



SANTA ROSA PLAIN
GROUNDWATER
SUSTAINABILITY AGENCY

Memorandum
Summary of Aquifer Testing Findings
Santa Rosa Plain Subbasin

Santa Rosa Plain
Groundwater Sustainability Agency

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Introduction

This memorandum provides a summary of aquifer test data gathered and evaluated for the Santa Rosa Plain Subbasin (Subbasin). The data summarized will support the Santa Rosa Plain Groundwater Sustainability Agency (GSA) in its ongoing planning and implementation of the Santa Rosa Plain Groundwater Sustainability Plan (GSP). The following sections of this memorandum provide:

- Background and previous estimates of aquifer properties within the Subbasin
- Summary of aquifer test data recently collected or compiled; and
- Summary of findings and recommendations

Aquifer Test Data Available within the Basin

Background and Previous Estimates

Aquifer tests (or pumping tests) are field experiments where a well is pumped at a controlled rate while water levels (drawdown) are monitored in the pumping and any available observation wells. These tests are the most reliable method for determining key hydraulic properties of localized aquifer systems—such as transmissivity and storage capacity. Improving estimates of aquifer properties within the Subbasin is identified as a primary data gap within the GSP. Developing better estimates on aquifer properties within the Subbasin will help support future updates to the groundwater flow model for the Subbasin and constrain uncertainty on the estimates of groundwater storage changes and the Subbasin's response to future hydrology and pumping.

Previous evaluations and compilation of aquifer properties within the Subbasin were performed by the U.S. Geological Survey (USGS)¹ and utilized in developing the GSP. The results of these tests are summarized by geologic formation penetrated by the tested wells in the below excerpted Table 5 from the 2013 USGS report.

¹ U.S. Geological Survey, 2013. Hydrologic and Geochemical Characterization of the Santa Rosa Plain Watershed, Sonoma County, California, Scientific Investigations Report 2013-5118.

Table 5. Hydraulic properties from aquifer tests, Santa Rosa Plain watershed, Sonoma County, California.

[Abbreviations: ft, feet; gpd, gallon per day; gpm, gallon per minute; N/A, not applicable; —, no data]

State well number	Hole depth (ft)	Cased depth (ft)	Top perf (ft)	Bot perf (ft)	Pumping rate (gpm)	Aquifer thickness (ft)	Specific capacity (gpm/ft)	Transmissivity (gpd/ft)	Hydraulic conductivity (ft/d)	Storativity	Notes
Well pumping tests in Quarternary alluvial material											
7N/8W-24A4 ¹	1,200	912	295	912	1,000	230	—	72,580–88,000	42.2–51.2	0.0013–0.0017	Analyzed using Jacob method and (or) Hantush and Jacob method.
8N/8W-33K1 ²	400	400	100	400	106	300	7.9	4,825	2	0.19	Analyzed using Cooper-Jacob method.
Well pumping tests in Wilson Grove Formation											
7N/9W-15Q2 ¹	642	405	122	394	1,200	¹ 500	14.8	26,800	7	0.0011	Analyzed using Jacob method.
7N/9W-25M1 ³	790	770	310	750	2,070	440	17.4	26,100	—	0.00095	N/A.
7N/9W-25E1 ⁴	1,521	830	410	805	1,200	¹ 560	40	24,800	6	N/A	Analyzed using Jacob method.
6N/8W-7A2 ¹	815	—	650	800	1,500	¹ 160	N/A	10,100	8	0.0015	Analyzed using Hantush and Jacob method.
6N/8W-7A2 ¹	815	—	650	800	1,500	¹ 160	N/A	15,200	13	0.001	Analyzed using Jacob method.
7N/9W-36K1 ³	1,506	1,065	425	1,045	1,248	—	6.3	9,450	—	—	N/A.
7N/9W-36K1 ³	1,506	1,065	425	1,045	1,650	—	27.5	41,250	—	—	N/A.
7N/9W-36K1 ³	1,506	1,065	425	1,045	1,709	—	13.9	20,850	—	—	N/A.
7N/9W-36K2 ³	1,074	1,040	410	1,020	2,746	³ 900	18.4	27,600	4	0.001–0.08	N/A.
6N/9W-2C1 ⁴	600	600	332	600	444	268	8.9–25	13,350–37,500	7–19	—	N/A.
6N/9W-2H1 ⁴	776	530	237	468	925–1,050	231	23.6–75	35,400–112,500	21–65	—	N/A.
6N/9W-2B1 ⁴	647	528	138	528	850	390	18.5–37.2	27,750–55,800	10–19	—	N/A.
6N/9W-1M3 ⁴	1,015	572	172	552	1,210–2,017	380	23.2–69.9	34,800–104,850	12–37	—	N/A.
6N/9W-1N ₁ ⁴	760	690	270	670	842	400	7–7.8	10,500–11,700	4	—	N/A.
6N/9W-1N ₂ ⁴	760	690	270	670	1,220	400	6.3	9,450	3	—	N/A.
Well pumping tests in Glen Ellen Formation											
8N/9W-12Q2 ¹	500	500	270	495	200	¹ 150	N/A	5,870	5	N/A	Analyzed using Jacob method.

¹Kadir and McGuire (1987).²Written communication, ENGEO, Inc. (2006).³Written communication, Sonoma County Water Agency (2009).⁴Written communication, city of Sebastopol (2009).

Source: U.S. Geological Survey, 2013. Hydrologic and Geochemical Characterization of the Santa Rosa Plain Watershed, Sonoma County, California, Scientific Investigations Report 2013-5118.

Summary of Recent Aquifer Testing

Following development and submittal of the GSP, additional aquifer testing has been performed, analyzed and documented from three locations within the Subbasin (two within the Wilson Grove Formation and one within the Sonoma Volcanics), as summarized below.

2022 Sebastopol Road Well Aquifer Testing

In 2022, Sonoma Water modified the total depth of its Sebastopol Road Well #2 (screened within confined aquifer sediments of the Wilson Grove Formation) based on findings from the depth-specific water quality sampling and vertical flow profiling, which indicated the entrance of poorer water quality within the lower 130 feet of the well's screened interval. This screened section was abandoned resulting in a new total

well depth of 860 feet below ground surface (bgs). Following this modification, a 30-hour constant-rate pumping test was conducted with a mean pumping rate was 1,126 gallons per minute (gpm). Water levels were measured in Sebastopol Well #2, the adjacent and later destroyed Sebastopol Road Well #1, and transducers recorded the changes in water level at these wells and the six nearby monitoring wells.

Aquifer parameters were determined by the Cooper-Jacob straight-line method on the last 900 minutes of water level data from the constant-rate test. The calculated transmissivity values range from 12,200 to 15,600 gallons per day per foot (gpd/ft), which is slightly lower than estimates from aquifer testing performed on the well prior to its modification in 2000 of 27,600 gpd/ft. Estimates of the aquifer storage coefficient were also able to be calculated from the ASR pilot test, which range from 0.0011 to 0.0089 and are consistent with estimates from 2000.

The local hydraulic conductivity of the aquifer material screened by the well is estimated to be approximately 4 feet per day (feet/day), based on the quotient of the transmissivity and screen length.

2024 Occidental Road Well Aquifer Testing

In 2023, Sonoma Water drilled and constructed a new water well at its Occidental Road well facility (Occidental Road Well #3). Occidental Road Well #3 is completed to a total depth of 495 feet and is screened within sediments of the Wilson Grove Formation between 320 to 485 feet within the confined deep aquifer system.

In March 2024, a 48-hour constant-rate pumping test was performed at a mean rate of 984 gpm. The Cooper-Jacob straight-line method of evaluating drawdown data results in a transmissivity value of 26,200 gpd/ft.

2025 Martha Way Test Well Aquifer Testing

The Martha Way Well was constructed in 2010 to a depth of 870 feet bgs. The pilot borehole was drilled to a depth of 1,080 feet. The well is constructed with an 8-inch-diameter low carbon steel casing and a continuous wire wrap screen with a 0.080-inch opening. The screen intervals range from 500 to 620 feet and from 750 to 860 feet bgs within the Sonoma Volcanics (basalt with some sedimentary layers) in the deep aquifer system. In 2025, GEI Consultants performed an aquifer storage and recovery (ASR) pilot test² on the City Santa Rosa's Martha Way test well, which included an evaluation of prior aquifer tests performed on the well and collection and analysis of new aquifer test data.

Previous aquifer tests performed on the Martha Way test well include 47- and 23-hour tests in 2010, which yielded estimated transmissivity values ranging from 43,000 to 91,300 gpd/ft. For the 2025 ASR pilot test, estimated transmissivity values range from 21,000 to 27,000 gpd/ft using the specific-capacity correlation method and from 151,000 to 191,600 gpd/ft using the Cooper-Jacob straight-line method. Hydraulic values were estimated from the quotient of the transmissivity and aquifer thickness or well screen length (230 feet for Martha Way Well). For the specific-capacity derived transmissivity values, hydraulic conductivity varies from 12 to 16 feet/day (mean: 15 feet/day). For the Copper-Jacob transmissivity values, hydraulic conductivity varies from 47 to 111 feet/day (mean: 85 feet/day).

² GEI Consultants. 2026. Technical Addendum for Martha Way ASR Pilot Study. May

Summary of Findings

Updated estimates of aquifer properties for the confined deep aquifer system within the Wilson Grove Formation derived from the aquifer testing described above indicate that transmissivity ranges from 12,200 to 26,200 gpd/ft at the Sebastopol Road and Occidental Road Wells, respectively. These values are within the range of previous estimates (9,450 to 112,500 gpd/ft, as reported by the USGS. Estimates of the aquifer storage coefficient for the confined aquifer system within the Wilson Grove Formation ranging from 0.0011 to 0.0089 and are also within the range of previous estimates (0.00095 to 0.08) as reported by the USGS.

The recent testing provided hydraulic property estimates for the Sonoma Volcanics which range from an estimated transmissivity from 21,000 to 191,000 gpd/ft. Hydraulic conductivity values were estimated to range from 12 to 111 feet/day. Hydraulic properties of the Sonoma Volcanics calculated from aquifer test data were not compiled by the USGS and are not available for comparison.

It is recommended that the GSA: (1) continue evaluating opportunities to improve and constrain estimates of aquifer properties for other primary geologic formations which comprise the principal aquifer system; and (2) utilize the updated aquifer property estimates to inform future calibration updates to the groundwater flow model.