

Attachment 4: Project Description

DETAILED PROJECT DESCRIPTION

Groundwater is the sole source of supply for over half the residents of northern Santa Cruz County. The aquifers are managed under a groundwater management plan. A comprehensive groundwater monitoring program is necessary for meeting the management plan's goals of ensuring water supply reliability, maintaining water quality and preventing adverse environmental impacts. This project improves the existing monitoring system by expanding the monitoring network.

New monitoring wells will be installed to both enhance basin understanding and promote cooperative groundwater management. The project involves drilling, constructing, developing and equipping four new monitoring wells at two separate locations within the Soquel-Aptos area (Figure Att4-1). The new monitoring wells will expand Soquel Creek Water District's (SqCWD) existing multi-aquifer monitoring network to key areas between water purveyors and where data gaps exist. The monitoring network is used to collect groundwater level and groundwater quality data.

The project well sites are on SqCWD-owned parcels that are either future or existing storage tank locations (Figure Att4-1): Quail Run Tank Site and Larkin Valley Tank Site. The Quail Run Tank Site will be completed with two clustered wells, and the Larkin Valley Tank Site will be completed with two clustered wells. All monitoring wells will be equipped with low flow bladder pumps for water quality sampling and water level transducers/loggers for continuously recording groundwater levels. This equipment has been selected because they have proven reliable and collect high quality data that is instrumental in basin management.

PROJECT GOALS

To date, SqCWD has developed a monitoring well network that focuses on monitoring seawater intrusion, the primary threat to the basin, with coastal monitoring wells. Additional monitoring wells are located near production wells to monitor and address effects from pumping municipal wells. However, the boundaries of the Soquel-Aptos Basin are relatively poorly monitored. This data gap makes it difficult to evaluate three particular management issues: the quantity, quality, and impact of upgradient recharge, groundwater conditions in areas of the basin shared by municipal agencies and small water systems, and the amount of groundwater flowing between the Soquel-Aptos area and the neighboring Pajaro Valley Basin to the south. The proposed monitoring wells

are designed to address these important issues of the flows into and out of the groundwater management area.

The specific goals of the Soquel Creek Water District Monitoring Well Expansion Program will be:

- Goal 1: Fill key data gaps at the upgradient portions of the existing monitoring network area.
- Goal 2: Improve understanding of groundwater conditions in areas of the basin shared by municipal agencies and small water systems.
- Goal 3: Improve understanding of the groundwater gradients between the Soquel-Aptos area and the Pajaro Valley.

NEEDED FACILITIES AND LOCATIONS

The proposed locations of the new monitoring clusters are shown on Figure Att4-1.

1. SqCWD-owned future Quail Run Tank Site (APN 040-232-26, northeast of SqCWD's T-Hopkins Production Well). Apart from production wells, there are very limited groundwater data in this Central Purisima area (Figure Att4-3). This location would be used to estimate hydraulic gradients that are influenced by the surrounding recharge areas, which have been mapped by Santa Cruz County (Figure Att4-2) and basin storage. This location will also monitor areas of the basin shared with small water systems (Figure Att4-1). A two well monitoring cluster would target the Purisima F and BC units. The Purisima F unit outcrops in this area and best represents recharge conditions. The deepest groundwater elevations in the Soquel-Aptos area, caused by a pumping depression, occur in the BC unit.
2. SqCWD-owned Larkin Valley Tank Site (APN 049-011-25). This location will provide groundwater level data inland of SqCWD's Aromas production wells most susceptible to seawater intrusion and to fill in a data gap between bordering agencies Central Water District (CWD), Pajaro Valley Water Management Agency (PVWMA), and small water systems (Figure Att4-1 and Figure Att4-4). A two well monitoring cluster would be completed: one in the Aromas and one in the Purisima F unit. The Aromas outcrops in this area and best represents recharge conditions. The deepest pumping in this area occurs in the Purisima F unit.

The locations of these wells have been specifically selected to benefit SqCWD and its neighboring water purveyors. Groundwater conditions in the area between SqCWD and small water systems and the area between SqCWD and PVWMA are not well understood, thus the Quail Run Tank Site and Larkin Valley Tank Site monitoring wells will provide the needed groundwater level data to use in groundwater contour maps generated for the Annual Review and Report (ARR) for the Soquel-Aptos area (Figure Att4-3 and Figure Att4-4), as part of implementation of the Groundwater Management Plan (GWMP).

Table Att4-1 below summarizes the expected design of each of the monitoring wells based on a hydrogeological conceptual model developed by SqCWD (Johnson, et. al, 2004). Each well will be constructed with 2-inch Schedule 80 PVC flush-threaded casing and screen, with a 10 ft cellar. Each well will have its own well vault completed at grade. After the wells have been developed, each will be equipped with a dedicated low flow bladder pump and a pressure transducer data logger to continuously record groundwater levels.

Table Att4-1: Estimated Well Depths for Monitoring Wells

Well Site	Target Aquifer (Relative Depth)	Total Depth, ft bgs	Depth to Bottom of Sanitary Seal, ft bgs	Depth to Screen, ft bgs	Screen Length, ft
Quail Run Tank Elevation = 235 ft amsl	Purisima BC (Deep)	850	765	780	60
	Purisima F (Shallow)	250	185	200	40
Larkin Valley Tank Elevation = 390 ft amsl	Purisima F (Deep)	710	625	640	60
	Aromas (Shallow)	530	465	480	40

Individual wells are proposed for each depth because they are less susceptible to failure than nested wells. In addition, any issues that may be experienced at one well will only affect data at a single depth. SqCWD has recently had to replace several nested wells that had failed.

A map showing the project sites, existing facilities, and overlying and adjacent Soquel-Aptos area local agencies are included on Figure Att4-1. Existing monitoring well locations are shown in yellow dots and proposed wells that are part of the expansion program are shown as red circles. Existing production wells are represented by blue

triangles. Bulletin 118 groundwater basin boundaries and County-mapped recharge areas are shown on Figure Att4-2.

SUPPORTING THE GOALS OF THE GWMP

The Soquel Creek Water District Monitoring Well Expansion Program both directly supports the goals and objectives of the GWMP, as well as implements the elements (action items) in the GWMP. The GWMP goals supported by this project include:

- Goal 1: Ensure water supply reliability for current and future beneficial uses (GWMP, page 64). The data collected from this program will be used to manage groundwater pumping. This will directly influence the estimates of sustainable yield and change groundwater management practices.
- Goal 2: Maintain water quality to meet current and future beneficial uses (GWMP, page 64). The data collected from this program will be used to monitor and manage inland groundwater quality.

Basin Management Objectives in the GWMP that are supported by this study include the following:

- BMO 1-1: Pump within the sustainable yield (GWMP, page 66). Adding monitoring wells in data gaps helps with monitoring the effects of pumping within the sustainable yield.
- BMO 1-3: Manage groundwater storage for future beneficial uses and drought reserve (GWMP, page 70). Additional monitoring wells are needed to determine basin storage conditions, especially inland where the majority of recharge takes place and where data gaps exist.
- BMO 2-1: Meet existing water quality standards for beneficial uses, such as drinking water standards (GWMP, page 71). These monitoring wells upgradient of SqCWD's production wells will be used to monitor the groundwater quality of recharge water to the wells thereby contributing to a more reliable supply for long-term beneficial uses.

Elements (action items) of the GWMP that are supported by this study include:

- Element 1: Groundwater Monitoring, item 1 - Continue and Expand Existing Regional Groundwater Monitoring Programs (GWMP, page 79). Implementing this action item was the purpose for applying for this grant funding.
- Element 6: Protect Existing Recharge Zones, item 2 - Support future efforts to characterize recharge areas within the Soquel-Aptos area (GWMP, page 98). The

locations of the proposed monitoring wells are within or near groundwater recharge zones and upgradient of existing SqCWD production wells.

- Element 8: Manage Pumping, item 4 - Analyze groundwater level/quality data and groundwater pumping data at least annually, and recommend changes to the groundwater pumping distribution as necessary (GWMP, page 108). The groundwater level and water quality data collected at least quarterly from the monitoring wells will be used in the Annual Review and Report (ARR) that is produced annually as part of the implementation of the GWMP for the Soquel-Aptos basin. As part of that report, pumping for the forthcoming year is adjusted based on the groundwater levels reported at monitoring wells.
- Element 9: Identify and Manage Cumulative Impacts, item 2 - Identify and manage well interference and manage groundwater storage for beneficial uses and drought reserve (GWMP, page 111). The location of the proposed wells will facilitate groundwater storage calculations for the basin. Additionally, the location of the wells between small water systems and SqCWD will provide information on possible well interference.

ONGOING USE OF DATA

Data from the new monitoring wells will be incorporated into SqCWD's ongoing groundwater monitoring system. Groundwater level monitoring equipment will remain in the monitoring wells after the conclusion of this project. Data collection from the wells and data storage will be funded by SqCWD. Ongoing monitoring well maintenance will also be funded by SqCWD through its regular operations and maintenance budget to ensure the wells and equipment continue to collect high quality data. Semi-annual water quality testing from these wells will be funded by SqCWD.

Each year, data from the monitoring wells will be used in the ARR. This annual document is part of the implementation of the GWMP for the Soquel-Aptos basin. The ARR summarizes groundwater conditions in the Soquel-Aptos basin, documents the status of groundwater management activities, and recommends any amendments to the GWMP. In particular, the groundwater level data will be used to expand the groundwater elevations used for generating the Spring and Fall contour maps (Figures Att4-3 and Att4-4).

One or a number of the wells may be selected for inclusion in the California Statewide Groundwater Elevation Monitoring (CASGEM) effort for the area. In this case, the data will be sent to Santa Cruz County who is the CASGEM reporting agency.

The geophysical and lithologic data generated during the drilling process is of importance to the County and other stakeholders for defining the contact between the Aromas and Purisima, and contacts between various Purisima units in the region. These aquifers are the sole supply for SqCWD, CWD, and small water systems in the area.

COLLABORATION WITH STAKEHOLDERS

The Joint Exercise of Powers Agreement (JPA) between SqCWD and CWD provides for the duties and governance structure of a Basin Implementation Group (BIG), which meets at least annually. The BIG also includes an at-large member who is typically associated with a small water system. It is the primary responsibility of the BIG to:

- 1) Assure that the goals and objectives identified in the GWMP are pursued in a reasonable and timely manner;
- 2) Be accountable for the quality and accuracy of all reports associated with the groundwater management plan implementation;
- 3) Modify the GWMP as needed to address any new or escalated issues within the groundwater basin;
- 4) Direct future updates to the GWMP every five years or more frequently if needed to reflect changes in State law or in local conditions/programs.

The Basin Advisory Group (BAG) provides technical expertise necessary to guide and implement the groundwater management activities, as well as provide interagency coordination. The BAG consists of staff members from SqCWD, Central Water District (CWD), City of Santa Cruz (City), Pajaro Valley Water Management Agency (PVWMA) and Santa Cruz County. This group meets at least annually to:

- 1) Discuss the status of the groundwater basin
- 2) Review progress on the management goals and objectives as outlined in this GWMP; and
- 3) Develop a recommended work plan for the following year.

The data collected in this study is very important to SqCWD as well as a number of Stakeholders in the Soquel-Aptos area. These Stakeholders include members of the BAG: Central Water District (CWD), Pajaro Valley Water Management Agency (PVWMA), and Santa Cruz County. Additional stakeholders include small water systems and private well owners. A representative from a small water system typically fills the at-large seat on the BIG. The BAG and BIG annually meet to review the ARR, which will include data and analysis of the data obtained at the proposed monitoring

wells. The members of the BAG and BIG will be able to discuss and plan groundwater management in relation to the data. The BIG may invite a larger group of small water systems and private well owners to discuss groundwater management in relation to the data.

Information generated from this project will be disseminated at SqCWD Board of Director meetings, Basin Advisory Group (BAG) meetings, and Basin Implementation Group (BIG) meetings. Small water systems will also be notified about the availability of the information. In addition, the public will be able to access the information through the SqCWD's website, and hardcopies will be available at SqCWD's offices.

REFERENCES

Johnson, N.M, D. Williams, E.B. Yates, G. Thrupp. 2004. Groundwater Assessment of Alternative Conjunctive Use Scenarios, Technical Memorandum 2: Hydrogeologic Conceptual Model.

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HydroMetrics WRI. 2012. Soquel-Aptos Area Groundwater Management Annual Review and Report Water Year 2011. May.

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Soquel Creek Water District and Central Water District. 2007. Groundwater Management Plan -2007 Soquel-Aptos area. Santa Cruz County, California. April.

<http://www.soquelcreekwater.org/content/groundwater-management-plan>

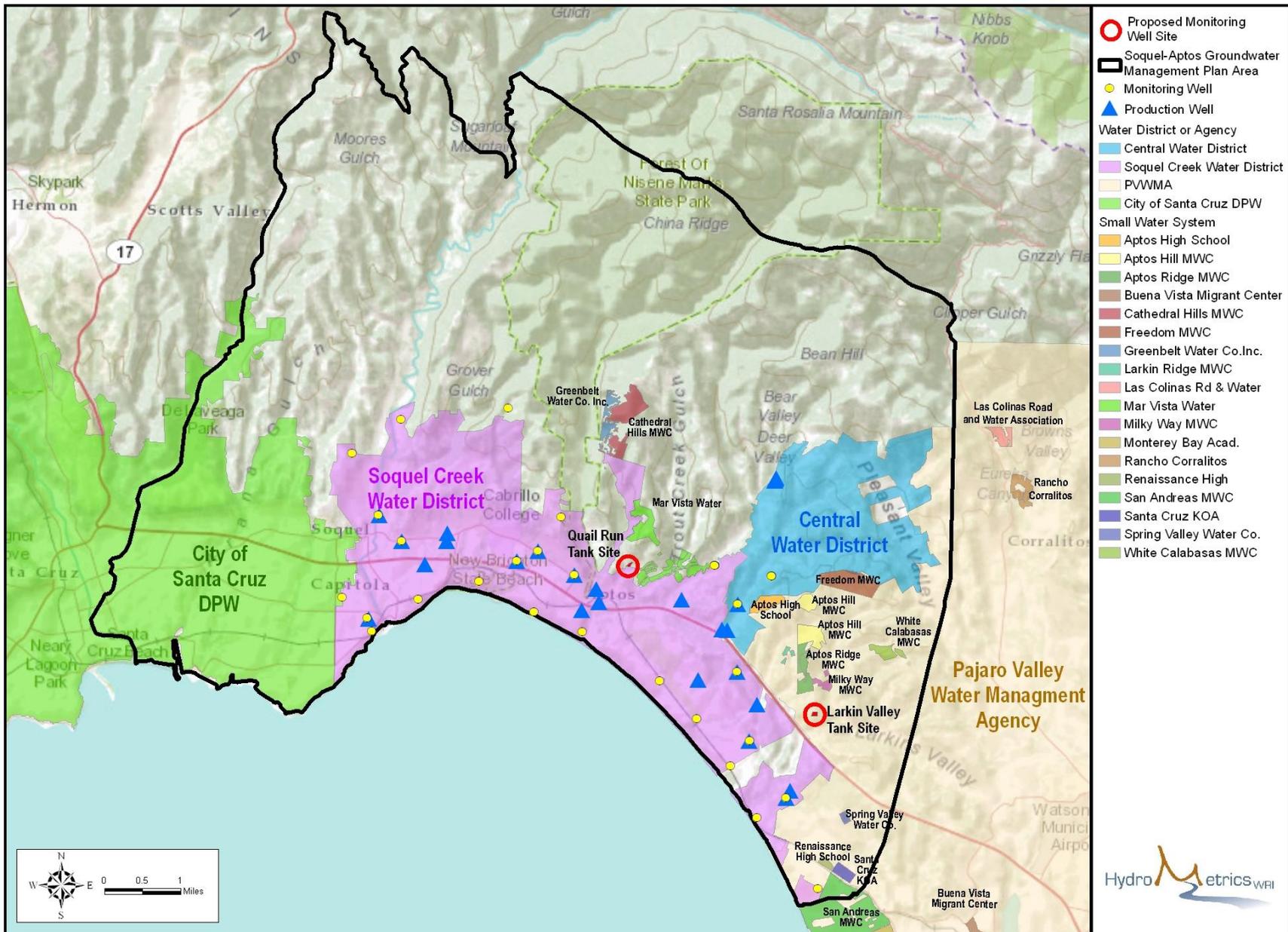


Figure Att4-1: Water Agencies, Groundwater Management Plan Area and Proposed Monitoring Well Sites

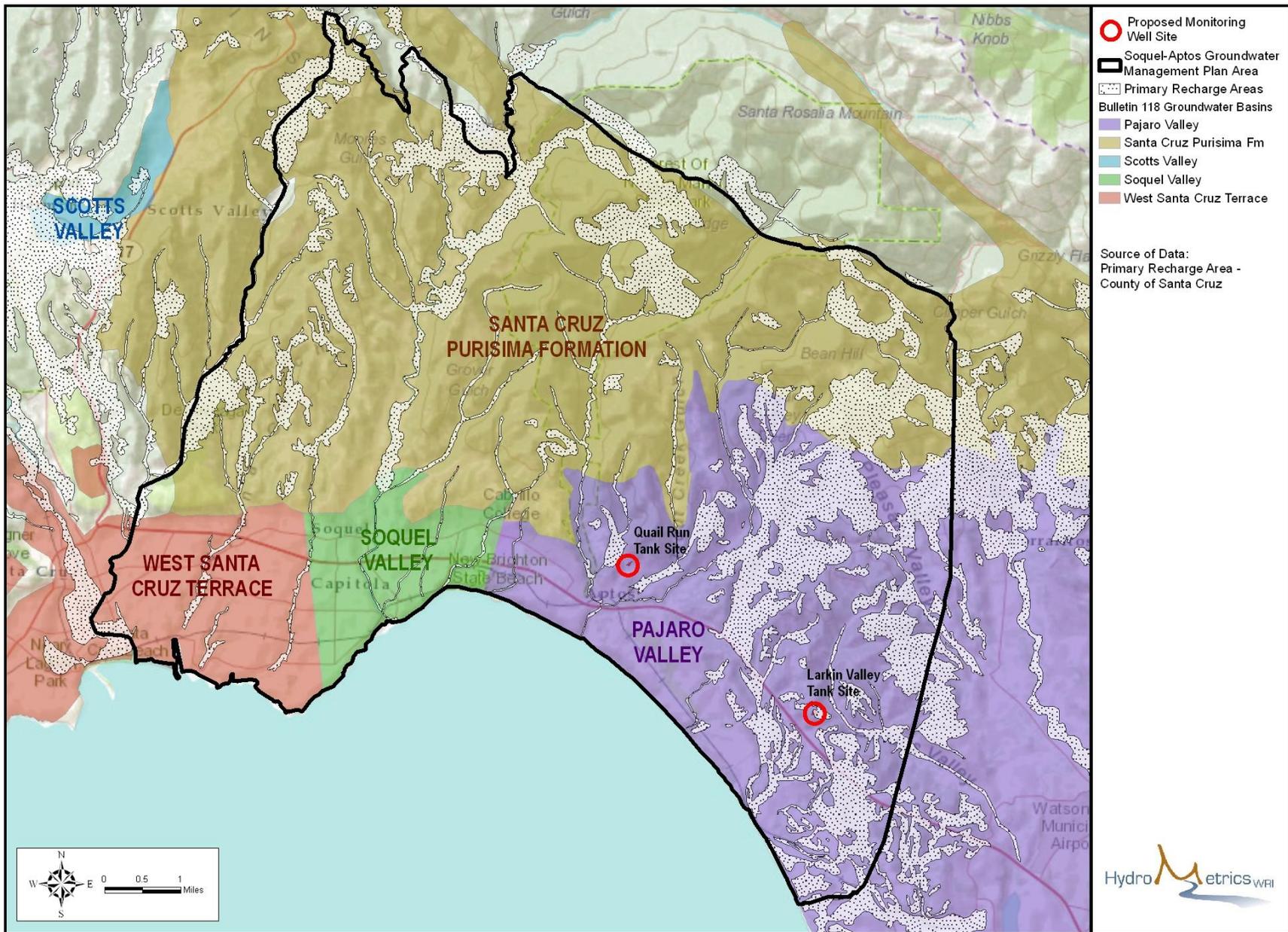


Figure Att4-2: Proposed Monitoring Well Sites, County Mapped Recharge Areas, and Bulletin 118 Groundwater Basins

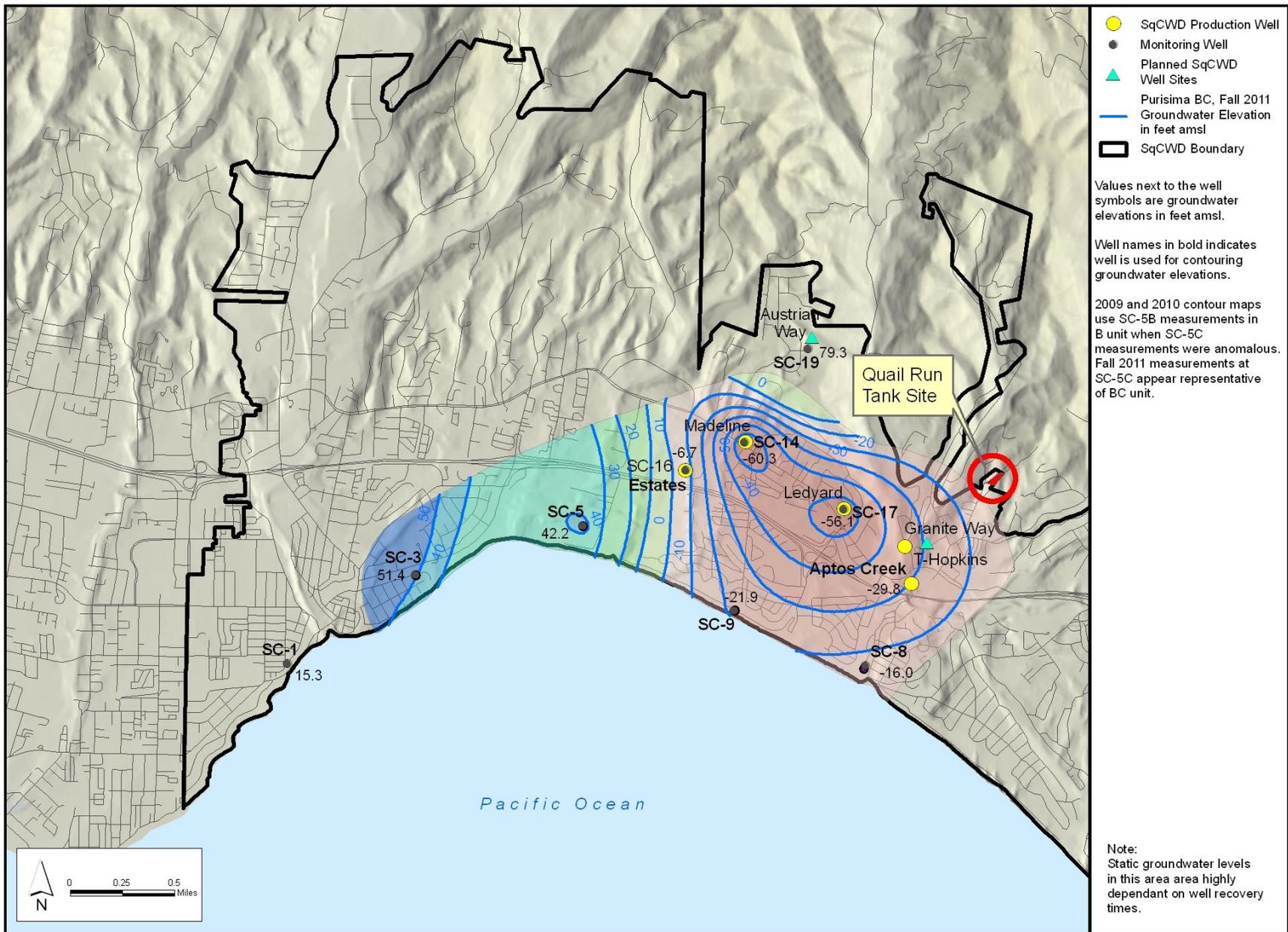


Figure Att4-3: Purisima BC-Unit Fall 2011 Groundwater Contours (from Water Year 2011 Annual Review and Report)

