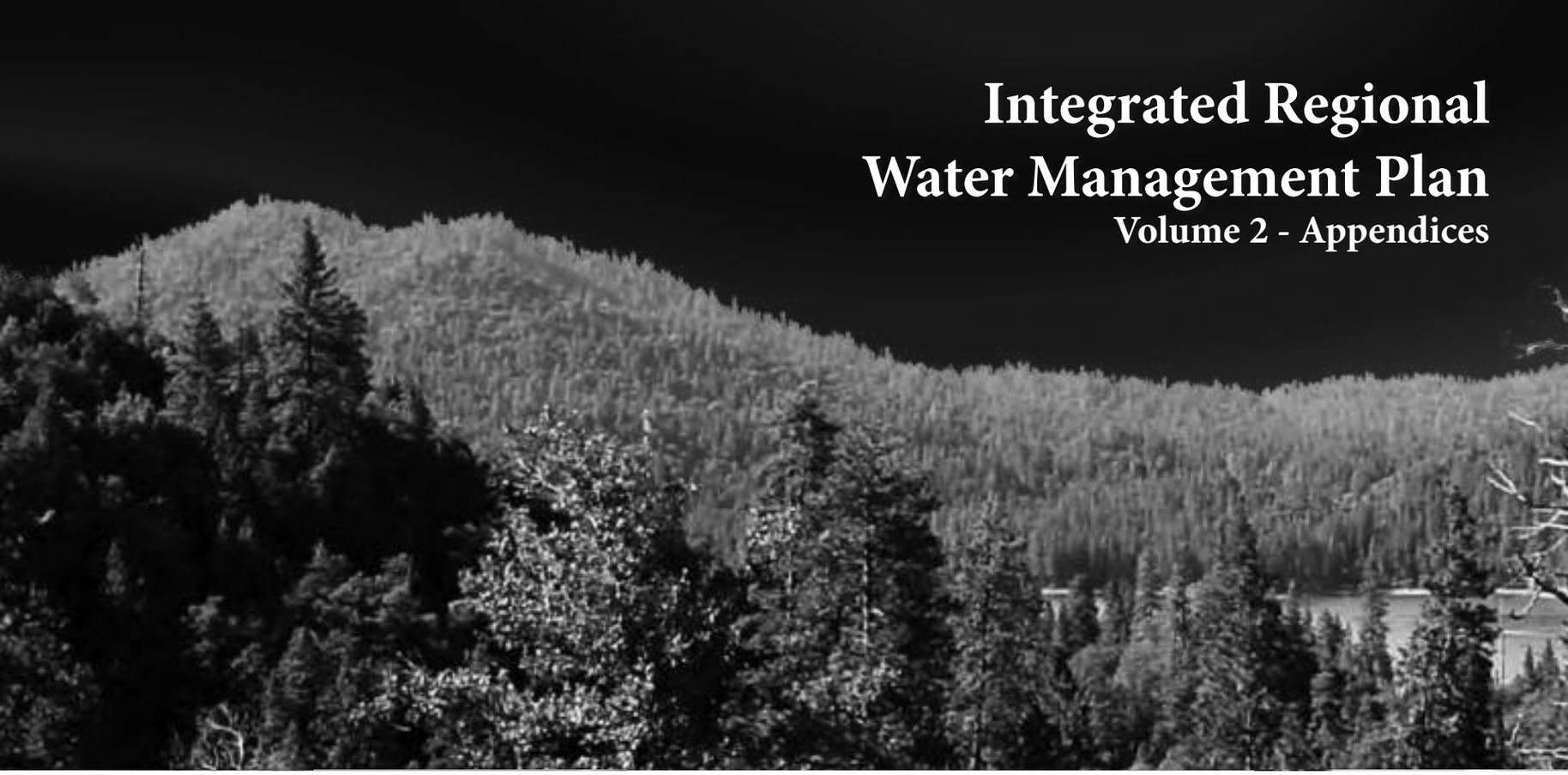
Integrated Regional Water Management Plan

Volume 2 - Appendices



April 2008

MADERA COUNTY
Established 1893
State of California

BOYLE ENGINEERING CORPORATION

In association with
Kenneth D. Schmidt and Associates

Integrated Regional Water Management Plan Volume 2 - Appendices

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April 2008

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Groundwater Conditions in the Oakhurst Area

GROUNDWATER CONDITIONS
IN THE OAKHURST BASIN

Prepared for:
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November 2005

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November 14, 2005

Ms. Jill Nishi, Director
Madera County Environmental
Health Department
2037 West Cleveland Avenue
Madera, CA 93637

Re: Oakhurst AB 303 Study

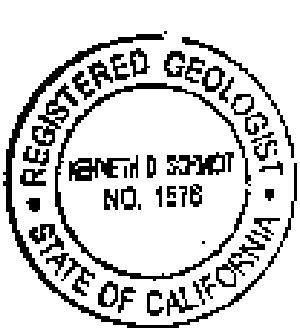
Dear Jill:

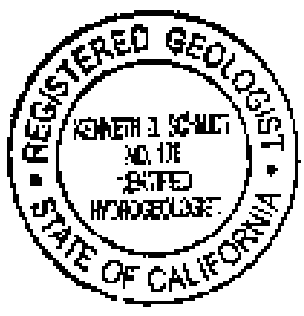
Submitted herewith is our final report on the Oakhurst AB 303 Study. We appreciate the cooperation of County Staff, members of the advisory committees, water purveyors, and individuals in the Oakhurst area.

Sincerely yours,

Kenneth D. Schmidt
Geologist 1578
Certified Hydrogeologist 176

KDS/pa





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GROUNDWATER CONDITIONS
IN THE OAKHURST BASIN

INTRODUCTION

This report is the product of a California Department of Water Resources (DWR) AB 303 grant to Madera County. The purpose of the study is to:

1. Provide a hydrologic framework leading to a better understanding of groundwater conditions in the Oakhurst Basin.
2. Report on the availability of groundwater in the basin.
3. Discuss the relevance of perceived water quantity and quality problems in the basin.

The study has been conducted by Kenneth D. Schmidt and Associates under contract with and with assistance from Madera County.

The Oakhurst Basin, as used in the report, is the designation used by the DWR in the Madera Investigation (Bulletin 135). The Basin is drained by the Fresno River, which leaves the basin about two miles south of Ahwahnee, near an area known as Windy Gap. Major tributaries of the Fresno River include:

1. Peterson Creek and Miami Creek. These tributaries join, at a confluence about one mile southeast of Ahwahnee and become Miami Creek. Miami Creek then flows south and southwest and joins the Fresno River about one mile upstream of Windy Gap.
2. Lewis Fork of the Fresno River and Nelder Creek. The Lewis Fork enters the Basin south of the Sugar Pine area and flows

through Cedar Valley and Yosemite Forks. Nelder Creek drains an area east of Yosemite Forks and northwest of Bass Lake and joins the Lewis Fork just south of Yosemite Forks. The stream below the confluence is the Fresno River.

3. China Creek. China Creek flows northwest and drains Thornbury Mountain. It joins the Fresno River just southeast of the junction of Highway 41 and Highway 49.

Figure 1 shows the locations of the major drainages, watershed divides, and subareas used in this evaluation. These subareas are: Peterson Creek-Miami Creek, Oakhurst, and Sierra Lakes.

Groundwater conditions in the basin are evaluated in terms of the following: subsurface geologic conditions, water levels, aquifer characteristics, recharge and discharge, and groundwater quality. In addition, precipitation, streamflow, and evapotranspiration are evaluated in terms of potential recharge to the groundwater. This evaluation provides the framework and baseline data for the development of improved water management tools for groundwater in the basin.

The area is characterized by numerous large and small water systems, as well as jointly used and individual wells developed for domestic use. Most of these systems and wells rely on groundwater pumped from wells tapping fractures in the hardrock.

Problems associated with groundwater development in the Oakhurst area have included declining well yields late in the summer

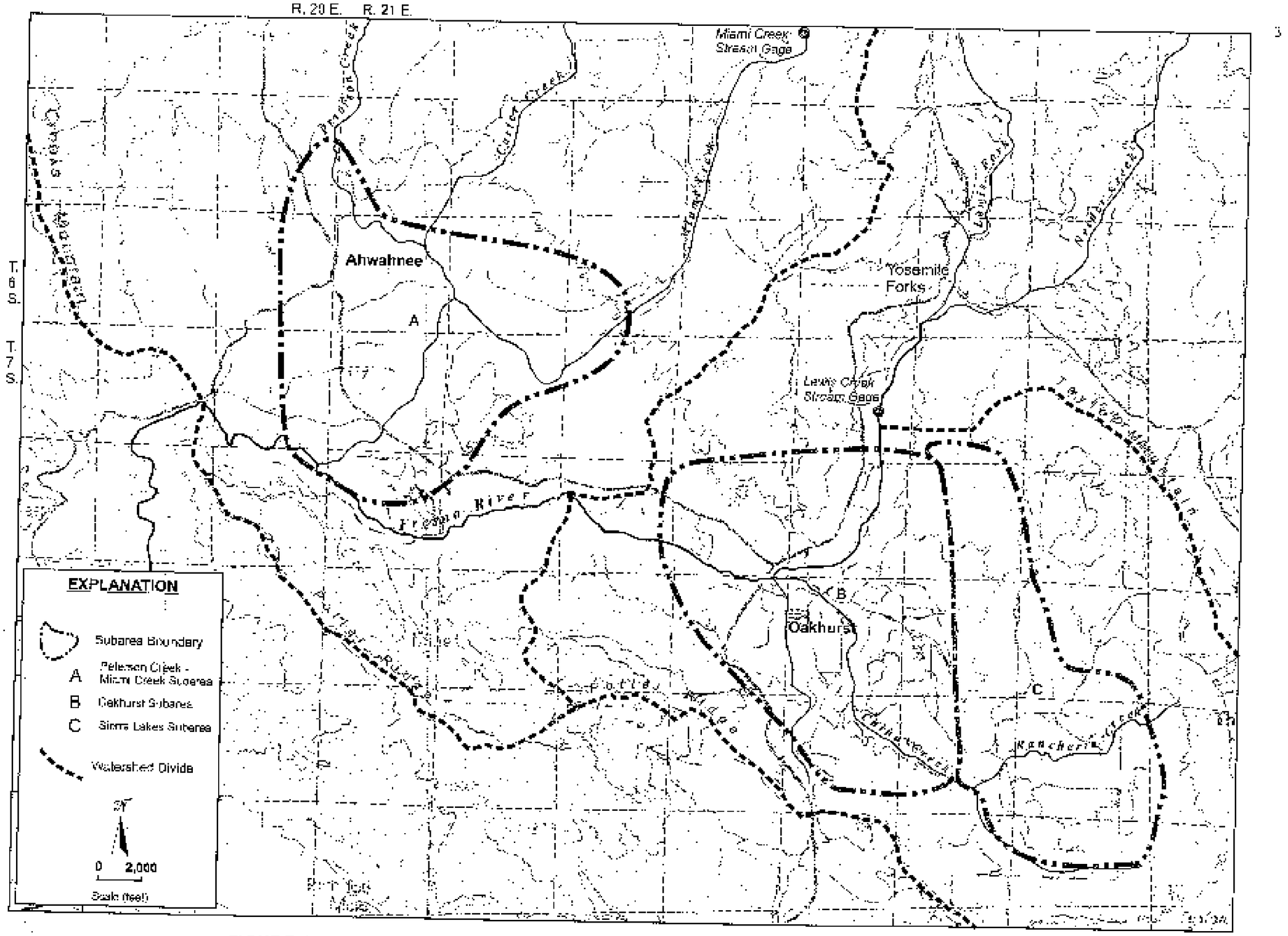

FIGURE 1 - STREAMS, WATERSHED BOUNDARIES, AND SUBAREAS OF THE OAKHURST BASIN

and early fall and in droughts, well interference (drawdowns in wells due to pumping of another nearby well or wells), low well yields in some areas, and a number of groundwater quality problems.

PRECIPITATION

Amounts of precipitation are crucial in hardrock area groundwater evaluations, because precipitation is the source of groundwater recharge. The California Department of Water Resources (1966, Plate 2) mapped lines of equal mean annual precipitation in eastern Madera County, including the Oakhurst Basin. Average annual precipitation in the Oakhurst Basin ranged from about 28 inches near Windy Gap to 40 inches on Taylor Mountain near Bass Lake. In the highest parts of the Fresno River watershed near Fish Camp (upstream of the Oakhurst Basin), the mean annual precipitation was almost 50 inches. These precipitation values represent the 50-year period from 1908-1957.

There have been precipitation stations near Ahwahnee, Bass Lake, and Windy Gap. Precipitation records for Ahwahnee (2,790 feet land surface elevation) are available for 1959-83. The mean annual precipitation was 28 inches. Precipitation records for Bass Lake (Crane Valley, elevation 3,400 feet) are available for 1903-98. The mean annual precipitation was 40 inches (Figure 2). Annual precipitation at this station ranged from about 15 inches (1978) to 74 inches (1979), indicating the high annual variability

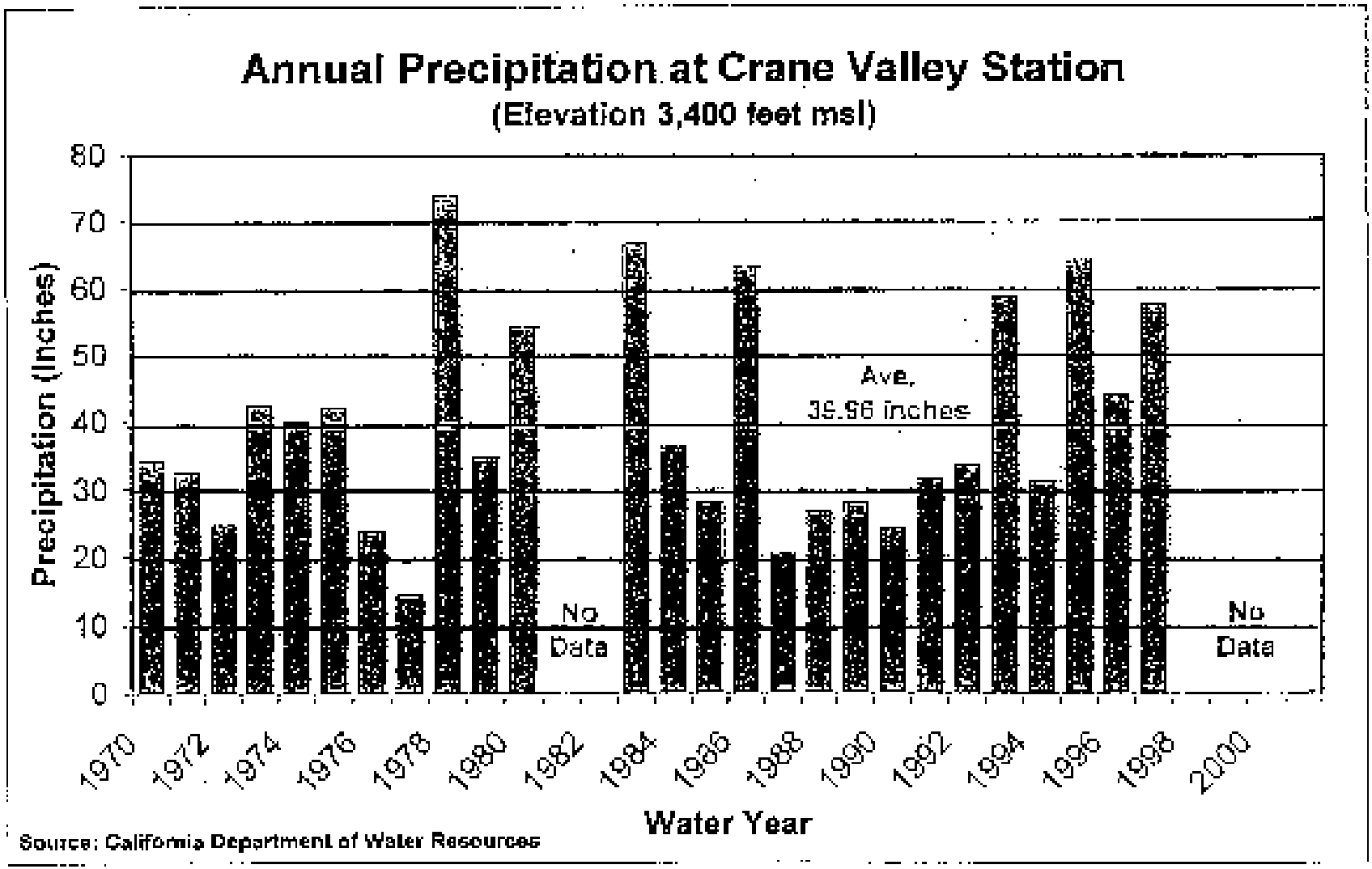

FIGURE 2-PRECIPITATION AT CRANE VALLEY

of precipitation. Precipitation records for Windy Gap (1,875 feet land surface elevation) extend from 1952-55. These records are too short to determine long-term trends.

Todd Engineers (2002, Figure 3) presented a graph of annual precipitation and elevation for Eastern Madera County. This graph is consistent with the isohetal map prepared by the California Department of Water Resources that was previously discussed. Figure 2, taken from Figure 4 of Todd Engineers, shows annual precipitation at the Crane Valley Station from 1970-1998. Almost 90 percent of the precipitation at this station occurred during November-April.

Monthly precipitation at the Oakhurst Fire Department station is available for the past six years. Below normal precipitation has occurred during this period. Table 1 shows precipitation during 2004-05 at the Fire Station.

STREAMFLOW

Todd Engineers (2002, Table 1) summarized streamflow records in Eastern Madera County, and these have been reviewed and updated for this study. Records for the Fresno River near Knowles (elevation 1,006 feet), for a 133-square-mile drainage area, indicated a mean annual streamflow of 60,200 acre-feet per year from 1917-89. The runoff over the watershed tributary to this streamgage thus averaged about 0.7 acre-foot per acre per year. The average annual

TABLE 1-PRECIPITATION AT OAKHURST FIRE STATION
(OCTOBER 2004-SEPTEMBER 2005)

Period	Precipitation (Inches)
10/16-20/04	4.1
10/23-27	1.7
11/3	0.5
11/7-11	0.6
11/26-27	1.2
12/6-8	1.4
12/26/04-1/11/05	11.4
1/24-27/05	1.5
2/6-7	0.1
2/10-11	0.3
2/14-24	4.2
2/28	0.9
3/1-4	0.3
3/18-24	5.8
3/27-28	0.6
4/3	0.5
4/7-8	0.7
4/27-28	0.6
5/4-10	3.2
5/16-17	1.0
Total	40.6

precipitation on the watershed tributary to this streamgage was estimated to be 30 inches per year. Thus the streamflow at the gage near Knowles was 28 percent of the precipitation on the tributary watershed. For the station on Miami Creek near Oakhurst (10.6 square-mile watershed), the mean annual streamflow was 6,200 acre-feet per year for 1961-91. This averaged about 1.0 acre-foot per acre per year over the watershed tributary to the streamgage. The estimated average annual precipitation on the tributary watershed was 40 inches per year. Thus the Miami Creek streamflow was 29 percent of the precipitation on the tributary watershed, nearly the same percentage as for the Fresno River streamgage near Knowles.

One stream gaging station has been operated since 1962 in the Oakhurst Basin. This is on the Lewis Fork, below the confluence with Nelder Creek (drainage area 32.5-square miles). The average annual runoff at this gage was 31,300 acre-feet per year for 1962-2003. This averaged 1.5 acre-feet per acre per year over the watershed tributary to the gage. The average precipitation on the tributary watershed was about 40 inches per year. Thus the Lewis Fork streamflow was about 45 percent of the precipitation.

EVAPOTRANSPIRATION ESTIMATES

The residual between precipitation and runoff in the Oakhurst Basin watershed is evapotranspiration of native vegetation and

consumptive use of water on developed lands. Todd Engineers (2002, pages 8-9) discussed evaporative demand in Eastern Madera County. Evaporative demand (i.e., water that could evaporate from a lake) is about 50 inches per year in the Oakhurst Basin. Of more importance to this evaluation is plant evapotranspiration. Estimates of plant evapotranspiration have been made for major vegetative types in the Sierra Nevada by the UC Berkeley Forestry Department and the U.S. Forest Service. For meadows and conifer Forests, typical of the higher parts of the watershed in the Oakhurst Basin, the annual evapotranspiration is indicated to be about 20 to 25 inches per year, or an average of about 1.8 feet per year. For grass-oak woodland, such as in the Ahwahnee-Windy Gap area, the annual evapotranspiration is likely about 15 to 20 inches per year.

For undeveloped mountainous acres, the precipitation is essentially equal to the sum of the runoff (streamflow) and evapotranspiration. For the entire watershed tributary to the Oakhurst Basin, the percent of land in natural vegetation is large, compared to the developed areas.

As part of this evaluation, the long-term average evapotranspiration was estimated for the watersheds above several stream-gages. This was done by deducting the long-term runoff from the long-term precipitation. The smallest of these watersheds was Miami Creek, above the confluence with Peterson Creek. The average annual precipitation in the tributary watershed above the stream-

gage is estimated to be 37 inches, and the average annual runoff is estimated to be about 12 inches per year. The evapotranspiration is thus approximately 25 inches per year, or 2.1 acre-feet per acre per year (feet per year). For the streamgage on the Lewis Fork, the average annual precipitation is estimated to be 40 inches per year and the average annual runoff is 18 inches per year. The long-term average evapotranspiration would be 22 inches per year, or 1.8 feet per year. For the Fresno River near Knowles streamgage, the estimated long-term average annual precipitation on the tributary watershed is 30 inches per year and the long-term runoff is about 8 inches per year. The average evapotranspiration is thus about 22 inches per year, or 1.8 feet per year.

This evaluation indicates that the long-term pre-development average evapotranspiration in the Oakhurst Basin is about 2.0 acre-feet per acre per year. In the lower topographic parts of the basin, the average annual runoff is only about four acre-inches per acre per year (0.33 feet per year). In the upper parts of the Fresno River watershed in the Oakhurst Basin, the average annual runoff is about one and a half acre-feet per acre per year.

Because of the small amount of groundwater in storage in the hardrock, groundwater development in hardrock terrains is based on recharge. Amounts of runoff and evapotranspiration are important in determining groundwater recharge. Groundwater that is pumped comes from recharge, which would otherwise have eventually left the

basin as streamflow, or have been consumed by evapotranspiration or consumptive use in developed areas. In most hardrock areas, the amount of groundwater that can be developed generally increases with increasing elevation, because of the larger excess of precipitation above evapotranspiration. The amount of groundwater that can be developed has commonly been in the range of about 10 to 20 percent of the average precipitation.

WATERSHEDS AND SUBAREAS

Figure 1 shows watershed boundaries and subareas that were developed for use in this study. South of the Fresno River, there is a drainage divide that extends from a point about one and a half miles west of High-way 41, to the south along the face of Potter Ridge to Deadwood Peak. On the north side of the river, this drainage divide extends to the northeast, and separates the Miami Creek drainage on the west from the Fresno River drainage to the east. These two drainage divides separate the westerly and easterly parts of the Oakhurst Basin. One subarea used in this evaluation is termed the Peterson Creek-Miami Creek area, and includes Ahwahnee, the Goldside area, Dillon Estates, Miami Creek Estates, Pike Ranch, and the Ahwahnee Country Club. Water systems in this subarea (Figure 3) include the Hillview Goldside, Pike Ranch, and three Madera County Maintenance Districts (MD 43, 46, and 60). The south boundary of this subarea is near the Fresno

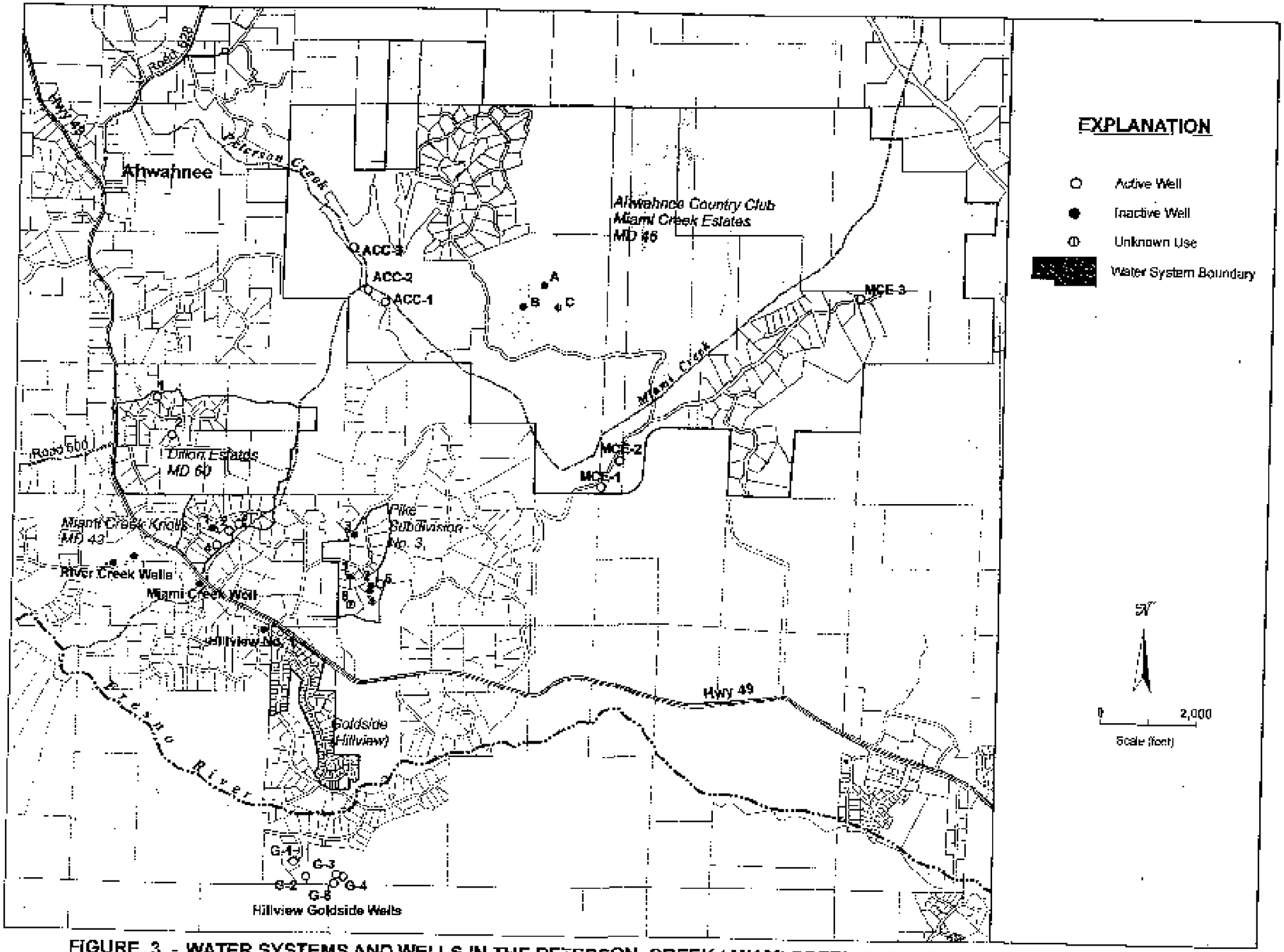

FIGURE 3 - WATER SYSTEMS AND WELLS IN THE PETERSON CREEK / MIAMI CREEK SUBAREA

River. The subarea extends south to include the Hillview Water Co. Goldside wells, which are south of the river. Streamflow in Miami Creek and its tributary, Peterson Creek, and precipitation contribute recharge to groundwater in this area. The former streamgage on Miami Creek was located about four miles upstream of the confluence with Peterson Creek. The combined average annual streamflow of these creeks at that point is estimated to be about 10,000 acre-feet per year.

The area east of these drainage divides and south of the streamgage on the Lewis Fork of the Fresno River was divided into two subareas. Figure 4 shows major water systems in the western subarea (Oakhurst), which includes the Hillview Water Co. Oakhurst system, Broadview Terrace Mutual Water Co. system, and Stillview Meadows (Madera County MD 42). The Oakhurst Wastewater Treatment Facility is located in the western part of this subarea. The Fresno River and China Creek pass through this subarea. The flow of China Creek has not been measured. This creek drains much of the Oakhurst subarea that is south and southeast of the Fresno River. Based on the streamflow and precipitation records for other streams in the Oakhurst Basin, and the size of the China Creek watershed, the long-term average annual runoff of China Creek is estimated to be about 3,000 acre-feet per year. Seepage from streamflow in China Creek and its tributaries and precipitation are indicated to be important sources of recharge to groundwater in the Oakhurst

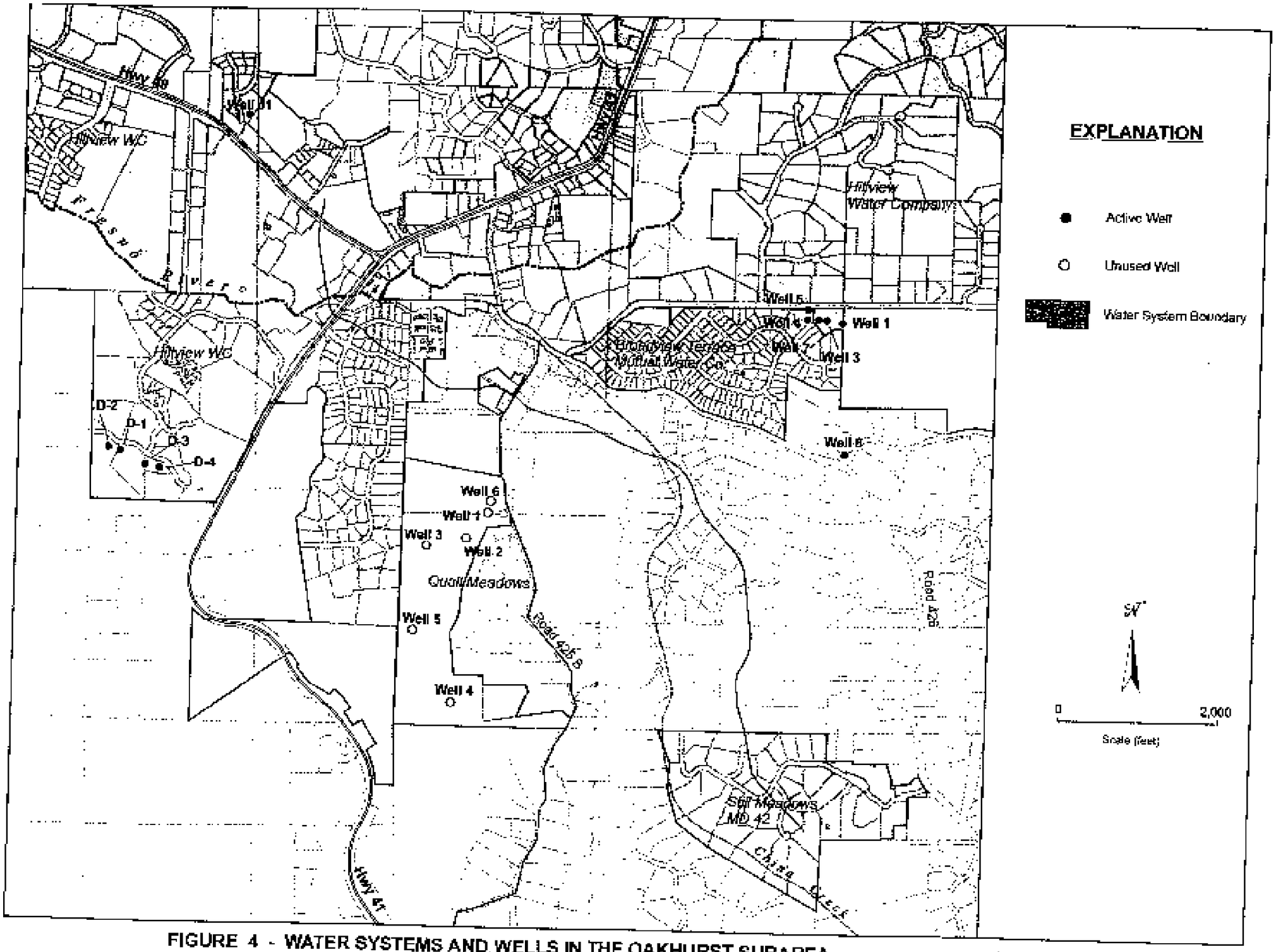

FIGURE 4 - WATER SYSTEMS AND WELLS IN THE OAKHURST SUBAREA

subarea.

Much of the rest of the China Creek watershed and some lands to the north are termed the Sierra Lakes subarea in this report. A considerable part of this subarea is served by the Hillview Water Company Sierra Lakes system (Figure 5). There are also a relatively large number of private domestic wells in parts of this subarea, particularly south of the Broadview Terrace MWC service area and east of the Hillview W.C. service area.

A subarea that was not evaluated in detail in this evaluation includes the Yosemite Forks area. The Lewis Fork of the Fresno River and Nelder Creek pass through this subarea. The Yosemite Forks water system supplies part of this area, and most of the rest of the area relies on private domestic wells. Streamflow in the Lewis Fork and Nelder Creek and precipitation are important sources of groundwater recharge in this subarea. As discussed previously, the average streamflow in Lewis Creek below the confluence of these two tributaries is over 31,000 acre-feet per year.

GEOLOGIC CONDITIONS

Important geologic features in terms of groundwater supplies is the Oakhurst area include contacts between different rock types, linear features or lineaments, and fracture orientations. Some of the most important references on geologic conditions in the Oakhurst basin are Morin (1977) and Bateman (1989). Morin's M.S.

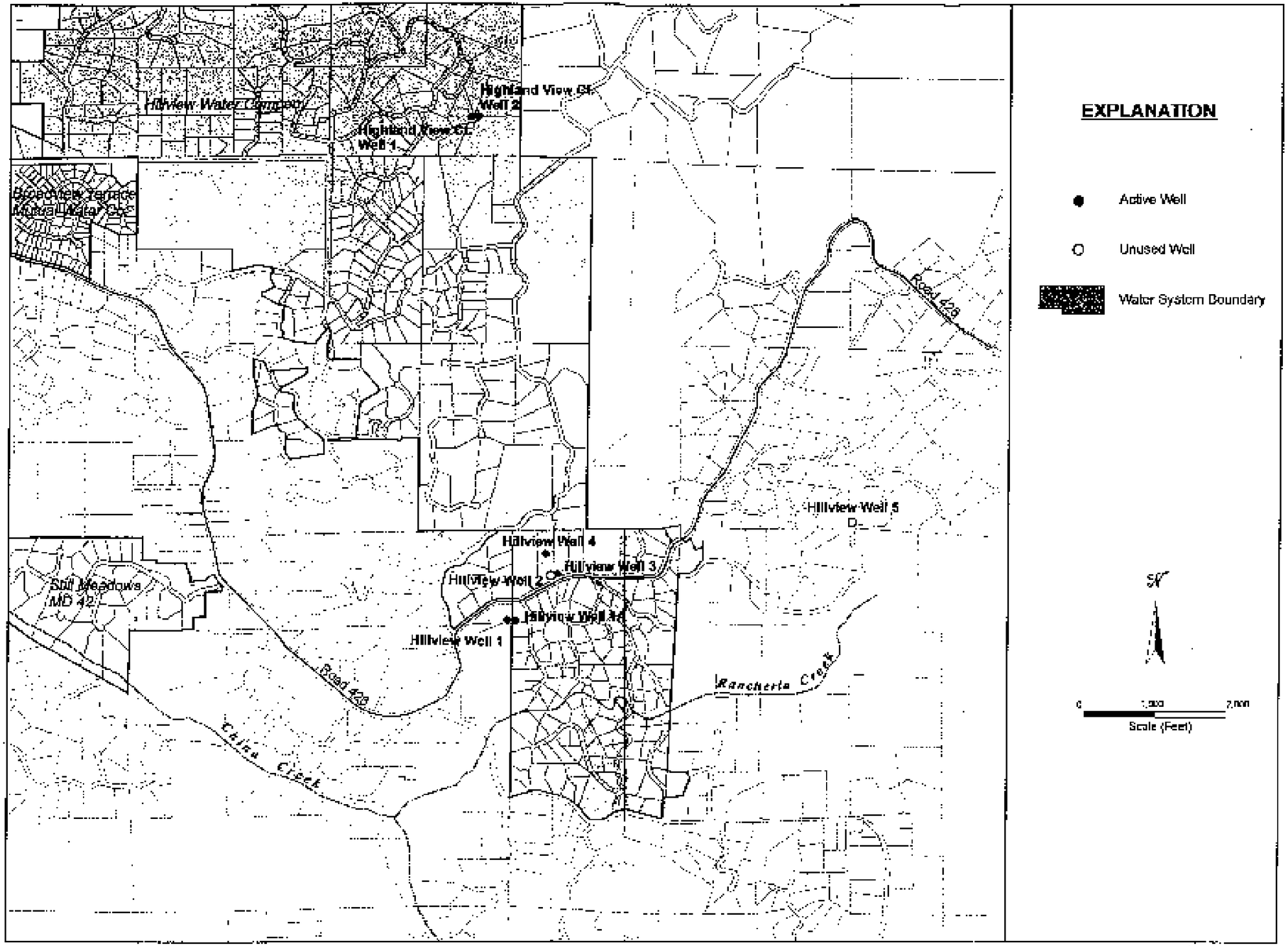

FIGURE 5 - WATER SYSTEMS AND WELLS IN THE SIERRA LAKES SUBAREA

thesis in Geology at CSU, Fresno focused on salt water in the central Sierra Nevada, which includes the Oakhurst area. She mapped three major rock types, as well as large linear features of importance to the occurrence of salt water in the hardrock in the Oakhurst area. Figure 6 shows the major rock types, linear features, and fracture orientations in the Miami Creek-Peterson Creek subarea. Figure 7 shows the same features in the Oakhurst subarea. As part of this evaluation, KDSA mapped the orientation of additional fractures, particularly near concentrations of water system wells, and these are also shown on these illustrations.

Metamorphic rocks (roof pendants) are predominant on the slopes of Potter Ridge and Thornbury Mountain, primarily south of the Fresno River. The rocks are primarily quartzite and schist. The other two rock types are igneous rocks, and are termed grantic rocks in this evaluation. North of the roof pendants, tonalite crops out, primarily between Deadwood Peak and Teaford Saddle. Bateman (1989) classified most of the grantic rock in the Oakhurst Basin as the Bass Lake tonalite. Granodiorite is present farther to the north in the Oakhurst basin. Bateman also showed several patterns of foliation in the grantic rock, which generally coincide with fracture orientations.

West of highway 41, the predominant strike of these fractures is northwest-southeast. In much of this part of the Oakhurst Basin, fracture dips are vertical or near vertical, and where dips

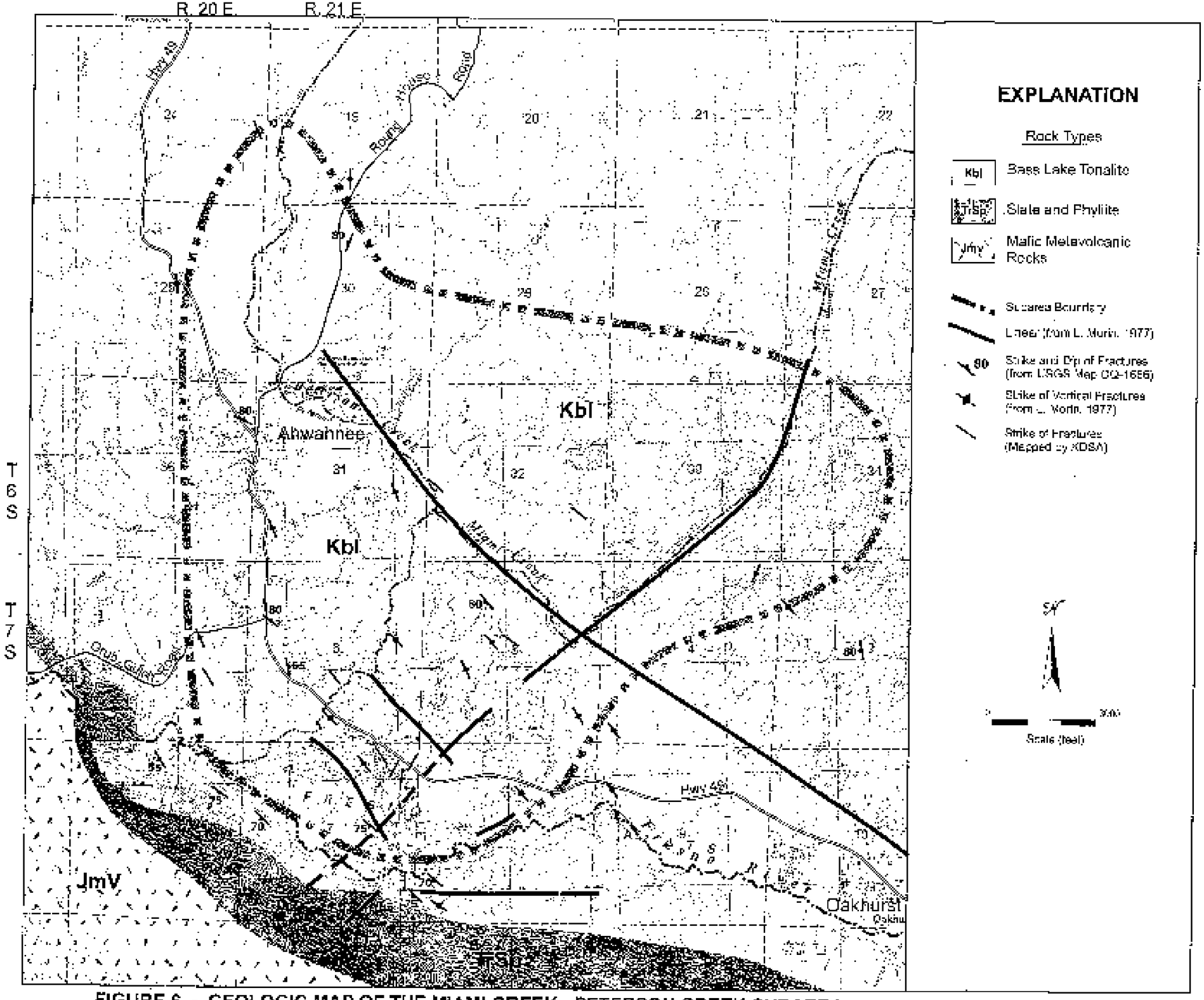

FIGURE 6 - GEOLOGIC MAP OF THE MIAMI CREEK - PETERSON CREEK SUBAREA

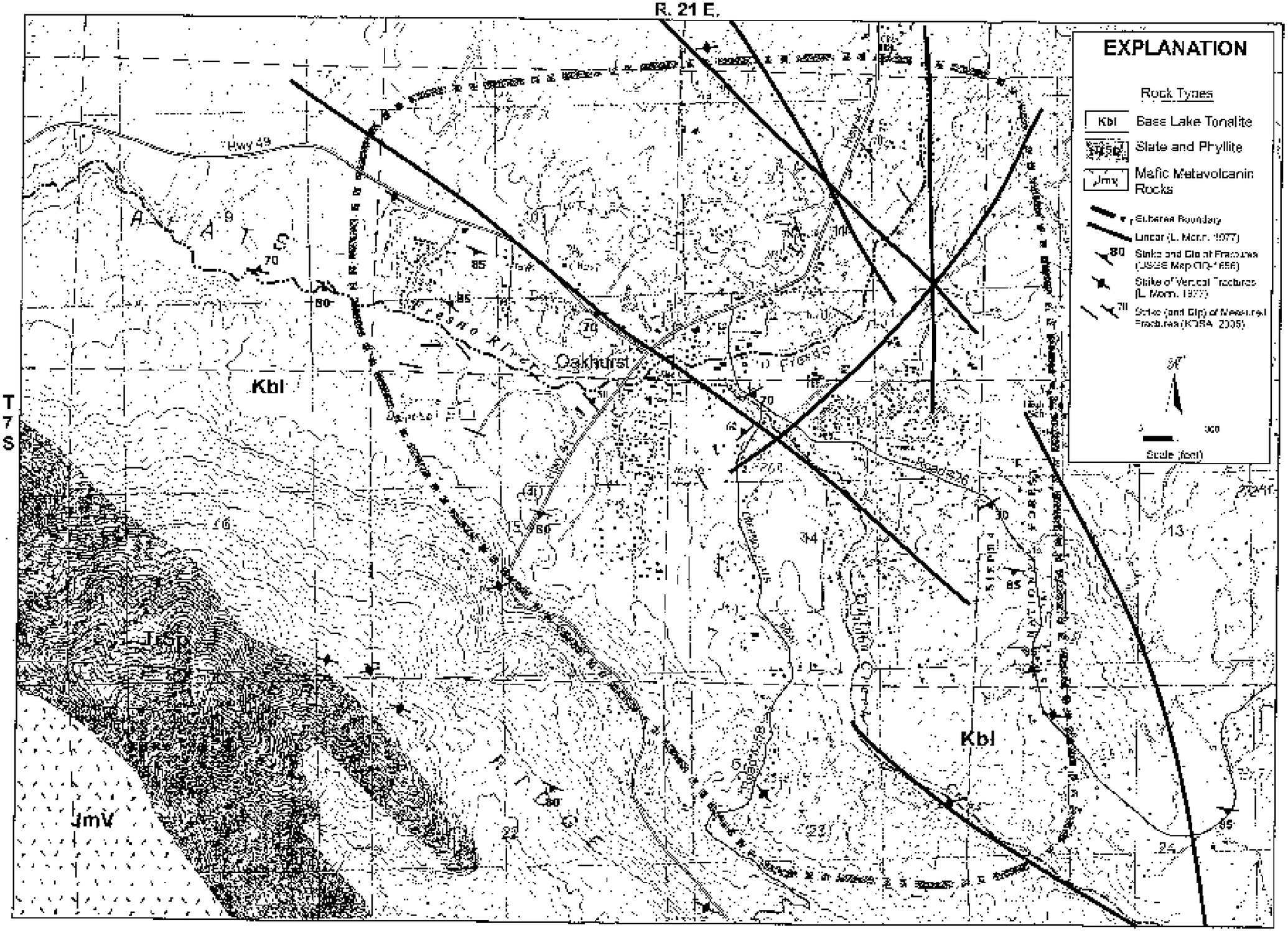

FIGURE 7 - GEOLOGIC MAP OF THE OAKHURST SUBAREA

are not vertical, they are usually steep to the southwest. In the Goldside-Windy Gap area, dips of the fractures are less, commonly from 60 to 75 degrees. East of Highway 41 and on the slopes of Thornbury Mountain, the strike is also northwest-southeast, and dips are near vertical. Farther east near Teaford Saddle, strikes are west to east or southwest to northeast, and dips are vertical. Between Oakhurst and Bass Lake, fracture trends are generally the same as near Teaford Saddle. Between Yosemite Forks and Bass Lake, fracture primarily have a northwest-southeast strike, and near vertical dips. Fracture trends are important in assessing the hydraulic connections of different wells. In general, wells along the same fracture trend are more hydraulically connected than otherwise. This has been demonstrated by previous pump tests in the Oakhurst-Coarsegold area. The results of these tests in the Oakhurst Basin are described in a later section of this report.

Linear features have been mapped and appear to be concentrated in at least four parts of the Oakhurst Basin. The first is east of the junction of Highways 41 and 49, and a second is in the Goldside area. A third is in the Yosemite Forks area, and a fourth is midway between Oakhurst and Yosemite Forks, along the Fresno River. All of these linears are generally in topographically low areas. This is probably because the linears are located along more erodable rock. The relationship between these linears and groundwater quality are discussed more in a future section of this report.

SUPPLY WELLS

Some springs provide the water supply in parts of the Oakhurst Basin, particularly in Cedar Valley and at Yosemite Forks. However, most of the water in the basin supply comes from hardrock wells, tapping fractures in the grantic rocks. A few wells derive water from shallow weathered or decomposed rock, which overlies the hardrock. These lateral or radial wells have been drilled at several sites near the Fresno River and at the Yosemite High School. Some have been abandoned because of their susceptibility to a surface water influence and contamination.

Water Systems

Water system wells in the Peterson Creek-Miami Creek area range in depth from as shallow as about 100 feet to as deep as more than 1,100 feet. Active Miami Creek Estates wells range from 500 to 1,097 feet deep, and two of these wells are at least 900 feet deep. Two active Dillon Estates wells range in depth from 140 to 900 feet. Active Pike Ranch Wells range in depth from about 500 to 600 feet. Active Hillview Water Co. Sierra Lakes wells range in depth from about 380 to 480 feet, although a new well not yet in service is 1,000 feet deep. Active Broadview Terrace Mutual Water Co. wells range in depth from 110 to 700 feet. Most of these water system wells were designed to produce at least 10 gpm, and deeper wells have generally been drilled to tap more water-producing

fractures in order to obtain higher sustainable yields.

Private Wells

In most areas, private domestic wells are no deeper than several hundred feet. However, in some topographically higher areas, private domestic wells are 500 feet or deeper. These wells are generally fairly shallow unless inadequate production was obtained, in which case, a deeper well was drilled.

As part of this evaluation, a number of private wells in the vicinity of water systems wells were field located and mapped using GPS equipment. Information on these wells was obtained from well completion reports and other sources. Locations of these wells are shown on the subarea maps. Well inventory information is provided in Appendix A. This information was assembled and placed in a computer data base for use in this evaluation and for future use by Madera County.

WATER LEVELS

Prior to this evaluation, water-level elevation maps were not available for water supply wells in the Oakhurst Basin. The direction of groundwater flow had not been determined, except at several localized, small sites (i.e., gasoline leak sites). A water-level measurement program was commenced in September 2004, and measurements continued as part of this evaluation through early September 2005. The purpose of these measurements was to determine

seasonal water-level fluctuations. Frequent (every several weeks) measurements were made in a selected group of wells in each of the main three subareas. In addition, two more extensive water-level measurement rounds were made in these and other wells in late fall-early winter, 2004, and in late April-early May, 2005. The purpose of these measurements was to allow water-level elevations and the direction of groundwater flow maps to be prepared prior to or in the beginning of winter recharge, and near the end of the winter recharge season. These maps are particularly useful in developing a conceptual understanding of the groundwater in the Oakhurst Basin. Water-level data are provided in Appendix B.

Fall 2004 Water-Level Elevations

The elevations and latitude and longitude of the measuring points of measured wells were determined by KDSA with a Trimble Pro XR GPS device owned by Madera County. Water-level measurements are provided in Appendix A. Figure 8 shows water-level elevations and the direction of groundwater flow in the Peterson Creek-Miami Creek subarea, based on measurements made on November 2-3, 2004. About six inches of winter precipitation had occurred prior to these measurements. Elevations of the channels of the Fresno River, Miami Creek, and Peterson Creek were also determined, to allow comparisons of stream channel elevations to groundwater level elevations. Water-level elevations ranged from almost 2,400 feet

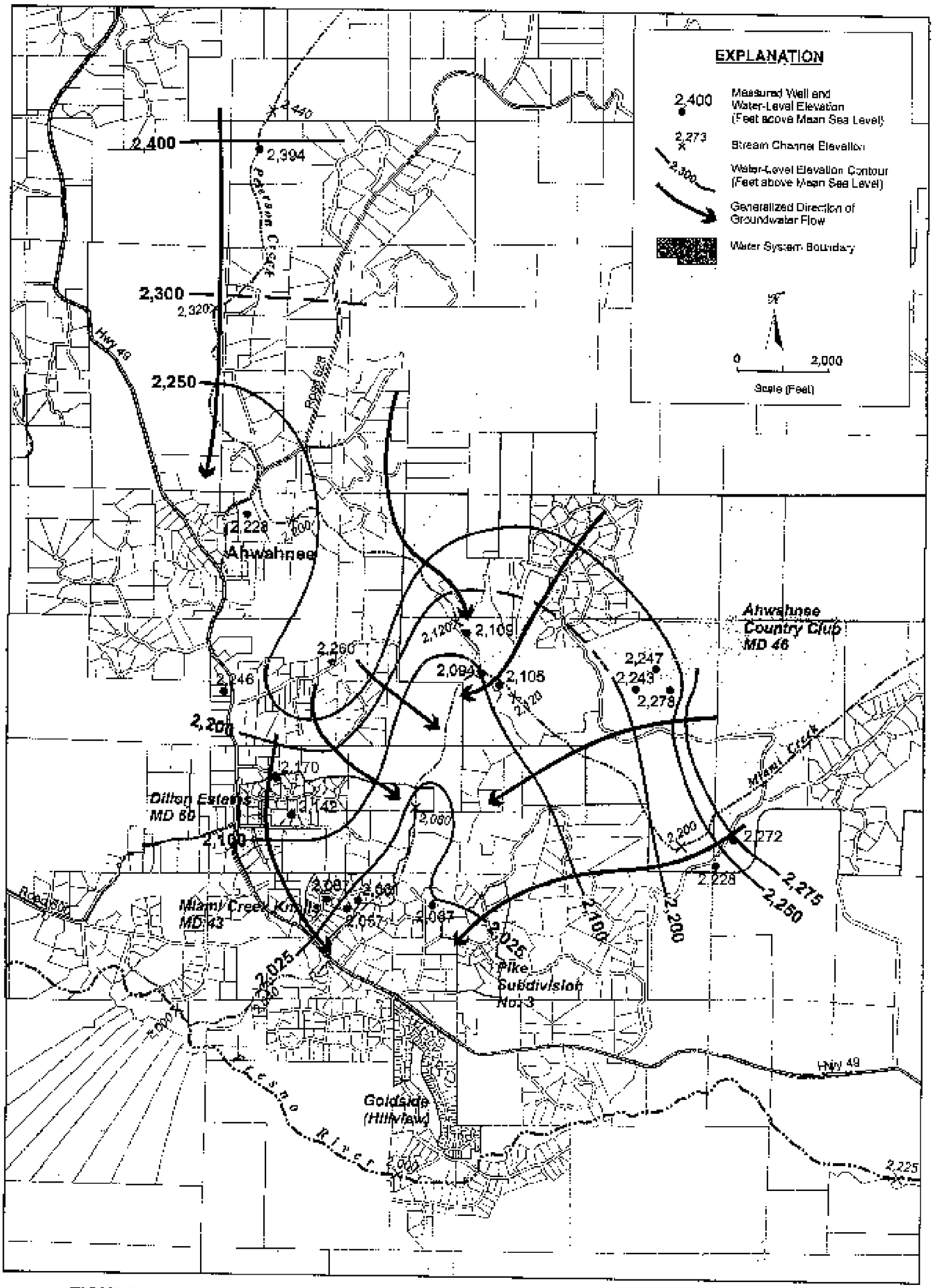

FIGURE 8 - WATER LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR THE PETERSON CREEK / MIAMI CREEK SUBAREA ON NOVEMBER 2 - 3, 2004.

above mean sea level along Peterson Creek, north of the junction of Road 628 and Highway 49 to less than 2,060 feet, near the Miami Creek crossing of Highway 49. Groundwater flowed south along Peterson Creek and to the southwest along Miami Creek above the confluences of the two creeks. A cone of depression was present in the Dillon Estates-Pike Ranch area due to pumping of a concentrated group of wells in this part of the subarea. Groundwater was flowing toward this depression and toward the Fresno River. In the higher topographic parts of the subarea, groundwater levels were below the stream channels, and streamflow seepage (when present) could recharge the groundwater at these locations. In contrast, in the topographically lower parts of the area near the Fresno River, groundwater levels were above the channel levels. This indicates that groundwater was discharging into the stream channel, or was being consumed by plant evapotranspiration in that vicinity. Groundwater discharges contribute virtually all of the streamflow in the Fresno River under baseflow (low flow) conditions, typically in the late summer and early fall.

Figure 9 is a similar map for the Oakhurst subarea, based on water-level measurements on October 13-14, 2004. Water-level elevations in the Oakhurst subarea ranged from almost 2,400 feet to the south along China Creek, to less than 2,300 feet near the Fresno River. The direction of groundwater flow was toward the Fresno River. A well developed cone of depression was present in

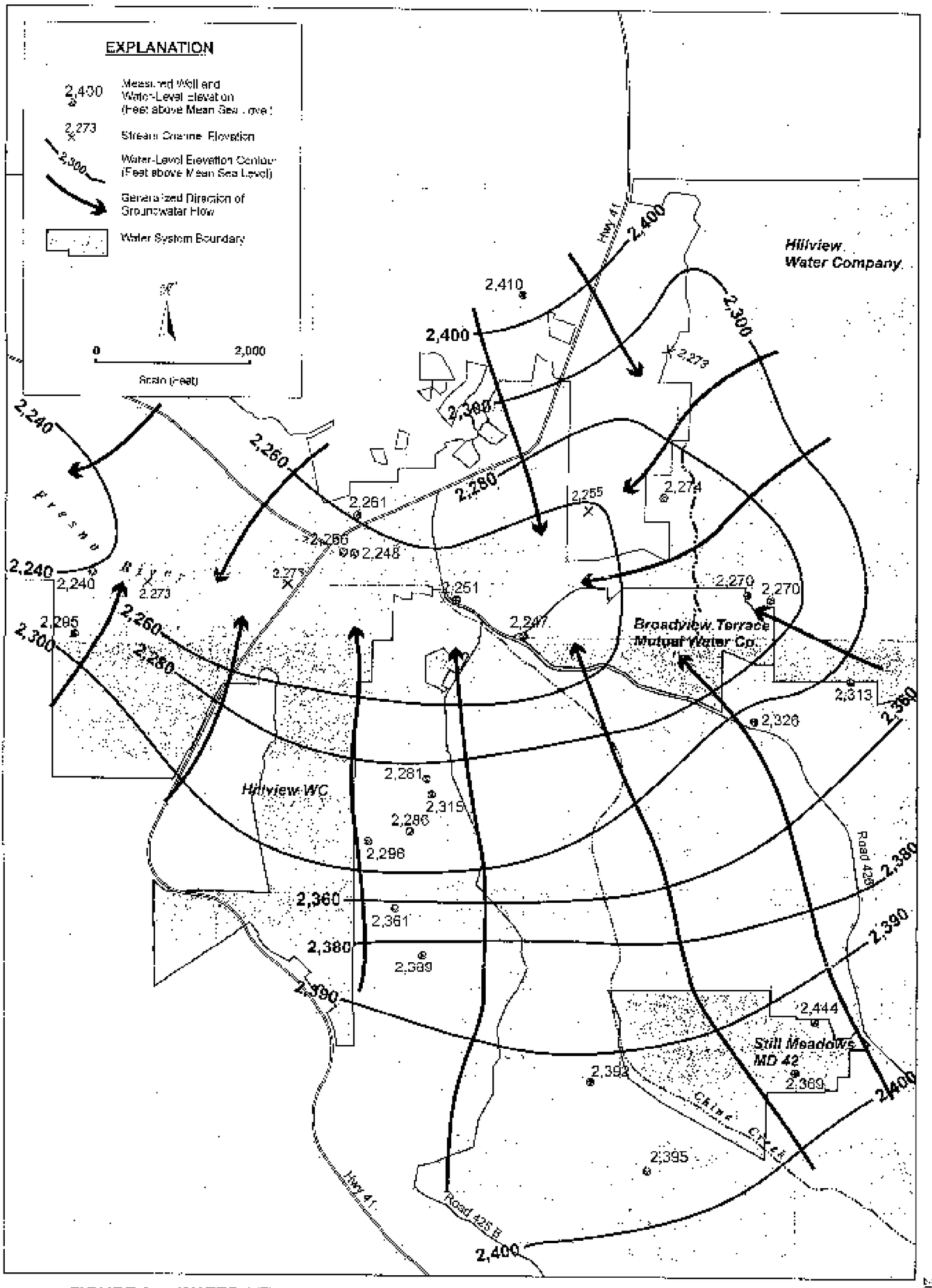

FIGURE 9 - WATER LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR THE OAKHURST SUBAREA ON OCTOBER 13-14, 2004.

an area of a concentrated group of wells in the Broadview Terrace Mutual Water Co. service area and near Yosemite High School. Along the upper parts of China Creek and its westerly tributary, water-level elevations were near stream channel elevations. This implies that the hardrock aquifer was almost full of groundwater in this part of the subarea at that time. The shape of water-level elevation contours along the Fresno River indicated that groundwater flowed toward and into the river. This confirms that the Fresno River is a source of groundwater discharge in the subarea. The EPA sponsored 208 nonpoint water quality monitoring program in the late 1970's included sampling of the streamflow in the Fresno River under baseflow (late summer) conditions. Local increases in chloride concentrations in the baseflow as one progressed downstream were due to inflow of groundwater with a high chloride concentration than in the upstream streamflow. Considering the rivers relatively low elevation and the groundwater elevations determined as part of this evaluation, the reach of the Fresno River in this subarea is not indicated to be a source of recharge to the groundwater.

Figure 10 shows water-level elevations and the direction of groundwater flow in the Sierra Lakes subarea on December 9, 2004. Water-level elevations ranged from more than 2,960 feet above mean sea level in the southeast part of the subarea to about 2,380 feet

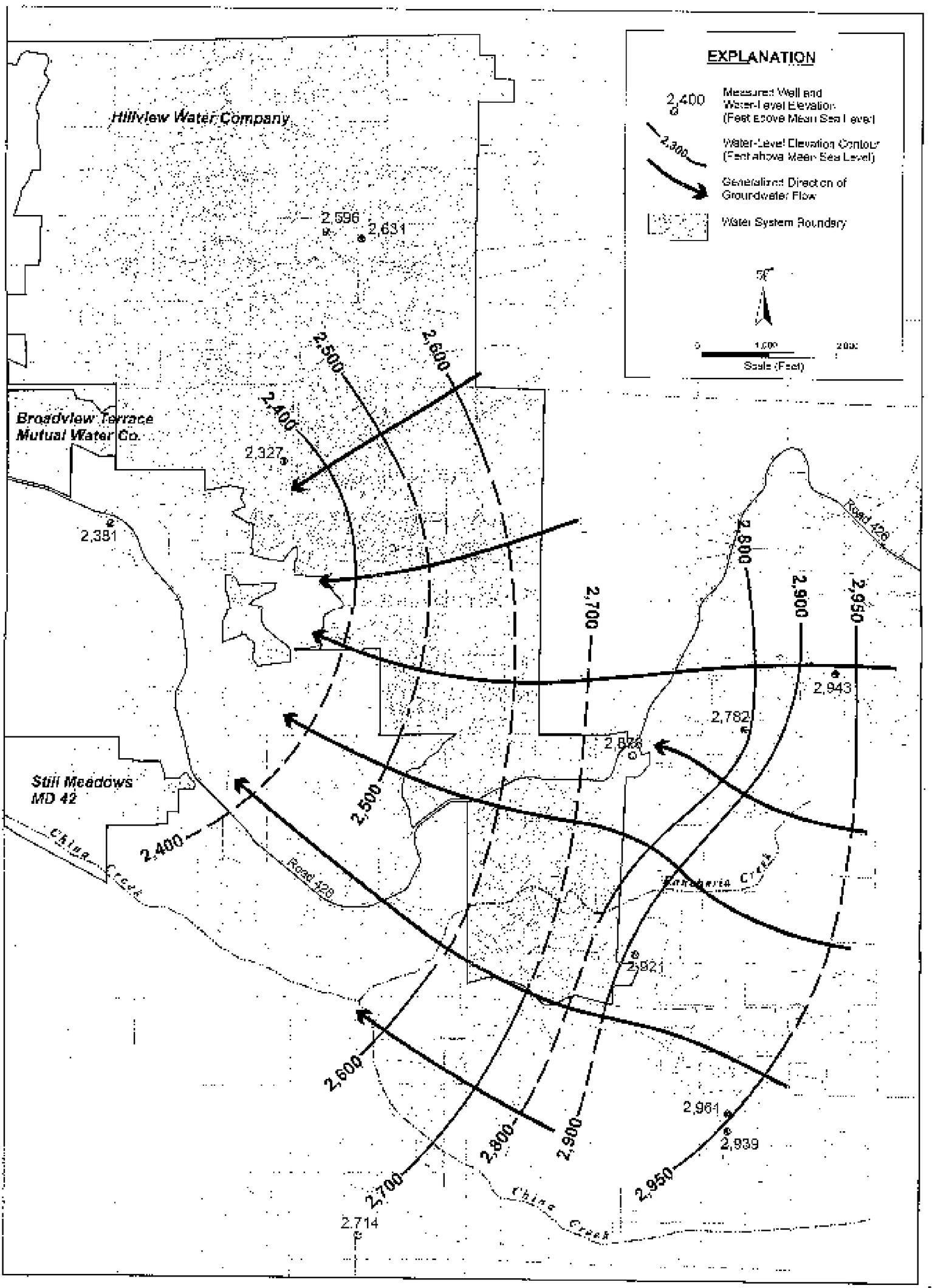

FIGURE 10 - WATER LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR THE SIERRA LAKES SUBAREA ON DECEMBER 9, 2004.

above mean sea level in the western part. The direction of groundwater flow was generally toward the Yosemite High School area, from higher topographic parts of the subarea. Water-level measurements were not available for the Hillview Water Co. Sierra Lakes wells, otherwise a cone of depression in that area would have been indicated. Figure 10 shows that groundwater not pumped or consumed by evapotranspiration moved toward a cone of depression in the Yosemite High School-Broadview Terrace Mutual Water Company service area.

Spring 2005 Water-Level Elevations

Figure 11 is a water-level elevation contour map for the Peterson Creek-Miami Creek subarea for April 27, 2005. These elevations reflect conditions near the end of the winter recharge season, and prior to heavy pumping. They are thus indicated to represent the seasonal shallow water levels in the subarea. This map is very similar to the one for November 2-3, 2004. Groundwater is indicated to flow along Peterson Creek, and to be at an almost identical elevation as the creek channel. This indicates that the hardrock aquifer was essentially full in this area near the end of the winter recharge season. Groundwater was flowing to the southwest along Miami Creek above the confluence with Peterson Creek. In the upper part of MD 46 (Ahawahnee Country Club), the creek channel was above the groundwater levels, and thus streamflow

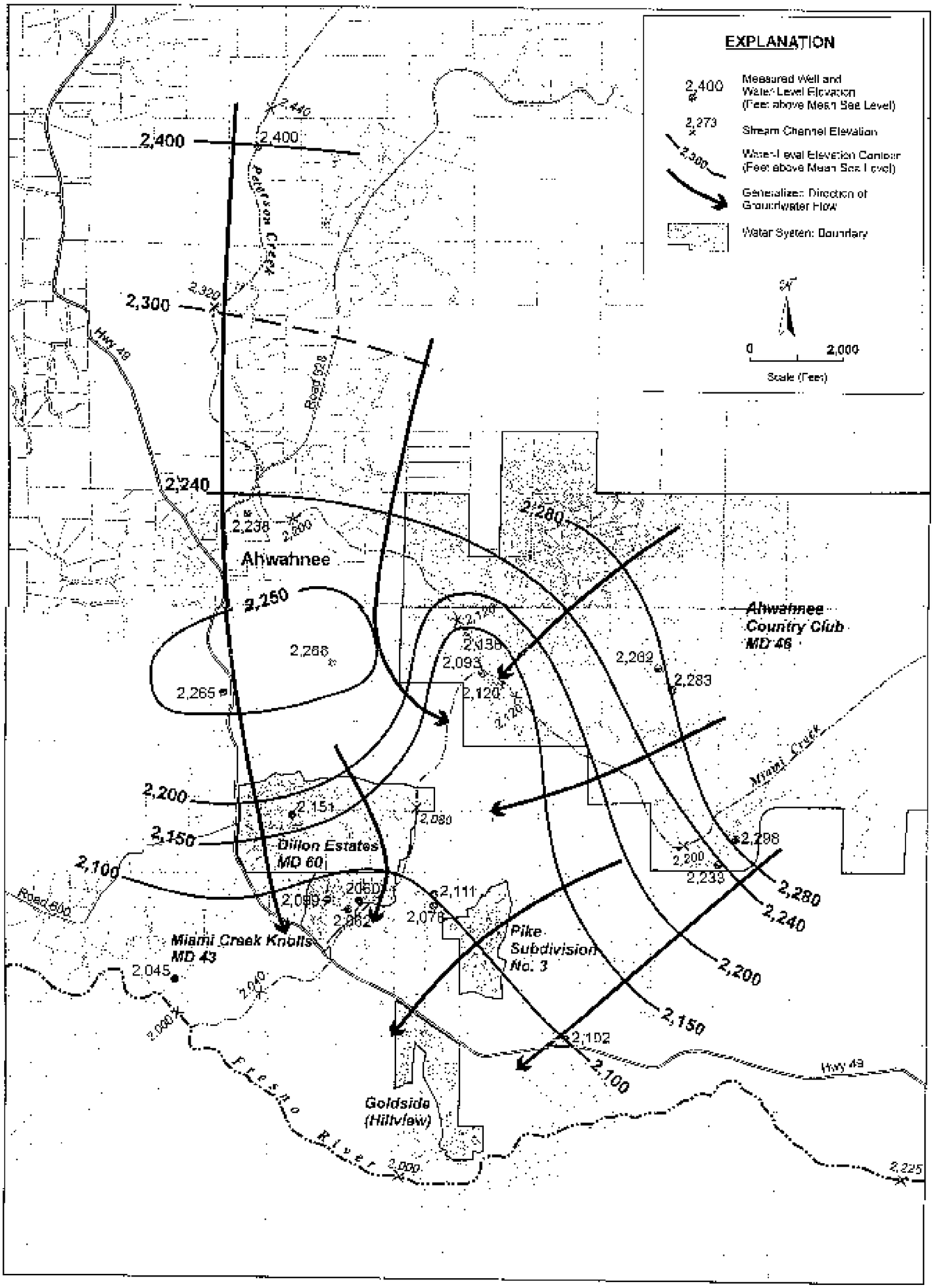

FIGURE 11 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW IN THE PETERSON CREEK - MIAMI CREEK SUBAREA (APRIL 27, 2005)

seepage could recharge the groundwater in this area. Near the confluence of Miami Creek and Peterson Creek, groundwater was flowing toward Miami Creek. This creek was indicated to be a source of groundwater discharge below the confluence. Farther south, groundwater in the subarea that was not pumped or consumed by evapotranspiration was moving toward the Fresno River in the Goldside area. Groundwater levels in the area south of Highway 49 were near or above the Fresno River channel, confirming groundwater discharge to the river.

Figure 12 is a water-level elevation and direction of groundwater flow map for the Oakhurst subarea for May 3, 2005. This map is similar to that for October 13-14, 2005, except that there is little evidence on Figure 10 of the large cone of depression that was indicated on Figure 7 for the Broadview Terrace MWC and Yosemite High School vicinity. Groundwater clearly flowed toward and into the Fresno River, from both sides of the river. Figure 12 shows conditions that are expected near the end of the water recharge season, following a period of minimal pumpage. Groundwater level elevations near the Fresno River were higher than the river channel, confirming that the river was a source of groundwater discharge.

Figure 13 is a water-level elevation and direction of groundwater flow for the Sierra Lakes subarea for May 4, 2005. Overall,

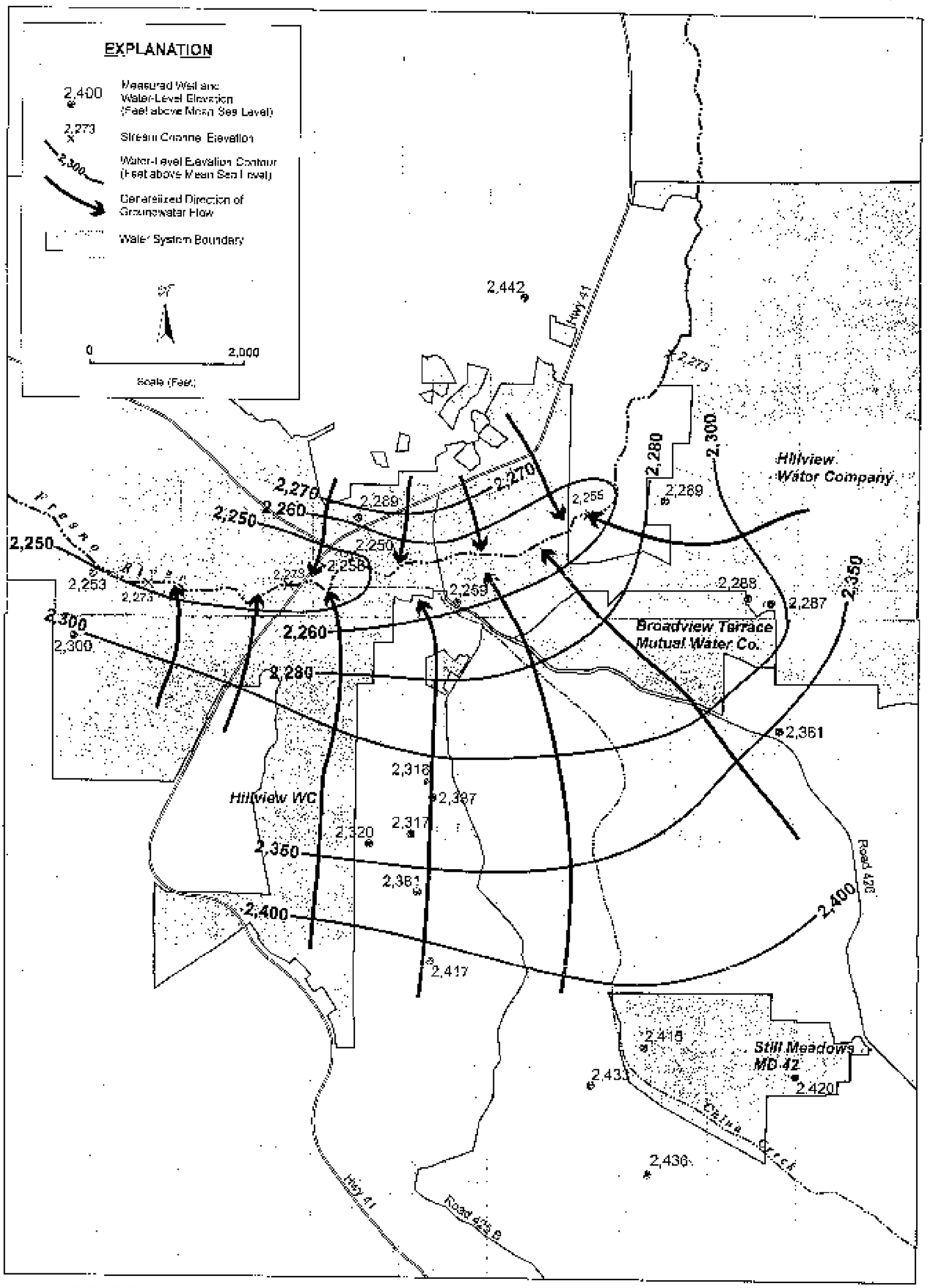

FIGURE 12 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR THE OAKHURST SUBAREA ON MAY 3, 2005.

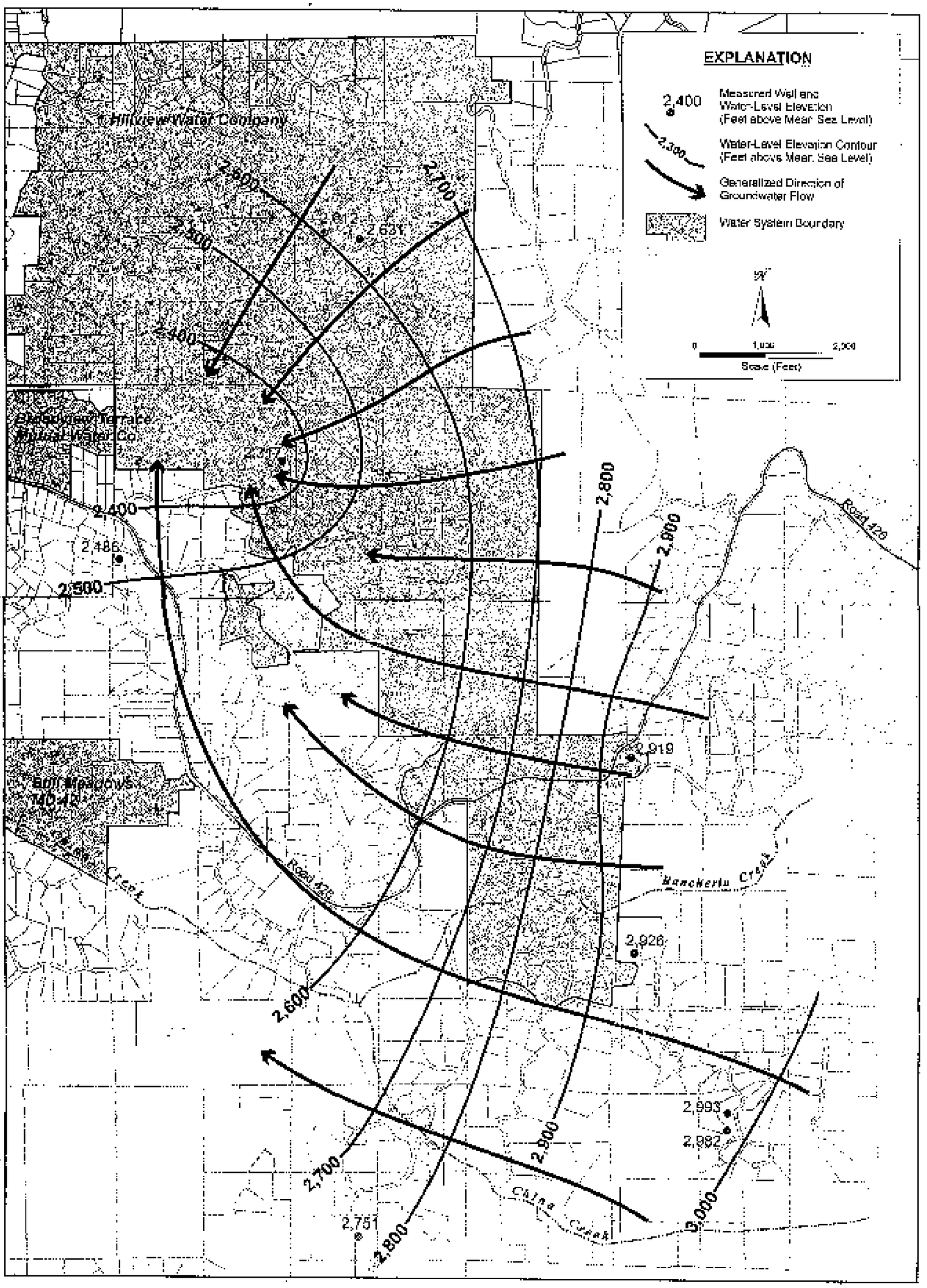

FIGURE 13 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW FOR THE SIERRA LAKES SUBAREA ON MAY 4, 2005.

this map is similar to that for December 9, 2004.

Water-Level Changes

Water-level hydrographs were prepared for a number of wells that were frequently measured as part of this evaluation. Figure 14 shows water-level hydrographs for three wells in the Peterson Creek-Miami Creek Subarea. Monthly precipitation as measured at the Oakhurst Ranger Station was also plotted on this and the other water-level hydrographs. Significant monthly precipitation (exceeding four inches) fell during October 2004, December 2004 through March 2005, and in May 2005. The shallowest water levels (less than 15 feet deep) in these wells were during March and April, 2005. Dillon Estates (MD60) Well No. 1, which is 900 feet deep, was flowing in March-May, 2005. This is the deepest of the three wells for which water-level hydrographs are shown in Figure 14, and this well had the greatest rate of water-level rise. This was likely due to the presence of confined groundwater at depth. Water levels in a number of deep wells measured during this program in the Oakhurst Basin responded quickly to precipitation. This indicates that deep fractures are recharged effectively in most cases. One of the reasons for this is that deep wells generally have only 20 to 50-foot deep annular seals. Many such wells also tap shallow fractures. Once recharge from winter recharge moves down and reaches the shallow fractures, water can fall down the

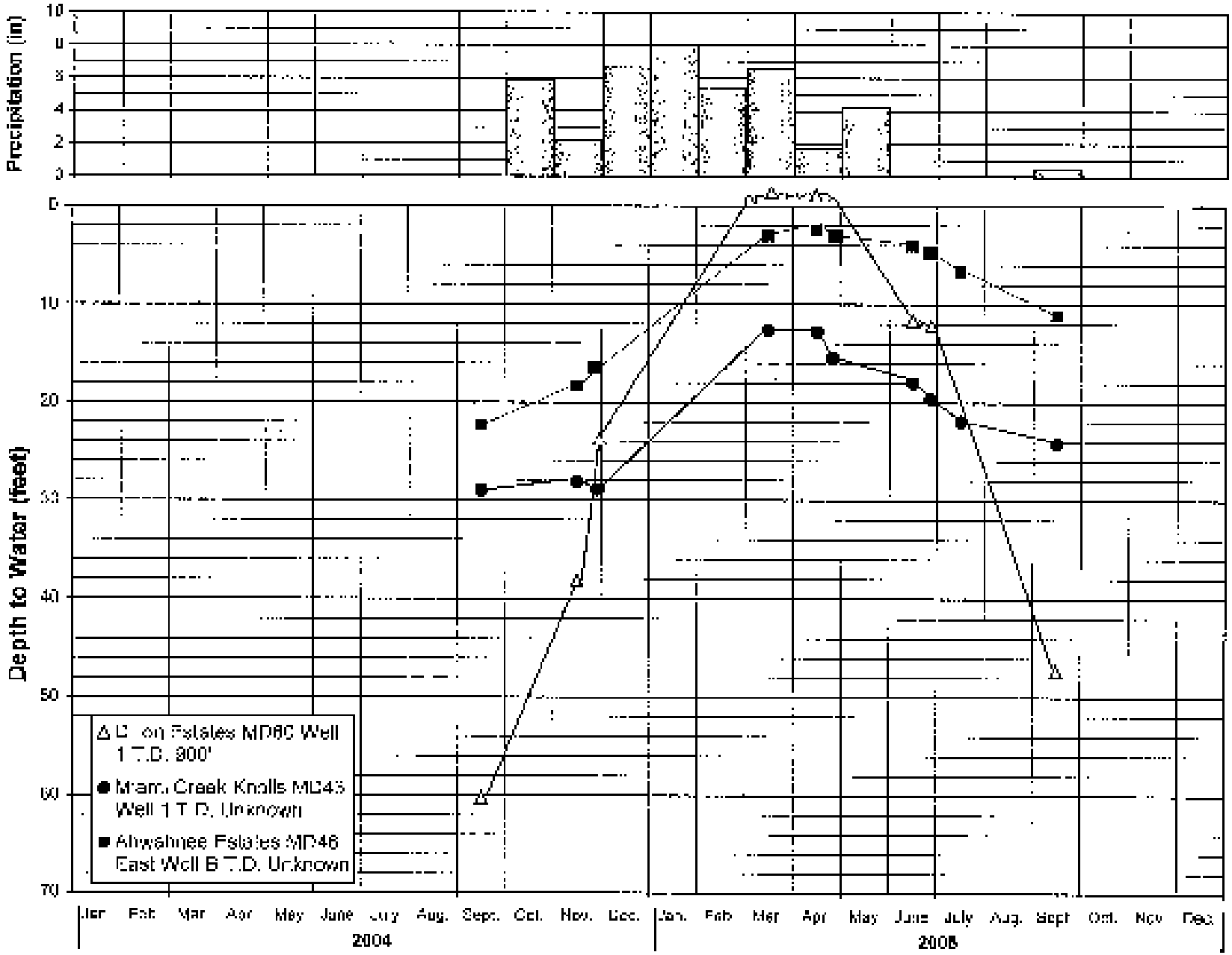

Figure 14 - Water Level Hydrographs for Wells in the Miami Creek-Peterson Creek Subarea

well and recharge the deeper fractures. This information indicates that there is an upward direction of groundwater flow in the Dillon Estates area in the winter recharge season. On the other hand, groundwater flows downward during the summer. Water levels in these wells began to decline by May 2005, following the cessation of winter-spring precipitation. By September 2005, they were usually about 10 to 15 feet shallower than in September 2004.

Figure 15 shows water-level hydrographs for three wells in the southwest part of the Oakhurst subarea. One is a 40-foot deep unused well near the Oakhurst WWTF, south of the Fresno River. The other two wells are at the Quail Meadows subdivision, west of China Creek and south of Road 426. The shallowest water-levels (30 feet deep or shallower) in these wells were generally during March-early May. The deepest well (Quail Meadows No. 5) had the deepest water levels, and the shallowest well had the shallowest water levels. This indicates a downward head gradient and downward direction of groundwater flow in this area. The Quail Meadows project wells were not yet in use for public supply at this time, but some construction water was being pumped. Water levels in these wells fell after early May after winter-spring precipitation stopped, and by September 2005 were also about 10 to 15 feet shallower than the levels measured in September 2004.

Figure 16 shows water-level hydrographs for five other wells in the Oakhurst subarea. Two of these wells are at MD 42 (Still-

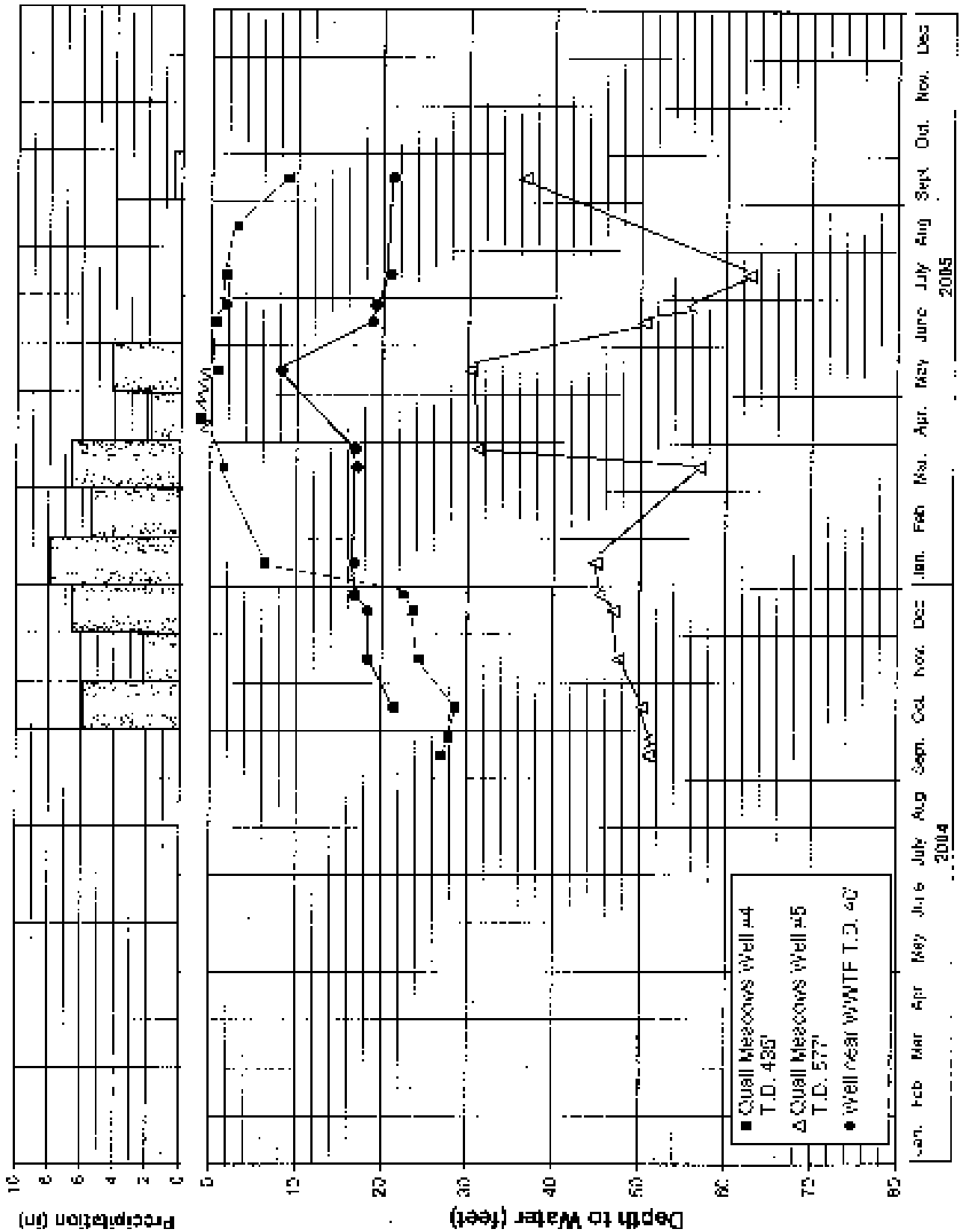

Figure 15 – Water Level Hydrographs for Wells in the Oakhurst Subarea

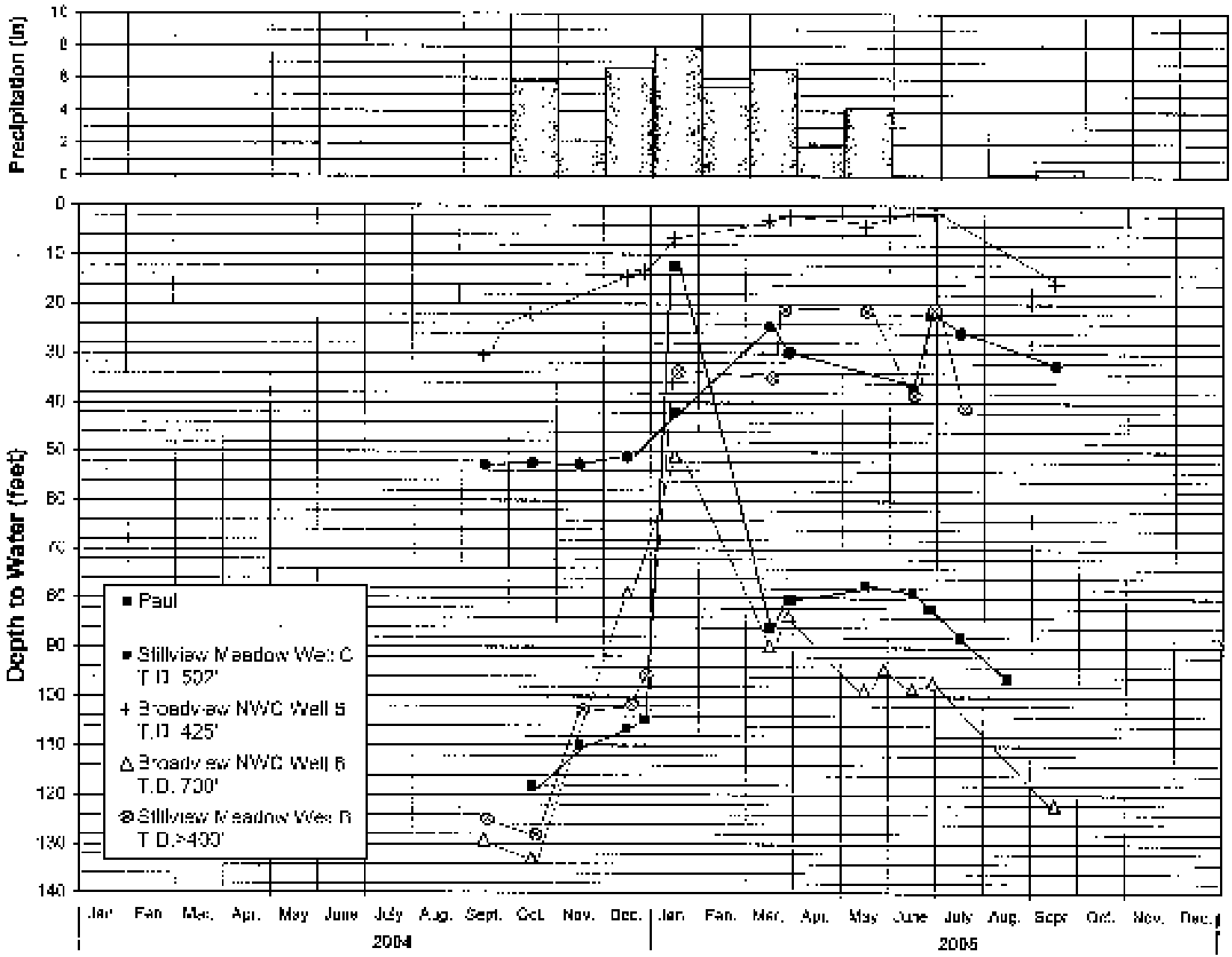

Figure 16 - Water Level Hydrographs for Wells in the Oakhurst Subarea

view Meadow), two others are Broadview Terrace MWC wells, and the remaining well is a private domestic well. Water levels in all of these wells rose following the onset of winter precipitation. The shallowest water levels in these wells were generally in March-April. Water levels began to decline in two wells (Stillview Meadow Well C and Broadview Terrace MWC Well 8) after March 2005, due to the onset of Spring pumping. Water levels in the other wells stayed relatively shallow through May-June, then fell in July and August. By September 2005, water-levels were the deepest of the period of measurements (which commenced in this subarea in December 2004).

Figure 17 shows water-level hydrographs for three private wells in the Sierra Lakes subarea. Water levels in these wells rose after December 2004, and were generally the shallowest in April 2005.

PUMPAGE

Todd Engineers (2002) compiled pumpage data for water systems in Eastern Madera County for 1996-2000. The average pumpage for each connection was 0.5 acre-foot per year, and the average daily use was 0.3 gpm per connection. Based on the number of known private domestic wells in the Oakhurst Basin (about 2,000), the estimated pumpage, at 0.5 acre-foot per well, was about 1,000 acre-feet per year. Pumpage records from community water systems in the

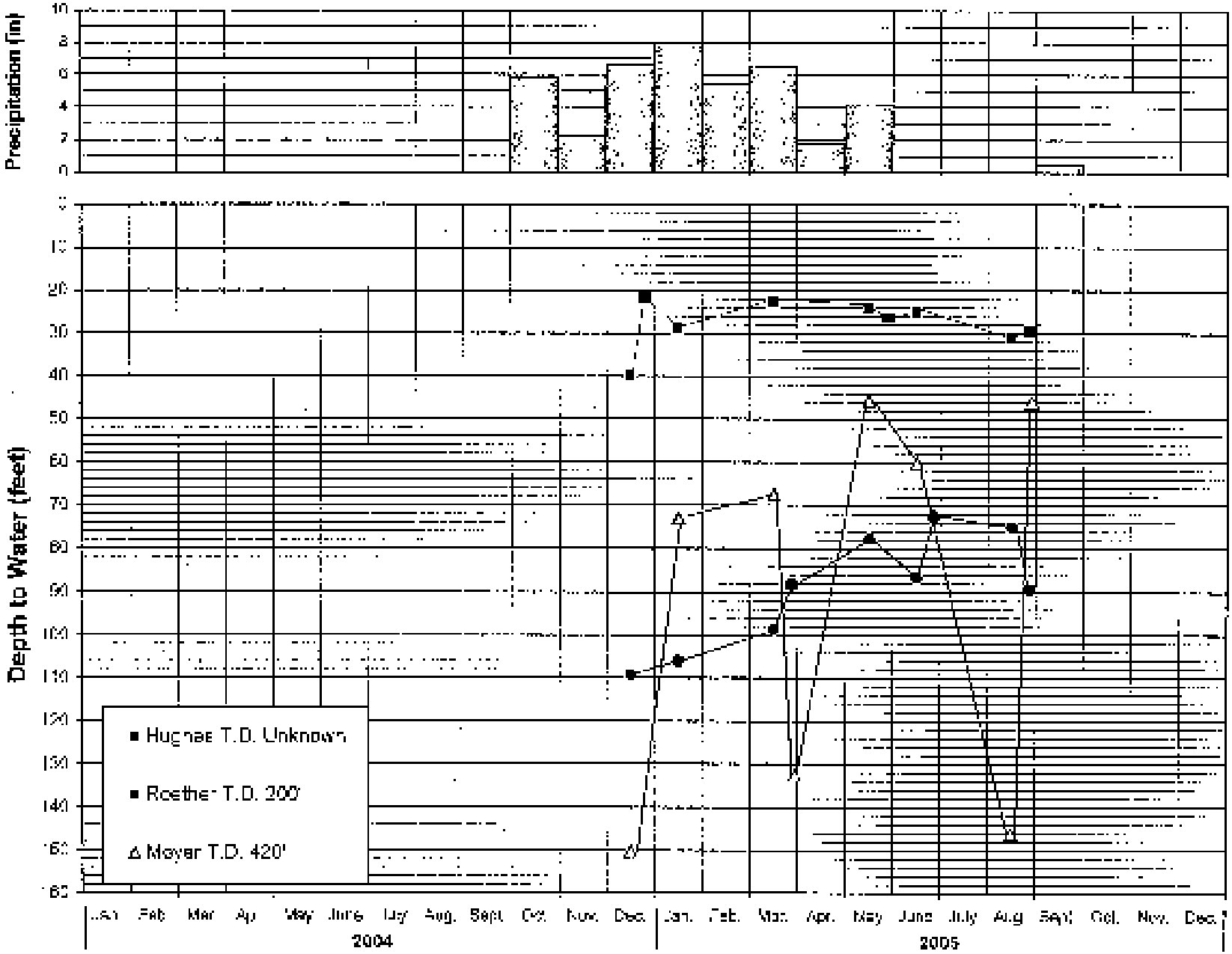

Figure 17 - Water Level Hydrographs for Wells in the Sierra Lakes Subarea

basin were obtained for 2004. 2004 pumpage was 620 acre-feet for the Hillview Water Company Oakhurst and Sierra Lakes Water Systems, 46 acre-feet for the Broadview Terrace MWC water system, and 21 acre-feet for Stillview Meadows. 2004 pumpage (including spring-flow) for community water systems in the Yosemite Forks and Cedar Valley areas was 130 acre-feet. Pumpage by community water systems in the Peterson Creek-Miami Creek subarea was about 185 acre-feet. An additional pumpage of about 200 acre-feet was for golf course irrigation, 100 acre-feet for small water systems, and 50 acre-feet for commercial use. The total pumpage (including developed springs) in the Oakhurst Basin was estimated to be about 2,350 acre-feet per year.

AQUIFER TESTS

There are two areas where detailed aquifer tests on community or water system wells have been conducted in the Oakhurst Basin. The results of these are in the public record, and a discussion of these follows.

Sierra Lakes

In November 2000, a nine-day pump test was conducted on new Hillview Water Co. Sierra Lakes Well No. 5. Well No. 5 was drilled to a depth of 758 feet, and was sealed from the land surface to a depth of 100 feet. Water production in this well reportedly came

from fractures in the hard-rock at the following depths: 340 feet, 389 feet, 509 feet, and 758 feet. Seven other wells in the area were used as observation wells for the test. The locations of the wells used for the test are shown in Figure 18.

Six of the observation wells were also hardrock wells. Depths of these and the approximate distances from Well No. 5 were as follows:

Well	Distance (feet)	Depth (feet
Zumwalt	250	650
Boswell	580	-
Siebenberg Dom	700	-
Grundmundston	770	690
Siebenberg East Unused	970	325
Siebenberg West Unused	1,150	768

Completion reports are not available for the Boswell or Siebenberg Domestic wells. Water production from the Zumwalt Well reportedly comes from fractures at depths of 360 and 540 feet. Water production from the Grundmundston Well reportedly came from fractures at a depth of 689 to 690 feet. Water production from the Siebenberg East Unused Well reportedly was from a fracture at a depth of 185 feet. Water production for the Siebenberg West Unused Well was reportedly from the following depths: 124 feet, 210 feet, 265 feet, 600 feet, 690 feet, 710 feet, 725 feet, 745 feet, and 750 feet.

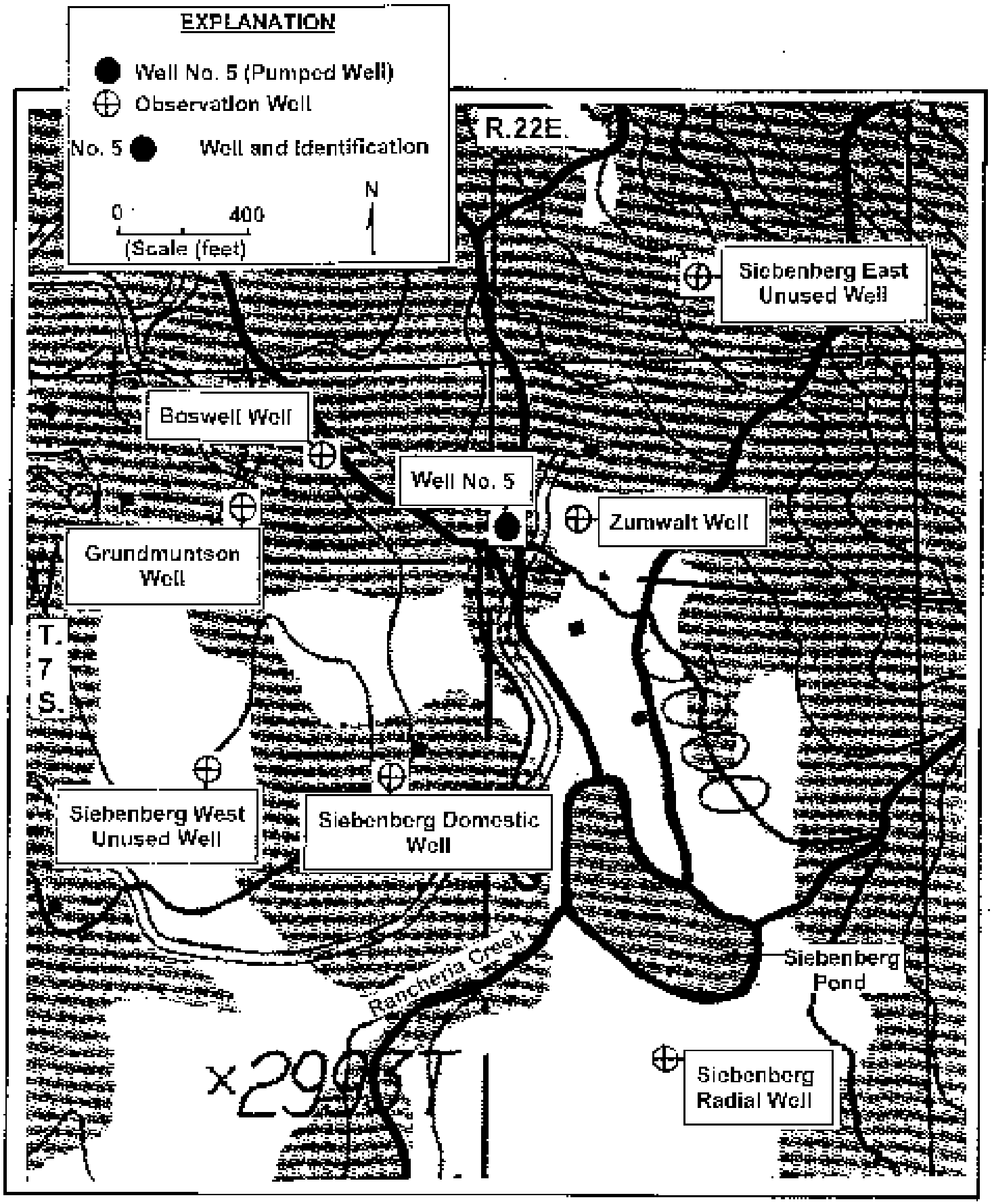

FIGURE 18-LOCATION OF WELLS USED FOR PUMP TEST ON SIERRA LAKES WELL NO. 5

The Siebenberg radial well, located south of the Siebenberg Pond, was also used as an observation well for the test. This well is 40 feet deep and has a number of laterals which tap weathered granitic rock above the hardrock. A staff gage was installed in the pond and pond levels were also measured during the test.

Drawdown Measurements

Pumping of Well No. 5 began at 10:50 AM on November 1 and continued until 10:50 AM on November 10, 2000. The static level in Well No. 5 prior to pumping was 48.5 feet below the measuring point. After four days of pumping, the pumping rate was 94 gpm and the pumping level was 458.9 feet. In order to determine the sustainable yield of the well, the pumping level was held constant thereafter, and the pumping rate allowed to adjust accordingly. The average pumping rate for Well No. 5 was 93 gpm during the test.

Figure 13 shows the gradual decline in pumping rate of Well No. 5 with pumping time after the first few days of pumping. By the end of the pumping period, the pumping rate was 88 gpm. The projected pumping rate after 180 days of continuous pumping at this pumping level was about 65 gpm. If the pumping rate was held constant over the 180-day period, a continuous pumping rate of 72 gpm could be obtained. In order to determine the sustainable yield of the well, recovery measurements need to also be considered, and these are discussed in a subsequent section of this report.

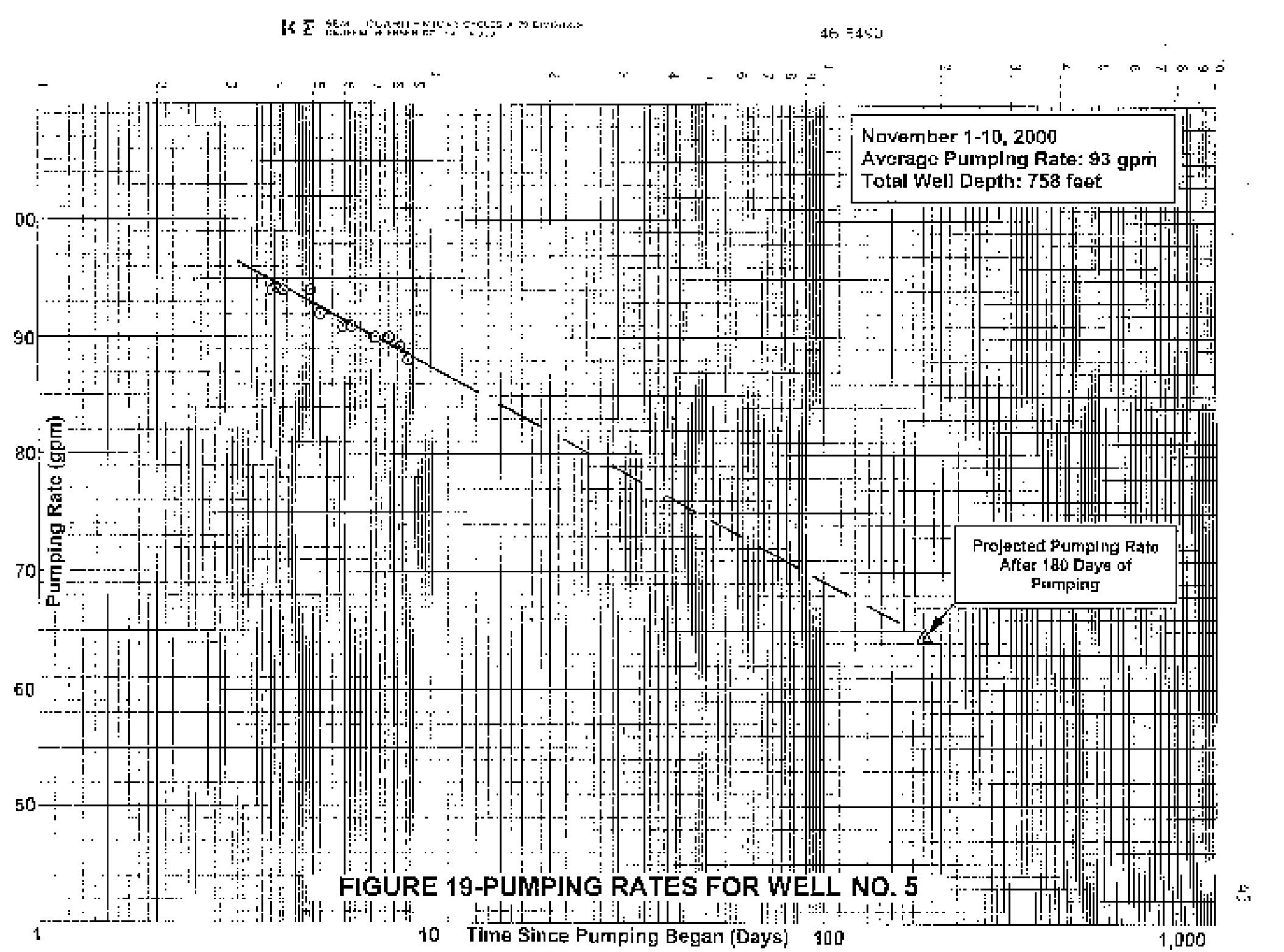

FIGURE 19-PUMPING RATES FOR WELL NO. 5

Drawdowns ranging from 11.7 feet to 15.7 feet were observed in five of the hardrock wells that were used as observation wells for the test. There was no drawdown in the Grundmundston Well, the Siebenberg Radial Well, or the Siebenberg Pond during pumping of Well No. 5. Drawdown measurements for the five wells were used to determine the aquifer transmissivity and storage coefficient. Figure 20 is an example of drawdown in one of the observation wells (the Zumwalt Well, which was located 250 feet east of Well No. 5). The static level in this well prior to pumping of Well No. 5 was 63.4 feet, and the water level at the end of pumping was 76.0 feet. Thus the drawdown was 12.6 feet. Drawdown measurements for the Zumwalt Well indicated a transmissivity of 1,620 gpd per foot and a storage coefficient of 0.009. Similar values of transmissivity and storage coefficient were obtained from the Siebenberg Domestic and Boswell Wells measurements. Transmissivities ranged from 1,690 to 1,750 gpd per foot and storage coefficients from 0.0016 to 0.0020 at these wells. Based on this information, it is likely that both of these wells tap water in some of the shallow fractures present at Well No. 5. Similar values of storage coefficient, ranging from 0.00054 to 0.00055, were obtained at the Siebenberg West and East Unused Wells. The smaller storage coefficients for groundwater in the fractures tapped by both of these wells and Well No. 5 indicates more confinement than for the previously discussed

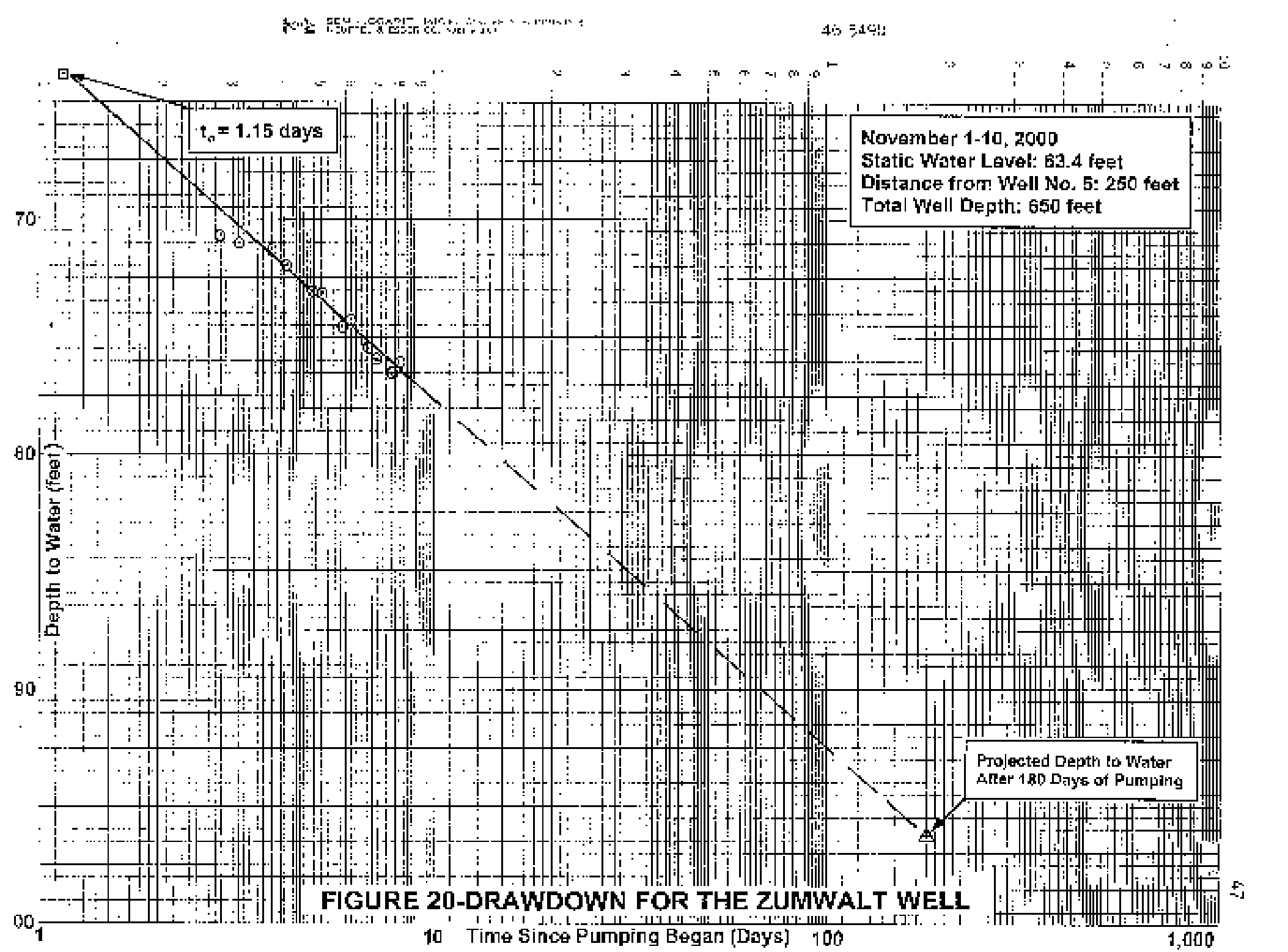

FIGURE 20-DRAWDOWN FOR THE ZUMWALT WELL

two wells. This is likely associated with the deeper fractures tapped by Well No. 5.

Transmissivities based on drawdown measurements for the five hardrock observation wells that were affected by pumping of Well No. 5 averaged 1,600 gpd per foot. Storage coefficients based on drawdown measurements for these wells averaged 0.0027. These are considered the best values for aquifer characteristics for the drawdown part of the pump test on Well No. 5.

Drawdowns in the affected observation wells ranged from 12 to 16 feet, regardless of the distance from Well No. 5. This situation is sometimes encountered in fractured hardrock with certain boundary conditions. A highly productive fractured zone was indicated, extending from the northeast to southwest through the vicinity of Well No. 5. Based on the semi-log plots, drawdowns can be predicted due to pumping Well No. 5 continuously for 180 days under the same conditions as for the nine-day test. Following are the drawdowns in the observation wells at the end of nine days and at the end of 180 days of continuous pumping of Well No. 5.

	Drawdown (feet)	
Well	9 Days	180 Days
Zumwalt	12.6	33.1
Siebenberg West Unused	12.0	32.3
Siebenberg Domestic	11.7	30.5

Siebenberg East Unused	15.7	38.0
Roswell	12.3	30.9

The projected drawdowns after 180 days of continuous pumping are believed to be near the maximum drawdowns that would occur in these wells due to pumping of Well No. 5, assuming that heavy pumping would normally be during April-September of each year. These drawdowns would thus range from about 30 to 38 feet in affected wells within about 1,200 feet of Well No. 5.

Recovery Measurements

Figure 21 shows water-level recovery in Sierra Lakes Well No. 5. The water level in this well recovered to a depth of 63.8 feet within 30 minutes after pumping stopped. This level is 15.3 feet below the static level prior to pumping, and slightly less than the maximum drawdown that was observed at any of the observation wells. After about 10 days of recovery, depth to water was 53.0 feet, or 10.5 feet below the static level prior to pumping. Full recovery in Well No. 5 was attained in 21 days. Recovery measurements indicated a transmissivity of 1,690 gpd per foot.

Figure 22 shows water-level recovery for the Zumwalt Well. After about 10 days of recovery, depth to water in this well was 69.0 feet, or 5.6 feet below the static level prior to pumping of Well No. 5. Full recovery for this well was projected to take 23

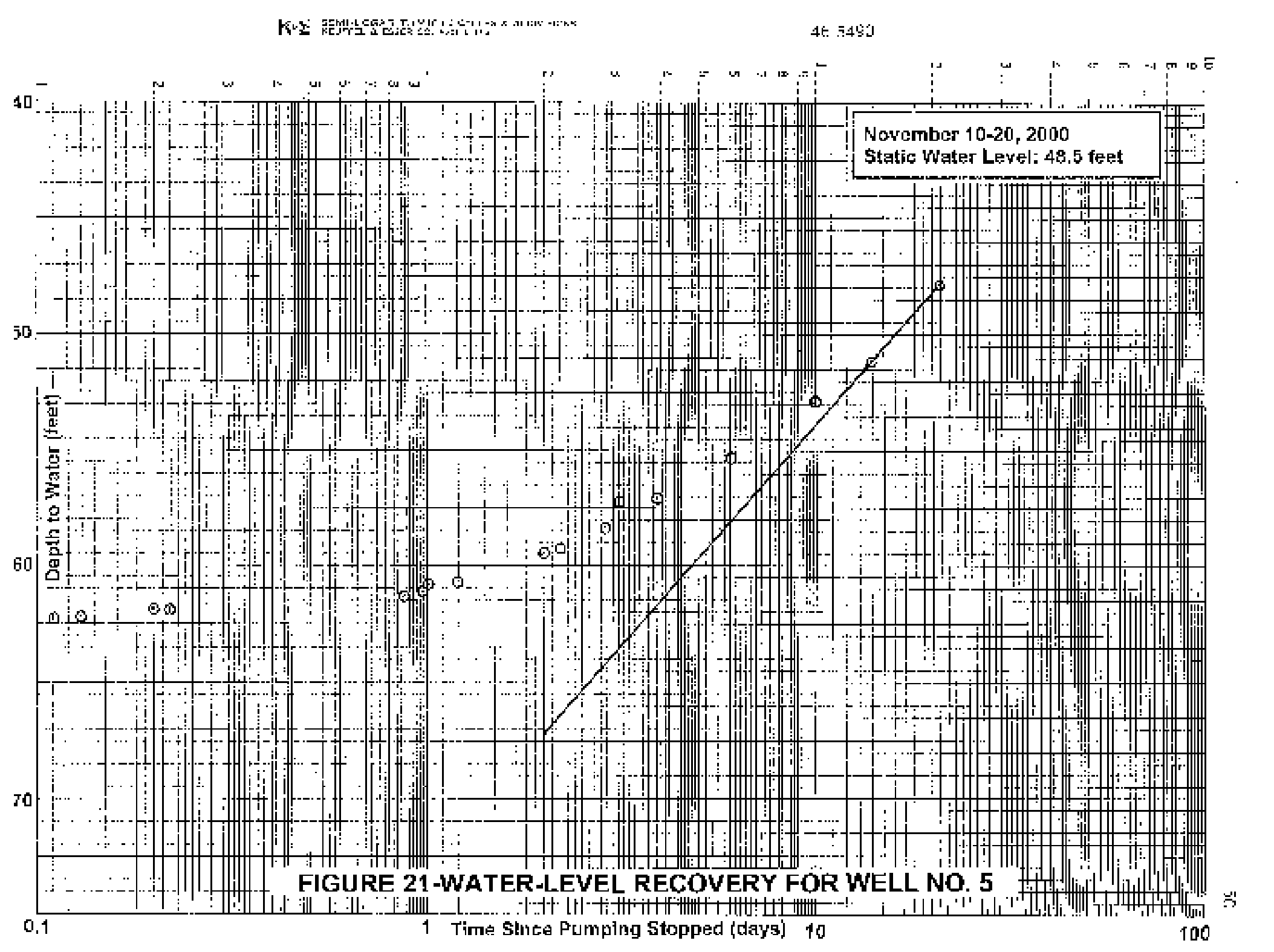

FIGURE 21-WATER-LEVEL RECOVERY FOR WELL NO. 5

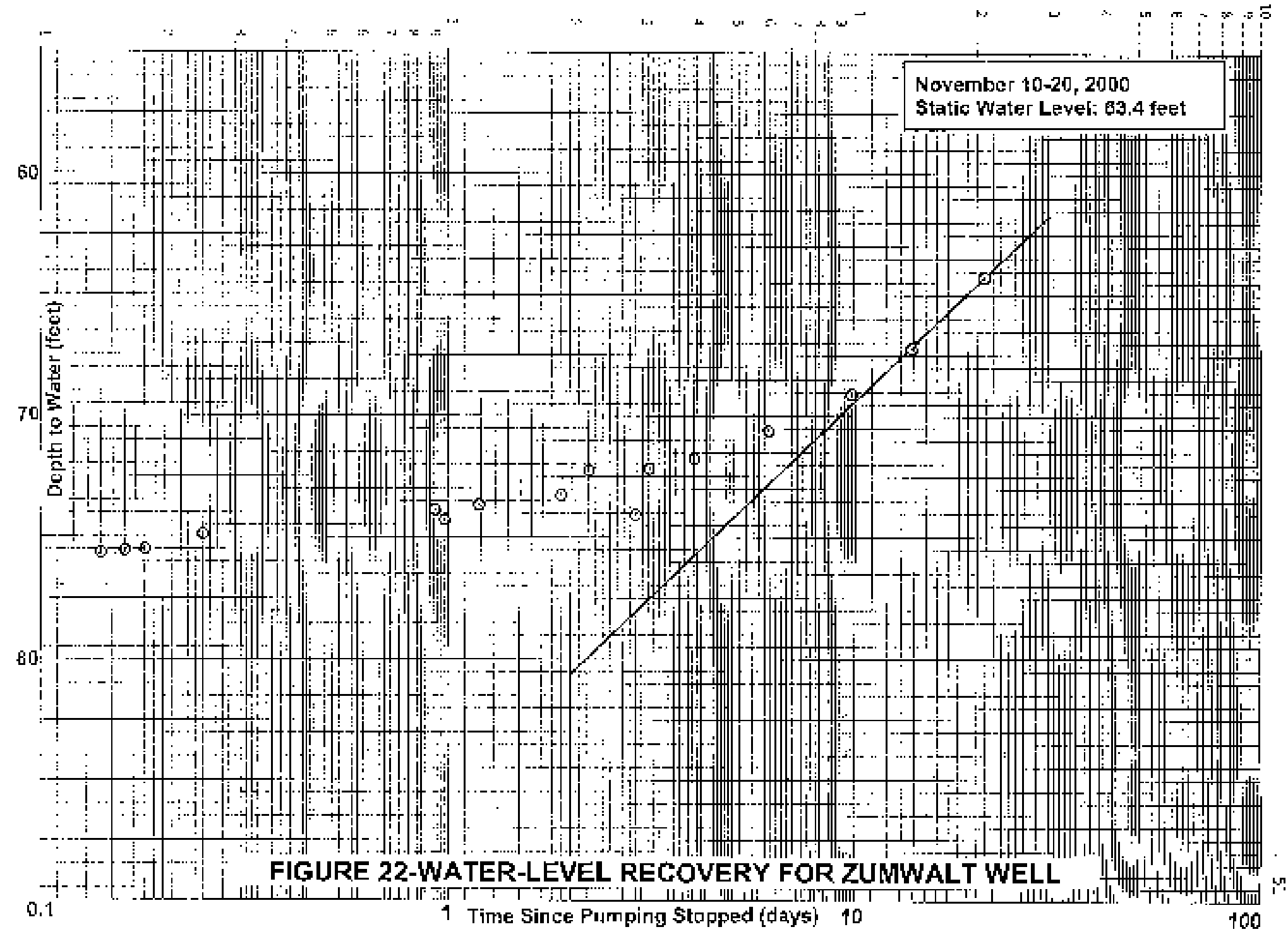

FIGURE 22-WATER-LEVEL RECOVERY FOR ZUMWALT WELL

days. Recovery measurements indicated a transmissivity of 1,580 gpd per foot. These results are representative of those for the other wells that had water levels respond to pumpage of Well No. 5. If Well No. 5 was pumped for only 12 hours per day, the sustainable yield would be double, or 62 gpm. Drawdowns in affected wells would range from about 26 to 33 feet.

Quail Meadows

The Quail Meadows project is west of Road 425B and south of the Fresno River. Well No. 2 was drilled to a depth of 485 feet and water production was obtained from five fractured zones between 200 and 480 feet in depth. Well No. 3 was drilled to a depth of 450 feet, and water production was obtained from three fractured zones between 155 and 426 feet in depth. Figure 23 shows the location of Quail Meadows wells used during the test. Because of their relatively close proximity (400 feet apart), Wells No. 2 and 3 were pumped concurrently for about 15 days in October 2002.

Drawdown Measurements

Well No. 3. The static level in Well No. 3 was 56.5 feet below the measuring point prior to pumping. After about 15 minutes of pumping, the pumping level was about 412 feet. The pumping level was generally kept between about 410 feet and 440 feet for the rest of the pumping period. The average pumping rate was 71 gpm over the

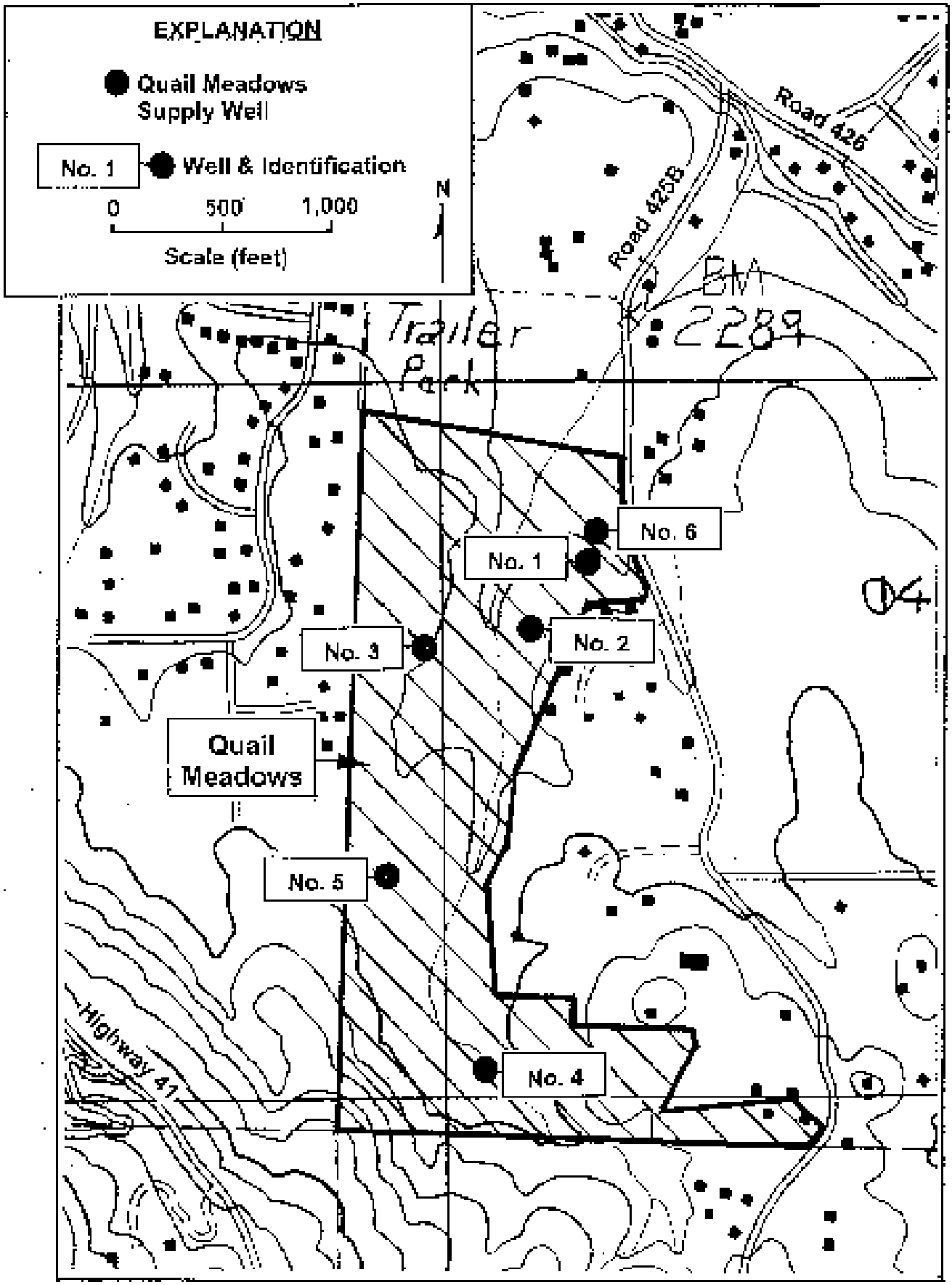

FIGURE 23-LOCATION OF QUAIL MEADOWS WELLS

26-day pumping period. Figure 24 shows the decline in pumping rate for Well No. 3 after the first day of pumping. The projected pumping rate after 180 days of continuous pumping in the absence of recharge is 54 gpm. The average pumping rate that could be maintained over this period in the absence of recharge is projected to be 57 gpm.

Well No. 2. The static level in Well No. 2 was 69.1 feet prior to pumping of Well No. 3. By October 13, after Well No. 3 had been pumping for almost five days, depth to water in Well No. 2 was 98.7 feet, or a drawdown of almost 30 feet. After about ten minutes of pumping, the pumping level was about 425 feet, and the level was kept near this depth for the rest of the pumping period. The average pumping rate was 23 gpm. Figure 25 shows the slight decline in pumping rate after the first day of pumping. The projected pumping rate after 180 days of continuous pumping in the absence of recharge is 22 gpm. The average pumping rate that could be maintained in the absence of recharge is projected to be 22 gpm.

Observation Wells. Table 2 summarizes water-level measurements for the test. Apparent drawdowns in the observation wells ranged from about one and a half to six and a half feet.

Recovery Measurements

Well No. 3. Based on the recovery measurements (Figure 26), full recovery (in the absence of recharge) was projected about 40 days

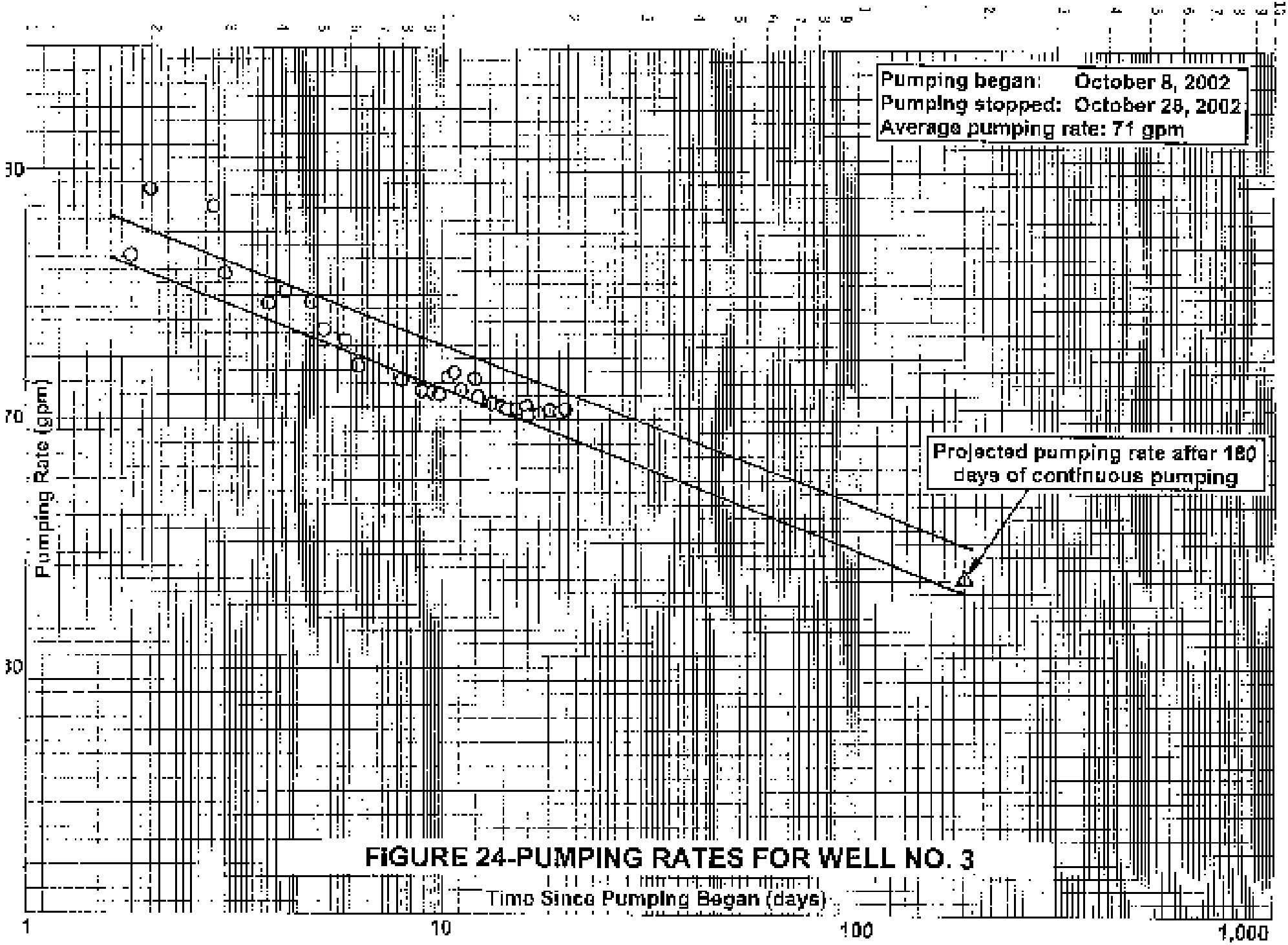

FIGURE 24-PUMPING RATES FOR WELL NO. 3

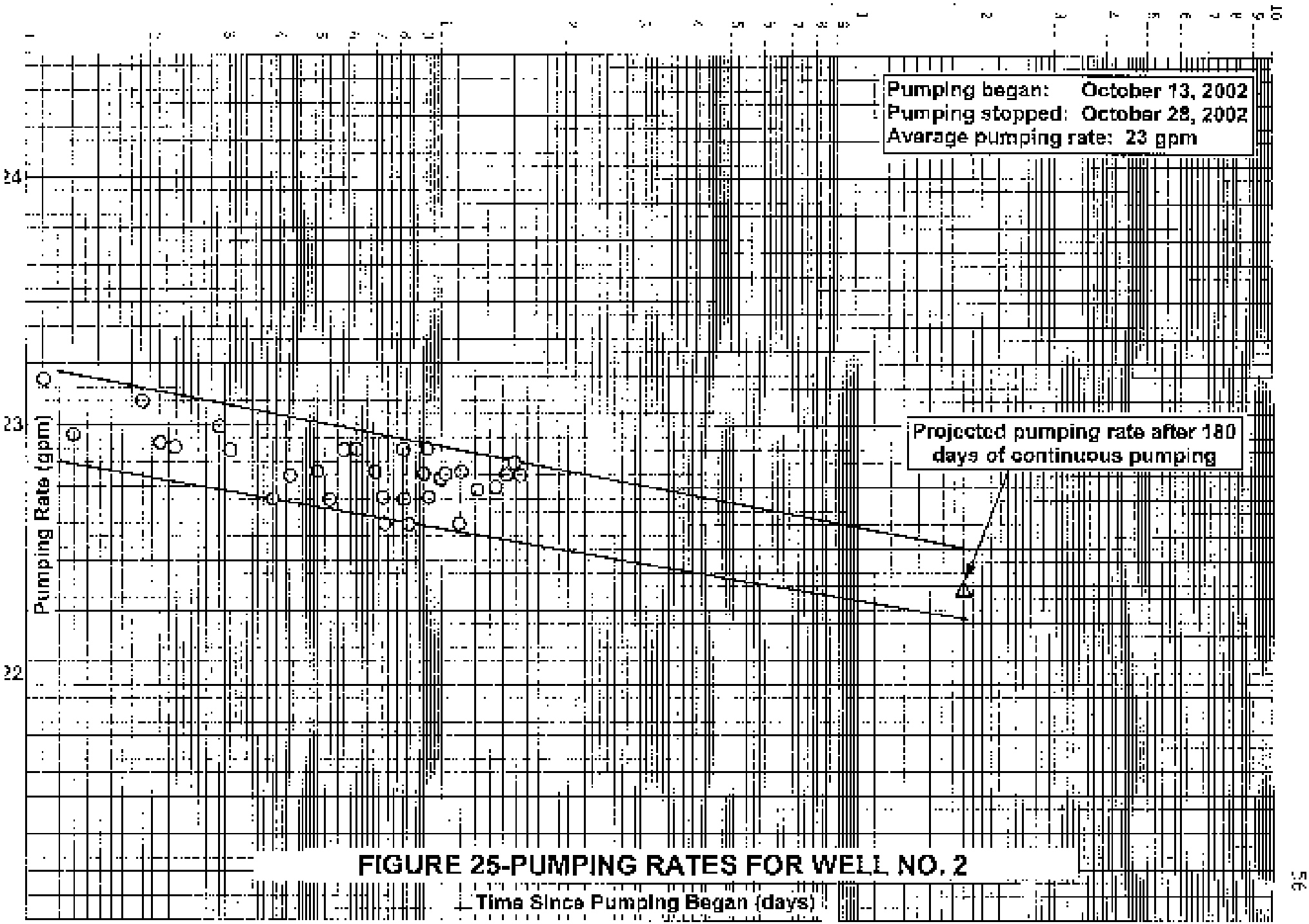

FIGURE 25-PUMPING RATES FOR WELL NO. 2

TABLE 2- SUMMARY OF WATER-LEVEL MEASUREMENTS FOR PUMP TESTS ON WELLS NO. 2 AND 3

Well	Static Water Level (feet)	Depth to Water (ft) at End of Pumping	Apparent Drawdown (feet)	Depth to Water (ft) at End of Recovery Measurements
2	69.1	425.9	356.8	50.7
3	56.5	452.2	395.7	74.9
1	25.7	32.3	6.6	26.3
Derry	65.7	71.3	5.6	69.0
Bailey	30.5	32.1	1.6	32.7

Well No. 2 was pumped from October 12-28, 2002 and Well No. 3 from October 8-28, 2002.

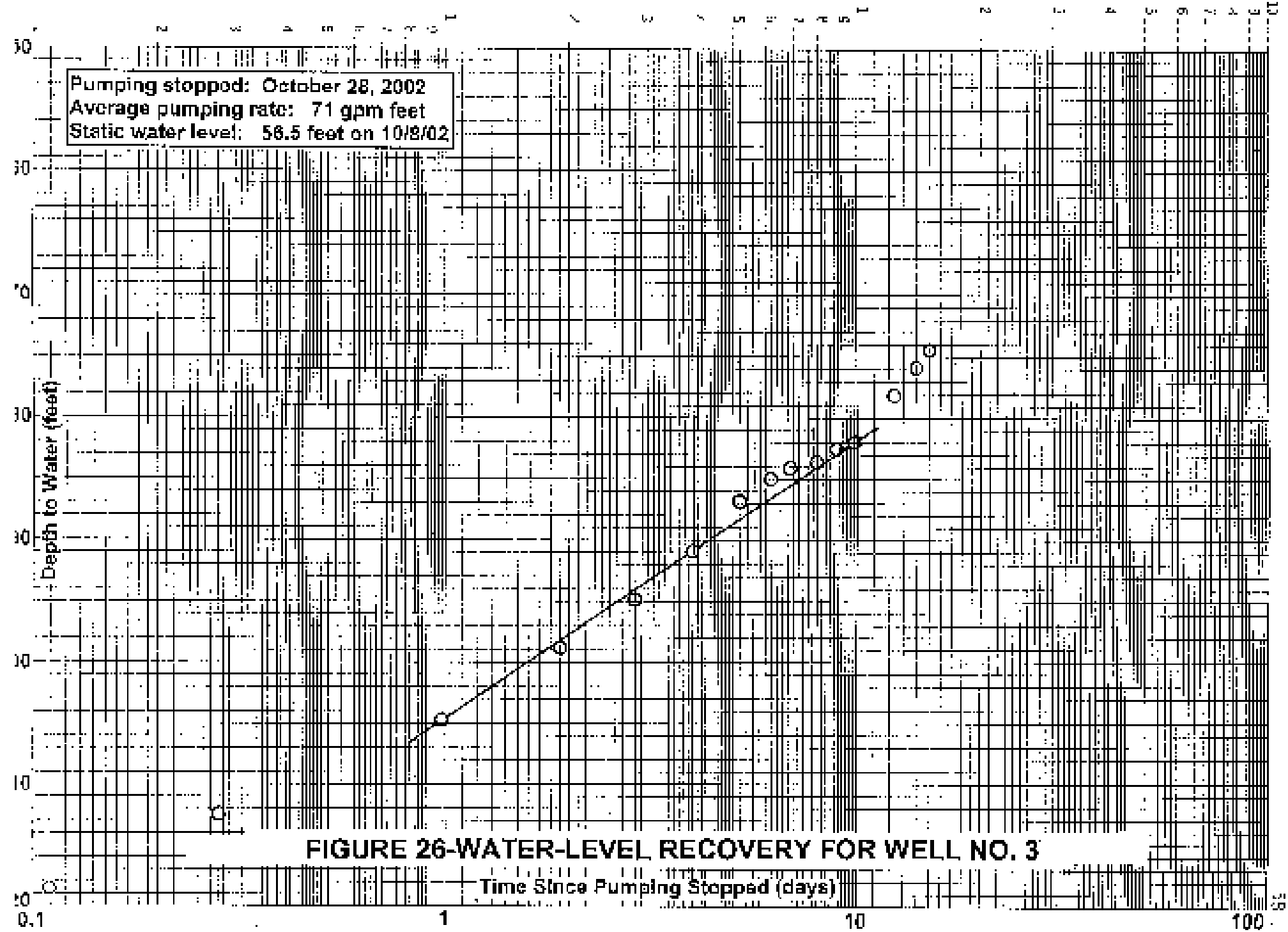

FIGURE 26-WATER-LEVEL RECOVERY FOR WELL NO. 3

after pumping stopped. The rate of recovery for Well No. 3 increased after 10 days of recovery, apparently due to heavy precipitation in early November. Recovery measurements for Well No. 3 prior to the influence of winter recharge indicate a transmissivity of 900 gpd per foot.

Well No. 2. Water-level recovery for Well No. 2 (Figure 27) was also initially rapid. After about one hour of recovery, depth to water was about 100 feet. After ten days of recovery, depth to water was about 58 feet, or above the static water level prior to pumping. The rate of recovery for this well also increased after the first 10 days of recovery. A transmissivity of 270 gpd per foot was indicated by the recovery measurements for Well No. 2, prior to winter recharge.

Observation Wells. Recovery measurements were made for the other wells that showed a response to pumping for the test. After 15 days of recovery, depth to water in Well No. 1 was 26.3 feet, or within 0.6 foot of the static level prior to pumping. After 15 days of recovery, depth to water in the Derry Well was 69.0 feet, or about 3.3 feet below the static level prior to pumping. After seven days of of recovery, depth to water in the Bailey Well was 32.7 feet, or about 2.2 feet below the static level prior to pumping. These measurements indicate that the drawdown in Well No. 1 was due to pumpage of Wells No. 2 and 3. However, the drawdowns

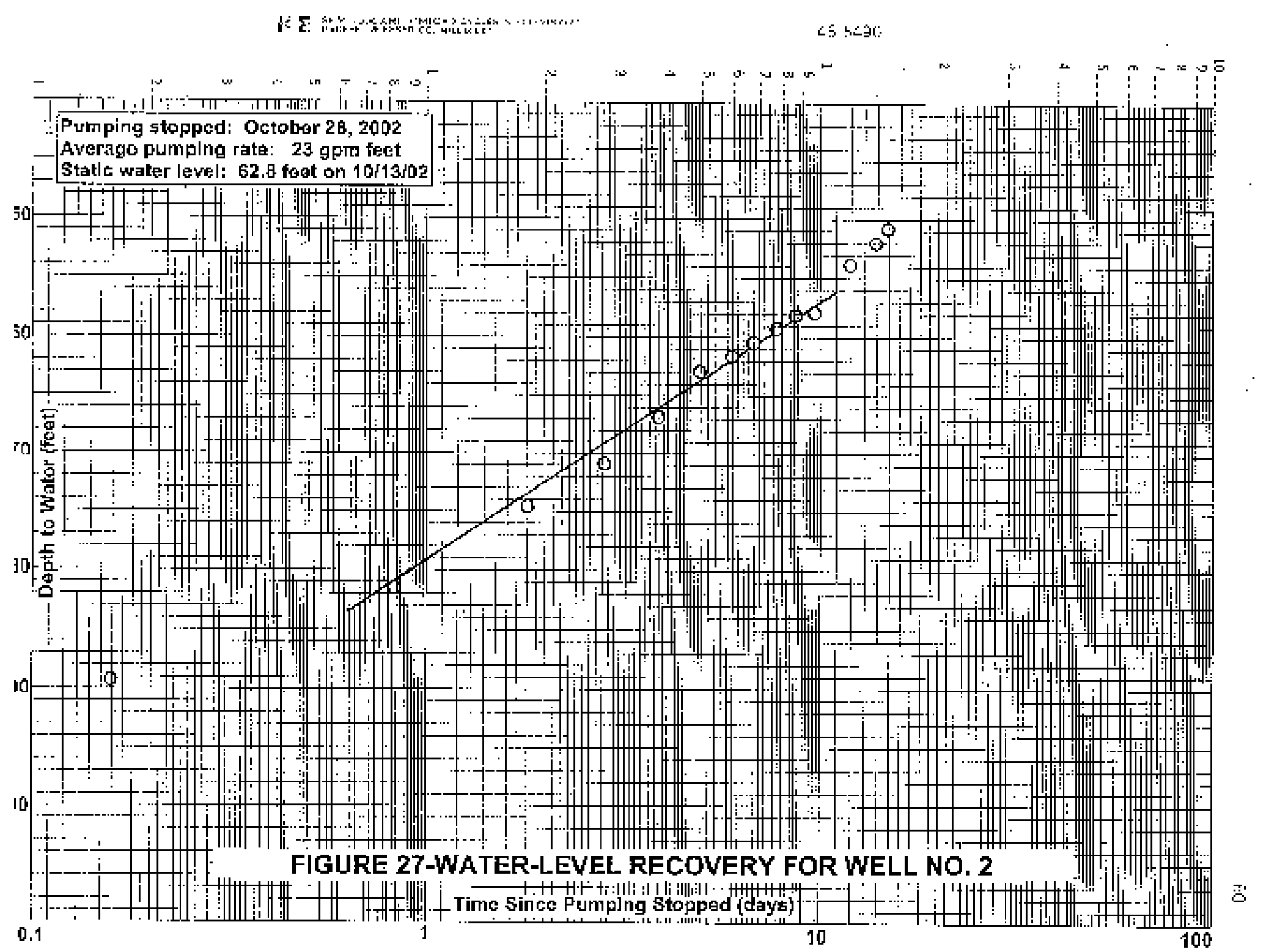

FIGURE 27-WATER-LEVEL RECOVERY FOR WELL NO. 2

in the other two wells were primarily due to pumping of a well or wells other than No. 2 and No. 3.

GROUNDWATER QUALITY

Problem Constituents

The California Department of Water Resources (1966) reported on groundwater quality problems that had been experienced in the Oakhurst-Ahwahnee area. They reported that overall, the quality of the groundwater in the Oakhurst Basin was generally considered to be excellent. However, local occurrences of high nitrate and iron concentrations had been experienced. At the time of that report, air-rotary drilling of hardrock wells was just commencing in the foothills and mountains of the central Sierra Nevada. When these wells are drilled, the overlying materials above the hardrock are generally sealed off. Prior to the mid-1960's, the cable-tool method was often used to drill in these areas, and only weathered deposits or shallow hardrock could be tapped. Most wells were less than about 200 feet deep and annular seals were difficult to place. The air-rotary drilling method has allowed the tapping of deep fractures, to depths exceeding 1,000 feet in parts of the Oakhurst Basin, and the installation of superior annular seals.

Morin (1977) reported on high chloride (greater than 100 mg/l) groundwater in the central Sierra Nevada, including the Oakhurst Basin. The high chloride is commonly called "salt water", when the

chloride concentrations exceed about 300 mg/l. She indicated that the high chloride groundwater was usually only found in topographically low areas, where vertical or near vertical fractures were present. Wells producing high chloride water were also generally found along linear features determined from interpretation of aerial photographs.

Morin (1977) identified four areas in the Oakhurst Basin where this high chloride well water had been found by the late 1970's. The most extensive was generally near and south and east of the intersection of Highways 41 and 49. A second area was in the Yosemite Forks area, generally southeast of the intersection of Highway 41 and Bass Lake Road. A third area was near the Fresno River, about midway between Yosemite Forks and downtown Oakhurst. The fourth area was along Miami Creek, about two miles southeast of Ahwahnee.

The California Department of Water Resources (1990) reported on natural radiological constituents in well water in the western Sierra Nevada. The study area extended from Mariposa County to Kern County, and included Madera County. One of the areas where uranium concentrations were elevated in well water was near Bass Lake. Subsequent sampling has indicated the fairly widespread occurrence of high uranium activities in the Oakhurst Basin, particularly in the Sierra Lakes subarea and along Miami Creek.

Much of the additional information on well water quality in the Oakhurst Area has been derived from sampling of wells in regulated water systems, particularly the larger water systems. Iron and manganese have been present at problem levels in wells in part of the Oakhurst Basin. These have commonly been addressed by wellhead treatment. Arsenic concentrations in water from most sampled wells have been below the presently applicable MCL of 0.05 mg/l. The EPA has developed a new federal MCL of 0.01 mg/l, and water from some sampled wells has had arsenic concentrations exceeding 0.01 mg/l.

Hydrogen sulfide (rotten-egg odor) has been found in water from some wells in the Oakhurst Basin, but concentrations have generally not been measured, and the occurrences have not been carefully mapped. Hydrogen sulfide is an aesthetic parameter as opposed to a health concern. In some cases, hydrogen sulfide odor and high chloride concentrations are found in water from the same well.

Lastly, the gasoline additive MTBE has been found at two station along Highway 41. One of these (Mr. Gas Texaco) is located south of the intersection of Highway 41 and 49. The other is located near the north part of the Oakhurst subarea (at Winding Way). MTBE has been found in water from 13 private domestic wells in this second area. Wellhead treatment units have been installed

to treat water from a number of these wells. A shallow groundwater pump and treatment system is being installed to contain the shallow groundwater with the highest MTBE concentrations. The solvent PCE has been found in shallow groundwater near a former dry cleaner.

As part of this evaluation, water samples were collected from about 30 domestic wells, to provide supplemental information on groundwater quality in the area. KDSA collected and preserved the samples, and delivered them to the Fresno County Public Health Department Laboratory in Fresno for analyses. Following is a discussion of groundwater quality in each of the subareas. Copies of the analyses of well water are provided in Appendix C.

Peterson Creek-Miami Creek Subarea

High chloride concentrations have been found in water from groundwater in the Goldside area, south of Highway 49. The recommended MCL for chloride is 250 mg/l. One presently unused well had a chloride concentration ranging from 250 to 766 mg/l in the 1970's. Water from several of the Hillview Water Co. Goldside wells has had chloride concentrations ranging from about 250 to 680 mg/l in recent years. Water from these wells is mixed with water from other wells to attempt to mitigate taste problems associated with high chloride levels.

High nitrate concentrations (43 to 45 mg/l, compared to the MCL of 45 mg/l) have been found in recent years in water from two

of the MD 43 (Miami Creek Knolls) wells. This water is blended with water from other wells to mitigate the high nitrate concentrations. High iron and manganese concentrations have been present in water from most of the Hillview Water Co. Goldside wells, and this water is treated for iron and manganese removal.

High alpha and uranium activities are the most widespread known groundwater quality problems in the Peterson Creek-Miami Creek area. The MCL for alpha activity is 15 picocuries per liter and the MCL for uranium activity is 20 picocuries per liter. These high activities have been found in water from three Miami Creek Estates wells, one Ahwahnee Country Club well, and one Pike Ranch well. Ahwahnee Country Club and Miami Creek Estates well water has been blended, to attempt to mitigate these high activities. In the future, notices may have to be sent to water customers regarding violations of the uranium MCL (Joe Beck, County of Madera, personal communication). Alpha activities in water system wells with exceedences of the MCL have ranged from about 20 to 190 picocuries per liter.

Water from ten private domestic wells in this subarea was sampled as part of this evaluation in August 2005. Alpha activities were below the MCL in water from five sampled wells along Highway 49 and Peterson Creek. Water from four other wells in the vicinity of Pike Ranch also had relatively low activities (6 pico-

curies per liter or less). However, water from two wells along Highway 49 had alpha activities of 730 to 1,508 picocuries per liter, some of the highest value yet known to have been found in the Oakhurst Basin.

Figure 28 shows the approximate extent of various groundwater quality problems in the Peterson Creek-Miami Creek subarea. There appears to be a correlation between high alpha and uranium activities and linear features. Also, these activities are generally high for water from large-producing wells. High alpha and uranium activities are common along Miami Creek, but not along Peterson Creek. The high chloride groundwater in the Goldside area coincides with lineare and is closer to the metamorphic rock outcrops to the south than other wells sampled in this subarea.

Oakhurst Subarea

High chloride concentrations have been found in well water in two parts of this subarea. One part includes three of the Hillview W.C. Ditton wells, located west of Highway 41 and south of the Fresno River. Chloride concentrations from about 480 to 1,200 mg/l have been present in recent years. Mixing water from these wells is used to attempt to mitigate these high chloride concentrations, to the extent feasible. Another high chloride area is to the northeast, near the intersection of Highways 41 and 49, extending to the east to near the west edge of the Broadview Terrace W.C.

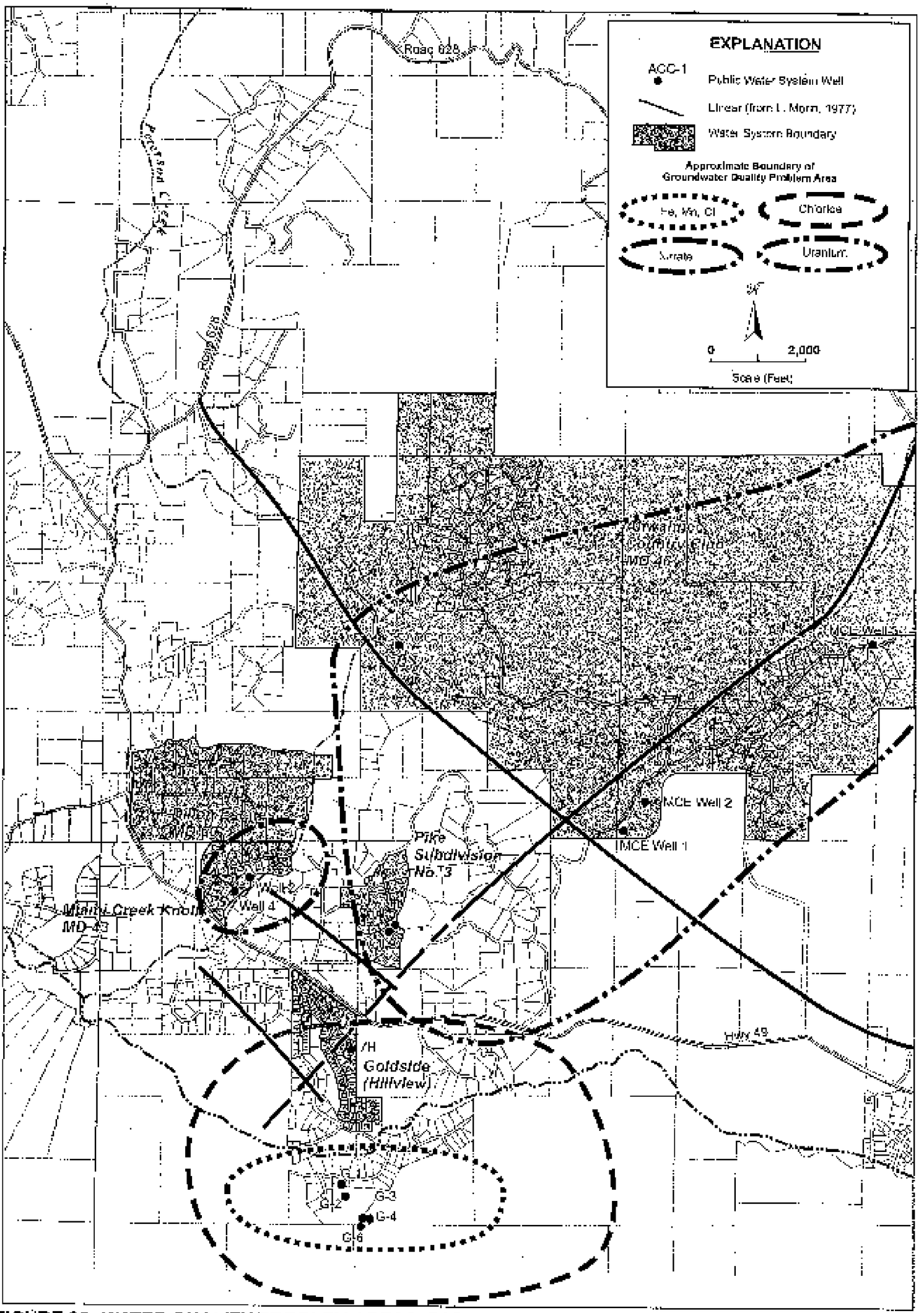

FIGURE 28 -WATER QUALITY PROBLEM AREAS FOR THE MIAMI CREEK - PETERSON CREEK SUBAREA.

service area. Chloride concentrations ranging from about 400 to 1,440 mg/l were found in water from four wells in this area in the 1970's. These wells are now unused.

High iron concentrations (0.4 to 4.8 mg/l) have been found in water from two of the Hillview Water Co. Ditton wells in recent years. High manganese concentrations (0.1 to 0.4 mg/l) have been found in water from three of the Ditton wells in recent years, and this water is treated for iron and manganese removal. Manganese concentrations in water from three of the Quail Meadows wells ranged from 0.06 to 0.10 mg/l, exceeding the MCL of 0.05 mg/l.

High alpha and uranium activities have been found in water from six of the Broadview Terrace Mutual W.C. wells. Uranium activities have ranged from about 15 to 98 picocuries per liter, exceeding the MCL of 15 picocuries per liter. This high uranium area is indicated to extend easterly into the Sierra Lakes subarea. During the non-summer period, water from Broadview Mutual WC wells is blended and alpha activities are reported to normally be below the MCL. However, during summer months, this doesn't mitigate high uranium activities and notices are sent out to water customers.

Water from 12 private domestic wells in this subarea was sampled as part of this evaluation in August 2005. Alpha activities ranged from 28 to 30 picocuries per liter in water from three wells located west and northwest of the Broadview Mutual Water Com-

pany service area. An alpha activity of 271 picocuries per liter was found in water from a deep well northeast of this service area. An alpha activity of 25 picocuries per liter was found in water from a well southwest of MD 42.

Figure 29 shows the approximate extent of various groundwater quality problems in the Oakhurst subarea. The lineans mapped by Morin (1977) are also shown. Sampling results indicate that groundwater of better chemical and radiological quality is present in the Quail Meadows and Stillview Meadows areas, and probably farther south. There is a good correlation between some of the lineans and high chloride concentrations and high uranium activities in well water. The three locations of trace organic contamination (BTX, MTBE, and PCE) of shallow groundwater are also shown on Figure 29.

Sierra Lakes Subarea

High chloride concentrations (about 320 mg/l) have been found in water from the Hillview W.C. Pierce Lake Estates well, which is inactive. This well is located just northeast of the Yosemite High School. High iron concentration (about 0.3 to 0.5 mg/l) have been found in water from three Hillview W.C. Sierra Lakes wells. Water from these wells is treated for iron and manganese removal. The most extensive groundwater quality problem in this subarea is high uranium activities. Few private domestic wells are known to have

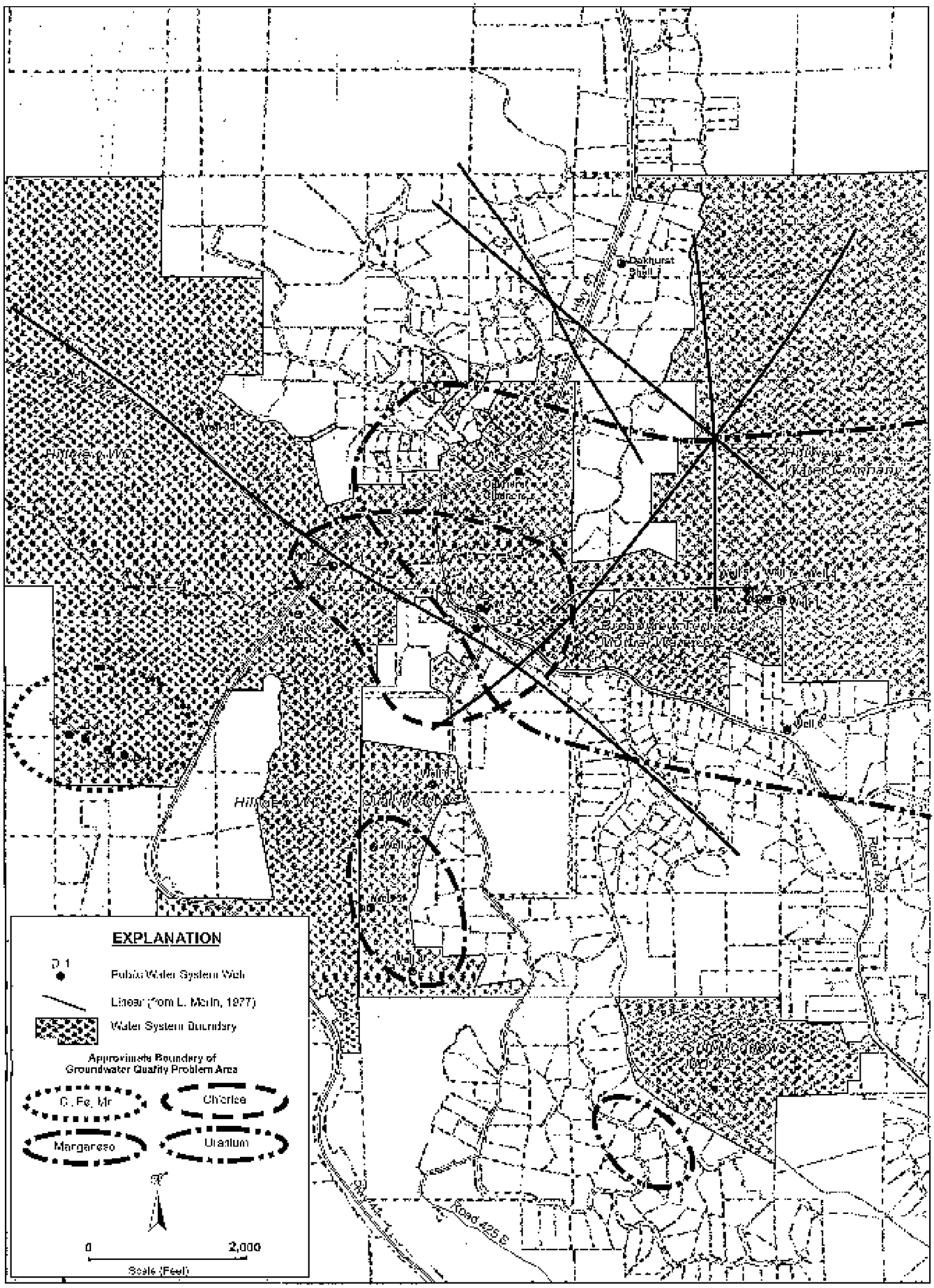

FIGURE 29 -WATER QUALITY PROBLEM AREAS FOR THE OAKHURST SUBAREA.

been sampled in this area. High uranium activities (35 to about 780 picocuries per liter) have been found in water from two Hillview W.C. Highland View wells (northeast of Yosemite High School). These wells have been placed on standby. A high uranium activity (226 picocuries per liter) was found in the inactive Pierce Lake Estates well. Water from two Hillview W.C. High School Wells has had uranium activities in the range of 16 to 70 picocuries per liter in recent years. Water from these wells is blended with water from other wells to lower uranium activities. In summer months, the Hillview WC generally sends out notices to customers on exceedences of the uranium MCL in this subarea.

In August 2005, water samples were collected from five private domestic wells in this subarea. Alpha activities less than 3 picocuries per liter were found in water from two domestic wells south of the previously defined high uranium area. Alpha activities ranging from 20 to 21 picocuries per liter were found in water from one well east of the previously delineated high uranium area and in water from another well in the southeast part of the subarea. Figure 30 shows the general location of uranium groundwater quality problems in the Sierra Lakes subarea. Low uranium well water has been found to the east and south of the high uranium area, but more sampling is needed for private domestic wells to precisely delineate the extent of high uranium groundwater in this subarea.

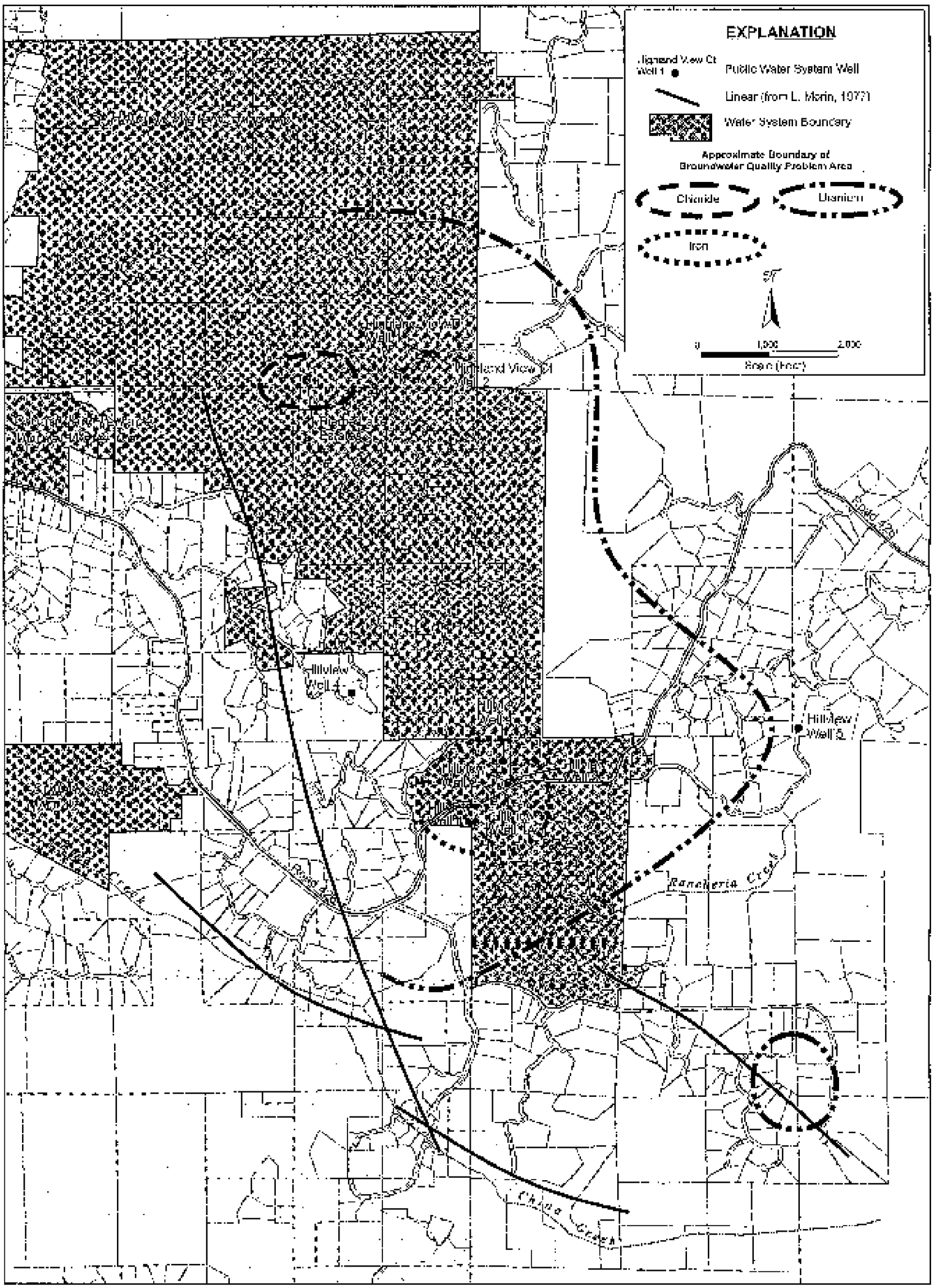

FIGURE 30 - WATER QUALITY PROBLEM AREAS FOR THE SIERRA LAKES SUBAREA.

WATER SUPPLY EVALUATIONS

Yields of Individual Domestic Hardrock Wells

These guidelines are intended for individual (small capacity) domestic wells tapping fractured or weathered granitic and metamorphic rocks, and not for large-capacity public supply or community wells. Longer-term testing is necessary for this latter group of wells. Also, separate guidelines are provided for individual wells in subdivisions.

Constant discharge (pumping rate) tests are commonly done for wells tapping alluvium. However, tests where the pumping rate is held constant and the pumping level is allowed to fall do not indicate long-term yields for hardrock wells. Thus, another type of test is necessary for hardrock wells. Under operational conditions, pumping levels in such wells are kept relatively constant (often with on-off electrodes). The type of pump test to be used for a hardrock public supply well is termed a constant head (water-level) test. For most hardrock wells, pumping rates for such tests decrease exponentially with pumping time.

Hardrock wells should ideally be tested when no recharge is occurring at the land surface. The goal is to determine the yield of these wells during periods of no recharge and high demand. Thus periods of overland flow from rainfall or snowmelt should be avoided. Such tests should thus normally be done during May to October, depending on the elevation and precipitation. For drought periods,

testing may be possible during a longer time period.

In order to obtain adequate data, the pumping period for tests on individual hardrock wells should extend for 24 hours. Water-level recovery is another aspect to be determined by the tests. The recovery period lasts until full recovery is documented (this doesn't mean 80 or 90 percent of the drawdown). Water levels in some hardrock wells quickly recover (i.e., within a few hours after 24 hours of pumping), whereas others may take much longer than the pumping period to recover (i.e., one week following 24 hours of pumping). Some hardrock wells take much longer to recover, and the long-term yield depends highly on annual winter recharge. For some hardrock wells, the water level takes years or decades to recover, and these wells are not reliable for a long-term water supply.

An appropriately sized totalizing flowmeter, reading in gallons, shall be installed in the discharge line, for determining pumping rate and incremental pumpage. A control valve shall also be installed in the discharge line to allow the pumping rate to be controlled (adjusted up or down). A sounding tube (normally 3/4-inch to 1-inch in diameter) shall be installed to allow water-level measurements by electric sounder. This tube shall extend from the surface to near the pump intake. The water pumped from the tested well shall be piped an adequate distance away from the pumped well and any observation wells, so as to not interfere with the test. In general, this means discharging the water at least 300 feet from

the pumped well, if possible, and far enough away so the discharged water cannot influence any water-producing fracture tapped by the pumped well or observation wells.

A constant pumping rate is to be maintained during the first six hours of pumping. After the first six hours or so of pumping, the pumping level is lowered (by opening the control value) to near the deepest pumping level that can be sustained for the rest of the test. For the rest of the pumping period, the pumping level is kept relatively constant, by adjusting the control value.

The static water level should be measured at least twice prior to pumping. The pumping rate and water level should be measured at least every 10 minutes during the first few hours of pumping, then at least every 30 minutes for the next eight hours. Thereafter, the pumping rate and pumping level should be measured at least every two hours for the duration of pumping. For the recovery period, the water level in the pumped well should be measured at least every 10 minutes during the first two hours, every 20 minutes for the next two hours, then every 30 minutes for the next six hours. The water level should then be measured every two hours for the same period as was the pumping duration, or until full recovery occurs.

If the water level doesn't fully recover (within two feet of the static level prior to pumping) within the period equal to the pumping duration, a correction factor to the pumping rate is ap-

plied. For example, if the average pumping rate for the test was 20 gpm, but the water level took two days to recover after one day of pumping for the test, then the long-term yield would be 1/2 times 20 gpm, or 10 gpm.

Yields of Public Supply Hardrock Wells

These guidelines are intended for fractured or weathered granitic and metamorphic rocks, and not for formations containing regional aquifers (such as basalt or limestone). The minimal yield for such a well will normally be considered to be about 10 gpm.

The type of pump test to be used is the constant head (water-level) test, as previously discussed, except the duration is longer. The decreases in pumping rates are used to determine long-term yields of hardrock public supply wells.

Hardrock public supply wells should be tested when no recharge is occurring at the land surface, as previously discussed for tests on individual hardrock wells.

In order to obtain adequate data, the pumping period for tests of hardrock public supply should extend at least 15 days and possibly up to 30 days. Durations near 15 days are possible when superior data are obtained, and well defined trends of the declining pumping rate have been obtained by the end of 15 days of pumping. Otherwise the test is continued longer, until an adequate trend line (described later) is established. Recovery is another

aspect to determine long-term yields of these wells. The recovery period last until full recovery is documented (within two feet of the static level prior to pumping). Some hardrock wells take long time periods to recover, and rely on annual winter recharge. These are relatively uncommon, but may require some measurements for months after pumping stops.

An appropriately sized totalizing flowmeter, reading in gallons, shall be installed in the discharge line, for determining pumping rate and incremental pumpage. A control valve shall also be installed in the discharge line to allow the pumping rate to be controlled (adjusted up or down). A sounding tube (normally 3/4-inch to 1-inch in diameter) shall be installed to allow water-level measurements by electric sounder. This tube shall extend from the surface to near the pump intake. The water pumped from the tested well shall be piped an adequate distance away from the pumped well and any observation wells, so as to not interfere with the test. In general, this means piping the water at least 500 feet from the pumped well, and far enough away so the pumped water cannot influence any water-producing fracture tapped by the pumped well or observation wells.

After the first day or so of pumping, the pumping level is lowered (by opening the control valve) to near the lowest water-producing fracture, if possible. If this is not possible, then the deepest pumping level that can otherwise be sustained is used. For

the rest of the pumping period, the pumping level is kept relatively constant, by adjusting the control valve.

The static water level should be measured at least twice prior to pumping. For this type of test, long-term measurements are most valuable and short-term measurements are less important. The pumping rate and water level should be measured at least every 30 minutes during the first few hours of pumping, then at least hourly for the next eight hours. Thereafter, the pumping rate and pumping level should be measured at least three time a day for the first week of pumping, and twice a day thereafter. A plot of pumping rate versus the logarithm of the days since pumping began should be maintained. Because of the normal exponential decrease in pumping rate with time, such plots show a linear trend. The pumping for the test continues until an adequate trend line is developed, to allow projections of the pumping rate out to the design period of maximum pumping (normally from 120 to 180 days). Water-level measurements in observation wells can be less frequent, but should be done at least daily. For the recovery period, the water level in the pumped well should be measured at least every 30 minutes during the first four hours, then hourly for the next eight hours. The water level should then be measured twice a day for the same period as was the pumping duration until full recovery occurs. Recovery measurements continue until either full recovery occurs, or an adequate trend line (depth to water vs. logarithm of days

since pumping stopped) is established to project the time required for full recovery.

The plot of pumping rate vs. logarithm of time of days is extrapolated out to the design period. Based on this plot, the total pumpage possible from the well over the design period is determined. Then the average pumping rate over the design period is determined, by dividing the total gallons by the duration. This is termed the "long-term" well yield, if adequate recovery occurs. If the water level doesn't fully recover within the period equal to the pumping duration, a correction factor is applied. For example if the average pumping rate projected over the design period is 30 gpm, but the water level took 60 days to recover after 20 days of pumping for the test, then the long-term well yield would be 1/3 times 30 gpm, or 10 gpm. This correction may not be necessary in cases where adequate winter recharge can be demonstrated.

Experienced water-resources hydrologists should oversee and interpret the results of such tests. A "water-resources hydrologist" is a certified hydrologist who specializes in ground water resource investigations, as opposed to a contaminant hydrologist or groundwater modeler. Certified hydrogeologist should prepare and stamp the reports.

Pump testing alone doesn't necessarily address the annual recharge, or the amount of groundwater that can be developed in a certain area. The water-budget approach can be used to provide an

upper bound to the potential annual groundwater recharge in an area. The tributary watershed is delineated, normally based on topographic maps for the land surface. Precipitation and evapotranspiration are then determined. These are normally taken from records from local weather stations, and supplemented by previously developed values. Runoff is normally the difference between precipitation and evapotranspiration. Successful supply wells in may settings can only be developed in part of the watershed (i.e, they cannot usually tap all of the recharge in the watershed). Potential recharge is often taken as a percentage of the runoff. These calculations should be done by experienced hydrologists.

Subdivision Studies

If it is proposed that groundwater is to be used to supply water to the subdivision, a complete hydrogeologic evaluation shall be made. The hydrogeologic evaluation shall contain appropriate hydrologic maps, and an evaluation of groundwater occurrence, water-level depths, direction of groundwater flow, recharge, discharge, aquifer characteristics, and chemical characteristics. Conclusions shall be submitted as to: 1) the amount of groundwater available for the entire development during a series of dry years; 2) the expected availability of water under full development; 3) whether the proposed method of obtaining the water (i.e., individual wells or community wells) is feasible; 4) the antici-

pated depths and yields of recommended wells; 5) the chemical and radiological quality of the water; and 6) type of well to be used.

The examination shall include the tentative subdivision area and shall be extended peripherally to include an evaluation of the effect of the pumpage for the proposed project on existing water supply wells in the area.

Individual Domestic Well Test Procedures. For individual wells, the following minimum number of wells shall be developed and tested: Where the subdivision is less than 100 acres - 3; where the subdivision is from 100 to 1,000 acres - 3 plus one additional for each 100 acres in excess of 100 acres; where the subdivision is more than 1,000 acres - 12 plus three additional for each 500 acres in excess of 1,000 acres. If individual domestic wells are to be used for a subdivision (as opposed to community wells) they shall be tested as follows:

> The test will be 72 hours in duration and will be divided into two phases. During the first 12 hours, a step drawdown test will be performed. The remaining part of the test will consist of a constant head test. During this phase the water level in the well shall be maintained near the lowest water bearing fracture, or as deep as possible, and kept constant for the rest of the test. The purpose of the second phase is to aid in evaluating the potential long-term yield of the

well.

Records for the pump test shall include: 1) Static and pumping levels, drawdown; 2) pumping rate; 3) total pumpage, and 4) water quality at the end of the test. Semilog plots of yield vs. time will be prepared and included in the report.

Recommended time intervals for time-drawdown plots.

Time Since Pumping	Time Intervals
0-20 minutes	1 minutes
20-40 minutes	2 minutes
40-60 minutes	5 minutes
1 to 2 hours	20 minutes
2-4 hours	30 minutes
4 hours-end of test	Discretion of responsible professional

Following pump shut-off, the water-level shall be measured, for at least 72 hours or until full recovery is obtained.

The Hydrogeologic Report shall specify proposed locations for wells to provide adequate amounts of water as specified by a water resources engineer to meet the project demand. An accurate site location map will be provided, and along with well drillers logs, pump test measurements and graphical plots, results of chemical analyses. All information derived from the drilling and testing must be in the report, including all dry holes and wells dry after testing.

Well locations shall be as specified by the Director of RMA in consultation with the hydrogeologist. Generally, test locations

will be selected to test the varying types of surface land and rock types evident in the subdivision. The Director may require additional wells at this selection stage if he deems it necessary in order to properly evaluate the subdivision. Additional wells, after the first selection, may be permitted by the Director to further test conditions in portions of the subdivision. Wells producing 2 gpm or less after two hour air test will be considered dry for purposes of establishing suitability.

Public Supply Wells. The same procedures should be followed as for the public supply wells previously discussed.

RECOMMENDATIONS

Recommendations are provided related to the following:

1. Enhanced guidelines for hydrogeologic evaluations and aquifer testing for new projects.
2. Hydrogeologic siting of new water system wells.
3. Required aquifer testing for new water system wells.
4. Consideration of larger lot sizes where individual domestic wells are used.
5. Consideration of development of well spacing criteria in densely developed areas.
6. Requiring chemical and radiological testing for all new water supply wells.

7. Depth sampling for new water system wells located in groundwater quality problem areas.
8. Maximize use of poor quality groundwater for irrigation and other non-potable uses.
9. Development of additional water, including surface water and pumping groundwater in winter to storage facilities.
10. Continued groundwater monitoring program, particularly for water levels.

Enhanced Water Supply Evaluations

Enhanced water supply evaluations and pump testing of new wells have already been discussed.

Siting of New Water System Wells

Water witching is commonly used to site new water system wells, or such wells are placed adjacent to existing wells. It is recommended that certified hydrogeologists recommend where new wells would be drilled, after fully considering well interference, locations of groundwater recharge, and other factors.

Aquifer Testing of New Water System Wells

New water system wells should be pump tested, following procedures previously recommended for new public supply wells. Once the test is completed, the hydrogeologist should recommend an optional pumping rate, after considering drawdowns in existing wells in the

area.

Lot Sizes for Individual Wells

Consideration should be given to increasing the minimal lot size to five acres in the Oakhurst Basin. Also, shared wells should not be allowed for new projects.

Well Spacing Criteria

Well spacing criteria could be developed to govern the distance between new public supply wells and existing wells in densely populated area. The purpose would be to decrease drawdowns in existing wells due to pumping of the new well. Aquifer test results for wells would provide estimates of aquifer parameters, which would be used in the evaluation.

Water Analyses for New Supply Wells

Presently, there is an overall paucity of groundwater quality data outside of regulated water systems. It is recommended that when new water supply wells are constructed, a chemical analyses and radiological analyses be required, and results submitted to Madera County. The following constituents would be determined by a California certified laboratory:

Major cations and anions

pH, TDS, and electrical conductivity

Iron, manganese, and arsenic

Alpha activity.

New Water System Wells and Water Quality

Evidence indicates that some problem constituents may be present at different concentrations in groundwater from fractures at different depths at the same location. It is recommended that water from individual fracture zones be isolated in a pilot hole and subjected to chemical and radiological analyses, prior to completing the well. In this manner, better quality groundwater would be tapped. Once this information is available, groundwater at problem levels could be isolated (sealed off), and better quality groundwater produced. Such a procedure has been followed for decades in groundwater quality problem areas in the San Joaquin Valley.

WWTF Effluent

Presently, effluent from the Oakhurst WWTF is disposed by hillside irrigation, and not beneficially used. Because of the limited groundwater resources in the Oakhurst Basin, plans should be developed to reuse all of the water possible for non-potable uses, including golf course and landscape irrigation.

Groundwater Monitoring

The water-level monitoring and water-level elevation mapping instituted during the AB303 program should be continued on at least

a monthly basis. In addition, water-level data from water system monitoring (such as the Hillview Water Co. systems) should be incorporated into this program.

SUMMARY AND CONCLUSIONS

Groundwater tapped by water-supply wells in the Oakhurst Basin is primarily present in fractured granitic rocks. Water-budget data indicate that there is a large amount of potential recharge from precipitation and streamflow in the Oakhurst Basin. Water-level elevations indicate movement of groundwater from topographically higher areas toward the Fresno River. Recharge occurs in the topographically higher areas, and groundwater discharges to pumping wells, plants, and the Fresno River in the topographically lower areas. Water-level elevations indicate that the groundwater in the lower topographic areas is hydraulically connected to streams. Relatively shallow groundwater levels are present in the winter in most wells, indicating that the basin is essentially full of groundwater. Water levels in wells, including most deep wells, respond relatively quickly to winter recharge. However, there is a limited storage space for groundwater in the hardrock. Many water system wells are clustered in relatively small areas, and thus can't effectively tap much of the groundwater that is in storage in the basin.

Groundwater quality problems in the basin are significant,

including salt water, and high uranium, iron, and manganese concentrations. In addition, the lowering of the federal MCL for arsenic will present an additional concern. The salt (high chloride) water and uranium appear to be correlated with deep fractures, manifested by linears that have been mapped from aerial photographs.

A number of recommendations are provided in this report, including:

1. Hydrogeologic siting of new public supply wells.
2. Hydrogeologic evaluations for groundwater supplies for new development.
3. Enhanced pump testing procedures for new wells.
4. Revising minimum lot sizes and procedures for shared wells, to minimize well interference.
5. Obtaining water samples for more comprehensive water analyses from new supply wells.
6. Depth sampling programs for water quality when new water system wells are constructed.
7. Reuse of effluent from the Oakhurst WWTF.
8. Developing more water, such as surface water, and evaluating groundwater management alternatives such as to pump more groundwater in the winter and store it for use in summer months.
9. Continuation of the water-level monitoring started as part of the AB 303 program.

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APPENDIX A

WELL INVENTORY TABLES

TABLE OF WELL CONSTRUCTION OF PRIVATE WELLS WITHIN 1/4 MILE OF PIKE RANCH, DILLON ESTATES (M.D. 60) AND MIAMI CREEK KNOLLS (M.D. 43) WATER SYSTEM

Well Identification T/R/S	Well Owner	Date Drilled	Total Depth (ft)	Airlift Yield (gpm)	Depth of Water Bearing Fractures (ft)
T7S8/R21E-5D	Thompson	2/95*	278	3	210-212
-5E	Weisman	5/83	152	12-18	90-152
-5E	McDonnel	4/89	140	20	68-69, 82-84, 100-101
-5F	Taber	4/90	775	20	700-750
-5K	Simmons	8/81	600	2	450-470
-5M	Schrank	8/93	200	11	116, 243
-5M	Johnson	4/91	675	15	600-660
-5P	-	12/91	1,001	150	1,001
-5Q	Dietz	10/87	352	10	94-97
-6E	Hawthorn	9/89	205	20	100-175
-6E	-	8/80	275	5	107, 147, 177
-6F	Holloway	10/94	525	7	320-340, 380-385, 445-470
-6F	-	9/93	600	2	455-463
-6H	Brand	10/83	450	4	-
-6J	Sherman	10/74	200	3	50-51
-6J	Clendenning	12/86	455	4	421-425
-6J	Sherman	10/78	150	8	-
-6K	-	6/81	450	55	208-212, 410-430
-6K	Gielgens	9/85	129	8	60-62, 108-109
-6Q	Snelling	2/93	500	60	444-445
-7A	Murray	9/84	48	-	-
-8B	Wiseman	10/90	300	4	
-8C	Gauthier	6/83	277	6-8	110-112, 161-165, 238-241
-8C	Sierra Pines Church	5/95	599	100	436, 597
-8C	Kerns	6/90	200	25	65

(*Deepened)

TABLE OF WELL CONSTRUCTION OF PRIVATE WELLS WITHIN 1/4 MILE OF PIKE RANCH, DILLON ESTATES (M.D. 40) AND MIAMI CREEK KNOLLS (M.D. 43) WATER SYSTEM

Well Identification T/R/S	Well Owner	Date Drilled	Total Depth (ft)	Airlift Yield (gpm)	Depth of Water Bearing Fractures (ft)
T65S/R21E-31K	Shawnee Chapel	9/89	450	25	437-438
-31K	Venica Jordan	4/90	280	2	246-247
-31P	David Jordan	9/90	275	4	178
-31P	James Gregerson	4/55	125	40	-
-31P	-	3/89	202	5	125-175
-31Q	Dragovich	7/89	225	15	-
-31Q	-	1/87	200	4	123
-31R	Springer	8/93	840	44	44, 90, 823
T75R/20E-1A	Giorgi	3/80	377	6	225-245
-1E	-	11/78	245	5	
-1G	-	12/99*	475	10	445-447
-1G	-	9/78	375	1.5	97-98, 206-207
-1H	-	1/90	475	50	300-400
-1H	-	1/90	505	15	300-375, 400-450

(*Deepened)

TABLE OF WELL CONSTRUCTION OF PRIVATE WELLS WITHIN 1/4 MILE OF THE DILLON ESTATES (M.D. 60) AND MIAMI CREEK KNOLLS (M.D. 43) WATER SYSTEMS

Identification T/R/S	Sec.	Well Owner	Address	Date Drilled	Total Depth (ft)	Airlift Yield (gpm)	Depth of Water Bearing Fractures (ft)	Latitude	Longitude
T6S R21E	31Q	Dragovich Eugene S & Ula R Trustee	42035 High Point Ct, Ahwahnee	7/89	225	15	-	37° 2'' 35.70620"	-119° 42' 56.47237"
T7S R21E	6E	Hawthorn Edgar Everett Jr	41447 Highway 49, Oakhurst	8/80	276	8	107,147,177	37° 21' 05.37641"	-119° 43' 19.78280"
T7S R21E	6J	Sherman Bude L & Ellis L Tr & Saundra R.	41386 Miami Way, Oakhurst	10/74	303	3	60-61	37° 21' 01.85748"	-119° 42' 32.78585"
T7S R21E	6J	Clendenning Andrew J & Robin C	41383 Miami Way, Oakhurst	12/85	455	4	423-425	37° 20' 58.87023"	-119° 42' 41.28685"
T7S R21E	6Q	Snelling Walter P & Norma Jean Tr	45791 Murray Hill Dr, Oakhurst	2/88	530	60	444-446	37° 20' 42.45947"	-119° 42' 42.10413"
T7S R20E	1	Otto Harris J & Joan C	41970 Road 600, Ahwahnee	08/90	377	6-8	79-80 200-2002, 226-245	37° 21' 18.32452"	-119° 43' 39.85781"

WELLS WITH MEASURED WATER LEVELS

No.	Well Name	Owner	Address		APN	Well Type	Elevation (ft)	Latitude (format: ° ' ")	Longitude (format: ° ' ")
1	Ahwahnee East W.A	Bard Investment Company LP			055-570-002	County WS	2248.409	37 21 48.80078	-119 41 52.62082
2	Ahwahnee East W.B	Bard Investment Company LP			055-570-002	County WS	2295.924	37 21 49.56384	-119 41 20.62305
3	Ahwahnee East W.C	Bard Investment Company LP			055-570-002	County WS	2280.030	37 21 45.93240	-119 41 23.42645
4	Ahwahnee W.1	Sierra Meadows Golf Club LP	48518 Spur Dr	Ahw. 93601	055-570-001	County WS	2135.287	37 21 30.68809	-119 42 16.64206
5	Ahwahnee W.2	Bard Investment Co.			055-570-009	County WS	2154.705	37 21 38.72873	-119 42 16.40516
6	Ahwahnee W.3	Bard Investment Co.			055-570-005	County WS	2126.493	37 21 46.65491	-119 42 24.89407
7	B. Silverman	Sherman Boad L & Ethel L Tr	41850 Miami Way	Oak. 93644	055-220-011	Priv. Dom.	2178.845	37 21 01.72758	-119 42 26.84340
8	Baker	Barker Michael M & Donna L Tr	42951 Road 628	Ahw. 93601	052-220-011	Priv. Dom.	2246.125	37 22 3.56963	-119 40 84.87028
9	Broadview W.3	Yosemite Union High School Distric	49880 Road 427	Oak. 93644	008-002-036	Priv. PS	2286.166	37 19 45.89315	-119 39 1.73702
10	Broadview W.4	Broadview Terrace Water Co	49820 Road 427	Oak. 93644	008-002-035	Priv. PS	2290.311	37 19 46.85678	-119 39 13.47806
11	Broadview W.5	Broadview Terrace Water Co	49820 Road 427	Oak. 93644	008-002-035	Priv. PS	2292.683	37 19 46.99483	-119 39 15.33766
12	Broadview W.6	West Trey G & D Collette Trustee			008-081-008	Priv. Dom.	2277.437	37 19 49.40668	-119 39 47.81872
13	Broadview W.8					Priv. Dom.	2460.893	37 19 28.10685	-119 38 02.09854
14	Charbolic Church	Roman Catholic Bishop Of Fresno	40180 Indian Springs Rd	Oak. 93644	035-082-038	Priv. Dom.	2311.445	37 19 58.28806	-119 32 24.63242
15	Craig	Craig Richard W & Betty Maria	51519 Road 426	Oak. 93644	036-220-007	Priv. Dom.	3792.181	37 19 52.86396	-119 30 28.85658
16	Craig Outhouse	Craig Richard W & Betty Maria	51519 Road 426	Oak. 93644	052-220-007	Priv. Dom.	3004.715	37 19 48.51665	-119 38 33.84480
17	Dillon Estate Well 1	D.L Limited Partnership			052-380-034	County WS	2260.710	37 2' 27.41252	-119 40 15.27675
18	Dillon Estate Well 2	Hall Wayne & Carolyn	40331 Sunrise Dr	Ahw. 93601	052-141-061	County WS	2159.668	37 2' 10.10644	-119 43 12.14815
19	Eulberg	Eulberg Alan C & Patricia A Tr	27630 Bear Meadow Rd	Oak. 93644	008-150-015	Priv. Dom.	2025.348	37 17 80.17739	-119 37 20.87837
20	Fresno Riv East WWTF	Robey Diane M Tr			004-150-022		2228.804	37 19 53.37460	-119 40 02.84347
21	Fresno Riv Griffith	Frye Michael G & Weigh Claudia A			008-182-027	Priv. Dom.	2070.872	37 19 59.80215	-119 42 46.33700
22	Fresno Riv Hartwell	Rice Harold R & Carolyn S Tr Etal	39746 Hartwell Rd	Oak. 93644	035-350-006		7972.880	37 20 16.80136	-119 34 22.40873
23	Fresno Riv Hondos	J S & S A Partnership	40088 Highway 41	Oak. 93644	056-310-041		2252.947	37 19 60.01175	-119 39 19.60041
24	Fresno Riv North WWTF	County Of Madera			004-140-020		2225.407	37 19 58.72856	-119 40 23.34963
25	Fresno Riv Mobile Hm P	Oakhurst Union Elementary Sch			008-081-029		2265.667	37 19 54.65266	-119 39 40.49897
26	Gray	Gray Robert E & Lynn L			035-081-037	Priv. Dom.	2373.695	37 21 11.26886	-119 41 55.69342
27	Goldmundeen	Godmundson Mark & Jan	51892 Quail Ridge Rd	Oak. 93644	059-190-210	Priv. Dom.	3068.221	37 19 58.30673	-119 36 11.80660
28	Hughes	Hughes Kenneth W & Eleanor A Tr	40897 Oakhurst View Ct	Oak. 93644	035-232-044		2830.997	37 20 1.80722	-119 37 30.02386
29	Hughes	Schneider Christopher R & Mega	40439 Oakhurst View Ct	Oak. 93644	035-232-045	Priv. Dom.	2879.978	37 20 1.27936	-119 37 21.54997
30	Hunting	Hunting Robert A & Nora L Tr	Meadowwood Rd	Oak	036-400-018	Priv. Dom.	2488.468	37 19 01.98018	-119 39 33.68966
31	Jerry Gaines	Horne Gerald E Etal	40660 Hodges Hill Dr	Oak. 93644	044-042-005	Priv. Dom.	2499.891	37 20 24.14871	-119 38 40.77677
32	Jordan	Jordan Ray & Vanessa B			035-101-011	Priv. Dom.	2312.178	37 21 42.56084	-119 40 29.85128

WELLS WITH MEASURED WATER LEVELS

33	Koenicke	Koenicke Richard B & Susan V Sva	33405 Cedar Creek Ct	Okh. 93644	068-210-002	Priv. Dom.	2845.018	37 15 [illegible]	-119 26 31.033037
34	McCarty					Priv. Dom.	2313.272	37 21 50.77374	-119 43 30.69870
36	MCE 1	Acacias Allan Survivors Tr			055-162-004	County WS.	2279.140	37 21 09.82260	-119 41 29.89799
38	MCE 2	Bard Investment Company Lc			057-630-009	County WS.	2307.322	37 21 12.88748	-119 41 17.99077
37	Meyer	Meyer Earl G & Hazel E Tr	50092 Road 428	Okh. 93644	068-220-025	Priv. Dom.	2537.695	37 16 21.07888	-119 38 07.43143
39	Miami Cr Knolls W.2	Drayer Betty J Trustee	49585 Laurl Ln	Okh. 93644	065-150-015	County WS.	2080.710	37 20 59.66416	-119 42 60.07265
39	Miami Cr Knolls W.3	Breitang Jack N & Ann H	49530 Laurl Ln	Okh. 93644	065-150-012	County WS.	2074.264	37 21 01.12875	-119 42 54.18662
40	Miami Cr. Knolls W.	County Of Madera Maint. District #43			065-150-056	County WS.	2114.798	37 20 59.58168	-119 43 01.21391
41	Mike Barker	Barker Michael V & Donna L Tr	42961 Road 638	Ahw. 93601	055-280-011	Priv. Dom.	2244.268	37 22 21.65216	-119 43 24.87484
42	Oakhill Cemetery	Madera Cemetery District	42128 Highway 41	Okh. 93644	064-261-004	Priv. Dom.	2278.911	37 19 56.41520	-119 39 15.97414
43	Oakhurst Lutheran Ch	Oakhurst Lutheran Church Corp	39245 Bass Rd	Okh. 93644	066-250-012	Priv. Dom.	3511.394	37 18 08.18367	-119 37 59.79508
44	Ortie Bush	Roecher Susan T & V Donna			068-180-046	Priv. Dom.	3014.672	37 17 56.52238	-119 38 18.50316
45	Paul	Mynart James T & Shirley L	46880 Ellmeadow Dr	Okh. 93644	068-400-008	Priv. Dom.	2618.624	37 18 33.56516	-119 38 20.80581
46	Quail Meadows W.1	G C Brown Developers Inc			068-870-002	Priv. Dom.	2388.818	37 18 23.57954	-119 39 03.42062
47	Quail Meadows W.2	G C Brown Developers Inc			068-360-031	Priv. Dom.	2350.178	37 18 17.55078	-119 39 09.57646
48	Quail Meadows W.3	G C Brown Developers Inc			068-360-031	Priv. Dom.	2377.366	37 18 17.20095	-119 39 11.50902
49	Quail Meadows W.4	G C Brown Developers Inc			068-360-031	Priv. Dom.	2418.960	37 19 58.08195	-119 38 00.07848
50	Quail Meadows W.5	G C Brown Developers Inc			068-360-031	Priv. Dom.	2412.717	37 19 05.79481	-119 38 14.76803
51	Quail Meadows W.6	G C Brown Developers Inc			068-370-002	Priv. Dom.	2349.433	37 18 21.81352	-119 38 30.34135
52	River Creek Gc				065-630-031	Priv. Dom.	2361.642	37 20 56.89554	-119 42 57.71124
53	Roether	Roether Stuart T & V Donna	27940 Wertham Rd	Okh. 93644	056-150-044	Priv. Dom.	3371.615	37 17 59.72758	-119 36 16.11550
54	Sierra Funeral Chpl	S E Acquisition Of Colonial Calif Inc	49269 Road 426	Okh. 93644	063-060-021	Priv. Dom.	2566.446	37 19 44.14807	-119 38 60.03502
55	Sierra Pines Church	Sierra Pines Church	49555 Covey Ct	Okh. 93644	052-440-029	Priv. Dom.	2396.580	37 20 32.73680	-119 42 00.25028
56	South Of Sherman	Schell Ralph A & Hazel F			055-280-037	Priv. Dom.	2117.122	37 20 59.72078	-119 42 34.33244
57	Still View Mdw W.A	Sleeman David W & Wanda S	50140 Meadowview Dr	Okh. 93644	068-460-003	County WS.	2612.491	37 18 44.50846	-119 38 34.55957
58	Still View Mdw W.B	Mc Glynn Betty Jo	50260 Road 426	Okh. 93644	068-200-032	County WS.	2674.324	37 18 51.64776	-119 38 32.64757
58	Still View Mdw W.C	Griffith Roger L & Leah Ann Trs	49858 Meadowview Dr	Okh. 93644	068-460-042	County WS.	2461.168	37 18 45.17647	-119 38 30.22094
60	Synder W.1	J S & S A Partnership	42059 Highway 41	Okh. 93644	068-010-042	Priv. PS.	2260.148	37 19 50.24843	-119 38 15.77885
61	Synder W.2	J S & S A Partnership	42059 Highway 41	Okh. 93644	068-010-041	Priv. PS.	2262.824	37 19 [illegible].00100	-119 38 17.77825
62	Tony Ward	Ward Anthony L & Diana R Tr	44249 Peterson Dr. Rd	Ahw. 93601	055-320-006	Priv. Dom.	2454.679	37 22 22.01169	-119 43 28.31222
63	WWTF Mw.4	County Of Madera	44282 Black Oak Ry Rd	Okh. 93644	064-093-001	Priv. Dom.	2309.023	37 19 39.4913	-119 39 58.39820
64	WWTF W.1	Robby Clara M Tr			064-150-022	Priv. Dom.	2284.069	37 19 48.52489	-119 40 01.95928
65	YHS W.1	Yosemite Valley High School	50407 Hangtree Ln	Okh. 93644	055-141-002	Priv. Dom.	2324.287	37 19 32.47636	-119 37 57.43155
66	YHS W.2	Yosemite Valley High School Dist	50200 Road 427	Okh. 93644	055-141-001	Priv. Dom.	2324.953	37 19 35.48206	-119 37 57.24814

County WS. = County Water System
Priv. Dom. = Private Domestic
Priv. WS. = Private Water Supply

APPENDIX B

WATER-LEVEL MEASUREMENTS

MIAMI CREEK/PETERSON CREEK SUBARRA

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: McCarty
Address: 45501 Road 621
Total Depth of Well: 325 feet

Date of Measurements	Time	SWL (feet)
11/03/04	3:00pm	52.40
11/24/04	12:00pm	62.40
01/18/05	1:15pm	62.80
03/02/05	12:50pm	60.20
04/06/05	9:50am	51.4
05/03/05	10:00am	47.15
06/06/05	10:40am	43.8
06/28/05	9:20am	42.3
07/28/05	10:50am	42.8
08/26/05	10:00am	43.9

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Mike Barker
Address: 42961 Road 628
Total Depth of Well: 60 feet

Date of Measurements	Time	SWL (feet)
11/03/04	11:20pm	16.0
11/24/04	12:30pm	15.5
01/18/05	1:30pm	14.2
03/02/05	1:00pm	10.6
04/06/05	9:40am	3.9
04/27/05	2:50pm	P.R.
05/04/05	10:25am	5.3
06/06/05	10:25am	9.6
06/28/05	9:10am	9.8
07/28/05	10:40am	15.9
08/26/05	9:30am	21.3

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: South of BL Sherman
Address:
Total Depth of Well: 000 feet

Date of Measurements	Time	SWL (feet)
11/02/04	3:50pm	47.85
11/24/04	11:40am	44.9
01/18/05	1:30pm	38.6
03/02/05	12:40pm	37.4
04/06/05	11:20am	34.7
04/27/05	3:30pm	37.95
06/06/05	12:35pm	39.9
06/28/05	10:05am	40.9
07/28/05	11:43am	43.2
08/26/05	10:30am	44.5

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: B. L. Sherman
Address: 41395 Miami Way
Total Depth of Well: 90 feet

Date of Measurements	Time	SWL (feet)
11/02/04	3:30pm	19.75
11/24/04	11:15am	18.10
01/18/05	1:35pm	10.0
03/02/05	12:30pm	6.8
04/06/05	11:15am	5.2
04/27/05	3:20pm	7.25
06/06/05	12:30pm	8.9
06/28/05	10:00am	9.9
07/26/05	11:40am	12.5
08/26/05	10:35am	14.5

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Tony Ward
Address:
Total Depth of Well: 780 feet

Date of Measurements	Time	SWL (feet)
11/13/04	10:20am	59.45
11/29/04	8:00am	58.10
03/03/05	9:20am	55.5
04/06/05	9:20am	53.5
04/27/05	2:20pm	53.35
06/06/05	10:05am	54.1
06/28/05	9:50am	64.9
07/29/05	10:30am	64.2
08/26/05	9:10am	66.9

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: River Creek Golf Course
Address:
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
01/21/05	10:30am	17.0
03/07/05	11:00am	14.8
03/31/05	2:45pm	13.7
05/04/05	10:40am	16.3
06/06/05	12:45pm	17.9
06/28/05	9:30am	19.5
07/28/05	11:00am	22.7
09/07/05	9:25am	25.7

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Bob & Lynn Gray
Address:
Total Depth of Well: 300 feet

Date of Measurements	Time	SWL (feet)
01/21/05	9:15am	32.85
03/07/05	10:30am	31.0
03/31/05	2:20pm	29.7
05/03/05	9:40am	27.05
06/06/05	1:10pm	25.30
06/28/05	10:50am	24.5
07/28/05	12:15pm	24.2
08/26/05	11:05am	24.5

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Venicia Jordon
Address: 42290 Hwy 49
Total Depth of Well: 110 feet

Date of Measurements	Time	SWL (feet)
11/03/04	2:10pm	72.80
04/27/05	3:05pm	53.30

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Sierra Pines Church
Address: 40901 Covey Court
Total Depth of Well: 539 feet

Date of Measurements	Time	SWL (feet)
01/21/05	11:40am	197.9
03/07/05	10:45am	171.2
03/31/05	2:40pm	169.7
04/27/05	9:30am	196.43
06/06/05	1:10pm	192.6
06/20/05	12:20pm	181.3
07/28/05	1:10pm	197.2
08/26/05	10:50am	203.5

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Miami Creek Estates Well #1
Address: Off Lauri Lane
Total Depth of Well: 1,097 feet

Date of Measurements	Time	SWL (feet)
09/28/04	10:45am	N.M.
11/02/04	12:30pm	43.15
11/24/04	10:05am	76.90
03/03/05	11:15am	P.R.
04/06/05	11:00am	11.1
04/27/05	12:00pm	38.1
06/06/05	12:00pm	63.4
06/27/05	11:10am	72.5
07/28/05	12:20pm	P.R.
09/07/05	10:50am	142.5

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Potegroon Creek
Well Owner: Madera County Miami Creek Estates
Well #2
Address: Off Lauri Lane
Total Depth of Well: 900 feet

Date of Measurements	Time	SWL (feet)
09/28/04		P.R.
11/02/04	12:20pm	33.2
04/27/05	12:05pm	7.3

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Ahwahnee West Well #1
Address:
Total Depth of Well: 358 feet

Date of Measurements	Time	SWL (feet)
09/28/04	12:10pm	97.87
01/02/05	10:30am	29.60
03/03/05	10:35am	17.1
04/27/05	11:15am	24.25

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Ahwahnee West Well #2
Address:
Total Depth of Well: 747 feet

Date of Measurements	Time	SWL (feet)
09/28/04	12:20pm	260.88
11/20/04	10:30am	61.25
11/24/04	11:05am	34.0
03/03/05	10:50am	42.2
04/06/05	10:40am	111.9
04/27/05	11:20am	61.87
06/06/05	11:30am	P.R.
06/20/05	10:20am	226.4
07/28/05	11:55am	P.R.
09/07/05	10:15am	177.4

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Paterson Creek
Well Owner: Madera County Ahwahnee West Well #3
Address:
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
09/28/04	12:30pm	4.10
11/02/04	10:40am	26.9
11/24/04	11:10am	2.4
01/03/05	10:55am	F
04/06/05	10:50am	F
04/27/05	11:30am	F
06/06/05	11:35am	F
06/28/05	10:30am	115.0
07/28/05	12:00pm	64.2
09/07/05	10.25am	147.9

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Ahwahnee West Well A
Address:
Total Depth of Well:

Data of Measurements	Time	SWL (feet)
09/28/04	11:15am	13.95
11/05/04	11:55am	4.45
04/27/05	12:30pm	F

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Ahwahnee West Well B
Address:
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
09/28/04	11:25am	22.33
11/02/04	12:00pm	18.35
11/29/04	10:40am	16.70
01/03/05	11:30am	3.0
04/06/05	10:20am	2.4
04/27/05	12:40pm	3.33
06/06/05	12:10pm	4.0
06/28/05	11:15am	4.2
07/28/05	12:50pm	6.7
09/07/05	9:10am	11.11

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Ahwahnee West Well C
Address:
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
09/28/04	12:00pm	12.48
11/02/04	11:50am	11.11
04/27/05	12:45pm	6.9

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Dillon Estates
Well #1
Address:
Total Depth of Well: 900 feet

Date of Measurements	Time	SWL (feet)
09/29/04	1:30pm	60.2
11/02/04	9:45am	38.2
11/24/04	9:30am	23.8
03/03/05	10:15am	P
04/06/05	10:00am	P
04/27/05	1:20pm	P
06/06/05	11:05am	11.6
06/28/05	9:40am	12.2
07/29/05	11:10am	P.R.
09/07/05	10:35am	47.3

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Dillon Estates
Well #2
Address:
Total Depth of Well: 140 feet

Date of Measurements	Time	SWL (feet)
09/28/04	1:20pm	26.9
11/02/04	10:00am	16.9
04/27/05	10:25am	7.48

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Miami Creek Knolls
Well #1

Address:
Total Depth of Well:

Date of Measurements	Time	BWL (feet)
09/28/04	12:45pm	29.0
11/02/04	10:05am	29.1
11/24/04	9:40am	28.7
03/03/05	10:40am	12.6
04/06/05	10:10am	12.8
04/27/05	10:40am	15.28
06/06/05	10:15am	18.0
06/28/05	9:45am	19.8
07/28/05	11:20am	21.9
09/07/05	10:15am	24.2

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Miami Creek Knolls Well #2
Address:
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
09/28/04	12:55pm	72.62
11/02/04	10:01am	12.5
04/27/05	10:50am	7.52

MADERA COUNTY OAKHURST STUDY

Subarea: Miami Creek/Peterson Creek
Well Owner: Madera County Miami Creek Knolls Well #3

Address:
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
09/28/04	1:10pm	P.E.
11/02/04	10:00AM	12.65
11/24/04	9:50am	12.10
03/03/05	10:25am	7.6
04/06/05	10:20am	7.9
04/27/05	10:50am	8.9
06/06/05	10:20am	12.5
06/28/05	9:55am	15.2
07/28/05	11:30am	54.2
09/07/05	10:50am	58.7

OAKHURST SUBAREA

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: William Paul
Address: 49628 Stillmeadow
Total Depth of Well: 300 feet

Date of Measurements	Time	BWL (feet)
10/13/04	3:39pm	118.15
11/15/04	10:15am	109.9
12/01/04	11:00am	106.5
12/14/04	10:45am	104.2
01/18/05	12:30pm	96.4
03/02/05	11:20am	86.1
03/31/05	11:05am	80.15
05/03/05	2:50pm	77.38
06/03/05	10:00am	78.8
06/23/05	10:55am	81.7
07/18/05	12:05pm	88.0
08/26/05	11:30am	96.3

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Our Lady of the Sierra Catholic Church
Address:
Total Depth of Well: Approximately 300 feet

Date of Measurements	Time	SWL (feet)
10/13/04	9:30am	37.35
12/14/04	8:35am	36.0
01/21/05	10:50am	31.56
03/02/05	9:20am	25.8
03/31/05	12:20pm	22.4
05/04/05	9:50am	22.5
06/03/05	12:50pm	23.9
06/23/05	12:15pm	24.6
07/26/05	11:15am	31.8
08/26/05	12:00pm	31.9

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Jerry Gamez
Address: 40690 Hodges Hill
Total Depth of Well: 127 feet (Deepened 1/28/05)

Date of Measurements	Time	SWL (feet)
10/13/04	11:20am	48.10
11/15/04	9:10am	48.30
12/01/04	2:00pm	48.10
12/14/04	11:25am	47.4
01/18/05	2:00pm	45.8
03/31/05	9:30am	19.7
05/03/05	2:00pm	17.95
06/03/05	9:00am	18.20
06/23/05	12:25pm	20.2
07/26/05	11:55am	N.M.

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner:
Address: East of WWTP, near River
Total Depth of Well: 40 feet

Date of Measurements	Time	SWL (feet)
10/13/04	4:00pm	21.45
11/15/04	11:30am	18.40
12/01/04	10:35am	18.40
12/14/05	11:00am	17.80
01/18/05	12:50pm	16.8
03/02/05	10:20am	17.1
03/31/05	10:10am	16.8
05/05/05	9:40am	8.14
06/03/05	9:15am	18.8
06/23/05	10:00am	19.6
07/18/05	11:30am	20.9
09/07/05	9:05am	21.2

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Broadview Terrace Well #5
Address:
Total Depth of Well: 425 feet

Date of Measurements	Time	DWL (feet)
09/13/04	PM	30.63
09/29/04	11:55am	24.1
10/14/04	1:10pm	22.0
12/01/04	1:50pm	14.7
12/14/04	8:45am	13.4
01/18/05	10:55am	6.7
03/02/05	12:20pm	2.8
03/31/05	12:30pm	3.2
05/04/05	12:05pm	4.1
06/03/05	12:40pm	1.5
06/23/05	12:05pm	1.8
07/26/05	11:05am	P.R.
09/07/05	12:05pm	15.7

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Broadview Terrace Well # 6
Address:
Total Depth of Well: 225 feet

Date of Measurements	Time	SWL (feet)
10/14/01	2:15pm	29.0
12/01/04	1:40pm	118.3
12/14/04	9:10am	115.6
01/18/05	10:30am	112.2
03/02/05	12:10pm	90.1
03/31/05	12:10pm	95.9
05/03/05	11:00am	79.5
06/05/05	10:15am	77.9
06/23/05	11:10am	62.5
07/26/05	9:30am	117.4
08/27/05	11:30am	94.3

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Broadview Terrace MC Well 8
Address:
Total Depth of Well: 700 feet

Date of Measurements	Time	SWL (feet)
09/13/04		
09/29/04	11:20am	129.1
10/14/04	12:40pm	132.85
12/01/04	1:00pm	78.9
12/14/04	9:20am	50.9
01/18/05	10:20am	50.9
03/02/05	11:40am	89.7
03/31/05	11:15am	81.6
05/04/05	11:10am	98.65
05/04/05	4:30pm	P.R.
05/17/05	10:50am	93.70
06/03/05	12:05pm	98.4
06/23/05	11:40am	97.3
07/26/05	9:50am	192.9
09/07/05	11:20am	121.9

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Madera County Stillview Meadow Well B
Address:
Total Depth of Well: >400 feet

Date of Measurements	Time	SWL (feet)
09/28/04	10:10am	124.57
10/14/04	12:07pm	127.38
11/15/04	10:50am	102.2
12/01/04	1:25pm	101.1
12/14/04	9:30am	95.2
01/18/05	11:20am	33.5
03/02/05	12:00pm	35.0
03/31/05	11:35am	21.6
05/03/05	1:15pm	21.15
05/05/05	10:40am	21.4
06/23/05	11:20am	38.1
07/26/05	10:35am	41.4
09/08/05	8:35am	44.8

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Madera County Stillview Meadow Well C
Address:
Total Depth of Well: 502 feet

Date of Measurement	Time	SWL [feet]
09/28/04	10:00am	52.70
10/14/04	11:55am	52.35
11/15/04	10:30am	51.50
12/01/04	1:10pm	51.0
12/14/04	9:40am	50.7
01/10/05	11:10am	42.0
03/02/05	11:50am	24.6
03/31/05	11:25am	29.8
05/03/05	12:55pm	35.1
06/03/05	10:30am	36.8
06/23/05	11:30am	22.1
07/26/05	10:40am	25.8
09/08/05	8:45am	32.4

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Yosemite High School Well #1
Address:
Total Depth of Well: 975 feet

Date of Measurements	Time	SWL (feet)
10/14/01	2:30pm	41.25
12/01/04	10:00am	5.11
01/18/05	1:10pm	0
05/09/05	11:30am	N.M.
05/17/05	11:00am	15.2
06/03/05	-	N.M.
06/23/05	11:55am	27.4
07/26/05	11:00am	N.M.

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Quail Meadows Well 1
Address: Off Road 426B
Total Depth of Well: 400 feet

Date of Measurements	Time	SWL (feet)
09/13/04	-	34.0
10/14/04	3:20pm	39.9
05/03/05	10:40pm	17.34

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Quail Meadows Well 2
Address: Off Road 426B
Total Depth of Well: 450 feet

Date of Measurements	Time	SWL (feet)
09/13/04	am	60.83
10/14/04	4:05pm	63.05
05/03/05	10:50am	32.03

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Quail Meadows Well 3
Address: Off Road 426D
Total Depth of Well: 485 feet

Date of Measurements	Time	SWL (feet)
09/13/04	am	78.78
10/14/04	3:30pm	81.60
05/03/05	11:10am	58.03

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Quail Meadows Well 4
Address: Off Road 426B
Total Depth of Well: 453 feet

Date of Measurements	Time	SWL (feet)
09/13/04	am	27.0
09/29/04	10:10am	28.10
10/14/04	3:50pm	28.6
11/15/04	9:45am	24.4
12/01/04	11:35am	23.7
12/14/04	10:10am	22.5
01/10/05	12:00pm	6.3
03/02/05	11:00am	1.5
03/31/05	10:40am	F
05/03/05	11:30am	0.75
06/06/05	9:45am	0.50
06/23/05	10:40am	1.7
07/18/05	11:55am	3.0
09/08/05	9:10am	8.9

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Quail Meadows Well 5
Address: Off Road 426B
Total Depth of Well: 577 feet

Date of Measurements	Time	SWL (feet)
09/13/04	am	50.95
09/29/04	10:20am	51.6
10/14/04	3:45pm	50.3
11/15/04	9:35am	47.5
12/01/04	11:40am	46.9
12/14/04	10:05am	45.7
01/18/05	11:50am	44.8
03/02/05	10:50am	56.9
03/31/05	10:30am	30.8
05/03/05	11:20am	30.26
06/06/05	9:40am	50.4
06/23/05	10:30am	56.3
07/18/05	11:50am	62.7
09/08/05	9:00am	36.5

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Quail Meadows Well 6
Address: Road 426B
Total Depth of Well: 853 feet

Date of Measurements	Time	SWL (feet)
09/13/04	am	78.0
09/29/04	10:00am	59.1
10/14/04	3:15pm	66.6
11/15/04	9:20am	47.0
12/01/04	11:15am	54.2
12/14/04	9:50am	50.7
01/18/05	11:35am	122.8
03/02/05	10:30am	89.7
03/31/05	10:20am	81.6
05/03/05	10:30am	31.73
06/06/05	9:25am	40.4
06/23/05	10:20am	40.5
07/18/05	11:40am	P.R.
09/08/05	8:50am	72.4

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Madera County Stillview Meadow Well A
Address:
Total Depth of Well: 480 feet

Date of Measurements	Time	SWL (feet)
09/28/04	9:30am	143.72
10/14/04	11:39am	141.25
05/03/05	1:25pm	90.34

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Broadview Terrace Well # 3
Address:
Total Depth of Well: 282 Feet

Date of Measurements	Time	SWL (feet)
09/13/04	pm	24.33
09/29/04	11:40am	23.5
10/14/04	12:57pm	23.7
05/04/05	12:00pm	7.13

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Sierra Funeral Chapel
Address: Off Road 426
Total Depth of Well: Unknown

Date of Measurements	Time	SWL (feet)
09/13/04	pm	17.74
09/29/04	11:10am	18.10
10/13/04	1:20pm	19.10
05/03/05	12:40pm	10.53

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Hunting
Address: 49575 Meadow Wood Drive
Total Depth of Well: 427 feet

Date of Measurements	Time	SWL (feet)
10/13/04	4:00pm	97.10
05/03/05	3:00pm	56.67

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Madera Cemetery/Oakhill Cemetery
Address: 40128 Highway 41
Total Depth of Well: 85 feet

Date of Measurements	Time	SWL (feet)
10/13/04	10:35am	10.30
05/03/05	2:10pm	10.40

MADERA COUNTY OAKHURST RTONY

Subarea: Oakhurst
Well Owner: WWTP MW-4
Address:
Total Depth of Well: 20 feet

Date of Measurements	Time	SWL (feet)
10/14/04	11:15am	11.75
05/05/05	10:20am	6.04

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Yosemite High School Well 2
Address: South of pool
Total Depth of Well: 850 feet

Date of Measurements	Time	SWL (feet)
10/14/04	2:05pm	9.33
12/01/04	10:15am	F
05/04/05	11:25am	F
06/03/05	12:15pm	F
06/23/05	11:50am	F
07/26/05	10:55am	6.2
09/07/05	11:08am	7.1

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Roger Synder Well # 1
Address: Rondos Steak House
Total Depth of Well: 96 feet

Date of Measurements	Time	SWL (feet)
10/14/04	9:40am	0.82
05/03/05	2:30pm	F

MADERA COUNTY OAKHURST STUDY

Subarea: Oakhurst
Well Owner: Roger Synder Well # 2
Address: Hondos Steak House
Total Depth of Well: Unknown

Date of Measurements	Time	SWL (feet)
10/14/04	9:50am	15.85
05/03/05	2:20pm	14.26

SIERRA LAKES SUBAREA

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Mark Gundmundsen
Address: 51892 Quail Ridge Run
Total Depth of Well: 690 feet

Date of Measurements	Time	SWL (feet)
12/09/04	3:40pm	284.90
01/21/05	11:50am	261.64
03/07/05	11:40am	253.7
03/31/05	1:30pm	230.4
05/04/05	2:35pm	244.94
06/03/05	11:15am	241.9
06/27/05	10:30am	239.0
08/02/05	9:15am	247.6
08/31/05	11:45am	293.9
09/21/05	11:00am	260.3

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Alvin Eulberg
Address: 37530 Bear Meadow
Total Depth of Well: 280 feet

Date of Measurements	Time	SWL (feet)
12/08/04	12:50pm	109.0
05/04/05	2:20pm	72.23

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Stuart Roether
Address: 37940 Northam
Total Depth of Well: 200 feet

Date of Measurements	Time	SWL (feet)
12/09/04	11:45am	109.15
01/21/05	11:30am	106.0
03/07/05	12:10pm	98.5
03/31/05	11:50am	88.5
05/04/05	2:00pm	77.7
06/03/05	10:55am	86.5
06/27/05	10:00am	72.4
08/02/05	10:50am	74.9
08/31/05	11:00am	90.2
09/21/05	10:45am	76.3

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Orrie Bush
Address: Chamal Drive
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
12/09/04	12:00pm	74.6
05/04/05	2:05pm	32.5

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Ken Hughes
Address: Oakhurst View Ct.
End of cul de sac
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
12/09/04	11:00am	39.9
01/21/05	11:15am	28.74
03/07/05	12:50pm	22.6
03/31/05	12:50pm	21.2
05/04/05	9:20am	24.05
06/03/05	12:30pm	25.0
06/27/05	11:15am	27.10
08/02/05	10:35am	31.0
08/31/05	12:35pm	30.1
09/21/05	11:55am	34.6

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Ken Hughes
Address: 40387 Oakhurst View Ct
Total Depth of Well: 950 feet

Date of Measurements	Time	SWL (feet)
12/09/04	10:30am	47.65
01/21/05	11:05am	38.35
03/05/05	12:30pm	35.60
03/31/05	12:45pm	43.9
05/04/05	9:40am	48.05
06/03/05	11:55am	68.9
06/27/05	11:10am	108.3
08/02/05	10:30am	150.6
08/31/05	12:25pm	110.0
09/21/05	11:45am	115.9

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Dick Craig
Address: 51518 Road 426
Total Depth of Well:

Date of Measurements	Time	SWL (feet)
12/09/04	3:20pm	213.75
01/21/05	12:10pm	202.25
03/07/05	12:00pm	206.1
03/31/05	1:45pm	150.2
05/04/05	2:50pm	172.6
06/03/05	11:30am	148.6
06/27/05	10:40am	185.6
08/02/05	9:20am	187.9
08/31/05	11:55am	197.6
09/21/05	10:05am	200.1

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Dick Craig
Address: 51510 Road 426
Total Depth of Well: 277 feet

Date of Measurements	Time	GWL (feet)
12/09/04	3:30pm	>277 (Dry)
01/21/05	12:20pm	39.0
03/07/05	11:50am	237.8
03/31/05	1:50pm	230.7
05/03/05	3:00pm	29.23
06/03/05	11:20am	29.8
06/27/05	10:45am	29.9
08/02/05	9:30am	32.4
08/31/05	12:14pm	241.5
09/21/05	11:20am	247.2

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Schlender
Address: 52171 Echo Valley View Ct
Total Depth of Well: 325 feet

Date of Measurement	Time	BWL (feet)
12/09/04	2:45pm	182.7
01/21/05	12:00pm	170.6

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Earl and Hazel Meyer
Address: 50092 Road 426
Total Depth of Well: 520 feet

Date of Measurements	Time	SWL (feet)
12/09/04	9:55pm	150.15
01/21/05	12:50pm	73.0
03/07/05	11:15am	67.4
03/31/05	-	N.M.
05/04/05	3:10pm	45.55
06/03/05	11:55am	60.1
06/27/05	11:00am	132.7
08/02/05	10:15am	146.1
08/31/05	10:00am	45.4
09/21/05	10:30am	47.3

MADERA COUNTY OAKHURST STUDY

Subarea: Sierra Lakes
Well Owner: Richard Kosnik
Address: 39405 Cedar Creek
Total Depth of Well: 540 feet

Date of Measurements	Time	SWL (feet)
12/09/04	12:20pm	25.7
05/04/05	1:40pm	20.88

APPENDIX C

CHEMICAL ANALYSES OF WELL WATER

PRIVATE DOMESTIC WELLS

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 All. Phone: (559)445-3397 Fax: (559)445-3540
ELAP Certification Number: 1898 James J. Spoleditl, Laboratory Director

0508-10334	18212	8/26/2005	8/26/2005	12:10 PM	Ori Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

SystemType: 02
Sample Type: Routine
Water Sys #:
Census Tract:
Well Number:
APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Ken Schmidt

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	20.0 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/6/2005
Calcium	00916	25 mg/L			2 mg/L	K. Lor, PHC	8/31/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	<2 mg/L			2 mg/L	K. Lor, PHC	9/9/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/6/2005
Potassium	00937	1 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	84 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	890 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	8/29/2005
Chloride	00940	36.2 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	8/29/2005
Fluoride	00951	0.8 mg/l		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	8/29/2005
Nitrate (Ion)	71850	2.4 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	8/29/2005
Sulfate	00945	9.0 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	8/29/2005
pH	00403	7.6 pH				K. Lor, PHC	8/29/2005
Bicarbonate (HCO3)	00440	175 mg/L			2 mg/L	L. Soriano, PHC	8/30/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	8/30/2005
TDS	70300	430 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/1/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" If Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)488-3307 FAX: (559)445-3560
State of California Laboratory Accreditation Program Certification Number 1828
James J. Spaletoff, Laboratory Director

0508-10334	8/28/2005	8/26/2005	12:10 PM	On Semiono
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 18212
System Type 02
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
800 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Ken Schmidt

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	30.2	0.31	15	8/28/2005	9/21/2005	Larissa Asatryan
Uranium	35.7	0.98	20	8/29/2005	10/10/2005	Larissa Asatryan

Analyst:

DateReported: 10/10/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3600
ELAP Certification Number: 1888 James J. Spaisdoff, Laboratory Director

Lab Number	Account #	Date Received	Date Collected	Time Collected	Collection/Inspector
0508-10333	18212	8/26/2005	8/25/2005	11:45 AM	Orf Soriano

System Type: 02
Sample Type: Routine
Water Sys #:
Census Tract:
Well Number:
APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Ken Schmidt

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	<2 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/6/2005
Calcium	00916	39 mg/L			2 mg/L	K. Lor, PHC	8/31/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	5 mg/L			2 mg/L	K. Lor, PHC	9/8/2006
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/6/2005
Potassium	00937	5 mg/L			1.0 mg/L	K. Lor, PHC	9/8/2005
Sodium	00929	105 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.P.C.	00095	690 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	8/29/2005
Chloride	00940	86.0 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	0.8 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	8/29/2005
Sulfate	00945	61.5 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	8/29/2005
pH	00403	7.2 pH				K. Lor, PHC	8/29/2005
Nitrate (ion)	71850	<2.0 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	8/29/2005
Bicarbonate (HCO3)	00440	204 mg/L			2 mg/L	L. Soriano, PHC	8/30/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	8/30/2006
TDS	70300	270 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/1/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

L. J. Soriano

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3357 FAX: (559)445-3060
State of California Laboratory Accreditation Program Certification Number 1888
James J. Spolsdoff, Laboratory Director

0509-10333	8/26/2005	8/26/2005	11:45 AM	Ori Sarkano
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 18212
System Type 02
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
800 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Ken Schmidt

Sample Site: _____

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	27.8	0.39	15	8/29/2005	9/29/2005	Larissa Asatryan
Uranium	29.4	0.69	20	8/29/2005	10/10/2005	Larissa Asatryan

Analyst: _____

Date Reported: 10/10/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3357 Fax: (559)445-3680
ELAP Certification Number: 1886 James J. Spoledoff, Laboratory Director

0508-10543	16212	8/31/2005	8/31/2005	9:23 AM	Ori Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

SystemType: 01

Sample Type: Routine

Water Sys #:

Census Tract:

Well Number:

APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	2.6 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	28 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	9 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	4 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	13 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	270 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	19.8 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	<0.1 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	4.1 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	8.4 pH				K. Lor, PHC	9/1/2005
Nitrate (as)	71850	36.3 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	53 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	230 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/8/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3357 FAX: (559)445-3560
State of California Laboratory Accreditation Program Certification Number 1880
James J. Spoleteff, Laboratory Director

LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector
0508-10549	8/31/2005	8/31/2005	9:23 AM	Orl Sartono

Account # 18212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
880 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	28.1	0.29	15	9/1/2005	10/3/2005	Larissa Asatryan
Uranium	33.5	0.88	20	9/1/2005	10/7/2005	Larissa Asatryan

Analyst:

DateReported: 10/7/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3680
ELAP Certification Number: 1869 James J. Spoledoff, Laboratory Director

0508-10559	18212	8/31/2005	8/31/2005	9:40 AM	Orl Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

SystemType: 02
Sample Type: Routine
Water Sys #:
Census Tract:
Well Number:
APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Stored #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	22.7 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	26 mg/L			2 mg/L	K. Lor, PHC	9/6/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	7 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	3 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	47 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	340 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	30.4 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	0.9 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	11.2 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.3 pH				K. Lor, PHC	9/1/2005
Nitrate (as)	71850	7.4 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	130 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	260 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/8/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3357 After Hours: (559)445-3357 FAX: (559)445-3590
State of California Laboratory Accreditation Program Certification Number 1868
James J. Spoledolf, Laboratory Director

0508-10550	8/31/2005	8/31/2005	9:40 AM	Ori Sartono
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 19212
System Type 02
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassalovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/l)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	10.2	0.17	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	8.8	0.48	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

DateReported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3580
ELAP Certification Number: 1888 James J. Spellacoff, Laboratory Director

0500-10551	18212	8/31/2005	8/31/2005	9:48 AM	Ori Sartorio
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

SystemType: 01

Sample Type: Routine

Water Sys #:

Census Tract:

Well Number:

APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	<2 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/6/2005
Calcium	00916	22 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	2 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	56 µg/L	High	50 µg/L	20 µg/L	E. Lennon, PHC	9/6/2005
Potassium	00937	3 mg/L			1.0 mg/L	K. Lor, PHC	9/8/2005
Sodium	00929	68 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	470 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	52.4 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	0.9 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	27.3 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.3 pH				K. Lor, PHC	9/1/2005
Nitrate (Ion)	71850	<2.0 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	147 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	310 mg/L		500 mg/L	1 mg/L	M. Jokes, PHC	9/8/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93776
Phone: (559)445-3407 Alt. Phone: (559)440-3397 FAX: (559)445-3580
State of California Laboratory Accreditation Program Certification Number 1660
James J. Spolyaroff, Laboratory Director

0508-10551	8/31/2005	8/31/2005	9:48 AM	Orl Sarlono
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 18212
System Type D1
Sample Type D1
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
840 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lasbotovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/S)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	11.8	0.22	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	10.9	0.54	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

DateReported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)448-3580
ELAP Certification Number: 1288 James J. Spaletoff, Laboratory Director

0509-10552	18212	8/31/2005	8/31/2005	9:48 AM	Ori Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

System Type: 01
Sample Type: Routine
Water Sys #:
Census Tract:
Well Number:
APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassalovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	4.9 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	24 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	9 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	5 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	14 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	240 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	7.4 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	0.1 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	10.2 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00405	7.7 pH				K. Lor, PHC	9/1/2005
Nitrate (ion)	71850	5.2 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	134 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	170 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/12/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3357 AIL Phone: (559)445-3357 FAX: (559)445-3580
State of California Laboratory Accreditation Program Certification Number 1858
James J. Spalsdorf, Laboratory Director

0508-10552	8/31/2005	8/31/2005	9:45 AM	On Sardow
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 18212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
600 W. Shaw Ste. #280
Fresno,CA 93704

Attn: Cheryl Lassatovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	27.5	0.28	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	26.6	0.87	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

DateReported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3594
ELAP Certification Number: 1888 James J. Spotsdoll, Laboratory Director

0508-10553	18212	8/31/2005	8/31/2005	10:30 AM	Ori Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

SystemType: PI

Sample Type: Routine

Water Sys #:

Census Tract:

Well Number:

APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Store #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	<2 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	14 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	6 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	6 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	14 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	180 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	5.3 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	<0.1 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	0.6 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.6 pH				K. Lor, PHC	9/1/2005
Nitrate (tot)	71850	22.1 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	89 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	160 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/12/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)440-3407 Alt. Phone: (559)445-3337 FAX: (559)445-3580
State of California Laboratory Accreditation Program Certification Number 1808
James J. Spoledoff, Laboratory Director

0508-10553	9/31/2005	8/31/2005	10:20 AM	Ori Sartono
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassetovillah

Account # 18212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	3.5	0.11	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	4.2	0.38	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

Date Reported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3357 Fax: (559)445-3590
ELAP Certification Number: 1883 James J. Spalsdoff, Laboratory Director

0508-10554	18212	8/31/2005	8/31/2005	10:34 AM	Orl Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

System/Type: D1

Sample Type: Routine

Water Sys #:

Census Tract:

Well Number:

APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassalovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	<2 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	14 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	5 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/8/2005
Potassium	00937	4 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	11 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	120 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor PHC	9/2/2005
Chloride	00940	3.0 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	<0.1 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	<0.5 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.2 pH				K. Lor, PHC	9/1/2005
Nitrate (as)	71850	3.9 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	77 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	120 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/12/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3387 FAX: (559)445-3600
State of California Laboratory Accreditation Program Certification Number 1852
James J. Spoleckff, Laboratory Director

0508-10554	8/31/2005	8/31/2005	10:34 AM	Chi Sartono
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 19212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/S)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	2.9	0.11	15	9/9/2005	10/12/2005	Larissa Asatryan
Uranium	2.0	0.26	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

Date Reported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3560
ELAP Certification Number: 1958 James J. Spalsdoff, Laboratory Director

0508-10555	18212	8/31/2005	8/31/2005	10:40 AM	Ori Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collection/Inspector

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno, CA 93704

Attn: Cheryl Lassetovitch

System Type: 01
Sample Type: Routine
Water Sys #:
Census Tract:
Well Number:
APN:

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	2.7 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	17 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	6 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	4 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	14 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	160 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	2.6 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	<0.1 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	0.8 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.3 pH				K. Lor, PHC	9/1/2005
Nitrate (Ion)	71850	2.4 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	101 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	140 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/12/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

L. J. Soriano
Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 FAX: (559)445-3680
State of California Laboratory Accreditation Program Certification Number 1835
James J. Spaletta, Laboratory Director

0508-10555	8/31/2005	9/31/2005	10:40 AM	Ori Sartomo
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 18212
System Type 01
Sample Type 05
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
800 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lasactovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/S)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	21.0	0.25	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	10.7	0.74	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

Date Reported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 All Phone: (559)445-3397 FAX: (559)445-3580
State of California Laboratory Accreditation Program Certification Number 1888
James J. Spotswell, Laboratory Director

0508-10566	8/31/2005	8/31/2005	10:58 AM	Orl Santono
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Account # 18212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	13.2	0.21	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	15.2	0.70	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

Date Reported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3589
ELAP Certification Number: 1888 James J. Spolsdoff, Laboratory Director

0508-10556	18212	8/31/2005	8/31/2005	10:58 AM	Ori Sartono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

SystemType: 01
Sample Type: Routine
Water Sys #:
Census Tract:
Well Number:
APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	24.7 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	38 mg/L			2 mg/L	K. Lor, PHC	9/9/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	5 mg/L			2 mg/L	K. Lor, PHC	9/9/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	2 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	37 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	310 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	13.6 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	0.3 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Nitrate (Ion)	71850	2.9 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	9.0 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.8 pH				K. Lor, PHC	9/1/2005
Bicarbonate (HCO3)	00440	180 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	240 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/12/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" If Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3357 Fax: (559)445-3580
ELAP Certification Number: 1888 James J. Spoleboff, Laboratory Director

0508-10557	18212	8/31/2005	8/31/2005	11:15 AM	Orl Sartorio
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

System Type: 01

Sample Type: Routine

Water Sys #:

Census Tract:

Well Number:

APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassolovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	<2 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00915	14 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	7 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01055	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/5/2005
Potassium	00937	3 mg/L			1.0 mg/L	K. Lor, PHC	9/9/2005
Sodium	00929	12 mg/L			2 mg/L	K. Lor, PHC	9/12/2005
S.E.C.	00095	170 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	2.3 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	<0.1 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Nitrate (as)	71850	<2.0 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00945	1.4 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.5 pH				K. Lor, PHC	9/1/2005
Bicarbonate (HCO3)	00440	118 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	150 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/12/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" If Result Exceeds MCL

J. J. Soriano

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 ATL Phone: (559)445-3397 FAX: (559)445-3520
State of California Laboratory Accreditation Program Certification Number 1888
James J. Spotswood, Laboratory Director

LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector
0608-10557	8/31/2005	8/31/2005	11:18 AM	Ori Sartorio

Account # 18212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassotovitch

Sample Site: _____

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/S)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	2.8	0.11	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	1.9	0.27	20	9/6/2005	10/12/2005	Larissa Asatryan

Analyst: _____

DateReported: 10/12/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 Fax: (559)445-3680
ELAP Certification Number: 1868 James J. Spoletodi, Laboratory Director

0508-10558	18212	8/31/2005	8/31/2005	11:58 AM	Ori Sertono
Lab Number	Account #	Date Received	Date Collected	Time Collected	Collector/Inspector

System Type: 01

Sample Type: Routine

Water Sys #:

Census Tract:

Well Number:

APN:

Ken Schmidt & Associates
600 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassetovitch

Sample Site:

GENERAL MINERAL, PHYSICAL & INORGANIC CHEMISTRY ANALYSES

Analysis	Storet #	Result	Flag	MCL	DLR	Chemist	Date Analyzed
Arsenic	01002	17.5 µg/L		50 µg/L	2 µg/L	E. Lennon, PHC	9/5/2005
Calcium	00916	20 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Iron	01045	<100 µg/L		300 µg/L	100 µg/L	K. Lor, PHC	9/13/2005
Magnesium	00927	4 mg/L			2 mg/L	K. Lor, PHC	9/8/2005
Manganese	01056	<20 µg/L		50 µg/L	20 µg/L	E. Lennon, PHC	9/6/2005
Potassium	00937	2 mg/L			1.0 mg/L	K. Lor, PHC	9/8/2005
Sodium	00929	27 mg/L			2 mg/L	K. Lor, PHC	9/13/2005
S.E.C.	00095	230 µmho/cm		900 µmho/cm	20 µmho/cm	K. Lor, PHC	9/2/2005
Chloride	00940	7.6 mg/L		250 mg/L	2 mg/L	L. Asatryan, PHC	9/1/2005
Fluoride	00951	0.2 mg/L		2.0 mg/L	0.1 mg/L	L. Asatryan, PHC	9/1/2005
Sulfate	00946	6.5 mg/L		250 mg/L	0.5 mg/L	L. Asatryan, PHC	9/1/2005
pH	00403	7.8 pH				K. Lor, PHC	9/1/2005
Nitrate (ion)	71850	<2.0 mg/L		45 mg/L	2.0 mg/L	L. Asatryan, PHC	9/1/2005
Bicarbonate (HCO3)	00440	142 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
Carbonate (CO3)	00445	<2 mg/L			2 mg/L	L. Soriano, PHC	9/7/2005
TDS	70300	150 mg/L		500 mg/L	1 mg/L	M. Ickes, PHC	9/14/2005

MCL = Maximum Contaminant Level
DLR = Detection Level for Reporting
AL = Action Level
QNS = Quantity Not Sufficient for Analysis
NTP = No Test Performed on Sample
Flag = "High" if Result Exceeds MCL

Director / Chemistry Supervisor / QA Officer

Date Reported: 9/14/2005

FRESNO COUNTY PUBLIC HEALTH LABORATORY

1221 Fulton Mall, Fresno CA 93721 P.O. Box 11867 Fresno, CA 93775
Phone: (559)445-3407 Alt. Phone: (559)445-3397 FAX: (559)445-3580
State of California Laboratory Accreditation Program Certification Number 1888
James J. Spuliadoff, Laboratory Director

0508-10658	8/31/2005	8/31/2005	11:58 AM	Ori Sartorio
LabNumber	Date Received	Date Collected	Time Collected	Collector/Inspector

Account # 18212
System Type 01
Sample Type 01
Water Sys #
Census Tract
Well Number
APN

Kon Schmidt & Associates
800 W. Shaw Ste. #250
Fresno,CA 93704

Attn: Cheryl Lassolovitch

Sample Site:

RADIOLOGICAL TEST RESULTS BY EPA METHODS 900.0 (Gross Alpha) & 908.0 (Uranium)

Analysis	Result (pCi/L)	C.E. (± pCi/L)	MCL	Date Prepared	Date Analyzed	Chemist
Gross Alpha	20.6	0.25	15	9/1/2005	10/12/2005	Larissa Asatryan
Uranium	19.5	0.78	20	9/1/2005	10/12/2005	Larissa Asatryan

Analyst:

DateReported: 10/17/2005