

Groundwater Elevation Monitoring Plan
for
Montecito Groundwater Basin #3-49

Prepared By
Montecito Water District

For compliance with the CA Statewide Groundwater Elevation
Monitoring (CASGEM) Program



March 12, 2018

INTRODUCTION

The purpose of this Monitoring Plan is to document the Montecito Water District (District) strategy for measuring, recording and reporting groundwater levels for the Montecito Groundwater Basin (Basin). The data recorded by the District will be provided semi-annually to the California Statewide Groundwater Elevation Monitoring (CASGEM) program. The data provided by the District is only for the Montecito Groundwater Basin and the District is the only Monitoring Entity within the Montecito Groundwater Basin. This Monitoring Plan and effort to track groundwater elevations in the Montecito Groundwater Basin is entirely voluntary by the Montecito Water District. The Bulletin 118 boundary for the Montecito Groundwater Basin does not have any sub-basins.

The District's governing authority is as a local agency that is managing all or part of a groundwater basin pursuant to Water Code Part 2.75 (commencing with Section 10750). Since the 1960's, Montecito Water District has explored groundwater as a water supply source in the Montecito Groundwater Basin. The District has experience with groundwater well construction, testing, operating, and maintenance. The District performs frequent well monitoring of all active District wells using certified Distribution Operators and Treatment Operators. Well monitoring activities performed daily by the agency include measurement of static and dynamic water levels, pump flow rates, discharge pressures, pump cycling, and other data as needed. The District will continue to perform this work in accordance with all local, state, and federal regulations and report the data to the CASGEM Online System. The District developed a Groundwater Basin Management Plan in 1998 and is in compliance with AB3030.

BACKGROUND

Basin Description

The Montecito Groundwater Basin (see map in Figure 1) covers 11.5 square miles. It is bounded on the north by the Santa Ynez Mountains and the Arroyo Parida fault, on the east by consolidated rocks, on the southeast by the Fernald fault, and on the northeast by a surface drainage divide that separates the Montecito and Carpinteria Groundwater Basins (DWR 1999). The offshore Rincon Creek fault and the Pacific Ocean bound the basin on the south. An administrative boundary on the west separates the Montecito Groundwater Basin from the Santa Barbara Groundwater Basin. The area overlying the basin is drained by several small creeks that flow from the Santa Ynez Mountains south to the Pacific Ocean. Precipitation typically averages 17 to 21 inches per year.

Natural recharge in the basin is derived from infiltration of precipitation over the basin, seepage from streams, and subsurface inflow from consolidated rocks (DWR 1999). Hydrographs show that water levels generally increased or remained steady from 1992 through 1998 (DWR 1999). The storage capacity above sea level is estimated at 14,490 AF (Montecito Water 1998). The total storage capacity of the basin has been estimated at 281,000 AF (Muir 1968; DWR 1975). Montecito Water District pumps 300 to 700 AF/YR of groundwater depending on rainfall patterns. However, the amount pumped by private well owners is unknown. Annual natural recharge is approximately 1,614 AF/YR (Montecito Water 1998). The average annual stream seepage rate is estimated at 764 AF/YR, and the average annual infiltration of rainfall is estimated at 500 AF/YR (Montecito Water 1998). The long-term average subsurface inflow is approximately 250 AF/YR. The long-term average deep percolation of irrigation water is estimated at 100 AF/YR (Montecito Water 1998). Historical and current water use in the basin is residential irrigation, domestic, commercial, institutional, and agricultural.

Hydrogeologic Conditions

The primary water-bearing deposits in the Montecito Groundwater Basin are the unconsolidated alluvial deposits, and the Casitas and Santa Barbara Formations (Montecito Water 1998). The specific yield for unconfined materials in the basin is estimated at 11 percent (DWR 1999). Holocene age alluvium consists of lenses of gravel, sand, silt, and clay. These deposits occur along stream channels and range to 80 feet thick (DWR 1999). Pleistocene age alluvium is composed of boulders and reddish clay, which, where saturated, yields only modest amounts of water to wells (DWR 1999). Groundwater is generally unconfined within alluvial deposits.

The Pleistocene age Casitas Formation consists of clay, silt, sand, and gravel. Groundwater is extracted mainly from the upper Casitas Formation, as it is the chief water-bearing deposit; the lower Casitas Formation is very fine-grained and displays poor water transmitting characteristics (Montecito Water 1998). Groundwater in this formation is partially confined along the north side of the Arroyo Parida fault in the northern part of the basin and also inland from the southern part of the basin (DWR 1999). The Pliocene to Pleistocene age Santa Barbara Formation consists of marine sand, silt, and clay and has a maximum thickness of 1,200 feet in the southern part of the basin (Hoover 1980). Groundwater within the Santa Barbara Formation is generally confined (Freckleton 1989). This formation occurs only in a restricted area in the southwest portion of the basin and, thus, is of negligible use as a groundwater source (DWR 1999).

The offshore Rincon Creek fault is an effective barrier to seawater intrusion into the deeper water-bearing zones (Montecito Water 1998). The east trending Arroyo Parida and Montecito faults are barriers to groundwater movement within the Montecito Groundwater Basin.

Groundwater Quality

The groundwater in the Montecito Basin is of two chemical types. South of the Arroyo Parida fault, groundwater has calcium bicarbonate character, however, north of the fault it has sodium sulfate character. TDS concentration ranges from 600 to 1,100 mg/L (Montecito Water 1998). Analyses of data from four District supply wells show an average TDS of 698 mg/L in the basin with a range from 526 to 778 mg/L. Iron and manganese concentrations in some District wells exceed Federal standards (Montecito Water 1998). During 1990, some wells yielded groundwater samples containing high chloride concentrations that exceed State limits. However, no wells are confirmed to be affected by seawater intrusion (Montecito Water 1998).

MONITORING PROGRAM AND WELL NETWORK

Monitoring Sites and Timing

The District has collected semi-annual, static groundwater level for all active and some inactive District water production wells since 1983. The semi-annual monitoring has historically been performed each spring and fall during high and low season groundwater levels. Each District owned groundwater well was installed for the purposes of groundwater production. The District owns and operates 12 active groundwater wells. Five of the wells are potable production wells and the other seven are used for irrigation. The District does not currently have plans to install future wells. These 12 wells are shown on the map in Figure 1 and well data is provided in Table 1. The 12 District wells have been and will continue to be monitored biannually, in May and November, to capture seasonal high and low groundwater levels.

Field Methods

A reference point was established for each well upon completion of the well. District employees use GPS locations overlaid in GIS on 5-foot topographic contours to determine ground elevation at the well. The GPS locations were recorded using a Trimble handheld GPS device and are sub-meter accuracy horizontally. The vertical data is provided by topographic contours from a 1993 Santa Barbara County Flood Control District topographic survey of the region.

The reference point is the top of the sounding tube for all wells. The top of the sounding tube was measured in the field using a tape measure from the ground surface elevation determined in GIS, to calculate the reference point elevation, in tenths of a foot. All groundwater elevations are measured from this reference point.

The District measures groundwater levels through the sounding tube at each well using a Powers Electric portable water meter (PWS 500). The PWS 500 product specifications give an accuracy of 1 millimeter for the device. The District has a strict 24-hour shut down period prior to any well sounding. At each well, District staff lower the sounding device cable into the sounding tube until the sounding device indicates it has reached the water surface elevation. The elevation is recorded on the Field Monitoring Form (see Table 2) and later entered into an Excel spreadsheet stored on the District server.

District staff record the readings and date on the Field Monitoring Form shown in Table 2. The current reading is compared to the previous two readings made at 6-month and 12-month prior intervals. Any special circumstances or comments are added to the “notes” column.

Data Reporting

The District will submit groundwater monitoring data semi-annually to CASGEM, by July 1st and by January 1st for each seasonal high and low groundwater elevations. The results will be submitted online in the appropriate format.

DATA GAPS

The 12 production wells owned and operated by the District are generally concentrated in the geographical center of the Montecito Groundwater Basin with the exception of the Edgewood Well on the eastern boundary. The data from these 12 wells provides a representative groundwater elevation trend for the center of the Basin but does not necessarily represent the outer extremities of the Basin especially given the geologic variability and seismic faults. Groundwater data gaps exist due to the high cost and low production of groundwater wells in the outer extremities of the District. The District does not currently have plans for future District owned wells to monitor these areas. At this time, the District does not have the resources to manage a program with private well owners to report their data as part of this Monitoring Plan.

REFERENCES

California Department of Water Resources (DWR). 1975. Sea-Water Intrusion in California: Inventory of Coastal Ground Water Basins. Bulletin 63-5., Southern District. 1999. Evaluation of Groundwater Overdraft in the Southern Central Coast Region, Part 2. Technical Information Record SD-99-2, 116 p.

- California Department of Water Resources (DWR). Southern District. 1999. Evaluation of Groundwater Overdraft in the Southern Central Coast Region, Part 2. Technical Information Record SD-99-2, 116 p.
- Freckleton, J. R. 1989. Geohydrology of the Foothill Ground-Water Basin Near Santa Barbara, California. U. S. Geological Survey Water-Resources Investigations Report 89-4017.
- Hoover, M. F. 1980. Safe Yield Evaluation of the Montecito Basin and Toro Canyon Area: prepared for the Montecito Water District, 40 p. Quoted in (DWR 1999). Evaluation of Groundwater Overdraft in the Southern Central Coast Region, Part 2. Technical Information Record SD-99-2, 116 p.
- Montecito Water District (Montecito Water). 1998. Groundwater Basin Management Plan for the Montecito Water District. 70 p. . 2001. District Facilities: Sources of Water. (August 2001).
- Muir, K.S. 1968. Ground-Water Reconnaissance of the Santa Barbara-Montecito area, Santa Barbara County, California. U.S. Geological Survey Water Supply Paper 1859-A.

Figure 1: Groundwater Basin and CASGEM Wells

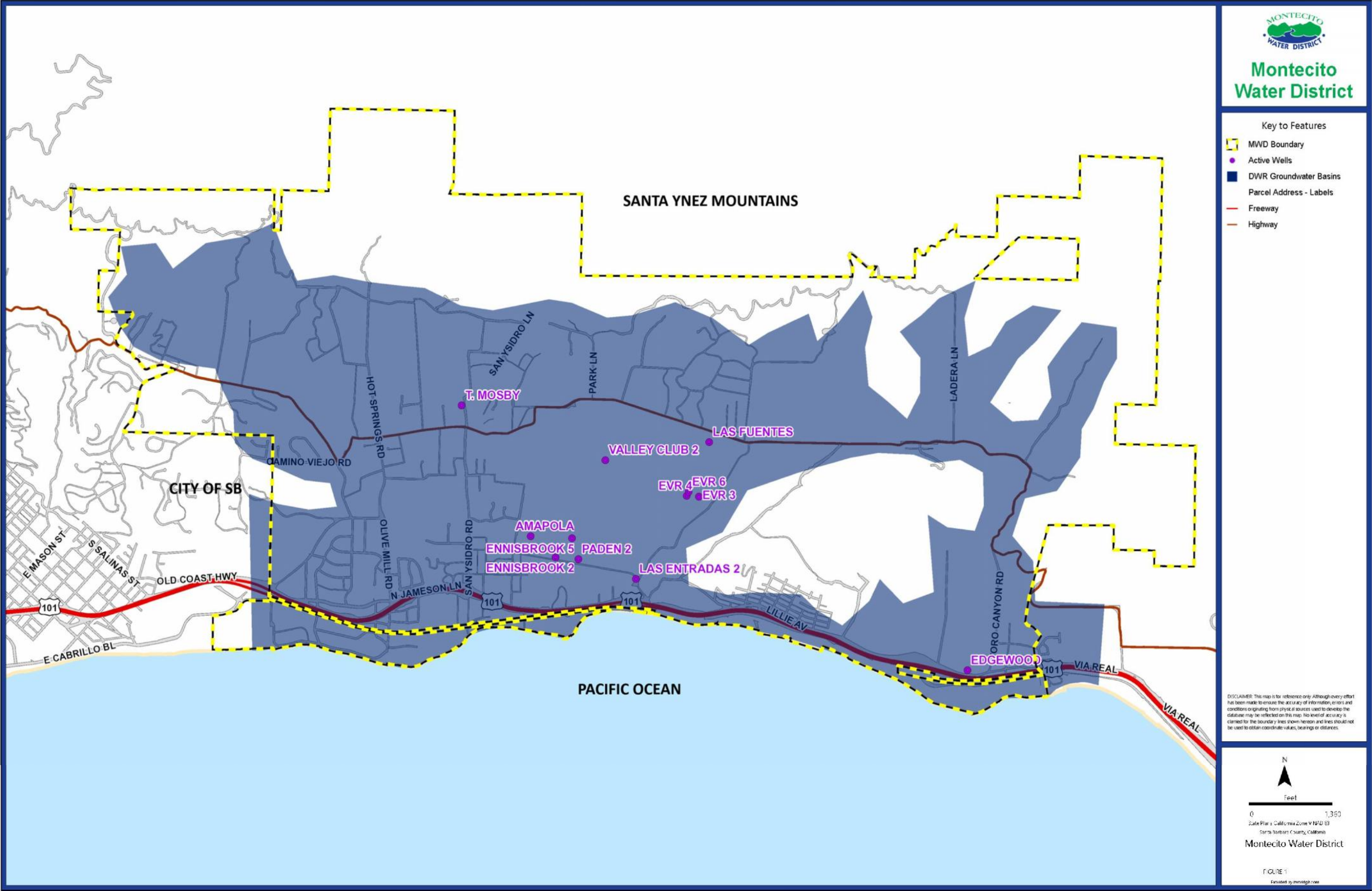


Table 1 - CASGEM Monitoring Well Data

Basin Name / Basin #	Well Category	Local Well Name	State Well #	CASGEM ID #	Well Completion Report # ²	Latitude ¹	Longitude ¹	Reference Point Elevation ¹ (ft AMSL)	Reference Point Description	Ground Surface Elevation ¹ (ft AMSL)	Total Casing Depth (ft BGS)	Perforated Interval (ft BGS)	Well Use / Status	Well Completion Type	Monitoring Agency	Monitoring Frequency	Notes
Montecito 3-49	CASGEM	T. Mosby	NA	51941	E0136945	34.43891	119.63260	220.50	Top of ST	219	400	150 to 390	Domestic, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Paden 2	NA	51942	E0152527	34.42552	119.61969	66.71	Top of ST	65	565	185 to 425; 445 to 565	Domestic, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Amapola	NA	51943	51667	34.42747	119.62489	75.71	Top of ST	75	618	167 to 607	Domestic, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Ennisbrook 2	NA	51944	160400	34.42563	119.62215	66.58	Top of ST	66	510	160 to 500	Domestic, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Ennisbrook 5	NA	51945	304876	34.42735	119.62040	81.50	Top of ST	79	460	180 to 450	Domestic, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Las Entradas 2	NA	51946	NA	34.42385	119.61342	86.17	Top of ST	85	490	50 to 490	Irrigation, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Valley Club 2	NA	51947	222473	34.43429	119.61694	221.02	Top of ST	220	230	50 to 230	Irrigation, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Las Fuentes	NA	51948	E0136945	34.43602	119.60572	242.00	Top of ST	242	700	400 to 700	Irrigation, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	Edgewood 3	NA	51949	222484	34.41627	119.57737	68.90	Top of ST	68	UNK	UNK	Irrigation, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	EVR 3	NA	51950	NA	34.43119	119.60675	185.25	Top of ST	185	43	4 to 23	Irrigation, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	EVR 4	NA	51951	NA	34.43126	119.60807	186.18	Top of ST	186	25	4 to 24	Irrigation, Active	Single	Montecito Water	Semi-Annually	
Montecito 3-49	CASGEM	EVR 6	NA	51952	NA	34.43160	119.60786	191.40	Top of ST	191	55	25 to 55	Irrigation, Active	Single	Montecito Water	Semi-Annually	

¹ Horizontal datum NAD83
² Well Completion Report or Drillers Report (Form 188)
³ ST = Sounding Tube
BGS = Below Ground Surface
AMSL = Above Mean Sea Level
NA = Not Available

Table 2. Field Monitoring Form

**Montecito Water District
Water Monitoring Program Well Route**

FALL 2017	Operator:
------------------	-----------

1" = 0.08 2" = 0.17 3" = 0.25 4" = 0.33 5" = 0.42 6" = 0.50 7" = 0.58 8" = 0.67 9" = 0.75 10" = 0.83 11" = 0.92

Well #	Address	Comment	Date	FALL 2016 Depth	Spring 2017 Depth	CURRENT Depth	Note
	583 San Ysidro	T. Mosby Well					
	300 Santa Rosa Ln.	Amapola Well					
	1700 Block San Leandro Ln.	Ennisbrook #2					
	437 San Leandro Ln.	Paden #2					
	Aurora Dr./Boeske	Ennisbrook #5					
	181 Sheffield Dr.	Las Entradas #2					
	368 Lambert Rd.	Edgewood 3					
	Las Fuentes	Las Fuentes Well					
	2145 Birnam wood	E.V.R. #3					
	Birnam Wood/Forge Rd.	E.V.R. #4					
	Birnam Wood	E.V.R. #6					
	501 Valley Club Rd.	Valley Club 2 Well					