

GROUNDWATER MANAGEMENT PLAN GILLIBRAND GROUNDWATER BASIN

Prepared For:



**VENTURA COUNTY
WATERWORKS
DISTRICT NO. 8 -
CITY OF SIMI VALLEY**

AND

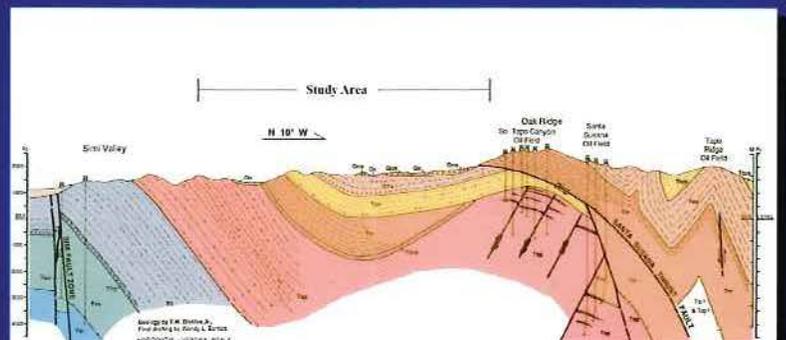
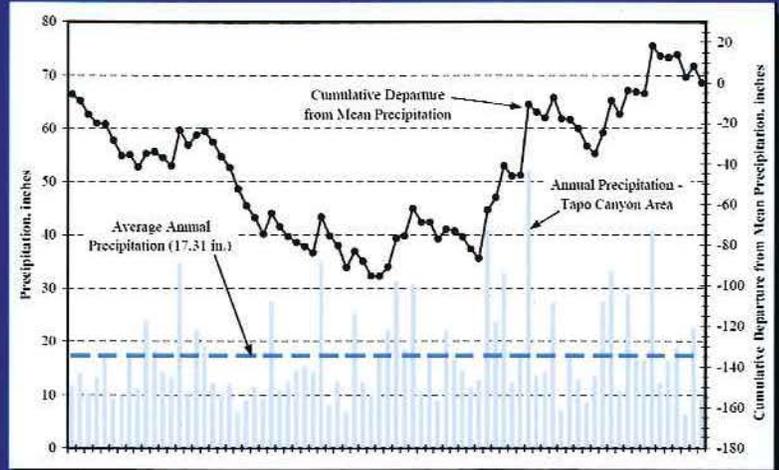
P. W. GILLIBRAND COMPANY

May 21, 2007

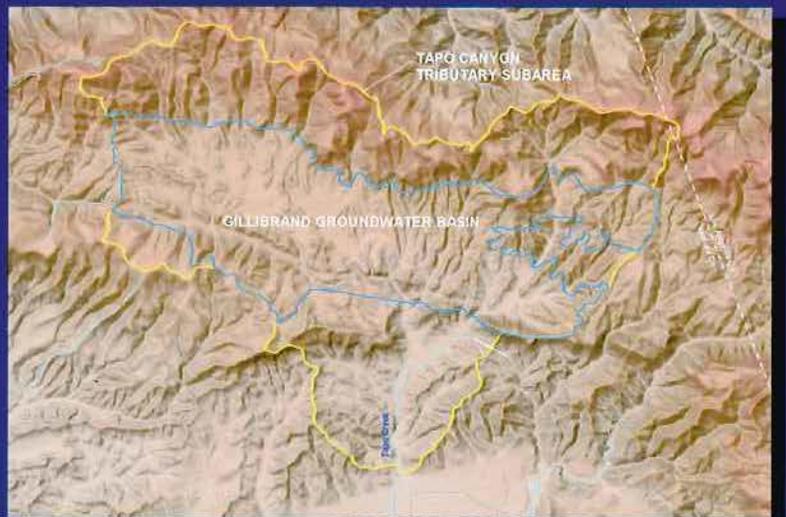
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Cross-Section of Study Area



**GROUNDWATER MANAGEMENT PLAN
GILLIBRAND GROUNDWATER BASIN**

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GROUNDWATER MANAGEMENT PLAN

GILLIBRAND GROUNDWATER BASIN

1.0 INTRODUCTION

This document presents a groundwater monitoring and management plan (GWMP) for the Gillibrand Groundwater Basin (Basin), located in Tapo Canyon north of the City of Simi Valley in southern Ventura County, California (see Figure 1). This GWMP has been prepared for the Ventura County Waterworks District No. 8 – City of Simi Valley (the District) in conjunction with the P.W. Gillibrand Company (Gillibrand) in accordance with the guidelines of AB3030 of the California Water Code. The District and Gillibrand are the primary groundwater pumpers within the Basin. The District produces water for irrigation and municipal supply and Gillibrand produces water for their mining operation. The GWMP has been developed to manage and protect the groundwater resources within the Basin for both entities.

1.1 Purpose of the Groundwater Management Plan

The purpose of this GWMP is to present a standard methodology for the collection of data in sufficient quantities and of adequate quality to enable informed decisions regarding the management of the Basin. The types of data to be collected include groundwater levels, groundwater production, and groundwater quality.

1.2 Background

The area encompassed by this GWMP is the Basin, which is located within the Tapo Canyon Tributary Subarea of the Calleguas Creek Watershed of southern Ventura County, California (see Figure 1). The Tapo Canyon Tributary Subarea is a surface water drainage catchment that

covers approximately 18 square miles within the Santa Susana Mountains north of Simi Valley (see Figure 1). The Basin covers approximately 5,130 acres (8 square miles) of the tributary subarea.

1.3 Scope of the Groundwater Management Plan

The GWMP summarizes groundwater production wells within the Basin, describes a monitoring protocol for the collection of data (including the frequency of data collection), and outlines the procedures for reporting of the data collected.

2.0 DESCRIPTION OF THE GILLIBRAND GROUNDWATER BASIN

The Basin is distinguished from the tributary subarea by the geology of the area. The Happy Camp Syncline results in folded formations that outcrop both north and south of the syncline (see Figure 2). The formations closest to the center of the syncline (Saugus and Pico) are younger, less consolidated and consist of sediments that are more permeable (sand and gravel) than the surrounding formations. These formations form the groundwater basin. Formations bounding the Saugus and Pico formations on the north and south are older, more consolidated and consist of sediments that are less permeable (siltstone and claystone).

The lateral extent of the Basin is defined by three types of boundaries: lithologic boundaries, fault boundaries, and topographic drainage area boundaries (see Figure 2). The lithologic boundaries occur where permeable sediments of the Saugus and Pico formations bound impermeable sediments of the Sisquoc Formation and Monterey Shale. The north-central boundary of the groundwater basin is a fault boundary defined by the Santa Susana Fault, which is assumed to present a relatively impermeable boundary between the rocks to the north and permeable water-bearing sediments to the south. The remaining boundaries correspond to the limits of the Tapo Canyon Tributary Subarea. The areal extent of the Basin, using the boundaries described above, is approximately 5,130 acres (8 square miles).

The subsurface base of the Basin is assumed to be the top of the Monterey Shale. Historical driller's logs from existing wells drilled in the Basin suggest that most of the wells have been perforated within the Saugus Formation, including District Wells 31 and 32 (see Figure 3). However, some more recent wells have been extended into the Pico Formation, which extends to depths of up to 1,500 ft below ground surface (see Figure 3) where it contacts the top of the Monterey Shale. Thus, the Monterey Shale is assumed to be the base of the effective aquifer system.

3.0 GROUNDWATER MANAGEMENT

The GWMP focuses on monitoring geohydrologic parameters within the Basin as a basis for making informed management decisions regarding the groundwater resources within the Basin. Geohydrologic parameters include groundwater production, groundwater levels, and groundwater quality.

3.1 Goals Of The Groundwater Management Plan

The primary goals of the GWMP are as follows:

Goal 1: To provide a standard methodology for the collection of geohydrologic data within the Basin

Goal 2: To provide a standard methodology for the regular analysis and reporting of geohydrologic data to enable informed management decisions for the Basin

Diligent implementation of the GWMP should result in a reliable and safe groundwater supply while minimizing adverse environmental and economic impacts.

3.2 AB3030 Components Addressed by the Groundwater Management Plan

In accordance with AB3030 of the California Water Code, specific components may be addressed in groundwater management plans, and the following components are applicable for this GWMP:

- Monitoring of groundwater levels and storage
- Identification of well construction policies

The GWMP considers these components and provides a methodology for Basin monitoring to develop prudent and efficient decisions for managing groundwater resources.

3.3 Future Changes to the Plan

It is the intent of this GWMP to be iterative and flexible, allowing for changes, as necessary, to accommodate advances in technology, changes in the number and/or type of monitoring features, and the frequency that data is collected. Monitoring wells may be added to or subtracted from the monitoring network of the most current GWMP. In the future, “key wells” may be identified or established to provide the data that would be used as a basis for analysis and decision-making. Groundwater monitoring frequency may be increased or decreased depending on the need (or lack thereof) for additional data. Either the District or Gillibrand can propose changes to the GWMP; however, incorporation of proposed changes would be implemented by mutual consent of both parties.

4.0 GROUNDWATER MONITORING

4.1 Groundwater Monitoring Facilities

This section describes the existing monitoring facilities and methodologies used within the Basin. At this time, these features include the District's two active production wells (Nos. 31 and 32) and one production well for the Gillibrand operation (Well No. 2). Construction details of the wells are provided in Table 1. A map showing the locations of the production wells is shown on Figure 4.

4.2 Monitoring Methodology

4.2.1 Groundwater Levels

Selected monitoring wells will be utilized for the purpose of periodically measuring groundwater elevations representative of the primary production aquifer within the basin (the Saugus and Pico Formations). Groundwater levels will enable evaluation of static groundwater level trends in individual wells as well as evaluation of regional groundwater flow characteristics.

Groundwater levels will be measured in the selected monitoring wells on a monthly basis. They will be measured using an electric water level sounder calibrated to the nearest 0.01 ft. Measurements will be made to the nearest 0.01 ft relative to an established reference point (RP) at the top of each well casing (or sounding tube). Depths to groundwater will be compared, in the field, to previous measurements and re-measured if the depths are significantly different¹. Example forms for recording groundwater level measurements are provided in Appendix A. Depth to groundwater measurements will be converted to groundwater elevations (above mean sea level) by subtracting the depth to water from the RP elevation. If possible, groundwater

¹ Significant variation is defined as a difference of approximately one foot or more from the previous measurement.

levels will be measured when the production well pump is off and groundwater levels have “recovered” to static (or predictable) conditions. Static conditions will be determined by straight-line trends on a semi-log plot of water levels versus time. Once a predictable groundwater level trend has been identified after the pump has been turned off (at least four measurements over a minimum 4 hour recovery time), the water level recovery trend will be projected to at least 1 week to determine the static groundwater level.

Groundwater levels will be measured in each production well on a monthly basis during the first week of each month.

4.2.2 Groundwater Production

Groundwater production will be recorded from inline flow meters in the discharge line of the production wells. Examples of forms for recording flow meter readings are provided in Appendix B. Groundwater production will be totaled on a monthly basis.

4.2.3 Water Quality Sampling and Analysis

Periodic measurements of groundwater quality allow for detection of degradation that may potentially impact water supply wells. Groundwater quality parameters specified in Title 22 of the California Code of Regulations will be measured in groundwater samples collected from each District production well every three years.² Additional samples will be collected from each District production well on an annual basis and analyzed for nitrate.

All groundwater samples will be submitted to a California Department of Health Services certified laboratory under chain-of-custody protocol within 24 hours of collection. In general,

² In accordance with State of California Department of Health Services requirements.

the laboratory will adhere to those recommendations promulgated in Title 21, Code of Federal Regulations, CFR Part 58 *Good Laboratory Practices*; criteria described in *Methods for Chemical Analysis of Water and Wastes* (EPA 1979; EPA-600/4-79-202). Groundwater samples collected for chemical analysis will be tested in accordance with the standard analytical procedures established by the EPA. The laboratory will be required to submit analytical results that are supported by sufficient backup data and quality assurance/quality control (QA/QC) results to enable the reviewer to conclusively determine the validity of the data.

5.0 NEW WELL CONSTRUCTION POLICY

All new wells constructed within the Basin will be required to conform to State of California standards described in California Department of Water Resources (DWR) Bulletin 74-81 (DWR, 1981) and 74-90 (DWR, 1991). Details regarding the location, construction and, as applicable, the design discharge rate of each new well will be summarized in the annual report following well completion.

6.0 DATA MANAGEMENT

6.1 Quality Assurance/Quality Control

For purposes of this plan, quality assurance (QA) is defined as the integrated program designed to assure reliability of monitoring and measurement data. Quality control (QC) is defined as the routine application of specified procedures to obtain prescribed standards of performance in the monitoring and measurement process (ASTM D-18). The District and their assigned technical experts are responsible for assuring that the precision, accuracy, and completeness of data collected for this GWMP are known and documented. Accordingly, all field instruments will be operated in strict accordance with manufacturers specifications. All data and data collection procedures will be checked by a California Certified Hydrogeologist.

6.2 Data Management Procedure

The purpose of this data management procedure is to establish guidance for data filing, storage, and security during the implementation of the GWMP. Data will be filed and stored in a Project file, a computer database, and presented in a GIS system.

GWMP files that store all technical project documents will be established. Technical documents include, but are not limited to, the following:

- All correspondence to/from regulatory agencies
- Memoranda containing technical information or documentation of technical decisions
- Reports
- Field data sheets
- Field logs/daily reports
- Laboratory reports
- Computer files of technical data
- Minutes of meetings with regulatory agencies

- Permits
- QA/QC reports

Information regarding each document will be entered into a computer database and the document filed in the Technical GWMP File. Active GWMP files will be maintained at the District.

Immediate access will be limited to District personnel, Gillibrand personnel, their assigned technical consultants and their legal representatives. Entities outside of the above referenced groups can obtain the records with the permission of the District and Gillibrand.

6.3 Project Database

Data also will be stored, organized, and secured in a computer database created specifically for the GWMP. The database will store data in an efficient and usable manner.

Types of data to be stored in the computer database may include, but are not limited to, technical information such as groundwater levels, groundwater production, and groundwater analytical data. Technical and database programs used for the GWMP will be those designed to run on IBM-compatible computers. If programs designed for other operating systems are used, the data files will be transferable to an IBM-compatible format. Microsoft Access or other equivalent relational database software will be used for general database applications. Specific technical programs used for data analysis will be selected based on the specific technical question to be answered.

7.0 REPORTING

Data collected as per the GWMP will be summarized in annual reports. Groundwater level, production and quality data will be presented in tables that include all historical data for comparison. Short-term and long-term hydrographs will be prepared for each production well and included in the report along with a groundwater contour map. Changes in groundwater production, groundwater levels, and groundwater quality will be discussed and graphically presented.

Each annual report will be prepared under the direct supervision of a California registered geologist or licensed professional civil engineer. An example table of contents for the annual report is provided in Appendix C.

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FIGURES

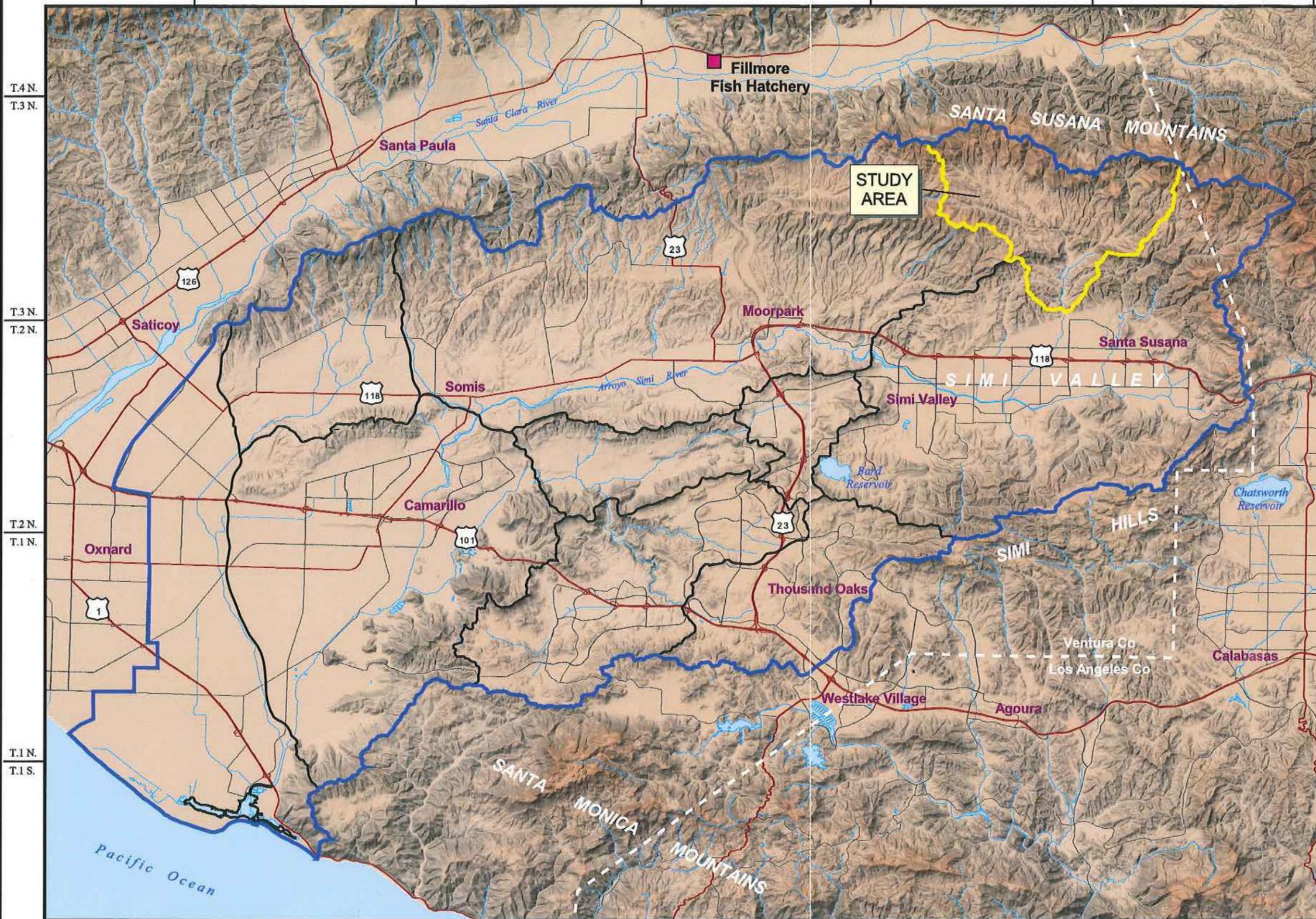
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COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

GROUNDWATER MANAGEMENT PLAN
GILLIBRAND GROUNDWATER BASIN

LOCATION MAP



EXPLANATION

-  Tapo Canyon Tributary Subarea Boundary
-  Calleguas Creek Watershed Boundary
-  Calleguas Creek Watershed Sub-basin Boundary
-  **Fillmore Fish Hatchery** Ventura County Watershed Protection District Evapotranspiration Station used in Analysis
-  white dashed line County Boundary
-  State Highway
-  Major Street
-  Surface Water
-  Creek, River or Drainage Channel



Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees



R.20 W. | R.19 W. | R.19 W. | R.18 W. | R.18 W. | R.17 W. | R.17 W. | R.16 W. | R.16 W. | R.15 W. | R.15 W. | R.14 W.

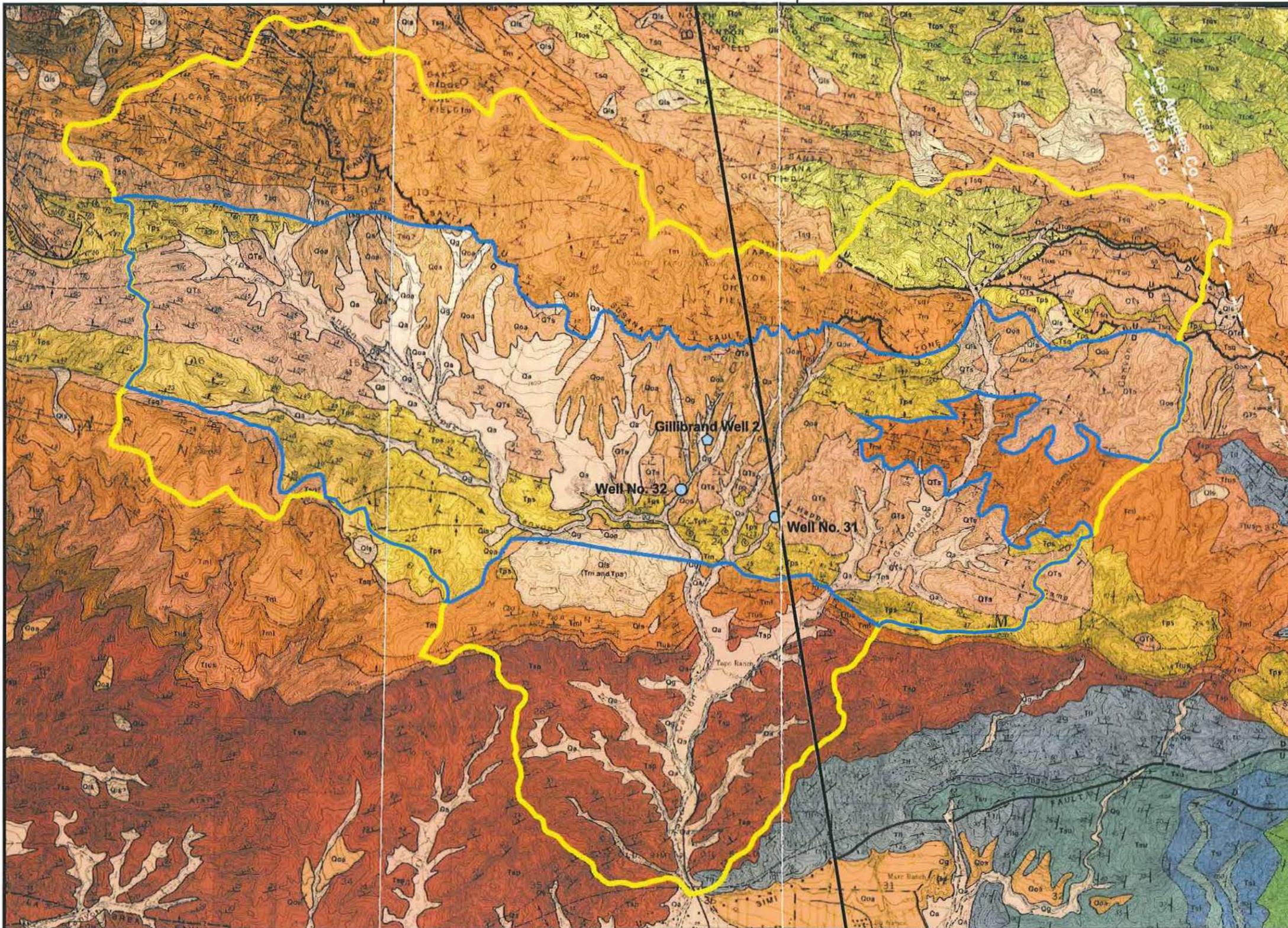
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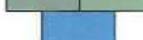
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Figure 1

**GEOLOGY OF THE
TAPO CANYON AREA
SHOWING
GROUNDWATER
BASIN BOUNDARY**



EXPLANATION

-  Tapo Canyon Tributary Subarea
-  Groundwater Basin Boundary
-  Qa/Qg Surficial Sediments
-  Qls Landslide Debris
-  Qoa Older Surficial Sediments
-  QTs Saugus Formation
-  Tps/Tp Pico Formation
-  Ttos/Ttoc Towsley Formation
-  Tsq/TsqS Sisquoc Formation
-  Tm/Tml Monterey Shale
-  Ttus Upper Topanga Sandstone
-  Tsp Sespe Formation
-  Tll/Tllg Lajas Formation
-  Tsu/Tsus/Tsi Santa Susana Formation
-  Kcs Chatsworth Formation
-  County Boundary
-  Trend of Geologic Cross Section (See Figure 3)

T.3 N.

R.18 W. | R.17 W.

21-May-07

Prepared by: DWB
Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

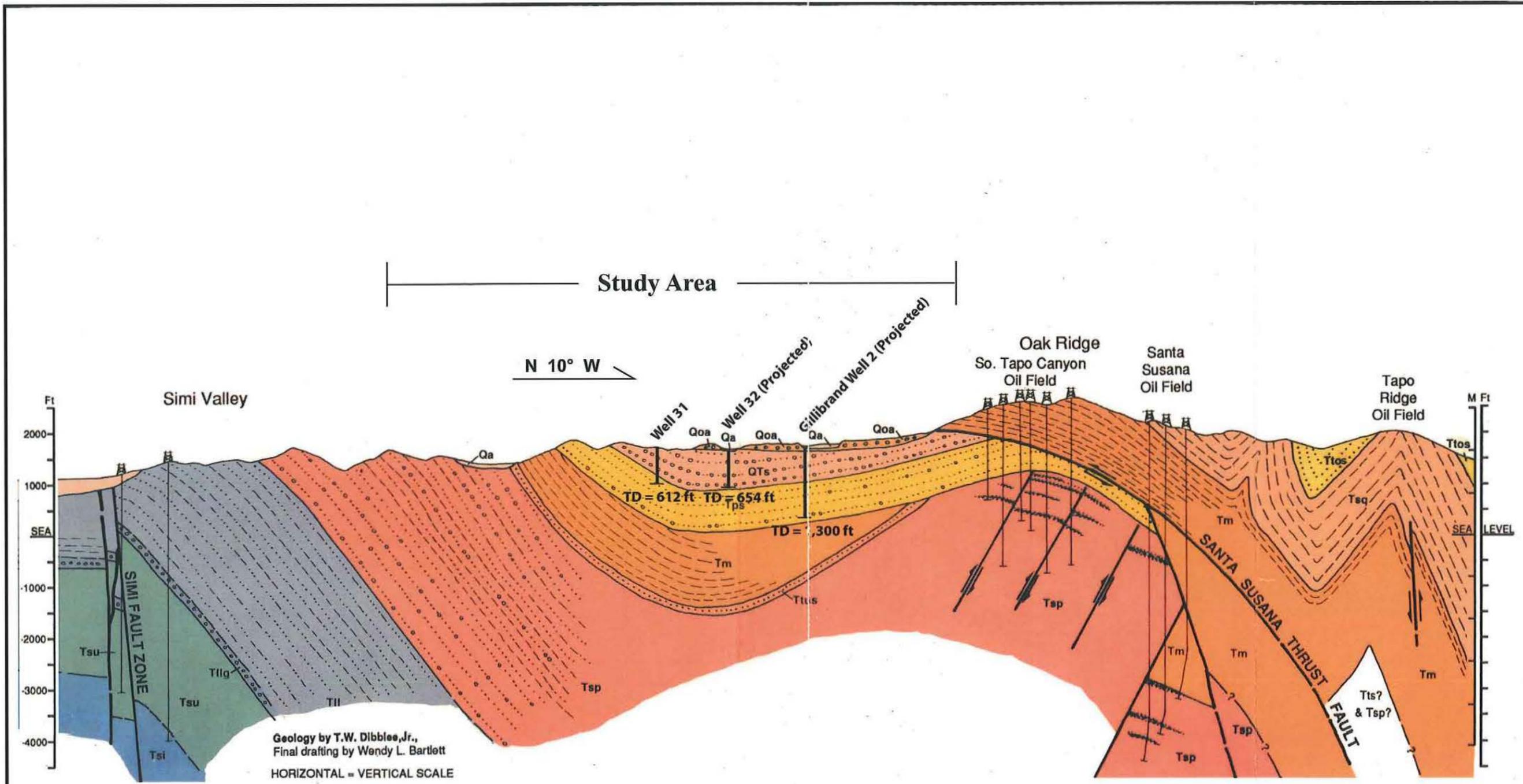
Source of Geology:
Dibblee, T.W. "Geologic Map of the Santa Susana Quadrangle". (DF-38). 1992.



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Figure 2



Source of Geology:
Dibblee, T.W. "Geologic Map of the Santa Susana Quadrangle". (DF-38). 1992.

See Figure 2 for Geologic Legend.

Drawn: DWB

Checked:

Approved:

Date: 21-May-07

COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

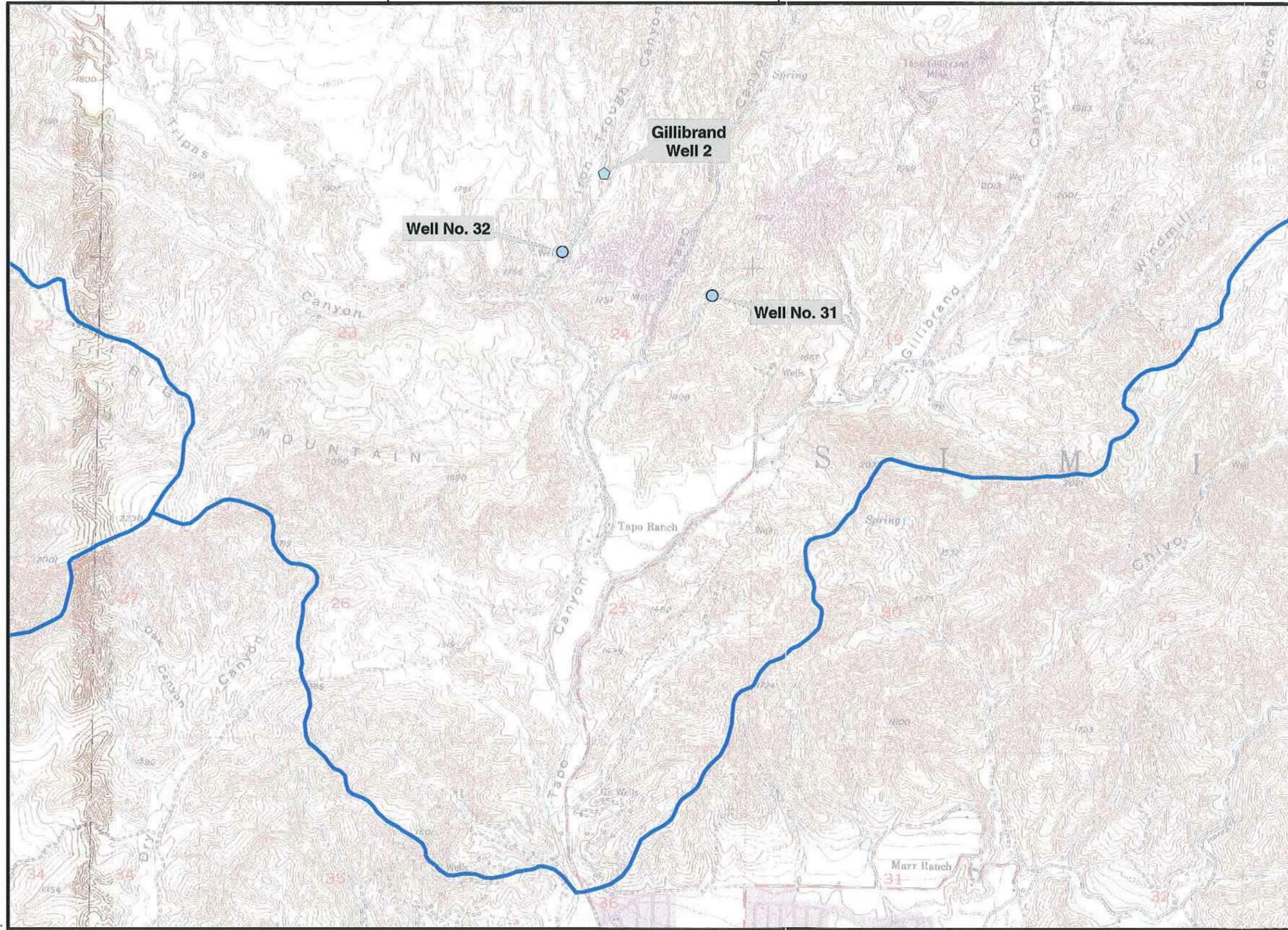
**GEOLOGIC
CROSS-SECTION**



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**Figure
3**

WELL LOCATIONS



EXPLANATION

Well Classification

- Industrial
- Municipal

Well Status

- Pumping
- Unknown

Example: = Pumping Municipal Well

Tapo Canyon Tributary Subarea Boundary

NOTE: Gillibrand Well 2 Location based on West Coast Environmental and Engineering, 2003.

T.3 N.

R.18 W. | R.17 W.

21-May-07

Prepared by: DWB
Map Projection:
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Figure 4

TABLE

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Summary of Wells Within the Tapo Canyon Tributary Subarea

Well No.	Alternative No.	Well Owner	Well Locations		State Well No.	Well Use	Well Status	Year Installed	Borehole Depth [ft bgs] ¹	Well Depth [ft bgs]	Casing Diameter [in.]	Perforated Intervals [ft bgs]	Maximum Yield [gpm ²]	Source
			x	y										
Well No. 2	24D3	P.W. Gillibrand	34.33563461	-118.72494107	03N/18W-24D3	Private	Pumping	1990	1520	1300	28	520-1,280	3,000	Driller's Log
Well No. 32	24C7 (22-P-28)	City of Simi Valley Dist. #8	34.33401416	-118.72044286	03N/18W-24C7	Municipal	Pumping	1957	765	654	14	204-654	2,100	Driller's Log
Well No. 31	24H	City of Simi Valley Dist. #8	34.33183815	-118.71086265	03N/18W-24H	Municipal	Pumping	1990	612	604	16.625	104-594	1,800	Driller's Log

Notes:

NA - Not Applicable

¹ feet below ground surface

² gallons per minute

APPENDIX A
Groundwater Level Field Recording Level

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APPENDIX B
Groundwater Production Field Recording Form

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APPENDIX C
Annual Groundwater Report
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