A Tradition of Stewardship
A Commitment to Service

Agenda Date: 1/21/2015
Agenda Placement: 9A
Continued From: December 17, 2014

Napa County Planning Commission
Board Agenda Letter

TO:	Napa County Planning Commission
FROM:	Charlene Gallina for David Morrison - Director Planning, Building and Environmental Services
REPORT BY:	Wyntress Balcher, Planner II - 707 299-1351
SUBJECT:	Girard Winery Use Permit #P14-00053

RECOMMENDATION

GIRARD WINERY USE PERMIT #P14-00053-UP

CEQA Status: Consideration and possible adoption of a Mitigated Negative Declaration and Mitigation Monitoring & Reporting Program (MMRP). According to the proposed Mitigated Negative Declaration and MMRP, the proposed project would have, if mitigation measures are not included, potentially significant environmental impacts in the following areas: Transportation/Traffic. The project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Request: Approval of a Use Permit to establish a new winery as follows: 1) 200,000 gallons per year production capacity; 2) Construction of new winery building, totaling 32,771 sq.ft. in area, to include: 28,955 sq.ft. production area (crush area, fermentation and barrel storage, restrooms); 3,816 sq.ft of accessory use area (offices, tasting rooms, retail storage, catered food prep area, and visitor restrooms), maximum height 35 ft. with 45 ft. tall cupolas; a 2,628 sq. ft. veranda; and a 2,871 sq. ft. covered work area; 3) Hosted daily tours and tastings for wine trade personnel and consumers by appointment only for a maximum of 75 persons per weekday (Monday-Friday); maximum of 90 persons per weekend day (Saturday-Sunday); 4) Hours of operation: 8:00 AM to 6:00 PM (production hours, except during harvest) and 10:00 AM to 6:00 PM (visitation hours), 7-days a week; 5) Employment of more than 25 employees: 11 employees (8 full time; 3 part-time) non harvest; maximum 19 additional employees (12 full time and 7 part time) during harvest; 6) Employee hours: production, 7:00 AM to 3:00 PM; hospitality/ tasting room, 9:30 AM to 6:30 PM; administration, 8:00 AM to 5:00 PM; 7) Construction of twenty-two (22) parking spaces; 8) Installation of landscaping, entry gate and a winery sign; 9) Establish a Marketing Program as follows: a) Four (4) events per year with a maximum of 75 guests; b) Four (4) events per year with a maximum of 200 guests; c) One (1) Harvest event per year with a maximum of 500 guests;d) All food to be catered utilizing a ±184 sq. ft. small prep/staging area; 10) On-premise consumption of wines produced on site within the tasting room and in the landscaped winery gardens in accordance with AB 2004; 11) Construct new 24” wide winery access driveway from Dunaweal Lane to the winery; 12) Construction of additional piping and service connections to the existing water system with an update to the existing Transient Non-Community Water System contract to include Girard Winery; 13) Installation of on-site sanitary disposal improvements and installation of new connections into the existing on-site winery waste water ponds serving Clos Pegase Winery (APN:020-150-012); and, 14) Installation of 30' diameter, 25,000 gallon water storage tank. The project is located on a 26.53 acre parcel at 1077 Dunaweal Lane, Calistoga, on the east side of Dunaweal Lane, approximately 1,000 feet south of its intersection with Silverado Trail, within the AP (Agricultural Preserve) Zoning District; APN: 020-150-017

Staff Recommendation: Adopt the Mitigated Negative Declaration and approve the Use Permit, as conditioned.

Staff Contact: Wyntress Balcher, Planner II (707) 299-1351; wyntress.balcher@countyofnapa.org

Applicant Contact: Heather McCollister, (707) 287-5999; bhmccolli@sbcglobal.net

ITEM CONTINUED FROM DECEMBER 17, 2014.

EXECUTIVE SUMMARY

Proposed Actions:

That the Planning Commission:

1. Adopt the Mitigated Negative Declaration and Mitigation Monitoring Reporting Plan for the Girard Winery based on Findings 1-5 of Exhibit A; and

2. Approve Use Permit (P14-00053) based on Findings 6-10 of Exhibit A, and subject to the recommended Conditions of Approval (Exhibit B).

Discussion:

The applicant requests approval of Use Permit application #P14-00053 to establish a new 200,000 gallon/year winery with the construction of a new winery building, totaling 32,771 sq.ft. in area, to include: 28,955 sq.ft. production area (crush area, fermentation and barrel storage, restrooms); 3,816sq.ft of accessory use area (offices, tasting rooms, retail storage, catered food prep area, and visitor restrooms); a 2,628 sq.ft. covered veranda; and a 2,871 sq. ft. covered work area. The maximum height of the building will be 35 ft. with two 45 ft. tall cupolas. The applicant also proposes the construction of: twenty-two (22) parking spaces; a new 24" wide winery access driveway from Dunaweal Lane to the winery; and additional piping and service connections to the existing water system with an update to the existing Transient Non-Community Water System contract to include Girard Winery; and the installation of a 25,000 gallon water storage tank. The applicant is requesting tours and tastings by appointment, for a maximum of 90 persons on weekends and 75 persons on weekdays and a Marketing Program to hold 9 events per year: four/year for 75 guests; four/year for 200 guests and one/year for 500 guests, to be catered and during winery operation hours.

A public hearing was held on December 17, 2014 and based upon Commission discussion, this item was continued. At that meeting, the Commission presented questions about the proposed project that they wanted answered: clarification of the size of the Clos Pegase Winery (APN: 020-150-012); confirmation of the size of the project parcel; and information regarding a transient non-community water system. Also, a continuance was requested by Ms. Norma Tofanelli and Mr. David Clark. The continuance enables Ms. Norma Tofanelli time for her consultant to prepare a report on water availability in the area.

FISCAL IMPACT

Is there a Fiscal Impact? No

ENVIRONMENTAL IMPACT

Mitigated Negative Declaration Prepared. According to the proposed Mitigated Negative Declaration, the proposed project would have, if mitigation measures are not included, a potentially significant environmental impact in the following areas: Transportation/Traffic. The project is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

BACKGROUND AND DISCUSSION

Response to Planning Commission Comments - A public hearing was held on December 17, 2014, and was continued to allow staff to prepare and to provide the Commission information regarding the size of the Clos Pegase Winery, confirmation of the size of the project parcel; and, provide background information regarding the transient non-community water system.

The project parcel (APN) 020-150-017, is 26.53 acres in area. The numbers were transposed on the Initial Study/Mitigated Negative Declaration document (Pg 1) and staff report background section (Pg 2), where the location is indicated.

Use Permit #458687 was approved by the Planning Commission to expand the production capacity of Clos Pegase Winery to 200,000 gallons/year; roof an existing work area; add 19,000 sq.ft. of caves; and construct a wastewater treatment pond on the adjacent parcel across Dunaweal Lane. According to the application, the existing winery is 25,000 sq. ft. in area. A copy of the approval letter is attached to this staff report.

The Water System Feasibility Report (Always Engineering, Inc; dated February 21, 2014) states the well on the project property (APN: 20-150-017) provides water to the Clos Pegase Winery, located across the street (1060 Dunaweal Lane, APN: 020-150-012), through a transient non-community water system permit. Transient noncommunity water systems are public water systems which serve at least 15 service connections or 25 or more persons for at least 60 days of the year (Example: A winery with less than 25 employees that has public wine tasting with an average of 25 or more visitors for 60 days of the year). The report stated that the parcel and the water system are both owned by Vintage Wine Estates. Upon grant of the use permit, the water system permit will be updated and the system name changed to The Clos Pegase and Girard Wineries Water System. Additional expanded information regarding public water systems is attached with this report.

Public Comment Responses - Ms. Norma Tofanelli, a neighbor who had requested the continuance of this item to have the water analysis reviewed by a hydrologist has notified staff that she needs additional time and indicated to staff that her additional information would not be available until January 16, 2015, which is after the packets are distributed. Upon receipt, staff will forward the information to the Commission under separate cover.

A letter from Ellison Folk of Shute, Mihaly, & Weinberger, LLP legal counsel for the Tofanelli family, was received on December 14, 2014, requesting a continuance of the hearing and requesting additional information regarding statements in the Initial Study: "(Pg 13) Minimum thresholds for water use established by Napa County Department of Public Works on USGS reports and copies of USGS' water resources investigations" and "(Pg 14) Napa County environmental resource mapping (Water Deficient Areas/Storage Areas)." This information was provided to Ms. Tofanelli at the hearing on December 17, 2014, and the documents were also e-mailed to the attorney on

December 19, 2014. These are attached to this report for Commission review.

Mr. David Clark also requested a continuance to accommodate additional time to review the project.

A Letter from the Mount Veeder Stewardship Council (December 16, 2014) was submitted to the Commission, expressing objection to the adoption of a Negative Declaration for the Girard Winery Use Permit Application, and respectfully requested that the Planning Commission not adopt (sic) the Negative Declaration, and instead have the applicant conduct the Environmental Impact Report addressing cumulative impacts of the project. Mt. Veeder further requested the applicant provide additional information regarding the water availability for the project. It should be noted that a Mitigated Negative Declaration, not a negative declaration, was prepared and circulated for the project.

The Mount Veeder Stewardship Council states in its letter that the Planning Department failed to require the applicant to provide any actual water availability data in support of its application. A Water System Feasibility Report (Always Engineering, Inc. dated February 21, 2014) was in fact prepared for the project and submitted with the application. The report indicated that the existing well produces 23 gpm, based upon the well logs which have been filed with the county. The report further indicates that the current pump supplies 18 gpm, and that this production amount is adequate to supply the winery processing, employees, tasting visitors, and events. Clos Pegase Winery incorporates many conservation measures in their water demands and proposes to incorporate the proposed Girard Winery into the existing recycled processed wastewater system for irrigation of the vineyards and landscaping. The wineries will share a well and the proposed Girard Winery will be added into the existing transient non-community water system serving Clos Pegase Winery. No new wells are proposed. There are three ponds on the Girard parcel, one which holds the irrigation water. In addition to the recycled water, the irrigation pond also captures rainwater and water from the vineyard subdrain collection system. No ground water is being proposed for the irrigation of the vineyards and landscaping. The use of the recycled processed wastewater for irrigation reduces the estimated water demand from the two wineries to 12.49 acre-feet/year (af/yr). The minimum threshold established by the County for this is 26.53 af/yr. The County has no record of problems or complaints of diminished groundwater supplies at the project site or in the general vicinity.

As discussed in the Mitigated Negative Declaration/Initial Study, minimum thresholds for water use have been established by the Napa County Department of Public Works, using reports by the United States Geological Survey (USGS). These reports are the result of water resources investigations performed by the USGS in cooperation with the Napa County Flood Control and Water Conservation District and more recently reviewed and found acceptable and defensible by Lundorff and Scalmanini in their work with the GRAC and their "Updated Hydrogeologic Conceptualization and Characterization of Conditions" (January, 2013). Any project which reduces water usage or any water usage which is at or below the established threshold is presumed not to have a significant effect on groundwater levels. The project is located on the valley floor in an area that has an established acceptable water use criteria of 1.0 acre foot per acre per year.

The cumulative traffic impacts were discussed in the Mitigated Negative Declaration/Initial Study, specifically regarding the turning movement at the intersection of Dunaweal Land with State Highway 29, and Silverado Trail. The Napa County General Plan Environmental Impact Report identified expected reduction in the Level of Service (LOS) on State Highway and Silverado Trail in 2030. Mitigation measures have been proposed to address this potential impact, and were incorporated into the project and agreed to by the applicant.

Based upon the above concerns, staff maintains that the proposed Mitigated Negative Declaration adequately addresses potential impacts of the project and is recommending in favor of the project: 1) the proposal includes substantial greenhouse gas offset features; 2) potential traffic impacts have been fully mitigated; 3) Girard’s Napa wines are presently made in Sonoma County and this facility will return Napa County fruit to production in Napa County; 4) the project will be subject to the County’s expanded housing impact fees; 5) visitation is within the scope of what has been approved at other similar facilities, and marketing is on the low end; 6) the amount of visitation space is relatively modest in comparison to the amount of production space; and 7) the project requires no reductions or alternatives to winery zoning standards.

SUPPORTING DOCUMENTS

A . EXHIBIT A - PROPOSED FINDINGS

B . EXHIBIT B - PROPOSED CONDITIONS

C . Clos Pegase Use Permit Approval Letter

D . Water Systems Background Information

E . Ellison Folk Correspondence

F . Water System Feasibility Report

G . 1973 Northern Napa Valley Groundwater Study

H . 1977 USGS Report

I . 1991 Public Works Water Availability Analysis

J . Girard - Water Deficient Areas GIS Map

K . Continuance Requests - Tofanelli - Clark

L . Mount Veeder Stewardship Council

M . Previous Commission Staff Report of December 17, 2014

N . Correspondence received after packet mail out (Added after meeting)

Napa County Planning Commission: Approve

Reviewed By: John McDowell

PLANNING COMMISSON HEARING – DECEMBER 17, 2014
EXHIBIT A - FINDINGS

GIRARD WINERY
USE PERMIT #P14-00053-UP
1077 Dunaweal Lane, Calistoga, CA 94515
APN 020-150-017

ENVIRONMENTAL DETERMINATION:

The Planning Commission (Commission) has received and reviewed the proposed Mitigated Negative Declaration and Mitigation Monitoring & Reporting (MMRP) Program pursuant to the provisions of the California Environmental Quality Act (CEQA) and of Napa County's Local Procedures for Implementing CEQA, and finds that:

1. The Planning Commission has read and considered the Mitigated Negative Declaration prior to taking action on said Mitigated Negative Declaration and MMRP and the proposed project.

2. The Mitigated Negative Declaration and MMRP is based on independent judgment exercised by the Planning Commission.

3. The Mitigated Negative Declaration and MMRP was prepared and considered in accordance with the requirements of the California Environmental Quality Act (CEQA).

4. There is no substantial evidence in the record as a whole, that the project as mitigated will have a significant effect on the environment.

5. The Secretary of the Commission is the custodian of the records of the proceedings on which this decision is based. The records are located at the Napa County Planning, Building, and Environmental Services Department, 1195 Third Street, Room 210, Napa, California.

USE PERMIT MODIFICATION REQUIRED FINGINGS:

The Commission has reviewed the use permit request in accordance with the requirements of the Napa County Code Section 18.124.070 and makes the following findings. That:

6. The Commission has the power to issue a use permit under the zoning regulations in effect as applied to the property.

   Analysis: The project is consistent with AP (Agricultural Preserve) zoning district regulations. A winery (as defined in Napa County Code Section 18.08.640) and uses in connection with a winery (see Napa County Code Section 18.16.030) are permitted in an AP zoned district with an approved use permit. The project complies with the requirements of the Winery Definition Ordinance (Ord. No. 947, 1990) and the remainder of the Napa County Zoning Ordinance (Title 18, Napa County Code) as applicable.

7. The procedural requirements for a use permit set forth in Chapter 18.124 of the Napa County Code (Use Permits) have been met.

   Analysis: The use permit modification application has been filed, noticed and public hearing requirements have been met. The hearing notice was posted on November 26, 2014 and copies of the notice were forwarded to property owners within 1,000 feet of the subject parcel and all other interested parties. The CEQA public comment period ran from November 26, 2014 to December 16, 2014.

8. The granting of the use permit, as conditioned, will not adversely affect the public health, safety or welfare of the County of Napa.

   Analysis: Various County departments have reviewed the project and commented regarding water, waste water disposal, traffic and access, and fire protection. Conditions are recommended which will incorporate these comments into the project to assure the ongoing protection of the public health and safety.

9. The proposed use complies with applicable provisions of the Napa County Code and is consistent with the policies and standards of the Napa County General Plan.

   Analysis: The proposed use complies with applicable provisions of the Napa County Code and is consistent with the policies and standards of the Napa County General Plan. The Winery Definition Ordinance (WDO) was established to protect agriculture and open space and to regulate winery development and expansion in a manner that avoids potential negative environmental effects. The project complies with the requirements of the Winery Definition Ordinance (Ord. No. 947, 1990) and the applicable provisions of the Napa County Zoning Ordinance (Title 18, Napa County Code).

   This proposal is consistent with the *Napa County General Plan 2008*. The subject parcel is located on land designated Agricultural Resource (AR) on the County's adopted General Plan Land Use Map. This project is comprised of an agricultural processing facility (winery), along with wine storage, bottling, and other WDO-compliant accessory uses as outlined in and limited by the approved project scope. (See Exhibit 'B', Conditions of Approval.) These uses fall within the County's definition of agriculture and thereby preserve the use of agriculturally designated land for current and future agricultural purposes.

   General Plan Agricultural Preservation and Land Use Goal AG/LU-1 guides the County to "preserve existing agricultural land uses and plan for agriculture and related activities as the primary land uses in Napa County." General Plan Agricultural Preservation and Land Use Goal AG/LU-3 states the County should, "support the economic viability of agriculture, including grape growing, winemaking, other types of agriculture, and supporting industries to ensure the preservation of agricultural lands."

   As approved here, the use of the property for the "fermenting and processing of grape juice into wine" (NCC Section 18.08.640) supports the economic viability of agriculture within the county consistent with General Plan Agricultural Preservation and Land Use Policy AG/LU-4 ("The County will reserve agricultural lands for agricultural use including lands used for grazing and watershed/ open space…"). Policy AG/LU-8 also states, "The County's minimum agricultural parcel sizes shall ensure that agricultural areas can be maintained as economic units and General Plan Economic Development Policy E-1 (The County's economic development will focus on ensuring the continued viability of agriculture…). Approval of this project furthers these key goals.

The General Plan includes two complimentary policies requiring that new wineries, "…be designed to convey their permanence and attractiveness." (General Plan Agricultural Preservation and Land Use Policy AG/LU-10 and General Plan Community Character Policy CC-2). The proposed winery, to the extent that it will be publicly visible, will convey permanence and attractiveness.

Agricultural Policy AG/LU-13 of the County General Plan recognizes wineries, and any use clearly accessory to a winery, as agriculture. The Land Use Standards of the General Plan Policy AG/LU-2 list the processing of agricultural products as one of the general uses recognized by the AR land use designations. The proposed project allows for the continuation of agriculture as a dominant land use within the county and is consistent with General Plan Agricultural Policy AG/LU-13.

The project is also consistent with General Plan Conservation Policy CON-53 and CON-55, which require that applicants, who are seeking discretionary land use approvals, prove the availability of adequate water supplies, which can be appropriated without significant negative impacts on shared groundwater resources. As analyzed below, the proposed winery will not interfere substantially with groundwater recharge based on the criteria established by Napa County Public Works Department.

Finally, the "Right to Farm" is recognized throughout the General Plan and is specifically called out in Policy AG/LU-15 and in the County Code. "Right to Farm" provisions ensure that agriculture remains the primary land use in Napa County and is not threatened by potentially competing uses or neighbor complaints. Napa County's adopted General Plan reinforces the County's long-standing commitment to agricultural preservation, urban centered growth, and resource conservation. On balance, this project is consistent with the General Plan's overall policy framework and with the Plan's specific goals and policies.

10. The proposed use would not require a new water system or improvements causing significant adverse effects, either individually or cumulatively, on the affected groundwater basin in Napa County, unless that use would satisfy any of the other criteria specified for approval or waiver of a groundwater permit under Napa County Code Section 13.15.070 or Section 13.15.080.

Analysis: The subject property is not located in a "groundwater deficient area" as identified in Section 13.15.010 of the Napa County Code. Minimum thresholds for water use have been established by the Department of Public Works using reports by the United States Geological Survey (USGS). These reports are the result of water resources investigations performed by the USGS in cooperation with the Napa County Flood Control and Water Conservation District. On June 28, 2011 the Board of Supervisors approved creation of a Groundwater Resources Advisory Committee (GRAC). The GRAC's purpose was to assist County staff and technical consultants with recommendations regarding groundwater, including data collection, monitoring, well pump test protocols, management objectives, and community support. The County completed a county-wide assessment of groundwater resources (Napa County Groundwater Conditions and Groundwater Monitoring Recommendations Report (Feb.

2011)) and developed a groundwater monitoring program (Napa County Groundwater Monitoring Plan 2013 (Jan. 2013)). The County also completed a 2013 Updated Hydrogeologic Conceptualization and Characterization of Groundwater Conditions (Jan. 2013). In general, recent studies conducted by the County's consulting hydrogeologist have found that groundwater levels in the Napa Valley Floor exhibit stable long-term trends with a shallow depth to water.

Any project which reduces water usage or any water usage which is at or below the established threshold is, for purposes of the application of the County's Groundwater Conservation Ordinance, assumed not to have a significant effect on groundwater levels. Based on the submitted Phase One Water Availability Analysis, the 26.53 acre subject valley-area parcel has a water availability calculation of 26.53 acre feet per year (af/yr), which is arrived at by multiplying its approximately 26.53 acre size by a one acre feet per year per acre fair share water use factor. The Clos Pegase Water System utilizes the well on the subject parcel (APN:020-150-017). The Water Demand Calculations submitted for the project placed water demand for existing uses on the property (residential-0.75 af/yr; and Clos Pegas Winery process–4.30 af/yr; visitation/marketing-.65 af/yr) at 5.70 af/yr. The proposed winery project places the proposed new demand for the parcel (Girard Winery processing–4.30 af/yr; visitation and marketing–0.50 af/yr for a total 4.80 af/yr) plus the existing demand (5.70 af/yr) to equal a total demand of 10.50 af/yr., which is less than half of the 26.53 acre-foot/year threshold

The analysis report states that currently, all vineyard irrigation (for both APN:020-150-12 and APN:020-150-017) is provided from using the existing irrigation pond located on the proposed Girard Winery property. The existing irrigation pond is filled with rainwater, vineyard subdrain collection water, and treated process wastewater. No well has been used to irrigate the existing vineyards. The existing and proposed landscaping will also use the treated processed wastewater. In addition, the proposed Girard Winery will contribute additional process wastewater into the reclaimed wastewater irrigation system. Therefore, vineyard irrigation and landscaping are not included in the groundwater demand.

Based upon the total demand from the existing uses plus the new winery,10.50 af/yr, the project would be well below the established threshold for groundwater use on the property (26.53 af/yr). The County is not aware of, nor has it received any reports of, groundwater shortages near the project area. The project will not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater level.

PLANNING COMMISSION HEARING – JANUARY 21, 2015
EXHIBIT B – CONDITIONS OF APPROVAL

Girard Winery
Application Number(s) P14-00053
1077 Dunaweal Lane, Calistoga, CA 94594515
(APN 020-150-017)

1. SCOPE

A. Approval of a Use Permit (P14-00053) to establish a new winery with an annual production capacity of 200,000 gallons as follows:

1. Construction of new winery building, totaling 32,771 sq.ft. in area to include: 28,955 sq.ft. production area (crush area, fermentation and barrel storage, restrooms); 3,816 sq.ft of accessory use area (offices, tasting rooms, retail storage, catered food prep area, and visitor restrooms), with a maximum height 35 ft. with 45 ft. tall cupolas. In addition a 2,628 sq. ft. covered veranda; and a 2,871 sq. ft. covered work area;
2. Hosted daily tours and tastings for wine trade personnel and consumers by appointment only for a maximum 75 persons per weekday (Monday-Friday); maximum 90 persons per weekend day (Saturday-Sunday);
3. Hours of operation: 8:00 AM to 6:00 PM (production hours, except during harvest) and 10:00 AM to 6:00 PM (visitation hours) 7-days a week;
4. Employment of more than 25 employees: 11 employees (8 full time; 3 part-time) non harvest; during harvest 19 additional employees (12 full time and 7 part time);
5. Employee hours: production, 7:00 AM to 3:00 PM; hospitality/ tasting room, 9:30 AM to 6:30 PM; administration, 8:00 AM to 5:00 PM;
6. Construction of twenty-two (22) parking spaces;
7. Installation of landscaping, an entry gate and a winery sign;
8. Establish a Marketing Program as follows:
   i. Four (4) events per year with a maximum of 75 guests;
   ii. Four (4) events per year with a maximum of 200 guests; and,
   iii. One (1) Harvest event per year with a maximum of 500 guests.
   All food to be catered utilizing a ±184 sq. ft. small prep/staging area;
9. On-premise consumption of wines produced on site within the tasting room, covered veranda and landscaped winery gardens in accordance with Business and Professions Code Sections 23358, 23390 and 23396.5 (AB 2004 -Evans Bill also known as the Picnic Bill);
10. Construct a new 24" wide winery access driveway from Dunaweal Lane to the winery;
11. Construct additional piping and service connections to the existing water system with an update to the existing Transient Non-Community Water System contract to include the Girard Winery;
12. Installation of on-site sanitary disposal improvements and installation of connections into the existing on-site winery waste water ponds serving Clos Pegase Winery (APN: 020-150-012); and,
13. Installation of one 25,000 gallon water storage tank.

The winery shall be designed in substantial conformance with the submitted site plan, elevation drawings, and other submittal materials and shall comply with all requirements of the Napa County Code. It is the responsibility of the applicant to communicate the requirements of these conditions and mitigations (if any) to all designers, contractors, employees, and guests of the winery to ensure compliance is achieved. Any expansion or changes in use shall be approved in accordance with Section 18.124.130 of the Napa County Code and may be subject to the Use Permit modification process.

**Alternative locations for fire suppression tanks are permitted, subject to review and approval by the Director of Planning, Building, and Environmental Services, when such alternative locations do not change the overall concept, and do not conflict with any environmental mitigation measures or conditions of approval.

2. **PROJECT SPECIFIC CONDITIONS**

Should any of the Project Specific Conditions below conflict with any of the other, standard conditions included in this document, the Project Specific Conditions shall supersede and control.

A. Evans Consumption

Consistent with Business and Professions Code Sections 23358, 23390 and 23396.5 (AB 2004 -Evans Bill also known as the Picnic Bill) and the Planning, Building, and Environmental Services Director's July 17, 2008 memo, "Assembly Bill 2004 (Evans) & the Sale of Wine for Consumption On-Premises," on-premise consumption of wine purchased from the winery may occur solely within the hospitality area which includes the tasting rooms, covered veranda and landscaped winery garden area. Any and all visitation associated with on-premise consumption shall be subject to the maximum daily tours and tastings visitation limitation of 75 persons daily and 90 persons weekends, and/or applicable limitations of permittee's marketing plan.

B. Mitigation Measures:

The permittee shall comply with all mitigation measures identified in the adopted Initial Study/Mitigated Negative Declaration and Project Revision Statement/Mitigation Monitoring and Reporting Program prepared for the project, inclusive of the following:

1. Schedule employee work shifts to commence and conclude outside of PM peak periods between 4:00 and 6:00 p.m. weekdays, between 2:00 and 4:00 PM on Saturday; and between 1:00 to 3:00 PM Sunday.

   <u>Method of Monitoring</u>: Within ten (10) days of issuance of a Certificate of Final Occupancy for the winery, the applicant/permittee shall provide written documentation to the Director of Planning, Building, and Environmental Services which demonstrates that employee work shifts are scheduled to commence and conclude outside of the peak periods as stated above.

2. Schedule marketing event set up, arrival and departure to occur outside of weekday and Saturday PM peak PM traffic periods. Peak periods are between 4:00 and 6:00 PM weekdays, 2:00 and 4:00 PM on Saturday and 1:00 and 3:00 PM on Sunday.

   Method of Monitoring: The applicant/permittee shall maintain a log book (or similar record) demonstrating the marketing event set up, arrival and departure occurs outside of the weekday, Saturday and Sunday peak periods as stated above. The log book shall be made available to the Director of Planning, Building and Environmental Services upon request.

3. Install 2 directional sign (s) to direct traffic to Silverado Trail for southbound travel and to use State Highway 29 for northbound travel. Such sign shall be submitted for review and approval by the Planning, Building and Environmental Services Department as well as the Public Works Department prior to installation.

   Method of Monitoring: Within ten (10) days of issuance of a Certificate of Final Occupancy for the winery, the applicant/permittee shall submit for review and approval the sign design and its location to Planning, Building and Environmental Services Department as well as the Public Works Department.

C. The permittee shall comply during all construction activities with the Bay Area Air Quality Management District Basic Construction Mitigation Measures (Table 8-1, May 2011 Updated CEQA Guidelines) as provided below:

1. All exposed surfaces (e.g. parking areas, staging areas, soil piles, grading areas, and unpaved access (road) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt tracked out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.

8. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. The Air District's phone number shall also be visible.

D. General Compliance and Annual Audits

Permittee shall obtain and maintain all permits (Use Permits and Modifications) and licenses from the California Department of Alcoholic Beverage Control (ABC), United States Tax and Trade Bureau (TTB), Department of Food and Agriculture (CDFA) Grape Crush Inquiry data, all of which are required to produce and sell wine. In the event permittee loses required ABC or TTB permits and licenses, permittee shall cease marketing events and tours and tastings until such time as those ABC and/or TTB permits and licenses are re-established.

Visitation log books, custom crush client records, and any additional documentation determined by staff to be necessary to evaluate compliance may be requested by the County in the event the winery is chosen in the annual audit. The permittee (and their successors) shall be required to participate fully in the winery audit process.

E. No building, grading or sewage disposal permit shall be issued, nor shall beneficial occupancy be granted until all accrued planning permit processing fees have been paid in full.

3. **COMPLIANCE WITH OTHER DEPARTMENTS AND AGENCIES**

Project conditions of approval include all of the following County, Divisions, Departments and Agency (ies) requirements. The permittee shall comply with all applicable building codes, zoning standards, and requirements of County Divisions, Departments and Agencies at the time of submittal and may be subject to change. Without limiting the force of those other requirements which may be applicable, the following are incorporated by reference as enumerated herein:

A. Engineering Services Division as stated in their Memorandum dated July 11, 2014.
B. Environmental Health Division as stated in their Memorandum dated December 3, 2014.
C. Department of Public Works as stated in their Memorandum dated May 12, 2014.
D. Fire Department as stated in their Inter-Office Memo dated April 3, 2014.

The determination as to whether or not the permittee has substantially complied with the requirements of other County Divisions, Departments and Agencies shall be determined by those Divisions, Departments or Agencies. The inability to substantially comply with the requirements of other County Divisions, Departments and Agencies may result in the need to modify the approved use permit.

4. **VISITATION**

Consistent with Sections 18.16.030 and 18.20.030 of the Napa County Code, marketing and tours and tastings may occur at a winery only where such activities are accessory and "clearly incidental, related, and subordinate to the primary operation of the winery as a production facility." Marketing and/or Tours and Tastings are not typically authorized until grant of the certificate of final occupancy, but exceptions where extenuating circumstances exist and are subject to review and approval by the County Building Official, County Fire Marshal, and the Director of Planning, Building and Environmental Services.

A log book (or similar record) shall be maintained which documents the number of visitors to the winery (be they tours and tastings or marketing event visitors), and the dates of their visit. This record of visitors shall be made available to the Planning, Building and Environmental Services Department upon request.

A. **TOURS AND TASTING**

Tours and tastings are limited to the following:

1. Frequency: 7 days per week, Monday through Sunday
2. Maximum number of persons per day: 75 weekdays (M-F);
3. Maximum number of persons on weekends: 90 (Sat - Sun);
4. Maximum number of persons per week: 555 (70 weekdays; 90 weekends);
5. Hours of operation: 10:00 AM to 6:00 PM; and,
6. All food to be catered utilizing a ±184 sq. ft. small prep/staging area.

"Tours and tastings" means tours of the winery and/or tastings of wine, where such tours and tastings are limited to persons who have made unsolicited prior appointments for tours or tastings. Tours and tastings may include food and wine pairings, where all such food service is provided without charge except to the extent of cost recovery and is incidental to the tasting of wine. Food service may not involve menu options and meal service such that the winery functions as a café or restaurant. (Napa County Code Sections 18.08.370, 18.16.030, 18.08.620, 18.20.030)

Start and finish time of tours and tastings shall be scheduled to minimize vehicles arriving or leaving between 4:00 PM and 6:00 PM, and shall be limited to those wines set forth in Napa County Code *18.16.03(G)(5)(c).*

B. **MARKETING**

Marketing events are limited to the following:

1. Frequency: Four times per year
   Number of persons: 75 maximum
   Time of Day: 10:00 AM – 6:00 PM*.*

2. Frequency: Four times per year
   Number of persons: 200 maximum
   Time of Day: 10:00 AM – 6:00 PM

3. Frequency: One (1) time per year
   Number of persons: 500 maximum
   Time of Day: 10:00 AM – 6:00 PM*.*

"Marketing of wine" means any activity of a winery which is conducted at the winery on a prearranged basis for the education and development of customers and potential customers with respect to wine which can be sold at the winery on a retail basis pursuant to Chapters 18.16 and 18.20 of the Napa County Code. Marketing of wine may include cultural and social events directly related to the education and development of customers and potential customers provided such events are clearly incidental, related and subordinate to the primary use of the winery. Marketing of wine may include food service, including food and wine pairings, where all such food service is provided without charge except to the extent of cost recovery.

Business events are similar to cultural and social events, in that they will only be considered as “marketing of wine” if they are directly related to the education and development of customers and potential customers of the winery and are part of a marketing plan approved as part of the winery’s use permit. Marketing plans in their totality must remain “clearly incidental, related and subordinate to the primary operation of the winery as a production facility” (subsection (G) (5) of Sections 18.16.030 and subsection (I) (5) of 18.20.030 of the Napa County Code). To be considered directly related to the education and development of customers or potential customers of the winery, business events must be conducted at no charge except to the extent of recovery of variable costs, and any business content unrelated to wine must be limited. Careful consideration shall be given to the intent of the event, the proportion of the business event’s non-wine-related content, and the intensity of the overall marketing plan. (Napa County Code Sections 18.08.370, 18.16.030, 18.08.620, 18.20.030)

Start and finish time of activities shall be scheduled to minimize vehicles arriving or leaving between 4:00 PM and 6:00 PM. If any event is held which will exceed the available on-site parking, the applicant shall have prepared an event specific parking plan which may include, but not be limited to, valet service or off-site parking and shuttle service to the winery.

5. **GRAPE SOURCE**

At least 75% of the grapes used to make the winery's wine shall be grown within the County of Napa. The permittee shall keep records of annual production documenting the source of grapes to verify that 75% of the annual production is from Napa County grapes. The report shall recognize the Agriculture Commission's format for County of origin of grapes and juice used in the Winery Production Process. The report shall be provided to the Planning, Building & Environmental Services Department upon request, but shall be considered proprietary information not available to the public.

6. **RENTAL/LEASING**

No winery facilities, or portions thereof, including, without limitation, any kitchens, barrel storage areas, or warehousing space, shall be rented, leased, or used by entities other than persons producing and/or storing wine at the on-site winery, such as alternating proprietors and custom producers, except as may be specifically authorized in this use permit or pursuant to the Temporary Events Ordinance (Napa County Code Chapter 5.36).

7. **SIGNS**

Prior to installation of any winery identification or directional signs, detailed plans, including elevations, materials, color, and lighting, shall be submitted to the Planning, Building, and Environmental Services Department for administrative review and approval. Administrative review and approval is not required if signage to be installed is consistent with signage plans submitted, reviewed and approved as part of this use permit approval. All signs shall meet the design standards as set forth in Chapter 18.116 of the Napa County Code. At least one sign placed and sized in a manner to inform the public must legibly include wording stating "Tours and Tasting by Prior Appointment Only".

8. **LIGHTING**

All exterior lighting, including landscape lighting, shall be shielded and directed downward, shall be located as low to the ground as possible, shall be the minimum necessary for security, safety, or operations, and shall incorporate the use of motion detection sensors to the greatest extent practical. No flood-lighting or sodium lighting of the building is permitted, including architectural highlighting and spotting. Low-level lighting shall be utilized in parking areas as opposed to elevated high-intensity light standards. Lighting utilized during harvest activities is not subject to this requirement.

<u>Prior to issuance of any building permit pursuant to this approval, two copies of a detailed lighting plan showing the location and specifications for all lighting fixtures to be installed on the property shall be submitted for Planning Division review and approval.</u> All lighting shall comply with the California Building Code.

9. **LANDSCAPING**

Two (2) copies of a detailed final landscaping and irrigation plan, including parking details, shall be submitted with the Building Permit application package for the Planning Division's review and approval prior to the issuance of any building permit associated with this approval. The plan shall be prepared pursuant to the County's Water Efficient Landscape Ordinance (WELO Napa County Codes Chapter 18.118) as applicable, and shall indicate the names and locations of all plant materials to be used along with their method of maintenance.

Plant materials shall be purchased locally when practical. The Agricultural Commissioner's office (707-253-4357) shall be notified of all impending deliveries of live plants with points of origin outside of Napa County.

No trees greater than 6" DBH shall be removed, except for those identified on the submitted site plan. Trees to be retained shall be protected during construction by fencing securely installed at the outer most dripline of the tree or trees. Such fencing shall be maintained throughout the duration of the work undertaken in connection with the winery development/construction. In no case shall construction material, debris or vehicles be stored in the fenced tree protection area.

Evergreen screening shall be installed between the industrial portions of the operation (e.g. tanks, crushing area, parking area, etc.) and any off-site residence from which these areas can be viewed.

Landscaping shall be completed prior to issuance of a certificate of final occupancy, and shall be permanently maintained in accordance with the landscaping plan.

10. **OUTDOOR STORAGE/SCREENING/UTILITIES**

All outdoor storage of winery equipment shall be screened from the view of adjacent properties by a visual barrier consisting of fencing or dense landscaping. No item in storage is to exceed the height of the screening. Water and fuel tanks, and similar structures, shall be screened to the extent practical so as to not be visible from public roads and adjacent parcels.

New utility lines required for this project that are visible from any designated scenic transportation route (see Community Character Element of the General Plan and Chapter 18.106 of the Napa County Code) shall be placed underground or in an equivalent manner be made virtually invisible from the subject roadway.

11. **COLORS**

The colors used for the roof, exterior walls and built landscaping features of the winery shall be limited to earth tones that will blend the facility into the colors of the surrounding site specific vegetation and the applicant shall obtain the written approval of the Planning, Building & Environmental Services Department prior to painting the building. Highly reflective surfaces are prohibited.

12. **SITE IMPROVEMENTS AND ENGINEERING SERVICES-SPECIFIC CONDITIONS**

Please contact (707) 253-4417 with any questions regarding the following.

A. **GRADING AND SPOILS**

All grading and spoils generated by construction of the project facilities, including cave spoils, shall be managed per Engineering Services direction. All spoils piles shall be removed prior to issuance of a certificate of final occupancy.

B. **TRAFFIC**

Reoccurring and scheduled vehicle trips to and from the site for employees, deliveries, and visitors shall not occur during peak (4-6 PM) travel times to the maximum extent possible. All road improvements on private property required per Engineering Services shall be maintained in good working condition and in accordance with the Napa County Roads and Streets Standards.

C. **DUST CONTROL**

Water and/or dust palliatives shall be applied in sufficient quantities during grading and other ground disturbing activities on-site to minimize the amount of dust produced. Outdoor construction activities shall not occur during windy periods.

D. **STORM WATER CONTROL**

The permittee shall comply with all construction and post-construction storm water pollution prevention protocols as required by the County Engineering Services Division, and the California Regional Water Quality Control Board (CRWQCB).

E. **PARKING**

The location of employee and visitor parking and truck loading zone areas shall be identified along with proposed circulation and traffic control signage (if any).

Parking shall be limited to approved parking spaces only and shall not occur along access or public roads or in other locations except during harvest activities and approved marketing events. In no case shall parking impede emergency vehicle access or public roads.

F. **GATES/ENTRY STRUCTURES**

Any gate installed at the winery entrance shall be reviewed by the Planning, Building & Environmental Services Department, and the Napa County Fire Department to assure that it is designed to allow large vehicles, such as motorhomes, to turn around if the gate is closed without backing into the public roadway, and that fire suppression access is available at all times. If the gate is part of an entry structure an additional permit shall be required according to the Napa County Code and in accordance with the Napa County Roads and Street Standards. A separate entry structure permit is not required if the entry structure is consistent with entry structure plans submitted, reviewed, and approved as part of this use permit approval.

13. **ENVIRONMENTAL HEALTH-SPECIFIC CONDITIONS**

Please contact (707) 253-4471 with any questions regarding the following.

A. **WELLS**

The permittee may be required (at the permittee's expense) to provide well monitoring data if the Director of Planning, Building and Environmental Services determines that water usage at the winery is affecting, or would potentially affect, groundwater supplies or nearby wells. Data requested could include, but would not necessarily be limited to, water extraction volumes and static well levels. If the applicant is unable to secure monitoring access to neighboring wells, onsite monitoring wells may need to be established to gauge potential impacts on the groundwater resource utilized for the project proposed. Water usage shall be minimized by use of best available control technology and best water management conservation practices.

In the event that changed circumstances or significant new information provide substantial evidence that the groundwater system referenced in the use permit would significantly affect the groundwater basin, the Director of Planning, Building and Environmental Services shall be authorized to recommend additional reasonable conditions on the permittee, or revocation of this permit, as necessary to meet the requirements of the Napa County Groundwater Ordinance (Napa County Code Chapter 13.15) and protect public health, safety, and welfare. That recommendation shall not become final unless and until the Director has provided notice and the opportunity for hearing in compliance with the Napa County Code §13.15.070 (G-K).

B. **NOISE**

Construction noise shall be minimized to the greatest extent practical and allowable under State and local safety laws. Construction equipment mufflering and hours of operation shall be in compliance with Napa County Code Chapter 8.16. Equipment shall be shut down when not in use. Construction equipment shall normally be staged, loaded, and unloaded on the project site. If project terrain or access road conditions require construction equipment to be staged, loaded, or unloaded off the project site (such as on a neighboring road or at the base of a hill), such activities shall only occur between the hours of 8 AM to 5 PM. Exterior winery equipment shall be enclosed or muffled and maintained so as not to create a noise disturbance in accordance with the Napa County Code. There shall be no amplified sound system or amplified music utilized outside of approved, enclosed, winery buildings.

14. **ARCHEOLOGICAL FINDING**

In the event that archeological artifacts or human remains are discovered during construction, work shall cease in a 50-foot radius surrounding the area of discovery. The permittee shall contact the Planning, Building and Environmental Services Department for further guidance, which will likely include the requirement for the permittee to hire a qualified professional to analyze the artifacts encountered and to determine if additional measures are required.

If human remains are encountered during the development, all work in the vicinity must be, by law, halted, and the Napa County Coroner informed, so that the coroner can determine if an investigation of the cause of death is required, and if the remains are of Native American origin. If the remains are of Native American origin, the nearest tribal relatives as determined by the State Native American Heritage Commission shall be contacted by the permittee to obtain recommendations for treating or removal of such remains, including grave goods, with appropriate dignity, as required under Public Resources Code Section 5097.98.

15. **ADDRESSING**

All project site addresses shall be determined by the Planning, Building and Environmental Services Director, and be reviewed and approved by the United States Post Office, prior to issuance of any building permit. The Director reserves the right to issue or re-issue an appropriate situs address at the time of issuance of any building permit to ensure proper identification and sequencing of numbers. For multi-tenant or multiple structure projects, this includes building permits for later building modifications or tenant improvements.

16. **INDEMNIFICATION**

If an indemnification agreement has not already been signed and submitted, one shall be signed and returned to the County within twenty (20) days of the granting of this approval using the Planning, Building and Environmental Services Department's standard form.

17. **AFFORDABLE HOUSING MITIGATION**

Prior to County issuance of a building permit, the applicant shall pay the Napa County Affordable Housing Mitigation Fee in accordance with the requirements of Napa County Code Chapter 18.107 or as may be amended by the Board of Supervisors.

18. **PREVIOUS CONDITIONS**

As applicable, the permittee shall comply with any previous conditions of approval for the winery use except as they may be explicitly modified by this action. To the extent there is a conflict between previous conditions of approval and these conditions of approval, these conditions shall control.

19**.** **MONITORING COSTS**

All staff costs associated with monitoring compliance with these conditions, previous permit conditions, and project revisions shall be borne by the permittee and/or property owner. Costs associated with conditions and mitigation measures that require monitoring, including investigation of complaints, other than those costs related to investigation of complaints of non-compliance that are determined to be unfounded, shall be charged. Costs shall be as established by resolution of the Board of Supervisors in accordance with the hourly consulting rate established at the time of the monitoring and shall include maintenance of a $500 deposit for construction compliance monitoring that shall be retained until grant of certificate of final occupancy. Violations of conditions of approval or mitigation measures caused by the permittee's contractors, employees, and/or guests are the responsibility of the permittee.

The Planning Commission may implement an audit program if compliance deficiencies are noted. If evidence of compliance deficiencies is found to exist by the Commission at some time in the future, the Commission may institute the program at the applicant's expense (including requiring a deposit of funds in an amount determined by the Commission) as needed until compliance assurance is achieved. The Planning Commission may also use the data, if so warranted, to commence revocation hearings in accordance with §18.124.120 of the Napa County Code.

20. **TEMPORARY AND FINAL OCCUPANCY**

All project improvements, including compliance with applicable codes, conditions, and requirements of all departments and agencies with jurisdiction over the project, shall be completed prior to granting of a certificate of final occupancy by the County Building Official, which, upon granting, authorizes all use permit activities to commence. The County Building Official is authorized to grant a temporary certificate of occupancy to allow specified limited use of the project, such as commencement of production activities, prior to completion of all project improvements. Marketing and/or Tours and Tastings are not typically authorized until grant of certificate of final occupancy, but exceptions where extenuating circumstances exists and are subject to review and approval by the County Building Official, County Fire Marshal, and the Director of Planning, Building and Environmental Services. In special circumstances, departments and/or agencies with jurisdiction over the project are authorized as part of the temporary certificate of occupancy process to require a security deposit or other financial instrument to guarantee completion of unfinished improvements. Consistent with Board of Supervisors Resolution № 2010-48, "Temporary Certificates of Occupancy are generally not to be used to allow production of wine for more than one year."

NAPA COUNTY

CONSERVATION — DEVELOPMENT
AND PLANNING DEPARTMENT

JAMES H. HICKEY
Director

1195 THIRD STREET, ROOM 210 • NAPA, CALIFORNIA 94559-3092
AREA CODE 707/253-4416

Assessor's Parcel # 20-150-12

May 28, 1987

Clos Pegase Winery
P.O. Box 305
Calistoga, Ca. 94515

Please be advised that Use Permit Application Number U-458687 to expand the winery with the increase in annual production, roof an existing work area, add 19,000 sq. ft. in caves on the winery site and to construct wastewater treatment ponds on the adjacent parcel across Dunaweal Lane located along Dunaweal Lane approximately 500 feet south of Silverado Trail within an AP (AGricultural Preserve) District. has been approved by the Napa County Conservation, Development and Planning Commission based upon the following conditions:

(SEE ATTACHED LIST OF CONDITIONS OF APPROVAL)

APPROVAL DATE: May 27, 1987

The use permit becomes effective ten (10) working days from the approval date unless an appeal is filed with the Napa County Board of Supervisors pursuant to Title XIII of the Napa County Code. In the event an appeal is made to the Board, you will be notified.

Pursuant to Section 12806 of the Napa County Code, the use permit must be activated within one (1) year and ten (10) calendar days from the approval date or the use permit shall automatically expire and become void. A one-year extension of time in which to activate the use permit may be granted by the County provided that such extension request is made thirty (30) days prior to the expiration date. A request for an extension of time is subject to payment of a $190.00 filing fee.

Very truly yours,

J. H. Hickey

JAMES H. HICKEY
Secretary/Director

JHH:ml:1

NOTE: Approved with modification of condition #3:

Director authorized to increase minimum parking spaces to 70 if circumstances require.

Approved with additional Mitigation Measures (see Attachment A)

cc: Bill L. Hall, Building Codes Administrator
Assessor's Office

EXHIBIT 15

PAGE 1 OF 2

Rev. 4/87

ATTACHMENT A

Additional Mitigation Measures
imposed by the Conservation, Development and
Planning Commission

Meeting: May 27, 1987
File #: U-458687

AESTHETICS

- Screen visibile portions of the waste water treatment ponds from residences along the Silverado Trail south easterly of Dunaweal Lane with strategically placed native vegetation.

AIR QUALITY

- Use gravel and chemical suppressants as often as necessary for on-site roads used by heavy equipment, to mitigate particulate emission impacts.

- Use watering of working areas, storage pile surfaces and traffic areas, to mitigate particulate emission impacts.

- Cover cave tailings storage pile surfaces with topsoil and revegetate prior to the start of the wet season (October 15), to prevent erosion and minimize particulate emission impacts.

EXHIBIT 15

CONDITIONS OF APPROVAL

Agenda Item: 10

Meeting Date: May 20, 1987
Use Permit: #U-458687

1. The permit be limited to an increase in annual production capacity not to exceed 200,000 gallons.

2. Winery expansion shall be in accordance with project description and drawings submitted on January 23, 1987, made as part of this application, including 1) project phasing, 2) location and 3) design (as maybe modified by the Commission).

   Any expansion or changes in use to be by separate Use Permit submitted for Commission consideration.

3. Provisions for a minimum of 35 off-street parking spaces on a dust free, all weather surface approved by the Public Works Department

4. Excavated material related to 19,000 square feet of addition tunnels, shall not be sold for commercial purposes, but shall be disposed of in a manner approved by the Director.

5. Compliance with all applicable building codes, zoning standards and requirements of various County departments and agencies.

6. Mitigation measures contained in the attached Negative Declaration.

:3f

ATTACHMENT 1

Mitigation Measures for
Clos Pegase - Kiriko Ltd.
Use Permit (#U-458687)

HYDROLOGY, WATER QUALITY

1. Plans for the proposed private sewage disposal system shall be designed by a licensed Civil Engineer and be accompanied by complete design criteria based upon local conditions and shall be subject to approval by the Department of Environmental Health prior to issuance of any permits.

2. That the use of the drainfield area be restricted to activities which will not contribute to compaction of the soil with consequent reduction in soil aeration. This includes equipment storage, traffic, livestock, etc., over the system.

3. The applicant shall maintain regular monitoring of the waste water system required by the Department of Environmental Health and submit quarterly reports. An annual permit is required.

4. Since the proposed ponds are to be installed on a separate parcel from the facility they are to serve, an agreement to grant a sewage easement must be filed with the Department of Environmental Health prior to issuance of sewage permits.

5. That the water supply system comply with the California Safe Drinking Water Act. This will require an annual permit from the Department of Environmental Health. A plan review of the water system will also be required.

6. That all solid waste be stored and disposed of in a manner to prevent nuisances or health threats from insects, vectors and odors.

7. Restriction of all ground disturbing activities (i.e., grading) to the dry season between April 15 and October 15.

8. Replanting of all areas disturbed by grading and construction activities prior to the beginning of the rainy season (by mid-October) to the satisfaction of the Resource Conservation District. It is recommended that topsoil be stockpiled to be redistributed on cut and fill slopes for more successful revegetation efforts.

9. Erosion control be provided to dispose of any concentrated runoff from all buildings constructed on parcel, including a storm drain plan indicating energy dissipation structures to be installed.

10. Water shall not be allowed to flow over cut and fill slopes. Drainage shall be intercepted and diverted away from cut and fill slopes by use of up slope berms or interceptor ditches and energy dissipation structures shall be installed when necessary.

11. Sediment catch basins shall be installed to contain the sediment runoff and keep it from moving into water channels beyond the property boundaries.

NOISE

12. Limitation of all construction activities on the proposed facilities to weekdays between Monday and Friday when they will cause the least amount of annoyance (i.e., between 7:30 AM and 4:30 PM).

13. All construction equipment shall be property and adequately mufflered at all times.

14. Place noisy stationary equipment such as compressors and pumps away from developed areas off-site and/or the provision of acoustical shielding around such equipment.

AESTHETICS

15. All exterior lighting shall be shielded and directed away from residences and roadways off-site.

CULTURAL

16. Placement in the specifications covering this project of a stipulation binding the applicant, his employees, and/or contractor(s) to stop all work within 35 feet if buried archaeological or historic materials are discovered during future development. A qualified archaeologist shall be retained to evaluate the find(s) and to recommend mitigation procedures, if necessary. Prehistoric archaeological materials include, but are not limited to, obsidian, chert, and basalt flakes and artifacts, groundstone (such as portars and pestles), shell beads and pendants, midden (locally darkened soil), and human graves. Historic archaeological materials include, but are not limited to, glass bottles, privys, and ceramics. All such recommendations, with the concurrence of the County Planning Director, be implemented.

TRAFFIC

17. Right of way widening to 30 feet from the centerline of Dunaweal Lane be granted to the County for roadway and utility purposes.

18. The access road serving the winery be a minimum width of 20 feet and consist of a minimum structural section equivalent to 5 inches of Class II Aggregate Base plus 2 inches of Asphalt Concrete.

19. Visitor parking areas shown on the site plan and any additional visitor parking required by the Commission have a minimum structural section equivalent to the same as the above access road.

20. Employee parking areas shown on the site plan and any additional areas required by the Commission have a minimum structural section equivalent to 5 inches of Class II Aggregate Base plus a double seal coat.

21. Any necessary storm drainage improvements be constructed.

22. All the above improvements be constructed according to plans prepared by a registered civil engineer and reviewed and approved by this department. A plan check and inspection fee in an amount equal to 3% of the estimated cost of construction of the above improvements be paid this department.

23. All construction within the County road right of way be in accordance with an encroachment permit issued by the Department of Public Works.

PUBLIC HEALTH

24. Compliance with Napa County Mosquito Abatement District Guidelines including:

   A. Access to ponds for maintaining mosquito control, weed control, and aquatic midge (gnats) control.

   B. Good access road to ponds.

   C. All levees, cross levees, and dikes wide enough for vehicular traffic (minimum 12 feet).

   D. Keys to locks or a place for Mosquito Abatement District lock on any gate to ponds.

   E. Fences on outside of levees enough to facilitate vehicular traffic.

   F. All levees, cross levees, and dikes clear of obstructions (pipes, pumps, electrical boxes, fuel tanks, etc.) to permit vehicular traffic.

25. Weed Control

   A. Property owners shall furnish soil sterilant (Aetrex, Krovar, Karmex, etc.).

   B. Mosquito Abatement District will apply on yearly basis.

26. Aquatic Midge Control

   A. Be able to launch boat in ponds (or lakes) for midge control.

NOTE: Any pond, lake, or reservoir, is a good potential midge source.

I understand and explicitly agree that with regards to all CEQA and Permit Streamlining Act (i.e., GCS 63920-63962) processing deadlines, this revised application will be treated as a new project. The new date on which said application will be considered complete is the date this project revision statement is received by the Napa County Conservation, Development and Planning Department.

I AGREE TO INCLUDE THE ABOVE MITIGATION MEASURES IN THE PROJECT.

[signature] 4/21/87
Date

Date

CONSERVATION, DEVELOPMENT AND PLANNING DEPARTMENT
SUPPLEMENTAL INFORMATION SHEET
USE PERMIT APPLICATION

1. DESCRIPTION OF PROPOSED USE:

USE: operation of vineyard and bonded winery

PRODUCT OR SERVICE PROVIDED: Table wine

FLOOR AREA: EXISTING STRUCTURES 25,000 SQ. FT. NEW CONSTRUCTION 1,600 SQ. FT. of for existing work area and 19,000 sq.ft. additional tunnels.
INDICATE SQUARE FOOTAGE ON EACH FLOOR DEVOTED TO EACH SEPARATE USE WITHIN AN EXISTING ground floor: 1,600 sq.ft. roof for existing work area;
AND/OR PROPOSED BUILDING: 19,000 sq.ft. caves for barrel and bottle aging of (underground)

SEATING CAPACITY: RESTAURANT N/A BAR N/A OTHER N/A

EXISTING STRUCTURES OR IMPROVEMENTS TO BE REMOVED: N/A

RELATED NECESSARY CONCURRENT OR SUBSEQUENT PROJECTS ON THE SITE OR IN SURROUNDING
Install process wastewater system of approx. 1.5 million gallons capacit
AREAS: on approx. 2 acres of AP# 20-150-17 with pipelines

2. NEW CONSTRUCTION: PHASE I: pave drive, install process wastewater system an 1,600 sq.ft. roof. PHASE II: install aging caves.
PROJECT PHASING:

CONSTRUCTION TIME REQUIRED (EACH PHASE): PHASE I: 1987-1988. PHASE II: 1988-

TYPE OF CONSTRUCTION: Wood Frame Roof and Supports; Earth-fill Ponds; Excava Caves

MAX. HEIGHT (FT.): EXISTING STRUCTURES 35' PROPOSED STRUCTURES 10'±(Pc 25'±(Pc

DESCRIPTION OF PROPOSED EXTERIOR NIGHT LIGHTING: No change

3. AVERAGE OPERATION: N-Normal Season
H-Harvest Season

HOURS OF OPERATION 0700 N / 0500 H A.M. TO 1800 N / 2400 H P.M. DAYS OF OPERATION M-F N / 7 Days

NUMBER OF SHIFTS: 1 N / 2 H EMPLOYEES PER SHIFT: 5 N / 10 H FULL TIME X PART TIME
(CURRENTLY) (CURRENTLY)

NUMBER OF SHIFTS PROPOSED: 1 N / 2 H TOTAL EMPLOYEES PER SHIFT PROPOSED: 10 N / 15 H FULL TIME X PART TIME

NUMBER OF DELIVERIES OR PICK-UPS: PER DAY 2N / 6 H PER WEEK 10 N / 30 H

NO. VISITORS ANTICIPATED: PER DAY 75 Average (est.) / 200 Peak (est.) PER WEEK 725 week (e

ARE THERE SPECIAL OPERATIONS? PLEASE DESCRIBE ON SEPARATE PAGE No Change.

4. LANDSCAPING AND PARKING:

EXISTING LANDSCAPING PLAN SUBMITTED: YES X NO

PROPOSED LANDSCAPING PLAN SUBMITTED: YES No Chang NO

PARKING SPACES: EXISTING SPACES 35 EMPLOYEE 15 CUSTOMER 20

PROPOSED SPACES No Change EMPLOYEE CUSTOMER

5. UTILITIES:

WATER SUPPLY SOURCE: Two wells METHOD OF SEWAGE DISPOSAL: Domestic-septic tank and leach field Process-aerated lagoons w/spray dispos on vineyard and landscaping, existing r

IS ANNEXATION TO A SPECIAL SERVICE DISTRICT PROPOSED? YES ______ NO X

NAME OF DISTRICT: N/A

6. LICENSES OR APPROVALS REQUIRED:

DISTRICT N/A REGIONAL N/A

STATE No Change FEDERAL No Change

7. WINERY OPERATION:

X CRUSHING X FERMENTATION X STORAGE/AGING X BOTTLING/PACKING

X SHIPPING: VIA: truck; X ADMINISTRATIVE: X TOURS/PUBLIC TASTING

X OTHER: Process wastewater treatment and disposal.

GALLONS OF WINE TO BE PRODUCED: INITIAL OR CURRENT PRODUCTION 55,000 GALLONS/YR

REQUESTED PRODUCTION CAPACITY 200,000 GALLONS/YR

METHOD OF DOMESTIC WASTE DISPOSAL: Septic tank and leachfield.

METHOD OF INDUSTRIAL WASTE DISPOSAL: Septic tank and mound (existing) Aerated lagoons and spray disposal (prop

GALLONS OF DOMESTIC WASTE PRODUCED: 450 Average 800 Peak PER Day.

GALLONS OF INDUSTRIAL WASTE PRODUCED: 4,000 Normal 8,000 Harvest PER Day.

METHOD OF SOLID WASTE DISPOSAL: Removal by contract garbage service and/or application of pomace and stems to vineyards

CAPACITY OF WATER SUPPLY: 37 GPM GALLONS.

WATER AVAILABILITY: 200 GPM GALLONS PER MINUTE. (To winery)

ON-SITE FIRE PROTECTION: Hydrant/1,000GPM @ 50 PSI

EMERGENCY WATER STORAGE: 70,000 GALLONS. Tank and reservoir

TYPE OF STORAGE FACILITY: Concrete tank and frost control pond.

8. SPECIFIC INFORMATION FOR RESIDENTIAL CARE FACILITY/DAY CARE CENTERS:

TYPE OF CARE: N/A.

TOTAL NUMBER OF GUESTS/CHILDREN: EXISTING: N/A PROPOSED: N/A

NUMBER OF BEDROOMS: EXISTING: N/A PROPOSED: N/A

IS FACILITY LOCATED WITHIN 300 FEET OF ANOTHER FACILITY?: N/A.

NUMBER OF EMPLOYEES: FULL TIME: N/A PART TIME: N/A

IS#: 7692

NAPA COUNTY

CONSERVATION — DEVELOPMENT
AND PLANNING DEPARTMENT

JAMES H. HICKEY
DIRECTOR

1195 THIRD STREET, ROOM 210 · NAPA, CALIFORNIA 94558
AREA CODE 707/253-4416

RECEIVED
FEB 27 1987
PUBLIC WORKS DEPT.
COUNTY OF NAPA

PERMIT APPLICATION AND INITIAL STUDY
REQUEST FOR COMMENTS

TO: Public Works

APPLICATION TITLE: Clos Pegase / Kiriko Ltd. FILE #: U-458687

RESPONSE REQUEST DATE: 2-27-87 RESPONSE RETURN DATE: 3-13-87

This application (see enclosed project description and/or maps) is being sent to you for your review and comment.
With respect to environmental analysis, the County is assuming Lead Agency status for the project and will be preparing the necessary environmental documents.

Please advise us as to which of your permits is required, your environmental concerns, and whether you recommend that a Negative Declaration or an Environmental Impact Report be prepared on this project. Due to the provisions of AB 884, it is essential that we receive your comments within the next 10 days.

General Questions

1. Do you have jurisdiction by law over this project ☐Yes ☐No
2. Do you recommend: ☐Approval ☐Denial ☐No Recommendation
3. Recommend conditions-of-approval (use additional page if needed);
Our letter dated August 14 1984 is still applicable in all respects except that the applicant has granted the right of way widening.
4. Are you a responsible agency? ☐Yes ☐No. If yes, indicate required permits:
5. Indicate areas of environmental concern and availability of appropriate technical data:
6. Do you recommend: ☐Negative Declaration ☐Environmental Impact Report
7. Have you previously reviewed an application on any portion of this project?
☐Yes ☐No
8. Name of contact person: Telephone: 253-4351

Response Prepared by: JB Klein
Title: Civ Engr
Date: 4-1-87

cc: Clos Pegase, Inc

May 28, 1981

IS#: [illegible]

NAPA COUNTY

CONSERVATION — DEVELOPMENT AND PLANNING DEPARTMENT

JAMES H. HICKEY
DIRECTOR

1195 THIRD STREET, ROOM 210 • NAPA, CALIFORNIA 94558
AREA CODE 707/253-4416

PERMIT APPLICATION AND INITIAL STUDY
REQUEST FOR COMMENTS

TO: Bldg Insp

APPLICATION TITLE: Clos Pegase / Kiriko Ltd. FILE #: U-458687

RESPONSE REQUEST DATE: 2-27-87 RESPONSE RETURN DATE: 3-13-87

This application (see enclosed project description and/or maps) is being sent to you for your review and comment.
With respect to environmental analysis, the County is assuming Lead Agency status for the project and will be preparing the necessary environmental documents.

Please advise us as to which of your permits is required, your environmental concerns, and whether you recommend that a Negative Declaration or an Environmental Impact Report be prepared on this project. Due to the provisions of AB 334, it is essential that we receive your comments within the next 10 days.

General Questions

1. Do you have jurisdiction by law over this project ☒ Yes ☐ No
2. Do you recommend: ☐ Approval ☐ Denial ☒ No Recommendation
3. Recommend conditions-of-approval (use additional page if needed); OWNER SHALL SUBMIT PLANS AND TAKE-OUT REQUIRED Building PERMITS PRIOR TO START of Construction
4. Are you a responsible agency? ☒ Yes ☐ No. If yes, indicate required permits: Building, Plumbing, MECHANICAL AND ELECTRICAL PERMITS
5. Indicate areas of environmental concern and availability of appropriate technical data:
6. Do you recommend: ☐ Negative Declaration ☐ Environmental Impact Report
7. Have you previously reviewed an application on any portion of this project? ☒ Yes ☐ No
8. Name of contact person: Bill J. CRENSHAW Telephone: 253-4376

Response Prepared by: Bill Crenshaw
Title: Supt. Bldg Insp
Date: 3-10-87

May 28, 1981

NAPA COUNTY

DEPARTMENT OF ENVIRONMENTAL HEALTH

TRENT CAVE, R.S.
Director of Environmental Health

1195 THIRD STREET, ROOM 205 • NAPA, CALIFORNIA 94559
AREA CODE 707/253-4471

RECEIVED
MAR 11 1987
Napa County Conservation, Development & Planning Department

MEMORANDUM 03-11-87

To: Napa County Planning Department - James Hickey, Director

From: Department of Environmental Health - Tim Snellings, R.S.

Subject: Use Permit Application of Clos Pegase/Kiriko Ltd.

Located at Dunaweal Lane

A.P.# 20-150-12, 17 **FILE #** U-458687 **I.S.#** 2692

We have reviewed the above proposal and recommend approval of the use permit providing the following are included as conditions of approval :

1) Plans for the proposed private sewage disposal system shall be designed by a licensed Civil Engineer and be accompanied by complete design criteria based upon local conditions and shall be subject to approval by the Department of Environmental Health prior to issuance of any permits.

2) That the use of the drainfield area be restricted to activities which will not contribute to compaction of the soil with consequent reduction in soil aeration. This includes equipment storage, traffic, livestock, etc., over the system.

3) The applicant shall maintain regular monitering of the waste water system required by the Department of Environmental Health and submit quarterly reports. An annual permit is required.

4) Since the proposed ponds are to be installed on a separate parcel from the facility they are to serve, an agreement to grant a sewage easement must be filed with the Department of Environmental Health prior to issuance of sewage permits.

5) That the water supply system comply with the California Safe Drinking Water Act. This will require an annual permit from the Department of Environmental Health. A plan review of the water system will also be required.

6) That all solid waste be stored and disposed of in a manner to prevent nuisances or health threats from insects, vectors and odors.

cc : Kiriko Ltd.

TS/tc WD-2

IS#: 7692

NAPA COUNTY

JAMES H. HICKEY
DIRECTOR

RECEIVED
MAR 6 1987
Napa County Conservation,
Development & Planning Department

CONSERVATION — DEVELOPMENT
AND PLANNING DEPARTMENT

1195 THIRD STREET, ROOM 210 • NAPA, CALIFORNIA 94558
AREA CODE 707/253-4416

RECEIVED MAR 2 1987

PERMIT APPLICATION AND INITIAL STUDY
REQUEST FOR COMMENTS

TO: Napa Co Mosquito Abatement Dist

APPLICATION TITLE: Clos Pegase / Kiriko Ltd. FILE #: U-458687

RESPONSE REQUEST DATE: 2-27-87 RESPONSE RETURN DATE: 3-13-87

This application (see enclosed project description and/or maps) is being sent to you for your review and comment.
With respect to environmental analysis, the County is assuming Lead Agency status for the project and will be preparing the necessary environmental documents.

Please advise us as to which of your permits is required, your environmental concerns, and whether you recommend that a Negative Declaration or an Environmental Impact Report be prepared on this project. Due to the provisions of AB 334, it is essential that we receive your comments within the next 10 days.

General Questions

1. Do you have jurisdiction by law over this project ☐ Yes ☒ No
2. Do you recommend: ☐ Approval ☐ Denial ☒ No Recommendation
3. Recommend conditions-of-approval (use additional page if needed);

SEE ATTACHED GUIDELINES

4. Are you a responsible agency? ☐ Yes ☒ No. If yes, indicate required permits:

5. Indicate areas of environmental concern and availability of appropriate technical data:

6. Do you recommend: ☐ Negative Declaration ☐ Environmental Impact Report
7. Have you previously reviewed an application on any portion of this project? ☐ Yes ☒ No
8. Name of contact person: KEN CARDEN Telephone: 226-3915

Response Prepared by: KEN CARDEN
Title: FOREMAN
Date: 3-5-87

May 28, 1981

NAPA COUNTY
Mosquito Abatement District
P. O. Box 655 - 964 Imola Avenue West
Napa, California 94558
226-3915

GUIDELINES FOR MOSQUITO PREVENTION, WEED CONTROL AND MAINTENANCE IN WASTEWATER PONDS

A. Access to ponds for maintaining Mosquito Control, Weed Control, and Aquatic Midge (gnats) Control.

1. Good access road to ponds.

2. All levees, cross levees, and dikes wide enough for vehicular traffic (minimum 12 feet).

3. Keys to locks or a place for Mosquito Abatement District lock on any gate to ponds.

4. Fences on outside of levees enough to facilitate vehicular traffic.

5. All levees, cross levees, and dikes clear of obstructions (pipes, pumps, electrical boxes, fuel tanks, etc.) to permit vehicular traffic.

B. Weed Control

1. Property owners shall furnish soil sterilant (Aatrex, Krovar, Karmex, etc.).

2. Mosquito Abatement District will apply on yearly basis.

C. Aquatic Midge Control

1. Be able to launch boat in ponds (or lakes) for midge control.

NOTE: Any pond, lake, or reservoir, is a good potential midge source.

6/82

Small Water System Compliance Monitoring, Compliance Determination & Waivers

Stefan Cajina, P.E.
District Engineer, Central District
California Department of Health Services
Division of Drinking Water and Environmental Management

Outline

- Legal Obligations of Public Water Systems
- Water Supply Permits
- Emergency Notification Plans
- Operator Certification

Outline Continued

- Water Quality Monitoring Requirements:
  - Bacteriological
  - Inorganic Chemical Monitoring
  - Nitrate and Nitrite Monitoring
  - Organic Chemical Monitoring
  - Secondary Standards
  - Radionuclide Monitoring
  - Unregulated Chemicals
  - EDT Regulations
  - Distribution System Water Quality Monitoring
  - CA SWTR and LT1ESWTR
  - Consumer Confidence Report

- Questions ???

California Safe Drinking Water Act

- California's legal authority to carry out the federal Safe Drinking Water Act is defined in the California Health and Safety Code (CHSC), Chapter 4, "California Safe Drinking Water Act", Sections 116270-116751.
- Authority for additional programs is included in CHSC, Chapter 4.5, "Safe Drinking Water State Revolving Fund Law of 1997."
- The regulations to carry out the SDWA are defined in the California Code of Regulations, Title 17 and Title 22.

Definition of a Public Water System

California Health and Safety Code (CHSC) Section 116275:

- "Public Water System" means a system for the provision of water for human consumption through pipes or other conveyances that has 15 or more service connections or regularly serves 25 individuals daily at least 60 days out of the year.

Types of Public Water Systems

Community Water Systems

- A public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents of the area served by the system.
- Typically includes cities, residential areas, mobile home parks, etc.

Types of Public Water Systems (cont.)

Noncommunity Water Systems

- **Nontransient** – a public water system that is not a community water system and that regularly serve at least 25 of the same persons over 6 months per year.
  - Includes facilities that serve a generally stable population: schools, places of business, etc.
- **Transient** – a noncommunity water system that does not regularly serve at least 25 of the same persons over six months per year.
  - Includes facilities that serve a generally transient population: campgrounds, restaurants, stores, wineries, etc.

Regulatory Responsibility in California

- EPA has delegated primacy to enforce the Safe Drinking Water Act to DHS
- DHS has delegated primacy to 34 of the 58 counties (known as LPA counties) for small water systems
  - Community water systems < 200 service connections
  - Non-community water systems (transient and non-transient)

Key Legal Obligations of Public Water Systems (1)

Most of these will be discussed further in this presentation.

- Provide a reliable and adequate supply of pure, wholesome, healthful, and potable water.
- Obtain a Water Supply Permit and comply with all conditions.
- Use only approved drinking water sources.
- All new public water systems and those that change ownership must comply with Technical, Managerial, and Financial (TMF) requirements.
- Prepare and maintain an Emergency Notification Plan.

Key Legal Obligations of Public Water Systems (2)

- Employ or utilize only water treatment plant operators that have been certified by the Department of Health Services at the appropriate grade.
- Comply with operator certification requirements.
- Conduct water quality monitoring and submit results as required.
- Comply with bacteriological quality requirements.
- Comply with primary and secondary drinking water standards.
- Provide treatment as necessary to comply with requirements.

Key Legal Obligations of Public Water Systems (3)

- Comply with waterworks standards.
- Ensure that the water system will not be subject to backflow under normal conditions.
- Prepare and distribute an annual Consumer Confidence Report as required.
- Submit an annual report to the Department.
- Maintain records and submit reports as required.
- Pay all required fees.
- Use only NSF approved additives.
- Comply with Department orders and directives.

Reliable Supply

Section 116555 of the CHSC requires each public water system (PWS) to:

"Provide a reliable and adequate supply of pure, wholesome, healthful, and potable water."

- The system must have adequate source capacity and storage to meet average and peak demands.
- The system must be properly operated, maintained, and protected from damage and contamination.
- Water must always be delivered at proper pressure (20 psi).*

** Currently under review*

Water Supply Permit
Permit Requirements

- No person shall operate a public water system without applying for and receiving a valid permit.
- The Department may renew, reissue, revise or amend any domestic water supply permit when deemed necessary, whether or not an application has been filed.
- An application for an amended permit is required for changes in source, treatment or distribution system. Changes to the distribution system do not require an amendment if they comply with waterworks standards.
- Water systems may only use sources that are approved in the water supply permit.

Water Supply Permit
When is an Application Required?

- New water system
- Change of ownership
- Changes in source – new sources, change in status (from standby to active, etc.), change in method of collection, removal of sources
- Changes in treatment – chlorination, filtration, new treatment process
- Addition of a storage reservoir
- Major expansion of service area
- Consolidation of water systems
- Change in regulatory jurisdiction (i.e., from DHS to LPA)
- Change in water system classification

Water Supply Permit
Application

- Permit Application consists of:
  - Application form
  - Technical report
  - Permit application fees
  - Other information as required by the Department.
- Department will review information and inform applicant within 30 days if application is complete.
- If not complete, applicant must submit information within specified time frame.
- Once application is complete, Department has 90 days to approve or reject application.

Water Supply Permit
Technical Report

- Technical Report
  - General information
  - Technical, Managerial and Financial information (TMF)
  - Source information
  - Water quality monitoring
  - Drinking Water Source Assessment (to be discussed later)
  - Treatment information
  - Distribution system information
  - Engineering and design information
  - Plans and specifications
  - Operations/Maintenance plans
  - Additional information as required.

Emergency Notification Plan

- The ENP identifies procedures for the immediate notification of customers of any significant rise in bacterial count or other failure of a primary drinking water standard.
- The ENP must include:
  - Names and phone numbers (day and evening) of water system contact and alternates
  - Names and phone numbers (day and evening) of DHS or LPA contact and alternate.
  - Methods to be used to notify customers and detailed procedures (i.e., door-to-door, telephone, etc.)

Operator Certification

- New regulations effective January 2001
- **Treatment**: In 1971, laws and regulations governing the certification of the potable water treatment facility operation were enacted. These regulations established at what level water treatment facilities should be staffed, established minimum qualifications for testing at each of the five grade levels, and established criteria for the renewal and revocation of certificates. These regulations govern a program consisting of ~13,000 certified water treatment operators.

Operator Certification

- **Treatment and Distribution**: In 1998, the US EPA released Guidelines for the Certification and Recertification of Operators of Community and Nontransient Noncommunity Public Water Systems. Based on these guidelines, state regulations governing the certification of potable water treatment operators were revised to include distribution operators. **These regulations became effective on January 2001**. The new distribution grades are designated D1 through D5.

- http://www.dhs.ca.gov/ps/ddwem/publications/opcert/index.htm

Water Quality Monitoring Requirements

Constituent(s)	Source or System?	Type of System
Bacteriological	System	All
Primary Standards – Inorganic	Source	All (with exceptions)
Primary Standards – Organic	Source	Comm. & Nontransient
Secondary Standards	Source	Community
Unregulated Chemicals	Source	Comm. & Nontransient
Trihalomethanes and Haloacetic acids, MRDLs	System	Comm. & Nontransient
Radioactivity	Source	Community
Lead and Copper	System	Comm. & Nontransient
Surface Water Treatment	Source & System	All (with surface water)
Treated Water	System	All (if treatment req'd)

Bacteriological Quality

Each water supplier shall:

- Develop a sample siting plan that identifies routine and repeat sampling locations
- Collect routine, repeat,and replacement samples as required
- Have all samples analyzed by approved laboratories
- Notify the Department when there is an increase in the coliform bacteria in samples
- Comply with the bacteriological MCL

Bacteriological Quality
Routine Sample Siting Plan

- Required for all water systems
- Sample sites shall be representative of the water throughout the distribution system
  - All pressure zones
  - Areas supplied by each source
  - Areas served by each distribution reservoir
- Water supplier may rotate among sample sites if number of sites exceeds number required to be tested each month
- Use certified operators or trained personnel
- Keep the plan current

Bacteriological Quality
Routine Sample Siting Plan

- Plan must identify:
  - Routine sample sites
  - Repeat sample sites
  - Laboratory analyzing samples
  - Personnel to be notified by laboratory of positive samples
  - Contact name and phone numbers (day and evening) for DHS or LPA

Note: *Storage tanks, wells, blow offs, and fire hydrants are not acceptable sampling locations*

Bacteriological Quality
Number of Samples

Routine Samples (CCR Table 64423-A)	
Type/Size of System	Minimum # Samples
Community Water Systems 25 - 1000 population > 1000 population	 1 sample per month See Table 64423-A
Nontransient Noncommunity 25 - 1000 population > 1000 population	 1 sample per month See Table 64423-A
Transient Noncommunity - GW 25 - 1000 population > 1000 population	 1 sample per quarter See Table 64423-A
Transient Noncommunity - SW 25 - 1000 population > 1000 population	 1 sample per month See Table 64423-A

Bacteriological Quality
Sample Collection and Analysis

- Sample Collection – make sure that
  - Sampler is adequately trained
  - Samples are correctly taken
  - Samples are labeled correctly: routine, repeat, special, replacement
- Sample Analysis
  - Use an approved laboratory
  - Have sample analyzed for total coliform (T.C.)
  - If T.C. present, lab must sample for fecal coliform or E. coli
  - Lab must notify water supplier within 24 hours of presence of T.C., fecal coliform, or E. coli

Bacteriological Quality
Reporting Results

- Analytical results for a month must be submitted to DHS or LPA by the 10^{th} of the following month.
- For systems serving a population < 10,000, laboratories are required to submit results directly to DHS or LPA
- Water supplier must keep results for at least 5 years

Bacteriological Quality
Repeat Sampling

- If a routine sample is T.C. positive, the water supplier shall collect a repeat sample set within 24 hours of being notified
- Repeat sample set (for systems that collect one or fewer routine samples per month) = 4 samples:
  - 1 at original site
  - 1 within 5 connections upstream
  - 1 within 5 connections downstream
  - 1 at another location (DHS Guidance Memo 2003-03)
- If any of the repeat samples is T.C. positive, the water system has violated the Total Coliform MCL
- In the month following any T.C. positive sample, the water system shall take 5 routine samples

Bacteriological Quality

Repeat Sampling

Number of Repeat Samples

# Routine Samples/Month	# Repeat Samples	# Routine Samples Next Month
1 or Fewer	4	5
2, 3 or 4	3	5
5 or More	3	Per Routine Requirements

See additional comments in June 18, 2003 DHS Guidance Memo 2003-03: TCR Sample Siting Plan and SWS Repeat Sample Collection Sites

Bacteriological Quality
Repeat Sampling – Additional Repeats

- If any repeat sample is Total Coliform-Positive, the system must collect another set of repeat samples, as before…
- Until either:

- Total coliforms are not detected in one complete set of repeat samples, or
- The MCL has been violated and the system has notified the DHA or LPA

Note:If analysis or collection of samples cannot meet 24hr requirement, the system must notify DHS or LPA, who will determine how much more time will be allowed

Bacteriological Quality
Significant Rise in Bacterial Count

- DHS or LPA must be contacted if there is a violation of the Total Coliform MCL or any detection of fecal coliform or E. Coli
  - By end of day, or
  - Within 24 hours if DHS or LPA office closed
- When notifying DHS or LPA, include information on the current status of the system and activities that may have contributed to the results
- If DHS or LPA determines there is a Significant Rise in Bacterial Count, the water system shall implement its Emergency Notification Plan

Bacteriological Quality
Sample Invalidation

- DHS or LPA may invalidate a positive sample when there is evidence of a sampling site (non-distribution system) plumbing problem causing contamination.
  - Based on repeat sample results
  - Routine sample and repeat sample at original location are the only positive samples
  - Not if all repeats are negative
  - Not if system has only 1 service connection
- DHS or LPA may invalidate a positive sample if the laboratory, at the Purveyor's request, is willing to document laboratory error.
  - Replacement sample required from original sample site within 24 hours of notification

Bacteriological Quality
Sample Invalidation

Case 1.				
	Routine Sample		+	
	Repeat Set	- -	+	- -
	Repeat Set	- -	+	- -
			Flow ›	

Case 1 - Sample invalidated due to site contamination

Case 2.				
	Routine Sample		+	
	Repeat Set	- -	-	- -
			Flow ›	

Case 2 - Sample is not invalidated

Bacteriological Quality
TCR Violations

- Monthly MCL compliance is determined for each month in which the system is required to monitor for total coliforms
  - Calendar month - Not a 30-day period
- Acute MCL compliance is determined by sample results of routine and repeat samples
  - May span more than one month

Bacteriological Quality

Monthly MCL Violation (Requires Tier 2 Public Notice)

Number of Samples Analyzed/Month	System in Compliance with the MCL if…
Fewer than 40	No more than 1/month be total coliform-positive

Acute MCL Violation (Requires Tier 1 Public Notice)

	Total Coliform	*E.coli*/Fecal Coliform
Routine	+	-
Repeat	+	+

Routine	+	+
Repeat	+	-

Bacteriological Quality

Compliance Scenarios

PWS Takes 1 routine sample per month

Routine Sample TC+ EC-

A set of 4 repeats are required.

If all 4 repeats are analyzed as TC-, is there any violation?

Repeat Samples:

Original Site	TC-
Upstream	TC-
Downstream	TC-
Other Site	TC-

No violation, BUT the system must take a minimum of 5 routine samples in the following month

Bacteriological Quality
Compliance Scenarios

PWS Takes 1 routine sample per month

Routine Sample TC+ EC-

A set of 4 repeats are required.

Case 1 -One of the repeat samples was total coliform positive but E.coli negative.
Case 2 – PWS took NONE of the required 4 repeat samples

CASE 1

Repeat Samples:

Original Site	TC+ EC-
Upstream	TC-
Downstream	TC-
Other Site	TC-

CASE 2

Repeat Samples:

Original Site	NOT TAKEN
Upstream	NOT TAKEN
Downstream	NOT TAKEN
Other Site	NOT TAKEN

Case 1. That's a Monthly MCL violation (Requires Tier 2 Public Notice)

Case 2. That's is a Monitoring & Reporting (M&R) Violation (Requires Tier 3 Public Notice)

Bacteriological Quality
Compliance Scenarios

PWS Takes 1 routine sample per month

CASE 1		CASE 2	
Routine Sample	TC+ EC-	Routine Sample	TC+ EC+

A set of 4 repeats are required.

CASE 1		CASE 2	
Repeat Samples:		Repeat Samples:	
Original Site	TC+ EC+	Original Site	TC+ EC-
Upstream	TC-	Upstream	TC+ EC-
Downstream	TC-	Downstream	TC-
Other Site	TC-	Other Site	TC-

Cases 1 & 2 - ACUTE MCL violation (Require Tier 1 Public Notice)

Approved Coliform Test Methods

100 mL of sample must be used

- Total Coliforms:
  - Quantitative estimation (MTF)
  - Multiple Tube Fermentation
  - Membrane Filtration (MF)
  - Single vessel Presence-Absence (P/A) Methods (Colilert-Colisure, E*Colite, Colitag , Clark's)
- Fecal Coliforms:
  - MTF
  - MF
  - P/A confirmation with EC medium
- *E.coli*:
  - Colilert
  - Colisure
  - E*Colite
  - MF with nutrient agar + MUG
  -

CONFIRMATION: Fecal coliforms or *E.coli* must be determined for every TC positive sample

Primary Standards
Inorganic Chemicals

Note: As of January 2006 MCL for Arsenic is 0.01 mg/L

Table 64431-A

Maximum Contaminant Levels

Inorganic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
Aluminum	1.
Antimony	0.006
Arsenic	0.05
Asbestos	7 MFL*
Barium	1.
Beryllium	0.004
Cadmium	0.005
Chromium	0.05
Cyanide	0.2
Fluoride	2.
Mercury	0.002
Nickel	0.1
Nitrate (as NO3)	45.
Nitrate + Nitrite (sum as nitrogen)	10.
Nitrite (as nitrogen)	1.
Selenium	0.05
Thallium	0.002

*MFL = million fibers per liter; MCL for fibers exceeding 10 um in length.

Primary Standards
Inorganic Chemicals

- These are inorganic chemicals that represent a health risk to the consumer
- All community and nontransient water systems, and transient systems >1000 population, shall monitor for the chemicals in CCR, Title 22 Table 64431-A
- Monitoring frequency (except Nitrate)
  - Ground water sources – once every 3 years
  - Surface water sources – annually
- Detections above MCL (except Nitrate)
  - Inform DHS or LPA within 48 hrs and begin quarterly monitoring, or
  - Inform DHS or LPA within 7 days and collect second sample within 14 days. If average of 2 samples > MCL, begin quarterly monitoring
- Waivers possible that may reduce monitoring frequency

Primary Standards
Nitrate and Nitrite

- All systems shall monitor for Nitrate and Nitrite
- Nitrate monitoring frequency:
  - Transient systems – annually
  - Community and Nontransient systems:
    - Ground water sources – annually
    - Surface water sources – quarterly
- Nitrite monitoring frequency:
  - All systems – once every 3 years
- Detections above MCL
  - Laboratory must notify water system within 24 hrs
  - Second sample required
  - If average of samples > MCL contact DHS within 24 hours
  - If average of samples < MCL contact DHS within 7 days
- Detections > 50% of MCL
  - Conduct quarterly monitoring

Primary Standards
Fluoride and Asbestos

- Fluoride
  - All transient systems shall monitor once
  - Additional monitoring requirements if system fluoridates
- Asbestos
  - Community and Nontransient systems only
  - Source sampling same as for other inorganic chemicals
  - Distribution system sampling required if system has AC pipe
  - Waivers possible for systems not vulnerable to asbestos contamination in its source OR to leaching of AC pipes

Primary Standards
Arsenic

- In January 2006 EPA has adopted a MCLG for arsenic of 0 and a MCL of 0.010 mg/L
- All water systems must comply with new MCL of 0.010 mg/L
- Department is accepting pre-applications for SRF monies for projects dealing with arsenic problems

Primary Standards
Organic Chemicals

- These are organic chemicals that represent a health risk to the consumer. These include Volatile Organic Chemicals (VOCs) and Synthetic Organic Chemicals (SOCs)
- Monitoring required for Community and Nontransient systems
- Initial monitoring = four quarterly samples
- Repeat monitoring based on results; if no detections:

  VOCs
  - GW = 3 annual samples, then once every 3 years
  - SW = annual sampling

  SOCs
  - > 3,300 population = 2 quarterly samples once every three years
  - < 3,300 population = once every three years
- Waivers possible that may reduce repeat monitoring frequency

Primary Standards – Organic Chemicals

- If VOC or SOC detected:
  - Within 7 days, collect 1 or 2 *confirmation samples*
    - If no detection in 2 additional samples – disregard
    - If detected in an additional sample, detected level = average of original and additional sample
  - Additional requirements:
    - Additional monitoring required for certain chemicals
    - Repeat monitoring frequency increased. Title 22, Section 64445.1(c)(5)(B) Repeat sampling, outlines requirements for systems serving ≤3,300 persons
    - If concentration > 10 x MCL, immediately discontinue use of source, notify DHS within 48 hrs, and take a confirmation sample within 48 hrs

Secondary Standards

Table 64449-A

Secondary Maximum Contaminant Levels
Consumer Acceptance Limits

Constituents	***Maximum Contaminant Levels/Units***
Aluminum	**0.2 mg/L**
Color	**15 Units**
Copper	**1.0 mg/L**
Corrosivity	**Non-corrosive**
Foaming Agents (MBAS)	**0.5 mg/L**
Iron	**0.3 mg/L**
Manganese	**0.05 mg/L**
Methyl-*tert*-butyl ether (MTBE)	**0.005 mg/L**
Odor—Threshold	**3 Units**
Silver	**0.1 mg/L**
Thiobencarb	**0.001 mg/L**
Turbidity	**5 Units**
Zinc	**5.0 mg/L**

Table 64449-B

Secondary Maximum Contaminant Levels - Ranges

	Maximum Contaminant Level Ranges		
Constituent, Units	***Recommended***	***Upper***	***Short Term***
Total Dissolved Solids, mg/L	**500**	**1,000**	**1,500**
or			
Specific Conductance, micromhos	**900**	**1,600**	**2,200**
Chloride, mg/L	**250**	**500**	**600**
Sulfate, mg/L	**250**	**500**	**600**

Secondary Standards

- These are chemicals and constituents that affect the consumer acceptability of the water.
- Community water systems must monitor for those in Tables 64449-A and 64449-B, and these:
    - Bicarbonate
    - Carbonate
    - Hydroxide alkalinity
    - Calcium
    - Magnesium
    - Sodium
    - Total hardness
- Monitoring frequency:
    - Ground water = once every 3 years
    - Surface water = annually
- Waivers possible that may reduce monitoring frequency, per Title 22, Section 64449(e) and (h). Must renew every 9 years.

Radionuclide Monitoring

- Radioactivity
  - Community water systems must monitor source for naturally occurring gross alpha and uranium once every 4 years
  - Community water systems > 30,000 service conn. and system using surface water must monitor for man-made radioactivity once every 4 years

  The federal radionuclides rule became effective December 2003.

  Four quarters of initial monitoring are required by 01/31/07.

  - CA proposed regulation available at: http://www.dhs.ca.gov/ps/ddwem/publications/Regulations/proposedregulations.htm

Proposed Radionuclides Reg.

- Applies to community and non-transient, non-community water systems
- Initial Monitoring

- Each system needs to collect one sample from each source and monitor for gross alpha particle activity and Radium-228
- Monitoring for Radium-226 can be waived if the gross alpha particle activity is < 5 pCi/L
- Monitoring for Uranium can be waived if the gross alpha particle activity is < 15 pCi/L
- Frequency of monitoring is determined by initial round of monitoring results

Unregulated Chemicals

- These are chemicals for which no drinking water standard has been set, but monitoring is required.
- Monitoring is required by community and nontransient water systems
- Initial monitoring for 9 chemicals due by 12/31/2003
- Systems serving < 150 service connections may be eligible for an exemption based on existing data, per Title 22, Section 64450 (d)

Waivers (1)

- Overview: - Contaminant specific
  - Can apply to one, some, or all sources
  - Individual systems or area-wide
  - Requested by the system (except area-wide)
- Types: - Use waivers [chemicals used, manufactured, or stored in zone of influence]
  - Susceptibility waiver based on analytical results & vulnerability assessment
- Waiver Implementation: IOCs

NO WAIVERS for NITRATE & NITRITE !

- Based on 3 rounds of monitoring: SW 3 annual samples
GW 3 rounds of monitoring

- At each entry point

- All analytical results below the MCL

Waivers (2)

- Waiver Criteria: IOCs
  - Reported concentrations from all previous monitoring
  - Variations in monitoring results
  - Changes in: GW pumping rates
    System configuration
    Operating procedures
    Source characteristics
- Asbestos: Potential source contamination
  Use of asbestos-cement pipe
  No monitoring required for asbestos under a waiver
  Waiver duration = 3 years
  - Cyanide Not vulnerable due to a lack of any industrial cyanide source

Waivers (3)

- Waiver Implementation: SOCs

  Systems serving ≤3,300 persons can apply for a waiver for one or more of the SOCs after 3 consecutive years of annual sampling results are below the detection limit

  - Must renew every 3 years

- Waiver Implementation: VOCs

  GW Systems: Systems can apply for a monitoring waiver for VOCs after 4 initial quarters OR 3 consecutive years of annual sampling results are below the detection limit.

  - Must renew every 6 years.

  SW Systems: Systems can apply for a monitoring waiver for VOCs after 4 initial quarters OR 3 consecutive years of annual sampling results are below the detection limit.

  - Must renew every 3 years.

Note: *GW sources – sample each well head*
SW sources – sample each water intake

Waivers (3)-Vulnerability Assessment
(VOCs and SOCs)

- Previous analytical results
- Proximity to sources of contamination
- Environmental persistence, fate, and transport of the contaminant
- How well the source is protected
- Elevated nitrate levels at the source (SOCs)
- Use of PCBs in equipment used in the production, storage, or distribution of drinking water
- Depending on their level of detail, Source Water Assessments my be useful tools during vulnerability assessments

EDT Regulations

- As of March 1, 2002, all source water quality monitoring results must be submitted by Electronic Data transfer (EDT) to the Department

- All certified laboratories are required to have EDT capabilities

Note: Treated Water

  – Any water supplier utilizing treatment to comply with an MCL shall collect monthly samples of the treated water prior to distribution

Distribution System Water Quality Monitoring

- Bacteriological monitoring, as described previously
- Color, odor, and turbidity monthly monitoring, if required by the Department
- Lead and Copper
  - Community and nontransient water systems
  - Samples required at customer taps
  - # Sample sites based on population
- Federal Disinfectants/Disinfection Byproducts Rules (EPA Stage 1 DBP Rule is plant-based, dependent on number of treatment plants or wells; EPA Stage 2 DBP Rule is population based, dependent on population served)

Distribution System Monitoring

Lead and Copper Tap Monitoring

- Monitoring Requirements
  - First and Second Round Initial Tap Monitoring
  - First and Second Round Annual Tap Monitoring
  - First and second Round Triennial Tap Monitoring

- Standard vs. Reduced monitoring

Title 22, Table 64684

System Size	Standard Monitoring	Reduced Monitoring
501 to 3,300	20	10
101 to 500	10	5
< 101	5	5

Federal Stage 1 DBP

- Purpose: Increase public protection from disinfection byproducts (DBPs) by reducing the exposure to TTHMs, HAA5, bromate, and chlorite
- Scope: Applies to ALL sizes of CWS and NTNC water systems that add a disinfectant to the drinking water during any part of the treatment process and TNC water systems that use chlorine dioxide
  - Addresses both acute and non-acute health effects

Regulated Contaminants/Disinfectants:	MCL (mg/L)
Total Trihalomethanes (TTHMs)	0.080
Five Haloacetic Acids (HAA5)	0.060
Bromate (plants that use ozone)	0.010
Chlorite (plants that use chlorine dioxide)	1.0

Maximum Residual Disinfectant Levels:	MRDLs (mg/L)
Chlorine	4.0
Chloramines	4.0
Chlorine Dioxide	0.8

Federal Stage 1 DBP

TTHM & HAA5 Distribution System Monitoring

Type of System	Monitoring Frequency	Locations
Subpart H Serving <500	1/plant/year in month in month of warmest temperature*	Max. Residence Time (MRT)
GW serving <10,000	1/plant/year in month in month of warmest temperature*	MRT

TTHM & HAA5 Reduced Monitoring

Type of System	Requirement	Reduced Level
Subpart H Serving <500	N/A	N/A
GW serving <10,000	TTHM RAA** < 0.040 mg/L HAA5 RAA ** < 0.030 mg/L For 2 years **OR** TTHM RAA ** < 0.020 mg/L HAA5 RAA ** < 0.015 mg/L For 1 year	1/plant/3-year monitoring cycle cycle at MRT

Subpart H Systems – surface water or GWUDI systems

** - System must increase monitoring to 1 sample per plant per quarter in an MCL is exceeded

* - Running Annual Average

Federal Stage 1 DBP

- DBP Precursors
  - Found naturally in water
  - React with disinfectants to produce DBPs
  - Reducing DBP limits formation of DBPs
- DBP Precursor Treatment Technique (TT)

  Applies only to Subpart H systems using conventional filtration or enhanced softening which include these 4 filtration components:

  1. Coagulation
  2. Flocculation
  3. Sedimentation
  4. Filtration
- DBP Precursor Routine Monitoring Requirements (1 sample set per month)
  - Source water alkalinity
  - Source water TOC & Treated water TOC (**Paired sample**)

TOC – Total organic carbon

Federal Stage 1 DBP

DBP Precursor Removal Percentages

Removal requirements depend on source water characteristics:

Treatment Technique Removal Percentages

Source Water TOC (mg/L)	Source Water Alkalinity (mg/L as $CaCO_3$)		
	0-60	>60-120	>120
>2.0 - 4.0	35.0%	25.0%	15.0%
>4.0 – 8.0	45.0%	35.0%	25.0%
>8.0	50.0%	40.0%	30.0%

[1]*Systems meeting at least one of the alternative compliance criteria in the rule are not required to meet the removals in this table*

[2] *Systems practicing softening must meet TOC removal requirement in the last column to the right*

DBP Precursor Reduced Monitoring

Qualify if average treated water TOC level is:

- Less than 2.0 mg/L for 2 years OR less than 1.0 mg/L for 1 year
- Reduced Schedule: 1 sample set per quarter. Return to routine monitoring if RAA off treated water TOC > 2.0 mg/L

Federal Stage 1 DBP

DBP Precursor Alternative Compliance Criteria

1. RAA of monthly source water TOC samples < 2.0 mg/L
2. RAA of monthly source treated water TOC samples < 2.0 mg/L
3. RAA of source water TOC samples < 4.0 mg/L, RAA of source water alkalinity >60 mg/L, and either:

   TTHM RAA ≤0.040 mg/L and HAA5 RAA ≤0.030 mg/L

   OR System has made a "clear and irrevocable commitment" to installing technology to limit TTHM & HAA5 to those levels
4. TTHM RAA ≤0.040 mg/L and HAA5 RAA ≤0.030 mg/L, and system uses only chlorine for primary disinfection and maintenance of a residual
5. RAA of SUVA prior to any treatment <2.0 L/mg-m
6. RAA of treated water SUVA <2.0 L/mg-m

Distribution System Water Quality

- Water supplier shall:
  - Maintain records on the following:
    - Water main flushing
    - Consumer complaints
    - Other data relative to physical water quality
  - Conduct monitoring and keep records on color, odor, and turbidity if directed by the Department
  - Keep the distribution system free from significant amounts of particulate matter

Records and Reporting

- Analytical results for a calendar month shall be reported to DHS or LPA no later than the 10th day of the following month.

Type of Records	Retention Time
Complaint records	5 years
Bacteriological analyses results	5 years
Chemical analyses results	10 years
Records relating to violations	3 years from final action
Reports, summaries, communication relating to an inspection	10 years after inspection
Variances or exemptions	5 years following expiration
Permits	Forever

Notification of the Department and Water Consumers

- Acute health risk
  - Significant rise in bacterial count
    - **Notify consumers via electronic media w/in 24 hrs**
- Water quality failure
  - Exceedance of an MCL
  - Failure to comply with a treatment technique established in lieu of an MCL
  - Violation of a schedule for variance or exemption
    - **Notify consumers via newspaper w/in 14 days and mail or hand deliver w/in 45 days**
    - **Or if no newspaper, expedited hand delivery w/in 14 days or continuous posting initiated w/in 14 days**

Notification of the Department and Water Consumers (cont.)

- Procedural failure
  - Failure to take and report required # of samples
  - Failure to comply with a testing procedure
  - Water system operating under a variance or exemption
    - **Notify consumers via newspaper w/in 3 months and mail or hand deliver w/in 3 months**
    - **Or if no newspaper, hand delivery w/in 3 months or continuous posting initiated w/in 3 months**
- All public notifications must follow a specific format and include required language

Notification of the Department and Water Consumers (cont.)

- NOTE: Federal Public Notification Rule may take precedence, though not yet adopted in CA.
- Use most conservative approach.
- EPA has published guidance, including templates for various types of notification.
- Even when observing CA timeframes and methods, federal templates may be used for notice.
- Visit http://www.epa.gov/safewater/pn.html

Surface Water Treatment Rules

- Purpose: To improve public health protection through the control of microbiological contaminants
- Scope: Apply to ALL public water systems using surface water or ground water under the direct influence of surface water (GWUDI), otherwise known as "Subpart H Systems".
- Surface water treatment regulations
  - Establish treatment techniques in lieu of MCLs for turbidity and microbiological contaminants
  - Require all Subpart H systems to:

    disinfect, filter, monitor individual filters, meet CFE limits, apply treatment technique requirements for control of microbials

Surface Water Treatment Rules

- Type of Filtration:
  - Conventional Filtration
  - Direct Filtration
  - Slow Sand Filtration
  - Diatomaceous Earth Filtration
  - Alternative Filtration Technologies

Overview of CA SWTR and LT1ESWTR Requirements

- All Subpart H systems must comply with the following requirements:

  -Removal/inactivation requirements for viruses, *Giardia*, and *Cryptosporidium*

  - Residual disinfectant monitoring

  - Disinfection profiling and benchmarking

  - Sanitary surveys (no less than every 3 years for CWS and no less than every 5 years for noncommunity water systems)

  - Covered finished reservoirs/water storage facilities

  - Certified operators

Overview of CA SWTR and LT1ESWTR Requirements

Regulated Pathogens: *The removal/inactivation requirements are as follows:*

Microbial	MCLG	Removal/Inactivation Req.
Viruses		99.99% (4-log)
Giardia Lamblia	Zero	99.9% (3-log)
Cryptosporidium	Zero	99% (2-log)(removal only)

Residual Disinfectant Monitoring Requirements

Population	Entrance to Distribution Sys.	In Distribution Sys.
All Subpart H systems	Cannot be <0.2 mg/L for more than 4 hours[1] monitored continuously	Detectable in at least 95% of samples in a month for any 2 consecutive months

[1]DHS or LPA may allow systems serving ≤3,300 pop to take grab sample from-1-4 times per day, depending on system size (Title 22, Section 64656, Disinfection)

Overview of CA SWTR and LT1ESWTR Requirements

Residual Disinfectant Reporting Requirements

Monthly reports to DHS or LPA due within 10 days of the end of the following month

- Lowest daily CT value for each day
- A calculation of the % of distribution residual samples that were undetectable
- The date and duration when residual disinfectant was <0.2 mg/L
- When DHS or LPA was notified of events when residual disinfectant was <0.2 mg/

Additional Disinfectant Monitoring Requirements

Frequency	In Distribution System
Daily	Before **or** at the first customer: - Temperature - pH (if chlorine is used) - Disinfectant contact time(s) at peak hourly flow - Residual disinfectant concentration measurement(s) at peak hourly flow used in the inactivation calculation(s)

Additional Disinfectant Reporting Requirements

- Daily residual disinfectant concentation(s) and disinfectant contact time(s) used for calculating the CT value(s)
- Instances where the residual disinfectant level entering the distribution system was <0.2 mg/L

SWTRs

Compliance Scenario: Disinfectant Residual

PWS takes 3 routine TCR samples, uses surface water and has a conventional filtration

Q. *In addition to taking one sample at the entry point to the distribution system, what does this system need to do to comply with the SWTRs residual disinfectant monitoring requirements?*

A. System needs to take 3 disinfectant residual samples at the same time and place in the distribution system as the total coliforms sample

SWTRs Turbidity Requirements
Conventional & Direct Filtration Systems

Combined Filter Effluent (CFE) Requirements

Monitoring Requirement	Monitoring Frequency	Measurement
CFE 95% Value	At least every 4 hrs	≤ 0.3 NTU
CFE Max Value	At least every 4 hrs	1 NTU

CFE Reporting - *Monthly reports to DHS or LPA due within 10 days of the end of the following month*

- Total number of CFE measurements
- Percentage of CFE measurements ≤ 95% limit
- Date and value of any CFE measurement that exceeded 1 NTU

SWTRs Turbidity Requirements
Conventional & Direct Filtration Systems

serving < 10,000 people

Individual Filter Effluent (IFE)

IFE must be monitored continuously every 15 minutes

IFE Follow-up Steps

	Condition	Action
1.	2 consecutive measurements >1.0 NTU taken 15 minutes apart	Reporting only
2.	2 consecutive measurements >1.0 NTU taken 15 minutes apart at the same filter for 3 months in a row	Conduct a filter self-assessment within 14 days
3.	2 consecutive measurements >2.0 NTU taken 15 minutes apart at the same filter for 2 months in a row	Arrange for a CPE* within 60 days and submit report within 120 days

* *Comprehensive Performance Evaluation. Exception if a CPE was done in the last 12 months.*

SWTRs Turbidity Requirements Conventional & Direct Filtration Systems

serving < 10,000 people

IFE Reporting – Condition 1

Monthly reports to DHS or LPA due within 10 days of the end of the following month:

- *Filter number*
- *Turbidity value*
- *Cause (if known)*
- *Date*
- *If applicable, date CPE was triggered*

IFE Reporting – Condition 2

Monthly reports to DHS or LPA due within 10 days of the end of the following month (or within 14 days of filter self-assessment being triggered in the last 4 days of the month).

Report: Date the filter self-assessment was triggered
Date the filter self-assessment was completed

Overview of CA SWTR and LT1ESWTR Requirements
Disinfection Profiling and Benchmarking

- Purpose: to balance disinfection and proper inactivation with Stage 1 DBP requirements
- Applies to : all Subpart H PWSs
- Profiling requirements vary by system size
- Disinfection benchmark must be calculated and DHS or LPA must be consulted if the system is considering:
  - Changes to the point of disinfection
  - Changes to the disinfectant(s) used
  - Changes to the disinfection process
  - Any modification identified by the DHS or LPA

Consumer Confidence Report (CCR)

- An annual report to the customers of a water system
- Informs customers of water quality and related information
- Replaces previous requirement for an Annual Water Quality Report
- Required for all community and nontransient water systems
- Must be delivered by July 1 of each year

Consumer Confidence Report (cont.)

- Required content:
  - Description of water source
  - Information from source water assessment, if completed
  - Definition of terms (MCL, MCLG, PHG, AL, Treatment Technique)
  - Detected contaminants
    - Results, MCL, likely source of contaminant, health effects language
  - Sodium and hardness results
  - Required information language

Conclusion

- For more information contact your local State DWFOB office or County DHS office
- Make sure to review materials on the DHS website: http://www.dhs.ca.gov/ps/ddwem/

  Info on Regulations, TMF Capacity, State Revolving Fund, Proposition 50, Consumer Confidence Reports, Operator Certification, and more.

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services
1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Planning Director

December 19, 2014

Ellison Folk
Shute, Mihaly, & Weinberger, LLP
396 Hayes Street
San Francisco, CA 94102

RE: Girard Winery Use Permit #P14-00053-UP
Request for Continuance and Public Records

Dear Ms. Folk,

Pursuant to your correspondence of December 15, 2014, wherein you indicated that your firm is representing the Tofanelli family on matters relating to the proposed Girard Winery Use Permit (project), we are enclosing the documents that were requested in said correspondence in lieu of a formal Public Record Act request to ensure that this information is provided in advance of the Planning Commission meeting of January 21, 2015. The records are being provided in the PDF format and attached to this e-mail.

Specifically, enclosed are the: "Water Availability Analysis, Policy Report, August 2007"; "Memorandum to Conservation, Development and Planning Commission" regarding the Public Works "Department Report on Water Availability Analysis", dated February 27, 1991; "U.S. Geological Survey, Water-Resources Investigation 77-82 Open-File report", prepared in cooperation with the Napa County Flood Control and Water Conservation District [Ground-Water Hydrology of the Lower Milliken-Sarco-Tulucay Creeks Area, Napa County, California]; "Ground-Water Hydrology of Northern Napa Valley California" U.S. Geological Survey, Water-Resources Investigations 13-73, Prepared in Cooperation with the Napa County Flood Control and Water Conservation District; and the Napa County Environmental Resource Map (Water Deficient Areas/Storage/Areas).

Please be advised that these documents were also provided to Norma Tofanelli at the Planning Commission hearing on December 17, 2014.

If there are any other documents that will assist you with the preparation of your comments on the project for the Planning Commission hearing on January 21, 2015, please feel free to contact me, Wyntress Balcher, the project planner at (707) 299-1351 or at my e-mail address, wyntress.balcher@countyofnapa.org.

Sincerely,

Wyntress Balcher, Planner II

encl.

cc: Norma Tofanelli
Napa County Counsel
David Morrison
John McDowell

Planning Commission Mtg.

DEC 17 2014

Agenda Item #_9A

SHUTE, MIHALY & WEINBERGER LLP

396 HAYES STREET, SAN FRANCISCO, CA 94102
T: (415) 552-7272 F: (415) 552-5816
www.smwlaw.com

ELLISON FOLK
Attorney
folk@smwlaw.com

December 15, 2014

Via E-Mail and U.S. Mail

Napa County Planning Commission
1195 Third Street, Suite 210
Napa, CA 94559
Attn: Melissa Frost, Secretary
Melissa.frost@countyofnapa.org

Re: Girard Winery Use Permit #P14-00053-UP
Request For Continuance and Public Records

Dear Commissioners:

We represent the Tofanelli family on matters relating to the proposed Girard Winery Use Permit ("Project"). The purpose of this letter is twofold: first, to request that the Planning Commission postpone its consideration of this Project for a minimum of 30 days, and second, to request documents pursuant to the Public Records Act.

Request For Continuance

The County released the Initial Study for the proposed Project on November 25, 2014, just two days before Thanksgiving. County staff is recommending that the Commission approve this Project on December 17, 2014, just 16 business days after the Initial Study was published. This is a large Project with the potential for numerous environmental impacts. We have retained technical experts to review the adequacy of the Initial Study. Providing a sixteen business day review period, which happens to include the Thanksgiving holiday, is entirely insufficient for meaningful public input. Moreover this expedited schedule does not even allow the Commissioners the opportunity to consider the public comment on the Initial Study.

To make matters worse, it is not possible to review the Initial Study's water supply analysis because the vast majority of the supporting documents have not been made publicly available. In particular, the Initial Study does not include the following documents:

1. "Minimum thresholds for water use established by Napa County Department of Public Works based on USGS reports and copies of USGS' water resources investigations," (IS pg. 13).

2. Napa County environmental resource mapping (Water Deficient Areas/Storage Areas) (IS pg. 14).

We anticipate submitting extensive comment on this Project after we and our technical experts have an opportunity to evaluate the Initial Study and its technical analyses. We believe it would be prudent for the County to extend the public comment period for minimum 30 days to allow us time to provide meaningful public input.

Public Records Act Request

Pursuant to the California Public Records Act, Government Code § 6250 et seq., and Article 1, Section 3 of the California Constitution (collectively "PRA"), we hereby request, the aforementioned documents.

Government Code section 6252 (e) and (g) broadly defines the records and writings to be disclosed under the Public Records Act. The term "records" includes, but is not limited to, letters, memoranda, electronic mail and data, memoranda to files, and any other correspondence sent or received, or other information that would be an agency record subject to the requirements of the PRA when maintained by an agency in any format, including an electronic format.

Pursuant to Government Code section 6253(c), please make a determination on and respond to this request within 10 days of your receipt of it. If you determine that any of the information is exempt from disclosure under the PRA, we request that: (1) you exercise your discretion to disclose the record notwithstanding the exemption; or (2) pursuant to Government Code section 6253(a), provide a written response describing the legal authority on which you rely.

If any of the requested records are currently in electronic format, we request electronic transmission of such records. Such electronic records may be placed on an FTP site or mailed on a CD to the above address. *Please also notify me of the direct cost of making any paper copies of the requested records* <u>*before*</u> *such copies are made. See* Gov't Code § 6253(d) (fees may only be charged for the direct costs of duplication). If the cost is too high, I may request inspection of records instead.

Thank you for your attention to these requests. Please contact me at (415) 552-7272 or folk@smwlaw.com if you have any questions or concerns.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Ellison Folk

cc: Norma Tofanelli

646470 2

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

Stacey Harrington
Napa County Planning, Building, and Environmental Services
Department of Environmental Management
1195 3rd St. Room 101
Napa, Ca

Project: Girard Winery – New Winery and Tasting Room Use Permit
Water System Feasibility
1077 Dunaweal Lane
Calistoga, CA 94515
APN: 020-150-017

Stacey,

This letter is provided in support of the Girard Winery Use Permit application to construct a new onsite winery and tasting room. Specifically, this letter shall provide preliminary information with respect to the Technical, Managerial and Financial Capacity of the winery to operate the proposed system.

PROJECT AND SITE BACKGROUND

Vintage Wine Estates owns and operates the existing "Clos Pegase" water system (ID # 28-01007) located at 1060 Dunaweal Ln in Calistoga, Ca (APN: 020-150-017). The system is currently regulated as a Transient Non-Community water system. Attached please find the most recent water system permit dated 3/22/13.

Vintage Wine Estates is applying for a Use Permit to construct a new winery and tasting room onsite; the Girard Winery. With the Use Permit, it is proposed to also serve water to the proposed Girard Winery using the same system. A new supply main, storage tank, booster pump, and distribution system will be required.

The existing water system permit will need to be updated to include additional piping and service connections for the Girard Winery, as well as any additional documents which must be updated as a result.

WATER SYSTEM NAME

The water system shall be known as:

The Clos Pegase and Girard Wineries Water System

REPORT PREPARATION

This report was prepared for Girard Winery by Ben Monroe, P.E. of Always Engineering, Inc. Questions or comments regarding the content of this report should be directed to:

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

Ben Monroe
Always Engineering, Inc.
131 Stony Circle, Suite 1000
Santa Rosa, Ca 95401
Office: (707) 542-8795 x17
Cell: (707) 318-7099
BenM@alwayseng.com

TECHNICAL CAPACITY

A. System Description

The existing water system for Clos Pegase Winery consists of the following features; one active onsite well (Well #2), pressure tanks, sediment filter, softeners, 58,000 gallon storage tank, pressure tanks, ultraviolet disinfection, and potable use. The well is located on 1077 Dunaweal Lane, Calistoga (APN: 020-150-012), where it supplies the residence and Clos Pegase Winery.

A water system schematic is attached.

B. Source Adequacy Assessment and Evaluation

The Clos Pegase and Girard Wineries Water System is sized for ultimate build-out of the parcel and therefore the supply and demand, and infrastructure is expected to be sufficient for at least the next 10 to 20 years. In order to determine the adequacy of the water system, the volume of supply from each source and demand from each use is estimated and evaluated on the following pages:

a. Supply Capacity Assessment

The proposed source for the Water System is as follows:

- Source 1: Well #2

Well #2 produces approximately 23 gpm per the well logs, but the current pump supplies 18 gpm. A copy of the well log is on file with the County and can be provided upon request. There is one additional onsite well which is not used. No surface water is used in the system and therefore the Surface Water Treatment Rule does not apply.

Therefore, the current available supply for the domestic uses onsite is approximately 18 gpm. An 18 gpm supply is sufficient to supply 1,080 gallons an hour which is sufficient to supply 8,640 gallons over 8 hours or 25,920 gallons operating for 24 hours a day. This is capable of producing 9,460,800 gallons when operating for 24 hours a day, for 365 days a year.

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

b. Demand Assessment

Onsite water use demand from the system is from the following uses:

Clos Pegase and Girard Wineries

- Winery Processing
- Winery Employees
- Wine Tasting
- Wine Events

All vineyard irrigation is provided by the onsite reservoir pond. Well No .2 is dedicated to potable uses only.

Demand from each winery is presented below:

Clos Pegase

Winery Process Amended Permit Application

Annual Use	=	920,000 gal/year
Peak Harvest Day	=	5,759 gpd

Winery and Residence Domestic Use

Annual Use (assumes peak day 365 days/year)	=	651,702 gal/year
Peak Day	=	1,785 gpd

Therefore the total water demand for the Clos Pegase is calculated:

Peak Daily Demand		
Winery PW + Winery Domestic + Residence	=	7,544 gpd
Annual Demand		
Winery PW + Winery Domestic + Residence	=	1,517,702 gal

Girard Winery

Winery Process

Annual Use	=	920,000 gal/year
Peak Harvest Day	=	5,759 gpd

Winery Domestic

Peak Day	=	1,675 gpd
Annual Use	=	611,375 gal/year

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

Therefore the total water demand for the Girard Winery is calculated:

<u>Peak Daily Demand</u>		
Winery PW + Winery Domestic	=	7,434 gpd
<u>Annual Demand</u>		
Winery PW + Winery Domestic	=	2,183,077 gal

Landscape Irrigation

Landscape Irrigation is provided by another onsite well and/or treated process wastewater and therefore does not impact the public water system demands.

TOTAL WATER DEMAND

For the purposes of simplifying this analysis, all peak water uses are assumed to occur on the same day. This is not the case, as peak winery use only occurs during the months of harvest (Sept – Oct) and typically does not overlap with events. Given the above water demands, the peak water use for the Clos Pegase and Girard Wineries is estimated as follows:

Peak Daily Water Demand

Peak flows are estimated as follows:

Peak Daily Demand for Clos Pegase + Peak Daily Demand for Girard =

7,544 gpd + 7,434 gpd = 14,978 gpd

As demonstrated above, the Well No. 2 can produce 25,920 gpd alone and is more than sufficient to supply water to meet the peak onsite daily uses. The well will only have to operate for 832 minutes (13.8 hours) to provide this volume of water. A storage tank of sufficient volume will be provided for the proposed Girard Winery. A booster pump system will meet the peak hourly use from this tank.

Annual Water Demand

Annual demand for the Clos Pegase and Girard Wineries is the summation of all onsite annual average use and is calculated as follows:

Winery PW + Winery Domestic +Residential =

1,840,000 gal + 1,095,475 gal + 325,851 gal = 3,261,326 gal

The well only needs to operate for a period of approximately 125 days (3,020 hours) in order to supply water for the entire year.

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This analysis assumes winery peak domestic uses occur 365 days a year, which will not be the case.

c. Water Quality Assessment

Previous testing indicates that the water is of good quality. Sediment filters, pH adjustment, water softening, and Ultraviolet disinfection are the only treatment components provided. The existing Well No. 2 has been sampled and only requires treatment to remove hardness. If required, a current sample will be collected and submitted for testing.

A review of all parcels within 500' of the property line has been done to identify any potential hazardous spills. A map is provided to demonstrate this. There are no spills within 500' on any adjacent parcels

d. Consolidation Feasibility

It is proposed to connect to the Clos Pegase Winery to supply Girard Winery, as described in this report.

MANAGERIAL CAPACITY

A. Ownership

The parcel and water system is owned by a Vintage Wine Estates, with Pat Roney being the corporate officer. A copy of the Deed of Trust for the parcel can be submitted to the County to document this. Vintage Wine Estates also owns and operates the existing public water system for Clos Pegase Winery and Cosentino Winery.

B. Organization

The Clos Pegase and Girard Wineries Water System will be operated by Jason Duval, the Clos Pegase Water System Manager. Mr. Duval reports directly to Mr. Roney and has experience operating the water system at the Clos Pegase water system for 15 years. In the event that Mr. Duval is not available during a water system emergency, Glen Hugo the Girard winemaker shall be responsible for water system operation. Vintage Wine Estates will contract out for all legal, engineering, and maintenance of the water system.

C. Water Rights

The Owner's water rights to the groundwater sources have been demonstrated by a copy of the Deed of Trust for the Parcel on file at the County. The parcel is not located within a groundwater basin that has been classified as being in overdraft, or subject to groundwater adjudication procedures.

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Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

D. Emergency/Disaster Response Plan

A complete Emergency/Disaster Response Plan has been submitted to the Napa County office of Environmental Management (NCEM) for the Clos Pegase Winery Water System. An updated plan will be generated when the Girard Winery Water System is designed

FINANCIAL CAPACITY

A. Budget Projection

Vintage Wine Estates, Clos Pegase, and Girard Wineries are not currently encumbered by any judgments, liens, or other financial liability that would prevent operation of the Clos Pegase and Girard Wineries Water System. The majority of the system components are already installed with the exception of the new storage tank, booster pump, and distribution to Girard. Purchase and installation of these components for the system is projected to cost approximately $50,000. Replacement of the entire treatment system is also expected to cost approximately $15,000. Approximately $6,000 per year and $30,000 for the first five years will be required for operation of the Clos Pegase and Girard Wineries Water System. The costs of system maintenance and replacement will be covered by wholesale and retail wine sales.

We trust that this letter and attachments is sufficient to allow processing of the Girard Winery Use Permit for a new winery and tasting room. Please feel free to contact us with any additional questions, comments, or requirements.

Sincerely,

Robert Osborn, EIT
ALWAYS ENGINEERING, INC.
Engineering Technician

Ben Monroe, P.E., QSD/QSP
ALWAYS ENGINEERING, INC.
Project Manager

Enclosures

cc: Heather McCollister
Pat Roney (Vintage Wine Estates)

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN W. MONROE
No. 70012
Exp. 9-30-14
CIVIL
STATE OF CALIFORNIA

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A Commitment to Service

Planning, Building & Environmental Services

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Napa, CA 94559
www.countyofnapa.org

Hillary Gitelman
Director

March 22, 2013

CLOS PEGASE WINERY
JASON DUVAL
1060 DUNAWEAL LANE
CALISTOGA, CA 94515

Dear Water Purveyor,

Subject: Clos Pegase Water System Amendment (WS/484/PMT)

On March 7, 2013 an application was submitted for an amendment to the Clos Pegase Winery Water System located at 1060 Dunaweal Lane, Calistoga, CA 94515. At this time the application has been ***approved***. The permit to operate has been attached, please read the permit in its entirety and note that this permit amendment is an addendum to the previously issued permit and all conditions noted therein.

Please feel free to contact me if you have questions or comments regarding this notice at (707)251-1072.

Regards,

Jahniah McGill
Registered Environmental Health Specialist

STATE OF *CALIFORNIA*

DOMESTIC WATER SUPPLY PERMIT

Issued To

Clos Pegase Winery

28-01007

By

The Environmental Health Division of Planning, Building, and Environmental Services

PERMIT NO.: ***484*** EFFECTIVE DATE: ***3/21/2013***

WHEREAS:

1. ***Jason Duval*** on behalf of ***Clos Pegase Winery Water System*** submitted an application to the Division of Environmental Health on ***3/7/ 2013*** for an amendment to the Domestic Water Supply Permit issued to the ***Clos Pegase Winery Water System.***

2. The purpose of the amendment, as stated in the application, is to allow the ***Clos Pegase Winery Water System*** to make the following modifications to the public water system:

   a) Add sodium hydroxide injection for pH adjustment
   b) Remove the Calcite filters
   c) And a kinetic softener

3. The ***Clos Pegase Winery Water System*** has submitted all of the supporting information required to evaluate the application.

4. The Division of Environmental Health has evaluated the application and the supporting material and has determined that the proposed modifications comply with all applicable State drinking water requirements.

THEREFORE:

1. The Napa County Department of Environmental Management hereby approves the application submitted by the ***Clos Pegase Winery Water System*** for a permit amendment. The Domestic Water Supply Permit issued to the ***Clos Pegase Winery Water System*** is hereby amended as follows:

   a) Sodium Hydroxide injection is approved for pH adjustment.

2. This permit amendment is subject to the following conditions:

   a) The only sources approved for potable water supply is as follows:

Source	PS Code	Status	Capacity	Comments
001	2801007-001	Disconnected	unknown	Well 1
003	2801007-003	Active	23 gpm	Well 2

Two-40 gallon Sanitron Ultra Violet water purifiers, both with 40 gpm flow restrictors, and an additional 40 gpm ultraviolet unit with a 20 gpm flow restrictor are approved as *precautionary* treatment for this water system. Replacement bulbs must be stored onsite at all times and an employee must be trained to replace the bulbs.

One sodium hydroxide injection unit using the filter cases for contact time to assist with pH adjustment

One Kinetico Softener is approved for the removal of iron and manganese.

A 58,000-gallon tank which is lined with a COOLPRO Polypropylene PP78 sanitary liner is approved for water storage.

   b) Bacteriological and chemical tests shall be performed in compliance with the requirements of the California Drinking Water Standards, and the water system shall comply with all reporting requirements. See attached chemical testing schedules

Quarterly bacteriological reports from an approved lab must be submitted to this office no later than the 10th day following the end of the sampling period. The bacteriological samples shall be collected from the location specified on the Bacteriological Sample Siting Plan. The source chemical monitoring sampling must be completed as shown on the attached chemical testing schedule

   c) The application states that the backwashing filter is plumbed to a sump which disposes to the processed wastewater ponds. This connection must be via an air gap to provide adequate backflow prevention.

d) The system is required to contact their local Pollution Prevention team and update the Hazardous Materials Business Plan (HMBP).

e) A pH sample must be submitted prior to treatment and post treatment to ensure that the pH levels are no longer corrosive in the distribution system.

f) No changes, additions, or modifications shall be made to the sources or treatment unless an amended water permit has first been obtained from the Department.

g) The **Clos Pegase Winery Water System** is operated and maintained in compliance with the California Safe Drinking Water Act.

h) This permit may be revoked or suspended for failure to comply with the California State Health and Safety Code, California Code of Regulations and Title 13 of the Napa County Code Relating to Wells and Water Supply Systems.

This permit supersedes all previous domestic water supply permits issued for this public water system and shall remain in effect unless and until it is amended, revised, reissued, or declared to be null and void by the Division of Environmental Health. This permit is non-transferable. Should the ***Clos Pegase Winery Water System*** undergo a change of ownership, the new owner must apply for and receive a new domestic water supply permit.

Any change in the source of water for the water system, any modification of the method of treatment as described in the Permit Report, or any addition of distribution system storage reservoirs shall not be made unless an application for such change is submitted to the Division of Environmental Health.

FOR THE Division of Environmental Health

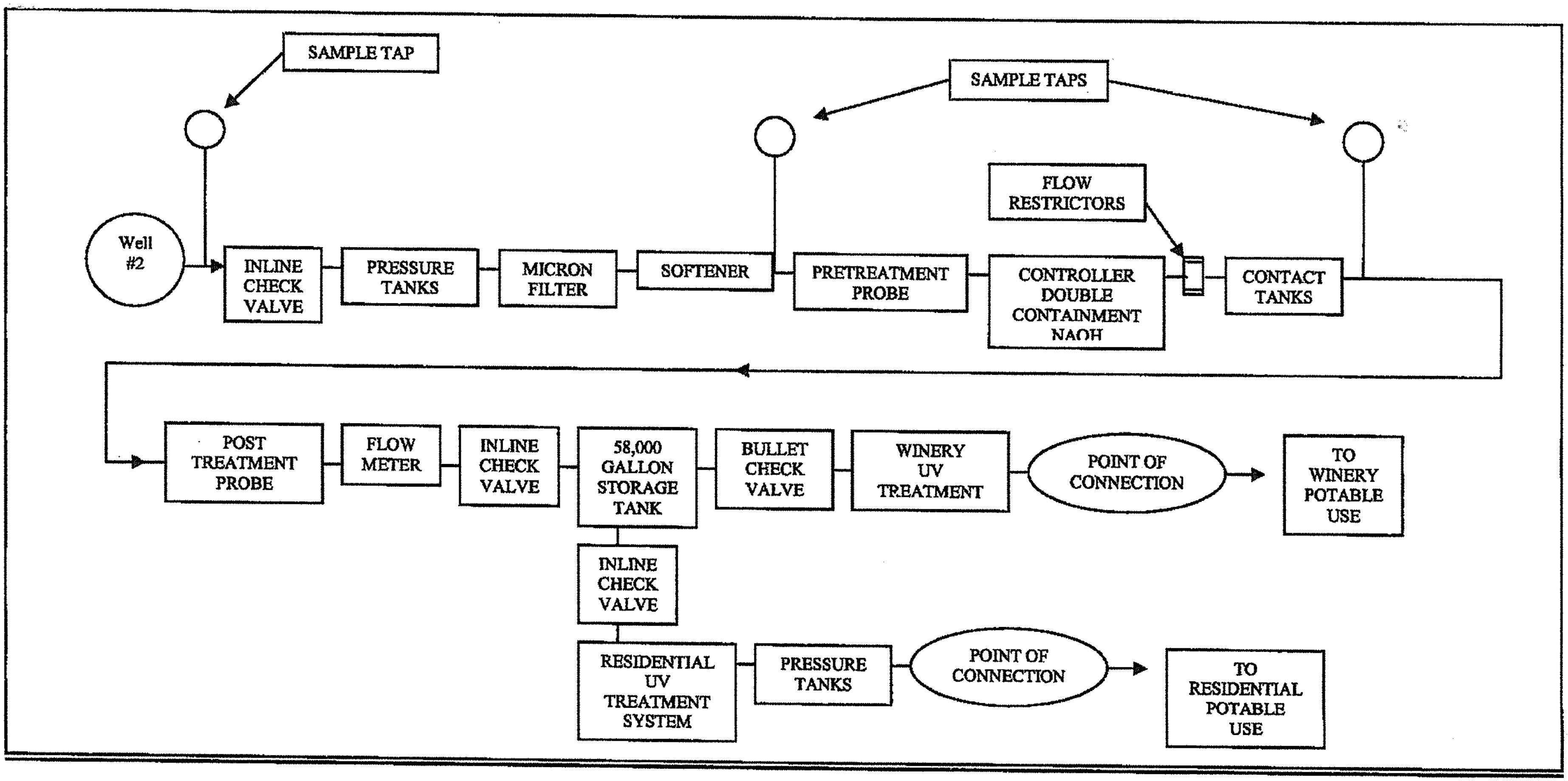
3/21/2013

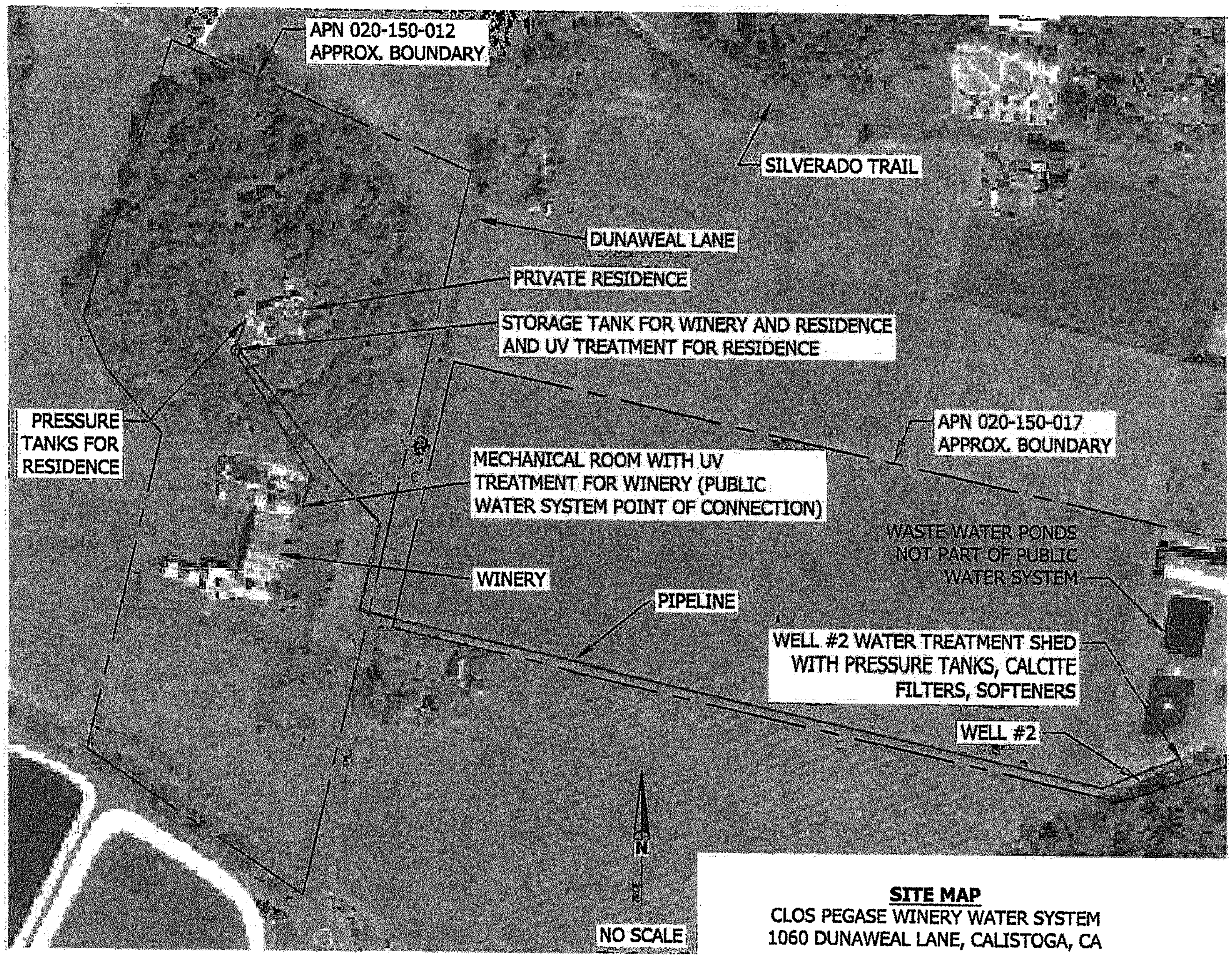
Date

Jahniah McGill, R.E.H.S.

CLOS PEGASE WINERY WATER SYSTEM

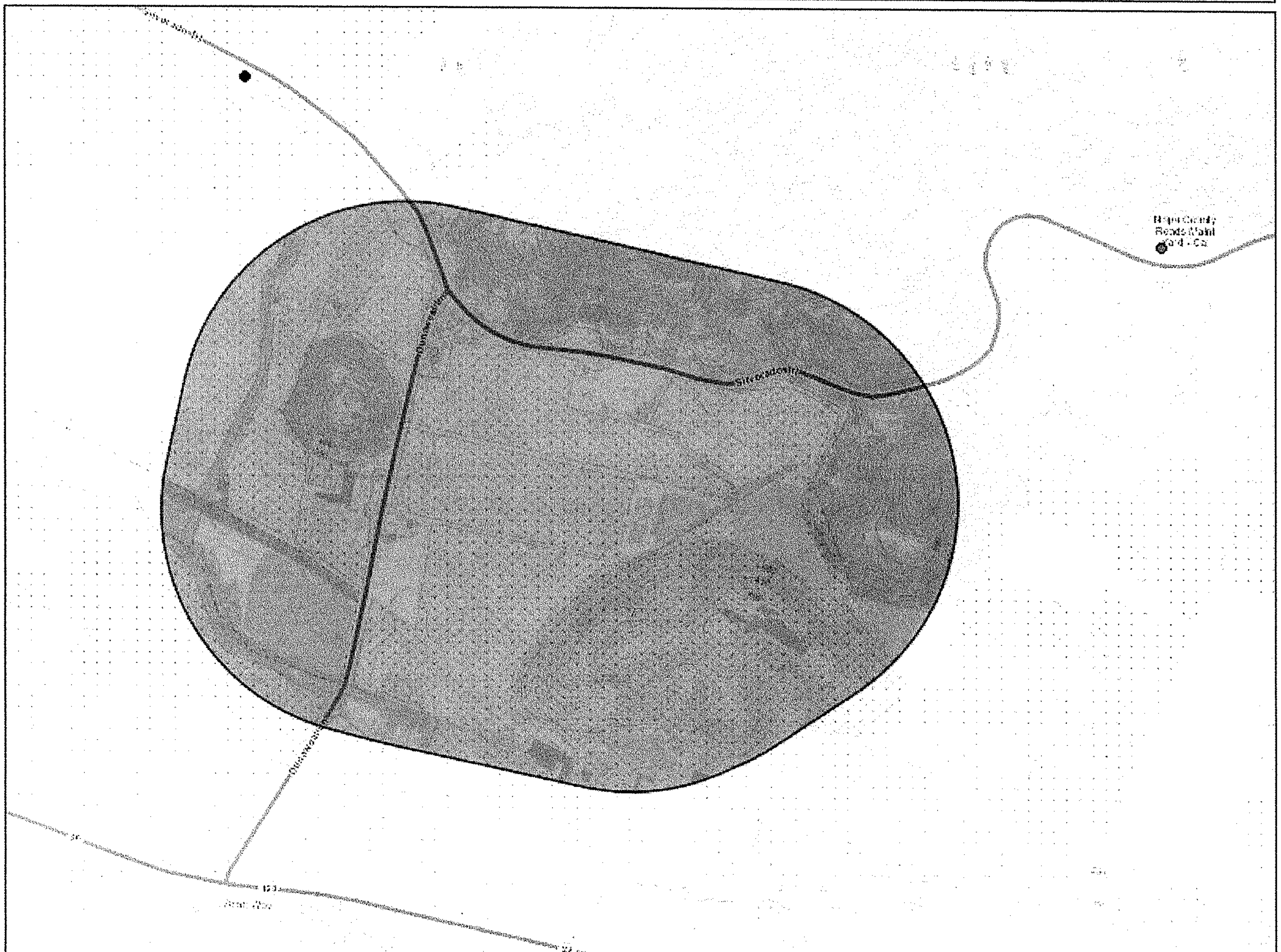
SYSTEM SCHEMATIC

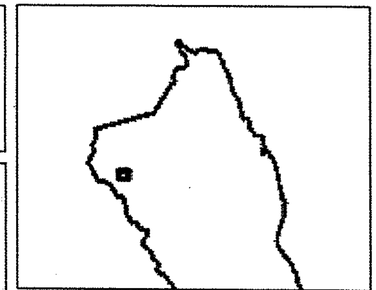




SITE MAP
CLOS PEGASE WINERY WATER SYSTEM
1060 DUNAWEAL LANE, CALISTOGA, CA

County of Napa GIS





Legend

- HazMat Spills (LOP)
- HazMat Spills (Non-LOP)
- Corner Records
- County Boundary

2,572.3 | 0 | 1,286.15 | 2,572.3 Feet

Disclaimer: This map was prepared for informational purposes only.
No liability is assumed for the accuracy of the data delineated hereon.

This map was printed on 11/6/2013

Notes

RECEIVED

MAY 07 2014

Napa County Planning, Building & Environmental Services

DECLARATION

(Nontransient-Noncommunity)

I, Patrick Roney, declare that I understand the definition of a public
(name of owner or legally authorized representative)

water system, as defined in the California Health and Safety Code (CH&SC), Division 104, Part 12, Chapter 4 (California Safe Drinking Water Act), Article 1, Section 116275(h), to mean that a **public** water system is "a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year."

Furthermore, I understand the definition of a nontransient-noncommunity water system, as defined in Section 116275(k), to mean "a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year."

Furthermore, I declare that I understand that Section 116275(e) defines human consumption as "the use of water for drinking, bathing or showering, hand washing, or oral hygiene."

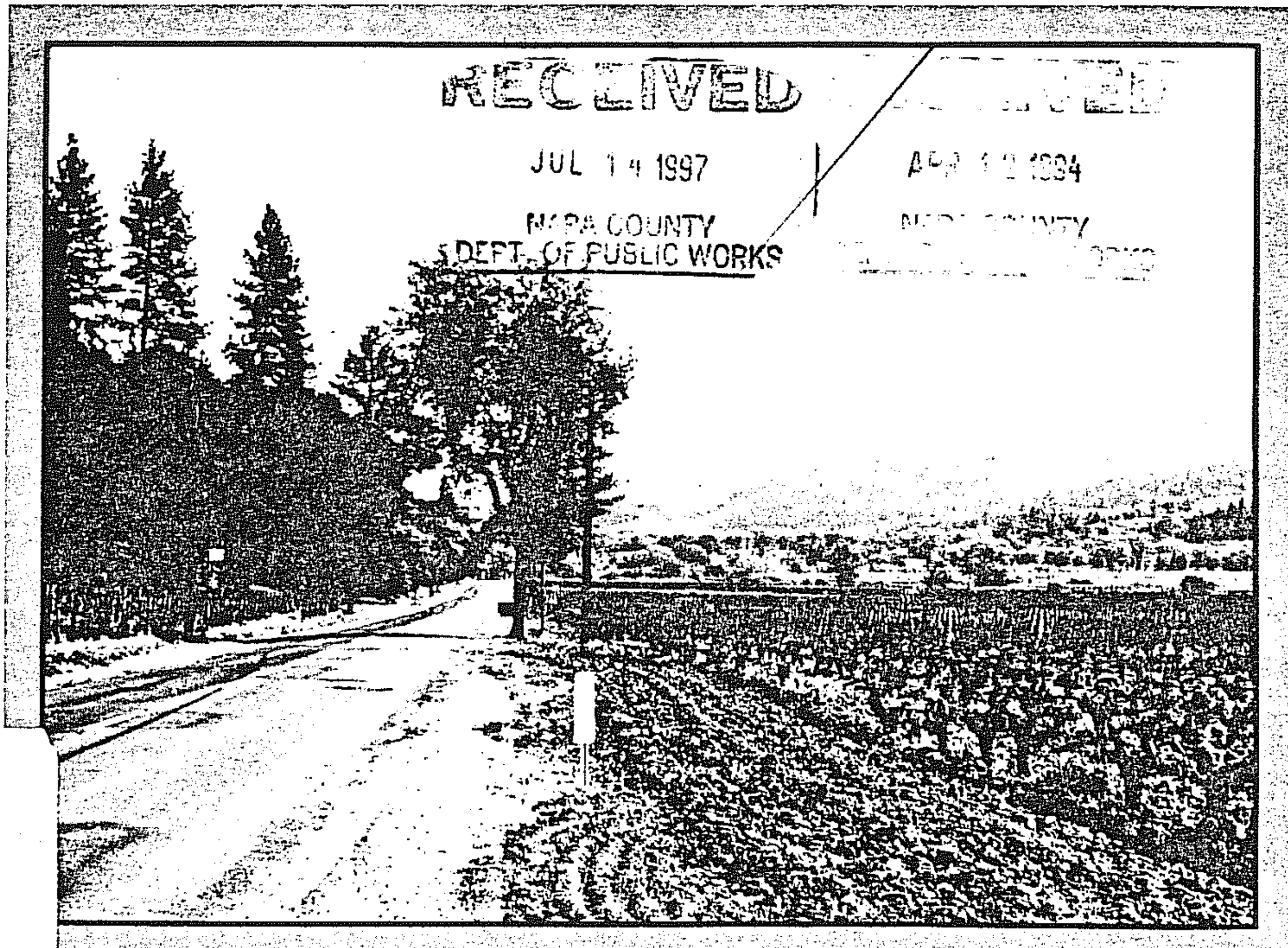
Furthermore, I declare that I understand that Section 116725 of the CH&SC states that "Any person who knowingly makes any false statement or representation in any application, record, report, or other document submitted, maintained, or used for purposes or compliance with this chapter (California Safe Drinking Water Act (AB 2995)), may be liable for a civil penalty not to exceed five thousand ($5,000) for each separate violation or, for continuing violations, for each day that violation continues." In addition, Section 116730 of the CH&SC states that violators may be prosecuted in criminal court and upon conviction, be punished by a fine of not more than $25,000 for each day of violation, or by imprisonment in the county jail not to exceed one year, or by both the fine and imprisonment.

In recognition of the above, declaring that I understand the definition of a public water system and the penalty for giving false information, I declare that my facility, Clos Pegase and Girard Wineries Water System, does not meet the definition of a nontransient noncommunity water system because ***it does not serve more than 24 people more than 6 months out of the year.***

5/2/14
Date

Signature

GROUND-WATER HYDROLOGY
of
NORTHERN NAPA VALLEY
CALIFORNIA



U.S. GEOLOGICAL SURVEY
WATER-RESOURCES INVESTIGATIONS
13-73

PREPARED IN COOPERATION WITH THE
NAPA COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT

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7. Author(s) Robert E. Faye			8. Performing Organization Rept. No. WRI 13-73
9. Performing Organization Name and Address U.S. Geological Survey, WRD California District 345 Middlefield Rd. Menlo Park, Calif. 94025			10. Project/Task/Work Unit No.
			11. Contract/Grant No.
12. Sponsoring Organization Name and Address Same as 9 above.			13. Type of Report & Period Covered Final Report 1971-72
			14.

15. Supplementary Notes
Prepared in cooperation with the Napa County Flood Control and Water Conservation District

16. Abstracts

A model study of the alluvium in northern Napa Valley indicates that the alluvial aquifer is capable of supplying most of the future water needs of the area. Part of the hydrologic budget for the alluvium was derived from noting rainfall-runoff relations and rainfall and water-table recovery relations.

Hydrothermal, sodium chloride ground water occurs in the northern part of Napa Valley and is only marginally suitable for irrigation. Model studies indicate that limited migration of sodium chloride water into intensively pumped parts of the alluvial aquifer probably will not be a serious problem.

17. Key Words and Document Analysis. 17a. Descriptors

*California, *Hydrologic budget, *Aquifer characteristics, *Rainfall-runoff relations, *Base flow, *Model studies, *Chemical analysis, Ground-water, Ground-water movement, Hydraulic conductivity, Specific yield, Storage capacity, Geology, Thermal springs, Water table, Boron, Chemical properties, Salinity, Sodium, Drought.

17b. Identifiers/Open-Ended Terms

*Napa River drainage, *Rainfall and water-table recovery relations

17c. COSATI Field/Group Ø2A

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GROUND-WATER HYDROLOGY OF NORTHERN NAPA VALLEY

CALIFORNIA

By Robert E. Faye

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 13-73

Prepared in cooperation with the

Napa County Flood Control and Water Conservation District

November 1973

UNITED STATES DEPARTMENT OF THE INTERIOR

Rogers C. B. Morton, Secretary

GEOLOGICAL SURVEY

Vincent E. McKelvey, Director

For additional information write to:

District Chief
Water Resources Division
U.S. Geological Survey
345 Middlefield Rd.
Menlo Park, Calif. 94025

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GROUND-WATER HYDROLOGY OF NORTHERN NAPA VALLEY, CALIFORNIA

By Robert E. Faye

ABSTRACT

The alluvium of northern Napa Valley is the principal aquifer of the area and is capable of yielding as much as 3,000 gallons per minute to wells. Generally the larger-yielding wells are along the Napa River where the alluvium is thickest and most permeable. Recharge to the alluvium is chiefly by percolation from streams and infiltration of precipitation. Discharge is chiefly flow to the Napa River, evapotranspiration, and pumpage from wells. Both recharge to, and discharge from, the alluvial aquifer are sensitively influenced by rainfall. About 190,000 acre-feet of water is presently (1972) stored in the alluvium of northern Napa Valley. Future annual water use in the project area will probably vary between 12,000 and 35,000 acre-feet and, for most purposes, can be supplied by the alluvial aquifer even during extended periods of limited rainfall. Generally low transmissivities in the alluvium, however, limit the opportunity for obtaining sustained, large yields from wells in much of the valley and require that large-scale development and operation of wells in much of the area be planned and synchronized.

Sustained drought conditions in the Napa Valley accompanied by expected increases in the use of ground water will probably cause significant reductions in the base flow of the Napa River and cause many shallow wells in the area to dry up.

Sodium chloride ground water occurs near Calistoga and in the vicinity of Oakville and in some places is not suitable for irrigation. Model studies indicate that limited migration of sodium chloride water into intensively pumped parts of the aquifer probably will not be a serious problem.

INTRODUCTION

Location and Extent of Project Area

The project area is within Napa Valley in the central Coast Ranges of California about 40 miles northeast of San Francisco (fig. 1). Comprising the northern part of Napa Valley, the project area extends from the vicinity of Oak Knoll Avenue, north of the city of Napa, to the northern end of the valley, north and west of the city of Calistoga. The area is a distinct topographic basin consisting of about 60 square miles of valley floor surrounded on three sides by foothills and mountain ranges.

Purpose and Scope

The purpose of this study was to assess the occurrence, availability and quality of ground water in the northern part of Napa Valley.

This report summarizes the geology and water-bearing characteristics of geologic formations; discusses the spatial and hydrologic parameters of water-bearing units with special emphasis on the alluvial aquifer; provides a qualitative and quantitative hydrologic assessment of the alluvial aquifer; discusses the quality of ground water with respect to occurrence, chemical composition, and use; and evaluates the quality of base flow and seasonal runoff in the Napa River.

The qualitative and quantitative hydrologic assessment of the alluvial aquifer includes a determination of: (1) The spatial distribution of thickness and hydraulic conductivity in the alluvial aquifer; (2) the quantity of water presently stored in the alluvial aquifer; (3) quantities of recharge to, and discharge from, the alluvial aquifer under given climatologic conditions; (4) recent quantities of pumpage from the alluvial aquifer; and (5) the response of water levels in the alluvial aquifer to specified pumping and recharge conditions.

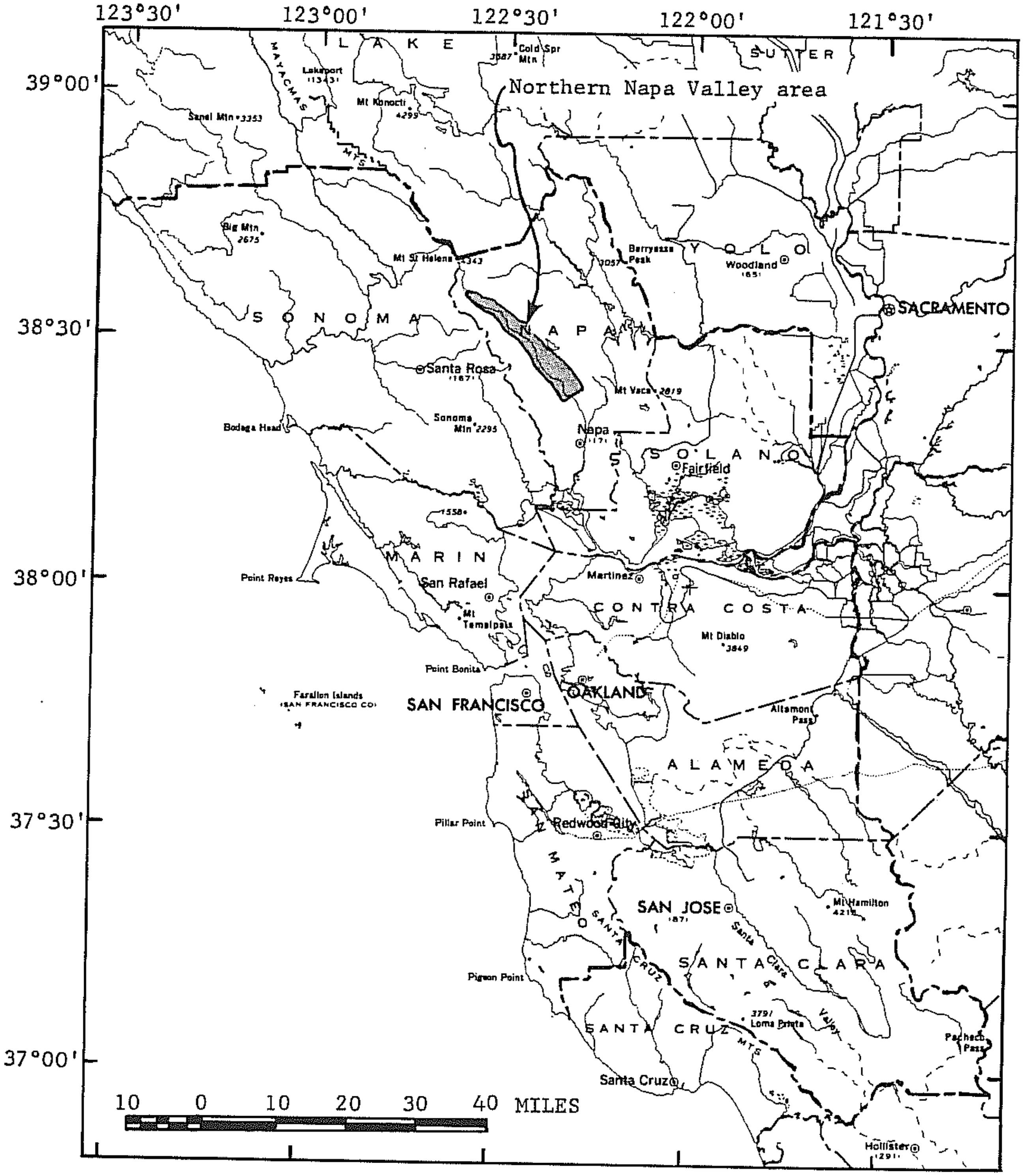

FIGURE 1.--LOCATION MAP OF PROJECT AREA.

The assessment of ground-water quality includes: (1) A chemical classification of ground water; (2) a determination of the occurrence of ground water containing high concentrations of boron and other undesirable constituents; (3) a determination of the redistribution of ground water of poor quality in the alluvial aquifer under specified recharge and pumping conditions; and (4) an evaluation of ground-water quality with respect to the use of ground water as an irrigation and domestic water supply.

The scope of this study included: (1) An evaluation of geologic and hydrologic data for the Napa Valley area; (2) the development of a transient-state mathematical model that adequately simulated the ground-water hydrology of the alluvial aquifer; and (3) a model analysis to evaluate the response of water levels in the alluvial aquifer to critical climatologic and pumping stresses.

Previous Work

The earliest known hydrologic work in the Napa Valley was an unpublished U.S. Geological Survey inventory of "deep" wells in 1895. Waring (1915) cataloged the various hot springs and "health resorts" located in the project area in the early 1900's. More comprehensive water-resources studies were completed by Bryan (1932) and Kunkel and Upson (1960). Interest in increased utilization of ground water for irrigation and frost protection resulted in ground-water investigations by the U.S. Bureau of Reclamation (1966) and the Napa County Flood Control and Water Conservation District (1972).

Early geologic work was done by Osmont (1905) and Dickerson (1922). Mapping of the volcanic rocks, older consolidated sedimentary rocks, and younger unconsolidated deposits was completed by Weaver (1949), Kunkel and Upson (1960), and Koenig (1961, 1963). Crutchfield (1953) and Johnston (1948) prepared detailed geologic maps of areas in the Calistoga quadrangle.

A soil survey and review of the contemporary agricultural industry in Napa County was issued by Carpenter and Cosby (1938). As of 1972, the U.S. Soil Conservation Service was preparing a comprehensive report on the soils of Napa County.

Well-Numbering System

The well-numbering system used by the Geological Survey in Napa Valley shows the location of wells and springs according to the rectangular system for the subdivision of public land. For example, in the number 9N/7W-26R2, which was assigned to a well located near Calistoga (fig. 3), the part of the number preceding the slash indicates the township (T. 9 N.,); the number between the slash and the hyphen indicates the range (R. 7 W.); the digits between the hyphen and the letter indicate the section (sec. 26); and the letter following the section number indicates the 40-acre subdivision of the section, as shown in figure 2. Within each 40-acre tract the wells are numbered serially, as indicated by the final digit of the number. Thus, well 9N/7W-26R2 is the second well to be listed in the SE¼SE¼ sec. 26. The letter X after the section number indicates the site was located only to the section.

Definitions of Hydrologic Terms

Aquifer: An aquifer is a formation, group of formations, or a part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian: Synonymous with confined.

Base flow: Sustained or fair weather runoff composed largely of ground-water effluent.

Cone of depression: A three-dimensional conical depression that develops around a pumping well, the outer boundary of which, defines the area of influence of the well.

Confined water: Ground water that is under sufficient pressure to rise above the level at which it is encountered by a well, but which does not necessarily rise to or above land surface.

Evapotranspiration: The total water removed from an area by transpiration and by evaporation from soil, snow, and water surfaces.

Gaining stream: A gaining stream is a stream, or reach of a stream, whose flow is being increased by inflow of ground water.

Hydraulic conductivity: A measure of an aquifer's capacity to transmit water, expressed in feet per day (fpd) or feet per second (fps).

Losing stream: A losing stream is a stream, or reach of a stream, that is losing water to the ground-water reservoir.

pH: The negative logarithm of the hydrogen ion concentration. A neutral water has a pH of 7; an alkaline water a pH greater than 7; and an acid water a pH less than 7.

Permeability: Synonymous with hydraulic conductivity.

Potentiometric: A surface that represents the static head of water in an aquifer.

Specific capacity: The discharge of a well expressed as rate of yield per unit of drawdown, generally gallons per minute per foot of drawdown (gpm/ft).

Specific yield: The specific yield of a rock or soil, with respect to water, is the ratio of (1) the volume of water which, after being saturated, it will yield by gravity to (2) its own volume.

Transmissivity: Transmissivity is the rate of flow in feet squared per second (ft^2/s) at prevailing water temperature, through a 1-foot wide vertical strip of aquifer extending the full saturated height of the aquifer under a unit hydraulic gradient.

Water table: The water table is that surface in an unconfined water body at which the pressure is atmospheric. It is defined by the levels at which water stands in wells that penetrate the water body just far enough to hold standing water. In wells penetrating to greater depths, the water level will stand above or below the water table if an upward or downward component of ground-water flow exists.

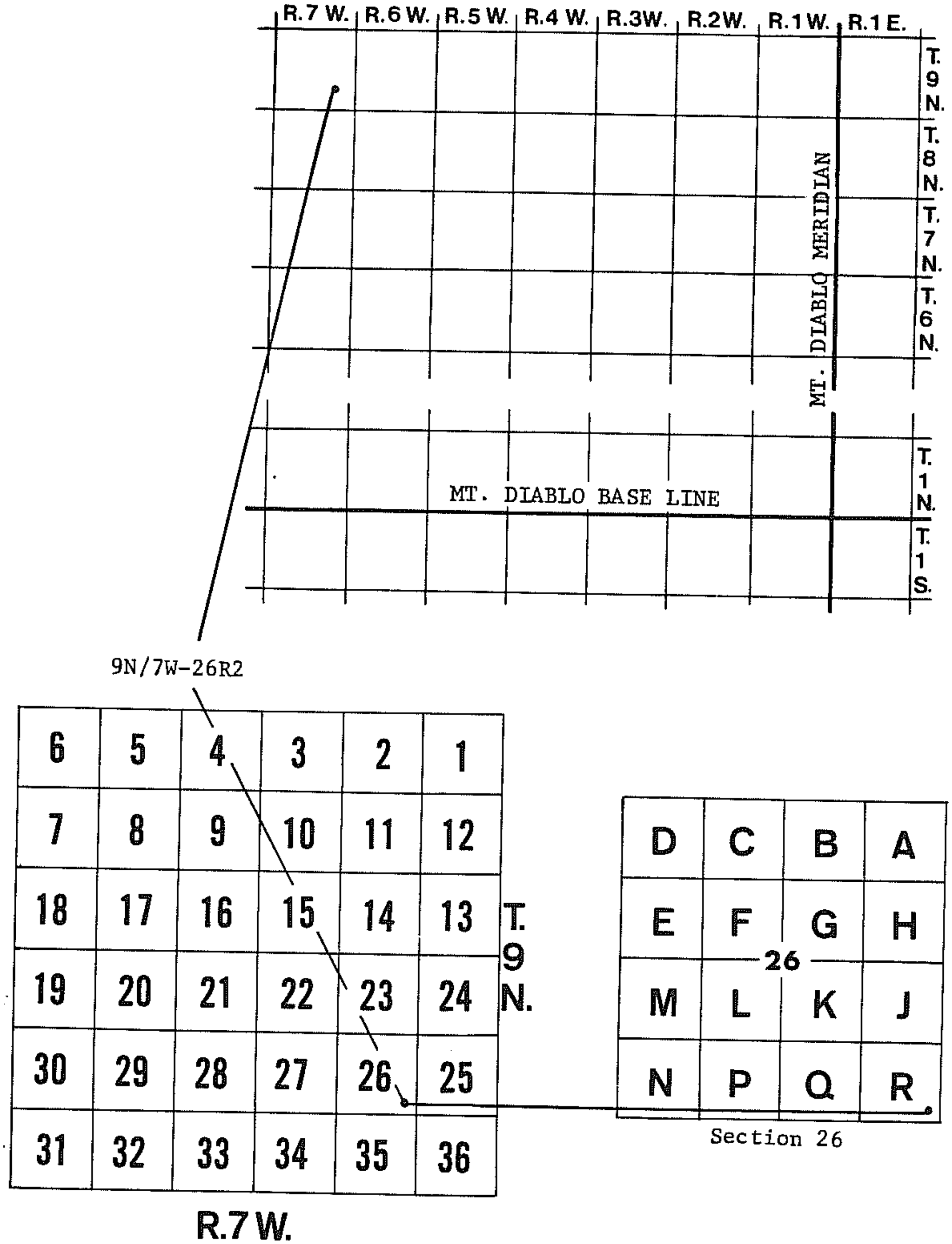

FIGURE 2.--WELL-NUMBERING SYSTEM.

Acknowledgments

Appreciation and thanks are due the residents of Napa Valley who provided access to their property and aided in the collection of data upon which much of this report is based.

The following personnel and agencies of Federal, State, and local governments aided in this investigation by providing information and assistance: Joseph V. Reynolds and Herbert J. Knierim, Napa County Flood Control and Water Conservation District; Gilbert Lambert and Albert J. McDowell, U.S. Soil Conservation Service; Robert E. Trefzger, U.S. Bureau of Reclamation; Robert S. Ford, California Department of Water Resources; James Lider, Napa County Agricultural Extension Service; James E. Page, Napa County Department of Public Health; Richard A. Campbell, city of Napa.

GEOGRAPHY

Topography

Napa Valley is a distinct topographic basin consisting of a central valley floor with bordering foothills and mountains. Situated within the north-central Coast Ranges, the basin is oriented generally to the northwest, parallel to the California coastline (fig. 1). The northern part of the Napa Valley--about 24 miles of alluvial plain along the Napa River--is of major interest in this investigation. Mountain ranges surround the valley on three sides and include the Mayacmas Mountains to the north and unnamed sections of the Coast Ranges to the east and west. The bordering mountains are, for the most part, steep and brush covered. Peaks in the surrounding mountain ranges have elevations ranging from less than 1,000 feet to more than 4,000 feet. The southern border of the project area was arbitrarily placed across the Napa Valley in the vicinity of Oak Knoll Avenue (fig. 3).

The approximately 60 square miles of alluvial plain in the project area slope gently from the periphery of the valley toward the Napa River. The plain is less than a mile wide at the northern end of the valley, but gradually broadens to a width of about 3½ miles in the vicinity of Oak Knoll Avenue. The elevation of the valley floor drops from 343 feet at Calistoga to about 50 feet near the Napa River at Oak Knoll Avenue.

The basin is drained by the Napa River and its principal tributaries; Conn, Dry, Sulphur, Rector, and Mill Creeks. The Napa River is incised within steep banks of alluvium, as are the lower parts of the principal tributaries. The tributary streams are, with few exceptions, intermittent under most climatological and water-use conditions. The Napa River is perennial except during years of less than normal rainfall. At present (1972) a significant part of the low flow of the Napa River is water discharged from municipal sewage-treatment plants at Calistoga and St. Helena. Controlled releases of water are made to downstream users from Lake Hennessey on Conn Creek.

Climate

The climate in Napa Valley is characterized by warm, dry summers and cool, moist winters. Most of the annual precipitation occurs as rain that falls during the winter and early spring months. The distribution of this precipitation is dependent upon the topography and the prevailing winds. Precipitation generally increases with increases in topographic elevation. Most of the rain comes with southwesterly winds and falls in a zone of high rainfall extending south to north along the slopes of the bordering western mountains. A less pronounced zone of high rainfall extends similarly along the slopes of the eastern mountains, but the precipitation is not as great there due to the generally lower elevations. The area of highest rainfall occurs at the northern end of the valley where the eastern and western rainfall zones join and are influenced by rain-bearing winds coming through wind gaps in the vicinity of Calistoga.

Rainfall data are available from U.S. Weather Bureau Climatological Data for California and from Kunkel and Upson (1960). For purposes of this report the rainfall record at St. Helena is considered most representative of annual precipitation throughout the project area, and references to rainfall or precipitation amounts refer to this record. The mean annual precipitation at St. Helena over the period of record 1906-70 is 33.5 inches. The standard deviation is 11.3 inches and the skew coefficient is 0.49. The median annual precipitation at St. Helena was 30.6 inches, or very near to the mean value. The small difference between mean and median values and the correspondingly small skew coefficient indicate that a frequency distribution of the annual rainfall at St. Helena will be generally symmetrical about the mean. Thus, for purposes of this report, rainfall is assumed to be normally distributed.

Table 1 shows the probability of exceeding, in any water year, the given amount of rainfall at St. Helena along with the probability that this rainfall will be exceeded for 2 years, consecutively. These probabilities are based on the assumption that values of annual rainfall at St. Helena are normally distributed, mutually exclusive, and independent.

TABLE 1.--*Probability that given amounts of annual rainfall at St. Helena will be exceeded in 1 and 2 water years, consecutively*

Annual rainfall at St. Helena (inches)	Probability that annual rainfall at St. Helena will be exceeded in any water year (percent)	Probability that annual rainfall at St. Helena will be exceeded in 2 consecutive water years (percent)
10	98	96
15	95	90
20	88	77
25	77	59
30	62	38
35	45	20
40	28	8
45	15	2
50	7	.5
55	2	.0
60	1	.0

Variations in annual rainfall for a single station within the project area can be very large. For example, only 12 inches of precipitation was recorded at St. Helena during the 1924 water year, whereas 59 inches was recorded during the 1914 water year.

Significant temperature variations also occur in the project area, largely as a result of the uneven topography. The lower valley troughs and the higher elevations of the surrounding mountains are generally cooler in the summer, and have the lower winter temperatures. The foothills and the alluvial plain are generally warmer, having a frost-free season at least a month longer than the colder zones. The less extreme temperatures in these areas result partly from the thermal insulating properties of night and morning fog blown in from San Pablo Bay. This fog, common during all seasons of the year, decreases the amount of heat received from the sun in summer and decreases radiation from the earth in winter. The mean annual temperature of the project area is about 60°F (15.5°C); there is a seasonal variation about this mean of approximately ±30 degrees. Temperature extremes of 115°F (46°C) and 10°F (-12.0°C) have been recorded at St. Helena.

During the winter months, temperatures below freezing (32°F or 0°C) occur infrequently. The average frost-free season in the valley proper spans 250 days from March 18 to November 22. This time period varies considerably, however, from year to year and from place to place within the valley. For example, frost has occurred at Napa as late as May 26 and as early as October 12. The period from March 15 to May 15 is especially critical to the grape industry because a frost at this time of year seriously reduces crop yields. Statistical information concerning the severity, distribution, and occurrence of frost periods is available from the Napa County Flood Control and Water Conservation District (1972).

GEOLOGY

The geologic formations in the project area were mapped by Weaver (1949), Taliaferro (1951), Kunkel and Upson (1960), and Koenig (1961, 1963). A brief description of the geologic formations, their history, their relation to one another, and their water-bearing properties is considered sufficient for purposes of this report. More detailed information may be obtained in the references cited above.

The floor of the Napa Valley consists of a relatively thin cover of alluvium of Quaternary age overlying a thick section of Sonoma Volcanics of Pliocene age, consolidated sedimentary rocks of Cretaceous age, sedimentary and metamorphic rocks of the Franciscan Formation, and ultrabasic plutonic rocks and serpentine of Jurassic age. As shown in figure 3, the Sonoma Volcanics and the older sedimentary, metamorphic, and ultrabasic rocks crop out in Napa Valley and constitute the bedrock in the project area.

Geologic History

The geologic activities that have had the most direct bearing on the hydrologic system of present-day Napa Valley began during the Miocene epoch. In early and middle Miocene time, the area now known as Napa Valley was part of a structural depression occupied by the Miocene sea. During that time, severe erosion from land masses which bordered the sea caused thousands of feet of sediment to be deposited in the depression.

During late Miocene and early Pliocene time, a general uplift occurred and the Miocene sea regressed. The Napa Valley area probably was above sea level during most of early Pliocene time and was modified by crustal movements, volcanic activity, and erosion. Large areas of the uplifted marine deposits were blanketed by pumice and volcanic ash or covered by flows of basalt, andesite, and rhyolite. In quiet periods between the volcanic episodes, stream valleys and topographic depressions were partly filled with deposits of gravel, sand, and clay, and diatomaceous deposits were formed in fresh or brackish-water lakes. In middle and late Pliocene time, volcanic activity increased and large areas were covered by pumice, welded tuff, and flows of primarily rhyolitic composition.

In early Pleistocene time the region was again uplifted and subjected to extensive erosion. During this time several oscillations of the sea level, accompanied by crustal movements, placed the land surface alternately above and below water. With each of these oscillations, the hydraulic gradients of streams draining the Napa Valley area were altered and readjusted. Stream channels shifted, gradients were changed, and sediments were deposited and eroded at varying rates. Hence, local deposits of early Quaternary age in Napa Valley are highly variable with respect to their lithology, thickness, and hydrologic properties. In middle Pleistocene time a general downwarping of the Napa Valley and surrounding areas forced the streams draining the basin to make further adjustments.

The general topographic form of the present-day Napa Valley area is the result of erosion and deposition that has taken place since the middle Pleistocene downwarping and the last great sea-level rise that occurred following the end of the last Ice Age.

Geologic Units and Their Water-Bearing Properties

For this report, the geologic units of the Napa Valley area have been divided into ultrabasic rocks of Jurassic age; the Franciscan Formation and its metamorphic equivalents of Jurassic and Cretaceous ages; consolidated sedimentary rocks of Cretaceous age; Sonoma Volcanics of Pliocene age; and alluvium of Quaternary age. Figure 3 shows the areal distribution and relative ages of the geologic units.

Ultrabasic Rocks

The ultrabasic rocks of Jurassic age include serpentine, peridotite, dunite, pyroxenite, and minor amounts of silica-carbonate rock derived from alteration of serpentine. The rocks occur as lenses, sheets, and irregularly-shaped masses within, or along, the boundaries of Jurassic equivalents of the Franciscan Formation. The serpentine masses probably were formed by alteration of original igneous intrusive material. Chemical analyses of the serpentinized intrusions (Bailey, Irwin, and Jones, 1964) indicate that the rock is composed of almost equal parts of silica and magnesium with residual amounts of other rock-forming minerals. These rocks are poorly permeable and not important as a source of water supply.

Franciscan Formation

The Franciscan Formation of Jurassic and Cretaceous ages is a heterogeneous assemblage of graywacke, altered volcanic rocks and associated metamorphic rocks, shale, chert, limestone, and conglomerate. In the Napa Valley area, the Franciscan Formation is chiefly consolidated graywacke and shale with minor amounts of greenstone, chert, and conglomerate. All of the units have been more or less metamorphosed and altered by pronounced changes in the physical and chemical environment in which the rocks originated.

Chemical analyses of the sandstone and shale of the Franciscan Formation (Bailey, Irwin, and Jones, 1964) indicate that silica and aluminum are the dominant constituents, followed by iron, magnesium, and calcium, respectively.

Except where fractured or deeply weathered, the Franciscan Formation is poorly permeable. Wells penetrating the rocks may yield enough water for minimum domestic or stock requirements but the water may be of poor quality for domestic uses.

Consolidated Sedimentary Rocks of Cretaceous Age

The consolidated sedimentary rocks of Cretaceous age are chiefly mudstone and siltstone with minor beds of thin-bedded sandstone. The rocks are well consolidated and poorly permeable. Where penetrated by wells, they yield small quantities of water that may be sufficient for minimum domestic or stock requirements but the water may be too mineralized for human consumption.

Yield of Wells Tapping the Consolidated Sedimentary Rocks of Cretaceous Age, the Franciscan Formation, and the Ultrabasic Rocks

Logs of wells and pump-test information supplied by drillers, pump companies, and land owners indicate that the consolidated sedimentary rocks of Cretaceous age, rocks of the Franciscan Formation, and the ultrabasic rocks generally yield small quantities of water to wells. However, significantly larger quantities of water may be obtained from highly fractured or deeply weathered zones. Well-test information from 36 wells drilled into these rocks show an average yield of 19 gpm (gallons per minute) with most wells yielding 10 gpm or less. Most of the well tests for which both yield and drawdown information are available show a specific capacity less than or equal to 0.1 gallon per minute per foot of drawdown.

Sonoma Volcanics

The Sonoma Volcanics constitute a thick and highly variable series of volcanic rocks including andesite, basalt, and minor rhyolite flows with interbedded and discontinuous layers of tuff, tuff breccia, agglomerate and scoria. Redeposited tuff and pumice, diatomite, diatomaceous mud, silt, sand, and gravel, and a prominent body of rhyolite flows and tuff with some obsidian and perlitic glass are also included in this group of rocks.

Redeposited, water-laid pyroclastic materials, diatomite, silt, sand, and gravel are exposed in roadcuts along the Silverado Trail east and southeast of St. Helena. In the vicinity of Calistoga, prominent bodies of rhyolite and rhyolitic tuff have been altered by hydrothermal processes to a hard, dense, fine-grained rock. Thin-section and X-ray diffraction analyses indicate that the altered rhyolitic rocks now consist mostly of quartz and kaolinitic and montmorillonitic clays.

Well-test information from 140 wells tapping the Sonoma Volcanics show an average yield of 32 gpm and an average specific capacity of 0.6 gallon per minute per foot of drawdown.

Alluvium

In this report, deposits described as alluvium or as the alluvial aquifer, include the older alluvium, terrace deposits, older alluvial-fan deposits, and younger alluvium as mapped and described by Kunkel and Upson (1960).

The alluvium underlies and forms the floor of Napa Valley and consists mostly of lenticular, unconsolidated, poorly sorted, and imperfectly bedded deposits of gravel, sand, silt, and clay. Individual lenses of gravel, sand, and clay generally are not more than 10 feet thick but may extend laterally over large areas.

The floor of the Napa Valley is formed mainly by the flood plains and channels of the Napa River and its tributaries. Mechanical analyses by Carpenter and Cosby (1938) show that flood-plain materials consist mostly of silt and clay with a small percentage of gravel and sand. Channel deposits were shown to consist mostly of sand and gravel.

The yield of wells tapping the alluvium ranges from about 50 gpm to about 3,000 gpm depending on the number and thickness of gravel and sand lenses penetrated at the particular well. Well-test information supplied by drillers, pump companies, and land owners for 100 wells perforated in the alluvium indicate that this unit is by far the best aquifer in the project area. The average yield of these 100 wells is about 220 gpm and the average specific capacity is about 10 gallons per minute per foot of drawdown.

Geothermal Activity

Geothermal activity, in the form of "geyser" wells, hot springs, and wells that discharge warm to hot water, occurs at several places in the project area. Ground water associated with geothermal activity is termed "hydrothermal" because the water temperature is unusually high. A standard definition (White, 1957) is used in this report and states that water at a temperature of 5°C or more above the mean annual temperature of the surrounding environment is considered hydrothermal. Thus, for the project area, a well or spring containing water at a temperature equal to, or greater than, 20.5°C (69°F) is said to yield hydrothermal water.

The most notable occurrence of hydrothermal water in the project area is in the vicinity of Calistoga. Kunkel and Upson (1960) reported that several wells in sec. 26, T. 9 N., R. 7 W. periodically discharged hot water and steam in the manner of a geyser. Health resorts featuring hot springs and hot mineralized water have been developed near wells 9N/6W-21M3 and 9N/7W-26R1, 2, (fig. 3). Most wells in the Calistoga area that contain hydrothermal water penetrate confined or semiconfined aquifers and many of these wells flow at the land surface. Drillers' logs indicate that "cool" water occurs at shallow depth throughout most of the Calistoga area; however, at depths ranging from 50 to 100 feet below land surface drillers generally encounter confined, hydrothermal water. Water temperatures in the deeper wells are reported to range from 29.5°C (85°F) to 120°C (248°F). Hydrothermal water and artesian conditions also occur in wells south and east of Calistoga in T. 8 N., R. 6 W., secs. 3, 4, 9, and 25 and in the Rutherford-Oakville area in T. 7 N., R. 5 W., secs. 3, 14, 15, 25, and 26.

Figure 3 shows the location of wells that yield hydrothermal ground water. Table 4 shows chemical analyses of water samples taken from wells that yield hydrothermal water.

GROUND-WATER HYDROLOGY

Ultrabasic Rocks, Franciscan Formation, and Sedimentary Rocks of Cretaceous Age

The ultrabasic rocks, Franciscan Formation, and the sedimentary Cretaceous rocks are saturated below the water table, but yield very little water to wells. This restricted ability to yield water to wells results from a very low average hydraulic conductivity which, for these rocks, is probably on the order of 10^{-4} fpd (feet per day) or less. Ground-water flow patterns in these units generally conform to the topographic slopes except where interrupted by faults or other barriers that impede ground-water movement. The few well records available indicate that confined conditions occur locally within this group of rocks.

Sonoma Volcanics

The tuff breccia, scoriaceous material, and sedimentary deposits that compose a relatively small part of the Sonoma Volcanics generally are more permeable than the older ultrabasic, Franciscan, and sedimentary Cretaceous rocks and yield, on the average, greater quantities of water to wells. The hydraulic conductivity of the breccia, scoria, and sedimentary deposits is probably on the order of 10^{-2} to 10^{-3} fpd. Other units of the Sonoma Volcanics, most notably the andesitic, basaltic, and rhyolitic flow rocks and the hydrothermally altered material, yield little water to wells and probably have a hydraulic conductivity on the order of 10^{-4} fpd or less.

Water in the Sonoma Volcanics commonly is confined, though few wells penetrating this unit actually flow at land surface. Of the wells that do flow, most are located in the Calistoga area and the majority of these discharge hydrothermal water (fig. 3, table 4). Density differences between the hydrothermal water and the cooler ground water are caused by high subsurface temperatures and pressures and probably contribute to the upward movement of hydrothermal water and to the potentiometric heads observed at flowing, hot-water wells and "geyser" wells in the Calistoga area. On the other hand, the relation of depth to the occurrence of confined, hydrothermal water in wells in the Calistoga area (p. 15) suggests that the occurrence of hydrothermal water may be associated with a confining zone.[1] The fact that flowing wells, discharging hydrothermal water, occur in the project area is probably due to the combined influence of a local confining zone and the geothermally induced density differences of ground water.

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[1]A possible mechanism for the development of such a confining zone in hot-water dominated, hydrothermal systems is described on page 53.

Intermittently flowing wells in the Sonoma Volcanics that do not discharge hydrothermal water are located in sec. 16, T. 7 N., R. 5 W. and in secs. 6 and 7, T. 8 N., R. 6 W.

Alluvium

Spatial and Hydrologic Properties

The alluvium is by far the best aquifer in the project area and is locally capable of providing water to wells at rates of more than 3,000 gpm. The average hydraulic conductivity of the alluvium, as determined from drillers' logs and from specific-capacity data ranges from 10 to more than 100 fpd, depending on the percentage of sand and gravel in the alluvial deposits. The distribution of sand and gravel is irregular and variable but, as indicated in figure 4, the average values of hydraulic conductivity follow a general pattern; increasing from north to south and from the peripheries of the valley toward the Napa River. Thus, along any section that crosses the valley, the average hydraulic conductivity near the Napa River is virtually always the highest, and ranges from approximately 40 fpd near Calistoga to more than 110 fpd near Oak Knoll Avenue.

Except for small localized areas of semiconfinement, water in the alluvium is unconfined and moves under a natural hydraulic gradient that conforms in a general way to the surface topography. However, wells in the alluvium ranging in depth from 10 to 56 feet flow continuously or seasonally in secs. 22, 23, and 26, T. 7 N., R. 5 W. Most of these wells contain confined, hydrothermal water similar to wells in the Calistoga area, and the high potentiometric heads are probably the result of geothermally related phenomena such as described on page 16.

The thickness of the alluvium increases progressively from north to south, and from the periphery of the valley toward the Napa River. Figure 5 shows that the thicker sections of alluvial materials are beneath the Napa River and its major tributaries. The alluvium nearly everywhere thins toward the edges of the valley, except in the area immediately east and southeast of St. Helena. Here the thicker sections of alluvium occur at the eastern edge of the valley and abut directly against redeposited material of the Sonoma Volcanics. Also, a thick section of alluvium abuts the Sonoma Volcanics that form the Yountville Hills.

Kunkel and Upson (1960, table 8) used specific-yield values that ranged from 5 to 8 percent to estimate the volume of water in the alluvial aquifer. Because most of the values were in the 6-percent range in the areas of concern to this report, that value was used in conjunction with historical water-level data and estimated aquifer thicknesses (fig. 5) to determine that, as of 1972, the available quantity of water in the alluvial aquifer of northern Napa Valley was about 190,000 acre-feet.

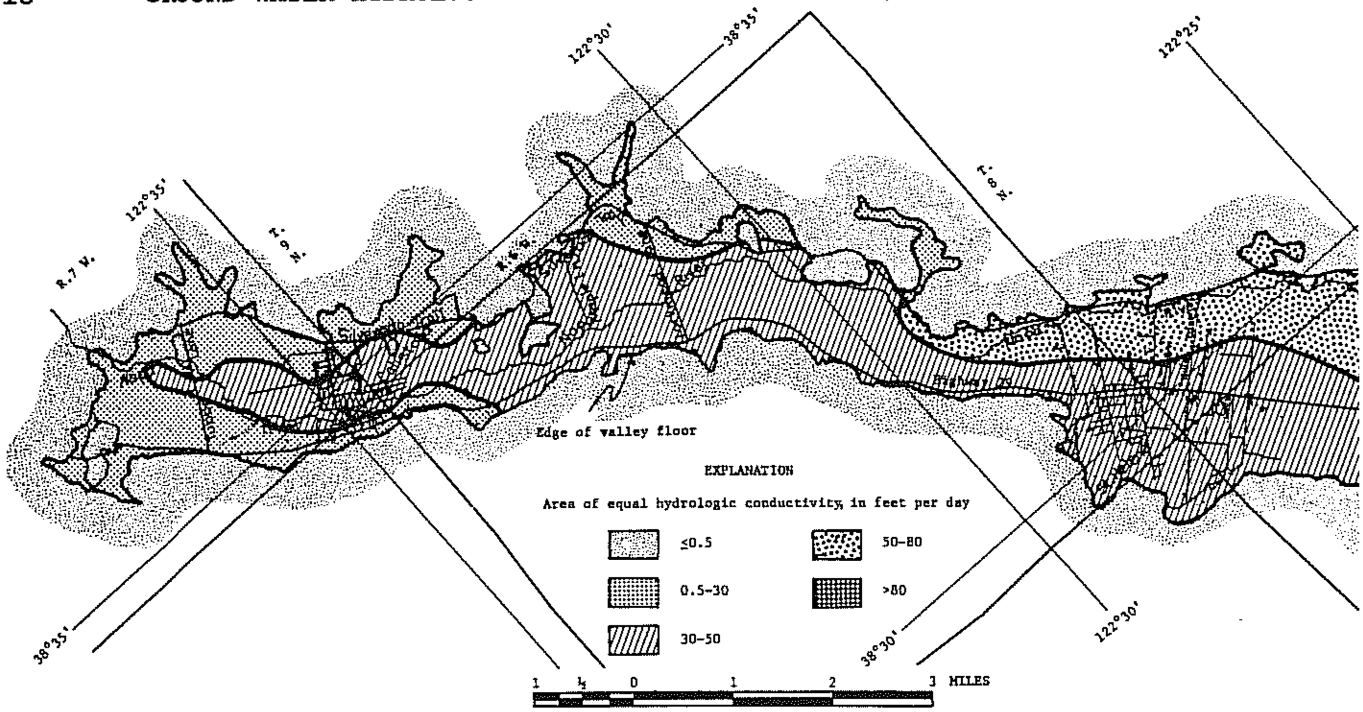
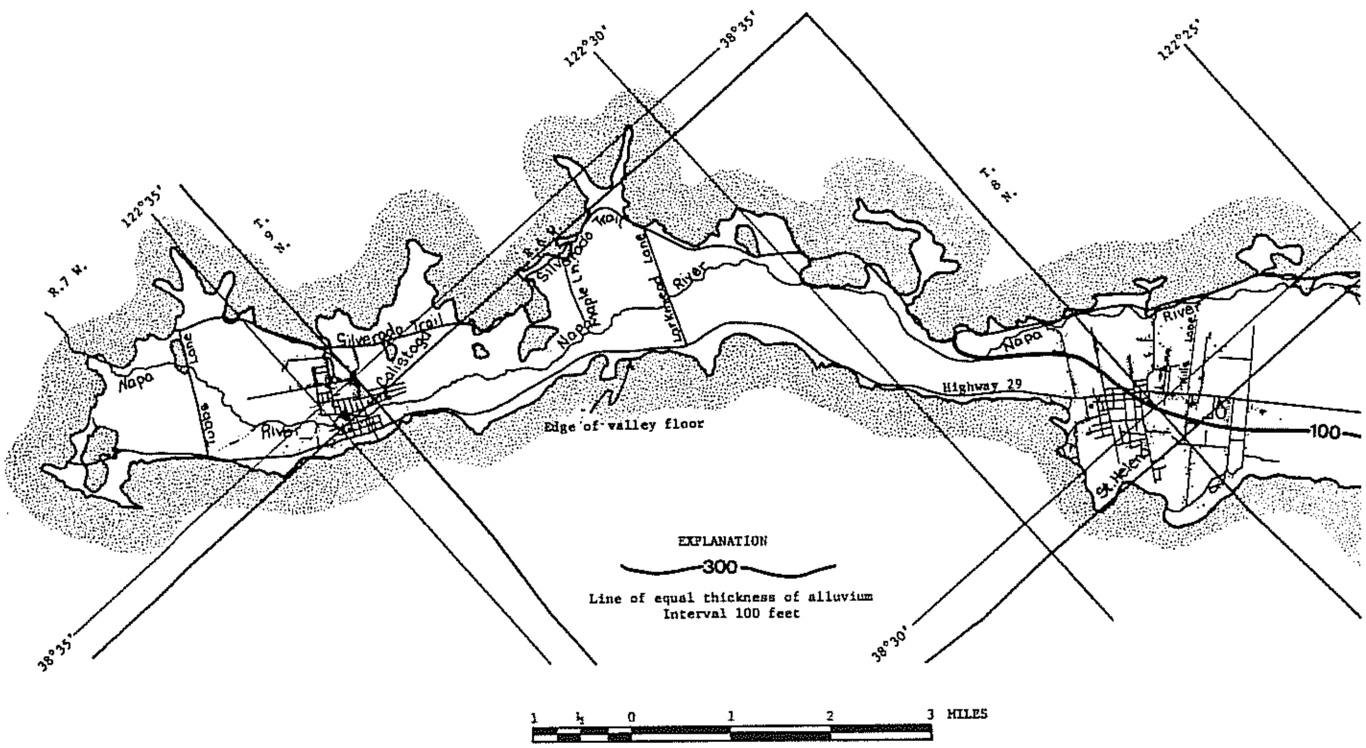


FIGURE 4.--HYDRAULIC CONDUCTIVITY OF THE ALLUVIUM IN NORTHERN NAPA VALLEY.



Base from U.S. Geological Survey 15' topographic series: Calistoga, 1959, St. Helena, 1960; Sonoma, 1951; and Santa Rosa, 1954

FIGURE 5.--THICKNESS OF ALLUVIUM IN NORTHERN NAPA VALLEY.

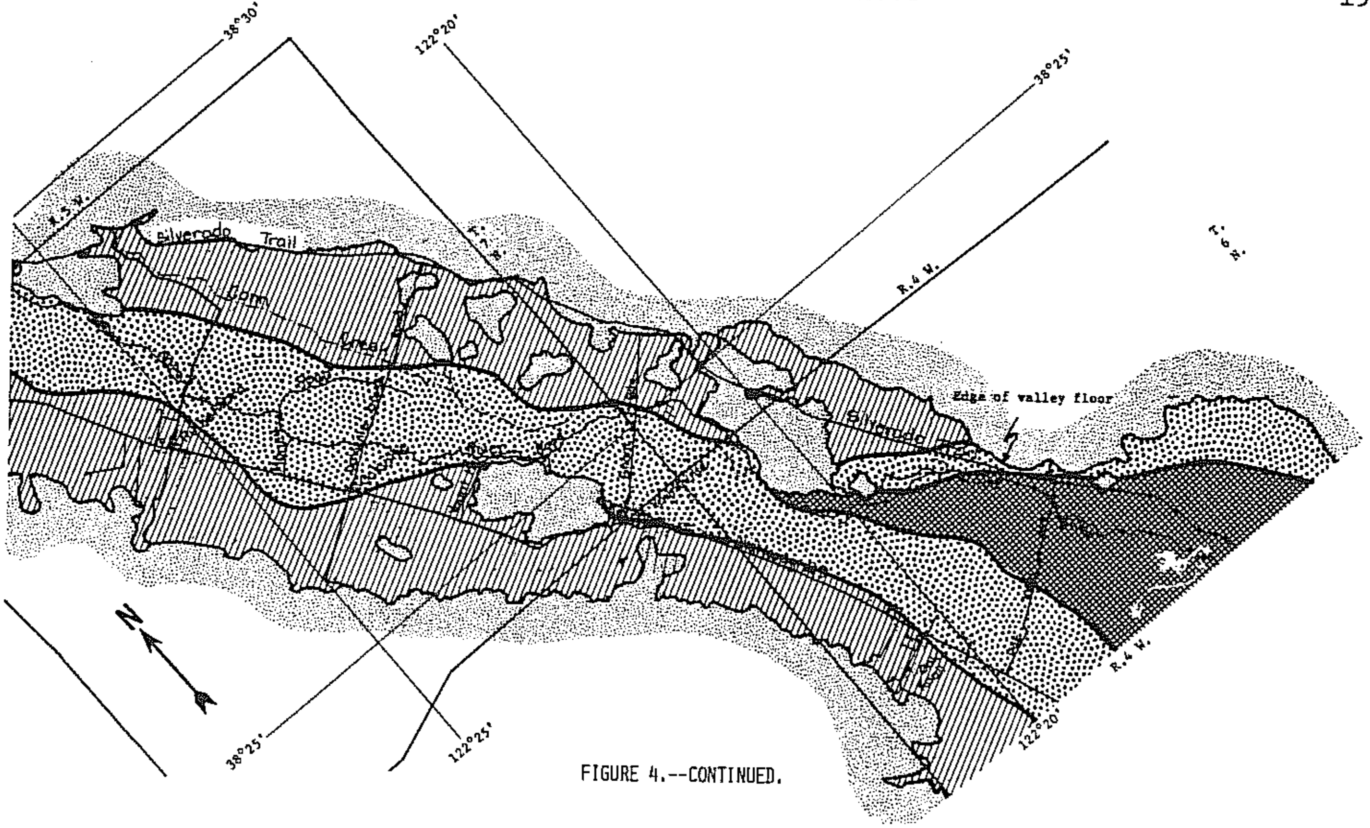


FIGURE 4.--CONTINUED.

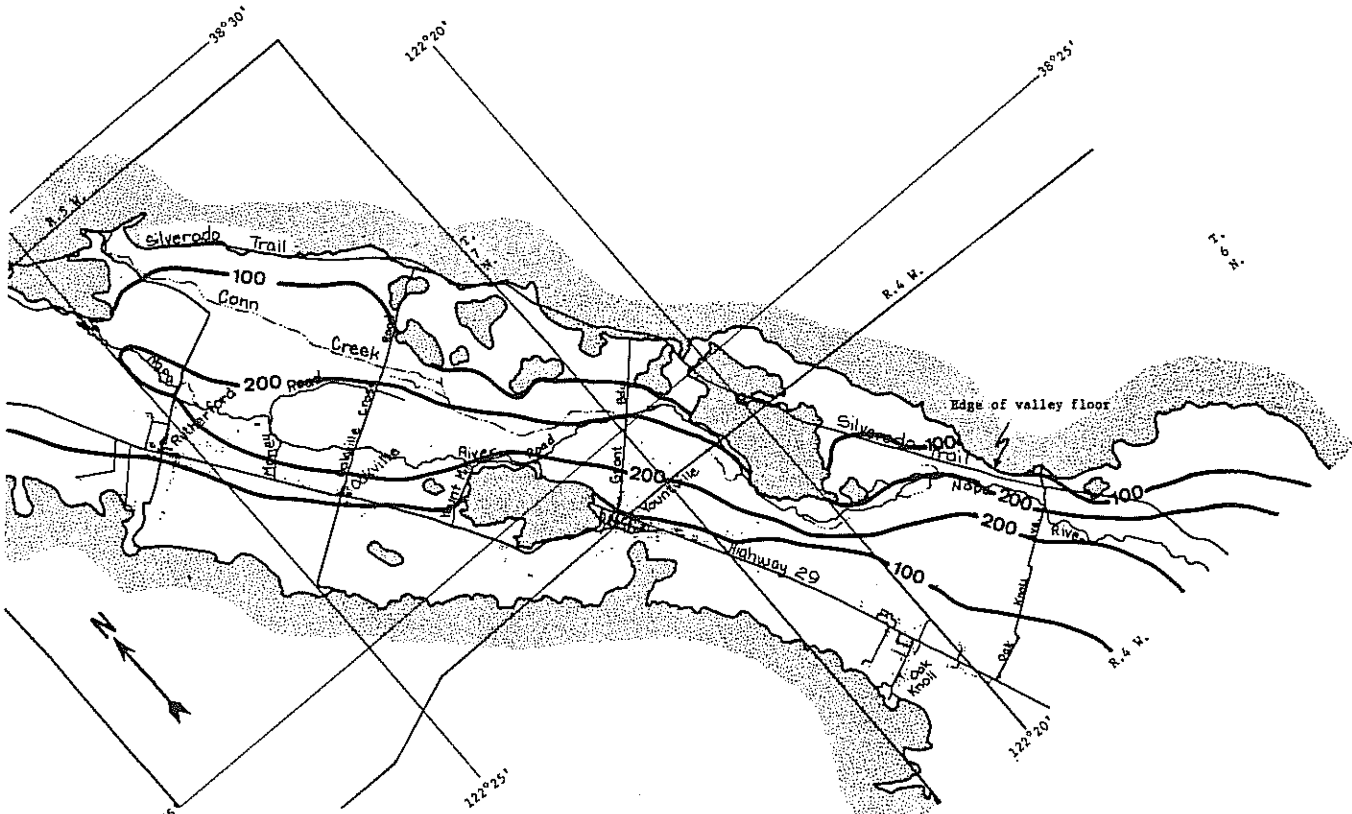


FIGURE 5.--CONTINUED.

Recharge and Discharge

Recharge to the alluvium occurs by infiltration of rain, percolation from streams, and subsurface inflow from older rocks. Discharge from the alluvium occurs by evapotranspiration, ground-water flow to the Napa River, pumping from wells, and subsurface outflow across the southern boundary of the project area.

At the present time (1972), the Napa River is a gaining stream and contributes little recharge to the water table. Even during years of limited rainfall, when the river flows intermittently, water is discharged from the aquifer in those reaches where the river is flowing and water recharges the alluvium in reaches where the river channel is dry; thus, net recharge to the alluvial aquifer is negligible.

Subsurface outflow occurs across the southern boundary of the project area as underflow in the alluvial deposits beneath and directly adjacent to the Napa River and is considered to be relatively constant over time. Using Darcy's law, known values of the hydraulic gradient, and estimated values of hydraulic conductivity, the subsurface discharge is calculated to be between 1 and 2 cfs (cubic feet per second). Subsurface inflow along the periphery of the valley is insignificant except in the area east and southeast of St. Helena. Here, relatively permeable redeposited volcanic materials abut thick sections of alluvium and provide an estimated constant inflow to the alluvial aquifer of 0.50 cfs.

Fluctuation of Water Levels and Streamflows and the Response of Water Table and Streamflows to Annual Rainfall

Historically, ground-water levels and streamflows in the Napa Valley have varied considerably from season to season and from year to year and have been most critically influenced by winter and early spring precipitation. Seasonal fluctuations of the water table and seasonal changes in streamflows are relatively large because of large seasonal variations in rainfall. Consequently, streamflows and ground-water levels are highest in the spring, decline progressively through the summer and autumn, and are lowest before the onset of winter rains.

Fluctuations of the water table and total streamflows from water year to water year are also directly dependent upon rainfall. During most water years, rainfall is sufficient to meet soil-moisture requirements and to replace ground water lost by pumping and by natural discharge. During years of limited rainfall, however, soil-moisture requirements are not met, some depletion from ground-water storage occurs, and surface runoff and ground-water discharge to the Napa River are reduced. Several consecutive dry years in succession would aggravate the problem of decreased streamflows to a degree commensurate with the length and severity of the drought and the amount of ground-water pumping. During years when rainfall is significantly below average, there may be no flow in the Napa River during most of the summer and autumn months. If significant storage depletion occurs as the result of pumping during a dry period and if the water is replaced as a result of recharge during a subsequent wet period, the total discharge of the Napa River at Oak Knoll Avenue during the wet period will be reduced by the amount of storage gained after flow begins.

Water-level data indicate that during the last 42 years (1929-70) seasonal and annual water-table fluctuations caused by periods of below average rainfall and pumping from wells have not exceeded 30 feet.

Water-table response to annual rainfall is a reflection of the annual recharge to the aquifer and indicates the ability of the aquifer to receive further recharge. The three curves in figure 6 show annual water-table recovery in three observation wells in the alluvium plotted against total annual rainfall for the same year. The graphs show that annual recharge to the water table is sensitively controlled by total annual rainfall up to a threshold value of 35 to 40 inches at St. Helena. Beyond this amount, significant increases in rainfall do not cause a corresponding recovery of water levels, and the excess rainfall becomes rejected recharge. Consequently, the threshold value of 35 to 40 inches indicates the average annual rainfall required at St. Helena to meet soil-moisture requirements and to replace ground-water storage previously depleted as a result of pumping and natural aquifer discharge.

Several wells some distance from the Napa River and the three wells for which the general response curves (fig. 6) were calculated, indicate that long-term rainfall trends rather than annual rainfall may influence water-table response for a particular water year. For example, several consecutive years of rainfall well below the threshold value, followed by a year of rainfall well above the threshold value, can produce a water-table response for the last year considerably above that indicated by the general response curve. Similarly, several consecutive years of rainfall above the threshold value can produce a water-table response for the last such year considerably below that indicated by the response curve. Such extreme variations in precipitation and recharge have influenced water-table response through the years. However, repetition of precipitation-recharge conditions has also occurred, and the response data generated from these events, coupled with long-term rainfall and water-level records, were used to damp the influence of extreme climatologic variations on the water-table response curves. Thus, the curves do define valid relations and become a useful aid in estimating precipitation-recharge relations.

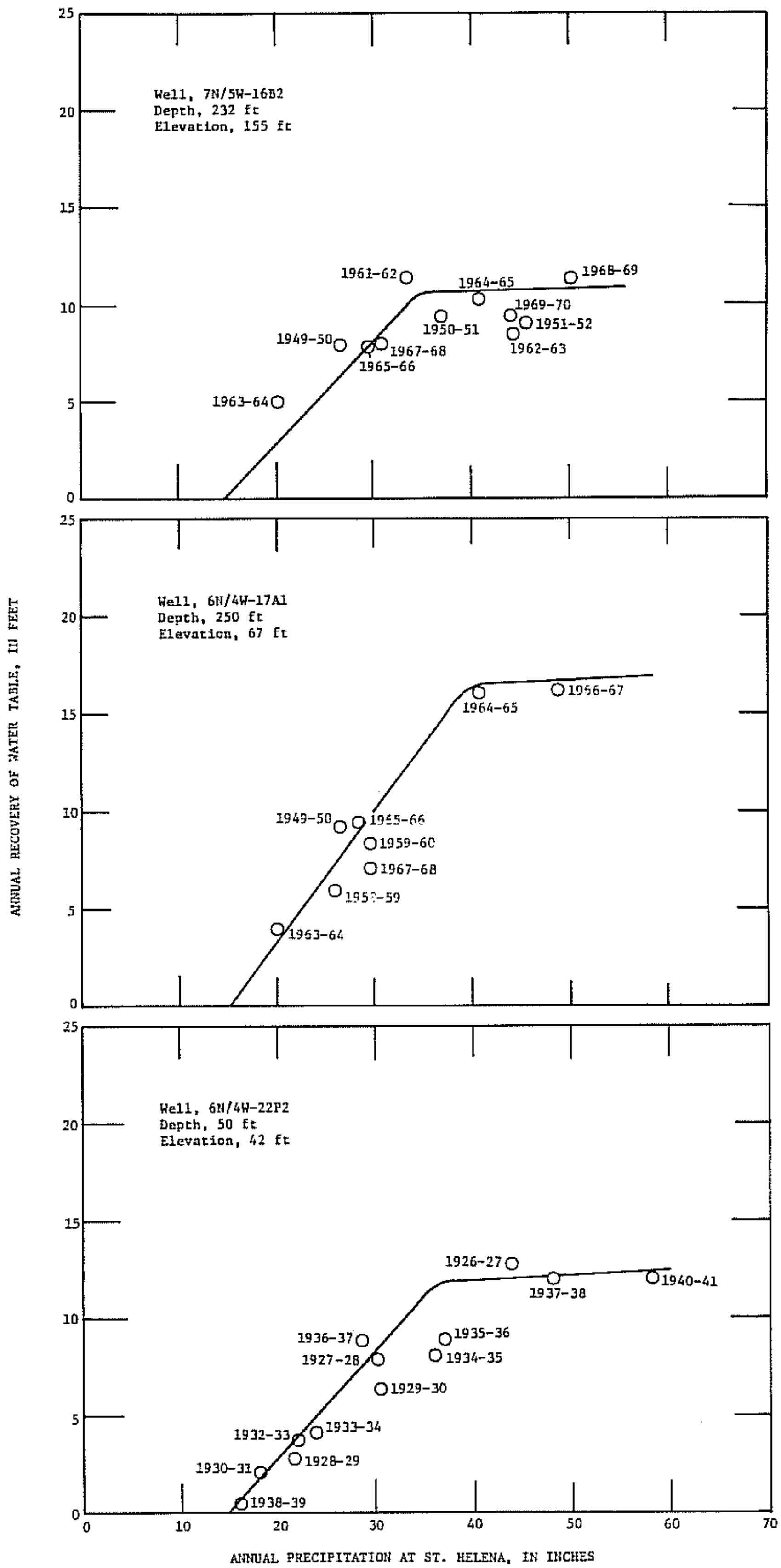


FIGURE 6.--WATER-TABLE RESPONSE CURVES.

Only three response curves are shown in figure 6 because sufficient long-term water-level data were not available for other observation wells. However, comprehensive water-level data for short periods of record from Bryan (1932) and Kunkel and Upson (1960) indicate that the magnitude of water-table response to annual rainfall generally is the same in most parts of the alluvial aquifer. Thus, the "threshold" values shown in figure 6 can be extrapolated to most of the project area. The exception to this rule is in the narrow part of the alluvium north of St. Helena, near Barro, where aquifer geometry and the requirements of flow continuity maintain high ground-water levels and dampen response to rainfall.

Total annual stream discharge from the project area is also directly dependent upon annual rainfall. This relation is indicated by the curves in figure 7 where the total annual streamflow for Conn Creek, Dry Creek, and the Napa River is plotted against total annual rainfall at St. Helena. These curves indicate that the annual discharge of tributary streams decreases with decreasing rainfall and becomes negligible when annual rainfall at St. Helena is 20 inches or less.

Relation of Annual Recharge to Annual Rainfall

Subsurface inflow was discussed previously (p. 20) and is considered to be nearly constant over time. Recharge to the alluvial aquifer from rainfall and streamflow, on the other hand, is not independent of annual precipitation; in fact, recharge amounts vary considerably when annual rainfall is less than the threshold value (fig. 6).

For example, net annual recharge[1] to the alluvial aquifer from percolation of rain is estimated to be 3 inches per unit area during water years when the threshold value of rainfall is equalled or exceeded. This recharge is progressively reduced when rainfall departs negatively from the threshold value, and it probably becomes virtually zero during water years when total rainfall at St. Helena is less than 12 inches.

Net recharge from streamflow is similarly dependent on annual rainfall. Most of this recharge is derived from streams tributary to the Napa River and occurs near the valley margins where the tributary flows leave the older, impermeable rocks and pass over permeable channel deposits in the alluvium. Net annual recharge from streamflows is at a maximum when annual rainfall equals or exceeds the threshold value, becomes progressively less when rainfall is less than the threshold value, and for most years probably is negligible when annual rainfall at St. Helena is 20 inches or less.

[1]Net recharge to the alluvium is defined as the total amount of water recharged to the water table minus the losses from the water table attributed to evapotranspiration.

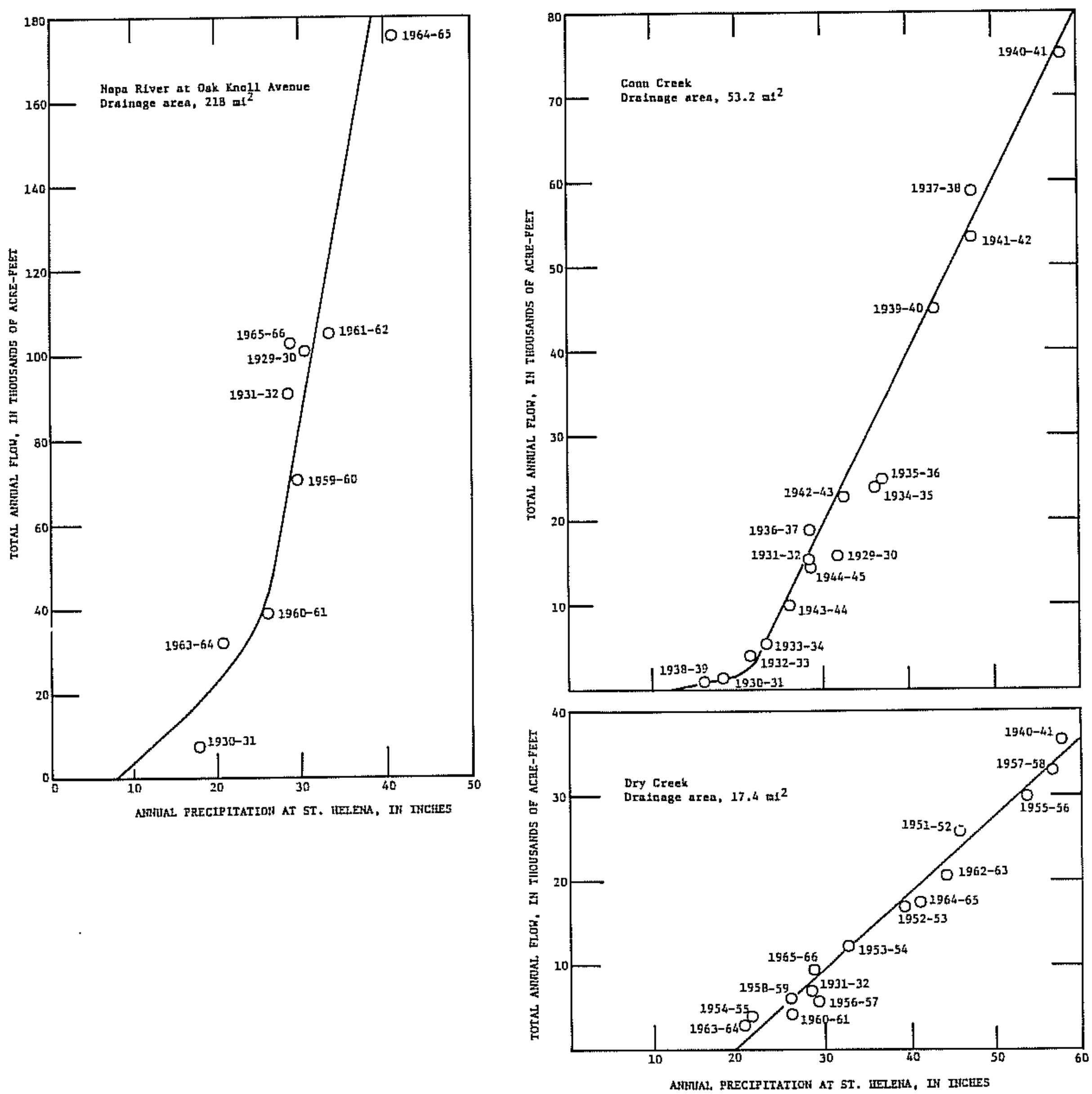


FIGURE 7.--STREAMFLOW RESPONSE CURVES.

Ground-Water Pumpage

Faye (1972) calculated the annual agricultural use of ground water in the project area from power records for the years 1964-70 (table 2). Domestic use of ground water in the project area for the same period is estimated to have been 300 acre-feet per year. Annual agricultural pumpage for the 1964-67 period (table 2) varied inversely with the rainfall at St. Helena After 1967, however, annual pumpage increased significantly and no longer varied in a way sensitive to rainfall. The 1967-70 period coincides with the increasing use of ground water to provide frost protection for vineyards. Thus, future ground-water withdrawals probably will reflect the length and severity of spring frosts and the amount of acreage devoted to vineyards.

TABLE 2.--*Calculated agricultural pumpage from the alluvial aquifer in northern Napa Valley for water years 1964-70 (Faye, 1972)*

Water year	Pumpage (acre-feet per year)
1964	4,500
1965	4,050
1966	4,650
1967	3,300
1968	5,150
1969	5,600
1970	5,700

Definition of Steady-State and Transient-State Conditions in the Alluvial Aquifer

The flattening of the water-table response curves in figure 6 indicates that the distribution of ground-water levels in the alluvial aquifer is about the same during those water years when rainfall equals or exceeds the threshold value. A statistical evaluation (table 1) of the rainfall record at St. Helena indicates that the threshold value of rainfall has a recurrence interval of less than 3 years. On the average, then, approximately the same distribution of water-table elevations, and, by inference, the same quantities of aquifer recharge and discharge, occur throughout the alluvial aquifer every 3 years. Thus, for purposes of this study, steady-state conditions are said to occur in the alluvial aquifer during those years when rainfall equals or exceeds the threshold value (p. 21). The quantities of water recharged to, and discharged from, the alluvial aquifer during those years and the spring water-table surface that develops as a result of that recharge and discharge are said to define those steady-state conditions.

The fact that long term, water-table elevations in the alluvial aquifer are generally static indicates that very little storage depletion or storage accumulation has occurred with time. Thus, in order to satisfy continuity, net discharge[2] from the alluvial aquifer must equal net recharge when steady-state conditions prevail.

Rainfall and water-level records indicate that steady-state conditions occurred in the alluvial aquifer during the 1963 water year. Using unpublished water-level data and estimated quantities of recharge and discharge, a water-level contour map for the spring of 1963 (fig. 8) was prepared and a ground-water budget (table 3) was computed. The ground-water budget and the water-level contour map are considered representative of the water body in the alluvial aquifer during most of the 1929-70 period.

Separation of the streamflow hydrograph into quantities of base flow and surface runoff for the Napa River at Oak Knoll Avenue indicates that the average ground-water discharge to the Napa River and subsequently out of the project area, during the 1963 water year was 18.0 cfs. Net pumpage of ground water during that water year was estimated to have been 4.0 cfs, after allowing for an estimated 10 percent irrigation return flow. Subsurface outflow across the southern boundary of the project area was estimated to be 1.5 cfs (p. 20). Thus, the total average net discharge from the alluvial aquifer for 1963 water year is computed to have been 23.5 cfs, and is considered to be the steady-state discharge from the project area.

Net recharge from direct rainfall penetration is estimated to be 3 inches per unit area during periods when the total rainfall at St. Helena equals or exceeds the threshold value. Rainfall thus contributes about 12.5 cfs of net recharge to the alluvium under steady-state conditions. Nearly all the remaining 11.0 cfs of net recharge required to maintain steady-state ground-water conditions is contributed by tributary streams along the periphery of the valley.

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[2]Net discharge is defined as all water discharged from the saturated zone except evapotranspiration.

Even though steady-state conditions generally have prevailed in the project area during the past 40 years, the rainfall record indicates that dry periods have occurred during which the annual rainfall was less than the threshold value for several consecutive years. During these periods, steady-state conditions did not prevail in the alluvial aquifer, some storage depletion occurred, and in extreme cases--most notably during the 1930 and 1931 water years--the Napa River did not flow for a considerable period of time. At the end of such periods, the water-level contours were generally 20 to 30 feet below steady-state levels. For this study, whenever rainfall at St. Helena is significantly below the threshold value for several consecutive water years, ground-water conditions are defined as undergoing change and a transient-state situation is said to prevail. Water-level contours in, and quantities of recharge to and discharge from the alluvial aquifer under transient-state conditions are defined as transient-state parameters.

Bryan (1932) reported water-level records and streamflow hydrographs for 1929-32 water years, during which a total of 77.1 inches of rainfall was measured at St. Helena. Transient-state conditions prevailed throughout that period, most notably from the spring of 1930 through the summer of 1931. Water-level contours at the beginning and end of this period are shown in figures 9 and 10. Figure 9 shows that in the spring of 1930, water levels were 5 to 10 feet below steady-state water levels (fig. 8). Figure 10 shows that in June of 1931, water levels were generally 15 to 25 feet below steady-state levels (fig. 8).

The period April 1930 to June 1931 is considered most representative of transient-state conditions as defined in this report, and will henceforth be referred to as the transient period. Separation of streamflow hydrographs for base flow and surface runoff indicates that from April 1930 to June 1931, the base flow of the Napa River averaged 10.5 cfs. No flow was recorded in the Napa River at Oak Knoll Avenue from June 5 to November 26, 1931. The total ground-water withdrawal from the alluvial aquifer during the transient period was estimated to be 3,700 acre-feet. This amount was about 200 acre-feet more than the annual average withdrawal rate of 3,000 acre-feet reported by Faye (1972) as representative of this period. The difference reflects an estimated increase in the use of ground water to supplement deficient rainfall. Bryan (1932) indicated that during the transient period approximately 1,100 acre-feet of base flow was diverted from the Napa River and from Conn Creek for irrigation purposes upstream from Oak Knoll Avenue. Thus, the total net discharge from the alluvial aquifer during the transient period was estimated to have been 18.0 cfs, after allowing for an estimated 10 percent irrigation return flow and assuming that subsurface discharge across the southern boundary of the project area remained unchanged at 1.5 cfs.

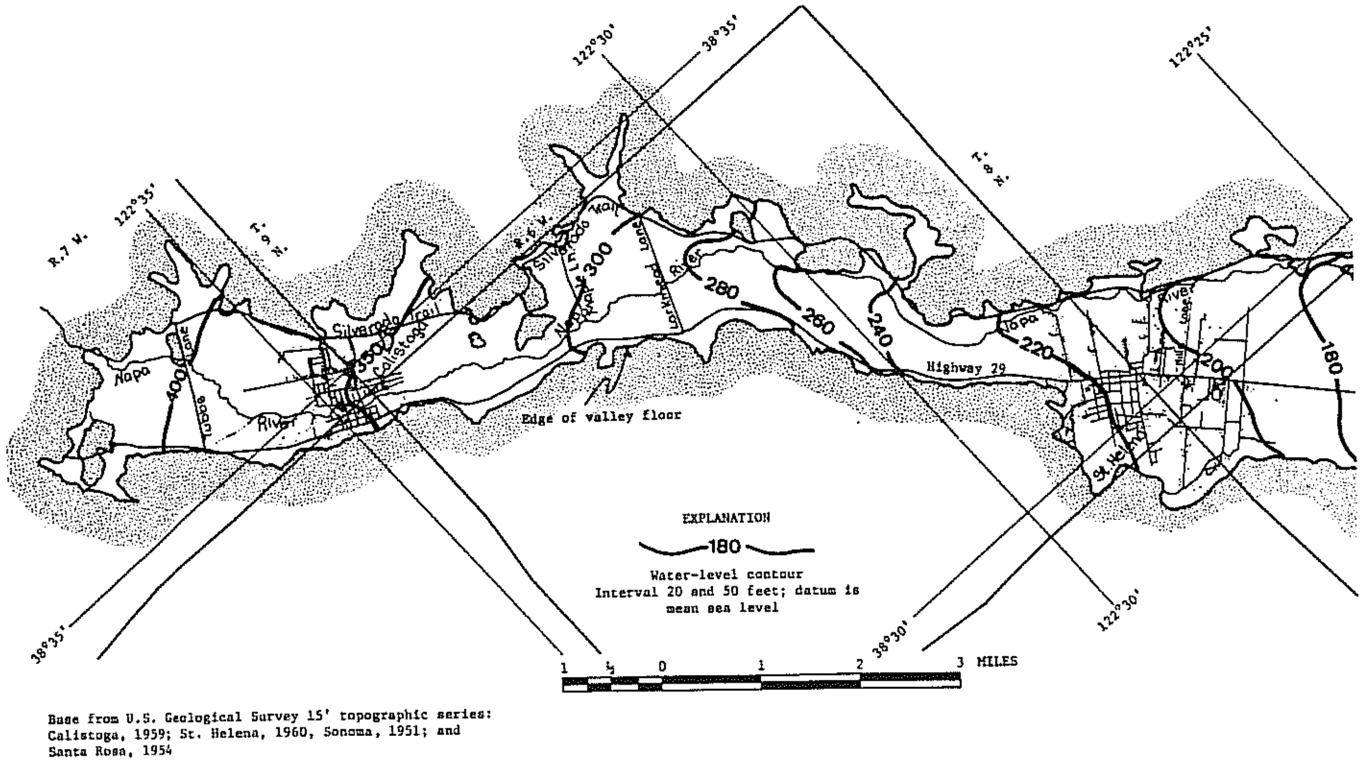


FIGURE 8.--WATER-LEVEL CONTOURS IN NORTHERN NAPA VALLEY, SPRING 1963.

Recharge to the alluvial aquifer in the transient period occurred during seasonal rains of the 1931 water year when approximately 18 inches of precipitation was measured at St. Helena. Relating this annual precipitation to the water-table response curves in figure 6, indicates that total recharge to the water table for the 1931 water year was 11 to 16 percent of the steady-state value. Considering that evapotranspiration from an unusually low water table was minimal, the net recharge to the alluvial aquifer during the transient period was estimated to be 14.5 percent of the steady-state recharge, or 3.6 cfs. Net recharge to the water table from streams tributary to the Napa River is estimated to be zero when annual rainfall at St. Helena is 20 inches or less. Thus, the total net recharge during the transient period was estimated to consist of 0.5 cfs of subsurface inflow and 3.1 cfs of direct infiltration of rainfall. Table 3 summarizes the steady-state and transient-state water budgets for the alluvial aquifer.

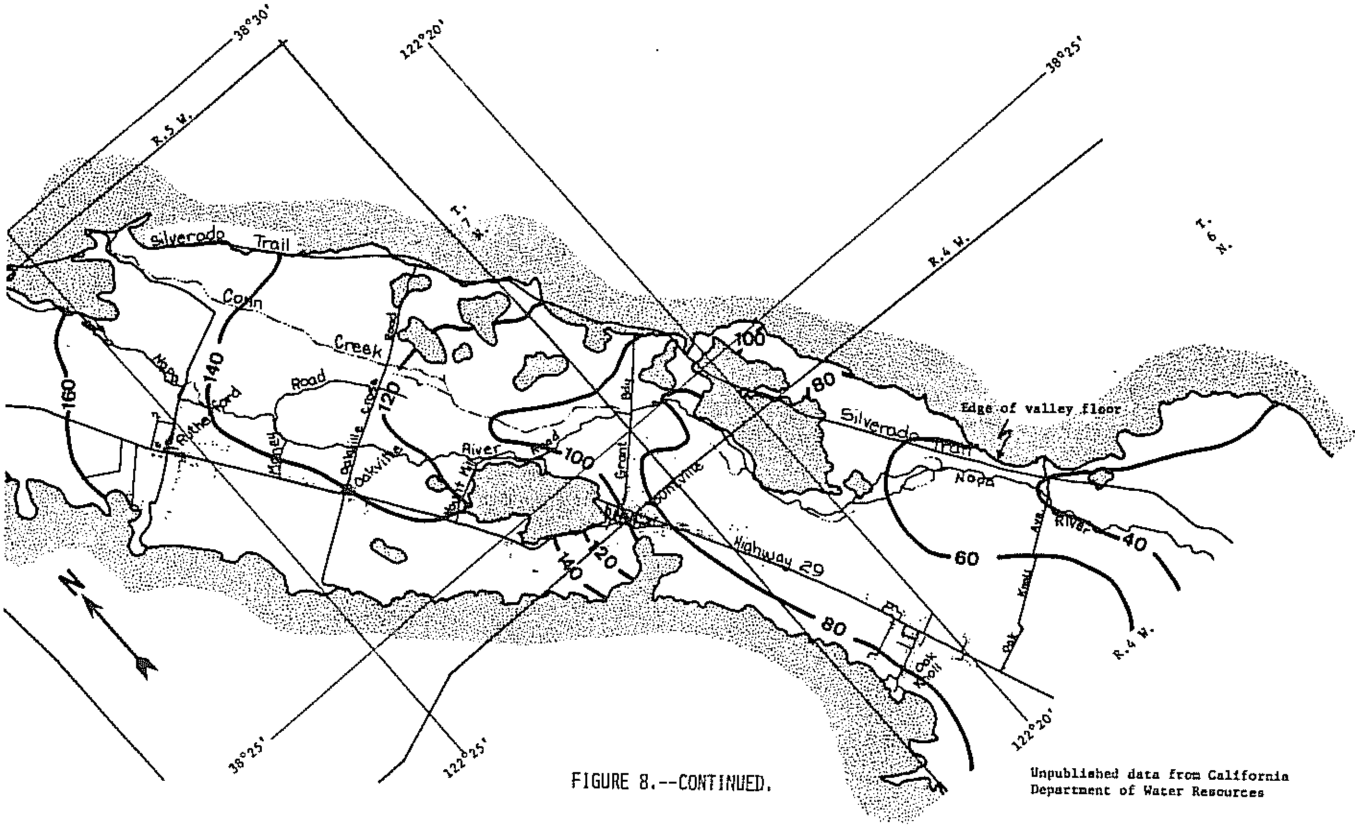


FIGURE 8.--CONTINUED.

TABLE 3.--*Water budgets for steady-state and transient-state conditions in the alluvial aquifer of northern Napa Valley*

Steady-state conditions				Transient-state conditions			
Discharge (cfs)		Recharge (cfs)		Discharge (cfs)		Recharge (cfs)	
Base flow in Napa River	18.0	Rainfall	12.5	Base flow in Napa River	10.5	Rainfall	3.1
Net pumpage	4.0	Tributary streams	10.5	Net pumpage	6.0	Tributary streams	0
Subsurface outflow	1.5	Subsurface inflow	.5	Subsurface outflow	1.5	Subsurface inflow	.5
Total	23.5		23.5		18.0		3.6
Gross change in storage = 0 cfs				Gross change in storage = 14.4 cfs			

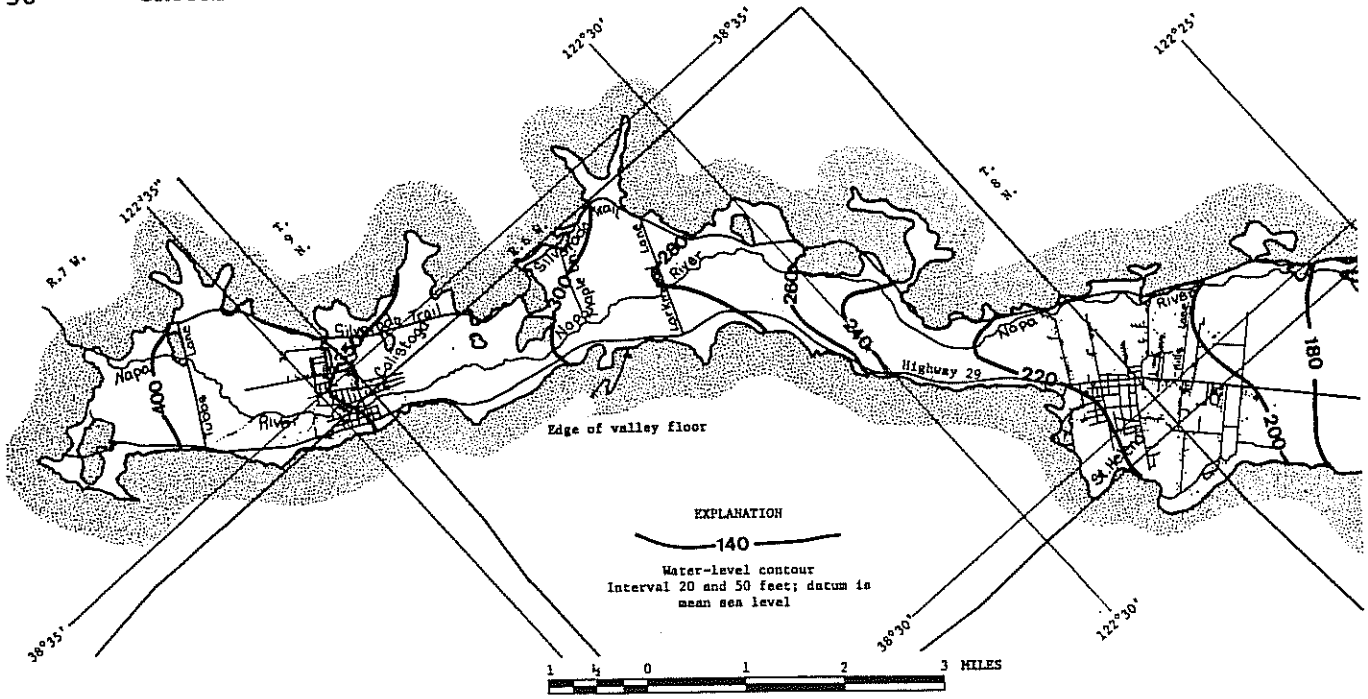
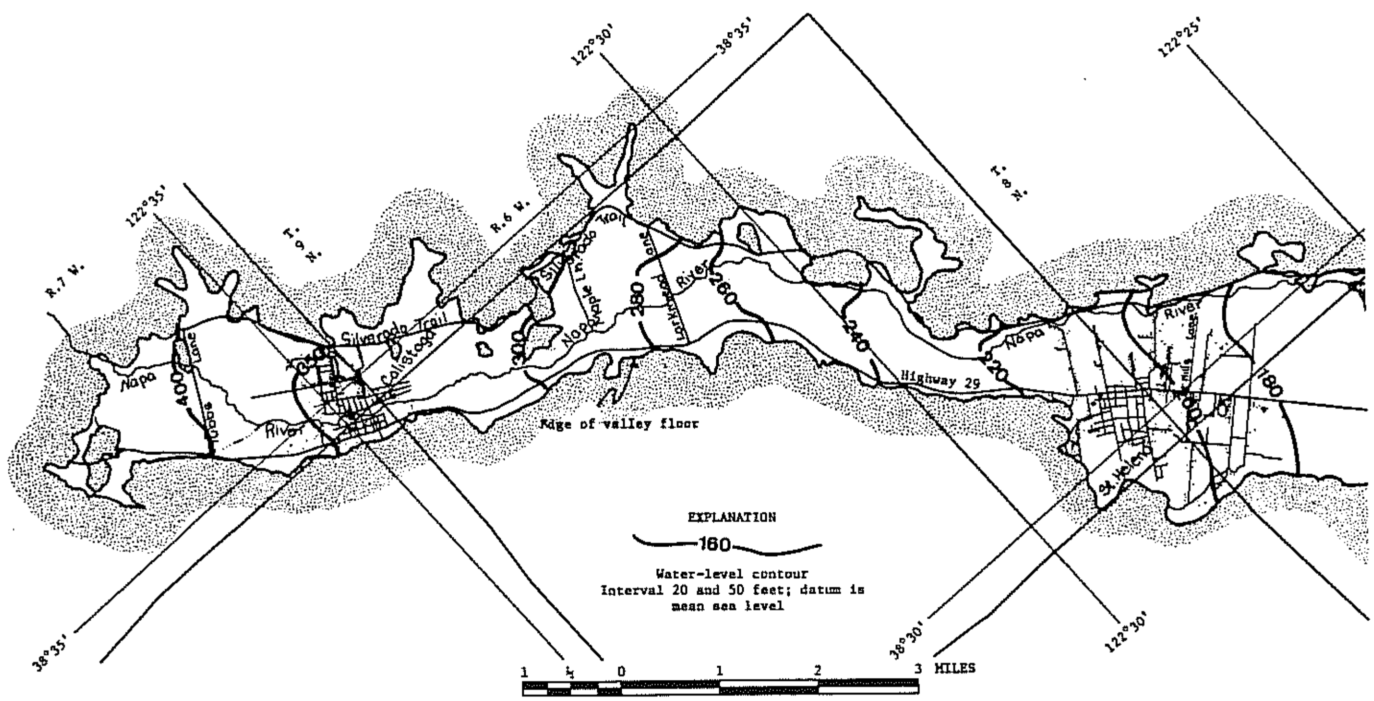


FIGURE 9.--WATER-LEVEL CONTOURS IN NORTHERN NAPA VALLEY, SPRING 1930.



Base from U.S. Geological Survey 15' topographic series: Calistoga, 1959; St. Helena, 1960, Sonoma, 1951; and Santa Rosa, 1954

FIGURE 10.--WATER-LEVEL CONTOURS IN NORTHERN NAPA VALLEY FOR JUNE 1931.

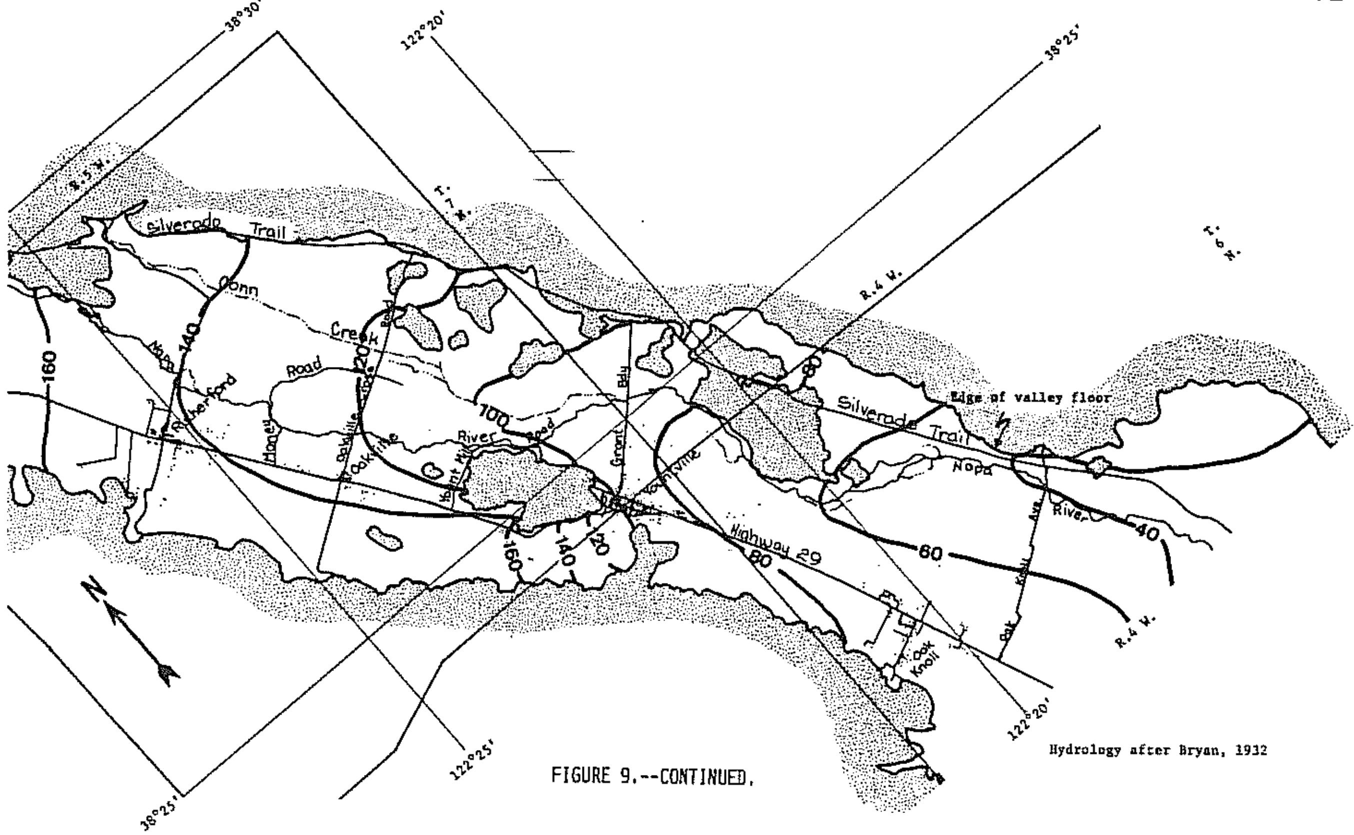


FIGURE 9.--CONTINUED.

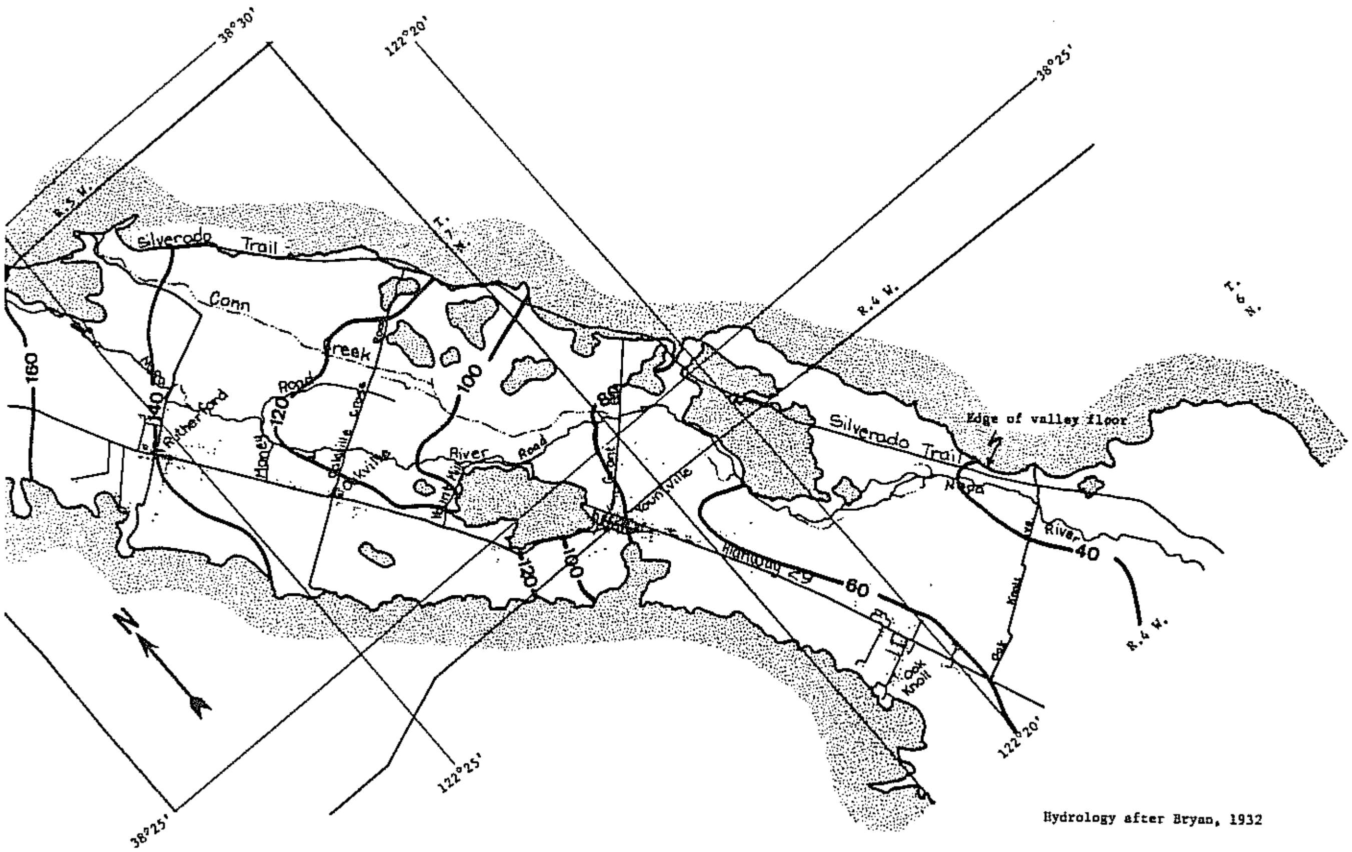


FIGURE 10.--CONTINUED.

MATHEMATICAL SIMULATION OF THE ALLUVIAL AQUIFER

Discussion of the Mathematical Model

The linear mathematical model used in this study is an expression of two-dimensional flow through porous media in the form of a computer program designed to simulate the response of an unconfined aquifer to constant rates of recharge or discharge. A detailed discussion of model theory and the analytical approach to model development is given in Pinder and Bredehoeft (1968).

A mathematical model, such as the one mentioned above, is an idealized representation of a ground-water system and is designed to describe, in concise quantitative terms, the response of the aquifer system to various conditions of stress. Such a quantitative response is necessary for even a general understanding of the complex hydrologic relations that occur in an aquifer system and it facilitates a description of the combined influences that climate, geology, hydrology, and man have on a ground-water basin.

Hydrologic relations are seldom simple and, generally, cannot be exactly described. Model simulation, therefore, requires assumptions and approximations that simplify conditions in the so-called "real world." Models are only as accurate as the assumptions used in their construction, and these assumptions should be kept in mind when model results are evaluated. The simplifying assumptions used in the model designed for this study are:

1. The alluvial aquifer is the only significant source of ground water;

2. Ground water occurs under water-table (unconfined) conditions;

3. The hydraulic head in the aquifer and the thickness, hydraulic conductivity, and specific yield of deposits are areally distributed and sufficiently uniform that each of these parameters can be represented by an average value per unit area;

4. Values for specific yield do not change with time;

5. Within the alluvial aquifer, vertical flow components are negligible compared with horizontal flow components; and

6. Recharge and discharge occur at constant rates over specified periods of time.

Before the model can be used to predict future ground-water levels, the model parameters used to describe the alluvial aquifer must be verified and checked against known geologic and hydrologic data. When the model-generated water levels for a particular set of conditions approximate the historic water levels within some predetermined limit of accuracy, the model is considered verified and ready for use in predicting future ground-water levels under various patterns and rates of pumping.

For this study, a uniform rectangular grid network of 35 rows and 27 columns was superposed on a plan view of the alluvial aquifer. Each unit area, or node, represents 6,750,000 square feet or nearly 155 acres. Model-control points were designated at the center of each node. A model boundary was then placed on the grid by tracing along the individual rectangular areas, or nodes, where they approximated the alluvial contact described in figure 3. The grid network, model boundary, alluvial contact, and other elements used in the model analysis are shown in figure 11. All hydrologic parameters communicated to, or computed by, the model were referred to the various nodes in units of feet and seconds. An individual node is designated by the number of the row and column. For example, the tenth node of the fifth row is designated (5-10).

At each node the following information was recorded:

1. The size of the grid interval, 1,500 x 4,500 feet;

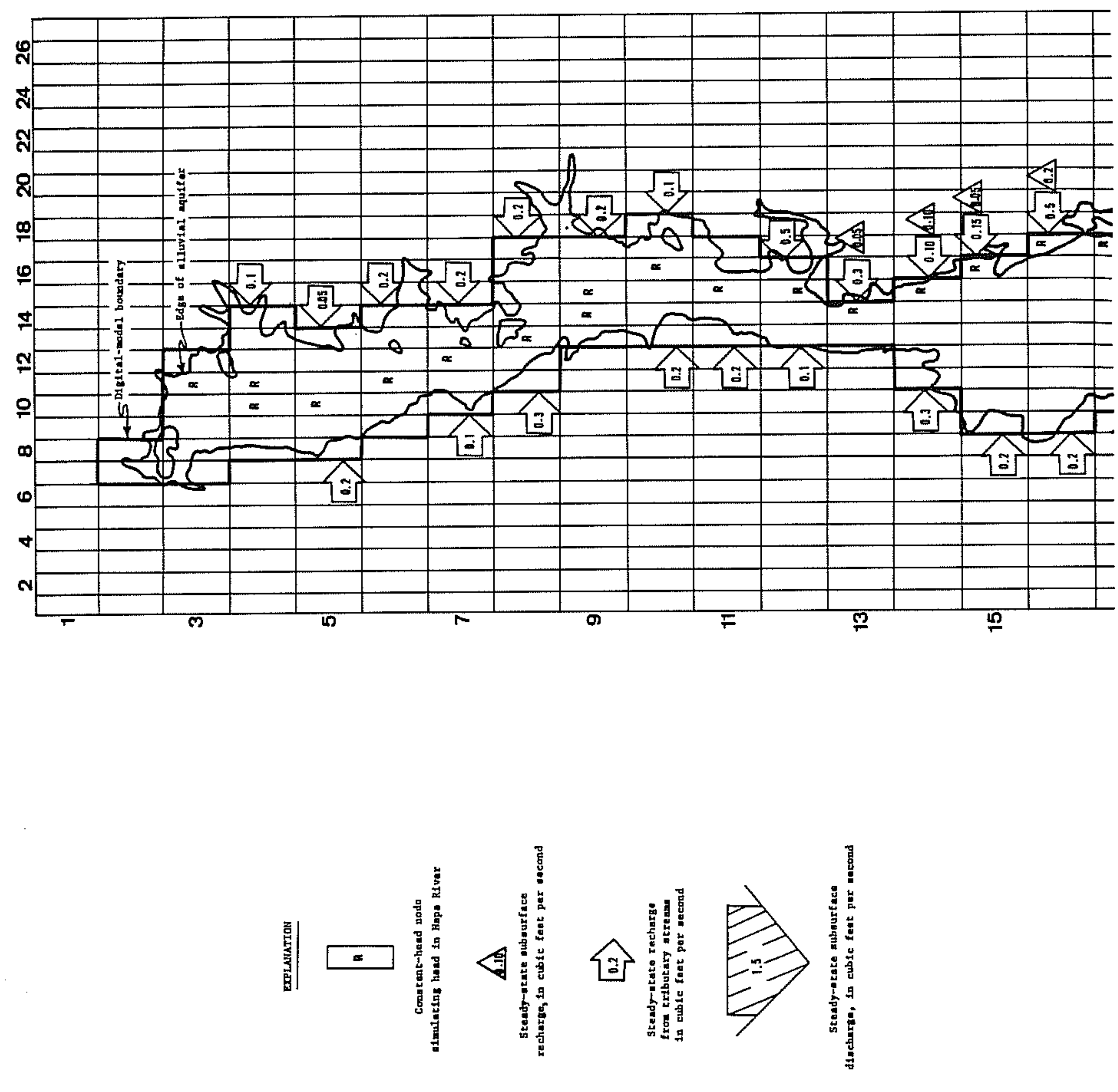
2. Initial hydraulic-head values in the alluvial aquifer, in feet;

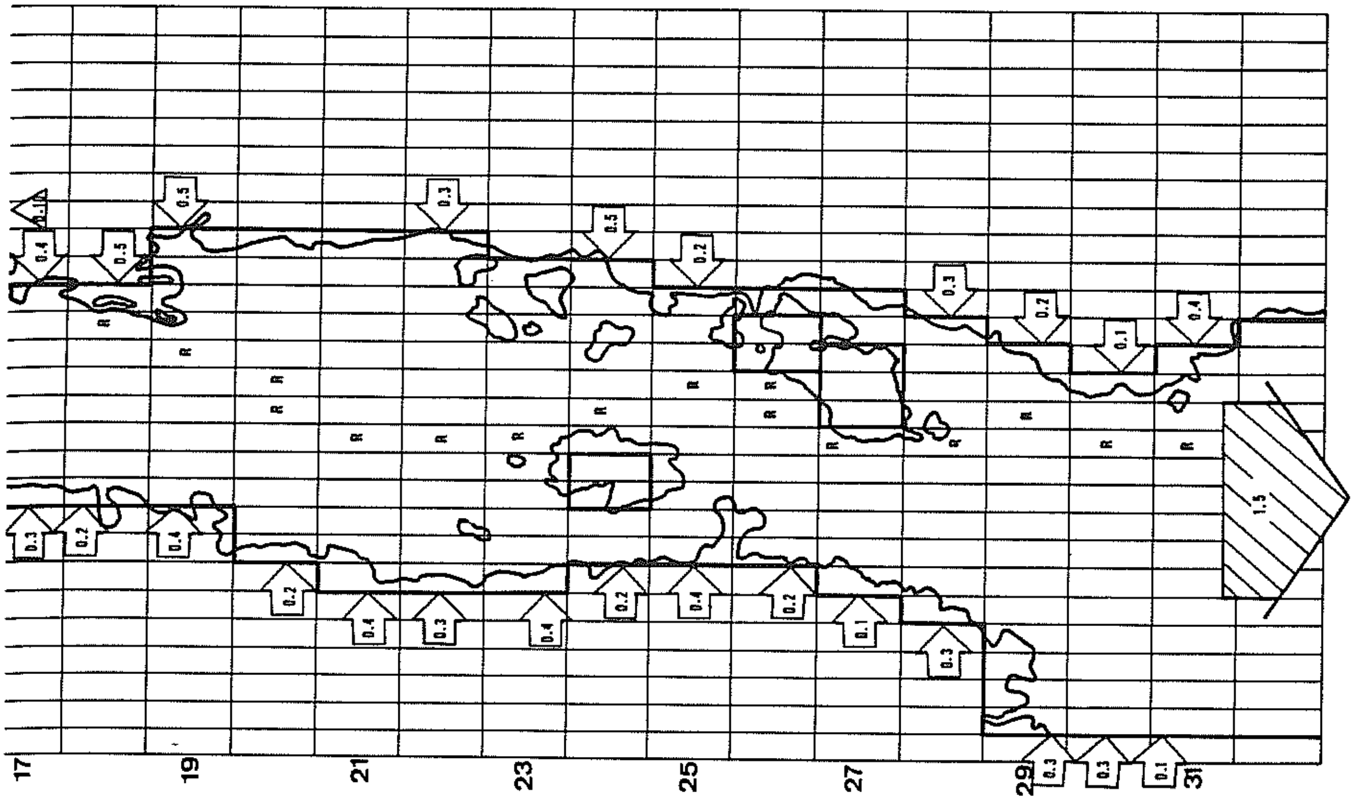
3. Elevation of the base of the alluvial aquifer, in feet;

4. Hydraulic-conductivity values for the alluvial aquifer, in feet per second;

5. Specific-yield values for the alluvial aquifer;

6. Recharge or discharge rates, in cubic feet per second, at each node designated as a recharge or discharge point. Negative values indicate a recharge point.


Digital-model boundary
Edge of alluvial aquifer
EXPLANATION
R
Constant-head node simulating head in Napa River
Steady-state subsurface recharge, in cubic feet per second
Steady-state recharge from tributary streams in cubic feet per second
Steady-state subsurface discharge, in cubic feet per second



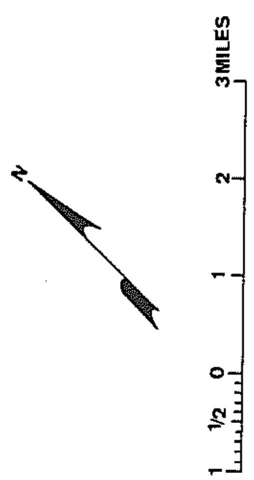


FIGURE 11.--MAP SHOWING DIGITAL-MODEL GRID NETWORK, CONSTANT-HEAD NODES, AND LOCATION AND QUANTITIES OF STEADY-STATE RECHARGE AND DISCHARGE FOR THE ALLUVIAL AQUIFER.

Simulation of Steady-State and Transient-State Conditions in the Alluvial Aquifer

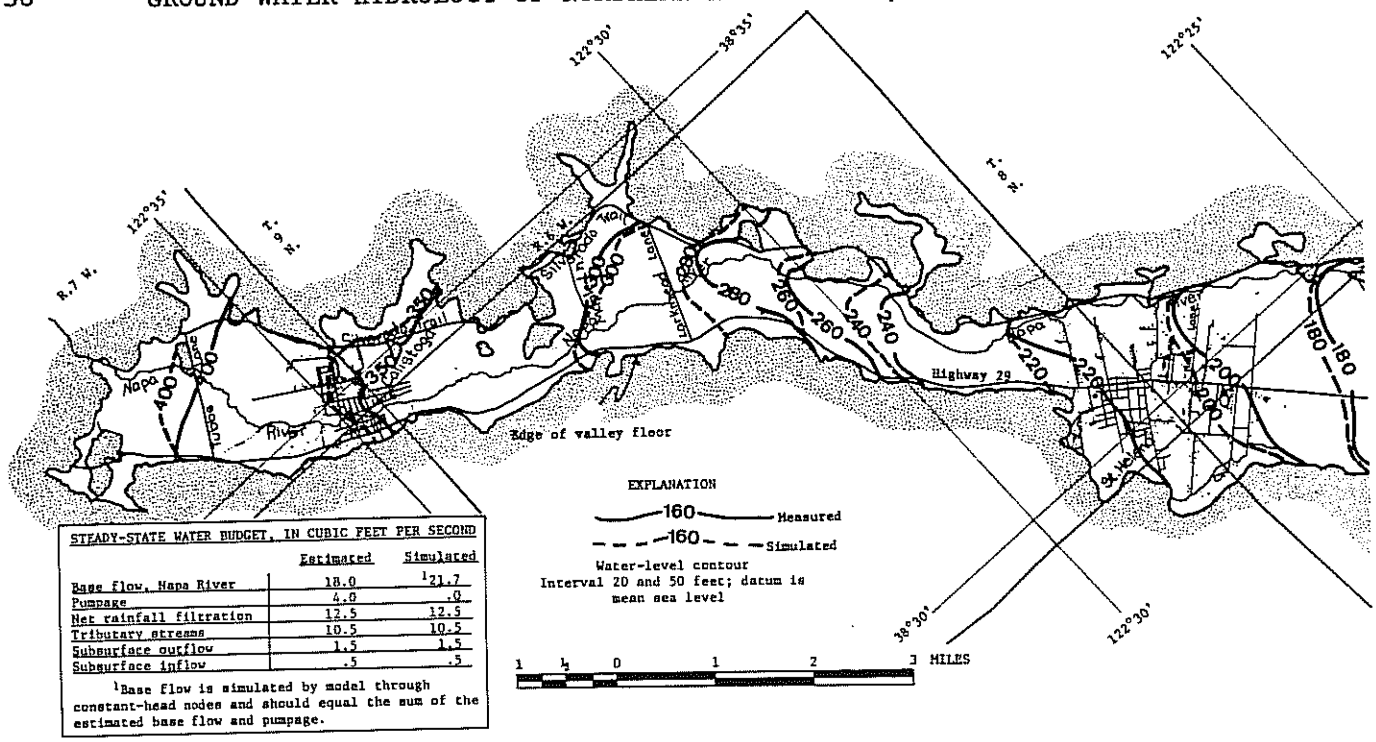
For this study, steady-state and transient-state conditions in the alluvial aquifer were simulated using the Pinder-Bredehoeft digital model and the assumptions discussed earlier. Net recharge to the model aquifer was simulated by postulating recharge wells at appropriate nodes; a constant rate of vertical recharge was postulated at every node in order to simulate infiltration of rainfall to the water table. Data for pumping rates at individual wells were unavailable. Consequently, total net discharge from the aquifer under both steady-state and transient-state conditions was assumed to have occurred as flow to the Napa River and subsurface flow out of the area. The Napa River was simulated by using constant heads at appropriate nodes that act as points of discharge from or recharge to, the aquifer, depending on the water-table elevations at adjacent nodes. Net quantities of water entering or leaving constant-head nodes were calculated by the model and were not specified by the model operator.

The model was calibrated by matching computed water-level contours and aquifer-discharge data with measured water levels and estimated aquifer-discharge data. Proper calibration of the model aquifer required adequate simulation of both steady-state and transient-state conditions; utilizing, in each case, the same nodal distribution of constant-head nodes, hydraulic conductivity, aquifer thickness, and specific yield.

Steady-state conditions were simulated using the steady-state water-level contours (fig. 8) and the recharge and discharge data given in table 3. Figure 11 shows the nodal distribution and quantities of steady-state peripheral recharge from tributary streams, subsurface discharge, and the distribution of the constant-head nodes simulating the Napa River. Approximately 3 inches of water per unit area was recharged to the model at an average rate in order to simulate net infiltration of rainfall to the water table. Quantities of peripheral recharge from tributary streams were distributed at appropriate nodes (fig. 11) according to the size, number, and location of tributary streams entering the valley. Subsurface recharge from redeposited materials in the Sonoma Volcanics totals 0.5 cfs and was distributed at nodes 13-14, 14-15, 15-16, 16-17, and 17-17 (fig. 13). Subsurface discharge across the southern boundary of the project area was estimated at 1.5 cfs and was distributed at nodes 31-7, 31-8, 31-9, 31-10, 31-11, 31-12, and 31-13. Other steady-state discharge was simulated as aquifer discharge to the Napa River and was calculated by the model as flow to constant-head nodes. The model aquifer was operated under simulated steady-state conditions for a period of time corresponding to a real time difference of 35 years. At the end of that time, water-table elevations were calculated by the model at each appropriate node and compared to historical data. Figure 12 shows the simulated steady-state water-level contours, contours constructed from historical water-level data, and estimated and simulated water budgets for the steady-state condition.

Transient-state conditions brought about by large variations in rainfall and runoff were simulated using the initial water-level contours shown in figure 9 and the transient-state recharge and discharge data given in table 3. Approximately 0.75 inch of water per year per unit area was recharged to the model in order to simulate net infiltration of rainfall to the water table. No peripheral recharge from tributary streams was provided for; however, subsurface recharge from redeposited materials in the Sonoma Volcanics totals 0.5 cfs and was distributed at nodes 13-14, 14-15, 15-16, 16-17, and 17-17. Subsurface discharge across the southern boundary of the project area was maintained at 1.5 cfs and distributed at nodes 31-7, 31-8, 31-9, 31-10, 31-11, 31-12, and 31-13. Other transient-state discharge was simulated as aquifer discharge to the Napa River and was calculated by the model as flow to constant-head nodes. The model aquifer was operated under simulated transient-state conditions for a simulation period corresponding to the 14-month dry period from April 1930 to June 1931. At the end of this period, water-table elevations were calculated by the model at each appropriate node and compared to historical data. Figure 13 shows simulated water-level contours and contours constructed from historical data for June 1931 and compares the estimated and simulated transient-state water budgets. The differences between the calculated and simulated values of aquifer discharge and gross storage change in the alluvial aquifer for the transient period were considered to be within acceptable limits of error.

The aquifer response under both transient and steady-state conditions was simulated by the model using the same nodal distributions of hydraulic conductivity, aquifer thickness, and specific yield. Successive simulations of transient conditions for time periods of 31, 78, 148, 254, and 412 days, indicated a progressive water-table decline throughout most of the model aquifer. This water-table decline was accompanied by a progressive decrease in model-aquifer discharge to constant-head nodes at the Napa River. Similar declines in the water table and in aquifer discharge to the Napa River were described as representative of the alluvial aquifer's response to transient conditions (p. 21). At the end of the transient period, flow directions at approximately one-third of the constant-head nodes had reversed; indicating, in effect, that dry reaches had occurred along the Napa River. Such transient response from the model aquifer and the properly simulated water-level contours and water budgets (figs. 12 and 13) indicated that the model aquifer was properly calibrated and is sufficiently accurate to be used as a tool to predict future ground-water levels. The above statement should be qualified with respect to response of the constant-head nodes when simulating short-term, transient conditions of less than a year. Reliable short-term simulations require a much more sensitive response to model-aquifer conditions at the constant-head nodes than can now be achieved. It was not within the scope of this project to provide a model of such sensitivity, nor would it have been possible to do so within the limitations of time and money alloted. However, future efforts to provide refinements of the model should include attempts to simulate more accurately the alluvial aquifer's response to rapidly changing flow conditions in the Napa River.

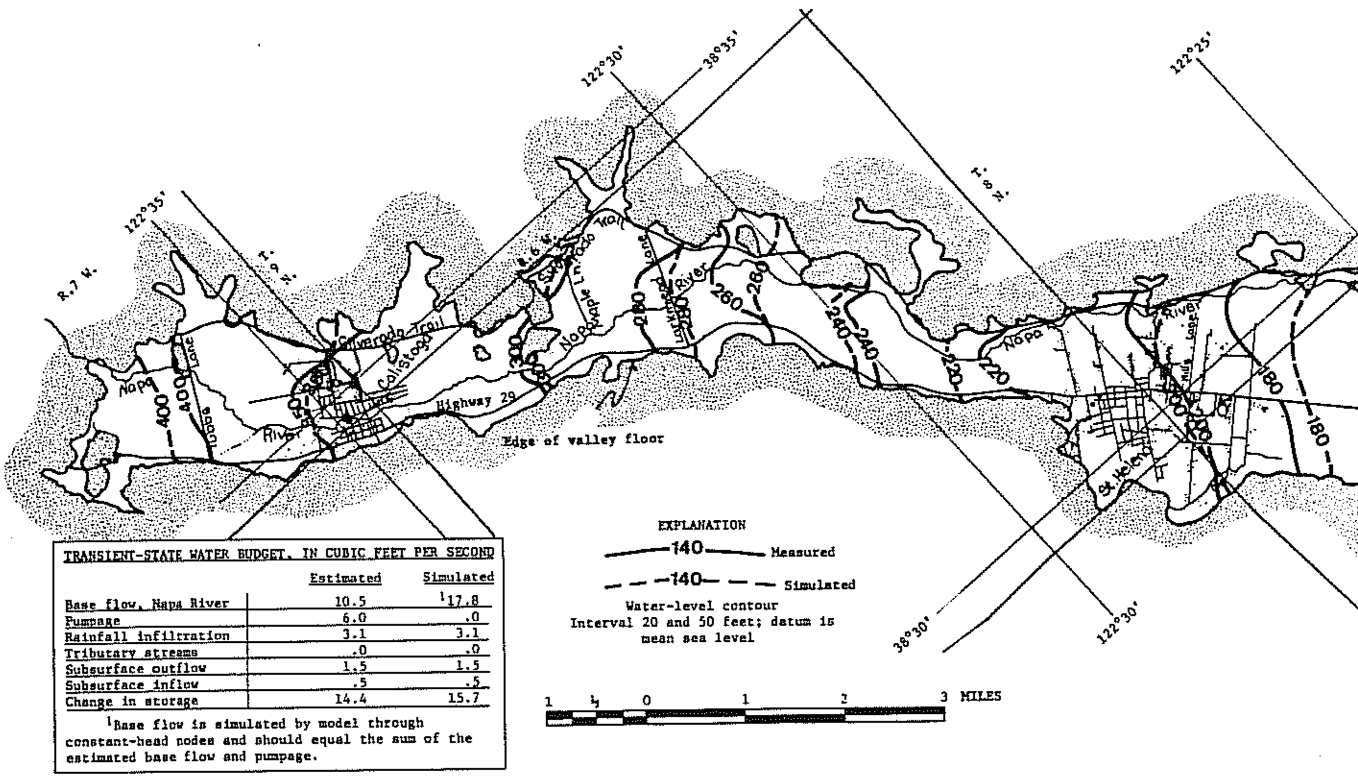


STEADY-STATE WATER BUDGET, IN CUBIC FEET PER SECOND

	Estimated	Simulated
Base flow, Napa River	18.0	[1]21.7
Pumpage	4.0	.0
Net rainfall filtration	12.5	12.5
Tributary streams	10.5	10.5
Subsurface outflow	1.5	1.5
Subsurface inflow	.5	.5

[1]Base flow is simulated by model through constant-head nodes and should equal the sum of the estimated base flow and pumpage.

FIGURE 12.--COMPARISON OF MEASURED AND SIMULATED



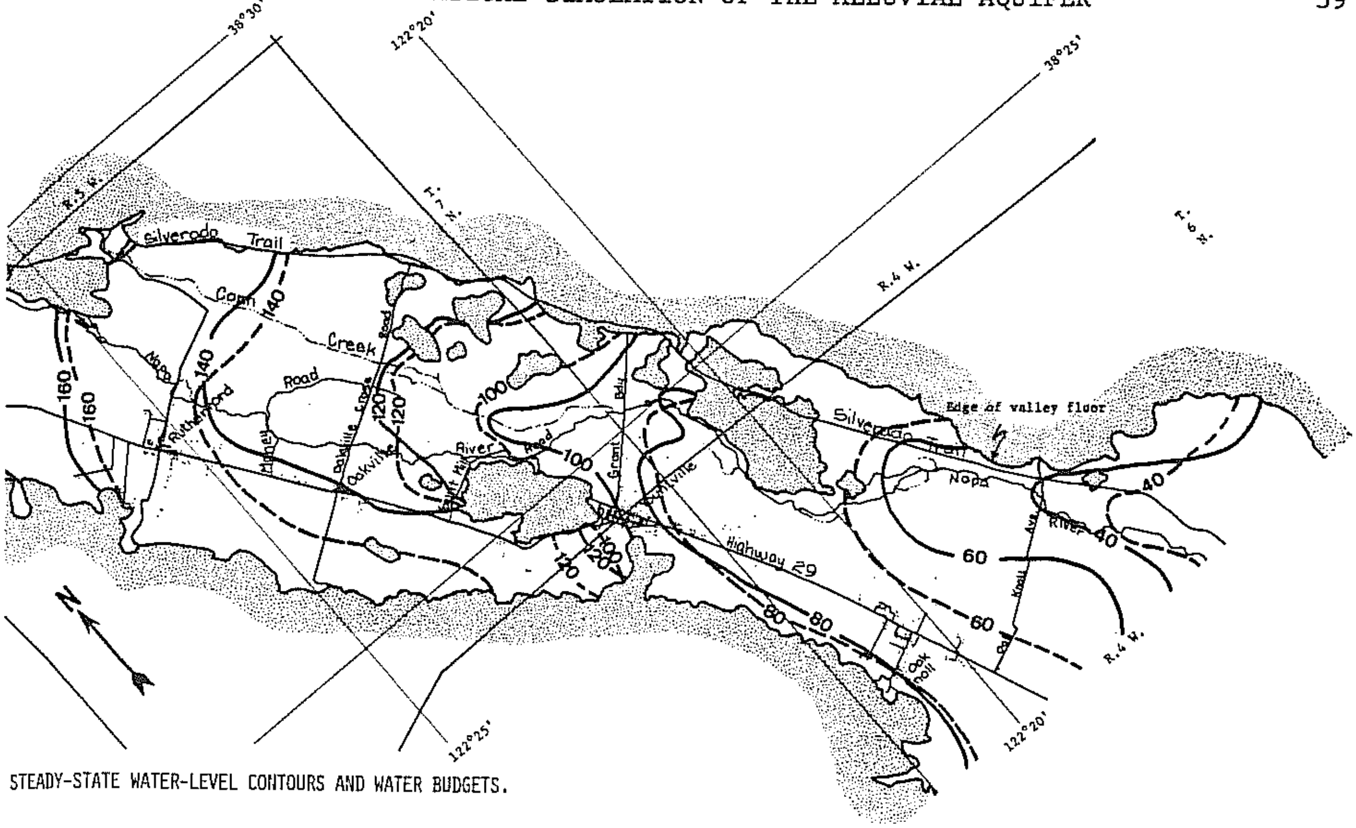
TRANSIENT-STATE WATER BUDGET, IN CUBIC FEET PER SECOND

	Estimated	Simulated
Base flow, Napa River	10.5	[1]17.8
Pumpage	6.0	.0
Rainfall infiltration	3.1	3.1
Tributary streams	.0	.0
Subsurface outflow	1.5	1.5
Subsurface inflow	.5	.5
Change in storage	14.4	15.7

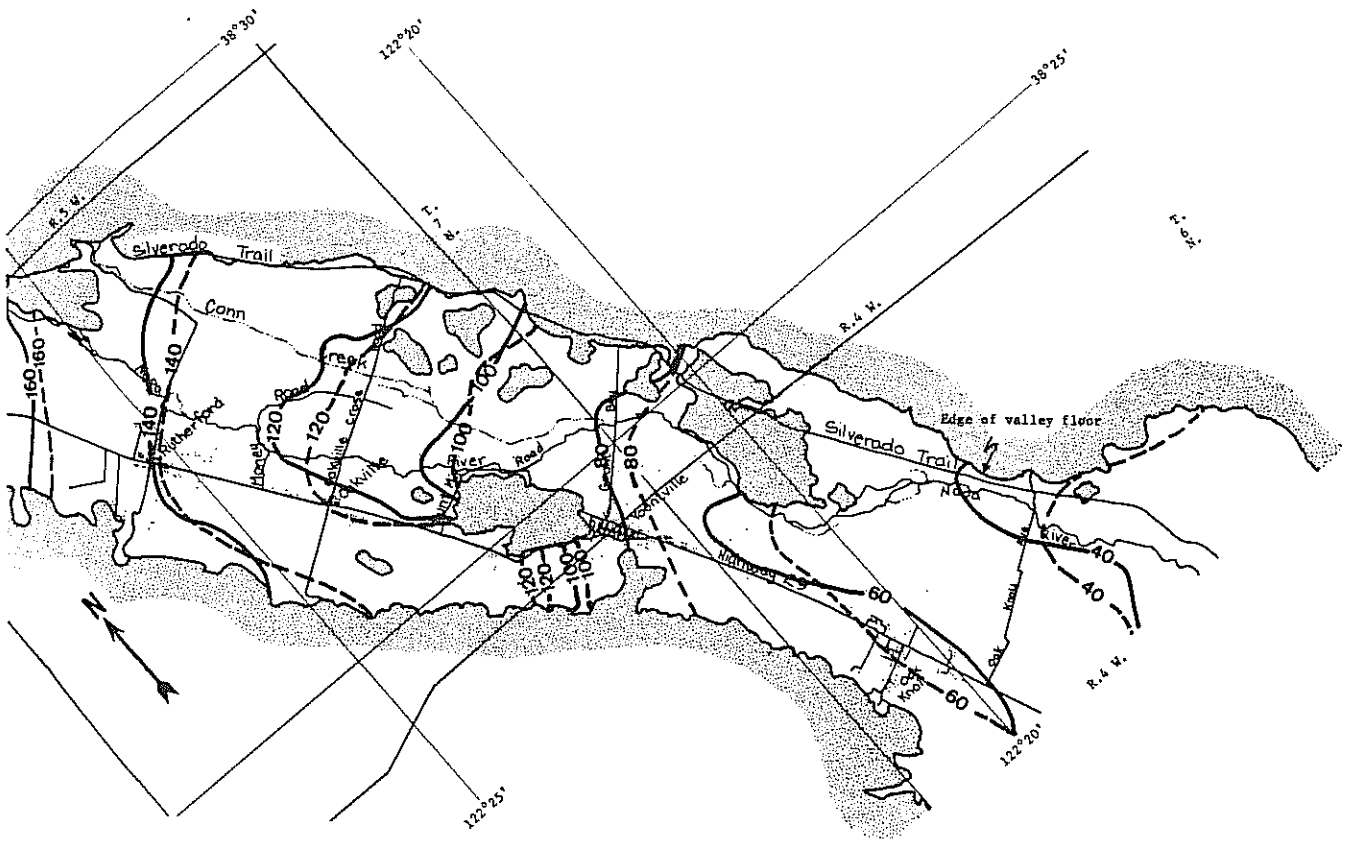
[1]Base flow is simulated by model through constant-head nodes and should equal the sum of the estimated base flow and pumpage.

Base from U.S. Geological Survey 15' topographic series: Calistoga, 1959; St. Helena, 1960; Sonoma, 1951; and Santa Rosa, 1954

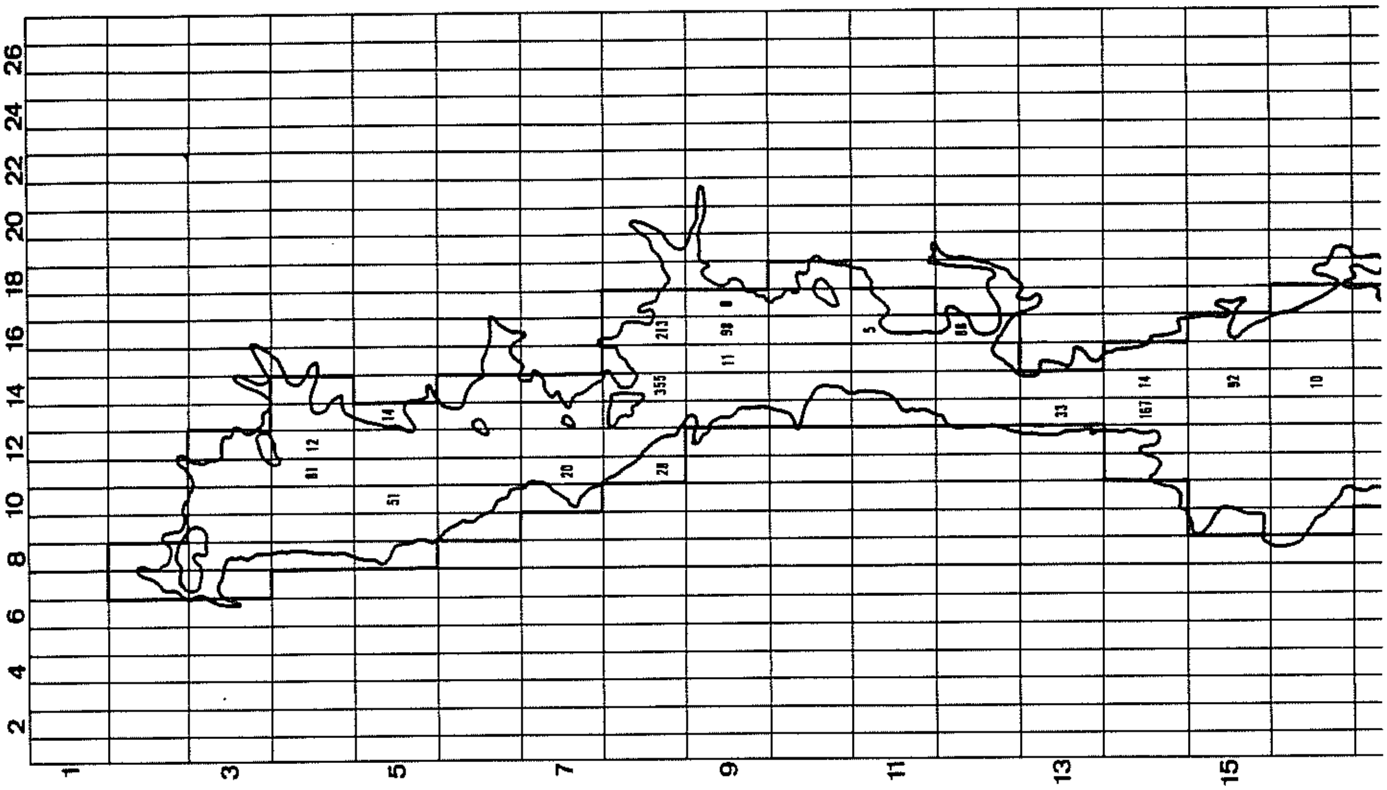
FIGURE 13.--COMPARISON OF SIMULATED AND MEASURED WATER-LEVEL CONTOURS



STEADY-STATE WATER-LEVEL CONTOURS AND WATER BUDGETS.



FOR JUNE 1931 AND APPLIED AND SIMULATED TRANSIENT-STATE WATER BUDGETS.



EXPLANATION

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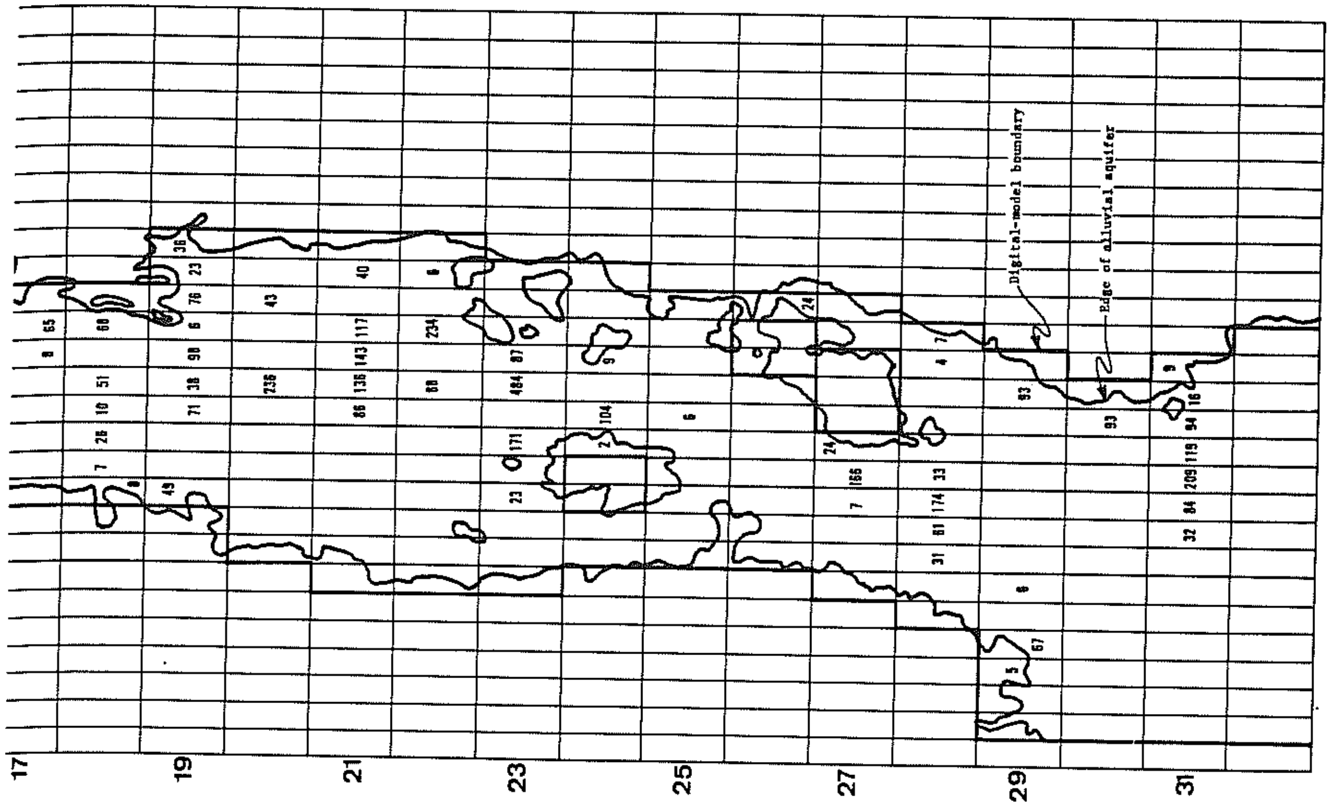
Nodal unit simulating ground-water pumpage, 1970
Number indicates volume of water pumped, in acre-feet

Total pumpage = 5,300 $\frac{\text{acre-ft}}{\text{yr}}$ = 7.3 cfs



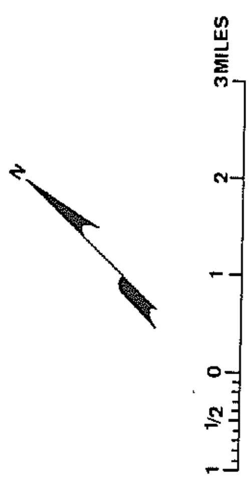


FIGURE 14.--NET GROUND-WATER PUMPAGE FROM ALLUVIAL AQUIFER IN NORTHERN NAPA VALLEY, 1970.

SIMULATION OF CRITICAL DROUGHT CONDITIONS IN THE PROJECT AREA

The Napa County Flood Control and Water Conservation District (1970) estimated that by the year 2020 the annual use of ground water in the project area could range from 12,000 to 35,000 acre-feet. The ability of the alluvial aquifer to provide such large withdrawals, without imposing serious limitations on well users, depends for the most part on the amount of net recharge available every year. During water years when precipitation is equal to or above the threshold value, net recharge to the aquifer is expected to be sufficient to replace the storage depleted during the previous season(s). On the other hand, if several consecutive years occur, during which precipitation is significantly less than the threshold value; the net aquifer recharge will be small or entirely lacking and drought conditions may result. The effect of such drought conditions, measured in terms of their impact on ground-water users, will depend on the distribution of pumping centers in the project area; the rate and timing of pumping from large capacity wells; and the length and severity of the drought. The most critical situation will develop when large quantities of water are pumped from the alluvial aquifer during a year or series of years, when net aquifer recharge is practically zero. For this study, a period of critical drought is said to occur when large-scale ground-water pumpage takes place after a water year or series of water years when recharge to the alluvial aquifer is negligible. Table 1 indicates that the probability of occurrence of critical drought conditions is about 3 percent annually and only 0.09 percent for the occurrence of two such years in sequence.

The response of the alluvial aquifer to critical drought conditions for periods of 1 and 2 years was simulated by the aquifer model. Initial conditions were taken to be the same as those simulated for June 1931; that is, no flow in the Napa River and no simulated net recharge occurring from tributary streams or from precipitation. Subsurface recharge and discharge were simulated using the same values as used for the steady-state and transient-state conditions described above. Withdrawal rates from the alluvial aquifer were estimated using data from Faye (1972), the 1970 distribution of irrigation wells, assumed total lifts and pumping times, and the design capacity of pumps in the project area during the 1970 water year. Figure 14 shows the calculated net pumpage from the alluvial aquifer during the 1970 water year. This pumpage represents total calculated pumpage (5,900 acre-feet) less an estimated 10 percent irrigation return flow. In order to simulate future ground-water conditions the 1970 nodal distribution of pumping was maintained, but pumping rates were doubled and quadrupled. Critical drought conditions were then simulated for 2 years using twice the 1970 rate of pumping and for 1 and for 2 years using 4 times the 1970 rate of pumping. The results of these simulations are shown in figures 15, 16, and 17. These figures show the probable distribution of water-level contours in the alluvial aquifer after a simulation of what probably are the most adverse conditions to which the aquifer will ever have to respond.

Simulation of twice the 1970 pumpage for 2 years (fig. 15) and quadruple the 1970 pumpage for 1 year (fig. 16) indicated little depletion of the aquifer. A significant pumping depression did develop just north of Maple Lane in the center of the valley. South of St. Helena, many wells 30 feet or less in depth would be dry under these drought conditions and pumping lifts at deeper wells would be increased.

Figure 17 indicates that significant declines in the water table would occur after 2 years of critical drought conditions with quadruple the 1970 pumping rates. The pumping depression near Maple Lane would expand and another depression would probably develop directly east of it. In the center of the valley, between Rutherford and Oakville, much of the upper 50 to 70 feet of the alluvial aquifer would be dewatered and a cone of depression would extend northward toward the periphery of the valley. Also, dewatering of the upper part of the alluvial aquifer would occur between Yountville and Oak Knoll Avenue. In the vicnity of Oak Knoll Avenue, large simulated withdrawals made between Highway 29 and the Napa River would cause a cone of depression to extend westward toward the periphery of the valley. South of St. Helena, relatively shallow wells having depths of 60 feet or less would be dry under such conditions.

It should be emphasized that the critical drought conditions described above are statistically rare events, and even if pumpage should increase to the projected values, the amount of water stored in the alluvial aquifer would be sufficient for most of the projected needs. During most water years, some recharge to the aquifer will almost certainly take place accordingly to the recharge mechanisms described previously. If significant storage depletion occurs and if the water table drops below the bed of the Napa River, the river will become a major source of recharge to the alluvial aquifer and flow in the Napa River will be reduced accordingly.

It should also be emphasized that in years following critical dry periods, normal rainfall and runoff would cause substantial water-level recovery and steady-state water-level conditions would probably reoccur. Thus, no long-term aquifer depletion should develop in the alluvium under the water-use conditions expected during the 1970-2020 period. If optimum plans for using the alluvial aquifer could be developed so that costs were minimized, significant economic benefits could accrue to the water users in future years.

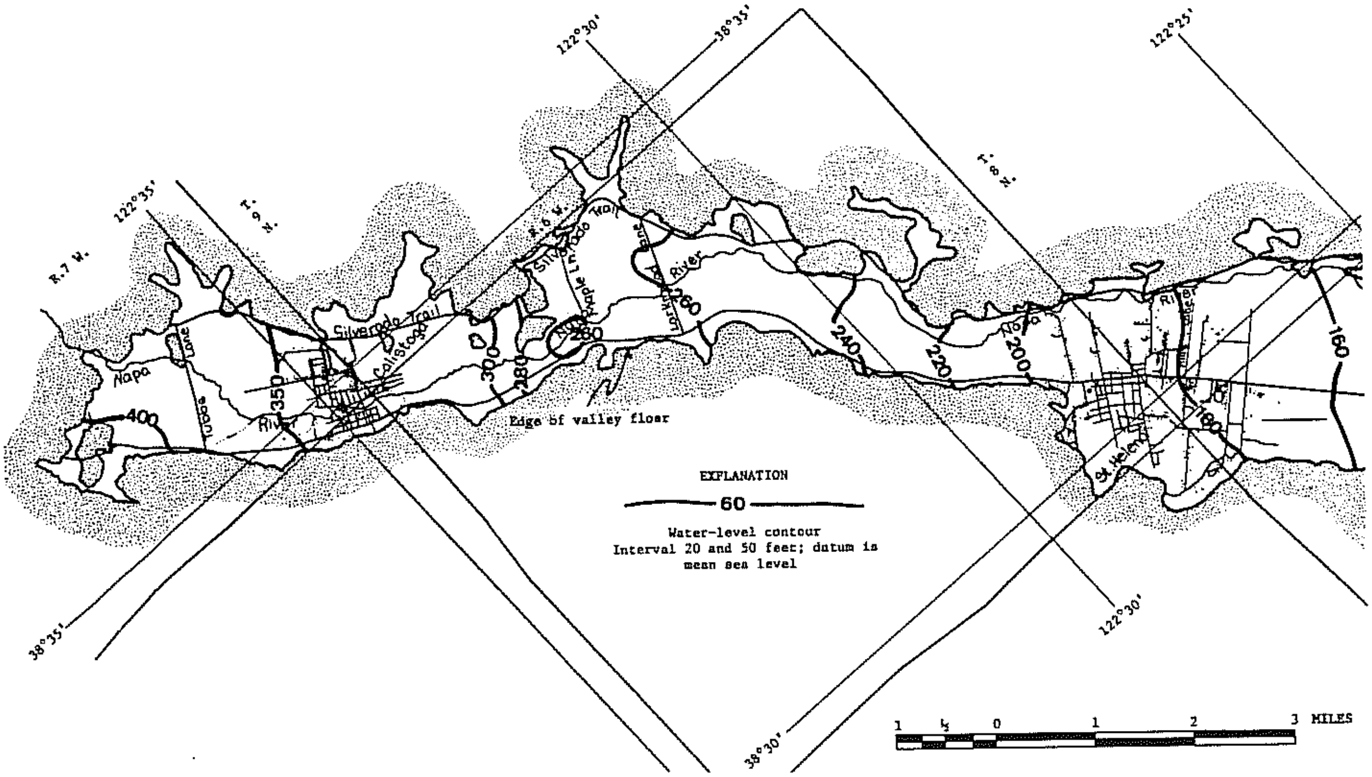
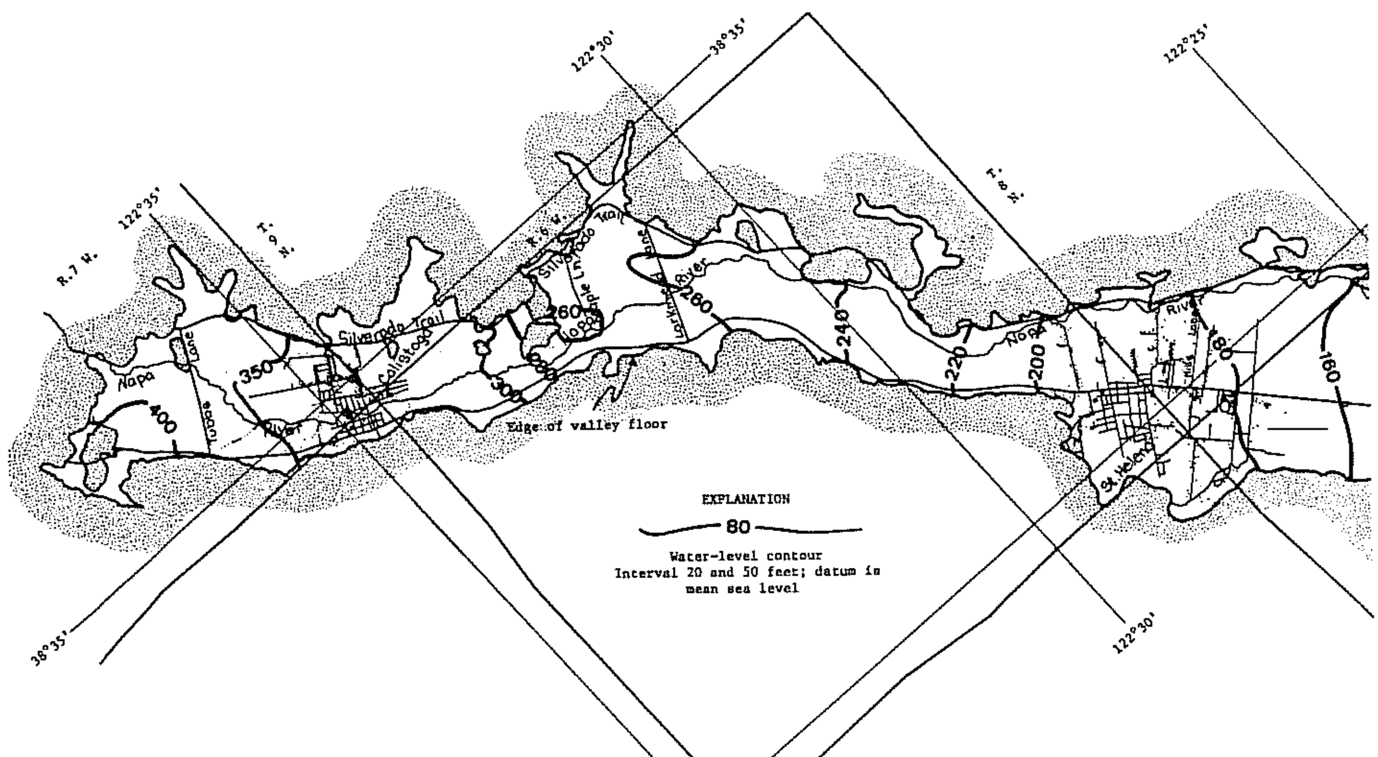
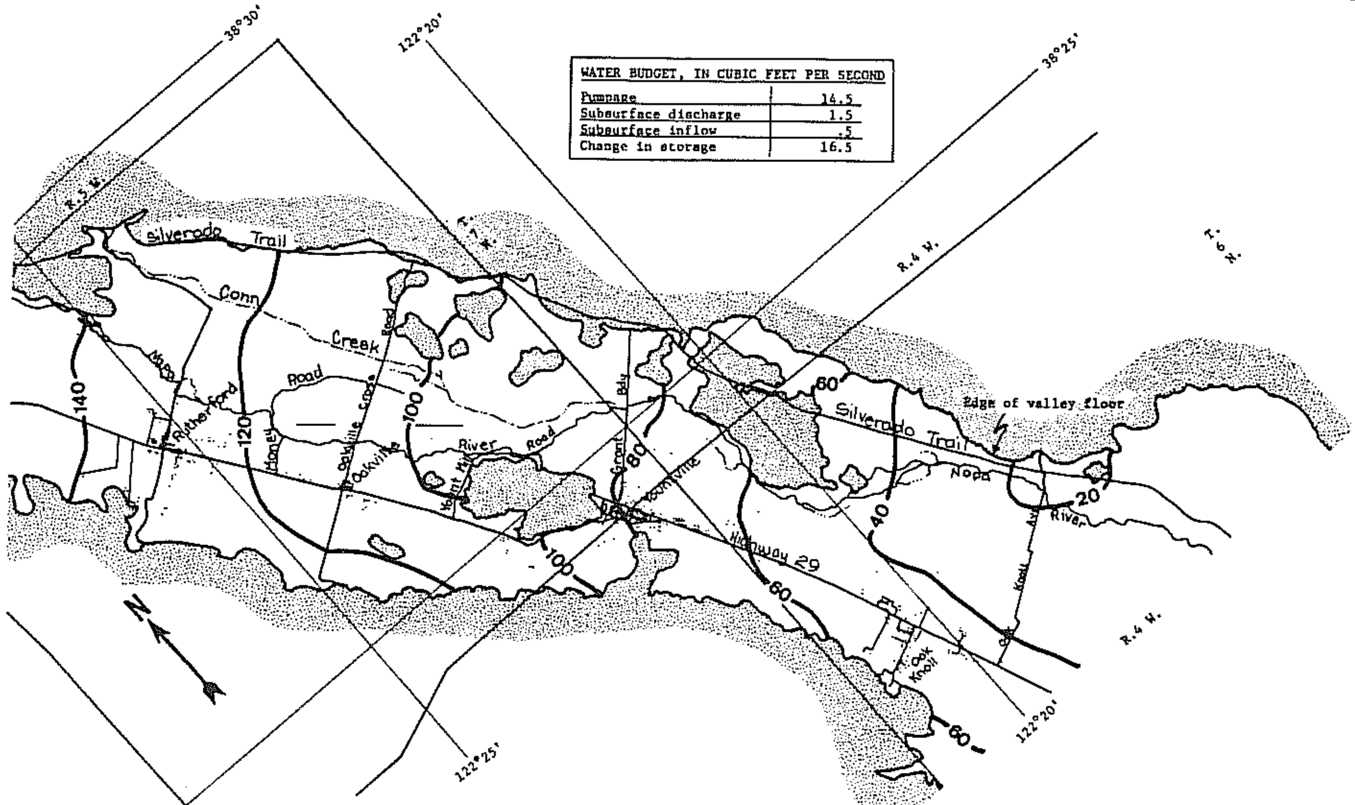


FIGURE 15.--WATER-LEVEL CONTOURS IN NORTHERN NAPA VALLEY AFTER TWO CONTINUOUS



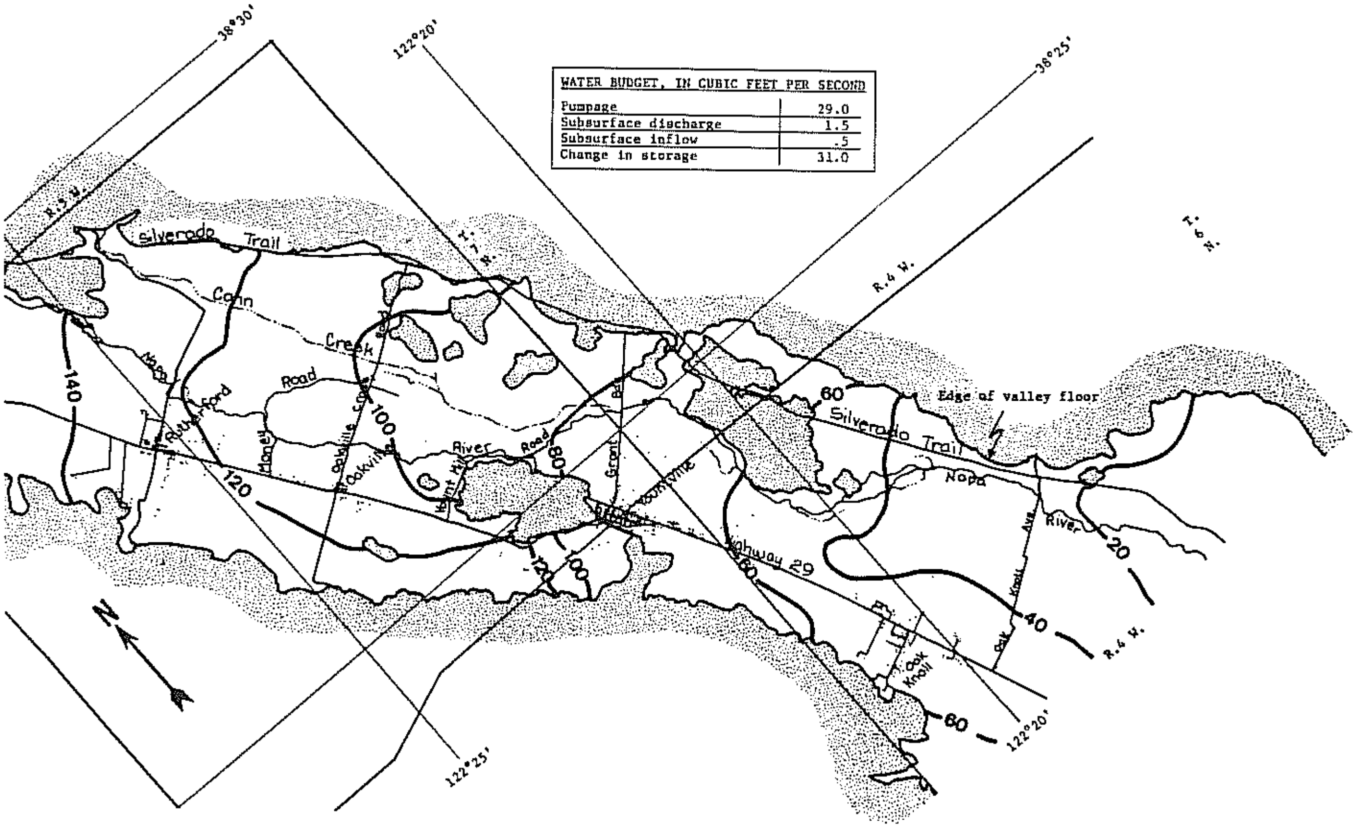
Base from U.S. Geological Survey 15' topographic series: Calistoga, 1959; St. Helena, 1960; Sonoma, 1951; and Santa Rosa, 1954

FIGURE 16.--WATER-LEVEL CONTOURS IN NORTHERN NAPA VALLEY AFTER 1 YEAR OF



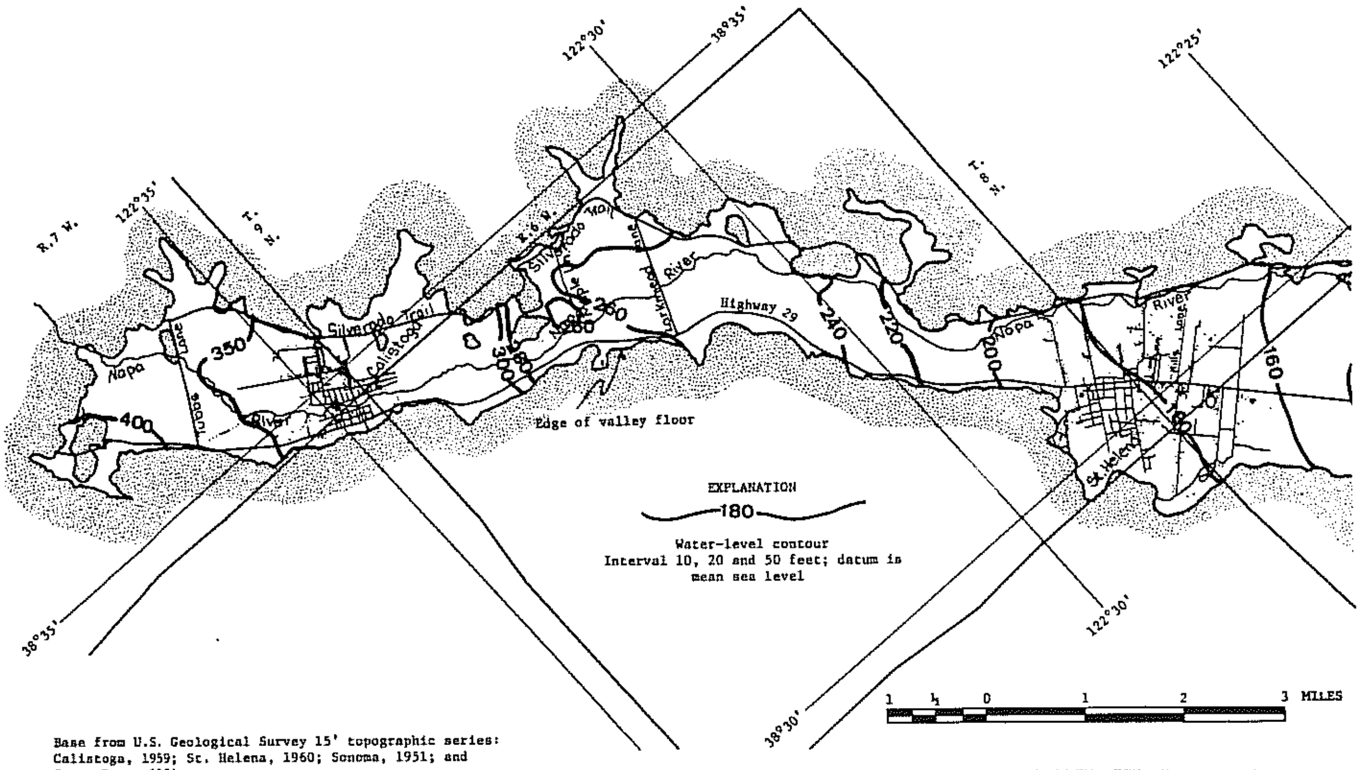
WATER BUDGET, IN CUBIC FEET PER SECOND	
Pumpage	14.5
Subsurface discharge	1.5
Subsurface inflow	.5
Change in storage	16.5

YEARS OF SIMULATED CRITICAL DROUGHT CONDITIONS AND PUMPING AT TWICE THE 1970 RATE.



WATER BUDGET, IN CUBIC FEET PER SECOND	
Pumpage	29.0
Subsurface discharge	1.5
Subsurface inflow	.5
Change in storage	31.0

SIMULATED CRITICAL DROUGHT CONDITIONS AND PUMPING AT QUADRUPLE THE 1970 RATE.

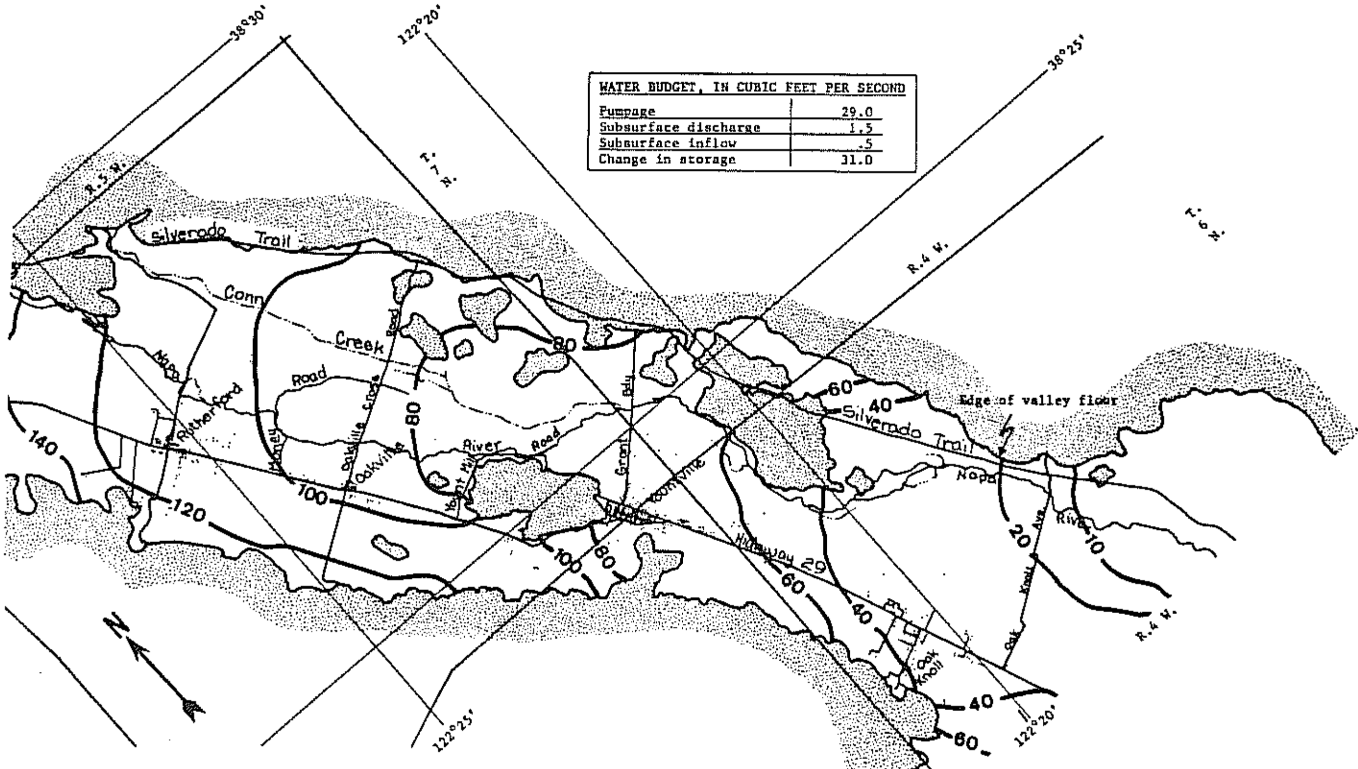


Base from U.S. Geological Survey 15' topographic series: Calistoga, 1959; St. Helena, 1960; Sonoma, 1951; and Santa Rosa, 1954

FIGURE 17.--WATER-LEVEL CONTOURS IN NORTHERN NAPA VALLEY AFTER TWO CONTINUOUS YEARS

GROUND-WATER QUALITY

Water-quality criteria are based on the type and amount of dissolved solids (mineral and organic matter) in water and on the intended use of the water. Dissolved matter in water is mostly in the form of electrically charged particles called ions whose concentrations are measured in milligrams per liter (mg/l) or milliequivalents per liter (meq/l). Positively charged ions are called cations; negatively charged ions are called anions. Among the more important factors that influence the quality of water for irrigation are the dissolved-solids concentrations, the ratio of sodium to other positively charged ions, the concentration of bicarbonate ions, and the boron concentration. Domestic water users are generally concerned with the hardness of water and the concentrations of such potentially harmful or distasteful constituents as chloride, nitrate, sulfate, fluoride, iron, and sodium.



OF SIMULATED CRITICAL DROUGHT CONDITIONS AND PUMPING AT QUADRUPLE THE 1970 RATE.

Because application of mineralized water to land having inadequate drainage may create an adverse nutritional or toxic response in crops (salinity hazard), the dissolved solids of a water should be known before it is used for irrigation. The electrical conductivity or specific conductance of water is commonly used as an indicator of total dissolved solids.

A high percentage of sodium in irrigation water may influence the soil texture by ion exchange and create a sodium hazard. In this process, sodium replaces calcium and magnesium in the soil complex. The sodium-bearing soil particles may cause the soil to deflocculate and become almost impermeable. A decrease in the relative permeability would also increase drainage problems and could result in the formation of a saline topsoil, creating a potential for salinity hazard.

Large concentrations of carbonate or bicarbonate ions in irrigation water increase the potential for sodium hazard. When a soil-water solution becomes increasingly concentrated, water containing high concentrations of carbonate and bicarbonate ions tends to precipitate calcium and magnesium as carbonates. With the progressive removal of calcium and magnesium from the soil solution, the relative proportion of sodium is increased and the potential for sodium hazard is increased proportionately.

Boron is essential to the normal growth of all plants, but the quantity required is very small. Also, the amount of boron that can be tolerated by one plant may be toxic to more sensitive plants. Boron hazard from irrigation water is based on the concentration of boron in the water and the kinds of plants to which the water is applied. Water having a boron concentration of 0.5 mg/l or less is generally safe to use on all types of crops (Wilcox, 1955).

High concentrations of iron in irrigation water may cause the formation of objectionable scale and bacteria growths in wells and pipe lines and iron precipitates tend to coat soil particles and deflocculate the soil during cyclical applications of irrigation water.

The U.S. Department of Agriculture has developed several methods to evaluate the salinity, sodium, and bicarbonate hazard of irrigation water (Wilcox, 1955). Bicarbonate hazard is evaluated by calculating the residual sodium carbonate (RSC) which is defined as:

$$RSC = (CO_3^{=} + HCO_3^{-}) - (Ca^{++} + Mg^{++})$$

in which the ionic concentrations are expressed in milliequivalents per liter (meq/l). Generally water containing an RSC of 1.25 meq/l or less is safe for irrigation purposes. Salinity and sodium hazards are evaluated using specific conductance (that is, total dissolved solids) and the sodium adsorption ratio (SAR). SAR is based on the absolute and relative concentrations of positively charged major ions in water such that:

$$SAR = \frac{Na^{+}}{\sqrt{\frac{Ca^{++} + Mg^{++}}{2}}}$$

where the concentrations are expressed in milliequivalents per liter.

The drinking-water standards of the U.S. Public Health Service (1962) are generally used to evaluate the chemical quality of domestic-water supplies. Recommended upper limits for some of the more common constituents, in milligrams per liter, are listed below.

Constituent	Recommended upper limit (mg/l)
Nitrate (NO_3^-)	45
Chloride (Cl^-)	250
Sulfate ($SO_4^=$)	250
Total dissolved solids	500

The Environmental Protection Agency (1971) has recommended that the upper limit of concentration for sodium in drinking water supplies be placed at 270 mg/l.

Excessive hardness of a domestic water supply generally is caused by high concentrations of calcium and magnesium ions in solution. Hardness usually is reported as total hardness as $CaCO_3$ (calcium carbonate) wherein the concentrations of hardness-producing ions are converted to equivalent weights of $CaCO_3$. Water with a total hardness of more than 120 mg/l as $CaCO_3$ is considered hard (Hem, 1970) and may have objectionable scale-forming and soap-consuming properties. Alkaline water containing calcium and carbonate ions in solution also tends to deposit $CaCO_3$ in pipes and tanks.

High concentrations of iron in domestic water supplies may stain glassware, porcelain, and laundered clothes and may impart an unpleasant inky or astringent taste to the drinking water.

Chemical Classification of Ground Water in the Project Area

Four chemically distinct types of ground water occur in the project area. These water types have been identified by comparing relative concentrations of representative chemical constituents in a water and are listed below according to their frequency of occurrence in the project area.

Mixed cation bicarbonate water
Sodium chloride water
Magnesium bicarbonate water
Sodium bicarbonate water

The chemical analyses of ground water from 59 sampling sites in the project area are given in table 4. Figure 3 shows the location of sampling sites, summarizes the chemical characteristics of ground water in different parts of the project area, and indicates places where hydrothermal water has been found.

TABLE 4.—*Chemical analyses of ground water in the northern part of Napa Valley*

Well locations explained in text, page 5.

Geologic units: Qal, alluvium; Tsv, Sonoma Volcanics, undivided; Ku, sedimentary Cretaceous rocks, undivided; KJf, Franciscan Formation; Jsp, Ultrabasic rocks.

SAR; sodium-adsorption ratio, $Na^{+}/\sqrt{(Ca^{++}+Mg^{++})/2}$, where the ionic concentrations are expressed in meq/l; symbol <, less than value shown.

RSC; residual sodium carbonate, $(CO_3^{=}+HCO_3^{-}) - (Ca^{++}+Mg^{++})$, where the ionic concentrations are expressed in meq/l; symbol <, less than value shown.

Tr, trace

Values for dissolved solids indicate residue on evaporation at 180°C, except those preceded by the letter "a" which have been calculated (sum of determined constituents).

Values for nitrate preceded by the letter "b" were reported as the sum of nitrate and nitrite.

Other constituents expressed in mg/l, in remarks column as follows: Al, aluminum; Li, lithium; PO_4, phosphate, total; N, nitrogen, total; Mn, manganese; As, arsenic.

Water temperature; degrees Celsius (°C) to degrees Fahrenheit (°F), F = 9/5 (°C) + 32.

Well number	Geologic unit	Depth of well (feet)	Date sampled	Water temperature (°C)	Concentration, in milligrams per liter (mg/l)															SAR	RSC	Specific conductance (micromhos at 25°C)	pH	Other constituents and remarks
					Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$					
									MIXED CATION BICARBONATE WATER															
[c]6N/4W-2H1	Tsv		1915	19.5	14	67	61	124	143	Tr		608	8.8	49					663	2.5	7			Spring; Al, 6.7; Li, Tr
6N/4W-17A1	Qal	250	8/27/58	16.5	25	15	29	18	19	2	167		35	5.9	0.1	6.2	0.0	222	146	<1.0	<1.0	363	7.9	
6N/4W-19J2	Qal		8/1/63		24		18	12	11	.7	58		12	12	.1	50	.28	170	95	<1.0	<1.0	248	6.7	
6N/4W-20L3	Qal	50	8/1/63		24		22	14	13	.5	92		18	9.9	.2	49	.32	187	40	<1.0	<1.0	300	7.0	PO_4, 0.03
7N/4W-30L1	Qal	171	4/19/61		29	.09	7.8	6.0	7.7	2.5	58		2.0	9.1	.1	.2	.0	92	44	<1.0	<1.0	136	7.8	Iron precipitate
7N/4W-19E1	Qal, Tsv	210	3/16/59				15	15	16		153	.0	.0	7.0		Tr	2.5		99	<1.0	<1.0	250	7.3	Water has slight yellow color
7N/5W-4A1	Qal, Tsv	244	8/5/71	20.0	100	3.8	16	6.6	18	4.0	95	.0	6.8	13	.0	b.06	.0	215	67	<1.0	<1.0	195	7.4	
7N/5W-5X	Qal	90	3/1/54				25	20	15		180	.0	.2	10			.1			<1.0	<1.0	310	7.4	
7N/5W-9J1	Qal, Tsv	459	7/20/71	21.0	53	.0	25	18	36	3.8	252	.0	17	8.0	.1	b.06	.2	286	140	1.3	1.4	411	7.8	
7N/5W-13N1	Tsv	147	7/20/71	20.0	94	.0	21	12	11	1.5	160	.0	2.0	6.7	.0	b.9	.0	228	100	<1.0	<1.0	250	7.2	
7N/5W-20B1	KJf, Jsp	181	10/9/70				44	36	23		340			10		.0	.22			<1.0	<1.0	620	7.3	
7N/5W-23C1	Qal, Tsv	390	8/2/71		52	.0	21	25	33	2.3	276	.0	13	9.8	.0	b.06	.0	292	160	1.2	1.4	424	7.9	
[c]7N/5W-26E1	Qal	66	3/16/51	29.5	131	.0	27	15	37	8.2	212		13	19	.3	.1	.78	355	129	1.2	<1.0	397	7.3	Flows
[c]7N/5W-26E2	Qal	79	4/28/52				30	15	40		220		10	30			.6		137	1.5	<1.0	410	7.4	Yellow residue
7N/5W-26M2	Qal, Tsv	215	6/18/53				25	20	25		175	.0	20	20			.0		144	<1.0	<1.0	340	7.6	
7N/5W-34H1	Qal, Tsv	200	8/3/71	16.0	87	.2	23	16	16	2.3	175	.0	13	4.4	.1	b.06	.0	248	120	<1.0	<1.0	286	7.4	
7N/5W-36H1	Tsv	104	8/27/58	20.5	96	.0	17	13	15	3.5	143	.0	7.4	6.2	.2	.5	.0	[a]230	96	<1.0	<1.0	265	8.1	
8N/5W-26M1	Tsv	340	7/10/72		93	.0	7.2	8.1	10	4.4	79	.0	3.8	8.9	.1	b6.7	.0	181	51	<1.0	<1.0	157	7.4	
8N/6W-4Q2	Qal, Tsv	232	9/29/55				10	5	10			65	.0	10			.0		46	<1.0	<1.0	130	7.3	
8N/6W-15A2	Qal	125	3/19/51		53	.0	20	10	10	3.4	112	.0	12	7	.2	1.4	.0	[a]170	91	<1.0	<1.0	211	7.4	
8N/6W-23B2	Qal	168	12/6/55				10	5	20		110	.0	.0	10			.11		46	<1.0	<1.0	160	7.2	
8N/6W-25B3	Qal, Tsv	325	5/28/54				15	15	15		130	.0	.0	15			.0		100	<1.0	<1.0	200	7.2	
9N/6W-31Q1	Qal	51	8/27/58		38	.0	8.9	3.9	8.3	.6	54	.0	7.4	3.9	.0	.2	.0	[a]98	38	<1.0	<1.0	118	7.4	
9N/7W-26M2	Qal, Tsv	140	7/10/72		36	.0	14	14	7.5	.2	95	.0	19	6.6	.0	b14	.0	158	93	<1.0	<1.0	222	7.7	
[c]9N/7W-26P1	Qal, Tsv	470	3/27/52		30		15	18	37	2.3	166	6.0	7.7	28	.1	2.8	1.5		111	1.6	<1.0	372	8.3	
9N/7W-27F1	Qal, Tsv	122	8/31/50				15	5	15		75		15	10			.0	[a]98	58	<1.0	<1.0	100	7.2	
[c]9N/7W-36F1	Qal	31	4/8/57				20	10	30		135	.0	.0	20			.3		92	1.3	<1.0	290	6.8	Yellow color

											SODIUM CHLORIDE WATER													
7N/5W-22G1	Qal	56	9/15/50				35	30	190		285		.0	270			14.0	668	212	5.7	<1.0	1,300	7.4	Flows in winter months
7N/5W-22G2	Qal	40	5/18/51				40	40	190		290		.0	300			14.5	730	255	5.0	<1.0	1,300	7.5	
7N/6W-2D1	KJf		5/11/65	32.0	46		4.6	.6	232	3.0	120	64	12	224	5.7	1.3	32	698	14	56	3.8	1,110	8.8	Spring
8N/6W-4F1	Qal, Tsv	207	--	82.0	111		.8	36	176			90.4	2.2	270				a690	154					"Geyser" well
8N/6W-5Q2	Qal, Tsv	305	8/5/71	20.0	65	.88	14	4.7	32	3.7	63	.0	17	50	.2	b.06	1.6	220	54	1.9	<1.0	295	7.1	
8N/6W-9D1	Qal, Tsv	165	2/19/51				35	5	85		110	10	55	95			3.2	a340	106	3.6	<1.0	690		
9N/6W-31H3	Qal, Tsv		4/17/70	98.0	134	.0	4.0	.0	180	10	122	3	18	211	11.4		10		10	23.6	1.8	995	8.7	
9N/7W-25N1	Qal, Tsv	149	8/27/58	29.5	66	.17	12	5.6	166	9.8	201	.0	.0	173	6.2	1.2	12	551	53	10	2.2	901	7.7	
9N/7W-26G1	Qal, Tsv	305	12/3/52	31.5			25	5	170		210		.0	220			11.6		93	8.0	1.7	1,420	7.7	Flows
9N/7W-26K2	Qal, Tsv	60	4/25/51				5	5	220		170		.0	190			7.0		36	19.2	2.3	900	8.0	Yellow residue
9N/7W-26K3	Qal, Tsv	150	6/30/55				.0	.0	190		145		.0	195			9.9		0	High	2.4	900	7.6	
9N/7W-26K4	Qal, Tsv	75	6/30/55				.0	.0	185		140	Tr	5	195			10.0		0	High	2.3	900	7.9	Flows
9N/7W-26R1	Qal	18	11/16/48				35	5	105		190		10	115			4.6	a370	108	4.5	1.0	800	7.3	
9N/7W-26R2	Qal, Tsv	207	1/10/48	43.5			15		170		165			190			10.6	a470				926		
9N/7W-35R1	Qal, Tsv	312					.6	.4	100		170			95			4.2			6.1	1.8	550	7.4	
9N/7W-36D2	Qal, Tsv	165	2/4/58				10	5	160		180	.0		165		Tr			46	12.6	1.8	996	7.6	Warm
											MAGNESIUM BICARBONATE WATER													
6N/4W-6P1	Qal	120	7/10/69	16.5			18	26	15	1.0	137	.0	40	12		19	.0	243	153	<1.0	<1.0	361	7.9	
6N/4W-7X	Qal	100	12/15/55				30	35	25		260	.0	40	20			.3		220	<1.0	<1.0	510	7.0	
7N/5W-5A1	Qal	38	9/29/59		27		18	46	17	3.9	235	.0	51	16	.2	4.6	.5		233	<1.0	01.0	512	8.0	
7N/5W-10M1	Qal, Tsv	590	8/3/71	15.5	39	.2		29	14	1.7	224	.0	18	7.1	.1	b16	.2	259	180	<1.0	<1.0	395	7.5	
7N/5W-20J1	Jsp		10/12/48				70	90	35		530		140	15			.4					1,010	7.1	Spring
c7N/5W-22K1	Qal	15	3/9/55				35	55	45		245	.0	20	100			2.9		315	1.1	<1.0	840	6.8	
7N/5W-23D2	Qal	139	2/1/51		47	.10	21	30	20	3.0	241	.0	13	8.0	.0	1.5	.21	a260	176	<1.0	<1.0	399	7.5	Flows in spring of the year
8N/6W-9F1	Qal	105	1951				20	20	15		135		10	30				a160	113	<1.0	<1.0	310	6.7	
											SODIUM BICARBONATE WATER													
6N/4W-4D1	Tsv, Ku	515	7/20/71		30	.0	40	8.4	110	.5	242	.0	130	11	.6	b.06	.0	450	130	4.1	1.4	637	7.8	
6N/4W-15Q1	Qal, Tsv	303	9/29/59	19.0	45		10	5.6	35	4.0	133	.0	2.1	8.4	.3	9.1	.2	185	48	13	1.2	254	8.1	
8N/5W-27H1	Jsp		8/21/59						644								3.5			23		3,040		
8N/5W-32C1	Tsv	132	3/8/63		100		14	13	57	7.0	248	.0	.0	13	.4	2.5	.64	347	89	2.6	2.3	422	7.8	N, 0.56
8N/6W-7F1	Tsv	245	8/5/71	25.0	91	5.1	7.0	2.2	23	4.6	84	.0	13	3.8	.0	b.06	.0	191	27	1.9	<1.0	160	7.3	
8N/6W-13K1	Tsv		5/11/65				3.8	1.3	7.5	2.8	26		4	5	.1	2.4	.0	97	15	<1.0	<1.0	80	6.1	Spring; PO_4, 0.25; As, Tr; Li, 0.03
8N/6W-15H1	Qal, Tsv		3/19/51		59	.8	13	8.4	39	6.6	180		4.1	5.8	.1	.0	.1	a230	67	2.1	1.6		7.3	Mn, 0.45
8N/6W-35R3	KJf		7/20/71		13	.6	44	13	150	3.4	450	.0	130	6.7	.1	b.2	.55	583	160	5.1	4.2	895	7.8	

c. Probably mixed with sodium chloride water.

Mixed Cation Bicarbonate Water

Mixed cation bicarbonate water is characterized by relatively high concentrations of calcium, magnesium, and bicarbonate ions, and commonly contains anomalous concentrations of sodium. This water is generally alkaline with pH values ranging from near 7.0 to as high as 8.3. The specific conductance is low, ranging from less than 100 micromhos to more than 400 micromhos at 25°C (77°F).

Mixed cation bicarbonate water occurs throughout the Napa Valley area and is generally associated with sediments and detrital material from granitic and volcanic sources. In the project area, the water is common to the alluvial aquifer and to several areas of the Sonoma Volcanics (fig. 3 and table 4).

This water is generally suitable for irrigation and domestic uses. SAR and RSC values (table 4) are characteristically low, and the water is generally classified as soft to moderately hard; total hardness as $CaCO_3$ is generally less than 150 mg/l. High concentrations of iron noted in several analyses may limit the use of the water as an irrigation and domestic water supply.

Sodium Chloride Water

In the project area sodium chloride water generally is associated with geothermal activity and contains relatively high concentrations of sodium, chloride, bicarbonate, boron, silica, and sulfate ions. Anomalous concentrations of nitrate were noted in several samples. The sodium chloride water is generally alkaline with pH values ranging from near 7.0 to as much as 8.7. The specific conductance ranges from less than 300 micromhos to more than 1,400 micromhos at 25°C (77°F).

White (1957) and White, Muffler, and Truesdell (1971) describe a process whereby sodium chloride water originates from a hot-water dominated hydrothermal system of volcanic origin. A similar process may account for the occurrence of sodium chloride water in the northern part of Napa Valley. According to White (1957), deep-percolating meteoric water and possibly water of other origins become involved in a hydrothermal system of high terrestrial heat flow associated with a deep magmatic heat source. This water is heated to steam containing alkali halides in solution; is subsequently circulated within the hydrothermal, ground-water system; and, upon condensation at or near the surface of the earth, yields the characteristic sodium chloride water.

Sodium chloride water in the project area is generally hydrothermal and occurs most commonly in the Calistoga area (p. 15). Figure 3 shows that sodium chloride water also occurs along Maple Lane south of Calistoga, in Sulphur Canyon west of St. Helena, and in the vicinity of Oakville. Water of mixed type was found at Napa Soda Springs, in several wells south of Oakville, and in wells 9N/7W-26P1 and 9N/7W-36F in the Calistoga area (table 4).

The occurrence of sodium chloride water may be associated with faults. Barnes (1970) describes water containing high concentrations of sodium, chloride, bicarbonate, and boron ions that issues from springs along known or inferred fault zones in the western Coast Ranges of North America. In northern Napa Valley, a chemical analysis of water from Napa Soda Springs (6N/4W-2N1, fig. 3, and table 4) indicates the occurrence of sodium chloride water. The springs issue from orifices along the inferred strike of the Soda Creek fault. Sterns, Sterns, and Waring (1937) also implied an association between faults and the occurrence of hot springs in the Calistoga area. As more water-quality and geologic data for the Napa Valley area become available, the association between sodium chloride water and faults may become more apparent.

In the project area, sodium chloride water is marginally suited for irrigation purposes. Boron concentrations and SAR values are characteristically high, RSC values are commonly above 1.25 meq/l (table 4), and relatively high iron concentrations were noted in several analyses. Domestic use of sodium chloride water is practical in some instances even though concentrations of some constituents exceed the upper limits recommended by the U.S. Public Health Service (1962). Hardness generally is less than 150 mg/l as $CaCO_3$.

Water from well 9N/6W-31M3 (table 4) was given the most complete analysis of any sodium chloride water from the project area. Of particular interest is the temperature and the concentration of silica (SiO_2) in the water from this well and from well 8N/6W-4F1 (table 4).

Fournier and Rowe (1966), using curves that relate silica solubilities in water to temperature, have developed a method to estimate ground-water temperatures using the silica content of hot water discharging at land surface. This procedure suggests an underground temperature of at least 138°C (280°F) at well 9N/6W-31M3 and 130°C (266°F) at well 8N/6W-4F1.

A general dependence on depth to the occurrence of flowing wells and the possibility of general confinement in the Calistoga area has been previously mentioned (p. 15). Flowing wells in the Calistoga area are with few exceptions, hydrothermal and yield sodium chloride water. Noting the relation of silica solubility to water temperature (Fournier and Rowe, 1966) it is possible that hot sodium chloride water, rising from depth, mixes with downward-percolating cooler water causing the precipitation of silica and the subsequent cementation of material at the mixing interface. White, Muffler, and Truesdell (1971) indicate that such "self-sealing" phenomena are common in hot-water dominated hydrothermal systems with temperatures in excess of 150°C (302°F). Such activity, taking place over an area of several square miles, could produce a zone of relatively impermeable material that would confine sodium chloride water under a potentiometric head.

Magnesium Bicarbonate Water

Magnesium bicarbonate water is characterized by relatively high concentrations of magnesium and bicarbonate ions and lesser concentrations of calcium ions. This water is generally alkaline with pH values ranging from near 7.0 to 8.2. The specific conductance generally is high, ranging from about 300 micromhos to more than 1,000 micromhos at 25°C (77°F).

Magnesium bicarbonate water is generally of good quality for both irrigation and domestic purposes. SAR and RSC values (table 4) are low. In several analyses, however, boron concentrations were above recommended limits for boron-sensitive plants. Hardness ranges from about 100 mg/l to more than 500 mg/l as $CaCO_3$.

Barnes and O'Neil (1969) associated magnesium bicarbonate water in the Coast Ranges with serpentine and ultrabasic intrusive rocks. Water from a spring (7N/5W-20J1, fig. 3, and table 4) near the Bella Oaks Mine may represent this association. Also, as noted earlier (p. 13), chemical analyses of ultrabasic rocks show high concentrations of magnesium. Thus, these rocks are identified as a possible source of magnesium in ground water in the Napa Valley area. The occurrence of magnesium bicarbonate water within the alluvial aquifer probably is indicative of the infiltration of streamflow that originated as runoff from ultrabasic rocks.

Sodium Bicarbonate Water

Sodium bicarbonate water contains relatively high concentrations of sodium and bicarbonate ions. In Napa Valley several analyses also showed high concentrations of sulfate. This water is characteristically alkaline and pH values range from 7.3 to 8.1. The specific conductance ranges from less than 100 micromhos to more than 3,000 micromhos at 25°C (table 4).

In most places, sodium bicarbonate water is only marginally suited for domestic and irrigation purposes. SAR and RSC values are commonly greater than 2, boron concentrations are commonly too high for boron-sensitive plants, and relatively high iron concentrations may cause objectionable scales and stains on plumbing and other fixtures. Hardness is generally less than 100 mg/l as $CaCO_3$. Sodium concentrations may be above the limits (270 mg/l) recommended by the Environmental Protection Agency (1971) for public water supplies.

The source of sodium bicarbonate water is not well known, but available data suggest an association with the Franciscan Formation and the consolidated sedimentary rocks.

Occurrence and Classification of Sodium Chloride and Sodium Bicarbonate Water

Sodium chloride water and sodium bicarbonate water are the most troublesome mineralized ground waters in the project area. As shown in figure 3, sodium chloride water occurs in the Calistoga area and in the vicinity of Oakville. In the Calistoga area, most wells containing sodium chloride water are located along the topographic axis of the valley from Bennet Lane to Maple Lane. In the vicinity of Oakville, sodium chloride water occurs in the area from Money Road to Yount Mill Road, generally between Highway 29 and the Napa River. Water-temperature records (fig. 3 and table 4) suggest that sodium chloride water may occur in wells located in secs. 3, 15, 25, and 26, T. 7 N., R. 5 W., and in secs. 3 and 25, T. 8 N., R. 6 W.

Sodium bicarbonate water occurs less frequently in the project area than does sodium chloride water and commonly occurs along the periphery of the valley or in the foothills. Wells yielding sodium bicarbonate water are located in secs. 4 and 5, T. 8 N., R. 4 W., in secs. 27 and 32, T. 8 N., R. 5 W., and in secs. 7, 13, 15, and 35, T. 8 N., R. 6 W.

Sodium chloride and sodium bicarbonate water from selected wells were plotted on a diagram (fig. 18) widely used for evaluating water for irrigation. The diagram shows that the sodium chloride water has a medium to high salinity hazard and a low to medium sodium hazard. The sodium bicarbonate water has a low to very high salinity hazard and a low to very high sodium hazard.

Migration of Sodium Chloride Water During Critical Drought Conditions

Sodium chloride water has been identified as the most troublesome and potentially the most harmful type of ground water in the project area. Water-quality data indicate the distribution of sodium chloride water is presently stable. However, critical drought conditions may cause a migration of sodium chloride water into areas of the alluvial aquifer where it does not presently occur. Such a migration would depend, for the most part, on a major change in hydraulic gradients that direct the movement of water in the alluvial aquifer.

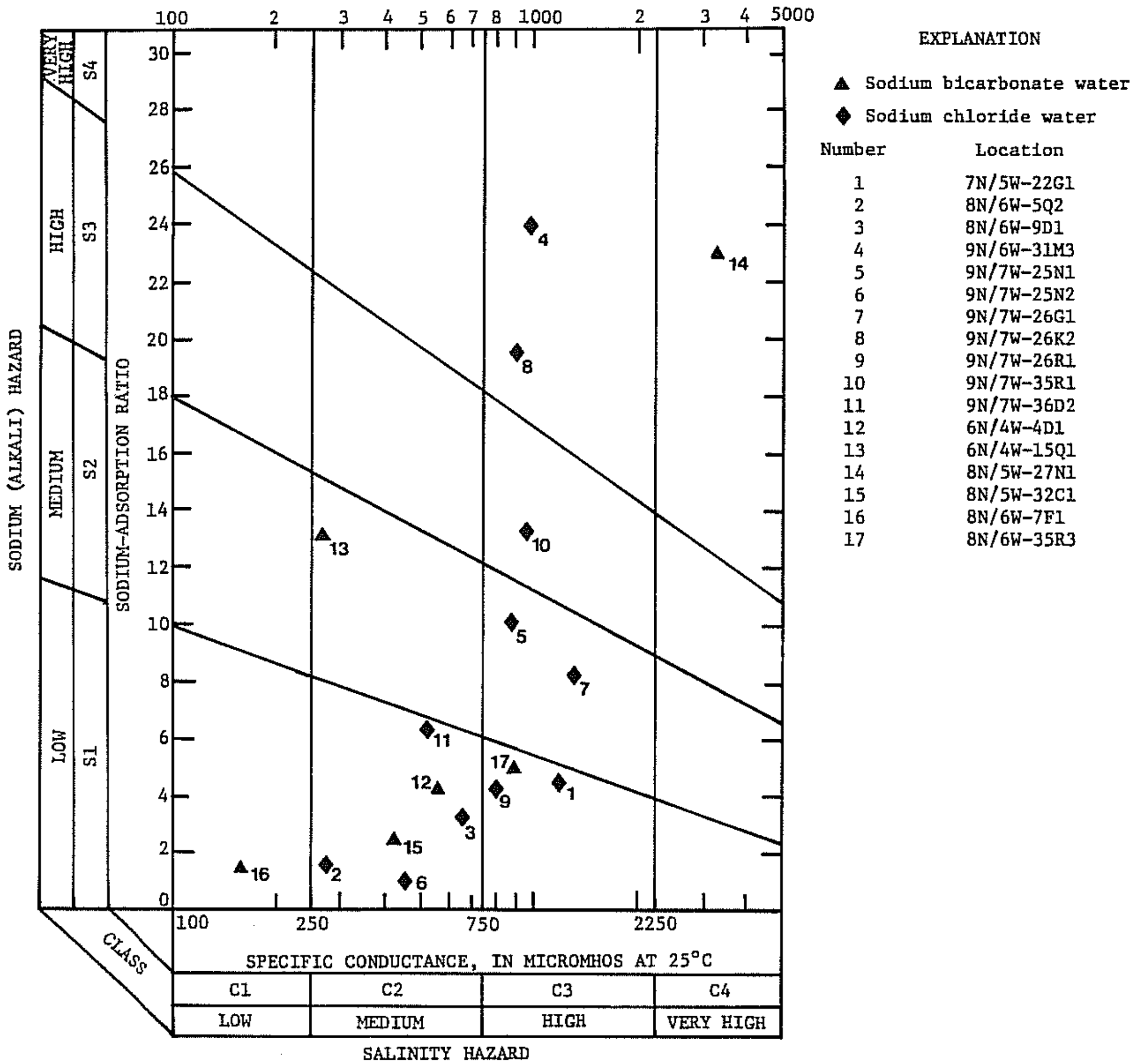


FIGURE 18.--CLASSIFICATION OF SODIUM CHLORIDE AND SODIUM BICARBONATE WATER FOR IRRIGATION. MODIFIED AFTER WILCOX (1955).

Simulation of critical drought conditions in the alluvial aquifer has been discussed in a previous section (p. 42). A comparison of figures 8, 15, 16, and 17 suggests that hydraulic gradients and the direction of ground-water movement probably will not change sufficiently to cause a significant migration of sodium chloride water until critical drought conditions occur and pumping from wells is about four times the volume pumped in 1970. Figure 17 shows simulated water-level contours for northern Napa Valley after 2 years of such conditions. The contours indicate a significant redistribution of hydraulic gradients, and suggest that a major depression caused by excessive pumping in the central part of the valley might extend westward toward Oakville and cause sodium chloride water to migrate toward postulated pumping centers. Because the effects of dispersion and dilution could not be determined, the extent of such a migration or the influences on the ultimate concentrations of sodium and chloride ions in the ground water could not be predicted. On the other hand, migration of undesirable chemical constituents to developed parts of the alluvial aquifer can generally be monitored in the field, and it is recommended that such a monitoring program be estabblished in the near future.

Although the potential for widespread migration of sodium chloride water is small, local problems of this nature can be expected as ground-water development increases. Development of ground water in the Oakville area may be most affected by intrusion of sodium chloride water into local cones of depression.

Evaluation of Quality of Base Flow and Seasonal Runoff in the Napa River

Although the Napa River at the present time is a gaining stream, large annual ground-water withdrawals could significantly alter this condition. For example, if significant storage depletion occurs in the alluvial aquifer during the summer and autumn, recharge from the Napa River will increase during the early part of the rainy season. At the same time, the lowered water levels in the alluvial aquifer may cause base flow to be depleted and no-flow conditions may become common in the Napa River during the later part of the water year. Such a situation would increase the opportunity for inducing recharge from the sewage effluent presently (1972) being discharged to the Napa River by the cities of Calistoga and St. Helena.

In order to evaluate the chemical quality of base flow in the Napa River and to estimate the qualitative impact of water recharged from the Napa River to the alluvial aquifer, two water-quality reconnaissances of the Napa River were made in July and December 1971 at the sampling sites listed below.

Sampling site	Station number	Station name	Local name
1	11-4580	Napa River near Napa	Bridge at Oak Knoll Avenue
2			Bridge at Grant Boundary Lane
3	11-4560	Napa River near St. Helena	Bridge at Zinfandel Avenue
4			Bridge at Lodi Lane
5			Pine Street, Calistoga

The July 1971 data (tables 5 and 6 and fig. 19[3]) are considered indicative of the quality of base flow. The December 1971 data (tables 5 and 6) are indicative of the quality of water most likely to be recharged to the alluvial aquifer by the Napa River after the first significant seasonal rains. These data indicate water of good mineral quality, but high coliform bacteria counts and relatively high concentrations of organic carbon and other nutrients suggest contamination from sewage and fertilizers.

[3]In figure 19, the rapid rise in water temperature during the late morning of July 27 is probably due to the dissipation of early morning fog and a subsequent sharp rise in air temperature.

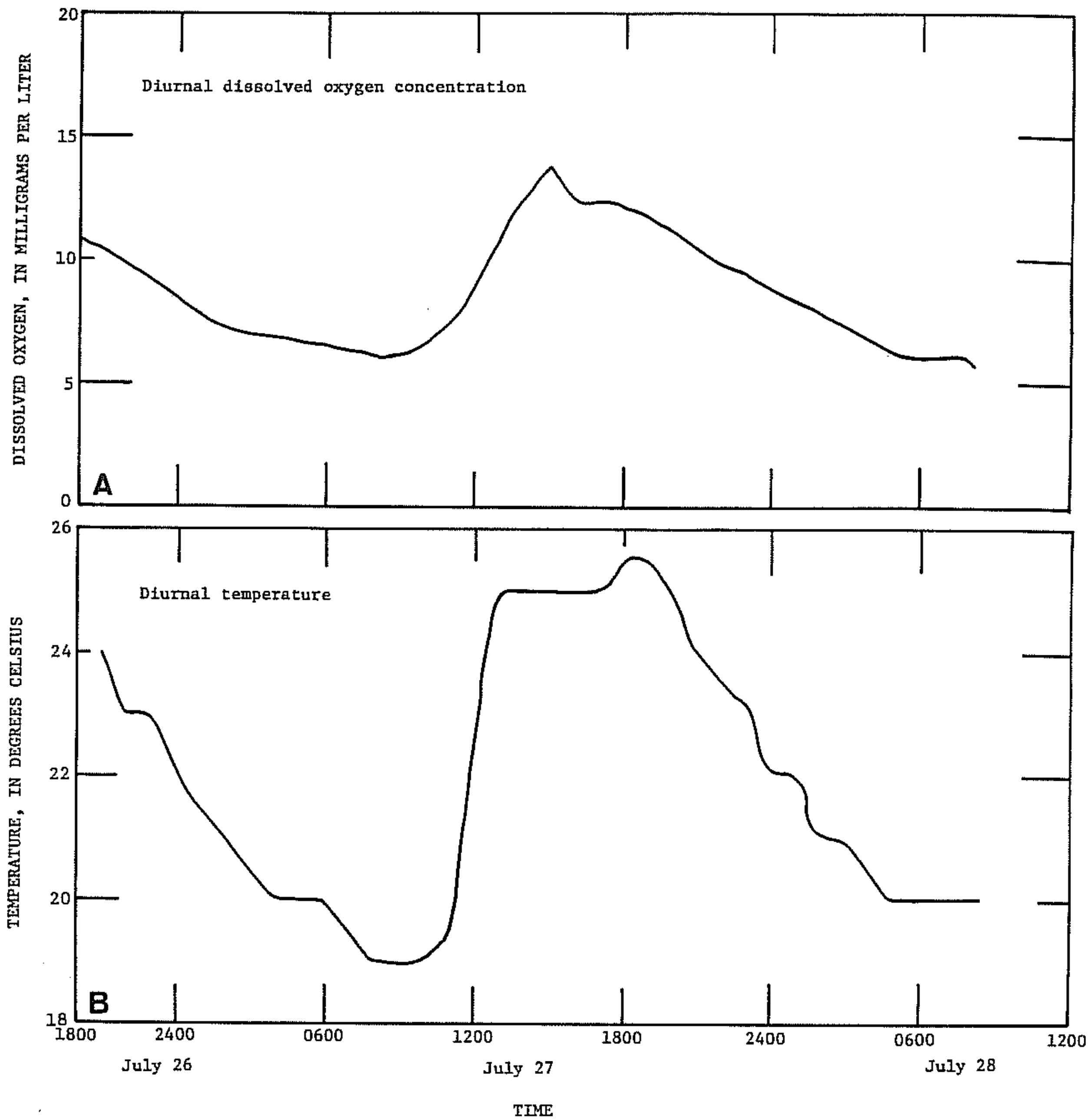


FIGURE 19.--CONTINUOUS DIURNAL DISSOLVED OXYGEN CONCENTRATION AND TEMPERATURE OF WATER IN THE NAPA RIVER AT OAK KNOLL AVENUE, JULY 26-28, 1971.

TABLE 5.—*Chemical analyses of water from the Napa River*

[Sampling sites shown in fig. 3 and explained on p. 58, discharge in cubic feet per second (cfs), computed from stage record at time sample collected]
Nitrate, reported as the sum of nitrate and nitrite.
Dissolved solids, reported as the residue on evaporation at 180°C.

Sampling site and number	Date and time of collection: Date	Time (hours)	Discharge (cfs)	Water temperature (°C)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate as N	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Noncarbonate hardness as $CaCO_3$	Total alkalinity as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
					Concentration, in milligrams per liter (mg/l)																			
1 Bridge at Oak Knoll Ave.	7-27-71	1100	2.4	19.0	30	0.02	27	22	21	2.9	198	0.0	27	16	0.1	0.76	0.32	247	160	0.0	162	22	389	7.7
2 Bridge at Grant Boundary Lane	7-27-71	0925		20.0	29	0.03	32	24	19	2.8	228	0.0	21	11	0.1	0.44	0.39	253	180	0.0	187	19	409	7.7
3 Bridge at Zinfandel Ave.	7-27-71	1120	2.0	22.0	27	0.07	32	15	17	2.7	185	0.0	16	11	0.1	0.63	0.37	215	140	0.0	152	20	336	7.6
4 Bridge at Lodi Lane	7-27-71	1330		24.5	47	0.07	11	5	21	3.3	96	0.0	9.3	12	0.3	0.03	0.31	157	48	0.0	79	47	195	7.7
5 Pine St., Calistoga	7-27-71	1435		23.0	49	0.04	17	8.4	36	4.1	142	0.0	23	14	0.5	0.03	1.2	223	77	0.0	116	49	311	7.6
1 Bridge at Oak Knoll Ave.	12-27-71	1500	670	7.0	22	0.16	8.6	5.9	10	3.0	51	0.0	14	9.8	0.4	1.4	0.15	106	46	4	42	31	134	7.1
3 Bridge at Zinfandel Ave.	12-27-71	1330	341	7.0	25	0.11	9.5	4.1	6.4	5.9	44	0.0	11	9.1	0.3	1.3	0.18	99	41	5	36	22	128	7.1

TABLE 6.—*Nutrient, organic, and biological constituents in water from the Napa River*

[Sampling sites shown in fig. 3 and explained on p. 58, discharge in cubic feet per second (cfs), computed from stage record at time sample collected]

Sampling site and number	Date and time of collection: Date	Time (hours)	Discharge (cfs)	Water temperature (°C)	Dissolved oxygen (DO)	Organic carbon (TOC)	Nitrogen, total as N	Nitrogen, total Kjeldahl, as N	Ammonia (NH_4) as N	Phosphorus, total as P	Phosphate, ortho as P	Remarks
					Concentration, in milligrams per liter (mg/l)							
1 Bridge at Oak Knoll Ave.	7-27-71	1100	2.4	19.0	-	6.5	1.1	0.38	0.27	0.45	0.40	Water turbid; large quantities of algae in stream channels; fingerlings and large fish noted; no odor
2 Bridge at Grant Boundary Lane	7-27-71	0925		20.0	7.4		0.85	0.41	0.27	0.09	0.08	Large quantities of yellow-green algae in stream channel; cattle near stream; no odor
3 Bridge at Zinfandel Ave.	7-21-71	1120	2.0	22.0	8.6	5.0	1.0	0.40	0.27	0.08	0.06	Large fish and fingerlings noted. No odor. [1]Total coli, 510 colonies per 100 ml.
4 Bridge at Lodi Lane	7-27-71	1330		24.5	8.6	4.0	0.31	0.28	0.21	0.17	0.15	Considerable algae growth in stream channel; no odor
5 Pine St., Calistoga	7-27-71	1435		23.0	6.8	5.5	0.30	0.27	0.21	0.20	0.15	Water clear; no algae; many aquatic insects and snails
1 Bridge at Oak Knoll Ave.	12-27-71	1500	670	7.0	-	10	2.6	1.2	0.11	0.34	0.08	[2]Total coli, 22,500 MPN per 100 ml; [2]fecal coli, 4,600 MPN per 100 ml
3 Bridge at Zinfandel	12-27-71	1330	341	7.0	-	5.5	2.1	0.75	0.11	0.31	0.28	[2]Total coli, 11,000 MPN per 100 ml; [2]fecal coli, 4,600 MPN per 100 ml

[1]Membrane-filter technique.
[2]Multitube-fermentation technique.

SUMMARY AND CONCLUSIONS

The alluvium is the principal aquifer in the project area and is capable of yielding large quantities of water to wells. The largest yielding wells generally are located along the Napa River and its major tributaries where the aquifer is thickest and most permeable. The total quantity of ground water stored in the alluvial aquifer at the present time (1972) is estimated to be 190,000 acre-feet.

Recharge to the alluvial aquifer occurs chiefly from infiltration of precipitation and percolation from streams tributary to the Napa River. Discharge occurs chiefly by direct discharge to the Napa River, by evapotranspiration, and by pumping from wells. Historically, water levels and stream discharges have been strongly influenced by precipitation. Annual precipitation generally has been sufficient to meet natural and artificial demands placed on the aquifer, and water levels have not changed significantly over time. During periods of limited precipitation, however, water levels have declined and stream discharges have been reduced significantly.

In order to meet increasing demands for agricultural water, users have increased ground-water pumpage since 1967. Projected future ground-water use is estimated to be as much as 35,000 acre-feet per year. Such large annual withdrawals, during critical drought periods, could result in significant aquifer depletion and restrict the availability of ground water to many users. A digital-computer model of the alluvial aquifer simulated critical drought conditions and indicated that (1) ground-water levels should not decline significantly until ground-water pumpage exceeds 24,000 acre-feet per year; (2) after two consecutive years of little or no natural recharge, ground-water withdrawals in excess of 24,000 acre-feet per year could cause significant declines in water levels and significantly redistribute the hydraulic gradients in the valley between Zinfandel Lane and Oak Knoll Avenue; and (3) the alluvial aquifer and the stream system can provide water sufficient to meet most projected ground-water requirements, even under protracted, adverse climatological conditions.

Because of generally low transmissivities in the alluvium, many widely-spaced wells may be required to obtain large rates of withdrawal. The development and operation of large-capacity wells should be managed with respect to placement and coordination of pumping rates and schedules so as to afford the greatest efficiency of operation. Optimum placement and operation of these wells probably cannot be achieved until a ground-water basin management model is developed and coupled to a refined model of the hydrologic system.

The following types of ground water occur in the projected area:

a. Mixed cation bicarbonate water
b. Sodium chloride water
c. Magnesium bicarbonate water
d. Sodium bicarbonate water

Although excessive hardness is common, the quality of most of the ground water is adequate for domestic and stock use. Sodium chloride water is generally unsuitable for irrigation purposes because of high boron concentrations and relatively high SAR values.

The potential for the migration of sodium chloride water under normal conditions of use is slight, but migration could increase locally in the Oakville area, especially during critical drought conditions.

If water levels decline enough to make the Napa River a major source of recharge to the alluvial aquifer, serious biologic and nutrient contamination of the ground water could occur if present (1972) water-quality conditions in the Napa River are maintained.

RECOMMENDATIONS FOR FUTURE WORK

In order to properly manage the water resources in the project area, the following should be considered:

1. The digital model should be refined to include a simulated Napa River that is responsive to withdrawals from the alluvial aquifer under all transient-state conditions.

2. The observation-well network presently operated by the Napa County Agricultural Extension Service should be modified and expanded to include more wells screened in the alluvial aquifer. Efforts should be made to obtain detailed records for existing observation wells, and for new wells that may be added to the network.

3. Pumpage should be compiled annually to provide realistic data for use in refining the digital model and monitoring the potential for critical drought conditions.

4. Hydrologic data from local, State, and Federal agencies should be collected and organized for use in future studies.

5. Wells to monitor the possible migration of sodium chloride water toward pumping centers in the Oakville area should be located and maintained for future sampling. Migrating sodium chloride water can be detected by measuring temperature, chloride, and the specific conductance of the water from wells.

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Open-file report

Prepared in cooperation with the
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222.0

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August 1977

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

V. E. McKelvey, Director

For additional information write to:

District Chief
Water Resources Division
U.S. Geological Survey
345 Middlefield Rd.
Menlo Park, Calif. 94025

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CONVERSION FACTORS

Factors for converting English units to metric units are shown to four significant figures. In the text the metric equivalents are shown only to the number of significant figures consistent with the values for the English units.

English	*Multiply by*	*Metric*
acres	4.047×10^{-1}	hm^2 (square hectometers)
acre-ft (acre-feet)	1.233×10^{-3}	hm^3 (cubic hectometers)
acre-ft/yr (acre-feet per year)	1.233×10^{-3}	hm^3/yr (cubic hectometers per year)
ft (feet)	3.048×10^{-1}	m (meters)
ft/yr (feet per year)	3.048×10^{-1}	m/yr (meters per year)
ft^2/d (feet squared per day)	9.290×10^{-2}	m^2/d (meters squared per day)
ft^3/s (cubic feet per second)	2.832×10^{-2}	m^3/s (cubic meters per second)
gal/d (gallons per day)	3.785	L/d (liters per day)
gal/min (gallons per minute)	6.308×10^{-2}	L/s (liters per second)
(gal/min)/ft (gallons per minute per foot)	2.070×10^{-1}	(L/s)/m (liters per second per meter)
in (inches)	2.540×10	mm (millimeters)
mi (miles)	1.609	km (kilometers)
mi^2 (square miles)	2.590	km^2 (square kilometers)

GROUND-WATER HYDROLOGY OF THE LOWER MILLIKEN-SARCO-TULUCAY CREEKS AREA, NAPA COUNTY, CALIFORNIA

By Michael J. Johnson

ABSTRACT

The Sonoma Volcanics are the principal water-bearing materials in the lower Milliken-Sarco-Tulucay Creeks area, which occupies about 15 square miles (39 square kilometers) in and east of Napa, Calif. The distribution and composition of these volcanic units are highly variable and complex. Within the Sonoma Volcanics the tuffs constitute the best ground-water reservoir. They are principally pumicitic ash-flow tuffs, partly welded and moderately permeable. These tuffs extend to a depth exceeding 500 feet (150 meters), and are irregularly interbedded with clay, igneous flows, and other volcanically derived material of very low permeability which locally confine the tuffs. Recharge and movement of ground water within these tuffs are affected by the highly variable character of this rock sequence, by adjacent formations, and by tectonic features such as the Cup and Saucer ridge and the Soda Creek fault. The lithology of the area limits specific yields to about 4 percent (unconfined conditions). Specific capacities of wells average less than 3 gallons per minute per foot of drawdown (0.6 liter per second per meter) except in the most permeable areas.

Annual pumpage of 3,000 acre-feet (3.7 cubic hectometers), mostly from the Sonoma tuffs, represents a significant portion of the ground-water discharge. The seasonal change in ground-water storage was about 6,600 acre-feet (8.1 cubic hectometers) in 1975. Water-level data from the area reflect the seasonal change in ground-water storage, with fluctuations of 3 to 60 feet (1 to 18 meters). The storage capacity to a depth of 500 feet (150 meters) may be as much as 196,000 acre-feet (242 cubic hectometers) in the study area, but physical and economic factors may restrict the usable capacity to about 20,000 acre-feet (25 cubic hectometers).

Recharge within the area is generally inadequate to marginal under 1975 demand. There is insufficient recharge in the Milliken and Sarco Creeks area to support 1975 pumpage. Long-term changes in the seasonal peak water levels indicate an average decline of 1.5 feet per year (0.5 meter per year). By 1975 annual pumpage was not exceeding recharge in the Tulucay Creek area. Although a downward trend in water levels was noted in the western part of this basin in the late 1940's, the pumping distribution and its stress on the ground-water system have since changed, and no overall downward trend was evident in the Tulucay Creek area in 1975.

INTRODUCTION

Purpose and Scope

Ground water has become increasingly important in the lower Milliken-Sarco-Tulucay Creeks area of Napa County with increased urbanization and continued irrigation of agricultural land and recreational land, mostly golf courses. Water levels have declined, and there is concern that future use and development might accelerate this decline. Data on the hydrologic system and the factors that exert controls on this system should be available for long-term management of the ground-water resource.

The purpose of this report, prepared by the U.S. Geological Survey in cooperation with the Napa County Flood Control and Water Conservation District, is to provide local planners with sufficient data to permit them to manage effectively the local ground-water resource for long-term use.

The scope of this report includes a description of the hydrologic system and the geologic features that affect the system. The report discusses the geology of the area, describes the occurrence and movement of ground water, identifies sources and areas of recharge and areas of discharge, includes estimates of pumpage and ground-water storage, and discusses changes in water levels and ground-water storage. Data used in the study were taken from previous investigations or acquired by fieldwork in 1974 and 1975.

Location and Extent of Study Area

The study area is adjacent to the city of Napa, approximately 40 mi (64 km) northeast of San Francisco (fig. 1). It is a 15-mi^2 (39-km^2) topographic depression underlain by volcanic debris, enclosed on three sides by the Howell Mountains and bounded on the west by the Napa River. An elevated hilly terrain exists in the central part, with the higher western edge termed the "Cup and Saucer". The topography and geology of the area have led geologists (K. F. Fox, oral commun., 1975) to speculate that part of the basin may be a collapsed caldera truncated by the Soda Creek fault.

The area includes the lower parts of the drainage basins of Milliken, Sarco, and Tulucay Creeks, and an area directly tributary to the Napa River (fig. 1). The three creeks drain the Howell Mountains on the east, cross the study area, and discharge into the Napa River. For this report the study area is referred to as the lower Milliken-Sarco-Tulucay Creeks area.

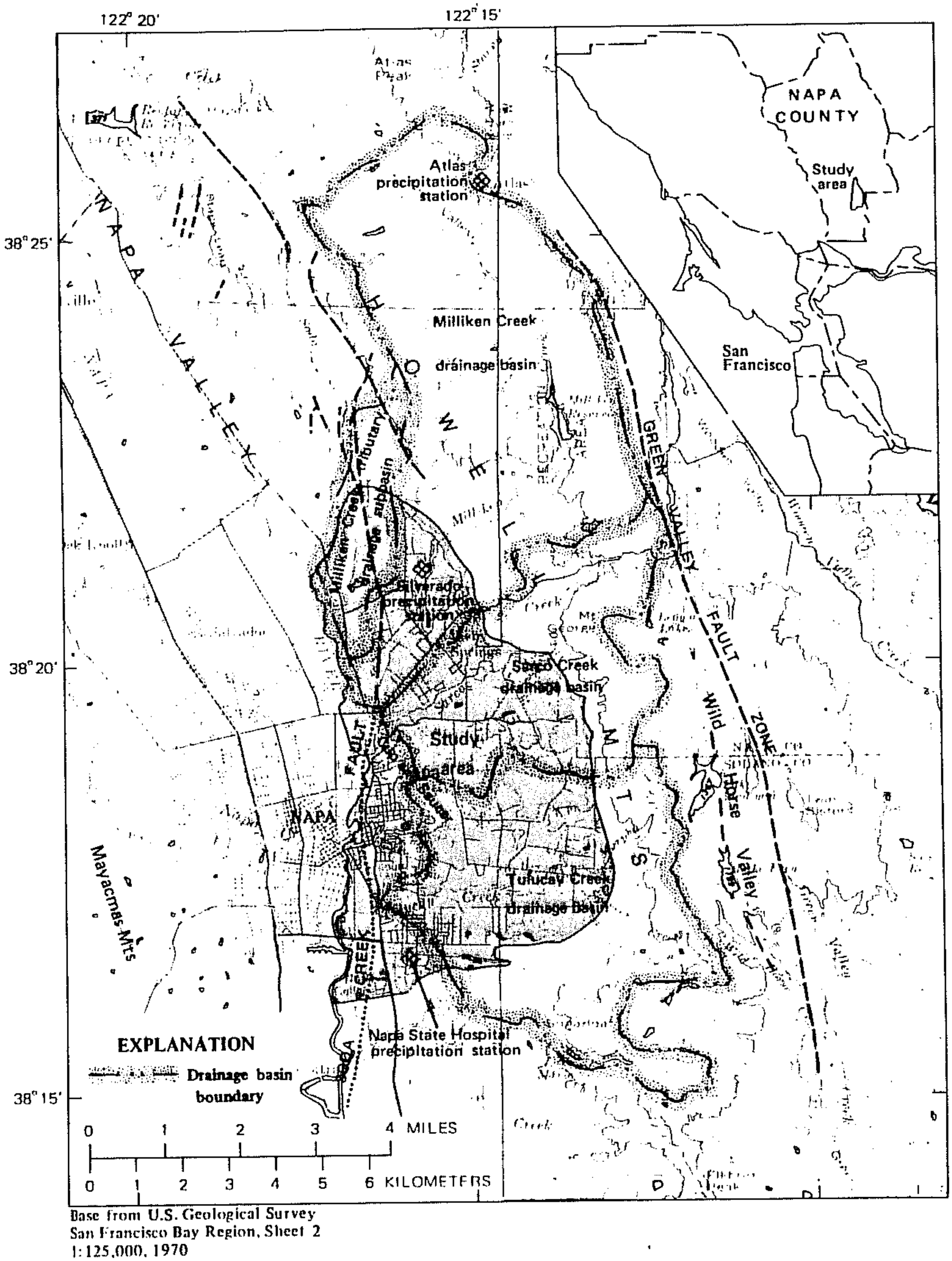


FIGURE 1.--Location and drainage basins of the study area.

Culture and Water Use

The study area is a rapidly urbanizing region, although vineyards and orchards are still common. Land use in 1970 is shown in figure 2. The western margin of the Tulucay Creek area is densely urbanized; improved open space predominates in the rest of that area, principally as pastureland but with an increasing number of new residences. Orchards are more prevalent in the Milliken and Sarco Creeks area, but residential use predominates. Two golf courses, the Silverado Country Club and the Napa Valley Country Club, are also here. A large block of homes within the city limits adjoins the Napa River just west of the Cup and Saucer. Vineyards are common north of the Cup and Saucer along the Napa River.

Data furnished by the Napa Department of Planning and Community Development indicate that about 13,000 people live within the study area; 8,800 of these people live outside the city limits in approximately 3,000 dwellings.

The urbanized western part of the Tulucay Creek area and some homes in the Milliken and Sarco Creeks area receive water from the city of Napa. A majority of the homes outside the city of Napa and almost all the areas used for agriculture and recreation use water from privately owned wells. Excluding county homes on city water and allowing for some dwellings sharing a common well, there are at least 1,500 wells in use within the study area. Of these wells, approximately 400 have some form of well record. Figure 2 shows the distribution of 190 new wells recorded by the Napa County Health Department for the 4 years from 1970 through mid-1974. This distribution coincides with areas of increasing urbanization.

Previous Investigations

Early geologic studies north of San Francisco Bay were made by Osmont (1905) and Dickerson (1922). More detailed studies of the Napa Valley were made by Weaver (1949) and Kunkel and Upson (1960). Chesterman (1956) described pumice deposits in the study area. A map prepared by Koenig (1963) shows general geologic features of the Napa Valley. Detailed geologic mapping of the study area was done by Fox and others (1973) and Sims and others (1973).

The hydrology of the Milliken and Tulucay Creeks area was discussed briefly by Clark (1919), Bryan (1932), and Weaver (1949). A detailed hydrologic study of the Napa Valley was made by Kunkel and Upson (1960). Other hydrologic studies for the Napa Valley describe ground water (Faye, 1972, 1973), water development (Nolte, 1960; Metcalf & Eddy, 1973), ground-water resources (U.S. Bureau of Reclamation, 1972), and use of ground water for irrigation and frost protection (Napa County Flood Control and Water Conservation District, 1970, 1972).

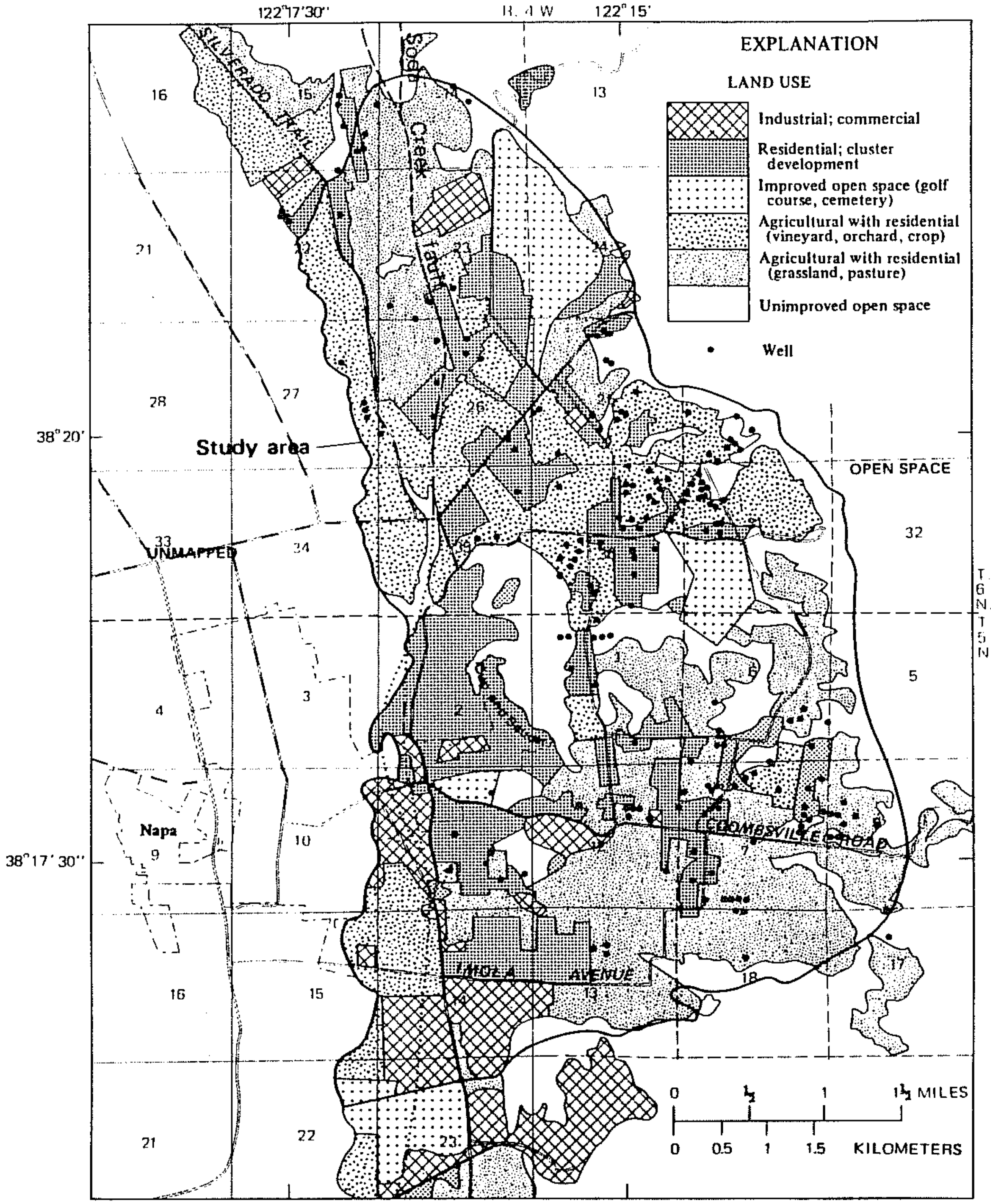


FIGURE 2.--Land use in 1970 (U.S. Geological Survey, 1973) and location of wells drilled from 1970 through mid-1974.

Well-Numbering System

Wells are numbered according to their location in the rectangular system for subdivision of public lands in California. For example, in the number 5N/4W-14J3, assigned to a well near Imola Avenue, that part of the number preceding the slash indicates the township (T. 5 N.,); the number between the slash and hyphen indicates the range (R. 4 W.); the digits following the hyphen indicate the section (sec. 14); the letter following the section number indicates the 40-acre (16-hm^2) subdivision of the section according to the following diagram. The final digit is a serial number for wells in each 40-acre (16-hm^2) subdivision. All wells mentioned in this report are referenced to the Mount Diablo base line and meridian.

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

GROUND-WATER GEOLOGY

This study was concerned exclusively with the Sonoma Volcanics of Tertiary age and the surficial deposits of Quaternary age. These units are identified in figure 3 and are discussed briefly in the text. Detailed geologic descriptions of these units and their regional distribution are given in the reports listed in the section "Previous Investigations."

Sonoma Volcanics and Their Water-Bearing Properties

The Sonoma Volcanics of Tertiary age are divided into three informal volcanic members after Dickerson (1922, p. 551) and two subaqueous deposits. They are the lower andesitic member, the middle tuffaceous member, and the upper rhyolitic member, the diatomaceous deposits, and the sedimentary deposits. All tuffs that occur in these units are referred to as Sonoma tuffs and collectively constitute the area's major aquifer system.

Andesitic member.--The lower andesitic member consists mainly of andesitic to basaltic flows with some interbedded tuffs, the whole member lying unconformably on Miocene sandstone and grading into the overlying middle tuffaceous member. These flows vary considerably in thickness and texture and are highly fractured in the recharge area along the eastern hills. The dense fine-grained materials generally yield no water, whereas the vesicular and agglomeratic materials may be of low to moderate permeability.

The andesitic member underlies the entire study area. Its flows become more predominant with depth as the tuff beds decrease in number and thickness. Well logs show that a continuous sequence of flows will be reached at less than 800 ft (240 m). Generally below 500 ft (150 m) flows with interbedded sticky clay predominate, precluding good ground-water yield. In the hilly Cup and Saucer area these flows are within 100 ft (30 m) of the surface and yield little water to wells along First Avenue.

Tuffaceous member.--Most of the Sonoma tuffs are in the tuffaceous member. This member thus makes up the principal aquifer within the study area east of the Soda Creek fault.

The tuffaceous member contains volcanic ejecta including fragmental pumice, tuff, ash, and scoria, which are highly permeable and yield water freely. The member also contains mudflow agglomerates, welded tuff, flows, and silts which do not yield water freely but serve to locally confine the more permeable material within the member. The member is principally a pumicitic ash-flow tuff, partly welded and of moderate permeability. These tuffs are bedded in between confining clays, flows, and less permeable volcanic material.

The tuffaceous member overlies the andesitic member and is extensive north and south of the hilly central part of the study area (fig. 3, DD'). The hilly central area contains andesitic flows in its western part, draped by a thin, elevated layer of tuffs and erosional debris, and it contains diatomaceous deposits in its eastern part (fig. 3, BB'). These materials comprising the hilly central part of the study area are, for the most part, of very low permeability, and they separate the thick tuffaceous member on the north from that on the south. Thus, ground-water development in the tuffs of either the Milliken and Sarco Creeks ground-water basin or the Tulucay Creek ground-water basin is not expected to have hydraulic effects on the other. The thin, elevated tuffs of the hilly central part of the area grade irregularly down into the thicker tuffaceous member to the north and south. The principal outcrop area of the deeper tuffs of the Milliken and Sarco Creeks basin and the Tulucay Creek basin is along the eastern edge of the study area.

Water in the more deeply buried tuffs is confined (artesian), but water in the exposed, partly welded tuffs in the hilly central area and along the eastern hills is under unconfined to semiconfined conditions. Wells in the central area along First Avenue may have very low yields, with specific capacities as low as 0.01 (gal/min)/ft or 0.002 (L/s)/m of drawdown in a mixture of shallow Sonoma tuffs dissected by intrusions and the deeper andesitic flows.

Specific capacity, as determined from drillers' tests, ranges from less than 1 (gal/min)/ft or 0.2 (L/s)/m to 42 (gal/min)/ft or 8.7 (L/s)/m for two deep, high-capacity wells with 12-in (305-mm) casings penetrating porous Sonoma tuffs in the Milliken and Sarco Creeks basin. The typical well in the study area has a 6- to 8-in (150- to 200-mm) perforated casing, a depth from 130 to 350 ft (40 to 110 m), and more than an 85-percent chance of having a specific capacity of less than 3 (gal/min)/ft or 0.6 (L/s)/m. A specific capacity over 15 (gal/min)/ft or 3 (L/s)/m is unusual in the study area; 42 (gal/min)/ft or 8.7 (L/s)/m is exceptional.

Wells drilled to the deeper tuffs along the lower Tulucay Creek ground-water basin have moderate yields with an average specific capacity of 4 to 5 (gal/min)/ft or 0.8 to 1.0 (L/s)/m locally in secs. 13 and 14 (T5N/R4W). Within the Milliken and Sarco Creeks ground-water basin the average well yield from the deeper tuffs is similar to the Tulucay Creek basin. Paralleling the eastern foothills from Hagen Road north through Vichy Springs, however, is an area having higher yielding wells with a high degree of variability from well to well. Weaver (1949) described "an uncommonly large yield" from a 305-ft (93-m) well drilled in 1916 in the Vichy Springs area. In 1975, aquifer tests at two sites in this area indicated the storage coefficient of the buried tuffaceous member was 0.00016 (±20 percent). This value is indicative of an average confined aquifer; the storage coefficient of most confined aquifers ranges from 0.00001 to 0.001 (Lohman, 1972).

In both the Tulucay Creek and Milliken and Sarco Creeks ground-water basins the tuffaceous deposits constitute a leaky multilayered aquifer system where the permeable tuffs are separated by irregularly interbedded igneous flows and clay of very low permeability. Consequently the tuff beds that yield water to wells deeper in the sequence are more effectively confined than are the successively shallower tuff beds. Storage coefficients of the deeper tuffs are probably as low as 0.0001, whereas the tuff beds in the upper part of this multilayered sequence probably have storage coefficients of more than 0.001.

Rhyolitic member.--The upper rhyolitic member consists of banded rhyolitic lava with intercalated rhyolitic tuff. Where present it rests uncomformably on the other two members of the Sonoma Volcanics. It is not present in the study area at altitudes below 300 ft (90 m). This member comprises compact, brittle flows of very low permeability. Its tuffs contain perched water that emerges as springs along the eastern hills; open joints and fractures in the lava also yield some water.

Diatomaceous deposits.--The diatomaceous deposits consist of diatomaceous clay and silt deposited in a lake or swamp environment with water-laid ash and pumice. The diatomaceous deposits are of low yield; wells typically have specific capacities less than 1 (gal/min)/ft or 0.2 (L/s)/m. The water is of poor quality and is reported to have high iron and sulfur concentrations (Kunkel and Upson, 1960). Interbedded with these diatomaceous deposits are some permeable, lenticular tuff beds that vary in granularity, thickness, and extent. These beds have higher yields.

The diatomaceous deposits lie principally between the Cup and Saucer ridge area and the eastern hills (fig. 3). The unit is known to be as much as 300 ft (90 m) thick and centered in sec. 6 (T5N/R3W). It thins to the northwest and southeast, forming a surface crescent with less diatomite along the outer fringes. In the central area it rests on the andesitic member; elsewhere it overlies and confines the tuffaceous member.

Sedimentary deposits.--The sedimentary deposits are composed of interbedded, fine-grained yellow silt and clay, tuffaceous sand, and volcanic gravel. This unit was probably deposited as an alluvial fan by streams draining mostly uplifted areas underlain by Sonoma Volcanics. The streams flowed into a basin which may have been closed, at least at times. The lowermost beds of the fan deposits contain considerable tuffaceous material and are interbedded with thin lenses of predominantly pumiceous material; these facts indicate that, locally, deposition began before the last eruptions that produced the Sonoma Volcanics. Kunkel and Upson (1960) referred to these deposits as the Huichica Formation.

The sedimentary deposits are principally in the Milliken Creek area along Atlas Peak Road. They overlie and confine the Sonoma Volcanics. Logs of wells east of the Soda Creek fault indicate a maximum thickness for the deposits of 250 ft (76 m). The deposits thin to the southeast where they overlie the diatomaceous deposits.

In the past, many shallow domestic wells (less than 130 ft or 40 m) tapped water in low-yielding semiconfined lenses of gravel interbedded with the silt and clay. Today, many deeper wells penetrate both the confined lenses of volcanic gravels and the Sonoma tuffs in the lower sedimentary deposits and the underlying tuffaceous member; these wells have moderate yields. Heavy pumping in these deeper wells that tap the more permeable materials causes a gradual lowering of water levels in the overlying materials of tighter composition.

Surficial Deposits and Their Water-Bearing Properties

Generally thin, Quaternary surficial deposits of older alluvium, younger alluvium, and fan deposits mask the Tertiary deposits in parts of the study area (fig. 3). West of the Soda Creek fault the alluvial deposits are considerably thicker and constitute the major aquifer in the Napa Valley to the west.

Older alluvium.--The older alluvium is in the western part of the study area where it overlies the deposits of Tertiary age. It is moderately permeable and yields water freely to wells. Many irrigation wells tap this unit between the Soda Creek fault and the Napa River where it is part of the main alluvial aquifer of the Napa Valley.

Younger alluvium and fan deposits.--The younger alluvium and fan deposits are moderately to highly permeable and where saturated yield water freely under unconfined conditions. These deposits within the study area are principally surficial and are generally above the saturated zone during dry seasons. No wells are known to tap these shallow units except where they are in hydraulic connection with stream channels or where they are recharged by springs along the eastern hills.

Structural Features

Regional faulting has displaced the rocks of the Napa Valley area. East of the study area the volcanic units are truncated by the Green Valley fault zone (fig. 1). From this fault zone the units dip westward toward the central part of the Napa Valley, interrupted by anticlinal and synclinal folding and further faulting.

A fault of hydrologic importance to the study area is the Soda Creek fault. It was described by Weaver (1949) as a normal fault with vertical displacement over 700 ft (210 m) at the north end of Soda Canyon. It extends southward with less vertical displacement as it passes along Soda Creek and becomes concealed beneath alluvial deposits at Milliken Creek (fig. 3). From there it skirts to the west of the Cup and Saucer ridge and extends under Tulucay Creek, parallel with the Napa River. North of Milliken Creek, in secs. 26, 23, and 14 (T6N/R4W), the fault has been mapped from traces of recent tectonic activity indicated by topographic features (Fox and others, 1973).

In the study area, clay derived from the decomposing volcanic minerals is prevalent throughout the three members of the Sonoma Volcanics and in higher concentrations in the two Tertiary sedimentary deposits of the Sonoma Volcanics. This clay limits the permeability of the units. It also contributes to the effectiveness of the Soda Creek fault as a hydrologic barrier. Where a fault has been active for a sufficient period, an impermeable clayey gouge may develop along the fault plane in clay-rich units, particularly in the unconsolidated materials. Also, clay may be produced by the rubbing and mashing of silicate minerals during displacement. The clay gouge seals the sheared edges of the permeable beds and limits permeability across the fault.

The younger surficial deposits of Quaternary age are more likely to be affected by abutment along the Soda Creek fault than by the development of a clay gouge. A fault may cause permeable beds to be displaced and abut less permeable beds or impermeable fault surfaces. As shown in section AA' (fig. 3), the Quaternary alluvium, of moderate to high permeability, abuts the Tertiary sedimentary deposits of low permeability. In section CC' the Quaternary alluvium on the west side of the fault does not necessarily abut a less permeable unit to the east. The older tuffaceous member of the Tertiary Sonoma Volcanics, however, is likely to have developed a clay gouge along its fault surface, against which the Quaternary alluvium abuts.

HYDROLOGY OF THE AREA

Precipitation

Most of the precipitation occurs as rain that falls from October through March. The distribution of this precipitation is affected mostly by topography. Heaviest precipitation occurs in the upper Milliken Creek drainage basin; there is less precipitation in the lower parts of the study area. The lightest recorded precipitation occurs at the Napa State Hospital weather station, where the average annual precipitation was 24.80 in (630 mm) during the base period 1941-70 (National Climatic Center). During an average year the drainage basins, comprising about 43 mi^2 (111 km^2), receive approximately 61,000 acre-ft (75.2 hm^3) of precipitation, based on calculations from regional isohyetal contours (Rantz, 1971) and from records at three precipitation stations (fig. 1).

Annual precipitation and the cumulative departure from average for the Napa State Hospital station are shown in figure 4 for the years 1878 through 1975. It shows that this study was made during an average water year preceded by two above-average years. Compared with the 30-year period 1941-70, a period of equivalent precipitation occurred prior to 1911, followed by a period of lower average precipitation lasting until 1940. These long-term precipitation trends indicate only the total amount of water available for ground-water recharge and for other hydrologic uses over a period of years.

A graph of average monthly precipitation is superimposed on the monthly precipitation for the 1974-75 water year in figure 5 to demonstrate that there are monthly departures even in a year of average annual precipitation. The monthly departures shown are small in relation to those of other years on record. Large monthly departures are common in this area.

In any given year the amount of precipitation may have less direct effect on the recharge of ground water than the duration, intensity, and distribution of the precipitation. Light rains of short duration might add up to a large yearly total but contribute little to ground-water storage. Heavy downpours quickly saturate the surface materials, exceeding infiltration rates, and a high percentage of the precipitation runs off. Regional storms of moderate intensity over many days offer the greatest potential for ground-water recharge. These storms occur principally during the winter months but occasionally during the autumn and spring.

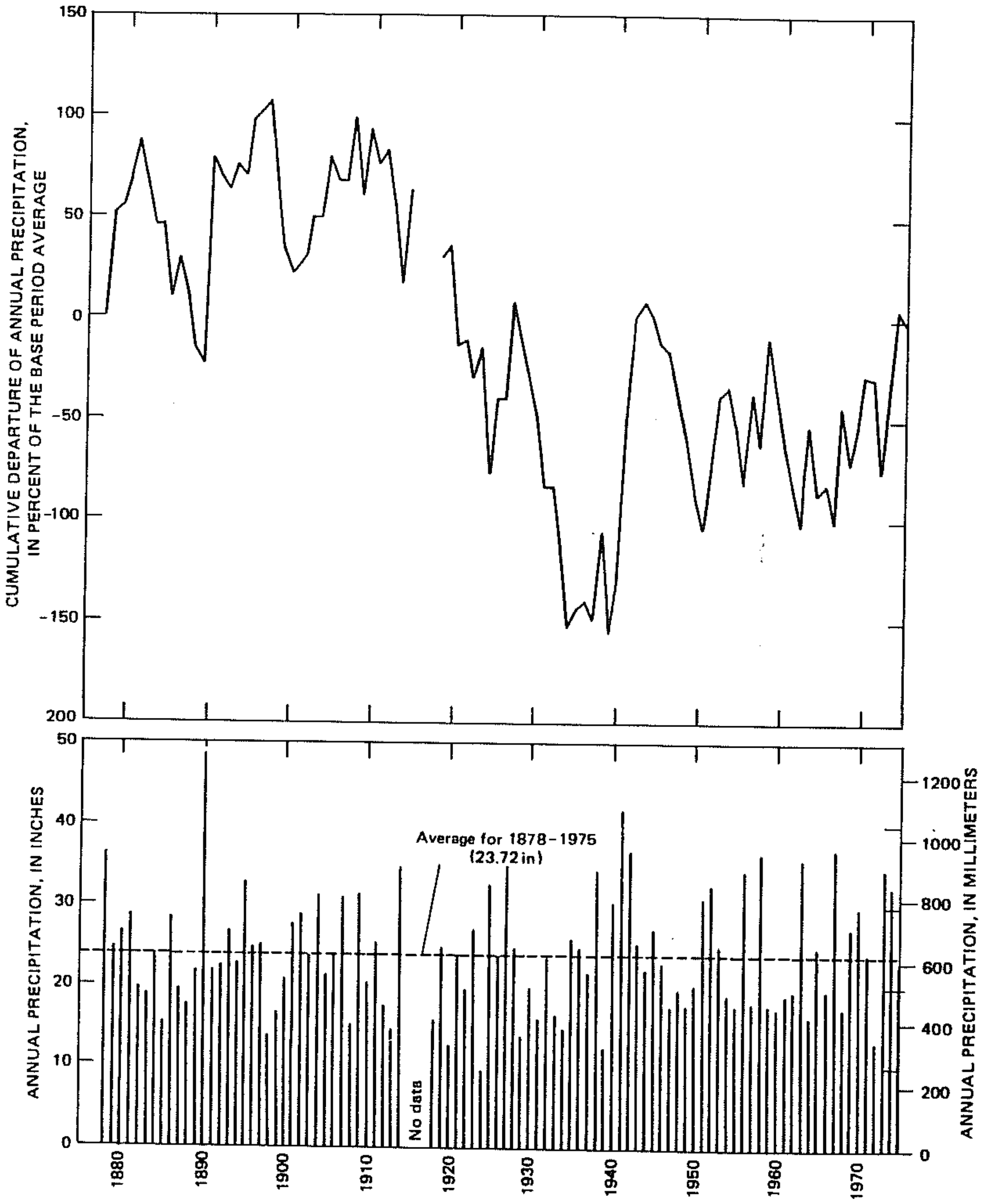


FIGURE 4.--Annual precipitation, 1878-1975, and cumulative departure from average precipitation at Napa State Hospital.

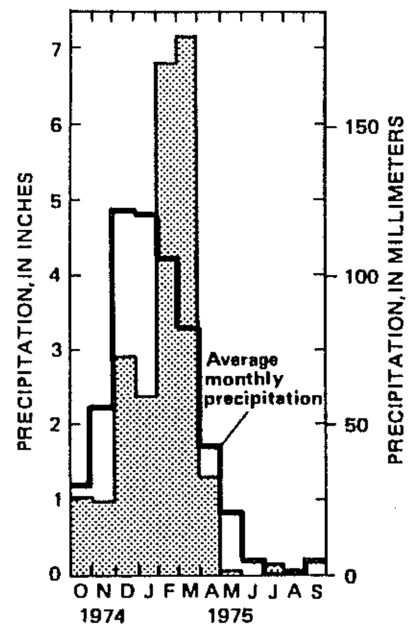


FIGURE 5.--Monthly precipitation at Napa State Hospital, 1975, compared to average monthly precipitation.

Surface Water

The study area is drained principally by Milliken, Sarco, and Tulucay Creeks[1] (fig. 1). The discharge of these creeks is highly variable, but most flow occurs during the winter months. Records obtained since 1970 from stream-gaging stations near the mouths of Milliken and Tulucay Creeks indicate the flashy characteristics of streams draining steep topography. Milliken Creek (at the gaging station) drains an area of 17.3 mi^2 (44.8 km^2) with an average annual discharge during the period 1971-74 of 22.5 ft^3/s (0.6 m^3/s) and a daily discharge rate of as much as 750 ft^3/s (21 m^3/s) with a maximum daily variation of 500 ft^3/s (14 m^3/s) (U.S. Geological Survey, 1970-74). The drainage areas for Tulucay and Sarco Creeks are 12.6 mi^2 (32.6 km^2) and 8.4 mi^2 (21.8 km^2). The flow variations in these smaller streams are similar to Milliken Creek. The estimated total discharge for the three creeks was 4,800 acre-ft (5.0 hm^3) in 1972 and 42,500 acre-ft (52.4 hm^3) in 1973, reflecting a variation in rainfall from 12 in (300 mm) in 1972 to 35 in (890 mm) in 1973 as recorded at the Napa State Hospital (National Climatic Center).

[1]The drainage basins for Milliken and Tulucay Creeks have gaging stations monitoring their discharge. One tributary of Milliken, Sarco Creek's drainage, and surface water flowing directly into the Napa River were not continuously monitored.

During an average year 24,100 acre-ft (29.7 hm^3) of surface water runs off through the study area. A total of 61,000 acre-ft (75.2 hm^3) of rain falls on these drainage basins during an average precipitation year (24.8 in or 630 mm). This means that about 9 in (230 mm) of the precipitation runs off as surface water. In addition, the city of Napa diverts water from Milliken Reservoir. This diverted water has averaged 1,200 acre-ft (1.5 hm^3) per year during the period 1966-75. The city of Napa recently completed the construction of a water-treatment facility at Milliken Reservoir which will permit an annual use of about 2,500 acre-ft (3.1 hm^3) of Milliken Creek water.

Evapotranspiration

The annual loss of water to the atmosphere by evapotranspiration (evaporation and plant transpiration) is difficult to measure in the field, because such variables as vapor pressure, temperature of soil and air, wind, soil type, vegetative cover, soil-moisture, and solar radiation must be monitored. It is common practice to determine evapotranspiration rate by relating the area to a State agroclimatic control station of similar vegetative and soil type where the evapotranspiration has been carefully monitored (California Department of Water Resources, 1975b). To transfer evapotranspiration data, evaporation from class "A" pans is measured at both sites. Pan evaporation reflects the amount of surface water evaporation at a given site, and it thereby indicates the maximum annual evapotranspiration that might occur when an adequate soil-moisture supply is available at all times throughout the year. Correlation factors are derived by comparing "A" pan evaporation rates in the area of interest with those at the control station. Consumptive-use formulas have also been derived (Veihmeyer, 1964), with coefficients to correct for differences in types of vegetation.

Within the study area, application of the Blaney-Criddle equation (Blaney and Hanson, 1965), with a maximum annual consumptive-use coefficient of unity, indicates a maximum annual potential evapotranspiration of 59 in (1,500 mm), a value that agrees with the State's pan evaporation measurements (California Department of Water Resources, 1975b). Actual evapotranspiration would be considerably less. Most evapotranspiration losses occur during periods of minimum precipitation from March through October when temperature, vapor pressure, solar radiation, and plant growth are major factors contributing to water loss. Part of the time from June through September (depending on precipitation patterns), the soil moisture is low, and this considerably reduces evapotranspiration.

The amount of soil-moisture depletion at the end of the dry season can give a realistic figure of actual evapotranspiration in this climatic area. The first rains after the dry season must resupply the depleted soil moisture before appreciable runoff or ground-water recharge can begin. The amount of this initial precipitation is approximately equivalent to the annual evapotranspiration. Therefore, an estimate of actual evapotranspiration may be obtained if the amount of the initial precipitation is determined.

The amount of precipitation needed to saturate the soil at the beginning of the rainy season can be inferred by comparing accumulated precipitation with runoff. The few years of runoff data available, compared with the precipitation data at Napa State Hospital (fig. 6), indicate that about 12 in (300 mm) of initial precipitation is needed before the soil is saturated and the rate of runoff increases appreciably within the study area. Water levels also begin to rise in wells in the unconfined aquifers throughout the study area at the time 10 to 14 in (250 to 350 mm) of precipitation has accumulated at the Napa State Hospital station. Using the precipitation record at the Napa State Hospital to index the commencement of recharge and appreciable runoff, the total evapotranspiration from the drainage basins containing the study area is estimated to be 30,500 acre-ft (37.6 hm^3) per year. This figure does not include any adjustment for initial runoff while soil moisture is being replaced during early rains or for some evapotranspiration between winter storms; these two factors are minimal and possibly cancel each other.

The Blaney-Criddle equation indicates that the annual consumptive-use coefficient would be 0.21 in the study area. This means that the actual evapotranspiration is approximately 21 percent of the maximum A-pan evaporation of 59 in (1,500 mm) for the area.

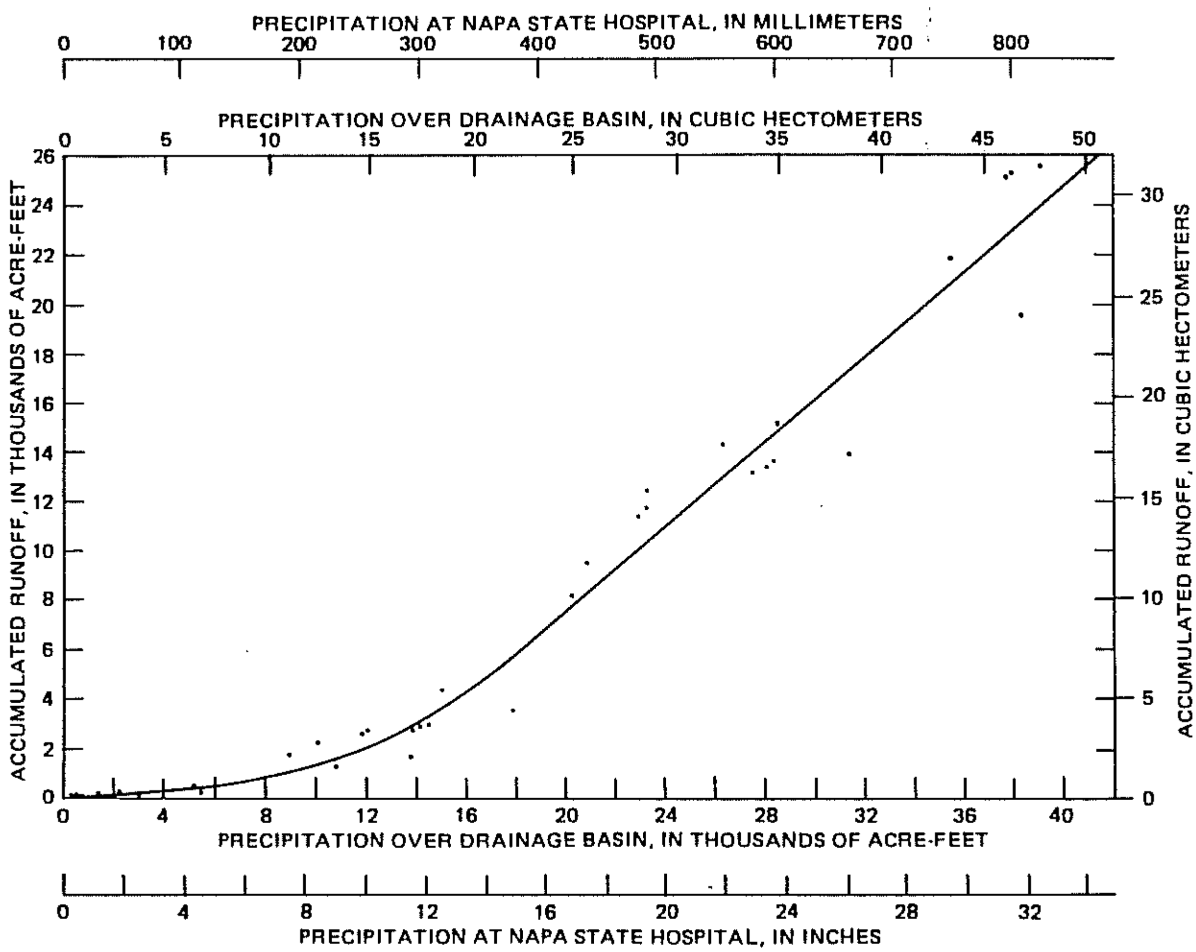


FIGURE 6.--Relation between accumulated runoff and precipitation for Milliken Creek drainage basin based on the average 1971-74 accumulations.

Ground Water

Occurrence

The principal occurrence of ground water in the study area is in the Sonoma tuffs east of the Soda Creek fault, mostly under confined conditions. West of the Soda Creek fault it occurs mainly in the older alluvial material of the Napa Valley, mostly under unconfined conditions.

The depth to water as shown in figures 7 and 8 is the difference between the water-level altitude and the topographic altitude. In general, where topographic altitude is greatest the depth to water is greatest.

The depth to water in the alluvial aquifer between the Napa River and the Soda Creek fault was typically 10 to 30 ft (3 to 9 m) below land surface during the spring of 1975 (fig. 7). In the Sonoma tuffs the depth to water in the Milliken and Sarco Creeks drainage basins during the spring of 1975 was typically 30 to 60 ft (9 to 18 m) below land surface; in the Tulucay Creek drainage basin it was typically 20 to 50 ft (6 to 15 m). In parts of these drainage basins the head is above the land surface. For example, in secs. 14 and 23 (T5N/R4W) unused wells 5N/4W-14P1, 5N/4W-23C1, and 5N/4W-23C2 flow the year around through leaks in their casing seals, and in sec. 13 (T5N/R4W) and sec. 26 (T6N/R4W) some wells, such as 5N/4W-13G and 6N/4W-26L, flow intermittently during the year (fig. 3).

Where the artesian pressure in the Sonoma tuffs is great enough, water penetrates the confining materials as "blowthroughs" or "sand boils" (defined by Ferris and others, 1962). In sec. 13 (T5N/R4W) (fig. 3) the diatomaceous member is penetrated by artesian water and supplies a small pond in the center of the section, while a new excavation just south of this pond has made the confining material incompetent, and observable sand boils have created a new pond.

Movement

The movement of ground water in the study area, as described by Kunkel and Upson (1960) and as indicated by water-level surveys for this report, is generally from areas of replenishment in the east toward areas of discharge in the west. Available evidence indicates that no ground water moves into the study area from farther east than the Green Valley fault zone (fig. 1).

The 1975 spring and autumn ground-water level contours shown in figures 9 and 10 demonstrate the general east to west direction of ground-water movement through the study area east of the Soda Creek fault. Locally the general flow pattern is altered by ground-water pumping centers, and in the hilly central part of the study area some natural ground-water flow is to the north and south into the Milliken and Sarco Creeks and Tulucay Creek basins, respectively. In the main alluvial aquifer of the Napa Valley the ground water moves generally southward, paralleling the Soda Creek fault. The water-level contours for April 1975 (fig. 9) show the composite potentiometric head after the winter rains when water levels are at the maximum for the area and presumably when pumping is minimal. Conversely, the water-level contours for September 1975 (fig. 10) show the composite potentiometric head during low water-level conditions when pumping stress is high. The water-level configurations depicted on the maps are derived from heads measured in wells, some of which are in the shallow unconfined parts of the aquifer system and others are in the deeper confined parts of the system.

The damming effect of the Soda Creek fault cannot be conclusively determined from the spring water-level contours (fig. 9). The autumn water-level contours (fig. 10) show, however, that the geologically active part of the fault serves as a subterranean dam during periods of low water levels, impounding water in the older Tertiary volcanics on the east side of the fault. Pumping along Silverado Trail in secs. 22, 23, 26, 27 (T6N/R4W) is being compensated by subsurface inflow of ground water moving from the north parallel with the fault and from the northwest down the Napa Valley. The difference in water levels across the fault is 20 to 30 ft (6 to 9 m).

In the area of the Milliken and Sarco Creeks basin south of Milliken Creek, water levels indicate ground-water movement across the upper part of the fault in sec. 35 (T6N/R4W). This is confirmed by the hydraulic interaction among wells on both sides of the fault. In response to a large-capacity well west of the fault that was pumping continuously for many days, water levels in deep wells directly east of the fault (sec. 35) dropped about 10 ft (3 m), and some shallow wells east of the fault reportedly went dry. This upper section of the fault in the area from Milliken Creek to the Cup and Saucer coincides with the presence of thick surficial deposits of older alluvium that extend across the fault (fig. 3).

In the Tulucay Creek basin, ground water moves westward across the Soda Creek fault, at least in the upper older alluvium shown in figure 3 (sec. CC'). The fault probably acts as an effective barrier in the lower tuffaceous member, but this has not been confirmed. No deep wells immediately west of the fault are available to monitor artesian head in this member. Immediately east of the fault, deep wells flow the year around. Maintenance of these high heads results, possibly, from the fault serving as a hydraulic barrier. The movement of ground water through the upper older alluvium from the Napa Valley into the Tulucay Creek part of the study area was observed by Kunkel and Upson (1960) when heavy pumping in sec. 14 (T5N/R4W) reversed the direction of flow.

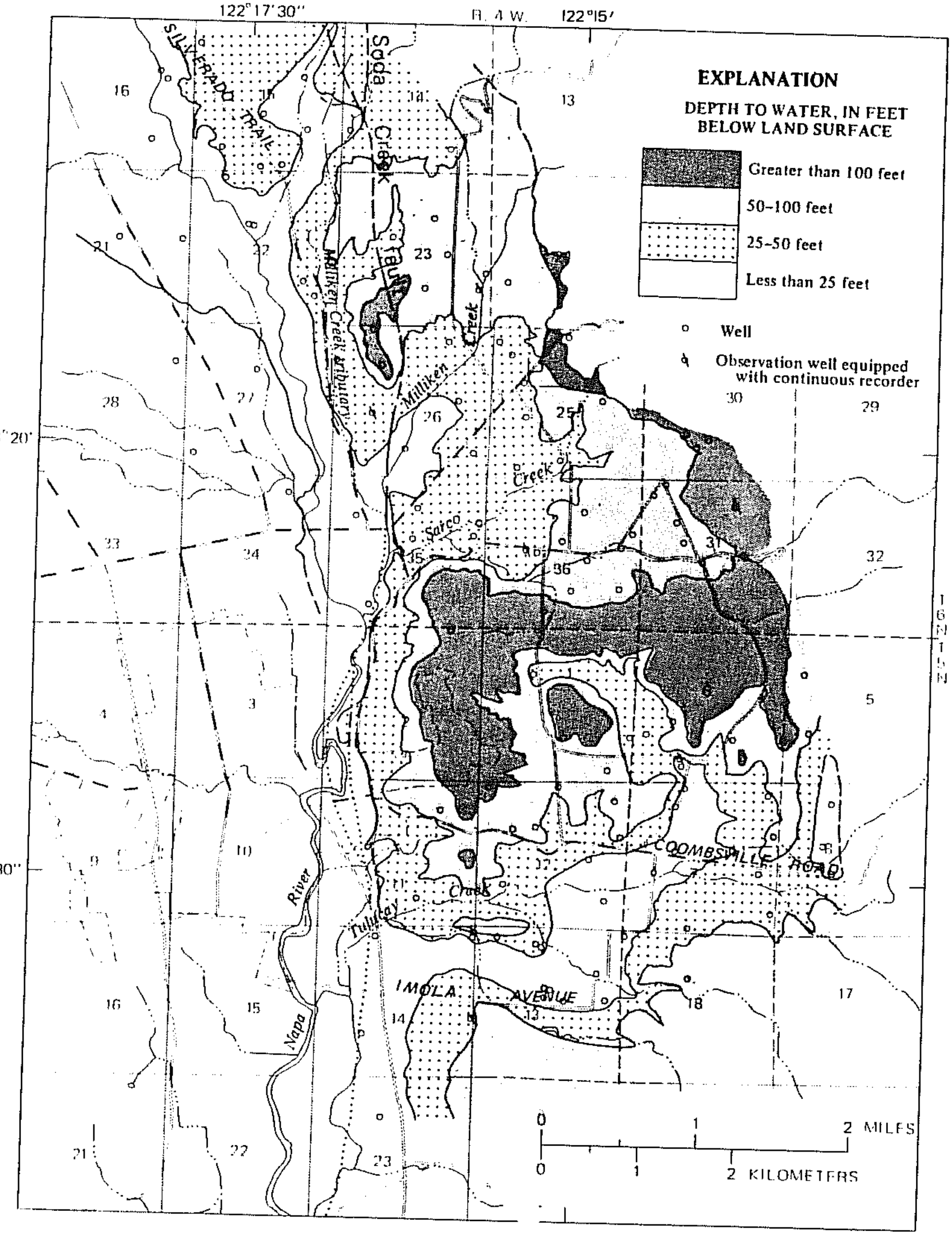


FIGURE 7.--Depth to water, April 1975.

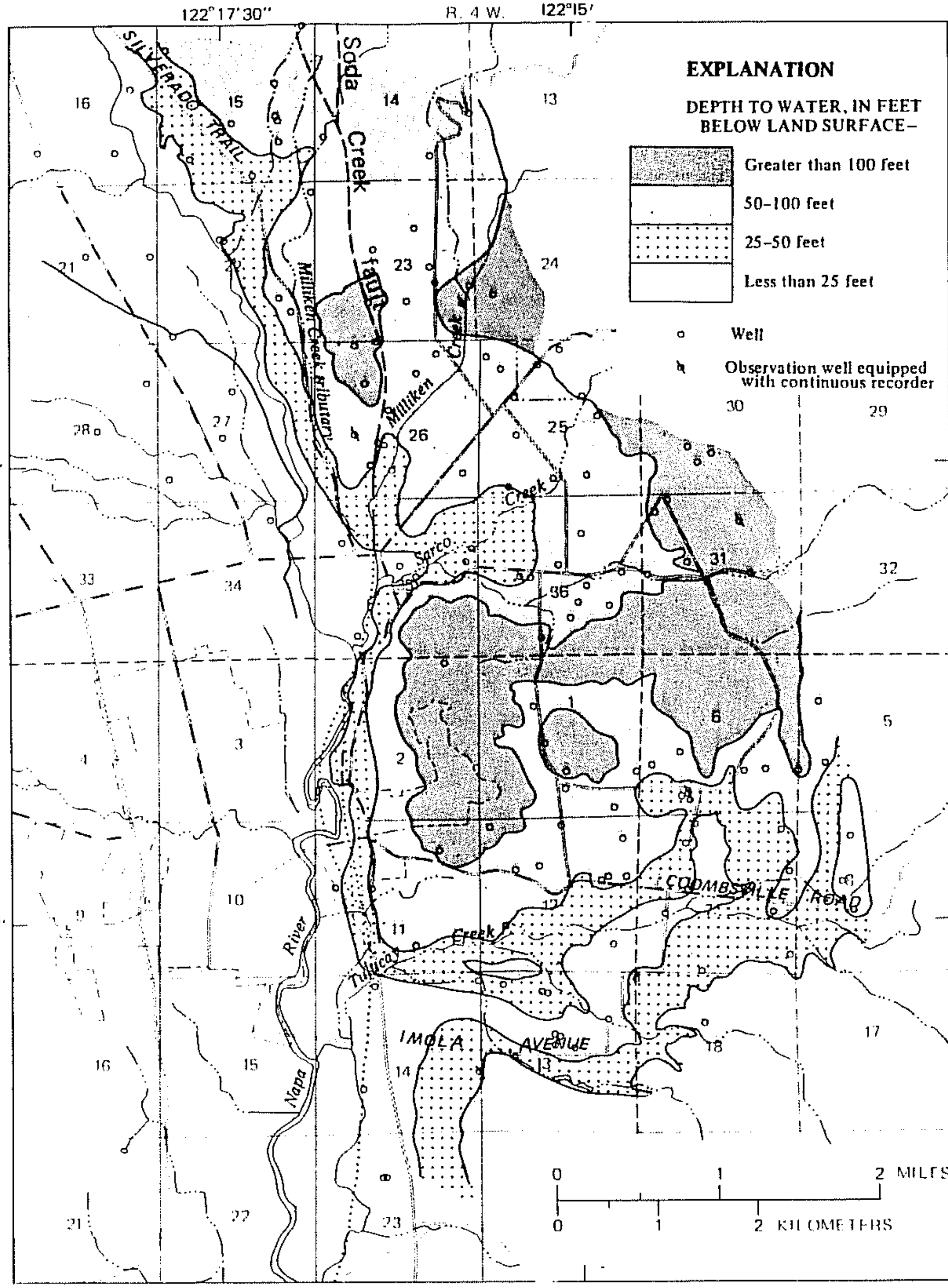


FIGURE 8.--Depth to water, September 1975.

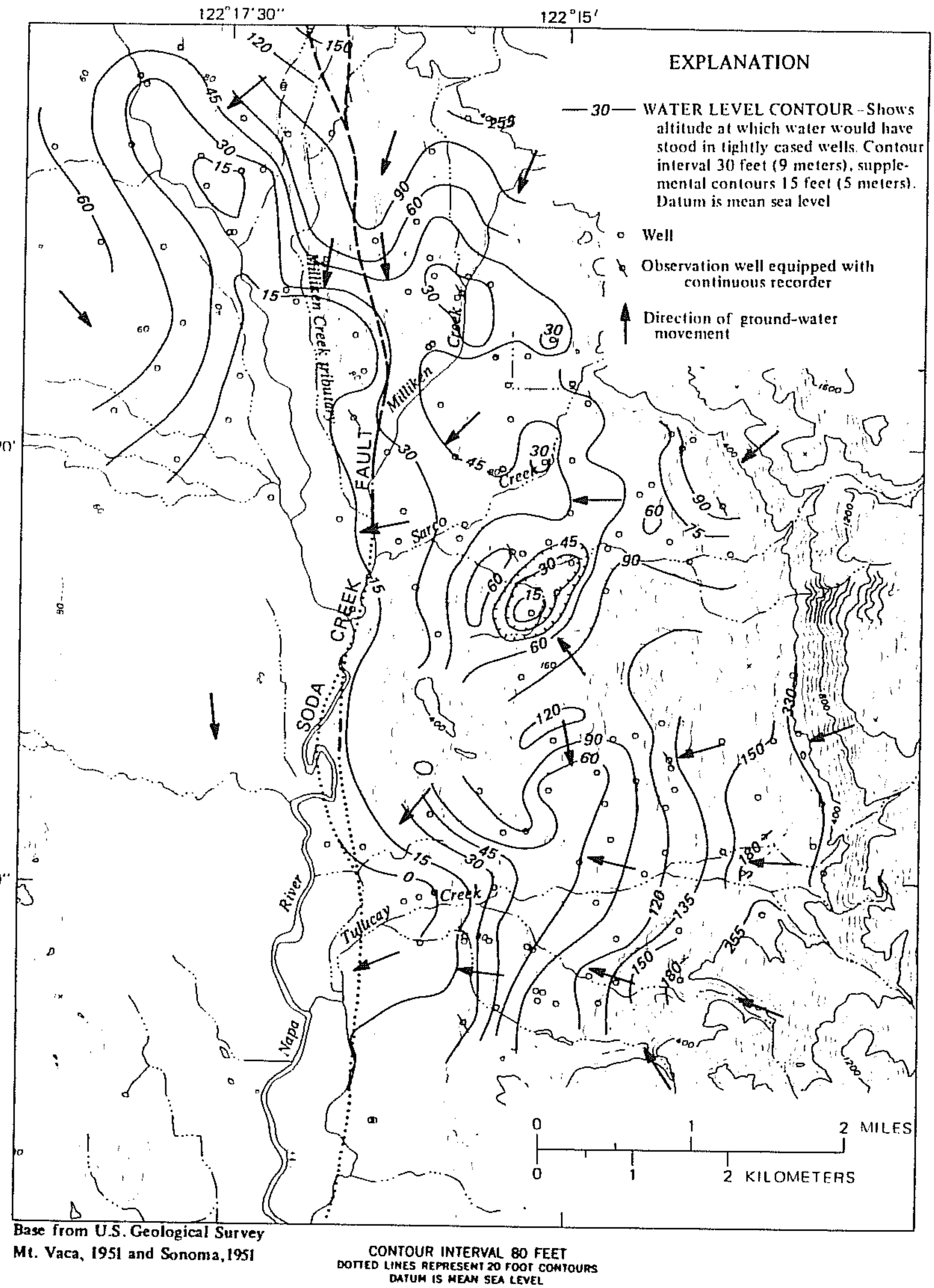


FIGURE 9.--Water-level contours, April 1975.

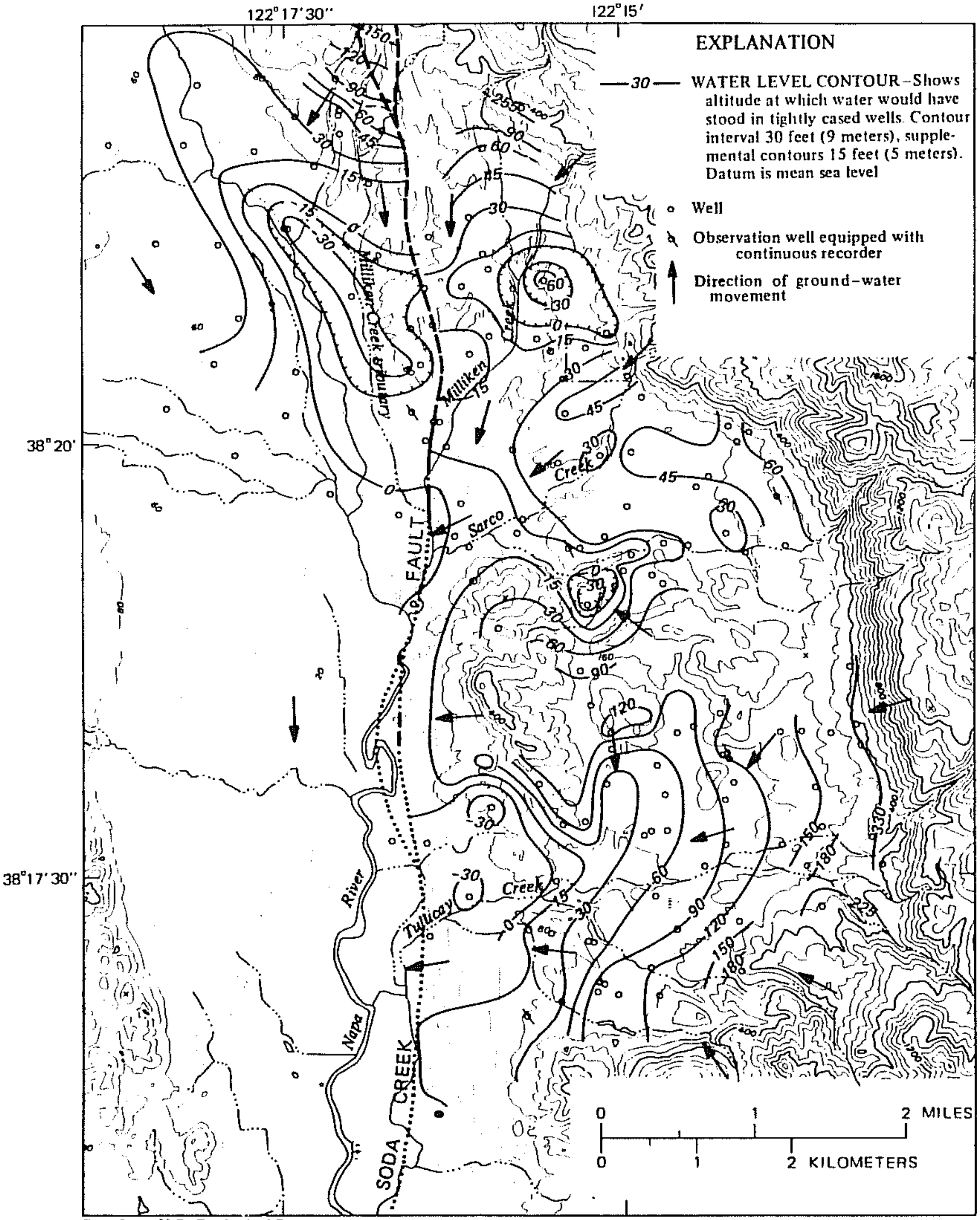


FIGURE 10.--Water-level contours, September 1975.

Recharge

The alluvial aquifer west of the Soda Creek fault is part of the major alluvial aquifer that extends up the Napa Valley where it is recharged by percolation from streams and infiltration of rain. It was described by Faye (1973) and will not be discussed further in this report.

The major source of ground water in the Sonoma tuffs is precipitation over the study area's drainage basins and some underflow from the Wild Horse Valley area (fig. 1). Recharge is supplied to the study area's confined ground-water system by infiltration from streams and by near-surface ground water moving downgradient through tuffs in the eastern hills. Most of this recharge occurs east of the infiltration boundary shown in figure 11. It is derived from precipitation over a 33-mi^2 (55-km) area. At lower altitudes, west of the infiltration boundary, recharge to the shallow unconfined aquifer is from local precipitation. Much of this precipitation is eventually lost to surface drainage and evapotranspiration, although some leaks downward to recharge the upper confined part of the tuffaceous member where pumping has locally reduced the artesian head. In the elevated hilly central area, precipitation infiltrates surface tuffs through which flow is mostly to the alluvial deposits around the base of the hills. However, some of the precipitation in the hilly central area does percolate down through tuffs in the underlying volcanics to ultimately recharge the deeper confined tuffs north and south of the hilly central area. The water level in well 6N/4W-36L2 reacts quickly to this recharge from precipitation in the central area; the majority of wells in the study area react more slowly and uniformly to recharge from the major source area to the east.

The infiltration boundary shown in figure 11 was defined from seepage runs made on the major creeks and tributaries in the study area during the winter, spring, and summer 1975. Significant losses were recorded where Milliken and Sarco Creeks cross tuff outcrops, where tributaries of Sarco and Tulucay Creeks cross the long fan deposit in the eastern part of the study area, and where other tributaries cross the geologic contact between the rhyolitic or andesitic member and the Tertiary deposits (fig. 3). It is estimated that 25,000 linear ft (7,600 m) of streambeds may be infiltration zones along the eastern edge of the study area (fig. 11).

From these infiltration studies and observation of springs and infiltration areas in the eastern hills, it was concluded that where tuffs are exposed or underlie shallow Quaternary deposits the infiltration rate from precipitation and runoff is greatest. In large areas where tuffs are not exposed, joints and fractures in otherwise impermeable rhyolitic and andesitic rock allow water to percolate to underground strata.

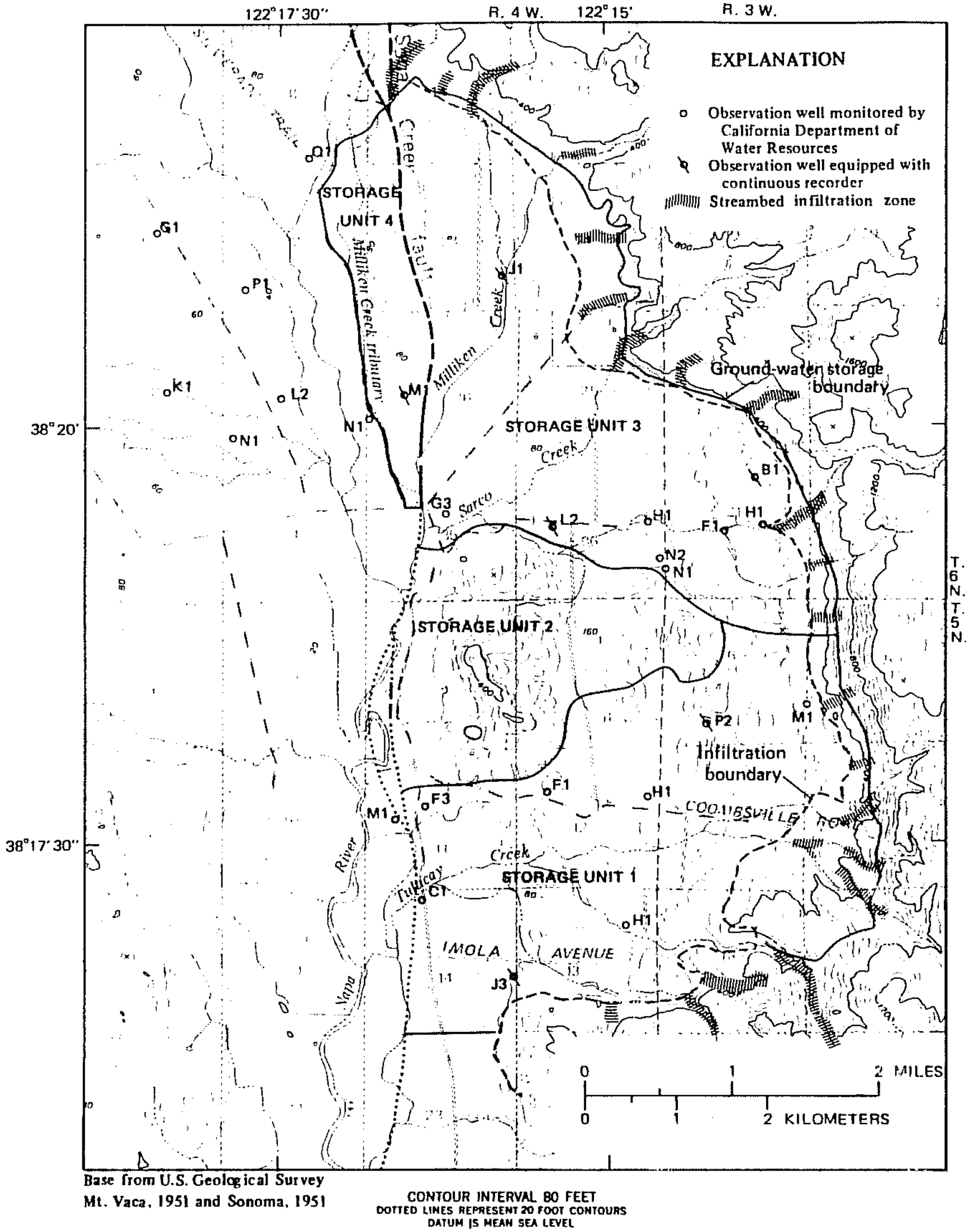


FIGURE 11.--Infiltration boundary, location of observation wells, and ground-water storage units.

The total amount of recharge during an average water year is estimated at 5,400 acre-ft (6.7 hm^3) from stream infiltration, subsurface inflow along the eastern hills, and infiltration at the higher altitudes within the study area. 57% Stream infiltration of 3,050 acre-ft (3.8 hm^3) is based on measured and extrapolated seepage values over stream courses. Subsurface inflow of 39% 2,100 acre-ft (2.6 hm^3) is estimated along the 9.5-mi (15.3-km) eastern boundary of the study area by applying Darcy's law where values of hydraulic 46% gradient are known (averaging 0.1) and transmissivity values are calculated from specific capacities that average between 0.1 and 0.5 (gal/min)/ft or 0.02 and 0.1 (L/s)/m. Infiltration of 250 acre-ft (0.3 hm^3) is from precipitation estimated to percolate into the elevated tuffs in the central area. Of the estimated 5,400 acre-ft (6.7 hm^3) of recharge, about 3,000 acre-ft (3.8 hm^3) supplies the Milliken and Sarco Creeks drainage area and the remaining 2,400 acre-ft (2.9 hm^3) supplies the Tulucay Creek drainage area.

This ground-water recharge figure is in close agreement with estimates based on precipitation minus surface runoff, water diverted out of the study area, and evapotranspiration. It is about one-half of L. H. Haeki's original estimate in 1918 (Clark, 1919) of inflow to the basin from the 33-mi^2 (85-km^2) source area east of the infiltration boundary. Haeki's estimate was made on limited hydrologic data when the basin was in an early stage of development.

Discharge

Natural discharge across the Soda Creek fault into the alluvial aquifer of the Napa Valley is known to occur principally where the upper surficial deposits cross the Soda Creek fault and when water levels (or potentiometric heads) are higher than the base of these deposits. Based on the geology, Darcy's law, and water-level gradients, the average annual natural discharge into the Napa Valley is estimated to be 2,650 acre-ft (3.3 hm^3), under 1975 pumping conditions.

Before wells were drilled, the ground-water basin was in equilibrium. The average annual inflow (recharge) to the basin was balanced by the average annual outflow (discharge). Except for seasonal fluctuations which caused changes in artesian pressure, the total volume of water in storage was virtually stable over many years.

Under present conditions, discharge is the sum of natural discharge and the amount of water pumped by wells. An estimated 3,000 acre-ft (3.7 hm^3) of water is pumped each year from the ground-water basin in the study area and used for irrigation and domestic purposes. This pumpage results in a decrease in natural discharge, a reduction in the quantity of water in storage as indicated by long-term water-level declines, and a potential increase in recharge owing to reduction in evapotranspiration and rejected recharge. Recharge could increase because storage now remains deficient throughout more of the wet season. This is particularly true in the Milliken and Sarco Creeks area where storage remains below its 1918 value throughout the year.

Irrigation pumpage was calculated from power records for the years 1966-75 (table 1). It was computed from the total electrical energy used for pumping water and the electrical energy required to pump a unit volume of water. Data on the electrical energy used for pumping were obtained from metered accounts of the Pacific Gas and Electric Co. The electrical energy required to pump a unit volume of water was computed from pump efficiency tests made by the same company.

During the period 1968-75, irrigation pumpage in the study area remained fairly constant--about 2,000 acre-ft/yr (2.5 hm^3/yr). Most of the water is pumped from May through October. Pumpage in the part of the study area between the Soda Creek fault and the Napa River (fig. 3), along Silverado Trail, has increased as vineyard cultivation increased. Pumpage for this purpose represents only a small part of the ground water that is being removed from the Napa Valley alluvial aquifer as a whole. About two-thirds of the irrigation pumpage in the study area is from the lower drainage basins of Milliken and Sarco Creeks. Prior to 1968, irrigation pumpage within the study area was considerably less than 2,000 acre-ft/yr (2.5 hm^2/yr).

TABLE 1.--*Irrigation pumpage in the study area, 1966-75*

Year	Pumpage (acre-ft per year)
1966	976
1967	1,606
1968	1,907
1969	1,907
1970	2,079
1971	2,348
1972	1,902
1973	2,190
1974	2,199
1975	1,808

During the period 1968-75, domestic pumpage undoubtedly increased. Although no figures on domestic pumpage are available for 1975 it was estimated to be 1,100 acre-ft (1.4 hm^3) based on the number of dwellings using ground water, the city of Napa's 1973 population estimate of 2.94 persons per dwelling, and a per capita usage of 150 gal/d (570 L/d). County building permits indicate housing starts peaked in the study area during 1973. Water-well permits recorded with the County Health Department also peaked in that year. Domestic demand for ground water is stabilizing largely owing to zoning laws which have increased minimum lot size and permitted fewer homes to be built on available land.

Water-Level Fluctuations

Water-level fluctuations in the study area indicate the continuous adjustment of ground water in storage to changes in recharge and discharge. The amount of ground water in storage changes seasonally, from spring high to autumn low, and it can also change from year to year. Seasonal changes within the area are monitored by water-level measurements obtained during the spring high and the autumn low periods. Timing of the seasonal water-level measurements is determined by daily monitoring. Long-term trends are monitored by measurements of water levels over many years. The long-term trends reflect the recharge-discharge balance.

Seasonal changes.--Seasonal fluctuations in water levels in the study area can be calculated from the water-level contour maps for 1975 (figs. 8 and 9). The maps are based on measurements of 145 wells. The timing of these measurements was determined from the continuous water-level recorders on six observation wells (fig. 11) of various depths and tapping different geologic formations. Hydrographs for three of these wells (fig. 12) show the yearly cycle with a peak at the end of the wet season and a low late in the dry season. The maximum seasonal fluctuation was 60 ft (18 m) at well 6N/4W-23J1 (at the Silverado Country Club) and the minimum seasonal fluctuation was 3 ft (1 m) at well 5N/4W-14J3 (at the Napa State Hospital). These seasonal fluctuations are determined from daily high water levels.

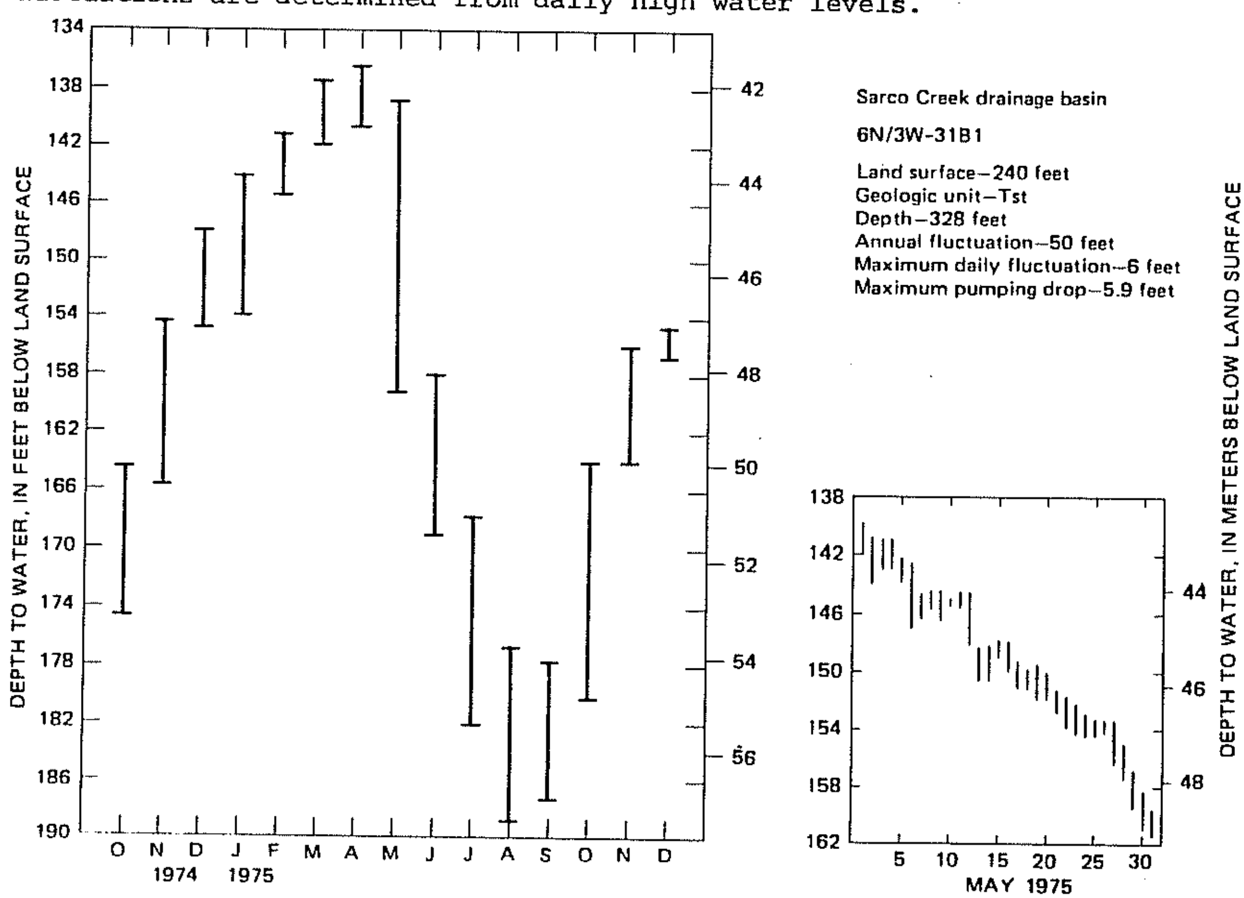
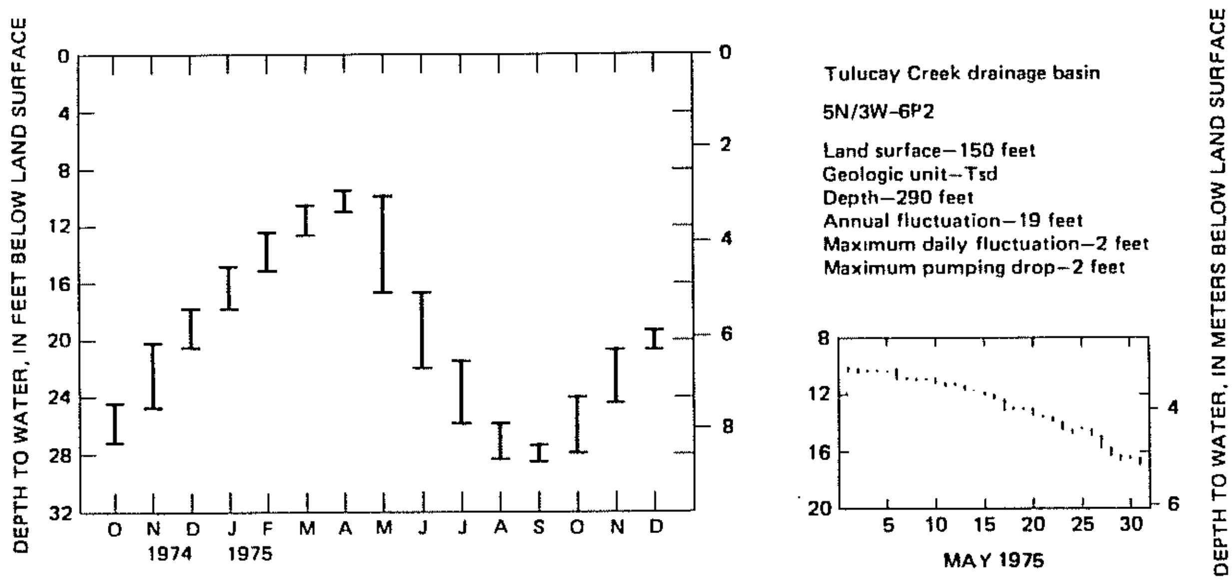


FIGURE 12.--Water-level fluctuations in three wells.



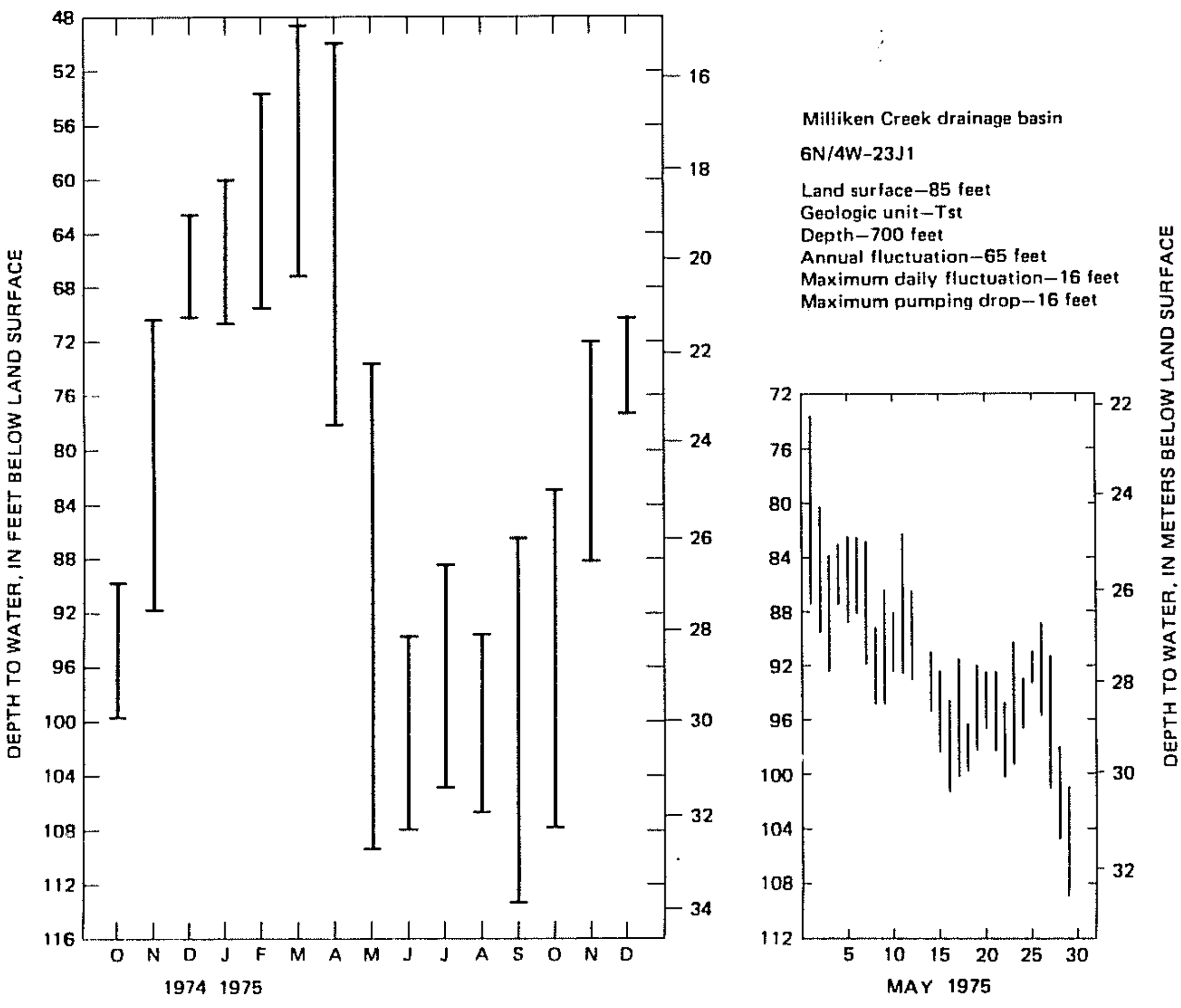
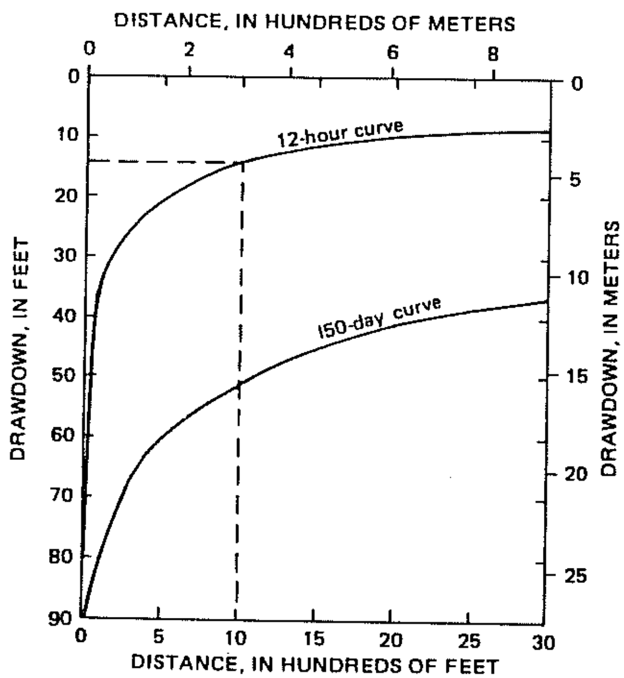


FIGURE 12.--Water-level fluctuations in three wells--Continued.

In the Milliken and Sarco Creeks area east of the Soda Creek fault, the average fluctuation was 24 ft (7.3 m), ranging from 5 to 60 ft (1.5 to 18 m). In the Napa River drainage area west of the fault, the average fluctuation was 27 ft (8.8 m), ranging from 5 to 50 ft (1.5 to 15 m). In the Tulucay Creek area, the average fluctuation was 14 ft (4.3 m); fluctuation in the northwestern and northeastern parts reached 30 ft (9.1 m), while in the southwestern part it was as little as 3 ft (1 m).

Besides seasonal fluctuations within the study area, water levels fluctuate daily, reacting to changes in barometric pressure and to pumping in the area. Observation wells in the tighter Tertiary sediments of the Sonoma Volcanics showed the least daily fluctuations in water levels (2 ft or 0.6 m) resulting from pumping in the area. Water levels in observation wells in the more permeable Sonoma tuff had greater daily variations (6 ft or 1.8 m). The water level in an observation well is influenced by the properties of the water-bearing materials, the rate and duration of pumping in nearby wells, and their distance from the observation well. One observation well (6N/4W-23J1) near a high-capacity well (both in the Sonoma tuffs) had a maximum 1-day fluctuation of 16 ft (4.9 m). Figure 13 shows how this fluctuation in the observation well could be caused by a nearby pumping well.



Drawdown curve based on Theis nonequilibrium formula (Johnson, 1972) and the following assumptions:

1. No water immediately available for recharge, and pumpage is from storage
2. Single well is pumped continuously for 12 hours at a rate of 750 gal/min (47L/s)
3. Transmissivity is 2,600 ft^3/d (240 m^3/d)
4. Storage coefficient of aquifer is 0.00016
5. Aquifer boundary is 3,000 ft (900 m) from pumping well

Continuous pumping for 150 days, for example from May 1 to October 1, would cause a maximum decline of 52 ft (16 m) at a distance of 1,000 ft (300 m), or less than four times that of the 12-hour pumping curve

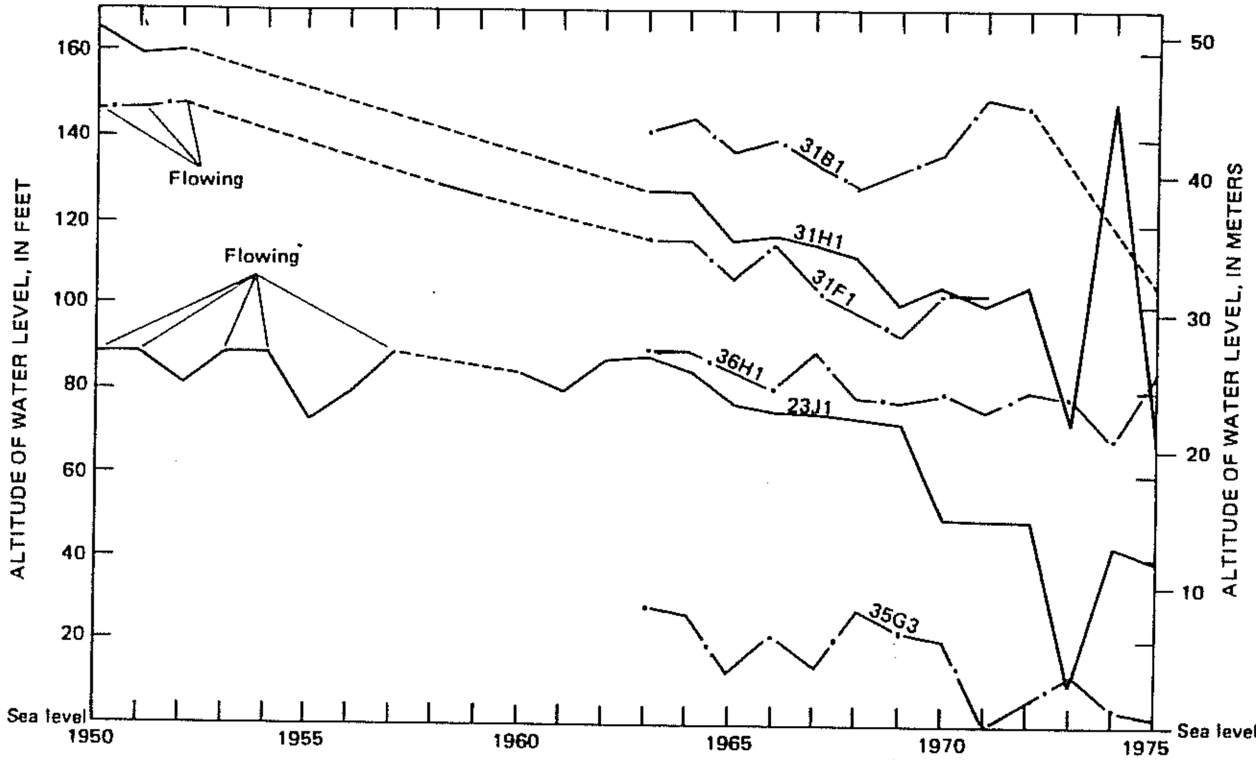
FIGURE 13.--Drawdown curve for high-capacity well in the Sonoma tuffs.

Long-term changes.--Information on long-term trends is available from observation wells (located in fig. 11) monitored by the State, principally during the spring of each year. The California Department of Water Resources (1975a) has monitored springtime water levels in the study area since the early 1960's; a few records go back to the early 1950's. These water levels may not show the spring peak; daily monitoring is needed as a control to determine accurately and consistently the spring peak water levels. For two of these wells (6N/3W-31B1 and 6N/4W-23J1), continuous hydrographs during 1975 (fig. 12) show how a steep drop in water levels after rains stop, coupled with daily pumping variations, affect annual spring measurements.

Figure 14 shows the spring water levels from 1950 through 1975 in six wells monitored by the Department of Water Resources in the Milliken and Sarco Creeks area. These water levels indicate a downward trend, between 1960 and 1975, of 2 to 4 ft/yr (0.6 to 1.2 m/yr) in general. As most of these wells are located near heavy drawdown zones (compare figs. 10 and 11), these water-level declines are not representative of the entire Milliken and Sarco Creeks area. Figure 10 indicates that water-level declines near Sarco Creek (between Hagen and Monticello Roads) and over most of the Milliken and Sarco Creeks area outside the deeper pumping cones are similar to those shown for wells 6N/4W-36H1 and 6N/4W-35G3. These wells showed declines, from 1963 through 1975, of about 1.5 ft/yr (0.6 m/yr).

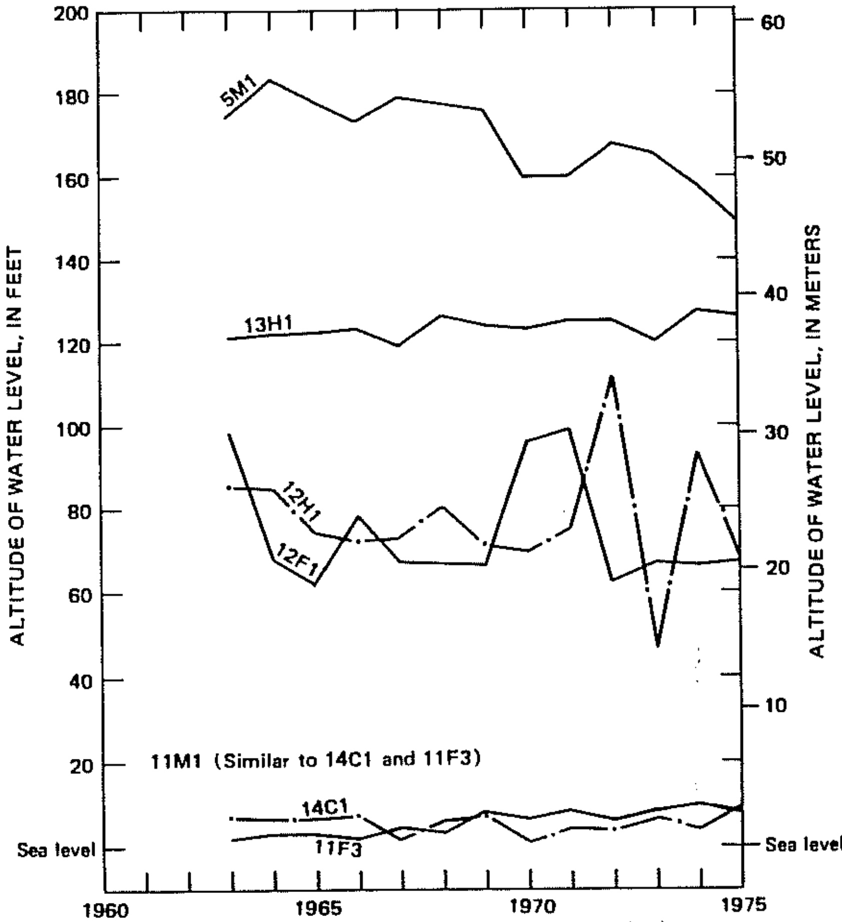
In the Tulucay Creek area, water levels monitored by the Department of Water Resources from 1963 through 1975 (fig. 15) generally show only slight recovery or loss. Only one well (5N/3W-5M1) monitored by the State, in the northeastern part of the area, showed a downward trend. Water levels in the southwestern part of the area have continued to rise since heavy pumping was curtailed in 1949 (U.S. Bureau of Reclamation, 1972). The water level in a well at Napa State Hospital (5N/4W-23C1) was more than 100 ft (30 m) below land surface in May 1932 (Bryan, 1932). In 1960 the water level was within 30 ft (9 m) of land surface (U.S. Bureau of Reclamation, 1972). In 1975 water was flowing through its partly sealed casing throughout the year. Another unused well (5N/4W-14P1) was also flowing. Well 5N/4W-14J3 recorded a depth to water of 116 ft (35.4 m) in December 1949 (Kunkel and Upson, 1960). In May 1975 the depth to water was 52 ft (16 m), comparable to the 56-ft (17-m) depth measured in May 1918.

In summary, long-term changes indicate a decline in water levels throughout the Milliken and Sarco Creeks area and a gradual depletion in ground-water storage. The declines from 1960 through 1975 averaged 15-30 ft or about 1.5 ft/yr (0.5 m/yr); overall declines in the area since 1918 may be 45-60 ft (14-18 m). In the Tulucay Creek area, water levels in the large central section fluctuate, but there has been no definite trend since 1963. Water levels in the southwestern section have risen, possibly to the 1918 levels. In the northeastern section, water levels downgradient from well 5N/3W-5M1 have declined in response to a new distribution of wells in the area, but water levels may be stabilizing.



Well number	Altitude of land surface (feet)	Depth of well (feet)
6N/3W-31B1	240.0	328
6N/4W-23J1	87.5	700
6N/4W-35G3	38.0	260
6N/3W-31H1	180.0	330
6N/3W-31F1	145.0	465
6N/4W-36H1	105.0	525

FIGURE 14.--Spring ground-water levels in six wells in the Milliken and Sarco Creeks area, 1950-75.



Well number	Altitude of land surface (feet)	Depth of well (feet)
5N/3W-5M1	255.0	117
5N/4W-13H1	132.0	364
5N/4W-12H1	121.0	478
5N/4W-12F1	130.0	203
5N/4W-14C1	17.0	220
5N/4W-11F3	16.0	165
5N/4W-11M1	13.0	58

FIGURE 15.--Spring ground-water levels in seven wells in the Tulucay Creek area, 1960-75.

Ground-Water Storage Capacity

The ground-water storage capacity is the total quantity of water in underground storage available for extraction. The amount of this storage that can be removed economically is termed the usable ground-water storage capacity (Poland and others, 1951, p. 621).

In an unconfined aquifer the storage capacity depends on the total volume of material that is or can be saturated and the material's specific yield--the ratio of the volume of water which can be drained by gravity to a unit volume of the saturated material. In a confined aquifer, storage capacity also depends on pressure, or head. The water stored in a confined aquifer increases slightly with an increase in head, but this accounts for only a small part of the aquifer's storage capacity. When pumping water from a confined aquifer, the head must be lowered below the base of the confining layer before dewatering of the aquifer can begin. Dewatering is necessary in order to withdraw the major part of the water available from storage in the confined aquifer. This part of the storage capacity of a confined aquifer depends on the same factors as does the storage capacity of an unconfined aquifer.

In calculating the ground-water storage capacity, it was not feasible to make field determinations of specific yield for the water-bearing materials; therefore, an estimated value for specific yield was assigned to lithologic units reported on drillers' logs. This relation of specific-yield values to drillers' terms is based on a San Joaquin Valley investigation (Davis and others, 1959) and on a previous Napa Valley investigation (Kunkel and Upson, 1960).

The study area was divided into four storage units (fig. 11). Unit 1 is the major part of the lower Tulucay Creek drainage basin, bounded on the west by the Soda Creek fault; unit 2 is the central hilly area with elevated tuffs that lies between the adjacent lowlands; unit 3 is the lower drainage basins of Milliken and Sarco Creeks east of the Soda Creek fault; and unit 4 is a small part of the Napa Valley that lies within the study area.

In estimating the specific yield for each depth interval, the storage units were subdivided into smaller zones of approximately 160 acres (65 hm^2). Well logs were then grouped and an average specific-yield value assigned by depth to each zone, thereby minimizing the effect on the unit of improper weighting of clustered wells.

Table 2 shows the number of well logs used in the calculation of the average specific yield, the amount of material classified, and the average specific yield for each depth interval. Sufficient data were available only to project specific-yield estimates to 500 ft (150 m), even though some wells penetrate to depths of 600-700 ft (180-210 m). Most new wells are being drilled to 150-500 ft (45-150 m); this constitutes the major zone of usable water.

TABLE 2.--*Average specific yield for selected depth intervals*

[Well footage, in feet; specific yield, in percent]

Ground-water storage unit	Depth intervals						Number of logs in unit
	10-50	50-100	100-200	200-300	300-400	400-500	
Unit 1							
Well footage	4,036	4,870	5,093	2,596	1,172	493	105
Average specific yield	4.3	4.7	4.4	5.2	5.2	3.7	
Unit 2							
Well footage	1,014	1,135	1,854	1,063	310	110	24
Average specific yield	2.2	1.9	2.8	3.7	3.6	3.3	
Unit 3							
Well footage	2,875	3,335	5,394	3,219	1,658	903	71
Average specific yield	5.4	4.0	4.3	4.6	4.6	4.0	
Unit 4							
Well footage	772	983	961	296	198	100	17
Average specific yield	5.0	4.9	4.8	5.3	4.8	5.2	

The storage capacity of each unit was estimated by multiplying the acreage, as determined by a planimeter, by the saturated thickness of the depth zone, times the specific yield. Table 3 shows the estimated storage capacities computed for the four units.

The storage shown in table 3 represents the volume of water stored in the 9,910-acre (4,010 hm^2) study area to a depth of 500 ft (150 m) when the material is saturated to within 10 ft (3 m) of the surface. By dividing the total volume of material (4,561,000 acre-ft or 5,624 hm^3) into the storage capacity (195,800 acre-ft or 241 hm^3 of water) an overall specific yield of 4.3 percent is obtained for the study area. This value is low when compared with the alluvial aquifer in the Napa Valley which has an average specific yield of 6 percent with values ranging from 25 percent for gravel to 3 percent for clay.

The accuracy of this method depends on an interpretation of the various drillers' descriptions of the lithology and on the quantity of data available. For example, the 100-200 ft (30-60 m) depth interval for storage unit 3 had the greatest well footage interpreted (5,394 ft or 1,644 m), but this is equivalent to only 54 wells completely penetrating the 100-200 ft (30-60 m) depth interval over an area of 3,584 acres (1,430 hm^2)--or one well every 66 acres (27 hm^2).

TABLE 3.--*Estimated ground-water storage capacity for*

[Volume, in acre-feet; storage capacity, in acre-feet

Ground-water storage unit (surface area, in acres)		Ground-water storage capacity					
		10-50		50-100		100-200	
		Volume	Storage	Volume	Storage	Volume	Storage
Unit 1	(3,873)	155,000	6,600	188,000	8,800	372,000	16,300
Unit 2	(1,638)	65,000	1,400	82,000	1,500	164,000	4,500
Unit 3	(3,584)	143,000	7,700	174,000	6,900	344,000	14,700
Unit 4	(815)	33,000	1,600	41,000	2,000	82,000	3,900
Totals	(9,910)	396,000	17,300	485,000	19,200	962,000	39,400

Total volume 4,561,000 acre-feet.
Average specific yield 4.3 percent.

Usable Ground-Water Storage Capacity

The ground-water storage capacity (based on unconfined conditions) shown in table 3 together with the relatively small amount of storage capacity resulting from confining pressure represents the total storage capacity of the study area. The usable ground-water storage capacity is considerably less. Of the water in the pore spaces which can be pumped, not all will be removed, owing to physical and economic limitations. Well spacing and depth are not uniform over the area, nor is it practical to try to dewater the saturated material to a depth of 500 ft (150 m).

Based on previous estimates of storage capacity in the younger, shallower alluvium of the Napa Valley (Kunkel and Upson, 1960; U.S. Bureau of Reclamation, 1972) and estimates of its usable storage (Faye, 1972; U.S. Bureau of Reclamation, 1972), the usable storage in the older, deeper Sonoma Volcanics is probably less than 20,000 acre-ft (25 hm^3), or 10 percent of the ground-water storage capacity to a depth of 500 ft (150 m). Extracting this much water during the dry season would lower water levels considerably below sea level in many areas.

saturated material, based on unconfined conditions adjusted for specific yield from table 2]

for indicated depth zones						Storage
200-300		300-400		400-500		
Volume	Storage	Volume	Storage	Volume	Storage	
356,000	18,500	341,000	17,700	325,000	12,000	79,900
164,000	6,000	163,000	5,800	163,000	5,300	24,500
333,000	15,300	319,000	14,600	308,000	12,300	71,500
82,000	4,300	82,000	3,900	82,000	4,200	19,900
935,000	44,100	905,000	42,000	878,000	33,800	195,800

Changes in Ground-Water Storage

Seasonal changes in the quantities of ground water in storage occur owing to removal of water from both the upper unconfined and underlying confined parts of the system. In the confined part water removal reflected by reduced pressure was about 350 acre-ft (0.4 hm^3) for 1975, based on artesian head losses, estimated storage coefficients, and areal extent of the aquifer. Estimated changes in storage in the upper unconfined parts of the system are shown in table 4 for each of the storage units. The estimated total quantity of ground water removed in 1975 by dewatering the unconfined aquifers, partly by leakage into the underlying confined aquifers, is about 6,600 acre-ft (8.1 hm^3). This estimate is based on the difference in storage between the spring high and autumn low water levels and the specific-yield values in table 2. The seasonal change in the quantity of ground water in storage in 1975 was about one-third the estimated usable ground-water storage capacity.

A comparison with pumpage estimates for 1975 indicates that less than one-half the change in storage, or 3,000 acre-ft (3.7 hm^3), was pumpage. Less than 30 percent of the water removed from storage in unit 1 was pumpage, but pumpage accounts for about 70 percent of that removed from unit 3. For the study area as a whole, annual pumpage of about 3,000 acre-ft (3.7 hm^3) is an appreciable part of the annual change in storage.

TABLE 4.--*Seasonal change in ground-water storage, 1975*

[Storage, in acre-feet]

Ground-water storage unit	Ground-water storage above sea level		Annual change in storage
	Spring	Autumn	
Unit 1	18,200	16,200	2,000
[1]Unit 2	3,000	2,500	500
Unit 3	9,770	6,970	2,800
Unit 4	1,550	260	1,290
Totals	32,520	25,930	6,590

[1]Estimates based on few data.

As pumpage increases, its effect on long-term changes in ground-water storage is moderated by a consequent reduction in natural ground-water discharge to the west through the upper unconfined deposits. This reduction will continue, but ultimately natural ground-water discharge can be reduced no further. Continued increase in pumping will then tend to deplete the storage units, with consequent further declines in water levels. In storage unit 1 (Tulucay Creek area), water levels for the period 1966-75 indicate no significant change; some areas have declined and others have recovered. In storage unit 3 (Milliken and Sarco Creeks area) the lowering of water levels from year to year indicates gradual depletion of the aquifer in that area.

To deplete the 20,000 acre-ft (25 hm^3) of usable ground water in storage, assuming normal recharge-discharge conditions and a uniform distribution of wells throughout the study area, it would be necessary to pump at double the 1975 rate for the 8-year period 1976-83. With natural discharge but no recharge to the ground-water system, the 1975 pumpage rate could theoretically be maintained for about 6 years. However, with the unequal distribution of pumpage over the study area, the period for sustained pumpage without recharge would be much less in heavily pumped localities.

In the lower drainage basins of Milliken and Sarco Creeks (storage unit 3) the average water-level decline of 1.5 ft/yr (0.46 m/yr) may represent a reduction of 250 acre-ft (0.31 hm^3) of water per year in storage. At the 1975 pumping rate in storage unit 3, and with normal recharge, it might take 30 years to deplete the 7,000 acre-ft (8.6 hm^3) of water in usable storage. Without recharge, pumpage in storage unit 3 could be continued at the 1975 rate for 2 or possibly 3 years, depending on well distribution and depth.

CONCLUSIONS

The quantity of ground water available in the study area depends on three main factors--the specific yield of the reservoir material, the size of the reservoir, and recharge to the reservoir. Any one of these factors could limit the available supply of ground water. If the materials composing the reservoir are fine grained, poorly sorted, or cemented they may not transmit water at a sufficiently rapid rate to supply it in quantity. If the reservoir is small it may be depleted rapidly by pumping unless there is continuous recharge at a rate equal to the rate of withdrawal. If recharge is less than withdrawal, the supply will not be replenished in full, and water levels will decline even though the yield may be large when the reservoir is first tapped.

The specific yield of materials in the lower Milliken-Sarco-Tulucay Creeks area is highly variable even within the same geologic unit. The predominance of fine sediments and impermeable rubble cemented by clay severely limits the yield of many wells, while a few permeable zones permit high yields for limited periods of time. The average well has a specific capacity of less than 3 (gal/min)/ft or 0.6 (L/s)/m of drawdown. The porosity distribution within the different geologic units indicates an overall average specific yield of about 4 percent over the study area under unconfined conditions--2 percent less than the average specific yield of the alluvial deposits in the main Napa Valley. Geologic formations in the study area are less homogeneous and permeabilities are lower than in the Napa Valley; these are major factors limiting individual well yields.

The size of the reservoir is more than adequate for the 3,000 acre-ft (3.7 hm^3) of water pumped annually. Well logs indicate the occurrence of water-bearing formations generally to a depth of 500 ft (150 m) over the study area with a storage capacity of 196,000 acre-ft (242 hm^3) and a usable storage capacity of 20,000 acre-ft (25 hm^3). The change in ground-water storage in 1975 was 6,600 acre-ft (8.1 hm^3), causing an average fluctuation in water levels of 20 ft (6 m) over the study area. With natural discharge but no recharge to the ground-water system, pumpage could theoretically be maintained at the 1975 rate for about 6 years in the area as a whole. With the unequal distribution of pumpage over the study area, the period for sustained pumping without recharge would be much less in heavily pumped areas, such as those in the lower drainage basins of Milliken and Sarco Creeks (storage unit 3). Pumping at the 1975 rate of about 2,100 acre-ft/yr (2.6 hm^3) in storage unit 3 could continue for 2 or possibly 3 years without recharge. With some recharge the period over which the water could be withdrawn is substantially increased.

Ground-water recharge seems to be inadequate to marginal throughout the study area under the 1975 demand. About 10 percent of precipitation from the Howell Mountains in the east, an area of about 33 mi^2 (85 km^2), eventually migrates to the study area's ground-water system. Low transmissivities impede the infiltration and movement of this water from the source areas.

For the ground-water supply in the lower Milliken-Sarco-Tulucay Creeks area to be permanent, discharge cannot continually exceed recharge. This does not mean that at times the discharge may not exceed recharge. In California this may happen for several years, but the overdraft should not be so great that a series of wet years will not bring the water levels back to normal. A water level stabilized below its original level does not preclude a permanent supply if the depth to water is within economic pumping lifts; but it does mean the water removed in permanently lowering the water level has depleted the supply in the previously saturated materials.

Water-level declines of about 1.5 ft/yr (0.5 m/yr) in the Milliken and Sarco Creeks area (storage unit 3) indicate recharge is not supplying the additional water needed to equal pumpage under the climatic conditions existing during the period 1965-75. Present pumpage in this storage unit is estimated at 2,000 acre-ft/yr (2.5 hm^3/yr), part of which is obtained from depleting existing storage. Pumping probably has also reduced the ground-water outflow.

Distributed over the Tulucay Creek area (storage unit 1), pumpage of about 600 acre-ft/yr (0.7 hm^3/yr) is not exceeding recharge and, over the long term, water levels seem stable. Pumping in the area caused considerable water-level declines during the late 1940's. At that time wells were concentrated in the southwestern part of the area at Napa State Hospital, and pumpage exceeded 400 acre-ft/yr (0.5 hm^3/yr) and reached 800 acre-ft/yr (1 hm^3/yr) (U.S. Bureau of Reclamation, 1972). Pumping cones extended into secs. 12 and 13, T5N/R4W (Kunkel and Upson, 1960). Pumpage in the mid-1970's is more uniformly distributed in the Tulucay Creek area. There is little pumpage in the southwestern part. There are indications of locally heavy pumpage in the northwestern part and a heavy concentration of domestic pumpage, with some local interference between pumping cones, in the northeastern part.

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NAPA COUNTY

CONSERVATION — DEVELOPMENT
AND PLANNING DEPARTMENT

1195 THIRD STREET, ROOM 210 • NAPA, CALIFORNIA 94559-3092
AREA CODE 707/253-4416

JEFFREY R. REDDING
Director

MEMORANDUM

TO: Conservation, Development and Planning Commission

FROM: Jeffrey R. Redding, Director

SUBJECT: Public Works Department Report on Water Availability Analysis

DATE: February 27, 1991

In response to the Commissions concerns regarding water availability, the Department of Public Works has prepared a report outlining a three phase process. (see attached) The three phases are 1) a reconnaissance report required at the application stage for all use permits and parcel/subdivision maps; 2) study of the effects of additional water consumption on surounding users based on a threshold level of water consumption; and 3) development of a contingency plan.

The report outlines the content of the Phase 1 Reconnaissance Report and the Phase 3 Contingency Plan; however, additional description is required for the Phase 2 Study. The water consumption thresholds need to be refined and criteria and guidelines must be developed for the the study content and methodology. Based on comments from the Commission and the Departments of Conservation, Development and Planning and Environmental Management, Public Works will proceed with these changes.

RECOMMENDATIONS

1. **The Commission approve, as an interim policy, the recommendations by Public Works for a three phase process to determine water availability for all use permits and parcel/subdivision maps.**

2. **The Commission direct staff to refine the water consumption threshholds and develop criteria and guidelines for the Phase 2 study.**

st\f\water

NAPA COUNTY DEPARTMENT OF PUBLIC WORKS

1195 THIRD STREET • ROOM 201 • NAPA, CALIFORNIA 94559-3082
AREA CODE 707/253-4351

HARRY D. HAMILTON
Director of Public Works
County Surveyor — County Engineer
Road Commissioner

STAFF REPORT
Water Availability Analysis

As a result of the environmental review process and the current drought conditions, the Napa County Planning Commission has expressed concern over water availability for Use Permit and Parcel Map applications. The availability of groundwater and the effects of pumping projected water demands of proposed facilities on the neighboring wells is of ultimate concern to both the Commission, neighbors and the applicant. In an effort to adress these concerns, the Public Works Department has attempted to establish criteria by which the applicant can perform well tests to satisfactorily evaluate the effects of projected water use on the local groundwater aquifer. This Department contracted with J.M.Montgomery, the County's consultant for the Water Resources Study currently in progress, to help establish these criteria. The resulting letter report submitted by Montgomery engineers has revealed two basic flaws in this approach:

1 - The general nature of the criteria to include all types of applications may not give specific enough direction to the applicant or his consultant resulting in a general evaluation of the aquifer no more informative to the Commission than current information presently provided;

2 - The cost of such well studies may be prohibitive to applicants of small wineries or parcel maps.

While this Department is working to bring local experts together to refine these criteria and provide a more definitive result, it is apparent that some form of interim guidelines are required. Therefore, this staff report has been put together to provide the Commission with some basic information pertaining to water use, available groundwater, existing information and interim recommendations to assist the Commission's decision-making process. This report is comprised of the following sections:

I. Existing Groundwater Studies and General Evaluation of Aquifers for Various Areas

II. Projected Water Use of Various Applications

III. Recommendations

I. Existing Groundwater Studies and General Evaluation of Aquifers for Various Areas

The most comprehensive study of groundwater in Napa County was done by the USGS in 1973. This study involved extensive monitoring of hundreds of wells within the Napa Valley floor from Calistoga south to the Oak Knoll Avenue. The Napa County Flood Control and Water Conservation District contracted the study and provided the monitoring program of these selected wells from 1962 to about 1975. The report concluded that the main Napa Valley aquifer was quite large, relatively stable and not in an overdraft situation. It was estimated that the basin contained about 200,000 acre-feet of water of which 24,000 acre-feet per year can be safely withdrawn without overdrafting the aquifer. The 1991 Montgomery study is suggesting a slightly lower "safe yield" for the basin of 22,000 acre-feet per year. Current usage is estimated at 16,000 acre-feet per year available befor an overdraft occurs.

In 1972 a prior USGS study investigated the groundwater basin for the Lower Miliken-Sarco-Tulucay Creeks area east of the City of Napa. Based upon this study, the usable storage capacity of that basin is approximately 20,000 acre-feet per year. The aquifer in this area is considerably more confined than the main Valley floor with lower tranmission rates (slower recharge of wells), fractured rock formations (segmenting of the aquifer) and generally a lower annual yield than the Valley floor. This annual yield is estimated at 3,000 acre-feet and pumpage at times is thought to exceed this amount.

Although no other extensive groundwater studies have been completed in the County, certain lesser investigations have been performed by the Flood Control and Water Conservation District. These investigations are primarily centered in areas with known groundwater problems and relative concentrated use. These areas are: Carneros, Coombsville (area discussed above), Dry Creek, Angwin, Mt. Veeder (and similar mountainous areas in volcanic formations), Pope/Chiles Valley, and Calistoga (mainly from a water quality standpoint). While no estimate of annual yield from these areas has been determined, they have been labeled as areas with groundwater problems that should be dealt with cautiously.

II. Projected Water Demand of Various Applications

It is extremely difficult to apply "across the board" criteria for evaluating water demand without first considering the relative consumptions of various uses for proposed sites. Some of these uses are currently regulated by the Planning Commission while some are not. Following is a table of various uses, their current average water demand and the County process, if any, that regulates that use.

USE	Projected Water Demand, (note units)	County Process
Residential:		BP
-primary residence	0.75 AC-FT/YR	UP,BP
-secondary res.	0.33 AC-FT/YR	UP,BP
-farm labor dwell.	1.0 AC-FT/YR(6people)	
Agricultural:		None
-vineyards	1.0 AC-FT/AC-YR	None
-irrigated pasture	4.0 AC-FT/AC-YR	None
-orchards	4.0 AC-FT/AC-YR	None
-livestock (sheep or cows)	0.01 AC-FT/AC-YR	
Winery:		UP,BP
-process water	2.15 ac-ft/100kgalwine	UP,BP
-domestic & land.	0.5 " "	
Industrial:		UP,BP
-food processing	31.0 ac-ft/employee-yr	UP,BP
-Printing/Publishing	0.6 "	
Commercial:		UP,BP
-office space	0.01 ac-ft/employee-yr	UP,BP
-warehouse	0.05 "	

From these estimated water usage numbers we can consider typical and "worst" case scenarios. For example, consider an 80 acre parcel currently in non-irrigated pasture land. If this parcel is used for grazing cattle or sheep, the water consumption will be approximately 1 ac-ft/yr for 320 head of sheep (or 80 cattle) on non-irrigated pasture. The parcel may also be irrigated to provide grazing for the same number of sheep and require 320 ac-ft/yr for irrigated pasture land. Either of these situations would not require any County permit or land division process. The same 80 acre parcel planted in vineyard would require about 80 ac-ft/yr of water and would likewise not require County approval. A third scenario would be the split of the 80 acre parcel into two 40 acre pieces requiring the owner to apply for a parcel map with the County. If the proposed purpose was to construct two single family dwellings, the resulting water consumption would be approximately 2 ac-ft/yr. All three of these scenarios would most likely rely on groundwater for their water supply though cattle and vineyard operations many times build reservoirs to store surface waters. To take the worst case possible in these three development scenarios let's add a primary residence, secondary residence and farm labor residence all with ample landscaping. Then the water consumption may be as shown in the following table.

SCENERIO	DESCRIPTION	ANNUAL WATER USE ac-ft/yr
#1	320 sheep irrigated pasture primary residence secondary res. farm labor dwell.	324
#2	80 acre vineyard primary residence secondary res. farm labor dwell. 50,000 gal winer	83.5
#3	primary residence secondary res.	1.2

It is apparent from this analysis that certain unregulated uses of parcels can utilize far more groundwater than regulated parcel splits confined to permitted dwelling units. While water consumption for industrial and commercial uses vary greatly and are supplied almost exclusively by M & I suppliers, they do have an overall effect on water supply for the County and during drought periods such as the current one, will cause a shift from imported water to groundwater, the impact of which is difficult to gage.

III. Recommendations

In an effort to provide the Commission with an interim, workable evaluation procedure the Public Works Department proposes the following recommendations:

1. Establish a three phase policy at the aplication stage for all use permit and parcel/subdivision map applications. The initial phase would be a reconnaisance level letter report which would include;

A. Site Map including
  - property boundaries
  - proposed building facilities
  - proposed agricultural development
  - existing and/or proposed water systems
  - adjoining neighbors
  - adjoining water systems

B. Narrative on the proposed project with description of processes or land use intended. This should include
  - acreage of vineyard/agricultural development
  - gallons of wine to be produced
  - homesites and number of occupants
  - potential for future development

C. Projected water consumption to include
   - total water requirement in acre-feet per year
   - peak demands and time of year
   - water source and delivery facilities

D. Summary of available information on groundwater for the specific site and general evaluation of the groundwater basin to include
   - list of available published information
   - available history of wells or water service for site
   - probable effects on surrounding wells
   - proposed mitigation measures

2. Establish a threshold level of acceptance for various permit processes that would determine the need for further study by the applicant. This threshold level of water consumption would be expressed in acre-feet per year and could be on a sliding scale depending on the hydrologic conditions for that period of time. For example, during the current drought period an appropriate threshold level might be 1 acre-foot per year on the Napa Valley floor. This is the expected demand of an average vineyard. This consumption would have relatively little effect on neighboring wells. In hillside areas, where the aquifer is more fractured, an appropriate threshold level might be 1/2 acre-foot per year. The applicant would then be able to design their facilities to that level of water usage without having to provide a more extensive well study involving the drilling and testing of wells on the site. Applicants wishing to exceed these threshold levels, whether use permit, parcel map or building permit, could provide the phase two study to inform the Commission on the effects of additional water consumption on surrounding users. This concept during the current drought conditions could be applied to all applications including building permits, subdivision development, industrial use permits, etc. with a more extensive study being required for exceeding the threshold levels. In years of average or above rainfall, these thresholds could be adjusted upward and as such be less restrictive on water use. The applicants would have to make certain assumptions for land use of their development and may wish to provide two different scenarios: the most probable use of the property and the worst case (greatest water consumption) for the property. Certain standards for testing of wells for the phase two studies would be necessary and could be developed by this Department in cooperation with the Environmental Management Department which administers the County well ordinance.

Based upon the estimated water usage described in II above, the following threshold levels are suggested:

	Acceptable Water Usage ac-ft/ac-year — Below Average Rainfall (Current 1991) Applications AREAS*			Rainfall at Average or Above AREAS*		
	1	2	3	1	2	3
USE PERMIT						
M&I Supplied**	1	.5	0	3	2	0
Well	1	.5	0	3	2	0
PARCEL MAP						
M&I Supplied**	1	.5	0	3	2	0
Well	1	.5	0	3	2	0
Building Permits						
M&I Supplied**	1	.5	0	3	2	0
Well	1	.5	0	3	2	0

*AREAS: 1-valley floor
2-hillside
3-historically poor water areas as identified by maps and records on file with the Department of Public Works

**Water supplied thru municipality or District

3. Develop a contingency for water supply. Even the most exhaustive hydrogeologic study contains assumptions and evaluations which may or may not prove correct. In instances where the study does not accurately evaluate the effects of project water usage on surrounding wells or users, a contingency plan would be required. This may be as simple as implementation of water conservation measures on a permanent basis to adding storage facilities for use during peak demands. Implementation of this contingency plan would be achieved in one of a few different ways:

- application for modification of the permit use
- verified recordings of negative effects on neighboring uses as presented to the Commission through a formal complaint process simular to an appeal
- static well level deterioration documented by Flood Control District monitoring program
- determination by the Board of Supervisors as to a state of emergency requiring severe measures.

At the application stage, the initial phase one study would be required to be submitted to the Department of Public Works for review prior to public hearing or permit issuance. This Department would review the letter report to determine the accuracy of the proposed water usage and it's initial evaluation of the water source and, if acceptable, compare to the threshold levels appropriate at the time and location. The applicant would then be advised to either submit additional study (phase two) or the probable acceptance by the Commission. The phase one study could be performed by the applicant or his representative depending on its complexity. The phase two study would require hiring a professional groundwater expert from a list available in the Department or submit qualification of their chosen expert for prior Department approval. The content of the phase two studies would meet certain minimum requirements by this Department, as outlined by the JMMontgomery letter report attached, with the primary purpose to measure the effects of proposed well pumping or water use on surrounding existing users. Should the phase two study result in "significant" effects on surrounding users, then the applicant would be expected to mitigate to an acceptable level. If the study results in "possibly significant" effects, then the applicant would be required to do the phase three study and develop a contigency plan as described in paragraph #3 above. Implementation of this proposal could occur immediately after establishment of acceptable threshold levels of water use. These levels would be established by this Department after receiving imput from the Departments of Conservation, Development and Planning and Environmental Management.

Planning Commission Mtg.

DEC 17 2014

Agenda Item #9A

17 December 2014

Via e-mail

Napa County Planning Commission
2741 Napa Valley Corporate Drive
Napa, California 94558

re: Agenda Item 9A Girard Winery Use Permit #P14-00053-UP
Request for Continuance

Dear Chair Fiddaman and Commissioners:

My mother, brother and I had a first meeting with Vintage Wine Estates principal Pat Roney and Clos Pegase General Manager Samantha Rudd last Friday, December 12.

It was a friendly and productive meeting during which we learned more about the proposed project and shared some of our initial concerns.

Mr. Roney stated he is willing to work with us on various issues, including fencing to separate our vineyards from winery public areas. The project's main consultant, Heather McCollister, has recently provided data and Mr. Roney has also offered access to his engineering consultant as we work through the many technical reports.

Mr. Roney indicated, however, that he prefers to move forward with the use permit before working out details to address our concerns and does not agree to a continuance.

We, however, believe it important to attempt to resolve our differences before the use permit is approved, not to argue after it is granted. We have dry-farmed these lands for over 85 years and will bear the burden of any negative impacts that may result from this project. Mutually-agreed upon conditions of approval can lead to a better project with potentially fewer harmful impacts.

And, while we appreciate the ability to dialogue directly, we still believe a continuance is appropriate to allow time for our technical consultants to study the data and provide informed comment on potentially very serious issues, including groundwater, traffic, lighting, production and marketing. Due to the short notice of only 16 business days, which included the Thanksgiving holiday, we are not prepared to do so today.

We, therefore, ask the Commission to continue the public hearing for a minimum of 30 business days or more, taking into account the Christmas and New Year holidays fast approaching.

Thank you for your consideration,

Norma J. Tofanelli
1001 Dunaweal Lane • Calistoga

cc: Ellison Folk
Pat Roney

Balcher, Wyntress

From: McDowell, John
Sent: Wednesday, December 17, 2014 7:55 AM
To: Frost, Melissa
Cc: Gallina, Charlene; Anderson, Laura; Morrison, David; Tran, Minh; Balcher, Wyntress
Subject: FW: Item 9A Girard Winery - Request to Continue
Attachments: GirardPC 141217.pdf

Correspondence on today's Girard Item.

-----Original Message-----
From: Norma Tofanelli [mailto:keepnvap@sonic.net]
Sent: Tuesday, December 16, 2014 11:56 PM
To: McDowell, John; Bob Fiddaman; Heather Phillips; Michael Basayne; Terry Scott; Matt Pope
Cc: Pat Roney; Ellison Folk; Laurel L. Impett
Subject: Item 9A Girard Winery - Request to Continue

Good morning, John and Planning Commissioners - Attached please find update on meeting with winery and request to continue.
Thanks - Norma

Balcher, Wyntress

om:	McDowell, John
ent:	Monday, December 15, 2014 10:08 AM
To:	Frost, Melissa
Cc:	Gallina, Charlene; Balcher, Wyntress
Subject:	FW: Girard on Dunaweal

Planning Commission Mtg.

DEC 17 2014

Agenda Item # 9A

Correspondence on Girard Item

From: Heather Phillips [mailto:heather@vinehillranch.com]
Sent: Monday, December 15, 2014 8:43 AM
To: David Clark
Cc: McDowell, John
Subject: Re: Girard on Dunaweal

Hello Mr. Clark,

I am forwarding your message on to John McDowell, Deputy Director to ensure your request becomes part of the record.

Best,

Heather Phillips

n Dec 14, 2014, at 11:03 PM, David Clark <david@davidsjewelers.com> wrote:

> Dear Commissioners,
>
> I've just heard about the Girard application for a winery on Dunaweal. A project this size is bound to impact this end of the valley, both positively and negatively. I'd really like to find out more about it, but with all the commotion of the holidays that will be hard for me, and I'd imagine for others too. Is it possible to continue it past New Year's so the community has a chance to hear it?
>
> Thanks so much, and best of the holidays to you all!
>
> David Clark
> 4704 Silverado Trail
> Calistoga

Mount Veeder Stewardship Council

www.mtveederstewardshipcouncil.org

December 16, 2014

Napa County Planning Commission
County Administration Building
1195 Third Street, Suite 201
Napa, CA 94559

Re: Napa County Planning Commission Notice of Intent to Adopt Mitigated Negative Declaration
Girard Winery Use Permit No. P14-00053
Hearing Scheduled for December 17, 2014

Dear Planning Commission:

The Mount Veeder Stewardship Council submits the following letter in Opposition to the Girard Winery Use Permit Application currently pending before the Napa County Planning Commission, and urges the Planning Commission to reconsider its intent to adopt a Negative Declaration for the Winery Use Permit.

The goal of the Mount Veeder Stewardship Council is to encourage sustainability of our natural resources and to ensure that the rich biodiversity and rural quality of life in the private and public lands of our pristine watershed are respected, conserved and protected for future generations through education, local community involvement and outreach to government and business stakeholders. At this time, the Mount Veeder Stewardship Council is concerned about the approval of new uses for water, during the drought.

Based upon our review of the Girard Winery Use Permit Application and subsequent submittals, it is our opinion that the Planning Commission should not adopt the proposed Negative Declaration, due to the fact that an adequate analysis of actual water available for the project was not performed, nor did the Planning Department take into consideration, while reviewing this application, the fact that California is currently in a serious drought.

The Project Fails to Consider Several Water Related Concerns

The Planning Department fails to require the applicant to provide any actual water availability data in support of its application. While the applicant does say that it will use a well on the parcel, as the source of water for the project, there is no data provided as to the amount of water produced by that well.

The Water Availability Analysis for Napa County presumes that there is 1.0 acre feet of water per year available under each acre of land on the Valley Floor, and without providing any actual data, the applicant just performs the simple math calculations to say that in theory there is sufficient water beneath the site, based upon the Napa County Phase 1 Water Availability Analysis.

This presumption was formed years ago, when California was not experiencing a drought, and this presumption is flawed. In the midst of the drought, to assume that the same amount of water is available, as during a year with normal or higher than normal rainfall, after three years with less than normal rainfall is not supported by any evidence.

California Water Code section 106 states "It is hereby declared to be the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation."

Water Code section 1254 states "In acting upon applications to appropriate water the board shall be guided by the policy that domestic use is the highest use and irrigation is the next highest use of water."

The use of water, for a winery, is neither domestic, nor is it irrigation, accordingly, it is a less important use of water, as set forth by the State of California.

The Planning Department has failed to consider state law in the allocation of scarce water; that domestic water use is the primary use of water, and irrigation is secondary use of water. The proposed Girard Winery is neither domestic use nor is it irrigation. It falls into a category lower than domestic and irrigation uses.

The Project Fails to Address Actual Water Availability for the Project

While the application indicates that there is a well on the parcel, which also serves a winery and vineyard on an adjacent parcel, there is no hard data in the Water Availability Analysis to show that the amount of water necessary for this project, as well as the other winery and vineyard, is available at this location. There are no well tests, or pump tests submitted with the application, to substantiate this claim.

Furthermore, the amount of water used by the existing winery and vineyard, on the adjacent parcel, appears to be based upon numbers provided by the County, rather than actual records showing what the actual amount of water is which is being used by the current adjacent winery operation and vineyard operation.

The lack of analysis of the water available for the site, as well of the lack of consideration of how the drought has and will impact the water availability at the site, the lack of required controls for water usage on the project, to deal with what could be a prolonged drought, all suggest that a thorough review of the actual water available for this project has not been performed.

The adoption of a negative declaration for this project is not appropriate. At the very minimum, the applicant should be required to provide actual water data on its well to address water availability.

The County Fails to Consider, the Cumulative Impact of the Project on Napa County

Before any issuance of a Negative Declaration for the Girard Winery Use Permit application, applicant and the County must consider how the addition of yet another winery, with more events for visitors, will impact the County as a whole. There has been no such consideration or discussion of how the continued approval of winery after winery will impact the County of Napa. At what point does the County reach a level of saturation of wineries? This analysis should consider all predictable and cumulative impacts such as traffic, noise, waste water, water, air, carbon and quality of life for those of us who call Napa County our home.

In the Negative Declaration, on page one, the number of visitors projected for this project, total 28,860[1] daily visitors and 1,600 visitors at large events, for a total of 30,460 visitors per year.

On page 14 of the Negative Declaration, the number of visitors projected for the Girard Winery, 31,200[2] daily visitors and 1,600 visitors at large events, for total of 32,800 visitors per year.

Page 1 of the Negative Declaration allows 30,460 visitors per year, yet, page 14 of the Negative Declaration allows 32,800 visitors per year at the winery. Which number is correct?

Does Napa County need another winery with over 30,000 visitors per year, adding to the already significant traffic on the roadways in the County? The Mount Veeder Stewardship Council thinks that it does not.

Adoption of a Negative Declaration for the Gerard Winery Project Would Set a Bad Precedent in the County

In the County of Napa, any approval of a use permit application must comply with California

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[1] 75 visitors per day for five days a week, plus 90 visitors per day for two days a week, both for 52 weeks per year, for a total of 28,860 visitors.

[2] 75 visitors per day for four days a week, plus 100 visitors per day for three days a week, both for 52 weeks per year, for a total of 31,200 visitors.

law, including the California Environmental Quality Act, and the California Water Code, as well as County policy. As set forth above, the Girard Winery Use Permit application fails to comply with CEQA.

The Girard Winery Use Permit application raises the question as to whether the Napa County General Plan even contemplates approval of water intensive uses, in this case a winery, in areas in the County which are lacking in water resources. The Mount Veeder Stewardship Council believes that it does not.

The core of the 1976 Land Use Element (since protected by Measure J) was an analysis of the "intrinsic suitability" of land for development, which took into account the County's understanding of water availability, at that time. Today, the County has a better, but still incomplete, understanding of water use and water availability throughout the County. There is increased competition for water from springs, streams and wells. Today, more rural properties are suffering the effects of water shortages.

The adoption of a Negative Declaration for the Girard Winery Use Permit, at this time, without an adequate study of the actual amount of water available for the project, would set the stage for a whole class of applications, whose cumulative impacts would severely harm the County, its resources, and their neighbors.

Accordingly, this use permit and any upcoming permit applications should be seriously weighed by the Planning Commission, and should contain a complete and thorough analysis of actual water availability, during this, California's worst drought, in the history of the State, instead of resting upon the faulty assumption upon which the County currently relies for water calculations.

The Mount Veeder Stewardship Council objects to the adoption of a Negative Declaration for the Girard Winery Use Permit Application, and respectfully requests that the Planning Commission not adopt the Negative Declaration for the Girard Winery Use Permit, and instead have the applicant conduct an Environmental Impact Report, addressing cumulative impacts of the project and requesting the applicant to provide additional information regarding water availability for the project.

Respectfully Submitted.

MOUNT VEEDER STEWARDSHIP COUNCIL

Margadant /ceo

Gary Margadant, President

Previous Staff Report From Planning Commission Meeting

Project Name: Girard Winery

Previous Meeting Date: December 17, 2014

Continued to: January 21, 2015

For attachments of this staff report please refer to the previous meeting date above.

A Tradition of Stewardship
A Commitment to Service

Agenda Date: 12/17/2014
Agenda Placement: 9A

Napa County Planning Commission
Board Agenda Letter

TO:	Napa County Planning Commission
FROM:	Charlene Gallina for David Morrison - Director Planning, Building and Environmental Services
REPORT BY:	Wyntress Balcher, Planner II - 707 299-1351
SUBJECT:	Girard Winery Use Permit #P14-00053

RECOMMENDATION

GIRARD WINERY USE PERMIT #P14-00053-UP

CEQA Status: Consideration and possible adoption of a Mitigated Negative Declaration and Mitigation Monitoring & Reporting Program (MMRP). According to the proposed Mitigated Negative Declaration and MMRP, the proposed project would have, if mitigation measures are not included, potentially significant environmental impacts in the following areas: Transportation/Traffic. The project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

Request: Approval for a Use Permit to establish a new winery as follows: 1) 200,000 gallons per year production capacity; 2) Construction of new winery building, totaling 32,771 sq.ft. in area, to include: 28,955 sq.ft. production area (crush area, fermentation and barrel storage, restrooms); 3,816 sq.ft of accessory use area (offices, tasting rooms, retail storage, catered food prep area, and visitor restrooms), maximum height 35 ft. with 45 ft. tall cupolas; a 2,628 sq. ft. veranda; and a 2,871 sq. ft. covered work area; 3) Hosted daily tours and tastings for wine trade personnel and consumers by appointment only for a maximum of 75 persons per weekday (Monday-Friday); maximum of 90 persons per weekend day (Saturday-Sunday); 4) Hours of operation: 8:00 AM to 6:00 PM (production hours, except during harvest) and 10:00 AM to 6:00 PM (visitation hours), 7-days a week; 5) Employment of more than 25 employees: 11 employees (8 full time; 3 part-time) non harvest; maximum 19 additional employees (12 full time and 7 part time) during harvest; 6) Employee hours: production, 7:00 AM to 3:00 PM; hospitality/ tasting room, 9:30 AM to 6:30 PM; administration, 8:00 AM to 5:00 PM; 7) Construction of twenty-two (22) parking spaces; 8) Installation of landscaping, entry gate and a winery sign; 9) Establish a Marketing Program as follows: a) Four (4) events per year with a maximum of 75 guests; b) Four (4) events per year with a maximum of 200 guests; c) One (1) Harvest event per year with a maximum of 500 guests;d) All food to be catered utilizing a ±184 sq. ft. small prep/staging area; 10) On-premise consumption of wines produced on site within the tasting room and in the landscaped winery gardens in accordance with AB 2004; 11) Construct new 24" wide winery access driveway from Dunaweal Lane to the winery; 12) Construction of additional piping and service connections to the existing water system with an update to the existing Transient Non-Community Water System contract to include Girard Winery; 13) Installation of on-site sanitary disposal improvements and installation of new connections into the existing on-site winery waste water ponds serving Clos Pegase Winery (APN:020-150-012); and, 14) Installation of 30' diameter, 25,000 gallon water storage tank. The project is located on a 25.63 acre parcel at 1077 Dunaweal Lane, Calistoga, on the east side of Dunaweal Lane, approximately 1,000 feet south of its intersection with Silverado Trail, within the AP (Agricultural Preserve) Zoning District; APN: 020-150-017

Staff Recommendation: Adopt the Mitigated Negative Declaration and approve the Use Permit, as conditioned.

Staff Contact: Wyntress Balcher, Planner II (707) 299-1351; wyntress.balcher@countyofnapa.org

Applicant Contact: Heather McCollister, (707) 287-5999; bhmccolli@sbcglobal.net

EXECUTIVE SUMMARY

Proposed Actions:

That the Planning Commission:

1. Adopt the Mitigated Negative Declaration and Mitigation Monitoring Reporting Plan for the Girard Winery based on Findings 1-6 of Exhibit A; and

2. Approve Use Permit (P14-00053) based on Findings 7-11 of Exhibit A, and subject to the recommended Conditions of Approval (Exhibit B).

Discussion:

The applicant requests approval of Use Permit application #P14-00053 to establish a new 200,000 gallon/year winery with the construction of a new winery building, totaling 32,771 sq.ft. in area, to include: 28,955 sq.ft. production area (crush area, fermentation and barrel storage, restrooms); 3,816sq.ft of accessory use area (offices, tasting rooms, retail storage, catered food prep area, and visitor restrooms); a 2,628 sq.ft. covered veranda; and a 2,871 sq. ft. covered work area. The maximum height of the building will be 35 ft. with two 45 ft. tall cupolas. The applicant also proposes: the construction of twenty-two (22) parking spaces; the construction of a new 24" wide winery access driveway from Dunaweal Lane to the winery; the construction of additional piping and service connections to the existing water system with an update to the existing Transient Non-Community Water System contract to include Girard Winery; and the installation of a 25,000 gallon water storage tank. The applicant is requesting tours and tastings by appointment only to a maximum 90 persons on weekends and 75 weekdays and a Marketing Program to hold 9 events per year: four/year for 75 guests; four/year for 200 guests and one/year for 500 guests, to be catered and during winery operation hours.

Although this is a relatively large project, staff is recommending in favor of its approval for the following reasons: 1) the proposal includes substantial greenhouse gas offset features; 2) potential traffic impacts have been fully mitigated; 3) Girard's Napa wines are presently made in Sonoma County and this facility will return Napa County fruit to production in Napa County; 4) the project will be subject to the County's expanded housing impact fees; 5) visitation is within the scope of what has been approved at other similar facilities, and marketing is on the low end; 6) the amount of visitation space is relatively modest in comparison to the amount of production space; and 7) the project requires no reductions or alternatives to winery zoning standards.

FISCAL IMPACT

Is there a Fiscal Impact? No

ENVIRONMENTAL IMPACT

ENVIRONMENTAL DETERMINATION: Mitigated Negative Declaration Prepared. According to the proposed Mitigated Negative Declaration, the proposed project would have, if mitigation measures are not included, a potentially significant environmental impact in the following areas: Transportation/Traffic. The project is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

BACKGROUND AND DISCUSSION

Owner/Applicant: Vintage Wine Estates, Pat Roney; 205 Concourse Blvd, Santa Rosa, CA 95403

Representative: Heather McCollister; 1512 D Street, Napa, CA 94559

Zoning: Agriculture Preserve – AP

GP Designation: Agricultural Resource – AR

Filed: February 28, 2014; **Completed:** November 12, 2014

Parcel Size: 26.53± acres

Existing Development: Clos Pegase Water System well and associated equipment & three Close Pegase Winery wastewater processing ponds and associated equipment, in addition to 12± acres of vineyard.

Proposed Winery Characteristics:
Winery Size (Proposed): 32,771 sq.ft. production building include: 28,955 sq.ft. production area (crush area, fermentation and barrel storage, restrooms); 3,816 sq.ft of accessory use area (offices, tasting rooms, retail storage, catered food prep area, and visitor restrooms), maximum height 35 ft. with 45 ft. tall cupolas; with a 2,628 sq. ft. covered veranda; and a 2,871 sq. ft. covered work area.

Production Capacity (Proposed): 200,000 gallons per year.

Development Area (Proposed): 139,763 sq. ft., or 3.21 acres.

Winery Coverage (Proposed): 132,793 sq. ft.; 3.05 acres; 11.49% of the 26.53± acre parcel (Maximum 25% or 15 acres).

Accessory/Production Ratio (Proposed): 3,816 sq. ft. accessory and 37,129 sq. ft. production; 10.2% (maximum 40% allowed).

Number of Employees (Proposed): More than 25 employees: maximum 11 employees (8 full time; 3 part-time), non harvest days; maximum 19 additional employees hired (12 full time and 7 part time) during harvest.

Visitation (Proposed): Hosted daily tours and tastings for wine trade personnel and visitors by appointment only for a maximum of 75 persons per weekday (Monday-Friday); maximum of 90 persons per weekend day (Saturday-

Sunday). Maximum of 555 persons/week.

Marketing Program (Proposed):
Four (4) events per year with a maximum of 75 guests, between the hours of 6:00 PM – 10:00 PM;
Four (4) events per year with a maximum of 200 guests between the hours of 6:00 PM – 10:00 PM; and,
One (1) Harvest event per year with a maximum of 500 guests between the hours of 6:00 PM – 10:00 PM.
All food to be catered utilizing a ±184 sq. ft. small prep/staging area located adjacent to the tasting room.

Days and Hours of Operation (Proposed): Employee hours: production, 7:00AM to 3:00 PM; hospitality/ tasting room, 9:00 AM to 6:00 PM; administration, 8:00 AM to 5:00 PM.

Parking (Proposed): 22 on-site parking spaces with 2 loading areas (15 visitor spaces and 7 employee spaces). The parking area also proposes to include an electric vehicle charging station space and one visitor clean air vehicle space.

Setbacks (Required): 20' side, 20' rear, 300' from Dunaweal Lane.
Setback (Proposed): No variance proposed. All required setbacks will be met.

Adjacent General Plan Designation/ Zoning / Land Use:

North:
Agricultural Resource (AR) /Agricultural Preserve Zoning (AP)/Agricultural use (vineyards) and residential use
South:
Agricultural Resource (AR) / Agricultural Preserve Zoning (AP)/Agricultural use (vineyards) and residential use
East:
Agricultural Resource (AR) /Agricultural Preserve Zoning (AP)/Agriculture (vineyards) and wine production (Sterling Vineyards Winery)
West:
Agricultural Resource (AR) /Agricultural Preserve zoning (AP)/Agricultural use (vineyards), residential use, and wine production use (Clos Pegase Winery)

Nearby Wineries (located within 1 mile of the project)

Winery Name	Address	Building Sq. Ft.	Production	Visitors (Ave/Wk)	Total Events/Yr	Employees
ARAUJO ESTATES WINES	2155 PICKETT RD	24,000	20,000	126	15	13
AZALEA SPRINGS WINERY	4301 AZALEA SPRINGS WAY	11,607	12,500	125	532	2
CLOS PEGASE INC	1060 DUNAWEAL LN	43,100	200,000	725n/a		10
CUVAISON	4550 SILVERADO TRL	46,026	155,048	525n/a		15
FISHER WINERY	4771 SILVERADO TR	16,200	30,000	50	23	3
JOSEPH CELLARS	4455 ST HELENA HWY	20,500	30,000	525	106	6
PAOLETTI ESTATES WINERY	4501 SILVERADO TRL N	10,004	16,000	350	3	1.5
PAVITT FAMILY VINEYARDS	4660 SILVERADO TRL	3,360	10,000	10	9	2

STERLING VINEYARDS	1111 DUNAWEAL LN	160,252	1,500,000	3,850n/a		143.5
TEACHWORTH WINERY	4451 N ST HELENA HWY	800	5,000	2	2	0.5
TWOMEY CELLARS	1183 DUNAWEAL LN	25,510	81,480	75n/a		3.5
VENGE VINEYARDS	4708 SILVERADO TRL	15,400	20,000	140	10	3

Parcel History and Evolution of this Application

The existing parcel is 26.53 acres in area and includes an existing storage building, three ponds for a wastewater processing system, water well, and associated infrastructure that are currently serving Clos Pegase Winery, which is also owned by the applicant, located at 1060 Dunaweal Lane (APN: 020-150-012), directly across the street. There are currently 12± acres of vineyards planted on the property, but there has been a history of a total of 18 acres of vineyard, of which 6± acres is now fallow. There are no other improvements on the property.

Code Compliance History

There are no open or pending code violations for the subject site.

Discussion Points

Setting - The project parcel (APN: 020-050-017) is 26.53 acres in area and is owned by Vintage Wine Estates. Across the street at 1060 Dunaweal Lane (APN: 20-150-012) is Clos Pegase Winery, also owned by Vintage Wine Estates. Water is provided to Clos Pegase Winery and the residence on that parcel through the "Clos Pegase Winery Water System", a transient non-community water system which utilizes the well on the project parcel. The old well on the Clos Pegase Winery parcel did not meet the seal depth requirements for the transient non-community water system regulations and is therefore not a part of the water system and used for back-up irrigation. The Clos Pegase Winery process wastewater is taken to the subject parcel for processing, utilizing the three existing ponds. The processed wastewater is used for vineyard and landscape irrigation on both the Clos Pegase property and the subject parcel. No groundwater is used for these activities.The proposed Girard Winery will connect to the existing water system and will require updating the water system permit to include additional piping and and service connections. The name of the water system will also be amended to include both wineries.The project parcel is rectangular with frontage on Dunaweal Lane, a collector status road, and is relatively flat. The frontage has non-native walnut trees lining the road and five are proposed for removal for the project driveway entrance. The nearest offsite residence is located approximately 130 feet south of the property line and is over 400 feet from the winery building site.

New Winery Proposal - Girard Wines is a label currently being produced by Vintage Wine Estates at a facility in Sonoma County. The wines are currently being sold at a tasting room in Yountville which is proposed to continue operating after completion of the the proposed new wine facility. The project proposes the construction of a 24' wide driveway to serve the 32,771 sq. ft. winery building located ±600 ft. from Dunaweal Lane and would circle around the building to the loading area in the rear. The required winery setback is 300 ft. The hospitality and administration areas are located on the west side of the building facing the street, where there is a landscaped veranda wrapping around the public entrance. The applicant is requesting approval of on-site consumption of wines produced on the site in the garden and veranda in addition to the tasting room in accordance with AB 2004 (also known as the Picnic Bill). The winery production area is located behind hospitality area with tanks, barrel storage, a covered crush area, and loading docks. There is an open covered work area adjacent to the refrigeration equipment at the rear of the building. The proposed building will be concrete, 33'-6" in height with metal roofing and stone veneers on the front (west) side of the building. Two cupolas are proposed at the front of the production portion of the building, 45' in height, with metal roofing. The veranda will be concrete with stone veneer and the building's divided-lite windows will have low-E glass and with stone ledges.

Twenty-two (22) parking spaces are proposed, 15 in the visitor parking area adjacent to the front of the winery building and seven (7) in the employee area behind the winery building. The visitor parking area also proposes to include an electric vehicle charging station space and one visitor clean air vehicle space, in addition to one electric vehicle charging station in the employee parking area. Based upon estimates of 2.6 visitors/vehicle on weekday (20± vehicles) and 2.8 visitors/vehicle on weekends (22± vehicles), the parking demand per day would be satisfied by the 22 parking spaces. The parking demand generated from nine marketing events (179± vehicles at largest event) would exceed the number of parking spaces available in the parking lot. Additional parking in the paved area at the rear of the winery can be utilized during events or shuttling from off-site parking lots. The applicant proposes Best Management Practices to encourage a reduction of vehicle miles traveled with priority parking for efficient transportation and to use bus transportation for large marketing events. The applicant owns the winery property across the street and event guests can be shuttled over from there. No parking will be permitted within the right-of-way of Dunaweal Lane or permitted on the entrance driveway, which is too narrow to accommodate parking.

Tours and Tastings/Marketing Events - The project proposes hosted daily tours and tastings for wine trade personnel and consumers by appointment only for a maximum 75 persons per weekday (Monday-Friday); a maximum 90 persons per weekend day (Saturday-Sunday) for a weekly total maximum of 555 visitor. The proposed visitation hours are 10:00 AM to 6:00 PM (visitation hours), 7-days a week with on-premise consumption of wines produced on site within the tasting room and in the landscaped veranda in accordance with AB 2004. The Marketing Program would consist of: four (4) events per year with a maximum of 75 guests, between the hours of 6:00 PM – 10:00 PM; four (4) events per year with a maximum of 200 guests between the hours of 6:00 PM – 10:00 PM; and one (1) Harvest event per year with a maximum of 500 guests between the hours of 6:00 PM – 10:00 PM. All food to be catered utilizing a ±184 sq. ft. small prep/staging area located adjacent to the tasting room area.

Staff has provided a table comparing marketing and tours and tastings visitation at other wineries with annual production of 200,000 gallons, below. The proposed visitation program falls within the lower half amongst its peer group of wineries with an approved production capacity of approximately 200,000 gallons per year. The table also provides a comparison of winery building floor area to the wineries listed. As can be seen, the floor area for the proposed area relative to its production capacity is below the middle of the spectrum, at ±28,955 sq.ft., with other wineries ranging in size from 24,100 sq.ft. to 49,480 sq.ft.

Winery	Location	Approved Production	Floor Area (sq. ft.)	Tours & Tastings visitors/week (average)	Marketing Events per year	Employees
BY APPT ONLY						
Groth Winery and Oakcross Vineyards	Valley Floor	200,000	49,480	180	77	24
Shafer Vineyards	Valley Floor	200,000	33,630	105	29	2
Silverado Hill Vineyards LLC	Valley Floor	200,000	27,454	490	126	24
Paraduxx Vineyards	Valley Floor	200,000	32,909	840	160	38
Girard Winery (Proposed)	***Valley Floor***	***200,000***	***39,604***	***555***	***9***	***11***

PUBLIC						
Clos Pegase, Inc	Valley Floor	200,000	24,100	725	0	10
Sutter Home Winery	Valley Floor	200,000	41,000	3,500	0	101
Whitehall Lane Winery	Valley Floor	200,000	34,227	600	60	7

Traffic - The project parcel is located on the east side of Dunaweal Lane, between State Highway 29 and Silverado Trail. Access to the proposed winery would be from both directions of Dunaweal Lane, via a 24 ft. wide driveway. The intersections with State Highway 29 and Silverado Trail are unsignalized; southbound traffic on State Highway 29 has a left turn lane. There are three existing wineries on Dunaweal Lane: Clos Pegase Winery, Sterling Vineyards, and Twomey Cellars. The project proposes to establish a new 200,000 gallon/year winery, office use, and hospitality functions. The proposed maximum daily visitation will be 75 persons on weekdays; 90 persons on weekends. There will be 25 or greater on-site employees: 8 full-time and 3 part-time, but will increase during harvest to 20 full-time and 10 part-time. Nine (9) marketing events per year are proposed: four (4) events with a maximum of 75 guests; four (4) events with a maximum of 200 guests; and one (1) harvest event with a maximum of 500 guests.

Whitlock & Weinberger Transportation, Inc. (W-Trans) prepared a focused traffic analysis (dated October 16, 2014) addressing potential traffic impacts and access needs for the winery. Mechanical counts of the traffic volumes on Dunaweal Lane were conducted on three consecutive peak days and intersection counts were taken during the month of September, 2014 to establish the existing conditions. The volume of traffic ranged from 1,484 vehicles on Thursday to 1,691 on Saturday. This count is considered relatively low. The turning movement data collected indicate that the intersections of State Highway 29 and Silverado Trail and Dunaweal Lane are operating at a LOS A or B overall and on all approaches. The anticipated daily trip generation for the project, winery plus tasting room, is projected at 74 trips during weekdays, including 26 weekday PM peak hour (4:00–6:00 PM) trips and 58 daily trips on weekends with 29 weekend PM peak hour trips (Saturdays 2:00-4:00PM). Upon adding project-generated trips to existing volumes, both intersections are expected to continue operating at LOS A or B overall as well as on all approaches.

The report addresses the future projected traffic volumes, using the 2030 and 2010 model volumes from the Solano Transportation Authority growth factor of 1.45 for State Highway 29. This growth factor was applied to turning movements to and from Dunaweal Lane and the remainder of the future increase was added to the volumes for the through movements. Based upon the projected future volumes, the two intersections are expected to operate acceptably overall, though the northbound Dunaweal approach to Silverado Trail is expected to operate at LOS E and the southbound Dunaweal Lane approach to State Route 29 is expected to operate at LOS F at the PM Peak Hour. Under the Napa County General Plan EIR, under projected 2030 volumes, State Route 29 is expected to operate at a LOS F in this project's study area during the PM Peak Hour, and, Silverado Trail is expected to continue operating at LOS C during the PM Peak Hour.

The traffic study proposes a mitigation measure that if the winery operation schedules employee shifts to minimize trips at the intersection during the PM peak periods (4:00-6:00 PM weekdays; 2:00-4:00 PM weekends) stating it will reduce the project's future potential impacts to the intersections at their most impacted time to a level of insignificance. The incorporation of a mitigation measure to reduce traffic during the PM Peak Hour can occur during the 9 events if the finish time of activities is scheduled to minimize vehicles arriving or leaving between 4:00 PM and 6:00 PM would reduce potential future traffic impacts to a level of insignificance. Further, the installation of directional signs at the winery exit to direct traffic to right-turn actions, such as southbound traffic from Dunaweal Lane to use Silverado Trail, and northbound traffic to use State Highway 29, would be a reduction in the LOS at those intersections, further reducing traffic impacts to a less than significant level. The applicant proposes Best

Management Practices to encourage a reduction of vehicle miles traveled with priority parking for efficient transportation and to use bus transportation for larger 200 to 500-guest marketing events.

Groundwater Availability - As indicated above, the well on the project parcel provides water to the applicant's Clos Pegase Winery (APN: 020-150-012) across the street. The well on the Clos Pegase winery is utilized as back up irrigation water. The Clos Pegase winery process waste water system is also located on the project parcel, which include the three processing and storage ponds. The reclaimed water is used to irrigate the vineyards and landscaping on the Clos Pegase parcel, and the vineyards on the project parcel. Girard Winery will be incorporated into these existing systems. Therefore, the Water Availability Analysis Report, prepared by Always Engineering (dated November 24, 2014) and the Phase One Study prepared for each of the parcels, evaluated the existing demand and the demand generated from the proposed Girard Winery.

The Phase One Study prepared for the 20.39 acre, valley area, Clos Pegase Winery property states that the Allowable Water Allotment for the property is 20.39 acre feet per year (af/yr), determined by multiplying its 20.39 acre size by the one af/yr/acre fair share water use factor. Clos Pegase Winery is a 200,000 gallon winery, with 10 employees (total 30 employees during harvest) and a visitation average of 725 people per week. The Clos Pegase Phase One study indicates the existing total demand is 9.70 af/yr.

The Water Availability Analysis-Phase One Study prepared for the 26.53 acre, the proposed Girard Winery property, states that the Allowable Water Allotment for the property is 26.53 acre feet per year (af/yr), determined by multiplying its 26.53 acre size by the one af/yr/acre fair share water use factor. The study found that the proposed 200,000 gallon Girard Winery with a proposed 11 employees (additional 19 for a total 30 employees during harvest), a maximum 10,090 visitors, and 9 events with a maximum 500 people, would result in a total demand of 16.70 af/yr.

The combined allowable water use for both parcels would be 46.92 af/yr. The existing and proposed water use for both parcels is 26.40 af/yr., which is 20.52 af/yr. below the threshold for the combined parcels. As such, the project meets the valley floor groundwater sustainability threshold in gross terms without consideration of other water sources such as reuse of treated process water and surface water captured within existing irrigation ponds. The Water Availability Analysis report indicates that currently all vineyard irrigation (both parcels) is provided for using the existing irrigation pond located on the property. The existing irrigation pond is filled with rainwater, vineyard subdrain collection water, and treated process wastewater. No well has been used to irrigate the existing vineyards and the existing landscaping. In addition, the proposed Girard Winery will also contribute additional process wastewater into the reclaimed wastewater irrigation system. Therefore, the total project demand on groundwater supplies would be 12.49 af/yr. Conditions from the Environmental Health Division require that an agreement to grant a water easement or an approved water easement for the water system located on and serving the two parcels must be filed prior to approval of a building permit. This will ensure that the Clos Pegase Water System is amended to include the new winery.

Greenhouse Gases/Climate Action Plan - The County requires project applicants to consider methods to reduce Green House Gas (GHG) emissions consistent with Napa County General Plan Policy CON-65(e), which requires GHG review of discretionary projects. The applicant has completed the Department's Best Management Practices Checklist for Development Projects, which is attached to this report as part of the application materials. The applicant proposes to incorporate GHG reduction methods including: alternative fuel and electrical vehicles in fleet; build to CALGREEN Tier 2; new vegetation plantings; CVMT reduction plan; energy conserving lighting; connection to an existing recycled water system; water efficient landscaping and shade trees; limiting the amount of grading and tree removal; composting; sustainable purchasing and shipping programs; electrical vehicle charging stations; bicycle incentives; and education of staff and visitors on sustainable practices.

GHG Emission reductions from local programs and project level actions, such as application of the CalGreen Building Code, tightened vehicle fuel efficiency standards, and more project specific on-site programs including those winery features noted above would combine to reduce emissions.

Grape Sourcing - The property is currently planted in 12 acres of vineyards. Upon completion of the project, the applicant proposes to replant those areas that are fallow or were disturbed by the project, resulting in 14.53 acres of vineyard. The applicant has informed staff that the 75% Napa Valley Grape Source can be met since there are contracts with other Napa County vineyards for 1,075 tons of grapes (154,800 gallons) that will be processed at the new winery. The applicant has advised that the Girard Winery label is currently active and the wines are being sold out of a tasting room located in Yountville, which will also remain open after completion of the winery.

Public Comments - On December 4, 2014, an e-mail was received from an adjacent neighbor, Norma Tofanelli, requesting a continuance of the hearing to allow time to review all of the reports and prepare for the hearing (See attached). Staff had been advised that the applicant and the neighbor will be meeting to discuss the project and the neighbor's concerns.

Consistency with Standards

Zoning - The project is consistent with the AP (Agricultural Preserve) zoning district regulations. A winery (as defined in the Napa County Code Section 18.08.640) and uses in connection with a winery (refer to Napa County Code Section 18.16.030) are permitted in the AP District with an approved use permit. The project, as conditioned, complies with the Napa County Winery Definition Ordinance and all other requirements of the Zoning Code as applicable.

Environmental Health Division - Recommends approval with standard conditions in the attached Memorandum dated December 10, 2014.

Engineering Services Division - Recommends approval with standard conditions in the attached Memorandum dated July 11, 2014.

Public Works Department (Ground Water and Traffic) - Recommends approval in the attached Memorandum, dated May 12, 2014.

Fire Department - Recommends approval with standard conditions in the attached Inter-Office Memo dated April 3, 2014.

SUPPORTING DOCUMENTS

A . Exhibit A - Findings

B . EXHIBIT B - CONDITIONS OF APPROVAL

C . Department Conditions

D . Public Comments

E . Mitigated Negative Declaration

F . Mitigation Monitoring & Reporting Program

G . Water Availability - Phase One

H . Biological Survey Report

I . Traffic Analysis

J . Wastewater Feasibility Study

K . Waters System Feasibility Report

L . Application documents

M . GRAPHICS

Napa County Planning Commission: Approve

Reviewed By: Charlene Gallina

21 January 2015

Planning Commission Mtg.

JAN 21 2015

Agenda Item # 9A

Napa County Planning Commission

Chair Heather Phillips
Commissioners

re: Girard Winery Use Permit #P-14-00053

I apologize to the Commission, staff and the applicant for the amount of information submitted just before this hearing. The timing of the continuance granted on December 17 included 2 major holiday weeks (Christmas and New Years), limiting the time available to find experts, complete research, compile data.

Please note for the record, that although we are adjacent neighbors to both the proposed Girard parcel and Clos Pegase, and we spoke at the December hearing, the Tofanelli family did not receive any legal notice of this hearing today.

Many of our concerns are detailed in the letter to you from Ellison Folk, Shute, Mihaly and Weinberger; others remain.

As immediate neighbors, we will be forever impacted by the massive change in operations on these parcels. The Girard winery building with faux stone front and tall cupolas will block the most beautiful down valley view on Dunaweal Lane as well as the incredible view of the western hills that I have enjoyed all my life. These views will be gone for our lifetime.

Our farming operations will be irrevocably altered - fences and gates will have to be installed to keep winery visitors from wandering into our home lands, adding to the increasing burden from tourist trespass and theft.

Mr. Roney has agreed to install fence(s) and gate(s) at mutually agreeable locations as conditions of approval. These must be installed before the winery is allowed to open for business.

Mr. Roney has also agreed to conditions of approval to control construction dust to protect our organic vineyards. As many signs around the valley point out - dust IS harmful to grapes, most particularly to those that are farmed organically. It is

critical that the dust be controlled and not creep over to our vines.

While Mr. Roney has been very gracious and accommodating, we are very concerned about the operations of Girard and Clos Pegase and the changes they bring to a once quiet rural area.

Clos Pegase is a pre-WDO winery with a permit for 200,000 gallons although it produces only 25,000 cases or about 60,000 gallons of wine. Warnings from neighbors so many years ago that the clay soils of the parcel would not perc proved true and we watched as truck after truck hauled out winery waste. Then we watched the mound system fail as toxic winery waste water inched toward the Napa River. We protested when they sought to pipe the waste under Dunaweal to be treated in ponds on the second, now Girard, parcel. County code at the time mandated the merger of contiguous parcels under same ownership when the use on one parcel required services that existed on the other parcel. The county disregarded its own code and the neighbors didn't sue. Too bad.

We warned, too, that the Clos Pegase parcel could not provide water as claimed. We laughed at the well drilling rig atop a huge pile of cave tailings at the base of the hill, watched as well drilling and the original well failed and water had to be piped in from the second parcel.

As long as a winery exists on the Clos Pegase parcel, the two parcels are inextricably linked. It can't produce its own water nor get rid of its own waste. To grant another winery on this parcel is contrary to the intent of the WDO. The parcel has been used - another winery should not be allowed. Where once there were approximately 50 acres of prime producing farm land with a modest farmer's house and barn there will now be two industrial processing plants with retail and commercial uses in their place. This appears to be a policy issue for the Board of Supervisors. When has a parcel been "used"?

Once again, neighbors are concerned about water. According to staff "The County has no record of problems or complaints of diminished groundwater supplies at the project site or in the general vicinity." Astonishing. We have been submitting data to support our water concerns for over 30 years. I have presented to this very Commission the attached area well log and history so many times - most recently: Pavitt, Venge, Fisher. These should be quite familiar to most of you.

Familiar also should be the attached pages from the 1989 WDO FEIR in which Jill Pahl, Senior Environmental Health Specialist, noted that the Dunaweal Lane area

warranted study as it appears to be an "existing problem yield area" where "water is in short supply." What happens to these documents that we labor to produce as evidence? Are they "disappeared" down Orwell's memory hole?

While much of the county, and Napa city, is grappling with the problem of water being trucked to increasingly unsustainable projects, staff appears unaware of water trucking in the Dunaweal area and again assures there is plenty of water. One acre foot of water for each acre of land can supposedly be continuously extracted with no harm. GRAC and Ludorff Scalmanini do not provide data to support that assumption. Indeed, they state there is insufficient data to assume anything and, instead, identify the Calistoga area as "High Priority" for study because it is particularly data deficient.

A small winery, Venge Vineyards (8,000 cases), less than a mile away, was approved in 2009, also with assurances of ample water - from 4 wells. The 12-acre parcel had a small vineyard and private residence but needed 4 wells to survive. Neighbors were told their water concerns were baseless. One acre foot of water for every acre of land? Venge was built in 2010 and now trucks water in regularly. At least one Venge neighbor now also has to truck in water periodically.

The problem in our area is that the alluvium capable of storing water is very thin, geothermal waters with vineyard-killing boron are very close to the surface and the hills are so fissured from volcanic activity it is unclear how much water received in the eastern hills actually recharges here.

Apparently unknown to the county, and perhaps unknown also to the applicant, is that Clos Pegase has also recently trucked in water. I watched in 2012-13 as water trucks regularly chugged up the hill to the storage tank near the residence.

The new owners plan to boost production at Clos Pegase to 200,000 gallons as permitted. An increase of over 300%. If water has had to be trucked in to produce 60,000 gallons, how many more water trucks will be needed when production grows threefold? How many will be needed when Girard is in production?

What is most concerning is the change that the new owners have brought to Clos Pegase. It is well known that weddings are illegal at Napa County wineries. One of the principles, Leslie Rudd, has owned a winery here since the late 1980's and surely is aware of this unwavering WDO policy. Yet, the major marketing plan to "grow" Clos Pegase appears to be via weddings. Almost immediate to the change in ownership, Clos Pegase began an intense wedding marketing program.

Included is a packet of printed wedding promo material downloaded from the internet. Google "Clos Pegase" - "weddings" is the first item that comes up. Click on Clos Pegase "weddings" and up pops the wedding home page. Click through and you will see they have pulled out vineyard to make way for a portable altar and chairs. They aren't kidding - they are promoting the actual wedding ceremony as well as the receptions and dinners. Lovely, expensive photography with brides and grooms all over the vineyard, winery and caves.

Wedding-spot.com provides more detail: maximum outdoor ceremony = 250 guests, maximum indoor reception = 250 guests. Average wedding cost is between $17,000 and $27,000 for 100 guests, or about $70,000 for the maximum 250 guests. And make no mistake, this is all about weddings and not at all about wine marketing. Only beer and wine are allowed and the alcohol is noted to be "BYO" - Bring Your Own. They aren't even required to drink Clos Pegase wines at these weddings.

We have recently observed events for wedding planners as well as the weddings. Napa County Sheriff's complaint logs contain the details. Code enforcement should check with them. One deputy, responding to a recent wedding complaint, told me that he could not do anything other than request the music be turned down, because he said "weddings are legal in Napa County, they happen up and down the valley all the time." When I cited the facts, that weddings are illegal here, he responded - "if that's true, and you can put a stop to them, you have no idea how many calls you will save this department."

I repeat - Napa County Sheriff's deputies appear to be responding regularly to complaints generated by weddings occurring all over the valley, but do not shut them down because they are considered "legal activities". Perhaps the Board of Supervisors should chat with the Sheriff? And Code Enforcement should open some files?

The new owners have at least one more trick up their marketing sleeve - see Calistoga Winegrowers promo piece. "The winery now hosts weddings, among other events, and a remodel of the house on the property will create a new event space." Not only is this a wedding mill, the private residence is intended to be a new event space for yet more illegal special events. Clos Pegase does not hold permits to allow these activities.

We are reminded that these same winery owners also own Cosentino, which uses

State Highway 29 as a personal loading and unloading zone because the parcel is too small for the winery activities it contains. The neighbors suffer. It is astounding that the county, CHP and CalTrans allow this to continue. We are not looking forward to policing our new, scofflaw, neighbors.

Weddings and illegal events were apparently conducted at the site by the former owner as well. Included in the packet is this letter, anonymously put into my mailbox by an irate neighbor who expected me to stop the shenanigans. I'm presenting it at this time, so they know their efforts were not in vain.

Every day we learn that Napa County has very serious problems that are not being addressed. Thousands of winery waste water trucks are apparently a surprise to planners. At one Raymond hearing, staff revealed that "dozens" of left-turn lanes throughout the county, mandated as CEQA mitigations, have never been installed. Yet traffic is one of our biggest issues. This Commission has been asking for at least a year for a nexus between marketing and production, for definitions of marketing events vs food and wine pairings. (*Attached request from Chair Phillips, July 16, 2014*). The much heralded NCTPA traffic study has not been completed - how can you assess cumulative traffic impacts? No one knows yet how many water trucks are delivering how much water to which unsustainable projects all over the county. And yet, Wine Business Journal recently reported that there are 80 winery projects "in the pipeline". How can this continue? How can you keep compounding the problem by approving more projects without current and complete data?

And, how can you issue a new use permit to owners who are openly and flagrantly violating the WDO and Napa County code?

Norma J. Tofanelli

Norma J. Tofanelli
for the Tofanelli Family
1001 & 1076 Dunaweal Lane

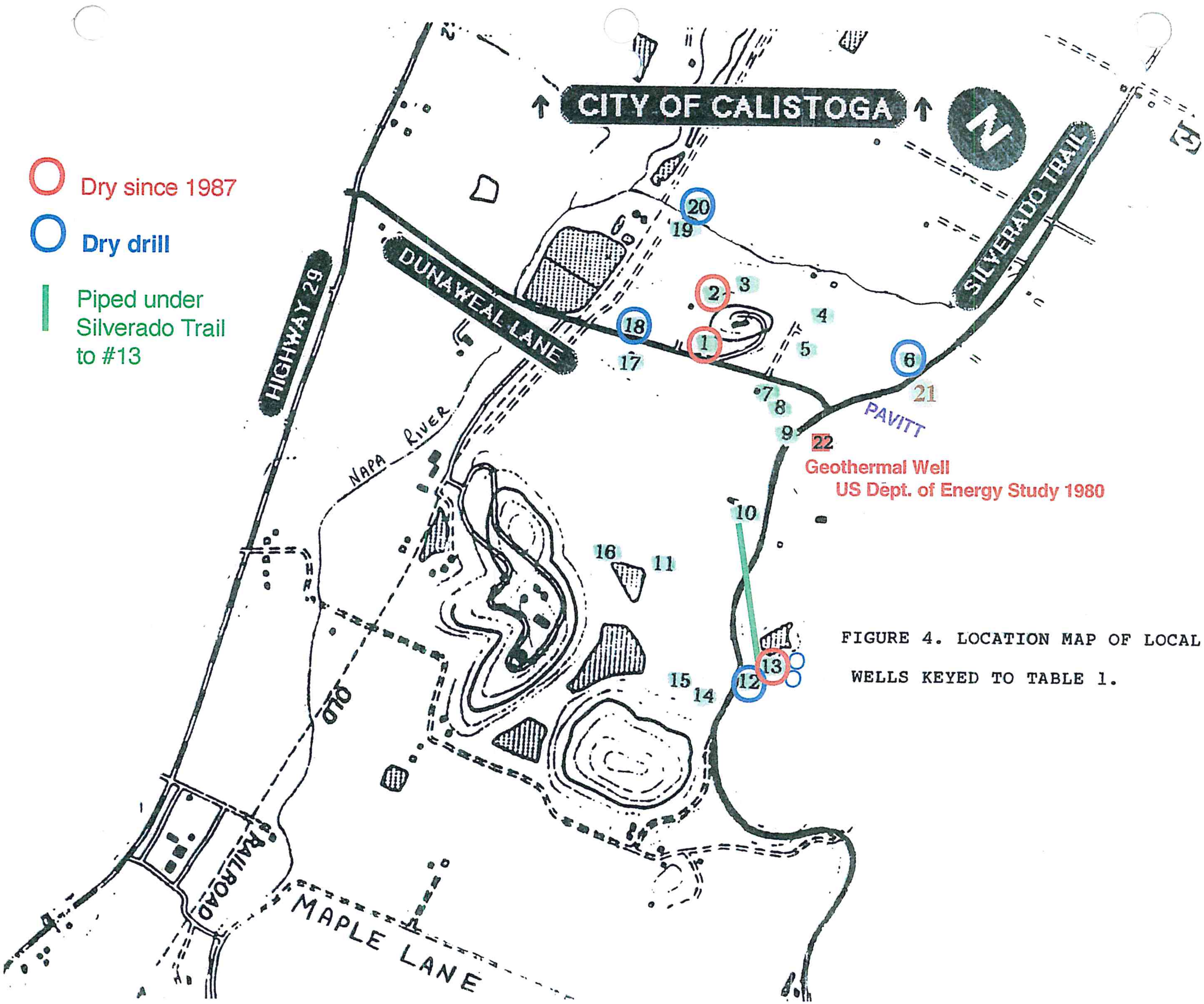

FIGURE 4. LOCATION MAP OF LOCAL WELLS KEYED TO TABLE 1.

1987 Data

Dunaweal Area Well Records

The following information was drawn from a series of interviews with property owners, winery employees, well drillers, Napa County Department of Environmental Health employees, and from personal information gathered over the 60 years that my family has been farming this area.

1. **Clos Pegase: 75', 30 gpm**

This well was drilled in July, 1985 after an unsuccessful attempt to drill (well #18) on the same parcel, southeast of this well. The well drilling rig was mounted atop the pile of debris from cave excavations and grading at the top of the hill and drilled down through the rubble. The previous vineyard manager/caretaker stated that the area drilled in had traditionally been an area of seepage from the hill.

2. **Clos Pegase: no records - depth unknown, 7 gpm?**

This is the property's historic well and hasn't been a good source according to previous owners and caretakers. It had to serve two single-family residences. *(Projected as 7 gpm because use permit claims 37 gpm total for winery site and well #1 is 30 gpm.)*

3. **Czapleski: depth unknown, 1-2 gpm.**

This was drilled about 15-20 years ago by the former owner. According to the former owner and tenants this well historically has dried up in late September. According to the former tenants they had to use bottled water for drinking in late summer and fall.

4. **Czapleski: depth unknown, hand-dug, 1-2 gpm**

This is the property's historic well dating back at least 60 years. According to conversations with former owners, (dating back to as early as 1929), this well was sufficient for domestic usage but in the last 20 years has had to be supplemented by other sources.

5. **Czapleski: 370', 1-2 gpm**

This well was drilled in May 1987. Water from wells #3, #4, and #5 is being pumped into a recently constructed concrete water storage tank in an effort to provide water for domestic as well as vineyard usage. Water was trucked in to fill the tank after construction presumably because the flow from the wells was insufficient to fill the tank within the time necessary to insure the proper curing of the concrete.

6. **Czapleski: dry, depth unknown**

This was drilled by the former owner and was abandoned before completion.

7. **Tofanelli (DiGiulio): 17', gpm unknown.**

This was the property's historic well already in existence when the property was purchased in 1929. It has served as the only source for domestic use until 1977 when it went dry. In approximately 1960, the water level began dropping seriously during summer and fall months. In 1977 the well dried up and water had to be tanked in. The

8. Tofanelli (DiGiulio): 195', 10gpm

This well was drilled in the fall of 1977 after well #7 went dry; the water is noticeably warmer than the water in well #7. This well is one of the 206 test wells being tracked in the study of the Calistoga area's geothermal resource being conducted by the US Department of Energy in conjunction with the California Division of Mines and Geology (CDMG).

This well was tested at 20°C in the most recent test and the report notes that "For the purpose of preparing Geothermal Resources Map of California, CDMG has chosen 20°C as the starting temperature for warm water." However, as it is common practice in Calistoga to store water in metal pressure tanks which can affect the temperature, so "...25°C has arbitrarily been chosen as the cutoff point for a geothermal well for the purpose of this investigation only." As no metal pressure tank is used at this well, it can be seen that this well qualifies as geothermal under the standard CDMG definition. This indicates just how close to the surface the geothermal is in this area, particularly since another well (well #22) just across the Silverado Trail from this one is also being monitored and has been tested at 41°C at 275'.

9. Tofanelli (DiGiulio): 19-20', hand dug - livestock only.

Since about 1960 this well dries up in late sumer-fall. It has been noted throughout the years that when neighbors across the Silverado Trail from this well are watering their lawns and runoff is seen, the well subsequently dries up and takes several days to recover.

10. Corry (Perry): 45', gpm unknown

This is the property's historic well. When the property was purchased by the current owners it was 15' hand-dug, but in 1959 it no longer provided sufficient water for domestic use and had to be drilled to 45'. It has been a sufficient domestic source since that time.

11. Tofanelli (DiGiulio): 18', gpm unknown - livestock only

This is one of the property's historic wells, already in existence in 1929. It has traditionally been used for livestock and was the source for the animals (horses and cows) that were pastured in this area when the vineyards were still being worked by horse (as recently as 30 years ago). It is currently used for livestock (horse) watering. In the last 20 years this source normally goes dry in late summer - fall.

As this well is currently used for livestock, and is located approximately 20-25' from the property line adjacent to the proposed wastewater ponds there is concern that it could be contaminated. Stored near the property line in this area is an old, abandoned out-house that has not been in use for about 25 years and is in unuseable condition. It has been filled with soda and beer cans and various garbage items by field workers over the years.

12. Angell: 325', dry - drilled in December 1985

This was an attempt to replace well #13, which was dry. The property owner was buying water from an adjacent property owner as there was no other source of water on this property.

13. Angell: 125', 9 gpm

This is the property's historic well and was 35' deep. For last 20 years it has been dry in summer-fall. In about 1982 it dried up totally. When the attempt to find water at well #12 failed, the driller tried to clean out this well, and somehow the bottom dropped down another 90' where water was found. It tested in January 1986 at 9 gpm.

14. Rosenberger: 135', 1.5 gpm

This well was drilled about 30 years ago. The owner indicated that it has been an increasingly poor summer-fall source.

15. Rosenberger: 250', 1.5 gpm

This was drilled about 8-9 years ago as #14 was not sufficient for domestic use even though the property owners are in residence normally only about three days per week.

16. Clos Pegase: not a well, but a sump hole

This was excavated by Blakeley construction company in about 1975.

17. D'Anneo: no information

Historically has not been a good well. The former owner was required, as a condition to serving as a foster parent family, to bring in bottled water for drinking.

18. Clos Pegase: depth unknown, dry

This was drilled in May or June 1985, during the winery permit appeal period. It was noted during the appeal hearings that the actual attempt to drill was made prior to obtaining a well permit to allow such drilling.

19. Tofanelli: 80', 1-2 gpm

This well was drilled in 1953 and has been sufficient for domestic use only; however, its recovery rate is very slow and water conservation measures have always been used by the owners. Over the last 15 years recovery rate has been increasingly slower.

20. Fisher: 600', dry; drilled approximately 1984.

The approximate depth of this well was learned in conversation with the drillers as work progressed. Its drilling was of particular concern to the Tofanelli family as its location is only a short distance from well #19. The drillers said that after drilling all of that depth only "a trickle of water" was found and the well was abandoned.

21. Curtiss: 235', 20 gpm

22. See #8 for data

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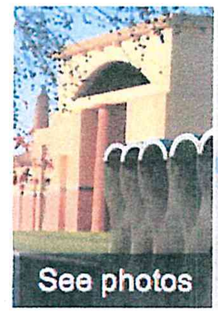

Clos Pegase Winery

Directions

4.4 ★★★★★ 9 Google reviews

Wine Store

Address: 1060 Dunaweal Lane, Calistoga, CA 94515

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WEDDINGS

A wedding in the vineyard

1 / 15

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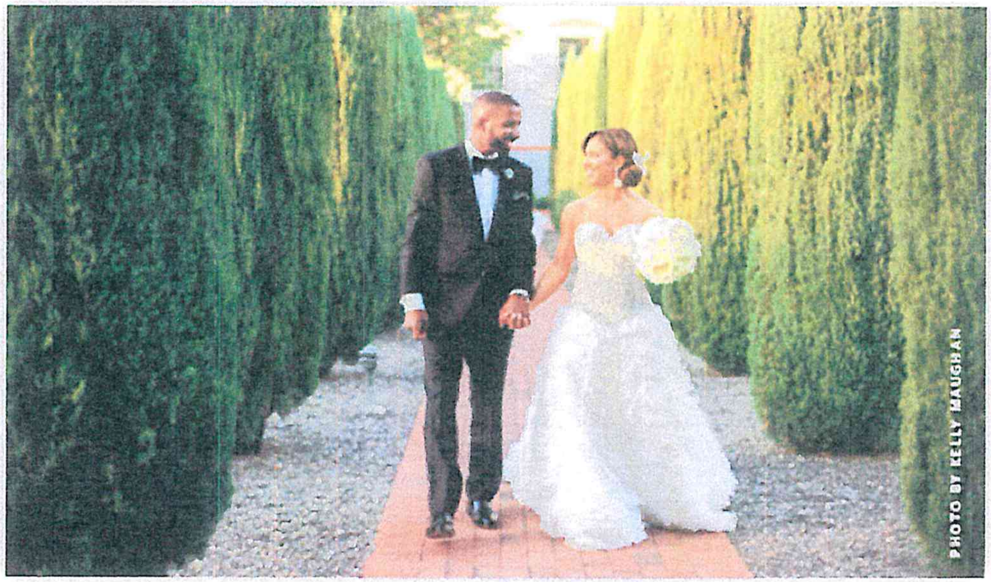

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CLOS PEGASE is an idyllic setting for any wedding, from a small intimate affair to a grand gathering of family and friends. An architectural masterpiece surrounded by vineyards, the property has a feel of modern luxury that is like no other winery in the Napa Valley. As you enter our breathtaking portico it provides a unique window to nature that embraces the winery, the expansive lawn lined with Cypress trees: that invites you to our spacious brick

CLOS PEGASE is an idyllic setting for any wedding, from a small intimate affair to a grand gathering of family and friends. An architectural masterpiece surrounded by vineyards, the property has a feel of modern luxury that is like no other winery in the Napa Valley. As you enter our breathtaking portico it provides a unique window to nature that embraces the winery, the expansive lawn lined with Cypress trees; that invites you to our spacious brick courtyard. **Applebone Vineyard**, is our unique wedding site that is nestled amongst the vines, with Mount St. Helena as a backdrop, and the rolling hills of the valley will provide you with a stunning setting for your most special day. All this conspires to create an atmosphere that is at once intimate and grand.

Clos Pegase offers exquisite caves to entertain your guests, with a dining capacity of up to 250 guests. The main tunnel will lead you to a trail of glowing candlelight into our enchanting Cave Theater, where your guests can dance the night away. Your wedding day here will be nothing short of magical!

We would be honored to be part of your day...

Location Names:

- Portico Entrance
- Courtyard
- Cypress Lawn
- Applebone Vineyard
- Cask Room
- Caves
- Cave Theater

CLOS PEGASE
NAPA VALLEY

AT CLOS PEGASE WINERY WE HELP YOU CREATE the most unique and memorable experiences. From anniversaries, rehearsal dinners, birthdays, holiday parties, private parties and more, we will transform our winery into your unique vision for the event. Along with the stunning setting, dramatic architecture, and world-class wines, we will provide you with best in class hospitality and get all of the details just right, including food, décor, and live entertainment. No matter the occasion, events at Clos Pegase reflect a welcoming blend of elegance and magic for you to create memories you will never forget.

Clos Pegase provides several distinct spaces for your event, each delivering a unique experience depending on your needs. Whether you are looking for an indoor or outdoor location, a large area for hundreds of guests or an intimate space, Clos Pegase has several different options from which to choose.

A few locations for our events:

- Portico entrance
- Courtyard
- Cave Theater
- Visitor Center
- Cask Room
- Harvest Dining Room
- Vineyard Picnic Area

Contact our Event Team at 707.921.2631 to work with you on all of the details to have the perfect event at Clos Pegase Winery.

Clos Pegase Winery

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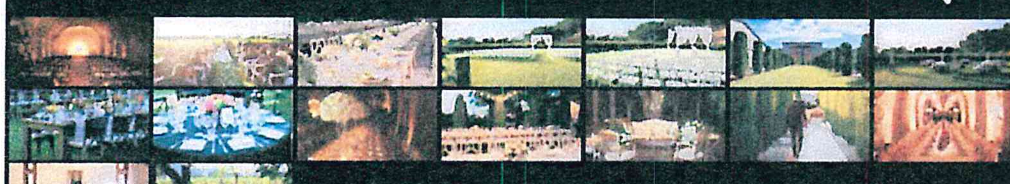

Venue Details

1060 Dunaweal Lane
Calistoga, CA 94515

Email Favorite

Style:	Winery/Vineyard, Historic/Landmark Building, Park/Garden, Outdoor
Max Capacity:	250 guests
Outdoor Ceremony:	Yes
Indoor Ceremony:	No
Outdoor Reception:	No
Indoor Reception:	Yes
Catering Options:	Choose from List
Alcohol Options:	BYO
Time Restrictions:	08:00AM to 10:00PM

Price This Venue

Book a Tour

Clos Pegase Winery Details

Overview Amenities

Description

Nothing says luxury like an elegant wedding celebration in one of Napa's exquisite wineries. Clos Pegase Winery, set in idyllic Napa Valley just minutes from Calistoga, is the epitome of modern luxury. This beautiful venue will make you feel as though you have been transported to Tuscany. As you enter the portico, the unparalleled view of the lush lawn lined with Cypress trees will take your breath away as you make your way into the brick courtyard. Imagine walking down the aisle with Mount St. Helena providing a grand backdrop for your special day, surrounded by your friends and family amongst the verdant vines of Applebone Vineyard. After your stunning vows, your guests can make their way through an elegant tunnel to enjoy gourmet food and exquisite wines in the soft, glowing candlelight of the Cave Theater. Full of vintage luxury, the Cask Room offers fantastic photo opportunities for your wedding album, and the unique caves will have your guests impressed the whole night through. Time to raise a glass and cheers to your new life together!

Wedding Style

Winery/Vineyard, Historic/Landmark Building, Park/Garden, Outdoor

Services

Outdoor Ceremony, Indoor Reception

Capacity

Max Outdoor Ceremony: 250 guests
Max Indoor Reception: 250 guests

Time Restrictions

Set up can start 3 hours prior to event. Events must end by 10:00PM.

Rental Fees

The rental fee ranges from $12,000 to $15,000 for ceremony and reception and includes 5 hours of event time excluding set up and clean up. Additional hours can be arranged.

Wedding Cost

The average wedding cost at Clos Pegase Winery is estimated at between $17,115 and $27,625 for a ceremony & reception for 100 guests.

Catering

Choose from List

Alcohol

BYO

Book a Tour Price This Venue

Calistoga Food and Wine Festival, continued...

The winery dinner will be the third portion of the festival and the cost will be based on a price set by the participating winery. Ultimately, it is **our goal to have multiple wineries hosting a Saturday night wine dinner, giving the attendees several options and a variety of unique experiences.** This may still be possible for this year depending on the responses we receive from the members of the CWG.

Sign ups are now open. Please respond to Adam Fox to ensure your participation and to help make the Calistoga Food and Wine Festival a success!

SEEKING MAGNUMS FOR AUCTION NAPA VALLEY E-AUCTION LOT

Calistoga Winegrowers is again participating in Auction Napa Valley with an E-Auction lot. **We are seeking two things to fufill this lot: Magnums of wine.** These do not need to be a Calistoga AVA wine, per se, but winery must be a member of Napa Valley Vintners and Calistoga Winegrowers. **Experiences:** This is a "Calistoga Experience" lot. So if you have any contacts that might be able to provide lodging, meals, museum tickets, spa treatments, etc., please forward their information to us.

Contact Carolyn Czapleski to donate to this lot.

MEMBER PROFILE: CLOS PEGASE

CLOS PEGASE
NAPA VALLEY

Founder: Jan Shrem **Current owner: Vintage Wine Estates**

General manager: Samantha Rudd

Winemaker: Richard Sowalsky, with Marco Di Giulio as consulting winemaker

When Vintage Wine Estates, owned by Leslie Rudd and Pat Roney, purchased Clos Pegase from founder Jan Shrem in August 2013, it was a bit like coming full circle for Leslie. "Clos Pegase was one of the first wineries my father visited when he came to Napa Valley, and always thought Calistoga was a special place," says Clos Pegase general manager Samantha Rudd. "We're honored to be the new stewards of this brand and winery."

Samantha joined Clos Pegase after a lunch with Jan and Leslie, where the talk turned to family. Leslie thought it would be valuable for Samantha—who at that time was managing hospitality at Rudd Estate—to spend some time earning her own success outside the family estate. Jan thought Clos Pegase could be a good fit for her. A month later, Samantha started as general manager of Clos Pegase.

Jan established the winery in 1984 with the help of Andre Tchelistcheff, who made the first vintage of wines, and legendary architect/designer Michael Graves, who designed the winery and its grounds. So Samantha's vision is to maintain the integrity of property and the brand while making both more accessible to wine lovers.

The winery now hosts weddings, among other events, and a remodel of the house on the property will create a new event space. "The house is a beautiful jewel, so we look forward to making that available," says Samantha. Wine production, which is currently at 25,000 cases, will be increased to make use of the winery's extensive vineyard acreage while still remaining focused on producing estate wines.

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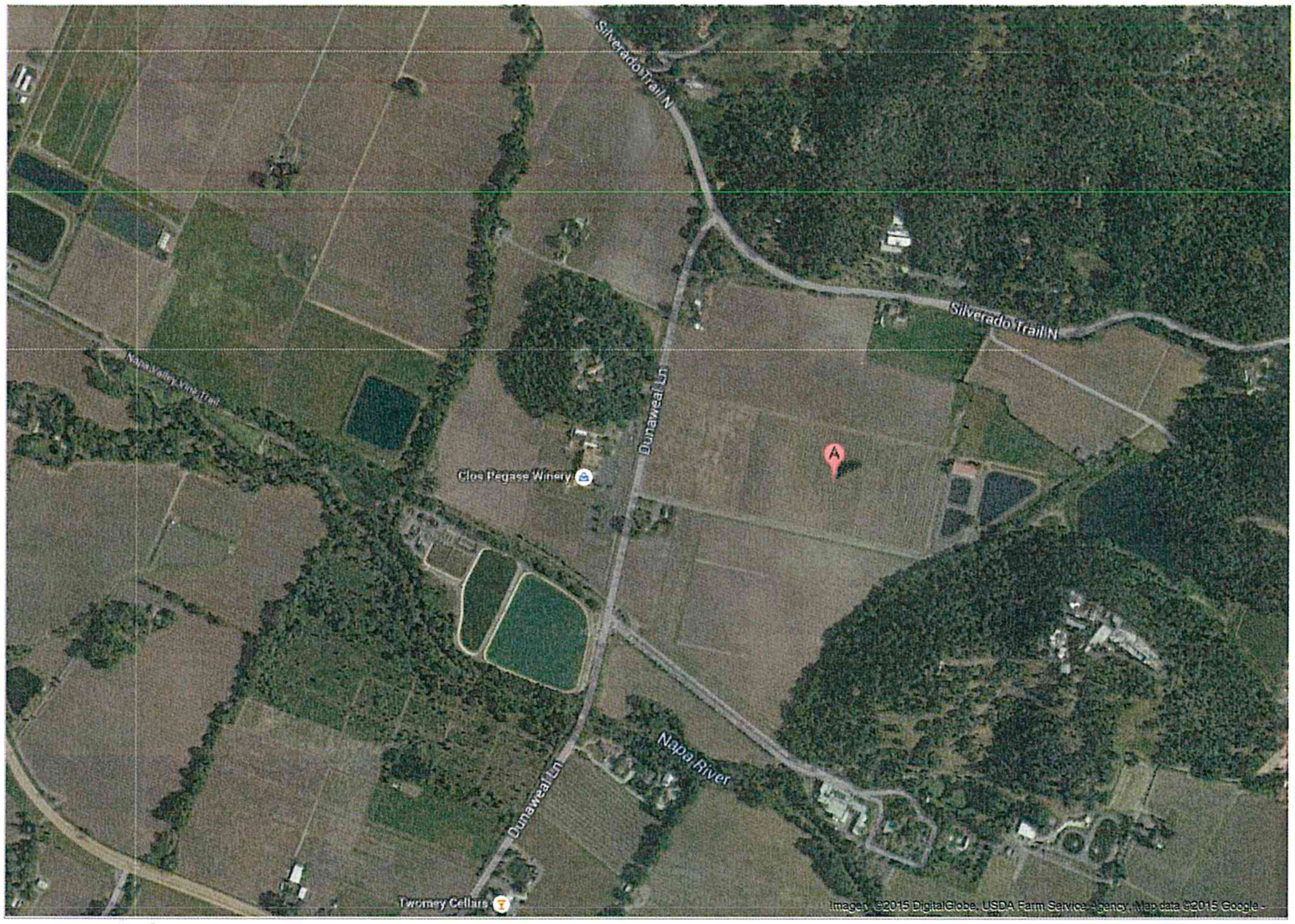
To see all the details that are visible on the screen, use the "Print" link next to the map.

Google



Planning Commission Mtg.

JAN 21 2015

Agenda Item # 9A

Bill Hocker Letter

Planning Commission Mtg.

JAN 21 2015

Agenda Item # 9A

John McDowell
Deputy Planning Director
Napa County

January 19, 2015

Regarding: Girard Winery Application

Dear John and Planning Commissioners,

My wife and I live at 4704 Silverado Trail, where Dunaweal intersects the Trail. I have concerns, and critical, relevant information about the Girard Winery application, regarding water supply in the area. The applicants have not adequately proved that sufficient water is available on the property, nor that there are no significant negative effects of pumping the projected volume of groundwater. I respectfully request the opportunity to speak longer than the normal 3 minutes at this Wednesday's hearing, to express this to the Commission; thank you.

My wife and I own 33 acres, with three wineries bordering our parcel. Our well is on the valley floor, and provided plenty of water. When a neighbor's 12.5 acres of valley floor vineyard and home needed more water than their existing 3 wells could provide, they drilled another well 50 ft from ours. Our available water then decreased.

Later, new owners converted some of that vineyard into Venge Winery, and constructed a large metal water storage tank to increase their capacity. However, during the growing season, despite pumping as much as they can from groundwater, their system does not supply enough. They've had to truck water in regularly for years, perhaps more than once a week. They probably would have had to show sufficient supply was available to get their winery permit, but that "proof" clearly turned out to be wrong.

Properties around us have multiple wells (some abandoned) in order to try to meet their water needs. After the neighboring vineyards reduced our well's output, we drilled 3 or 4 "dry" wells before we found more water. Only the variety of terrain on our property allowed that; we could have drilled on the valley floor forever without success, and simply drilling deeper to reach more water was not an option because drillers want to avoid hitting boron and geothermal, common to the Calistoga area.

Girard Winery water:

The Clos Pegas #2 well is designated to provide the water for Girard Winery, as well as continuing to provide for Clos Pegas Winery. It is currently providing for Clos Pegas winery production, reported to be 25,000 cases, or 60,000 gallons, with plans to increase that production and a permit for 200,000 cases (*Wine Spectator 8/21/13*). The Girard application is also for 200,000 gallons. The total production of the two wineries would be 400,000 gallons, or 6.7 times the current 60,000 gallons of Clos Pegas wine. This also means 6.7 times as much water would be used. That's a major change.

Well #2 may have produced enough water historically for Girard's past, lower production, but there has been no proof that 6.7 times the water can be pumped regularly over a prolonged period from this well, or as a whole from the property. Girard's Water System Feasibility report claims that the well logs show that well #2 produces 23 gallons per minute (gpm), and with its pump produces 18gpm, calculating that pumping for 13.8 hours daily will provide the required volume of 14,978 gallons. That's a theoretical conclusion, assuming the water level in the well doesn't drop; a lower level makes a pump work harder, producing less water; and if the water level falls too low from pumping… there is no water left to pump.

The Water Well Driller's Report #384909 reports the static water level in the well was 25ft, and that after a well test removed 30gpm for 3 hours, the water level had lowered to 200ft; the test may have stopped because the 220ft deep well was almost empty. This would equate to 5,400 gallons produced in this single test, which emptied the well. Well recovery time and prolonged water production have not been evaluated. The Peak Daily Water Demand (*Water System Feasibility study, pg 4*) is calculated to be 14,978 gallons, almost 3 times the test volume, per day. Because we don't know how long it takes this well to recover and be able to produce again, we don't know if the well can pump that test volume 3 times per day, or what the long term effects of such pumping will be on the well. Given that 14,978 gallons would be needed to produce 6.7 times the current Clos Pegas wine volume, then the calculated daily volume of production water this well currently produces for Clos Pegas could be estimated to be:

14,978 / 6.7 = 2235 gallons

Apparently the well can produce that much, but that's all that might reasonably be "proved" at this time; long-term capacity beyond that volume hasn't been proved. If this well can't produce sufficient water, the application mentions 1 (or 2?) other existing wells, which currently may be disconnected and/or not a potable source. The production of these wells has not been referenced, and the same concerns over proving actual production exist. Drilling additional wells is possible, but as my neighbor and I have experienced on our properties, it is no guarantee of water.

Trucking:

If sufficient water isn't available from the property, Girard and Clos Pegas would end up trucking water, probably lots of water. Does Napa County really believe in approving such a scenario? What if this becomes a County wide occurrence? That is not a sustainable policy. With the water information before you now, the Girard project should not be allowed to proceed and become a precedent for poor planning and trucking water. If wine can't be made on a site, there should not be a winery there. It's that simple.

This is exactly what has happened to Venge's 20,000 gallon winery, even after drawing as much water as possible from multiple wells on a 12.5 acre valley floor site. The Girard/Clos Pegas wineries will produce 20 times more wine, and need 20 times more water, but they will be drawing water from a valley floor site only 2 times the size.

That's 10 times the water per acre that my neighbor could find… will Girard be that lucky? Will the County bet on that?

Consider that, from the Phase 1 study, page 5:

> "…all vineyard irrigation is supplied by the irrigation reservoir on the Girard parcel. This pond is filled solely with rainwater, vineyard subdrain water, and treated winery process wastewater. This pond is the sole source of irrigation for all vineyards and landscape on the Girard and Clos Pegase parcels.
>
> *Clos Pegase Winery Process Use*
> Process water demand is estimated using the factors in the Napa County Phase One form.
>
> 200,000 gallons wine/yr x 2.15 ac-ft/100,000 gallons wine = 4.30 ac-ft/yr
>
> Additionally, water use data for the existing Clos Pegase and Girard process operations was reviewed for the wastewater feasibility study preparation. In that analysis, it was estimated that approximately 920,000 gallons (2.82 ac-ft/yr) of process water will be required. This number is used as an estimate of treated process wastewater available for irrigation of onsite vineyards and landscape. That volume is subtracted from the parcel demand, as it is not a demand on groundwater resources."

The winery process water comes from well #2, and a significant volume of process wastewater, 920,000 gallons, is earmarked for vineyard irrigation. If that well doesn't produce enough for the winery, the calculated wastewater would not be available for irrigation either; and all the project calculations fall apart.

So, if there is a need to truck water for winery production, that same trucked water would end up as process wastewater for irrigation. I understand the trucked water comes from municipalities… is irrigation with that water legal in this county?

The GRAC report:

The Napa Valley GRAC report is often referenced to claim that there is no known water shortage on the Valley floor. It can also be used to claim there is no known water abundance on the Valley floor, because the report actually says neither. It's an intelligent, highly professional, comprehensive report, but recognizes the need to state repeatedly throughout the text that available monitoring and data are often insufficient, especially in the Calistoga area, the site of the Girard proposal:

> **"2.3 Napa Valley Floor Geologic Subareas**
> The Napa Valley Floor is informally divided into four areas for this Report. The upper valley extends from the northern end of the valley just north of the town of

St. Helena. This area is about nine miles long and about one mile or less in width. Except for near St. Helena, the upper valley was not examined for this study." *(GRAC, pg. 25)*

"The upper Napa Valley and the MST area were largely excluded from the present study because of the small size of the upper valley and the previous detailed studies of the MST." (*GRAC, pg. 25)*

"As with the calculated depth to groundwater values along the Napa river thalweg, the groundwater elevation contours in Spring 2010 were interpreted with limited well control (wells in the groundwater level monitoring program with known well construction information) and, therefore, calculated values in many area of the valley have great uncertainty." *(GRAC, pg. 69)*

"**Figure 8-7** illustrates annual root-zone water balance model results for the Napa river near Calistoga watershed. This watershed is located at the north end of the Napa Valley and includes developed and undeveloped lands. The streamflow gage near Calistoga was only in operation for eight years…" *(GRAC, pg. 89)*

"10.3 Aquifer Testing

As explained in this Report, the distribution of the hydraulic conductivities in the Napa Valley as presented by Faye (1973) was based on data recorded on historical drillers' reports. During the current study, it became evident, based on the approximately 1,300 reports reviewed, that most of the "test" data are insufficient to adequately determine or estimate aquifer characteristics, since most of these data were recorded during airlift operations rather than a pumping test. Currently, test methods accepted in the County's Well and Groundwater Ordinance allow bailing, airlifting, pumping, or any manner of testing generally acceptable within the well drilling industry to determine well yield. Recommendations for modifying the Napa County's Well and Groundwater Ordinance (Title 13, Chapter 13.04) have been proposed to improve the quality of data received by Environmental Management concerning reporting of well yield (LSCE, 2011c). These recommendations included removal of bailing and airlifting as acceptable methods; pumping is recommended to gather the appropriate data to reliably determine well yield, particularly in areas where such information along with aquifer characteristics is determined to be important to accomplish other County groundwater objectives. In 2013, County staff and the GRAC plan to review this recommendation and provide guidance for updating the County's Well and Groundwater Ordinance. *(GRAC, pg.126)*

10.5 Groundwater Monitoring Network

This Report illustrates the distribution of current groundwater level monitoring locations, which is primarily located in the Napa Valley Floor-Napa and MST Subareas. Very little groundwater level monitoring is currently conducted elsewhere in Napa County outside these two subareas. *(GRAC, pg. 127)*

Luhdorff & Scalmanini's Figure 5-2 (page 152) map stops before Calistoga, and shows far fewer wells in the Girard project area than in St. Helena and south; their Figure 5-11 map goes no further north than St. Helena.

Some of the calculations and models do not reflect real world conditions, and so further calculations based on them for water analysis of projects such as the Girard proposal, will be increasingly inaccurate:

> **"8.10.1 Considerations Related to Overall Water Balance**
> The root-zone water balance has resulted in recharge estimates for the Napa River Basin Watershed and sub-watersheds. As noted in the discussion of the root-zone water balance components, this model does not include groundwater pumping or subsurface groundwater outflow from the underlying aquifer system." *(GRAC, pg.108)*

Conclusion:

In the absence of factual or accurate data from the GRAC report for the Girard region, the known facts from other sources concerning existing wells in the area become much more important. The water situation at Venge winery is one of the few comparisons available, and does not bode well for the much larger Girard project. At the very least, the project needs further data and studies. Tripling production at Clos Pegas to the permitted 200,000 gallons may itself create water problems; granting the Girard Winery permit will double that effect.

Even if the subject properties can produce the water, there have been no studies of the effects to neighbors or to the region in general. As in the case of Venge Winery, repercussions to neighbors do exist. The effects from the Girard/Clos Pegas project will be 20 times as great. No permit should be issued to Girard unless more extensive studies demonstrate a favorable outcome.

Sincerely,

David Clark
4704 Silverado Trail
Calistoga

Frost, Melissa

Subject: FW: Girard Winery hearing
Attachments: Girard.1.19.15.doc

-----Original Message-----
From: McDowell, John
Sent: Tuesday, January 20, 2015 10:11 AM
To: Balcher, Wyntress; Frost, Melissa
Cc: Gallina, Charlene; Anderson, Laura
Subject: FW: Girard Winery hearing

Correspondence on Girard item for tomorrow.

-----Original Message-----
From: David Clark [mailto:david@davidsjewelers.com]
Sent: Tuesday, January 20, 2015 10:07 AM
To: McDowell, John
Cc: heather@vinehillranch.com; terry scott; napacommissioner@yahoo.com; fidd@comcast.net; mattpope384@gmail.com
Subject: Girard Winery hearing

Hi John,

Would you please read my attached letter, enter it into the Girard file, and ensure that the Planning Commissioners get a copy? Thanks very much.

Best regards,

David Clark

4704 Silverado Trail

Calistoga

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Planning Commission Mtg.

JAN 21 2015

Agenda Item # 9A

Mr. John McDowell
Deputy Planning Director

Napa County Planning Commission
1195 Third Street, Suite 210
Napa, CA 94559

Re: Girard Winery, Use Permit P14-00053

Mr. McDowell, Planning Commissioners;

Please place the following comments of California Fisheries & Water Unlimited into the administrative record of Use Permit P14-00053 for the proposed Girard Winery, Calistoga, CA.

California Fisheries &Water Unlimited opposes the approval of this Use Permit and project as proposed because of the potential for adverse impacts to the Northern Napa River and its tributaries. CF&WU is interested in all projects, whether of county or municipal origin, which have the potential to adversely impact the Napa River watershed, its aquatic resources, and those species protected under state and federal law. It is the opinion of CF&WU that the information provided does not support a Negative Declaration, that additional analysis is needed to better determine the cumulative impacts to Napa Valley resources, and that an Environment Impact Report is warranted.

The Girard project is of particular concern because of cumulative impacts to the Napa River watershed. It is a critical time for the Northern Napa River. This neglected stretch of the Napa River system appears at last to be receiving the attention it sorely deserves and which is legally due it under the premise of the Public Trust Doctrine, the guiding principle which obligates government to protect and preserve US waterways "in trust" for public uses. Efforts at Northern Napa River restoration are just beginning. These include:

~ Recent litigation which has resulted in the bypassing of water from Calistoga's municipally-owned Ghisolfo Dam to Kimball Creek, the headwaters of the Napa River, for the first time since the dam's construction in 1939. This bypass is intended for the sole purpose of sustaining fisheries pursuant to California Fish & Game Code section 5937.

~ Agreement between Calistoga city managers and representives from Friends of the Napa River, Living Rivers Council, Napa Chapter of the Sierra Club, Napa County Resource Conservation District, and CF&WU on September 30, 2014, to support the modification and/or removal of a second municipally-owned dam and reservoir on Cyrus Creek, a tributary of the Northern Napa River. Feige Dam has been a barrier to migratory fisheries since its construction in 1885;

~ Joint efforts by the Napa County Flood Control, Napa County Resource Conservation District, California Department of Fish & Game, and City of Calistoga for the removal of a concrete footbridge on the Napa River in downtown Calistoga. The footbridge has been a barrier to migratory fisheries for many decades;

~ Receipt of a state grant in 2014 by the California Land Stewardship Institute to assess the condition of the Napa River from Bale Lane (approximately 4.1 miles south of Calistoga) to Lincoln Avenue (in downtown Calistoga) in an effort to plan for stream restoration, similarly to what has been done in Rutherford and Oakville. The Napa County Resource Conservation District will be acting as the subcontractor responsible for the fisheries assessment component of the plan, and notes that "improving and expanding habitat for steelhead trout and chinook salmon is a top priority in the Napa River watershed".

~ Recent adoption by the San Francisco Bay Regional Water Quality Control Board on November 12, 2014, of Cease and Desist Orders for the City of Calistoga for violations at its Dunaweal Wastewater Treatment Plant. The CDO includes a laundry list of demands to correct past violations, prevent additional emergency discharges of tertiary-treated wastewater to the Napa River, resolve seepage from the plant's unlined riverside effluent storage ponds to groundwater and the river environment, provide data on its "constituents of concern" (including boron, arsenic, copper, lead, thallium, zinc, and antimony), plan for future pollution prevention, and protect agricultural interests and authorized water users downstream. The close proximity of the Girard project to this problematic plant is especially concerning to CF&WU.

~ Continuing protest by the San Francisco Bay Regional Water Quality Control Board of plans for aggressive logging targeted on Calistoga's steep west side. Timber Harvest Plan 1-13-126 NAP, which requires the approval of multiple agencies to proceed, will decide the fate of the controversial Calistoga Hills Resort, located approximately 1.5 miles from the proposed Girard Winery project. The Regional Water Board is citing serious concerns with erosion, sedimentation, and adverse impacts to anadromous Salmonids (steelhead and salmon) in all freshwater life stages.

In light of these and other restoration efforts currently planned for the Northern Napa River, the extended drought conditions and climate changes associated with it, and four very ambitious projects approved and/or under construction in the City of Calistoga (the Indian Springs Resort, Silver Rose Resort, Calistoga Hills Resort, and the Calistoga Family Apartments low-income housing project), it is the opinion of CF&WU that now is not the time to be adding more stresses to the unique hydrogeology of the area, the greater Napa Valley groundwater basin, and the Napa River system, which is impaired and 303D-listed for sediments, nutrients, and pathogens, pursuant to the federal Clean Water Act. It is shortsighted to ignore consideration of city projects combined with those under county jurisdiction. All current and future projects that extract groundwater need to be assessed in order to fully assess undetermined cumulative effects created by this and future projects in order to assure that water resources are protected for future generations of Californians. As an example, the County must consider the fact that groundwater extraction from the Napa Valley groundwater basin is occuring within the municipalities of Calistoga, St. Helena, Napa, and American Canyon and are not regulated by the County. Like the human circulatory system, all water is interconnected, and water quantity and water quality go hand in hand: this is part of the larger California Basin Plan. Long-range, cumulative impacts to the Napa Valley groundwater basin, or to surface waters such as the Napa River and its tributaries must be considered in order to sustain a healthy, viable watershed. Much of this is law; some is simply common sense.

CF&WU has the following concerns with regard to Use Permit P14-00053 and the Girard Winery project as proposed, and urges further hydrogeologic analysis in order to better determine appropriate mitigations, if any.

Should further, detailed hydrogeologic analysis demonstrate that groundwater levels in the area are in decline, the Use Permit should not be approved, since the project has the potential to further deplete critical groundwater resources;

If further hydrogeologic analysis demonstrates the water table is in fact dropping as local sources report, whether it is due to climatic conditions, the cumulative effects from the pumping of neighboring wells, or otherwise, the Use Permit should not be approved. Additional groundwater extraction from the Napa Valley groundwater basin has the potential to contribute to diminished stream flows and/or to dewater portions of the Napa River and/or its tributaries;

If further hydrogeologic analysis demonstrates that the additional extraction of groundwater has the potential to cause problematic pollutants of the Dunaweal Wastewater Treatment Plant to move towards the Napa River and/or its tributaries, the Use Permit should not be approved. The interaction between the Napa River, its underflow, and the groundwater system must be taken into consideration when determining whether groundwater pumping has the potential to cause or create adverse environmental impacts;

If further hydrogeologic analysis demonstrates the possibility that additional groundwater extraction in the area will drawdown the water table, especially in dry years, and has the potential to change the flow gradient for discharge to the Napa River and/or its tributaries, then the Use Permit should not be approved;

And should there be any evidence after further study(s) that threatened or protected Salmonid species in all freshwater life stages of the Napa River system will be adversely impacted or will result in juvenile mortality, and budding efforts at restoring what was once a viable fishery are undermined in the process, then the Permit should be unequivocally denied. It is the County's responsibility to ensure that no adverse impacts to protected species of the Napa River occur due to conditions such as dewatering, groundwater extraction, or otherwise, in order to protect the beneficial uses of the Napa River and to prevent future degradation.

… As late as 1963, the Napa River was reported by the California Department of Fish & Game as the "most important steelhead stream bordering San Francisco Bay". In fact, the Napa River and many streams in the county historically supported large numbers of steelhead trout, chinook salmon, and coho salmon. Unfortunately, their populations have declined sharply in the past several decades. Steelhead were listed as threatened in Napa County in 1997 under the federal Endangered Species Act and are under the authority of the US NOAA Fisheries agency; they are also protected by the State of California Endangered Species Act under the authority and management of the California Department of Fish and Game. A small chinook salmon run still exists in the Napa River, but is remains unclear whether they are wild fish or hatchery strays originating from the Sacramento or San Joaquin river systems. Coho salmon became extinct in the Napa River in the 1960's.

I am unaware of any grape varieties in the valley nearing extinction.

CF&WU urges denial of Use Permit P14-00053 and strongly recommends preparation of an EIR for the Girard Winery project.

Respectfully submitted,

Christina Baiocchi Aranguren
California Fisheries & Water Unlimited

Dated: January 16, 2015
bcc: Interested parties

SHUTE, MIHALY
& WEINBERGER LLP

396 HAYES STREET, SAN FRANCISCO, CA 94102
T: (415) 552-7272 F: (415) 552-5816
www.smwlaw.com

Planning Commission Mtg.
JAN 21 2015
Agenda Item # 9A

January 20, 2015

Via E-Mail

Commissioner Phillips and Members of the
Planning Commission
Napa County
1195 Third Street, Suite 210
Napa, CA 94559

Attn: David Morrison, Department Director
David.Morrison@countyofnapa.org

Re: Girard Winery Use Permit P14-00053 Initial Study/Proposed Negative Declaration.

Dear Commissioners:

On behalf of the Tofanelli family, we submit these comments on the Initial Study/proposed Negative Declaration ("IS") for the proposed Girard Winery Use Permit ("Project"). Substantial evidence shows that the Project could have a number of potentially significant impacts on the environment. Accordingly, and as a matter of law, the Planning Commission would be in violation of the California Environmental Quality Act, Pub. Res. Code § 21000 et seq. ("CEQA") if it adopts the proposed Negative Declaration and approves the Project without first requiring the preparation of an environmental impact report ("EIR").

As discussed below, the IS neither accurately identifies nor analyzes the extensive project-specific and cumulative environmental impacts that will accompany the Project. The document lacks the necessary evidentiary support that the Project will not adversely impact water supply, water quality, transportation, parking, noise, and visual resources. Furthermore, the mitigation measures the IS relies on are vague, deferred and unenforceable. In the absence of an enforceable and proven plan for mitigation for the extensive significant environmental impacts, there remains more than a fair argument that the Project will have significant environmental effects not analyzed nor acknowledged in the IS.

In addition to these CEQA deficiencies, the Project violates the Winery Definition Ordinance and significant provisions of the Napa County General Plan. Thus, approval of the Project would not just violate CEQA, but would also violate California Planning and Zoning Law, Gov't Code § 65000 et seq.

As an initial matter, we request that the Planning Commission delay consideration of this Project for a minimum of 30 days. The abbreviated public review period for a project of this magnitude, and with such potentially severe environmental consequences, is particularly troubling. As we explained in our December 15, 2014 letter to the Commission, the County released the IS on November 25, 2014, just two days before Thanksgiving with an initial public hearing date of December 17, 2014. The County granted a brief extension of the comment period –till January 21, 2014 -- but the extension included the holiday season when members of the public were otherwise occupied. In essence, therefore, the County is providing only 12 additional days since the end of the holiday season to complete our review, retain experts and prepare a letter for submission. Of critical importance, the Commission is being asked to consider approval of this Project, without having the opportunity to review the public comment on the IS.

This letter, along with the hydrologic report prepared by Tom Myers, Ph.D., (Exhibit 1), as well as a separate letter and/or oral testimony to be submitted by the Tofanelli family, constitute the Tofanelli family's comments on the IS.

I. The Project Violates CEQA and the Project's Potentially Significant Impacts Prohibit the County From Approving the Project Without First Preparing an EIR.

A. Legal Standard

It is well settled that CEQA establishes a "low threshold" for initial preparation of an EIR, especially in the face of conflicting assertions concerning the possible effects of a proposed project. Pocket Protectors v. City of Sacramento, 124 Cal. App. 4th 903, 928 (2005). CEQA provides that a lead agency may issue a negative declaration and avoid preparing an EIR only if "[t]here is no substantial evidence, in light of the whole record before the lead agency, that the Project may have a significant effect on the environment." CEQA § 21080(c)(1). A lead agency may adopt a negative declaration only when all potentially significant impacts of a project will be avoided or reduced to insignificance. Pub. Res. Code § 21080(c)(2); Guidelines § 15070(b).[1] A

[1] The CEQA Guidelines, 14 Cal. Code Regs. § 15000 *et seq.*, are referred to as "Guidelines."

negative declaration will also be set aside if its conclusions are not based on substantial evidence in the record. *Sundstrom v. County of Mendocino*, 202 Cal.App.3d 296, 311 (1988).

An initial study must provide the factual and analytic basis for an agency's determination that no significant impact will result from the project. Guidelines § 15063(d)(3). An agency must prepare an EIR whenever it is presented with a "fair argument" that a project may have a significant effect on the environment, even if there is also substantial evidence to indicate that the impact is not significant. *No Oil, Inc. v. City of Los Angeles*, 13 Cal. 3d 68, 75 (1974); Guidelines § 15064(f)(1). Where there are conflicting opinions regarding the significance of an impact, the agency must treat the impact as significant and prepare an EIR. Guidelines § 15064(f)(1); *Stanislaus Audubon Soc'y v. County of Stanislaus*, 33 Cal. App. 4th 144, 150-51 (1995).

Further, where the agency fails to study an entire area of environmental impacts, deficiencies in the record "enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Sundstrom v. County of Mendocino*, 202 Cal.App.3d 296, 311 (1988). In marginal cases, where it is not clear whether there is substantial evidence that a project may have a significant impact and there is a disagreement among experts over the significance of the effect on the environment, the agency "shall treat the effect as significant" and prepare an EIR. Guidelines § 15064(g); City of Carmel-By-The-Sea v. Board of Supervisors, 183 Cal.App.3d 229, 245 (1986). Given this standard, an EIR is required for this Project.[2] As discussed below, there is a fair argument that the proposed Project will have potentially significant environmental impacts.

B. The IS's Hydrology and Water Quality Analysis is Inadequate, and There is a Fair Argument That These Impacts Are Potentially Significant.

1. Water Supply Impacts

The IS asserts that groundwater levels in the Napa Valley Floor exhibit stable long-term trends with shallow depth to water. IS at 13. It then asserts that "because the water demand for the Clos Pegase Winery and the Girald Winery is below the minimum threshold for water use, the Project would not substantially deplete

[2] Although it is our unwavering legal opinion that the County must prepare an EIR for this Project, if the County decides to rely on the IS, but modify the Project or adopt additional mitigation measures, it must, at the very least, recirculate the IS for further public review and comment. Guidelines § 15073.5.

groundwater supplies or interfere substantially with groundwater recharge. *Id.* at 13. As the Myers Report explains, the IS is wrong on both counts. Groundwater pumping for the Project may exceed the rate that groundwater is replenished because the IS appears to substantially overstate groundwater recharge. This pumping would cause depletion of the groundwater table and water to be drawn from the Napa River. In addition, the well proposed to be used for the Project may cause sufficient drawdown which would adversely affect neighboring wells.

(a) There is No Evidence that Napa Valley Has Stable Long Term Water Supply Trends.

According to Tom Myers, hydrographs for a nearby Project well (8N/6W-06L4) show declining groundwater levels commencing in about 2007. Myers Report at 2. In addition, at least four of eleven well hydrographs in the Calistoga area show downward trends in groundwater elevation. *Id.* at 3. Inasmuch as the drought has effectively continued since 2007, the groundwater level may have continued to decrease. *Id.* As Myers explains, in the absence of a detailed hydrogeologic study, there is insufficient support for the IS's determination that Napa Valley has stable long term water supply trends.

(b) Pumping For the Project Could Unacceptably Lower Groundwater Levels Because There is Not as Much Recharge in the Area as the County Assumes.

The Myers' report demonstrates that recharge for the area is likely overestimated. Myers Report pgs. 2 through 9. Consequently, it is possible that the County's water use criteria of 1.0 acre foot per acre per year ("af/y") is too high and that pumping at that rate, or even at a fraction of that rate, will draw down the groundwater table. Drawdown occurs when the pumping rate exceeds the rate recharge is replenishing the water table. Drawdown will also eventually change the flow gradient for discharge to the Napa River and pumping will affect the river. *Id.*

Myers' Report goes on to explain that the well proposed to be used for the Project may also cause sufficient drawdown, thereby potentially affecting neighboring wells. The Project applicant reports that the well that will provide water for the Project, currently serving the Clos Pegase Winery, has a yield of 23 gallons per minute (gpm) but has been fitted with a pump that will provide 18 gpm, or 9,460,800 gallons per year if operated full time[3], which is 29 af/y. Myers examined the log for this well and determined it is doubtful that this well could actually pump at 18 gpm and yield 29 af/y without going dry. Myers Report at 7,8. "The drawdown shown on the well log, if maintained for a significant period, would likely cause substantial drawdown of neighboring wells." *Id.*

C. Water Quality Impacts

In addition to depleting groundwater levels, the pumping associated with the Project could cause boron and arsenic plumes to expand through the area. According to the Myers Report, very high concentrations of each contaminant exist northwest of the Project site area and along the base of the mountains south of the site. Myers Report at 9 through 11. Pumping groundwater for the Project, especially if it causes substantial drawdown due to too little recharge, could create a drawdown which pulls contaminants toward the Project.

Most boron is due to relatively shallow geothermal water being drawn into the alluvial aquifers. Myers Report at 9. Just northwest of the Project site, the boron concentrations are quite high, as much as 14,000 ug/l, or almost five times the health advisory level of 3 mg/l. Arsenic concentrations range from 40 to 85 ug/l in the same area which are four to eight and a half times the maximum contaminant level. *Id.* One arsenic observation just south of the project site is 75 ug/l. Groundwater water quality in the Project area also shows that chloride, specific conductance, nitrate and total dissolved solids also occasionally exceed standards in the Calistoga area. *Id.*

Cumulative pumping in the Calistoga area controls the flow directions in the area. Additional pumping downgradient of the high concentrations, in what appears to be both an arsenic and boron plume, will draw the contaminants further into Calistoga and beyond to the southeast. *Id.* Additionally, pumping in surface aquifers which increases the gradient from depth to more shallow aquifers may draw boron or metals from geothermal water into shallow waters, thereby increasing the boron concentration.

Ample evidence exists that the Project could deplete groundwater supplies and contaminate groundwater in the Project vicinity. The County must thoroughly analyze these significant impacts in an EIR and identify mitigation measures capable of minimizing these impacts.

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[3] Letter from Robert Osborn, Ben Monroe, Always Engineering, to Stacey Harrington, Napa County Planning, Building and Environmental Services, Project: Girard Wintery – New Winery and Tasting Room Use Permit. February 21, 2014. P 2.

D. The IS's Transportation Analysis is Inadequate, and There is a Fair Argument that the Project May Have Significant Transportation Impacts.

The IS concedes that the Project will have significant impacts relating to the Project's increase in traffic. IS at 20. However, as discussed below, the document fails to adequately identify or analyze these impacts and fails to propose feasible mitigation. Consequently, the IS lacks the evidentiary support to conclude that these impacts would be mitigated to less than significant levels.

First, the IS's traffic analysis fails from its inception because it contains an inadequate study area for determining the Project's traffic impacts as it includes only two intersections -- Silverado Trail/Dunaweal Lane and SR 29/Dunaweal Lane. *Id.* at 20. By focusing only on these two intersections, the IS ignores the Project's contribution to traffic congestion north and south of Dunaweal Lane on both Silverado Trail and SR 29. Visitors to the proposed winery would, of course, not stop at these two intersections but would travel well beyond these points – north to Calistoga or south to Marin, San Francisco or Oakland.[4]

An analysis of other intersections and roadway segments along SR 29 and Silverado Trail is critical because these roadways are projected to operate at LOS F and LOS C, respectively, in 2030. *Id.* at 20. There is no doubt that traffic from the Project will contribute to these deficient service levels. Consequently, the County must evaluate the specific effect the Project's traffic will have along roadway segments and intersections north and south of Dunaweal on Silverado Trail and SR 29 and identify feasible mitigation for these impacts.

Second, the IS does not establish proper thresholds of significance for determining whether traffic from the Project will result in significant impacts on the two intersections it does analyze. The document merely recites the CEQA Appendix G checklist, which, among other things, requires the County to determine whether added traffic is "substantial in relation to the existing traffic load or capacity of the street system." IS at 19. But the IS never offers a specific numerical threshold to determine whether the new traffic from the site will be "substantial." CEQA recognizes that "the significance of an activity may vary with the setting." Guidelines § 15064(b). Without establishing how many new daily trips would constitute a significant traffic impact, it is

[4] The County's General Plan also requires impacts at unsignalized intersections (like those surrounding the Project site) to be evaluated on a case-by-case basis. General Plan at CIR-16.

impossible for the public and County decision makers to evaluate the Project's traffic impact.

Third, notwithstanding the IS's failure to identify proper thresholds of significance, the IS does acknowledge that the Project would contribute to significant impacts at the two intersections it analyzes. Under future (2030) traffic conditions, the northbound Dunaweal approach to Silverado Trail is expected to operate at LOS E and the southbound Dunaweal Lane approach to SR 29 is expected to operate at LOS F in the P.M. peak hour. *Id.* at 20. Unfortunately, the IS relies on vague and unenforceable mitigation measures to conclude the Project's impacts would be reduced to a less than significant level. *Id.*

The IS asserts that these impacts could be mitigated merely by altering employee shifts and the finish times of the nine scheduled events and by installing directional signs at the winery exit directing traffic to turn-right. The document concludes, absent evidence or analysis, that these measures would reduce the Project's traffic impacts to less than significant levels. *Id.* at 20. Yet these measures would be ineffective for numerous reasons. First, by focusing on traffic during the winery's nine marketing events, it does nothing to ensure that the Project's traffic will not impact area intersections and roadways on routine days of winery operation, i.e., the remaining 356 days of operation. Second, the provision calling for the winery to shift finish times during the winery's numerous events is vague and unenforceable. It does not describe how the winery will ensure that all traffic leaves the winery by 4:00 P.M. Indeed such an assertion is nonsensical inasmuch as the hours of operation and visitation extend until 6:00 P.M. daily. Finally, while the installation of directional signs may result in certain visitor's following these directions, unless the traffic is monitored and enforced, visitors will travel in the direction they find most convenient.

Fourth, the IS addresses only average trip generation and ignores the effect that traffic from the winery's events would have on nearby roadways and intersections. Nine marketing events per year are proposed: four with maximum 75 guests; four events with a maximum 200 guests and one harvest event with a maximum 500 guests. *Id.* While the winery would generate 74 weekday trips on an average day, it would generate a substantially greater number of trips during the winery's nine marketing events and during the crush. In fact, according to the IS's traffic study, the harvest event is projected to generate 437 daily trips. Traffic Study at 15. Furthermore, it is not clear if this figure includes the 242 daily truck trips associated with the crush days. *Id.* While we understand that these events would not occur on a daily basis, the IS may not simply ignore the severe traffic congestion that will accompany these events. Moreover, inasmuch as all of the wineries harvest during the same week or two, the cumulative effect of harvest truck trips and harvest events must be taken into account.

It is also critical to note that the Clos Pegase Winery routinely holds weddings despite the fact that such events are explicitly prohibited. Inasmuch as the proposed Project would be operated by the owner of Clos Pegase, the IS must acknowledge the potential for weddings at the Girard Winery and analyze the associated traffic impacts. Alternatively, the County must prohibit weddings as a condition of approval.

Finally, the IS fails entirely to examine the cumulative transportation impacts that will result from the Project and planned or recently approved projects in the County. Notably, the Yountville Hill Winery's September 2013 traffic study identifies 12 planned or approved new wineries or winery expansions that could have cumulatively significant traffic impacts. *See* Yountville Hill Winery's September 2013 Traffic Study, attached as Exhibit 2. But even the Yountville Winery traffic study does not include all of the new or modified wineries. In fact, the County has approved at least 19 new wineries or significant modifications to existing permits since the applicant released its traffic study last September. *See* List of Winery Projects, attached as Exhibit 3. The Girard Winery IS's failure to take into account traffic from any of these winery projects, let alone other planned land use development, is a fatal flaw. The County must properly analyze the Project-specific and cumulative traffic impacts. The appropriate forum for such an analysis is in an EIR.

E. The IS Fails to Adequately Consider Parking-related Impacts From the Project, and There is a Fair Argument That These Impacts Will Be Significant.

The IS ignores aspects of the Project that could worsen parking in the area. For instance, the proposed winery will only contain 22 parking spaces to accommodate 90 visitors and 25 employees per day, an unspecified number of trucks delivering grapes and to be used for bottling purposes, and even marketing events of up to 500 people. IS at 1, 20. The IS never considers whether this amount of parking is adequate to accommodate the maximum number of daily visitors, staff, and trucks serving the winery. Instead, it simply asserts that additional parking at the rear of the winery is available or visitors can be shuttled from off-site lots. *Id.* at 20.

The IS fails as an informational document because it does not identify how many extra vehicles the paved area at the rear of the winery could hold, or whether emergency vehicles will have adequate access with vehicles parked throughout the property. Even if the winery would have extra parking space, the County must condition the approval of the Project or adopt a mitigation measure requiring the applicant to use such space for overflow parking. *See* Guidelines § 15126.4(a) ("Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally-binding instruments"). The IS must fully analyze the parking issue to adequately inform the public about this potential environmental impact. *Taxpayers for Accountable School Bond Spending v. San Diego Unified School District* 215 Cal.App.4th 1013, 1052-54 (2013).

The IS errs further because it does not identify or analyze the transportation – or other environmental impacts – that would result from these shuttle bus operations. For example, it does not identify the location or size of the off-site parking lot, the number of shuttle buses that would be in operation, or the effect that motorists and buses accessing this parking lot would have on roadway operations. The IS's failure to identify and analyze these impacts is a fatal flaw.

Finally for reasons relating to overflow parking and other nuisances (e.g., noise, litter, vandalism) from visitors to the winery, it is imperative that a secure fence or wall be constructed between the winery and the Tofanelli family property. Such a fence or wall must be included as a condition of approval.

F. The IS's Noise and Air Quality Analyses Are Inadequate, and There is a Fair Argument That These Impacts Would Be Significant.

A particularly glaring inadequacy of the IS is its analysis of and mitigation for the Project's noise impacts. Although construction and operation of the Project is all but certain to result in a significant increase in noise levels, the IS makes no attempt to quantify these impacts. Instead it provides a generic overview, simply stating the obvious: that noise could create additional impacts and that these impacts would be less than significant. IS at 16,17. To conclude as the IS does that an impact is less than significant, the analysis must be supported with substantial evidence. Substantial evidence consists of "facts, a reasonable presumption predicated on fact, or expert opinion supported by fact," not "argument, speculation, unsubstantiated opinion or narrative." Pub. Res. Code § 21080(e)(1)-(2). Once again, the IS fails on many levels.

First, the IS provides no information as to the Project's environmental setting, other than to state that the nearest residences are located about 400 feet to the south. IS at 17. An environmental document "must include a description of the physical environmental conditions in the vicinity of the project." CEQA Guidelines § 15125(a). "Without a determination and description of the existing physical conditions on the property at the start of the environmental review process, [an environmental document] cannot provide a meaningful assessment of the environmental impacts of the proposed project." *Save Our Peninsula Committee v. Monterey County Board of Supervisors*, 87 Cal.App.4th 99, 119 (2001). Moreover, as discussed above, the significance of an impact may vary with the setting. While increased noise levels may not be significant in an urban area, they may be extraordinarily burdensome in a rural area. Due to the surrounding hills and knolls, the area acts as a natural amphitheater. Noise reverberates from hill to hill. Here, without any information on the area's acoustical setting, including an identification of existing ambient noise levels, an impacts analysis or proposed mitigation become meaningless.

Nor does the IS identify the standard or threshold of significance for determining a significant noise impact.[5] This is critical; without a significance threshold, there is no means by which to conclude whether impacts would or would not be significant. Since the requirement to provide mitigation is triggered by the identification of a significant impact, the IS's failure to identify all of the Project's significant impacts also results in a failure to mitigate these impacts.

Given the failure to describe the existing noise environment and to establish thresholds of significance, it comes as no surprise that the IS fails to identify the noise levels that would accompany construction of the Project. In fact, the document, never even attempts to predict noise levels during each phase of construction at nearby sensitive receivers. As the attached table shows, construction-related equipment and operations can be extraordinarily loud. A typical noise level for a jackhammer, for example, is upwards of 96 decibels, while loaders, backhoes and bulldozers can generate noise upwards of 85 decibels. *See* OSHA Construction-Related Noise levels, attached as Exhibit 4. The County must analyze how construction of the Project will impact noise levels in the vicinity.

Operational noise from the winery can also be quite intrusive. Noise from the winery's marketing events, in particular, such as vehicular traffic, truck traffic, buses and amplified sound could be particularly burdensome to the Project's neighbors, yet the IS provides no analysis of these impacts. Finally, as discussed above, unless weddings are prohibited as a condition of approval, the County is obligated to analyze the increase in noise from wedding-related activities.

The IS also errs in its analysis of air quality impacts because it fails to analyze the threat to neighboring farms from the dust that will accompany Project construction. Dust from Clos Pegase' vineyard operations is already harmful to the Tofanelli family's organic farms. The IS must evaluate the effect that the dust from the

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[5] The IS does refer to the Napa County Noise Ordinance, explaining that it sets a maximum permissible sound level for rural residences as 45 dB between the hours of 10 P.M. and 7 A.M. (at 17), but since the proposed Project will not normally be operating during those hours, this information is not relevant.

Project's construction and operation would have on nearby properties and identify mitigation to reduce these impacts to a less than significant level.

G. The IS's Visual Resources Analysis is Inadequate, and There is a Fair Argument That the Project May Have Significant Aesthetic Impacts.

The proposed Project will result in potentially significant visual impacts. Project construction and operation will require the installation of additional lighting. IS at 4. This light pollution will dramatically alter the visual character of the site and further erode dark skies in the area. Nevertheless, instead of grappling with these readily-apparent aesthetic impacts, the IS largely dismisses them. First, the IS fails to establish a proper baseline for lighting impacts, a flaw that is fatal to any purported analysis of light pollution impacts.

Even if it had established a proper baseline, the IS effectively concedes that light pollution from the Project could create significant impacts: "the installation of additional lighting may have the potential to impact nighttime views." IS at 4. The IS assumes that certain design features for outside lighting could reduce the significance of such impacts (*Id.*), but offers no analysis of how much these measures will reduce light and glare on the Project site. In fact, the IS cannot offer this analysis because the applicant has not even disclosed which types of outdoor lighting it will use or where it will be placed. *See* Conditions of Approval at 7, indicating that a lighting plan has yet to be prepared. This approach directly violates CEQA. An agency is required to fully evaluate potentially significant environmental impacts before it approves a project. *See Laurel Heights Improvement Assn. v. Regents of Univ. of Ca*l. 6 Cal.4th 1112, 1123 (1993).

The IS identifies measures intended to reduce light and glare such as the use of motion detectors and the low-level lighting. But the record contains no evidence that these measures will be adequate to reduce the site's light pollution to less-than-significant levels. Indeed, the IS does not even adopt a threshold of significance for making this determination, much less account for how much light pollution the building will generate with these lighting techniques. Moreover the use of these lighting techniques are voluntary and unenforceable since they include language such as "to the greatest extent practical." *Id.* Consequently, the IS provides no evidence that the light and glare from the Project would be reduced to a less than significant level.

In addition, the IS concludes that the Project would result in less than significant visual impacts because "the buildings will not obstruct the scenic distant hillsides." IS at 4. Here too, the document does not include any thresholds for determining the significance of these impacts. Nor does it provide any photographs of the site or any photo simulations of how the Project would look superimposed on the landscape. Consequently, the IS provides no basis whatsoever for this less than significant conclusion. Had the IS included a proper analysis, it would have disclosed that the 35-foot building plus the 45-foot cupola will forever degrade one of the most beautiful parts of the downvalley scenic view. The County must provide a comprehensive analysis of these impacts. The appropriate forum for such an analysis is an EIR.

II. The Project is Inconsistent With the Winery Definition Ordinance and the County General Plan.

A. The Project Is Inconsistent with the Winery Definition Ordinance.

The Winery Definition Ordinance ("WDO") contains several statements of legislative intent directly relevant to this Project. These include a declaration that the ordinance must be interpreted to achieve the goal of protecting agriculture and open space use as the primary land use in the Agricultural Preserve, and to "prohibit" the use of agricultural land for non-agricultural purposes "except to the extent expressly permitted" by the General Plan and County ordinances. *See* WDO, § 6.

The Project is inconsistent with the WDO provisions that restrict the scope and maximum square footage of "accessory uses" such as "marketing of wine" and "tours and tastings." Specifically, all such accessory uses, "in their totality[,] must remain clearly incidental, related and subordinate to the primary operation of the winery as a production facility." *See*, e.g., NCC § 18.08.370; 18.16.030(G)(5); 18.08.020. In addition, the WDO places an absolute numerical cap of the square footage of structures that may be "used for accessory uses." *See* NCC 18.104.200 ("The maximum square footage of structures used for accessory uses that are related to a winery shall not exceed forty percent of the area of the production facility.").

In addition to the 3,800 square feet of accessory uses identified in the staff report, the Project also includes a 13,000 square foot outdoor garden and tasting area, as well as a 2,600 square foot covered veranda.[6] Together these uses constitute 67 percent

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[6] It is unclear how the County concludes that the Project's accessory uses comprise only 10.2 percent of the production area. The staff report states that the production area is 28,955 square feet. Other uses identified in the staff report do not meet the definition of production facilities in the WDO and should not be included in that area when determining the total percentage of the Project that is dedicated to accessory, tourist serving uses.

of the area of the production facility – far in excess of the 40 percent limit in the WDO. Both areas are clearly intended to serve visitors. The architect's drawing of the covered veranda depicts tables and chairs in the area and the applicant has designated the 13,000 square foot garden area as a tasting area under AB 2004. Accordingly, excluding them from the 40 percent calculation is inconsistent with NCC section 18.104.200. This exclusion is also inconsistent with the manner in which the Planning Commission calculated accessory use square footage in two recent actions concerning the B Cellars and Titus Vineyards projects. For both projects, the outdoor terraced spaces were counted as part of the percentage of the project used for accessory uses. The County should treat the present Project in the same manner.

Moreover, it is clear from the past activity of the Clos Pegase Winery that the Girard Winery will use these areas for tourist serving uses and other activities that are prohibited by the WDO. As discussed above, the Clos Pegase Winery (which also owns the Girard Winery) holds weddings at its facility throughout the year, even though weddings are not permitted under the WDO. NCC § 18.08.370 (social events are only permitted to the extent they are "directly" related to the education and development of potential customers and only as part of an approved marketing plan.) In adopting the WDO in 1990, the Board of Supervisors made an express factual finding that "[t]he interspersing of non-agricultural structures and activities throughout agricultural areas in excess of what already exists will result in significant increase in the problems and costs of maintaining vineyards and discourage continued use of the land for agricultural purposes." The Board acknowledged this same concern when it amended the WDO just four years ago, finding that the WDO had been successful in achieving its purposes, in part by "limiting commercial uses in agricultural areas by ensuring that wineries remain focused on the business of producing wines, and by ensuring that tours and tastings and marketing of wine play an accessory role."

In addition to violating the letter of the WDO, the Project contravenes the intent expressed in these findings by elevating nonagricultural uses over agricultural uses. The accessory, tourism-focused uses of the Project are not "clearly incidental, related and subordinate" to the Project's primary operation as a winery. Rather, these nonagricultural uses are the Project's core purpose.

Therefore, the Project cannot be approved unless it is modified to reduce the amount of accessory uses and the County expressly prohibits any weddings or social events that are not directly related to the education and development of customers at the facility.

B. The Project is Inconsistent with the County's General Plan.

Contrary to the IS's conclusions, the Project is not consistent with the Napa County General Plan. In particular, the Project is inconsistent with the Plan's Agricultural Preservation and Land Use provisions including but not limited to: Goals AG/LU-1, AG/LU-3, AG/LU-4, the Agricultural Resources ("AR") designation on the General Plan's Land Use Map, and Economic Development Policy E-1. The purpose of these goals and policies, and of the AR designation, is to preserve and promote the existing agricultural land uses on agriculturally designated lands and to support the economic viability of agriculture, including the necessary industries that support agriculture.

Although the IS provides almost no analysis, it appears that its finding that the Project is consistent with the General Plan is predicated on its determination that the Project's accessory uses comply with the WDO and "would allow for the continuation of agriculture as a dominant land use within the County." *Id.* at 15. As demonstrated above, however, the Project's visitor-serving uses do not comply with the WDO and do not qualify as permissible accessory uses. These uses are not necessary to support the economic vitality of agriculture and will, if anything, undermine the continued economic vitality of agriculture by allowing and encouraging excessive reliance on tourism.

Perhaps even more importantly, these uses are clearly inconsistent with the intent of the General Plan's Agricultural Resources designation. As County voters reaffirmed in approving Measure P in 2008, "agriculture is and should continue to be the predominant land use, where uses incompatible with agriculture should be precluded . . .". In short, the offices, tasting rooms, retail storage, catered food prep area, veranda and garden bar are commercial uses, not agricultural ones. Accordingly, they are inconsistent with the General Plan and may not lawfully be approved.

C. The Girard Parcel and The Clos Pegase Winery Parcel Should be Treated as a Single Parcel.

Finally, the County is not required to approve the Project in order to assure the owner an economic use of its property. The Girard parcel is part of a larger holding by the owner of the adjacent Clos Pegase winery, which relies on the Girard property to provide potable water and waste water disposal. Waste water is pumped from Clos Pegase under Dunaweal Road to the Girard Parcel, where it is treated. In addition, the well on the Girard parcel provides water to the Clos Pegase Winery. The well on the Clos Pegase winery is utilized only as back up irrigation water. As a result, the Girard parcel is inextricably linked to the Clos Pegase winery parcel. Indeed, the Clos Pegase winery could not operate without the water and waste disposal provided by the Girard parcel. Where a "developer treats several legally distinct parcels as a single economic unit, together they may constitute the relevant parcel." *See Forest Props., Inc. v. United States,* 177 F.3d 1360, 1365 (Fed. Cir. 1999) (holding relevant parcel included 53 upland acres and 9 acres of lake bottom where tracts were acquired at different times but "economic reality" was that owner treated the property as single integrated project). Because the Girard parcel and the Clos Pegase parcel are under single ownership and operate as a single unit, the County is not required to approve any development on the Girard property, much less a proposal of the scope and intensity proposed here.

III. Conclusion

For the reasons set forth above, the Tofanelli family requests that the County defer action on the proposed Project until an EIR is prepared that fully complies with CEQA. As described above, there is substantial evidence to indicate that the proposed Project may have a number of significant environmental impacts. Under CEQA, the County must provide an adequate analysis of these adverse effects and include feasible measures to mitigate impacts.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Ellison Folk

Laurel L Impett

Laurel L. Impett, AICP, Urban Planner

Exhibits:

Exhibit 1: Hydrologic Report prepared by Tom Myers, Hydrologic Consultant
Exhibit 2: Yountville Hill Winery's September 2013 Traffic Study
Exhibit 3: List of Winery Projects
Exhibit 4: OSHA Construction-Related Noise Levels

cc: Norma Tofanelli
Vince Tofanelli

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Exhibit 1

Exhibit 1

Tom Myers, Ph.D.
Hydrologic Consultant
6320 Walnut Creek Road
Reno, NV 89523
775-530-1483
tom_myers@charter.net

Technical Memorandum

Review of Girard Winery Use Permit P14-00053

January 20, 2015

Prepared for:

Laurel L. Impett, AICP, Urban Planner
Shute, Mihaly & Weinberger LLP
396 Hayes Street
San Francisco, CA 94102-4421

Summary

The proposed expansion of pumping for the Girard Winery project could possibly have two potentially significant impacts. First, the pumping could unacceptably lower the groundwater levels because there is not as much recharge in the area as the County assumes. This memorandum considers the river baseflow and suggests that existing recharge estimates may be too high. Pumping could also draw water from the river.

Second, the pumping could affect groundwater flow directions and cause boron and arsenic plumes to expand through a larger portion of the Calistoga area. There are very high concentrations of each contaminant northwest of the project site and along the base of the mountains south of the site. The project pumping, especially if it causes substantial drawdown due to too little recharge, could create a drawdown which pulls contaminants toward the project.

Because of these potentially significant impacts, the project should not be permitted until a much more detailed hydrogeologic study is completed. This would include the completion of a flow and transport model to assess the change in groundwater levels, flow paths, and the extent of the boron and arsenic plumes. If the project goes forward after such a study, the flow and transport model should be used to determine where monitoring is necessary to detect the movement of the plumes.

Introduction

This memorandum reviews the negative declaration for the Girard Winery Use Permit P14-00053 (hereinafter NegDec) and various supporting documents, county studies, and letters, as cited in the reference section or in a footnote. Specifically, this review is of section IX, Hydrology and Water Quality, questions b and f. The review considers whether the project will pump more water than is available, thereby causing a deficit in aquifer volume and the potential for the project to increase pollution in the area under question f.

My experience includes a Ph.D. and M.S. in Hydrology/Hydrogeology from the University of Nevada, Reno, and a B.S. in Civil Engineering from the University of Colorado. I have approximately 20 years of experience consulting and researching hydrogeology, including groundwater modeling and contaminant transport. My curriculum vitae is attached after the reference section.

The project area is on the Napa Valley Floor, Calistoga district (L&S 2013, 2011). Based on the location map, the project is very near a constriction on the valley floor about one mile downvalley from the town of Calistoga (southeast of town). Based on the topographic map, there is a bedrock high just downgradient from the project site. The geology map (L&S 2013) shows this outcrop to be Tst, or tuffs and sediments.

The following sections describe and review questions b and f in detail.

Question b

The statement in the NegDec (p 13) that "recent studies have found that groundwater levels in the Napa Valley Floor exhibit stable long-term trends with shallow depth to water" is incorrect. Figure 4-2 in L&S (2011) shows hydrographs for wells throughout Napa Valley; of relevance to this review is the hydrograph for well 8N/6W-06L4 (129) which shows declining groundwater levels commencing in about 2007 (this hydrograph is reproduced here as Figure 1). Considering that the drought has effectively continued since 2007 through the present, the water level may have continued to decrease. The County should have attempted to obtain a more complete data set for this well.

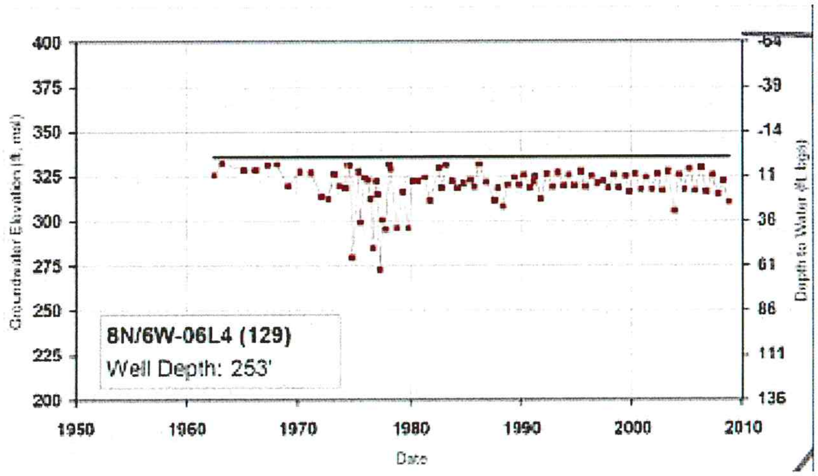

Figure 1: Snapshot of a hydrograph from Figure 4-2 from L&S (2011).

Also, at least four of eleven well hydrographs in the Calistoga area presented in the appendix of L&S (2011) show downward trends in groundwater elevation. In addition to the well cited above (NapaCounty-129), well 08N06W06LL04M decreased from more than 330 ft above mean sea level (AMSL) in the 1960s to near 320 ft amsl around 2008. Well NapaCounty-128 decreased from above 337 ft amsl in the 1960s to about 328 ft amsl in 2008. Well NapaCounty-127 decreased from about 378 in the 1960s to about 365 in 2008. Additionally, well 09N06W31Q001M appears to decrease but the elevations cannot be correct; the hydrograph shows groundwater elevations in the 100s of feet amsl in an area that the ground surface elevation exceeds 300 feet amsl and the depth to water is just two to twelve feet. Also, several well hydrographs have too short a period of record to analyze.

The water level maps in L&S (2011, Figures 4.8 and 4.9) are not sufficiently detailed to compare changes between the 1940s and 2008. Figures 7-1 and 7-2 in L&S (2013) should provide a comparison between 2008 and 2010 but in the Calistoga area appear to be based on different sets of wells so the contours in that area are not comparable.

Additionally, the statement that well levels "recover from dry periods during subsequent wet or normal periods" is not supported by the data shown in the well hydrographs. In fact, several of the wells showed a lack of recovery from the 1970s drought period. The additional statement that wells are "more affected by climatic conditions" is correct based on the seasonal changes shown on the graphs but there is no evidence that the long-term trends are based on climate, except for the drought in the 1970s, but rather based on pumping.

The NegDec also indicates the allotment for the project is 26.53 af/y, based on its area multiplied by the 1 af/y/acre "fair share water use factor" which is also called the allotment for a Napa Valley bottom acre. This allotment is compared with recharge in the area. The average

Frost, Melissa

Subject: Girard Winery, Use Permit P14-00035
Attachments: Girard Winery Use Permit.odt

From: McDowell, John
Sent: Tuesday, January 20, 2015 10:09 AM
To: Frost, Melissa; Balcher, Wyntress
Cc: Gallina, Charlene; Anderson, Laura
Subject: FW: Girard Winery, Use Permit P14-00035

Correspondence on Girard item for tomorrow's hearing.

From: California Fisheries & Water Unlimited [mailto:calfisheriesandwaterunlimited@gmail.com]
Sent: Monday, January 19, 2015 8:56 PM
To: McDowell, John
Subject: Girard Winery, Use Permit P14-00035

Mr. McDowell;

If you could please reply that you/Planning Commissioners have received the comments of CF&WU (attached), it would be much appreciated.

Thank you, Christina Aranguren

On Jan 16, 2015, at 11:18 AM, California Fisheries & Water Unlimited <calfisheriesandwaterunlimited@gmail.com> wrote:

Planning Commission Mtg.

JAN 21 2015

Agenda Item #_9A_

Frost, Melissa

Subject: FW: Girard Winery

From: Bill Hocker [mailto:bill@wmhocker.org]
Sent: Tuesday, January 20, 2015 11:14 AM
To: Heather Phillips; napacommissioner@yahoo.com; tkscottco@aol.com; mattpope384@gmail.com; Wagenknecht, Brad; Luce, Mark; Dillon, Diane; Pedroza, Alfredo; Caldwell, Keith; Morrison, David; McDowell, John; Balcher, Wyntress; anne.cottrell@lucene.com
Subject: Girard Winery

Supervisors, Commissioners and Planners,

I know this will seem like I'm just wasting everyone's time, and I agree with Supervisor Dillon that the big picture issues aren't going to be resolved through individual projects, and I know that I have no standing in the Girard project. But since I learned last March of a project proposed in my backyard I lie awake at night, every night, thinking about these things. Writing these letters helps.

"Napa County is one of the smallest counties in California and within the County areas suitable for quality vineyards are limited and irreplaceable. Any project that directly or indirectly results in the removal of existing or potential vineyard land from use depletes the inventory of such land forever."
- From the 1990 WDO

ask your indulgence for a moment to please take a look at the Girard vineyard on Google Maps by clicking here: https://maps.google.com/maps?q=1077+Dunaweal+Ln,+Calistoga,+CA&hnear=1077+Dunaweal+Ln,+Calistoga,+California+94515&t=h&z=16

GIven the propitious placement of the ponds, the vineyard is a perfect rectangle. It is almost an archetypal piece of agricultural land. But now imagine the Girard Winery, about the size of the Clos Pegase winery development area, located right in the middle of it.

Now zoom out a bit on the map and imagine a similar winery in the middle of every vineyard plot in the vicinity, including perhaps those nice rectangles on Larkmead Lane, another area of concern this week. Continue to mouse down through the entire length of the valley and imagine a winery on every empty vineyard you see. And then roam around the splotches of deforestation throughout the hills and imagine a similar winery on every splotch.

Is this the best way to protect agriculture? Is this what you want the Napa Valley to become?

The owner of the Girard vineyard has other properties already occupied by winery buildings, including the one across the street. Other developers are also coming before you seeking their 2nd or 3rd winery. Let them expand their existing wineries to increase capacity. I mean, what reason is there to build a winery other than to provide winemaking capacity? It would be a much more efficient use of the limited and irreplaceable land than the development of new facilities on undeveloped land. Please, begin here and let this plot, and all other plots in the county that have yet to be compromised by development, remain devoted purely to agriculture (in its pre-

WDO definition) . If the intentions that led to the creation of the ag preserve cannot protect this virgin field from development then the ag preserve is meaningless.

Bill Hocker
sodacanyonroad.org

Planning Commission Mtg.

JAN 21 2015

Agenda Item #_9A_

January 19, 2015

TO: Ben Monroe, PE, Always Engineering, Inc.

FROM: Jeremy Kobor, MS
O'Connor Environmental, Inc.

SUBJECT: Review of Girard Winery Phase I Water Availability Analysis, Public Water System Feasibility Study, and Water Supply Permit Amendment

Introduction

This memorandum summarizes the findings from the review of three documents related to the pending Girard Winery Use Permit application process. The documents reviewed include the following: a Phase I Water Availability Analysis completed by Always Engineering dated November 26, 2014, a Water System Feasibility Study for the Girard Winery completed by Always Engineering dated February 21, 2014, and an Amended Water System Technical Report for Clos Pegase Winery completed by Acme Engineering dated May 2009. In addition to commenting on the existing documentation, some additional perspective regarding the proposed water use relative to water availability and potential impacts to neighboring properties is also provided.

Summary of Findings

The different documents make different assumptions regarding the source of irrigation water and the Winery Water Use values. Despite these varied assumptions, even when the most conservative (highest water use) assumptions/values are used, the total proposed use for the Girard Winery is still below the 26.53 ac-ft/yr Allowable Water Allotment. Similarly, even using the most conservative water use values, the stated well capacity is sufficient to meet both peak and total annual demands under the proposed combined use by the Clos Pegase and Girard wineries.

It is my understanding that concerns have been raised that the proposed increase in production from the existing well could interfere with water availability on neighboring dry-farmed vineyards. Review of the driller's log for the project well reveals that the upper 90-ft contain primarily clay and that the well produces water over a screened interval of 80 to 220-ft below ground surface. The static water level at the time of well completion was 25-ft below ground surface. Given the presence of a thick clay layer(s) between the land surface and the zone of well production, and the separation between the water table and the land surface it is highly unlikely that groundwater production from this well would impact soil moisture conditions in the surrounding area.

Frost, Melissa

Subject: FW: Girard-Review of well information
Attachments: GirardWaterAvailability-Revised1-19-3.pdf

From: Heather McCollister [mailto:bhmccolli@sbcglobal.net]
Sent: Monday, January 19, 2015 5:42 PM
To: Balcher, Wyntress; McDowell, John; Gallina, Charlene
Cc: Pat Roney; Ben Monroe
Subject: Girard-Review of well information

Hi there,
Attached is a brief summary for independent review of our water availability/well data for Girard.

Thank you

Heather McCollister

Frost, Melissa

Subject: FW: Please forward to Planning Commissioners

Planning Commission Mtg.

JAN 21 2015

Agenda Item # 9A

From: Norma Tofanelli [mailto:keepnvap@sonic.net]
Sent: Tuesday, January 20, 2015 7:35 AM
To: McDowell, John
Cc: Morrison, David; Balcher, Wyntress; Pat Roney; Vince Tofanelli
Subject: Please forward to Planning Commissioners

Hi, John

Please forward the following apology to the Planning Commissioners - not all have contact info on the county planning web page.

The Tofanelli family apologizes for the late submission of data for the Girard hearing tomorrow.
Unfortunately, we are submitting most of our data later today. This does not allow you much time to read and absorb.
This unfortunate timing was mandated by the short continuance that you granted - over major holiday weeks.

Not only was the proposed Neg Dec issued just before Thanksgiving, the period of continuance from the original 12/17 hearing included several major holidays.
Christmas and New Year's fell in the middle of the week so that many offices were closed both weeks. and many professionals were on holiday.
In addition, yesterday was also a national holiday.
This timing allowed only about 2 weeks (from January 5 until today) to seek out and hire experts; proof and assemble final data and submit to you.
This was very difficult - most hydrologists require a minimum 45 days to prepare data. We were fortunate to find one who was familiar with Napa County and previous studies in the area. We just received his final proof.

We were able to meet with the project proponents and have agreement on conditions of approval for mutually agreeable fencing to prevent winery visitors from trespassing on neighbors' lands as well as dust control measures.

We hope that you understand and are able to study our submissions before the hearing tomorrow.

Thank you for understanding,
Norma Tofanelli

recharge for the Napa River near Calistoga watershed is 10,500 af/y (L&S 2013)[1], although this is based on the 1975 through 1983 period which includes very dry and very wet years (Figure 2). The recharge averages 19% of precipitation, but that should probably not be considered an annual value but only applied to the overall average. The gage is USGS gage #11455900 and the drainage area is 21.9 square miles. Distributing the entire recharge estimate of 10,500 af/y over the area above the gage yields an average recharge of 0.75 ft/y, which is less than the allotment. However, L&S (2013) notes that recharge varies by surface geology type; their Table 8-10 suggests that only 5867 acres or 42% of the total basin will accept recharge. If that is correct, the recharge is about 1.79 ft/y and the allotment value is conservative.

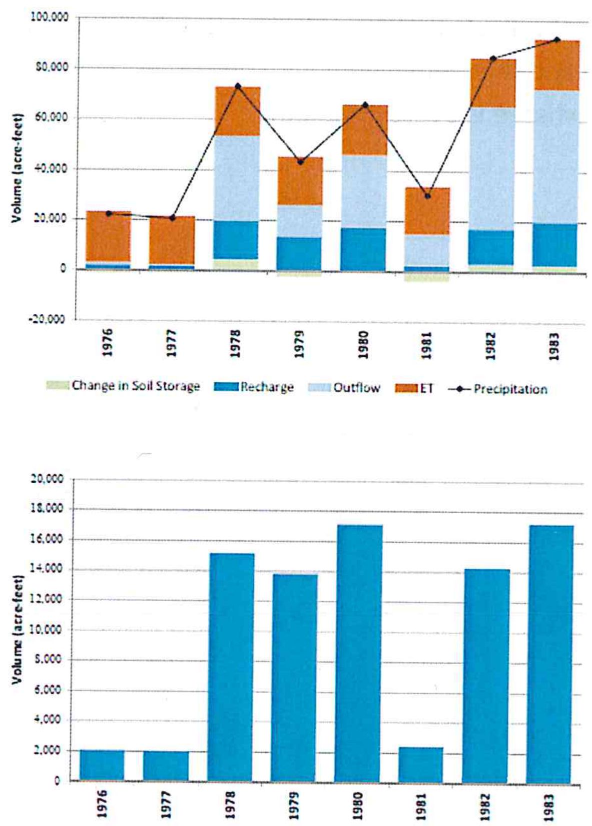

Figure 8-7. Annual Results for Napa River near Calistoga Watershed

Figure 2: Snapshot of Figure 8-7 from L&S (2013) showing the annual water balance (top) and recharge (bottom) for the Napa River near Calistoga watershed.

Recharge for the watershed above the Napa River at Calistoga gage may however be overestimated. The hydrograph for the gage is shown in Figure 3. Average flow is 32.5 cfs or

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[1] Reviewing the development of this recharge value is beyond the scope of this review.

23,556 af/y, so the estimated recharge, 14 cfs, equals 44% of the average flow. Recharge is commonly considered to equal baseflow in a river, because groundwater discharge supports a river during baseflow (Cherkauer 2004, Scanlon et al. 2002). For much of the period of record the flow for months is below 0.1 cfs (Figure 3); when the flow is that low it is without doubt baseflow especially since these low flows primarily occur during summer and early fall when there has not been substantial rainfall for months. During 1977, the highest flow was 9.9 cfs (Figure 3) or lower than the estimated recharge for the basin. Observed streamflow is often below the recharge average which indicates that the watershed had dried substantially since the previous significant recharge period; the basin is draining and the gradient for flow entering the river is decreasing as is the discharge to the river. However, even during the driest year with a peak flow of 9.9 cfs, it is likely that some flow is runoff. In summary, because of the wide range in flows at this gage and that very high flows control the average and likely the calculated recharge, it is likely that recharge is overestimated.

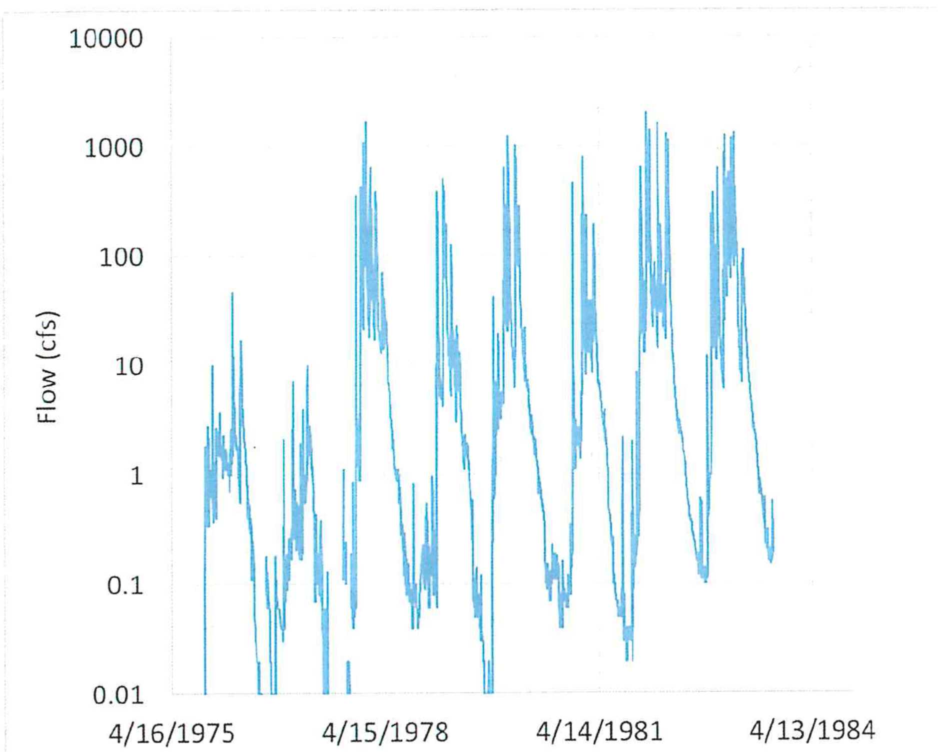

Figure 3: Hydrograph for Napa River at Calistoga gage # 11455900

Because recharge is likely overestimated, it is possible that the allotment of 1 af/y/acre is too high and that pumping at that rate, or even at a fraction of that rate, will draw down the groundwater table. Drawdown occurs when the pumping rate exceeds the rate recharge is replenishing the water table. Also, drawdown will eventually change the flow gradient for discharge to the Napa River and pumping will affect the river.

The groundwater level is above the thalweg[2] of the river through most of the Calistoga section of the valley based on measurements during spring 2010 (Figure 7-8 in L&S 2013). During spring, groundwater levels are at their seasonal highest and the groundwater is likely to discharge to the river. It is not possible to say with certainty that it does, however, because river water level is above the thalweg and the gradient for flow depends on the difference between groundwater and river water level. At times the river flow is very low, the water level would be only a few inches deep, so the approximation is that the locations on Figure 7-8 where the groundwater level exceeds the thalweg are likely locations where the groundwater discharges to the river. However, drawdown of wells, especially near the river, equaling just a few feet could reverse the flow. The effect of pumping on groundwater levels near the river is a cumulative effect based on all of the wells in the area, but it is certain that pumping this project will either prevent groundwater from discharging into the river or at worst will cause river water to enter the aquifer.

The applicant reports that the well that will provide water for the project, currently serving the Clos Pegase Winery, has a yield of 23 gallons per minute (gpm) but has been fitted with a pump that will provide 18 gpm, or 9,460,800 gallons per year if operated full time[3], which is 29 af/y. Presumably, this well is the log attached to the revised permit application[4]. This log shows the well to be 220 feet deep, screened from 80 to 220 feet, in clay or grey ash. It shows an air lift well test with 30 gpm discharge for 3 hours caused drawdown from 25 to 200 feet. This is a significant drawdown and there is no indication whether the well had reached an equilibrium after the three hours. Clay and grey ash do not likely have a high conductivity. Faye (1973) shows the alluvium has conductivity (K) from 30 to 50 ft/d and less than 100 feet thick. Faye's K value seems high based on the description provided on the well log.

There are too many unknown variables for detailed modeling of potential drawdown, but standard Theis computations (Fetter 2001) for a confined aquifer can be completed to consider the order of magnitude of potential drawdown. Treating the aquifer as confined is preferable based on the low conductivity clay in the upper part of the log. Figures 4 through 7 show drawdown with time for pumping 22, 18, 10, and 5 gpm at a radius of 1, 100, 1000, and 10,000 ft to demonstrate drawdown what could occur for continuous pumping. Radius equal to 1 approximates the drawdown at the pumping well and the analysis assumes the pumping is continuous. The transmissivity is 3000 ft^2/d, based on Faye (1973) and storage coefficient of

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[2] The thalweg is the lowest point of a river's cross-section. A line drawn along this point is the plan of the thalweg and the elevation is the profilt.

[3] Letter from Robert Osborn, Ben Monroe, Always Engineering, to Stacey Harrington, Napa County Planning, Building and Environmental Services, Project: Girard Wintery – New Winery and Tasting Room Use Permit. February 21, 2014. P 2.

[4] Letter from Always Engineering, to John McDowell, Deputy Planning Direct, Project: Girard Winery Use Permit Application, Revised November 25, 2014.

0.0001. A sensitivity analysis of storage coefficient suggested that an increase to 0.0008 would decrease the drawdown by about 20 feet.

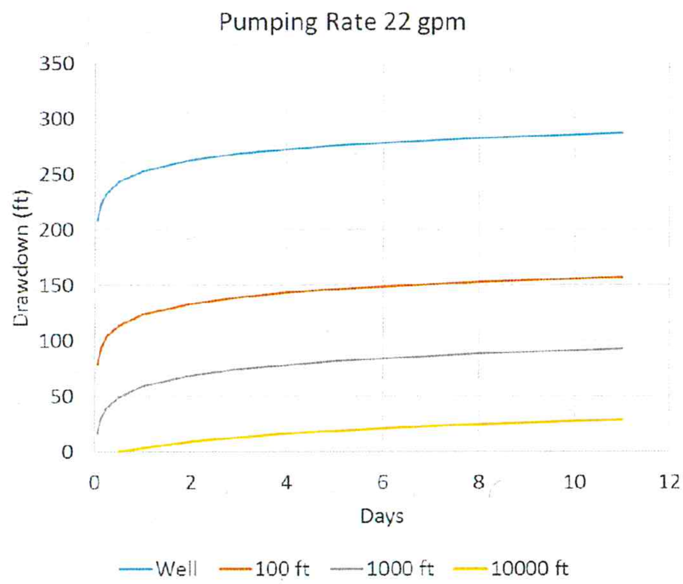

Figure 4: Drawdown for a well pumping 22 gpm in a confined aquifer for S=0.0001 and T=3000 ft2/d at specified radii.

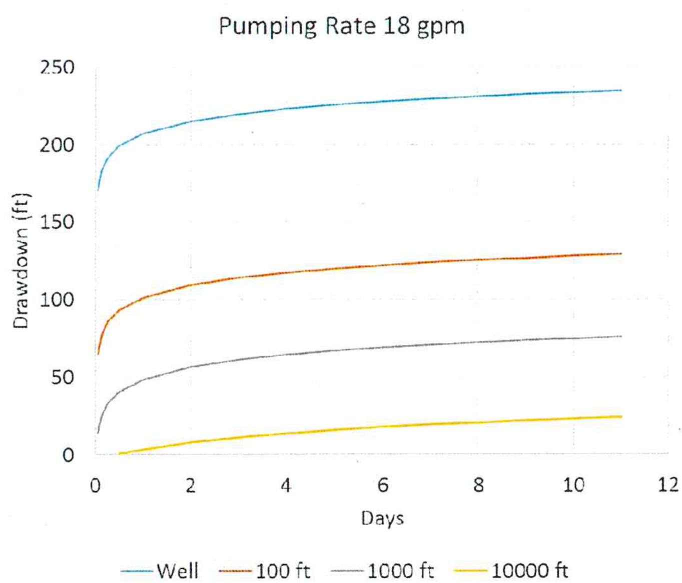

Figure 5: Drawdown for a well pumping 18 gpm in a confined aquifer for S=0.0001 and T=3000 ft2/d at specified radii.

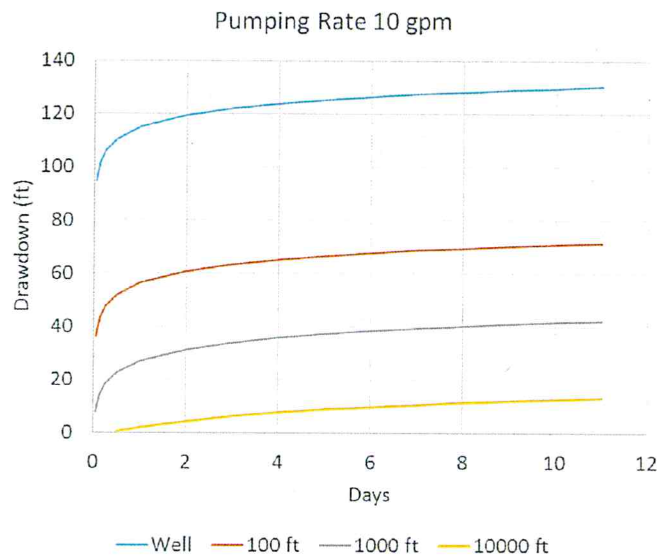

Figure 6: Drawdown for a well pumping 10 gpm in a confined aquifer for S=0.0001 and T=3000 ft2/d at specified radii.

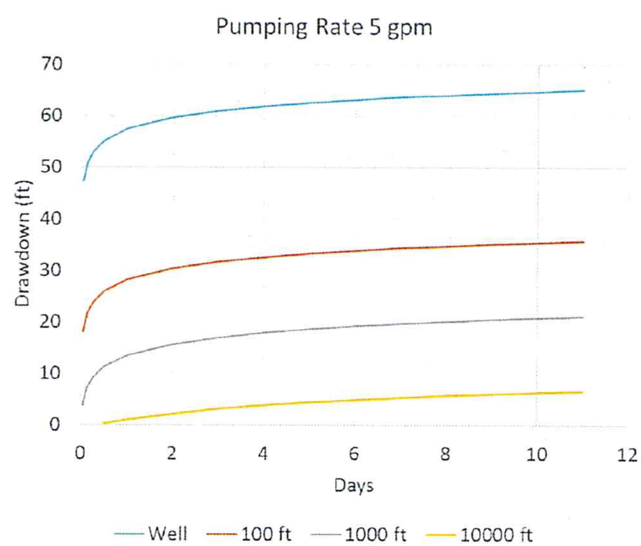

Figure 7: Drawdown for a well pumping 5 gpm in a confined aquifer for S=0.0001 and T=3000 ft2/d at specified radii.

It is doubtful that this well could actually pump at 18 gpm and yield 29 af/y without going dry. The drawdown shown on the well log, if maintained for a significant period, would likely cause substantial drawdown at the neighbors' wells. The results of this simplified analytical modeling are similar to those observed in the pump test; after three hours pumping at 22 gpm the simulated drawdown at the well was over 200 feet. This justifies the confined aquifer assumption.

Figures 4 and 5 indicate that drawdown at the well will exceed the distance from the water table to the bottom of the screen for pumping at 22 or 18 gpm. At 10 and 5 gpm, the drawdown at the well remains within the screen for the simulation period. Based on these simple hydraulic calculations, it does not appear that the well can pump at 22 or 18 gpm continuously without going dry. Also, at 22 gpm and 1000 and 10,000 feet, the drawdown would approach 100 feet and 25 feet (Figure 4) which would certainly affect nearby neighbors more than should be considered reasonable. Drawdown is progressively decreased as pumping rate decreases and the radius to the point of interest increases. However, even pumping at 10 and 5 gpm will impact neighboring wells; at 1000 and 10,000 feet from the well, the calculations suggest that pumping 10 gpm will cause drawdown to exceed 40 and 15 feet at 1000 and 10,000 feet, respectively, and for pumping 5 gpm, drawdown could exceed 20 and 8 feet at 1000 and 10,000 feet, respectively. Pumping from the proposed well for long-term periods at rates projected for the combined projects will cause significant drawdown at neighboring wells up to at least 10,000 feet away. The County should require a much more extensive pump test with monitoring of neighboring wells prior to granting this permit.

In summary, the NegDec's conclusion that the project will have "less than significant impact" is wrong because the pumping may exceed the rate that groundwater is replenished, based on the potential that recharge is less than the allotment. This would cause the groundwater table to be depleted and water to be drawn from the river. These impacts would be "potentially significant". The well proposed to be used may also cause sufficient drawdown to affect the neighbors' wells more than would be considered reasonable, which could also be a "potentially significant impact".

Question f

The NegDec declares the project will have a "less than significant" impact on water quality, but this is incorrect. The primary reason for this is that the project pumping will draw contaminated water from the northwest in the Calistoga area. The primary contamination is very high boron and arsenic concentrations, as seen on Figures 4 and 5, reproduced from L&S (2011). Most boron is due to relatively shallow geothermal water being drawn into the alluvial aquifers (L&S 2011, Faye 1973). The project site is at about the number 120 just southeast of Calistoga on Figure 4. The number 120 is a concentration in ug/l, which is much less than critical values for boron[5]. However, just northwest of the project site the boron concentrations are much higher, as much as 14,000 ug/l, or almost five times the health advisory level of 3 mg/l. Arsenic concentrations range from 40 to 85 ug/l in the same area which are four to eight

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[5] Boron has no MCL, but there is a health advisory for 3 mg/l (http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf) and California sets a "notification level" at 1000 ug/l (U&S 2011).

and a half times the MCL[6]. One arsenic observation just south of the project site is 75 ug/l. L&S (2011, Table 4-2) summarizes groundwater water quality showing that chloride, specific conductance, nitrate and total dissolved solids (TDS) also occasionally exceed standards in the Calistoga area.

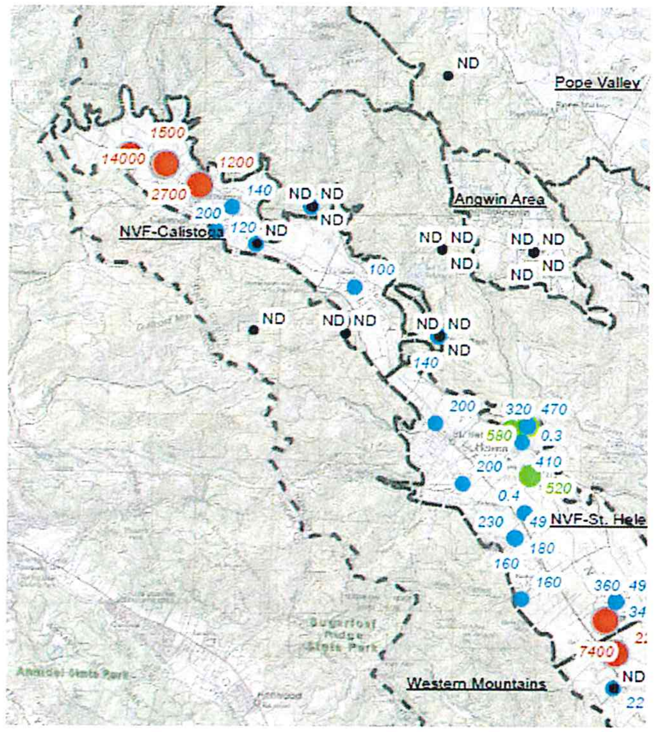

Figure 8: Snapshot of L&S (2011) Figure 4.19 showing groundwater boron concentrations in ug/l. The figure shows the northwest end of Napa Valley.

[6] The MCL for arsenic is 10 ug/l.

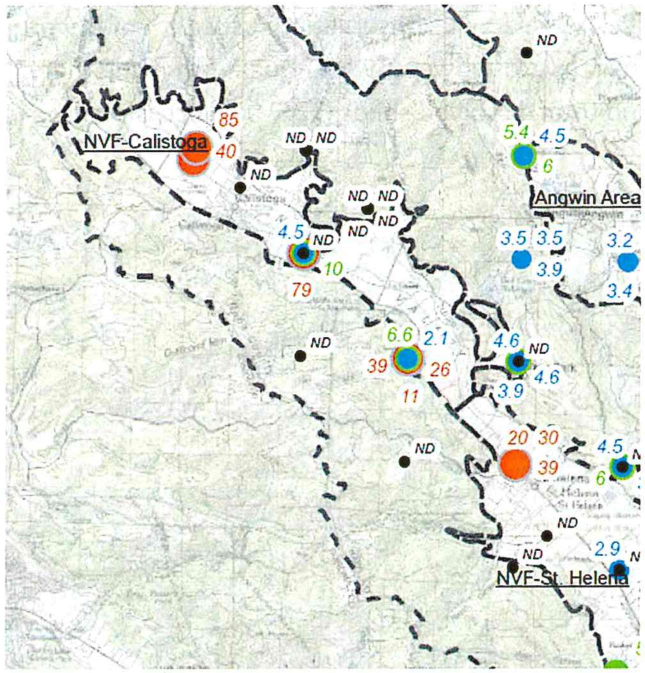

Figure 9: Snapshot of L&S (2011) Figure 4.18 showing groundwater arsenic concentrations in ug/l. The figure shows the northwest end of Napa Valley.

The higher concentrations all occur in or northwest of Calistoga or along the base of the mountains (L&S 2011). The reports do not discuss the cause of the higher values. Those of arsenic and boron are of the most significant concern.

Cumulative pumping in the Calistoga area controls the flow directions in the area. Additional pumping downgradient of the high concentrations, in what appears to be both an arsenic and boron plume, will draw the contaminants further into Calistoga and beyond to the southeast. Additionally, pumping in surface aquifers which increases the gradient from depth to more shallow aquifers may draw boron or metals from geothermal water into shallow waters, thereby increasing the boron concentration. Because of these potentials, the proposed pumping could increase the potential for water pollution to spread and cause a "potentially significant impact", contrary to the conclusion in the NegDec.

Conclusion and Recommendations

The proposed expansion of pumping for the Girard Winery could have two potentially significant impacts. First, the pumping could unacceptably lower the groundwater levels because there is not as much recharge in the area as the County assumes. This could also draw water from the river. Second, the pumping could affect groundwater flow directions and cause boron and arsenic plumes to expand through a larger portion of the Calistoga area.

Because of these potentially significant impacts, the project should not be permitted until a much more detailed hydrogeologic study is completed. This would include the completion of a flow and transport model to assess the change in groundwater levels, flow paths, and the extent of the boron and arsenic plumes. If the project goes forward after such a study, the flow and transport model should be used to determine where monitoring is necessary to detect the movement of the plumes.

References

Cherkauer DS (2004) Quantifying ground water recharge at multiple scales using PRMS and GIS. Ground Water 42(10:97-110

Faye RE (1973) Ground-water hydrology of northern Napa Valley California. US Geological Survey Water Resources Investigation 13-73.

Luhdorff and Scalmanini Consulting Engineers (L&S) (2013) Updated hydrogeologic conceptualization and characterization of conditions. Prepared for Napa County, January 2013.

Luhdorff and Scalmanini Consulting Engineers (L&S) (2011) Napa county groundwater conditions and groundwater monitoring recommendations, Prepared for Napa County Department of Public Works, Final Report February 2011

Scanlon BR, RW Healy, PG Cook (2002) Choosing appropriate techniques for quantifying groundwater recharge. Hydrogeology Journal 10:18-39. Doi 10.1007/s10040-0010176-2

Tom Myers, Ph.D.
Consultant, Hydrology and Water Resources
6320 Walnut Creek Road
Reno, NV 89523
(775) 530-1483
Tom_myers@charter.net

Curriculum Vitae

Objective: To provide diverse research and consulting services to nonprofit, government, legal and industry clients focusing on hydrogeology specializing in mine dewatering, contaminant transport, natural gas development, groundwater modeling, NEPA analysis, federal and state regulatory review, and fluvial morphology.

Education

Years	Degree	University
1992-96	Ph.D. Hydrology/Hydrogeology	University of Nevada, Reno Dissertation: Stochastic Structure of Rangeland Streams
1990-92		University of Arizona, Tucson AZ Classes in pursuit of Ph.D. in Hydrology.
1988-90	M.S. Hydrology/Hydrogeology	University of Nevada, Reno Thesis: Stream Morphology, Stability and Habitat in Northern Nevada
1981-83		University of Colorado, Denver, CO Graduate level water resources engineering classes.
1977-81	B.S., Civil Engineering	University of Colorado, Boulder, CO

Professional Experience

Years	Position	Duties
1993-Pr.	Hydrologic Consultant	Completion of hydrogeology studies and testimony focusing on mine dewatering, groundwater modeling, natural gas development, contaminant transport, NEPA review, and water rights for nonprofit groups and government agencies.
1999-2004	Great Basin Mine Watch, Exec Director	Responsible for reviewing and commenting on mining projects with a focus on groundwater and surface water resources, preparing appeals and litigation, organizational development and personnel management.
1992-1997	Univ of NV, Reno, Res. Assoc.	Research on riparian area and watershed management including stream morphology, aquatic habitat, cattle grazing and low-flow and flood hydrology.
1990-1992	U of AZ, Res. and Teach. Assistant	Research on rainfall/runoff processes and climate models. Taught lab sections for sophomore level "Principles of Hydrology". Received 1992 Outstanding Graduate Teaching Assistant Award in the College of Engineering
1988-1990	U of NV, Reno Res. Asst	Research on aquatic habitat, stream morphology and livestock management.
1983-1988	US Bureau of Reclamation Hydraulic Eng.	Performed hydrology planning studies on topics including floodplains, water supply, flood control, salt balance, irrigation efficiencies, sediment transport, rainfall-runoff modeling and groundwater balances.

Peer-Reviewed Publications

Myers, T., 2013. Remediation scenarios for selenium contamination, Blackfoot Watershed, southeast Idaho, USA. *Hydrogeology*. DOI 10.1007/s10040-013-0953-8

Myers, T., 2013. Reservoir loss rates from Lake Powell and their impact on management of the Colorado River. *Journal of the American Water Resources Association*. DOI: 10.1111/jawr.12081.

Myers, T., 2012. Potential contaminant pathways from hydraulically fractured shale to aquifers. *Ground Water* 50(6): 872-882. doi: 10.1111/j.1745-6584.2012.00933.x

Myers, T., 2009. Groundwater management and coal-bed methane development in the Powder River Basin of Montana. *J Hydrology* 368:178-193.

Myers, T.J. and S. Swanson, 1997. Variation of pool properties with stream type and ungulate damage in central Nevada, USA. *Journal of Hydrology* 201-62-81

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Myers, T.J. and S. Swanson, 1997. Stochastic modeling of pool-to-pool structure in small Nevada rangeland streams. *Water Resources Research* 33(4):877-889.

Myers, T.J. and S. Swanson, 1997. Stochastic modeling of transect-to-transect properties of Great Basin rangeland streams. *Water Resources Research* 33(4):853-864.

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Myers, T.J. and S. Swanson, 1996. Temporal and geomorphic variations of stream stability and morphology: Mahogany Creek, NV. *Water Resources Bulletin* 32:253-265.

Myers, T.J. and S. Swanson, 1996. Stream morphologic impact of and recovery from major flooding in north-central Nevada. *Physical Geography* 17:431-445.

Myers, T.J. and S. Swanson, 1995. Impact of deferred rotation grazing on stream characteristics in Central Nevada: A case study. *North American Journal of Fisheries Management* 15:428-439.

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Special Coursework

Years	Course	Sponsor
2011	Hydraulic Fracturing of the Marcellus Shale	National Groundwater Association
2008	Fractured Rock Analysis	MidWest Geoscience
2005	Groundwater Sampling Field Course	Nielson Environmental Field School
2004	Environmental Forensics	National Groundwater Association
2004 and -5	Groundwater and Environmental Law	National Groundwater Association

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Exhibit 2

Exhibit 2

omni · means
ENGINEERS · PLANNERS

September 19, 2013

Mr. Eric Sklar
CS2 Wines, LLC
P.O. Box 47
Oakville, CA 94562

Subject: ***Focused Traffic Analysis for the Proposed Yountville Hill Winery - Located at 7400 St. Helena Highway (SR-29) in Napa County***

Dear Mr. Sklar:

This report provides a focused traffic analysis for the proposed Yountville Hill Winery project located at 7400 St. Helena Highway in Napa County (see Figure 1 for Project Vicinity Map). This study reflects our discussions with County Planning staff regarding the project analysis approach and other adjacent approved/pending projects in the study area. In addition, the analysis will build on previous work conducted by George W. Nickelson, P.E. with regard to winery access to/from State Route 29 and driveway access. Some of the key issues evaluated in this study include the following:

- Existing and future weekday PM and weekend mid-day peak hour operations at the Yountville Hill Winery Project Driveway intersection with State Route 29;
- Near-term (Year 2015) traffic conditions reflecting other approved/pending projects in the study area;
- Project trip generation from proposed winery production, employment, and/or visitors;
- Project site circulation and vehicle access at State Route 29 project driveways and truck circulation;
- Cumulative year 2030 (no project) conditions along State Route 29 based on the Napa County General Plan Update EIR.

The following sections outline existing and future traffic conditions with and without the proposed Yountville Hill Winery project. Where necessary, measures have been recommended to ensure acceptable traffic flow, circulation, and/or fair share contribution to regional cumulative traffic improvements along State Route 29. I trust that this report responds to your needs. Please review this information and call me with any questions or comments.

Sincerely,

Peter J. Galloway

Peter J. Galloway, Transportation Planner
OMNI-MEANS, Ltd. Engineers & Planners

Cc: Mr. Lester Hardy, Attorney
Mr. George W. Nickelson, P.E.

Attachments: Appendices

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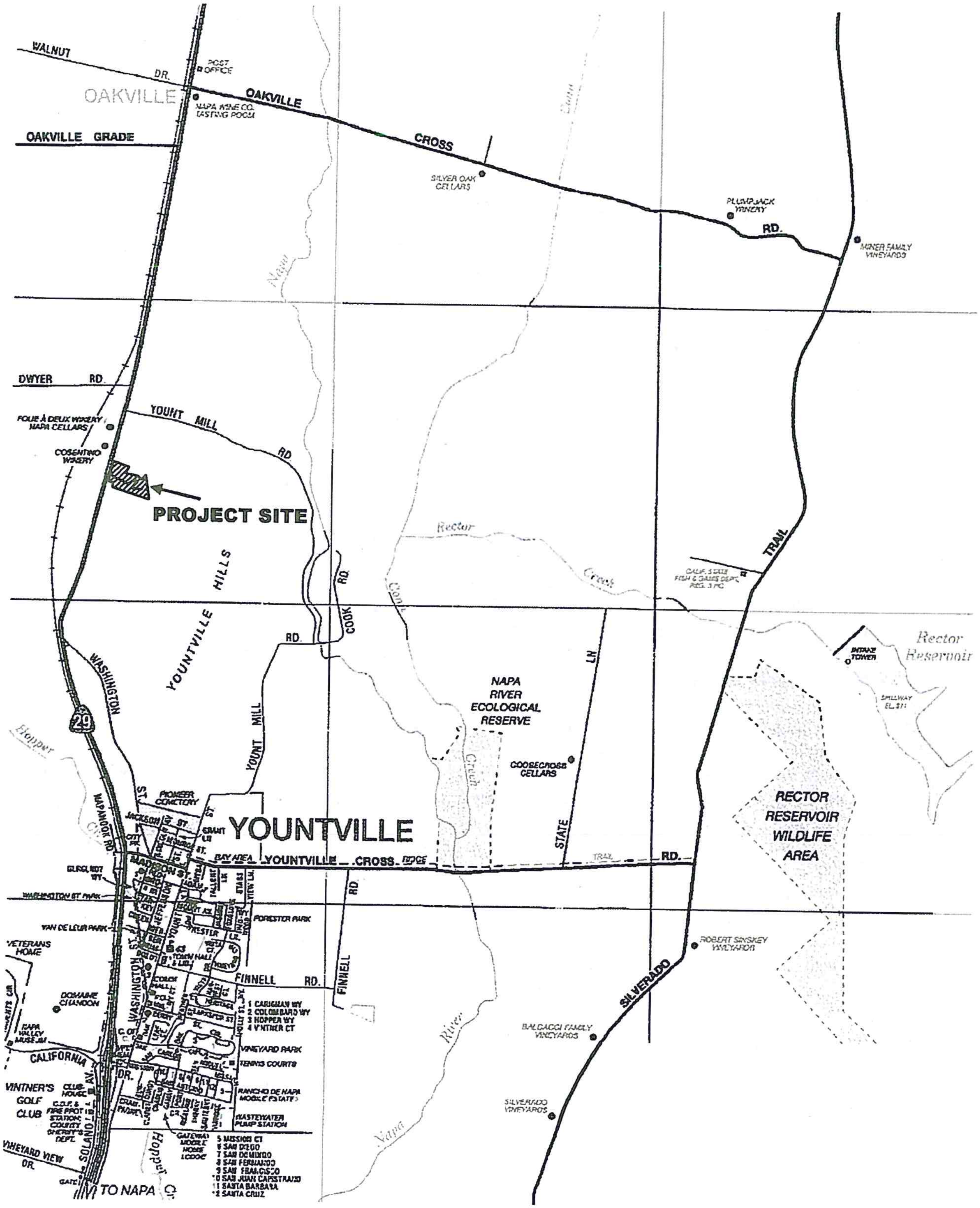

Project Vicinity Map

North

omni-means

figure 1

1. EXISTING TRAFFIC CONDITIONS

Roadways

The proposed Yountville Hill Winery project is located at 7400 State Route 29 (SR-29 or St. Helena Highway) on the northeast side of the highway. It is noted that SR-29 is primarily a north-south facility through the Napa Valley. However, SR-29 extends in a northwest-southeast direction immediately adjacent to the project site. A brief description of each roadway follows:

State Route 29 extends in a northwest-southeast direction between Yountville and Oakville in the project study area. Classified as a two-lane rural arterial roadway, SR-29 provides access northwest to Oakville, Rutherford, St. Helena, and Calistoga as well as southeast to Napa and American Canyon. In the immediate project site area SR-29 functions as a two-lane rural arterial road with two 12-foot travel lanes, a 12-foot two-way-left-turn-lane (TWLTL), and wide 8-10 foot shoulders (striped each side) at the project driveway intersection. The speed limit on SR-29 is 55 mph.

Yountville Hill Winery Driveway (existing configuration) extends east from SR-29 to provide access to the winery grounds and other parcels located in the project vicinity. The current driveway is paved with an 11-12 foot width and extends to an electronic acccss gate situated approximately 105 feet east of highway. Past the gate, the driveway continues east extending up a hill to an existing (former) Bed and Breakfast building. The driveway circles the building to create a one-way loop road that allows visitors to return via the same route. Prior to extending up the hill to the B&B building, a second driveway extends north approximately 360 feet to provide access to an existing residence.

Existing Roadway/Intersection Volumes

SR-29 acts as the primary north-south regional route through the Napa Valley and provides direct access to the project site. Based on the most recent Caltrans daily traffic counts conducted along SR-29 (south of Oakville Grade Road), SR-29 has a current annual average daily traffic volume of 22,800 vehicles.[1] During the peak month, the roadway carries 24,800 ADT. Based on Napa County roadway segment level-of-service (LOS) thresholds, these volumes are approaching the roadway capacity and represent LOS F conditions for a two-lane rural arterial roadway.[2] This would certainly be true of the peak month season (which typically occurs during the summer-fall season), and can result in southbound congestion approaching Yountville. As this heavy southbound flow approaches the traffic signal at Madison Avenue, vehicle queues can extend back towards the project area. Field observations made during peak weekday/weekend data collection at the SR-29/Project Driveway indicate relatively stable-flow conditions in both directions with occasional platoons/congestion in the southbound direction approaching Yountville.

As a part of this study, intersection turning movement counts were conducted on SR-29 at the proposed winery's access driveway during a weekday PM peak commute period (4-6 PM) and the Saturday afternoon peak period (1-3 PM).[3] (Winery visitor activity is expected to be highest during a Saturday afternoon). From these peak period counts, the "peak hour" of traffic flow was derived to calculate existing vehicle delay. These counts indicate a weekday PM peak hour flow of 1,755 vehicles and a Saturday afternoon peak hour

[1] *Caltrans, 2012 Traffic Volumes Book, State Route 29 average annual daily traffic (AADT) and peak month average daily traffic (ADT).*
[2] *Napa County Baseline Data Report, Table 11-1; Napa County Roadway Segment Daily LOS Volume Thresholds, Transportation and Circulation, November 2005.*
[3] *Omni-Means Engineers & Planners, Weekday PM peak period (4:00-6:00 p.m.) and weekend mid-day peak period (1:00-3:00 p.m.) intersection turning movement counts, SR-29/Project Driveway, July 13 & 17, 2013.*

flow of 1,675 vehicles. The counted peak hour volumes are somewhat lower than the expected typical day peak hour flow based on Caltrans data. To simulate "typical" peak conditions as indicated by Caltrans data, the volumes counted as a part of this analysis were increased by 16.5% These volumes reflect a two-way SR 29 operation that would be categorized as in the Level of Service (LOS) "E" range. Based on Caltrans count data, the peak hour volumes would be about 9% of the daily total or about 2,050 peak hour vehicles on a typical day.

It is noted that construction for the undergrounding of utilities is occurring along segments of SR-29 northwest of the project site. Based on the Caltrans website, this construction work is currently taking place between Mee Lane and Sulphur Springs Road on SR-29 and can require lane closures, flagmen, and cause moderate to severe traffic delays. With the project site being located south of the construction area, overall vehicle flow on SR-29 was not significantly affected.

Existing weekday PM peak hour and weekend mid-day peak hour intersection volumes have been shown in Figure 2.

Project Driveway/Access Operations

At the Yountville Hill Winery site access intersection, SR-29 has two travel lanes, paved shoulders and a standard two-way-left-turn-lane (TWLTL). Just to the north of the project driveway, the TWLTL provides access to the Mustard's Grill restaurant driveway on the west side of SR-29. The distance between the north side of the project site driveway and the south side of the Mustard's Grill driveway is about 40-45 feet. Both driveways share the existing TWLTL on SR-29 that allows motorists to make left-turn movements into the driveways without interrupting through-traffic flow on the highway. This same TWLTL allows outbound motorists from the same driveways refuge on SR-29 when making a left-turn movement and merging into through-traffic. This is noted because all outbound traffic from both the proposed project driveway and Mustards Restaurant driveway must yield the right-of-way to any vehicle in the TWLTL.

The Yountville Hill Winery project site currently has a 4-room inn (not in operation) and an off-site residence that gains access via the site driveway. The existing residence traffic activity is very low. During this study's peak period counts, only two vehicle trips in/out of the driveway occurred during the weekday PM and weekend mid-day peak hour (representing the single family dwelling). However, to provide an existing baseline for analysis, trips that would be generated by a 4-room inn were calculated and added to the driveway.[4]

Existing Intersection Operation

Intersection operation is one of the primary factors in evaluating the carrying capacity of a roadway network. Traffic conditions are measured by Level of Service (LOS), which applies a letter ranking to successive levels of intersection performance. LOS 'A' represents optimum conditions with free-flow travel and no congestion. LOS 'F' represents severe congestion with long delays at the approaches. For intersections with minor street stop control, the LOS reflects the delays experienced by the minor street approach. (LOS definitions and calculation worksheets are provided in the Appendix).

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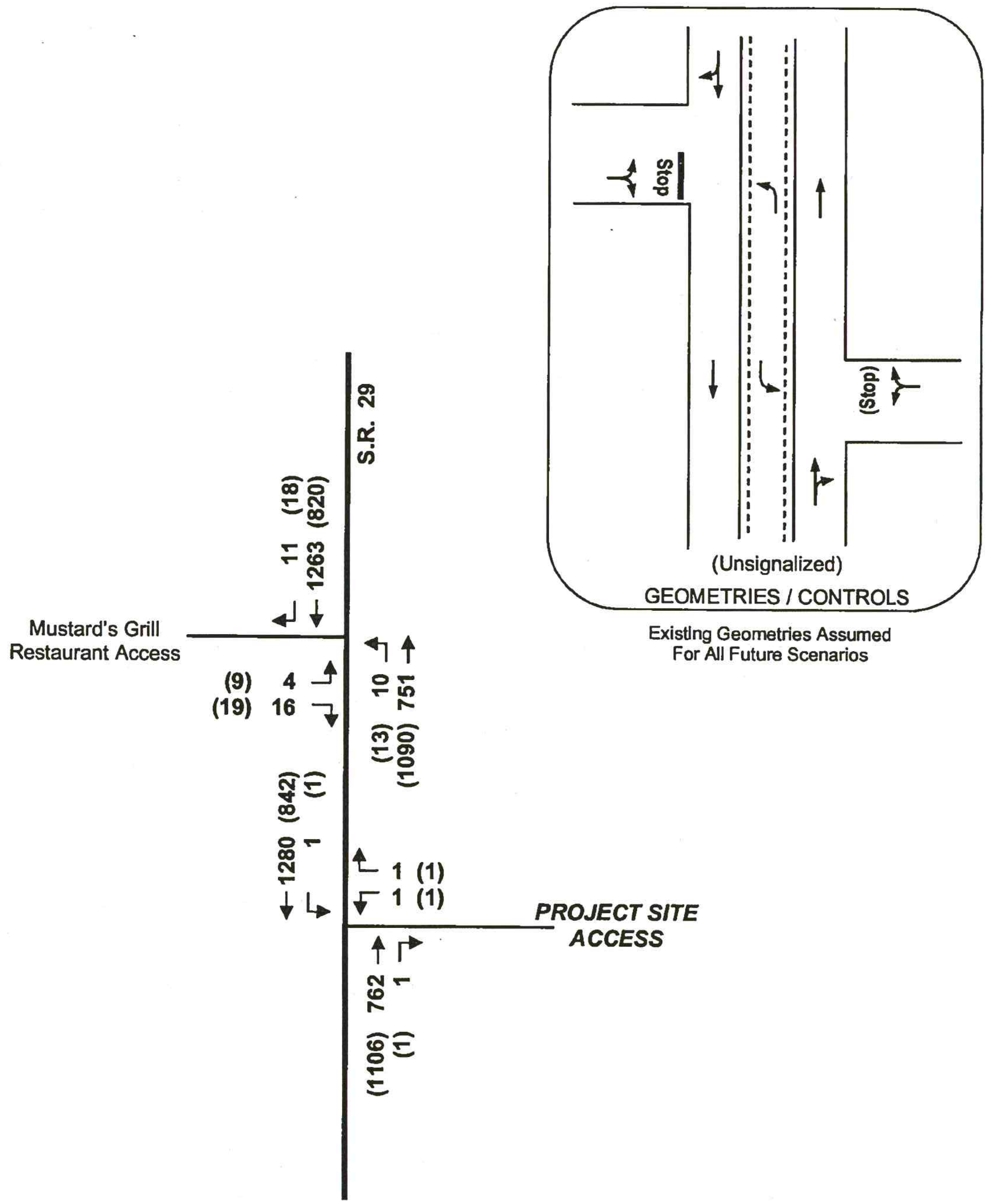
[4] *Institute of Transportation Engineers (ITE), Trip Generation, 9th Edition, Resort Hotel (#330), Based on 0.37 trips/room (= 2 peak hour trips) during both weekday PM and weekend mid-day peak hour, 2012.*



Existing Geometries Assumed
For All Future Scenarios

NOT TO SCALE

Existing Weekday P.M. and (Weekend Mid-day)
Peak Hour Volumes

North

omni-means

figure 2

The project study intersection at SR-29 is an unsignalized, minor-street stop-sign controlled intersection. Based on the Highway Capacity Manual (*HCM 2010*) operations methodology for unsignalized intersections, existing weekday PM peak and weekend mid-day peak hour existing (no project) level-of-service has been shown in Table 1. As calculated, during the weekday PM peak hour the Yountville Hill Project Driveway/SR-29 intersection is operating at LOS C (17.9 seconds delay) for the stop-sign controlled outbound turning movements onto SR-29. During the weekend (Saturday) mid-day peak hour, the same outbound turning movements are operating at LOS C (19.8 seconds of delay).

TABLE 1
EXISTING AND NEAR-TERM (NO PROJECT) CONDITIONS: INTERSECTION LEVELS-OF-SERVICE
WEEKDAY PM PEAK AND WEEKEND MID-DAY PEAK HOUR

#	Intersection	Control Type	Wkdy. PM LOS/Delay Existing (No Project)	Wkdy. PM LOS/Delay Near-Term (No Project)	Wknd. Mid-Day LOS/Delay Existing (No Project)	Wknd. Mid-Day LOS/Delay Near-Term (No Project)
1	Yountville Hill Driveway/SR-29	Stop	C 17.9 secs.	C 19.7 secs.	C 19.8 secs.	C 22.0 secs.

Based on Highway Capacity Manual (HCM) 2000, Operations methodology for stop-sign controlled (unsignalized) intersections using Synchro-Simtraffic software. Intersection calculation yields an LOS and vehicle delay in seconds. Stated LOS refers to the minor street (stop-sign) controlled movement.

Based on the California Manual on Uniform Traffic Control Devices (CAMUTCD) peak hour signal warrant criteria, the Yountville Hill Project Driveway/SR-29 intersection was evaluated for signalization.[5] The peak hour warrants are one of several standards to help determine if installation of a traffic signal is appropriate. Qualifying for signalization using the peak hour warrants does not necessarily mean a signal should be installed. The Yountville Hill Project Driveway/SR-29 intersection does not qualify for signalization under the peak hour warrants using existing volumes (the warrant graphs are provided in the Appendix).

Vehicle Speeds/Sight Distance

The primary issues for access design are the vehicle visibility and operation relative to vehicles traveling on SR 29 and vehicles turning in/out of the winery access. The required vehicle visibility or "corner sight distance" is a function of the travel speeds on SR-29. Caltrans design standards indicate that for appropriate corner sight distance, "a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the cross road and the driver of an approaching vehicle in the right lane of the main highway." [6] Based on radar surveys conducted as a part of this study, the "critical" vehicle speeds (85% of all surveyed vehicles travel at or below the critical speed) along SR-29 at the proposed project driveway were observed to be approximately 49-54 miles per hour (mph) during the weekday PM peak period and the Saturday afternoon peak period. Based on Caltrans design standards, these vehicle speeds require a sight distance of about 450-500 feet, measured along the travel lanes on SR-29. [7]

The proposed Yountville Hill winery project driveway intersection is located on a straight section of SR-29. Field observations indicate sight distances to the north and south are well in excess of the 500 feet needed for the measured vehicle speeds. However, there is an existing shrub/low tree situated on the north side of project driveway that blocks sight distance to the north. This shrub would have to be removed if/when project approval is granted.

[5] *California Manual on Uniform Traffic Control Devices (CAMUTCD), Chapter 4C, Peak hour signal warrant (#3), 2012.*
[6] *Caltrans, Highway Design Manual, Sixth Edition, July 1, 20009.*
[7] *George W. Nickelson, P.E., Radar speed surveys on State Route 29 at Yountville Hill Winery driveway(s), October 30 and November 5, 2009.*

2. NEAR-TERM (NO PROJECT) CONDITIONS

Near-Term (Approved/Pending Projects)

Near-term (no project) conditions represent a reasonable period of time in which the proposed project could be approved and/or constructed. Based on discussions with County staff, a two-year period to the year 2015 has been established for near-term (no project) conditions representing all approved/pending projects within the study area. In addition, recent approved/pending projects within the Town of Yountville are included in the overall project list. To generate near-term (no project) conditions, approved and pending projects provided by both Napa County and Town of Yountville Planning staff for other recent traffic analyses in the area have been used.[8] [9] To the best of our knowledge, these approved/pending projects are either new wineries or existing wineries applying for use permit modifications to increase production, employees, visitors, and/or marketing events. These projects are located both north and south of the project site off of State Route 29, in the City of St. Helena, or east of the project site off northern crossroad(s) that connect SR-29 with Silverado Trail and are described as follows:

Town of Yountville

Stewart Mixed-Use 6572 Washington St. Yountville, CA 94599	Wine Tasting Rm.: 2,350 square feet Bookstore: 1,420 square feet Café: 690 square feet Apartment: One Bedroom

City of St. Helena:

Crocker & Starr Winery 700 Dowdell Lane St. Helena, CA 94574	Production: 25,000 gallons per year Visitors: 16 visitors/day Employees: 7 full-time, 3 part-time

Napa County:

Raymond Winery 849 Zinfandel Lane St. Helena, CA 94575	Production: 1,500,000 gallons per year Visitors: 500 visitors/day Employees: 90 full-time
Kelham Winery 360 Zinfandel Lane St. Helena, CA 94575	Production: 75,000 gallons per year Visitors: 140 visitors/week Employees: 6 full-time
The Ranch Winery 105 Zinfandel Lane St. Helena, CA 94575	Production: 12,500,000 gallons per year Visitors: 15 visitors/week Employees: 85 full-time
Del Dotto Family Winery 1455 St. Helena Hwy. St. Helena, CA 94575	Production: 48,000 gallons per year Visitors: 15 visitors/week Employees: 5 full-time

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8 Mr. Greg Desmond, Interim Planning Director, City of St. Helena, Personal communication; Crocker & Starr Winery project, April 12, 2013.

9 Ms. Linda St. Clair, Planner III, Planning, Building, and Environmental Services Department, Personal communication, Yountville Hill Winery Use Permit Modification (dated 6-6-12), April 15, 2013.

Whitehall Lane Winery 1563 St. Helena Hwy. St. Helena, CA 94575	Production: 50,000 gallons Visitors: 500 visitors/week Employees: 5 full-time
The Sullivan Family Estate 1090 Galleron Road St. Helena, CA 94575	Production: 22,500 gallons per year Visitors: 7 visitors/week Employees: 4 full-time
Franciscan Winery 1178 Galleron Road St. Helena, CA 94575	Production: 1,200,000 gallons per year Visitors: 3,500 visitors/week Employees: 65 full-time
Flynnville Winery 1184 Maple Lane Calistoga, CA 94515	Production: 300,000 gallons per year Visitors: 500 visitors/day Employees: 30 full-time
Martini Winery 254 St. Helena Hwy. St. Helena, CA 94575	Production: 2,000,000 gallons per year Visitors: 1,400 visitors (+296 trade visitors)/week Employees: 54 full-time
Sinegal Estate Winery 2125 Inglewood Ave. St. Helena, CA 94575	Production: 60,000 gallons per year Visitors: 21 visitors/week Employees: 3 full-time

Near-Term (No Project) Trip Generation

Near-term (approved/pending) projects' weekday PM hour, weekend mid-day peak hour, and daily traffic volumes have been taken directly from previous transportation analyses performed for those projects and these include the following:

- *Omni-Means Engineers & Planners, Updated Traffic Study for the Proposed Raymond Winery Use Permit Application (#P11-00156), Napa County, Draft Report, April 5, 2013;*
- *Omni-Means Engineers & Planners, Focused Trip Generation Analysis for the Proposed Crocker & Starr Winery Project at 700 Dowdell Lane (APN 009-120-059), City of St. Helena, Draft Report, April 12, 2013;*
- *Omni-Means Engineers & Planners, Focused Traffic Analysis for the Proposed Flynnville Winery Project, Located at State Route 29/Maple Lane in Napa County, January 15, 2013:*
- *Omni-Means Engineers & Planners, Updated Focused Traffic Analysis for the Proposed Louis M. Martini Winery Master Plan—Located at 254 St. Helena Highway (SR-29) in St. Helena (Napa County), May 16, 2013.*

For all approved/pending winery projects, daily and peak hour trip generation was calculated using employee peaking factors, auto occupancy rates for visitors, and production ratios based on recent winery research conducted by the Napa County Conservation, Development, and Planning Department. For approved development in the Town of Yountville, peak hour trip generation was based on the Institute of Transportation Engineers (ITE) trip research for specialty retail and residential uses.[10] Near-term projects would generate 202 weekday PM peak hour trips and 206 mid-day weekend peak hour trips on

[10] Institute of Transportation Engineers (ITE), Trip Generation, 9th Edition, Specialty Retail (#826) and Apartment (#210) uses, 2012.

SR-29 adjacent to the Yountville Hill Winery. On a daily basis, near-term projects would generate 845 ADT and 828 ADT on a weekday and weekend, respectively.

Near-term (no project) daily and peak hour volumes for the weekday and weekend have been added to existing intersection volumes on State Route 29 based on previous transportation analyses conducted in the area. Near-term (no project) volumes for weekday PM peak hour and weekend mid-day peak hour have been shown in Figure 3.

Near-Term (No Project) Intersection/Roadway Operation

With near-term (no project) volumes, study intersection LOS has been calculated and is shown in Table 1. During the weekday PM peak hour, the Yountville Hill Winery Driveway/SR-29 intersection would be operating at LOS C (19.7 seconds). LOS operation during the mid-day weekend peak would be similar at LOS C (22.0 seconds). Near-term (no project) intersection LOS would represent minor increases in vehicle delay for outbound traffic from the Yountville Hill winery driveway of 2-3 seconds (all referenced intersection LOS refers to the stop-sign controlled outbound turning movements from the project driveway).

Based on CAMUTCD peak hour signal warrant criteria (Warrant #3), the Yountville Hill Winery Driveway/SR-29 intersection would not qualify for signalization with near-term (no project) volumes.

AADT volumes on SR-29 would increase from 22,800 to 23,645 vehicle under near-term (no project) conditions. Based on Napa County roadway thresholds, this would continue to represent LOS F conditions as under existing conditions.

3. Napa County Significance Criteria

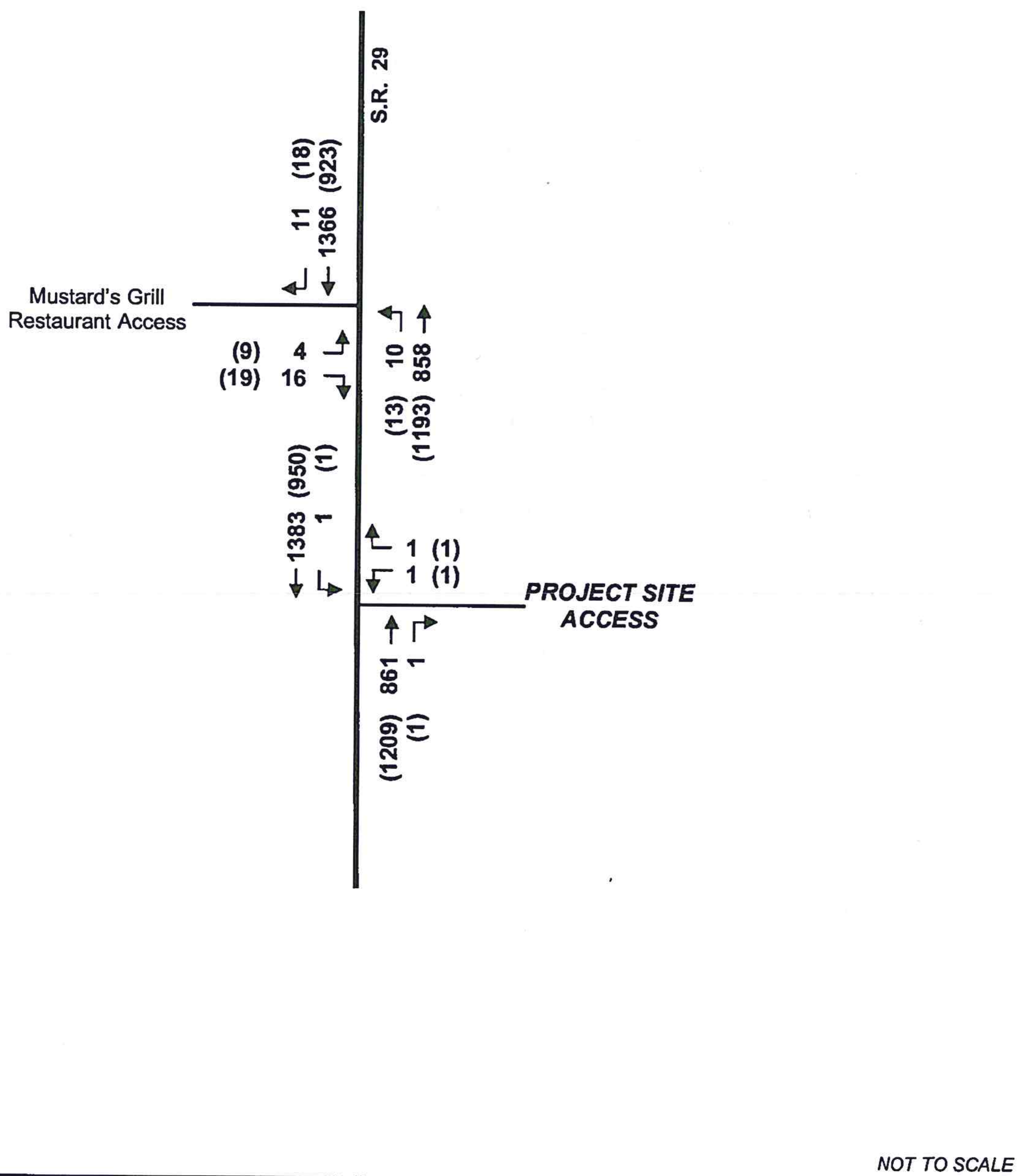
The County of Napa's significance criteria has been based on a review of the Napa County Transportation and Planning Agency and Napa County General Plan documentation on roadway and intersection operations. Specifically, the Circulation Element of the County's General Plan outlines the following significance criteria specific to intersection operation:

Intersections

- The County shall seek to maintain a Level of Service D or better at all intersections, except where the level of service already exceeds this standard (i.e. Level of Service E or F) and where increased intersection capacity is not feasible without substantial additional right-of-way.
- No single level of service standard is appropriate for un-signalized intersections, which shall be evaluated on a case-by-case basis to determine if signal warrants are met.

Further significance criteria are based on County and CEQA guidelines and apply mainly to intersection operation and access. A significant impact occurs if project traffic would result in the following:

- Cause an increase in traffic which is substantial in relation to existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume capacity ratio on roads, or congestion at intersections);
- Exceed either individually or cumulatively, an LOS standard established by the county congestion management agency for designated roads or highways;
- Result in a change of traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;



Near Term Approved/Pending Development
Weekday P.M. and (Weekend Mid-day) Peak Hour Volumes

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figure 3

- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency vehicle access;
- Project site or internal circulation on the site is not adequate to accommodate pedestrians and bicycles;

4. Proposed Project Impacts

Project Components

The proposed Yountville Hill winery project would consist of wine production, full-time employees, visitation tours/tasting, and marketing events throughout the year. The project applicant's use permit application indicates there would be no part-time employees (except during Crush). Full-time employees would either work a weekday shift and/or combination of weekday/weekend shift. Proposed project components can be described as follows: [11]

• Production	Annual:	100,000 gallons
• Employees:	Weekday:	19 full-time
	Weekend:	8 full-time
• Visitors:	Weekday:	110 visitors
	Weekend:	285 visitors
• Trucks:	Weekday:	2 truck per day
	Weekend:	2 trucks per day

Daily operations for the proposed Yountville Hill Winery project would involve an all on-site winery operation with a maximum annual production of 100,000 gallons (40,500 cases). All fruit (100,000 gallons of production) would be processed on-site during the year with the majority occurring during the harvest/crush season. Visitors (by appointment only) are expected; an average of 110 daily visitors on a typical weekday and 285 daily visitors on a Saturday. Visitor hours would be limited between 10:00 a.m. – 6:00 p.m. Employment is expected to be a maximum of 19 full-time employees during weekday and/or weekend periods. Winery operations for staff would occur between 6:00 a.m. – 6:30 p.m. The employment shift hours would vary dependent on specific work applications; five production staff (6:00 a.m. – 3:00 p.m.), six administrative staff (8:00 a.m. – 5:00 p.m.), and eight hospitality staff (9:30 a.m. – 6:30 p.m.). The largest marketing event would involve 200 guests occurring on an annual basis. All new marketing events would only be held during off-peak hours.

Annual winery production would be estimated at 100,000 gallons. With regard to truck activity, the winery would generate approximately 4-5 deliveries on its busiest day (crush season).

Project Trip Generation/Distribution

The proposed project's weekday and weekend peak hour and daily traffic volumes have been calculated and are shown in Table 3. Overall trip generation calculations have been based on employee peaking factors and auto occupancy rates for event visitors based on recent winery research conducted by the

[11] *Yountville Hill Winery, Winery Traffic Information/Trip Generation Sheet, Preliminary project data for production, employment, visitors, and marketing, Mr. Lester Hardy, Attorney, Personal communication, August, 2013.*

Napa County Conservation, Development, and Planning Department and existing driveway volumes.[12] It is noted that for peak hour traffic generation, only full time employees traveling to/from the site were included in project trip generation calculations. For the weekday PM peak hour, this included six administrative staff (production staff would be gone, hospitality staff still on-site). For the weekend mid-day peak hour, this included the eight hospitality staff (production and administrative staff would be gone). Based on production, employment, and visitor activity, the project would be expected to generate 145 daily weekday trips with 39 PM peak hour trips (16 in, 23 out). During a typical weekend, the project would be expected to generate 228 daily trips with 59 mid-day peak hour trips (30 in, 29 out).

During the six-week harvest crush season, the proposed project is expected to generate an average of 250 daily trips. This daily trip total would represent 285 visitors, 9 full-time and 4 part-time employees on-site during weekend periods, 100,000 gallons of wine production, and approximately 35 daily tons (on-haul) of grapes.

Based on the largest marketing event attendance of 200 persons (twice per year), there would total generation of 191event trips.

To determine traffic conditions with the proposed project, the calculated project trips were added to existing volumes. Based on observed turning percentages, the project trips were distributed 25% to/from the north and 75% to/from the south on State Route 29.

Existing plus project and near-term plus project volumes have been shown in Figure 4 and 5.

Project Effects on Roadway/Intersection Operation

A. Existing Plus Project Conditions

The project would be expected to add approximately 109 daily trips south of the site and 36 daily trips north of the site on State Route 29. This would represent an addition of less than 1 percent (0.006) to the daily volumes on the highway. The combined existing plus project volume of 22,945 daily trips would remain at LOS F operating conditions for a two-lane rural arterial roadway based on established County thresholds.

During the peak winery activity periods, the project would generate 39 weekday PM peak hour and 59 Saturday mid-day peak hour trips. Weekday PM peak hour and weekend mid-day peak hour intersection levels of service were evaluated with proposed project traffic and are shown in Table 4.

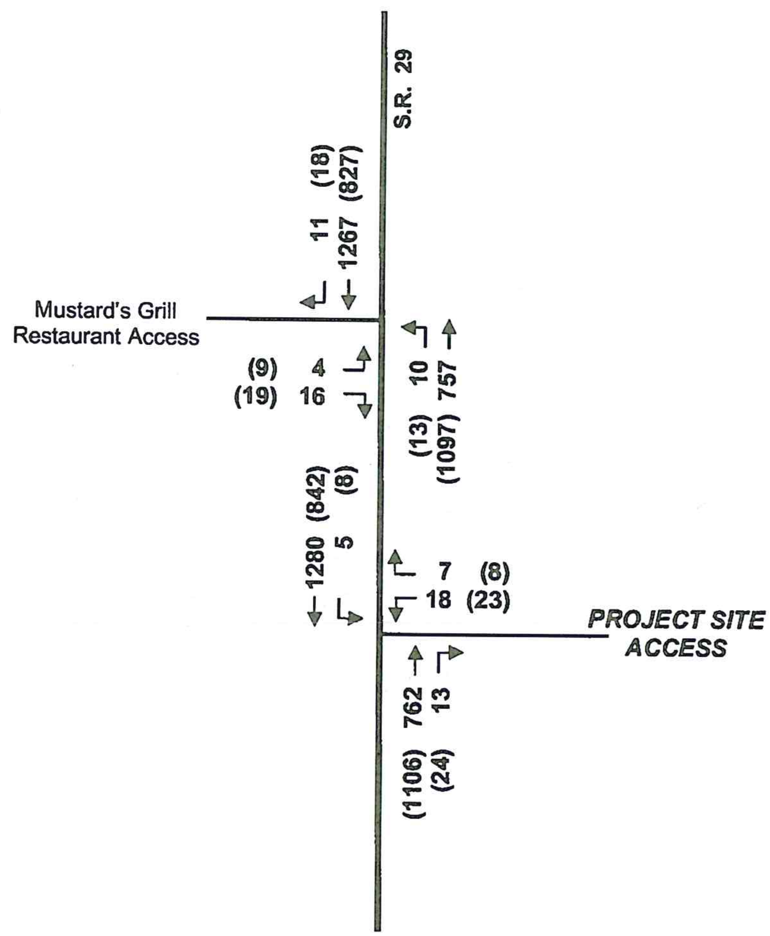
With existing plus project traffic volumes, the two project study intersections would continue to operate at acceptable levels (LOS C or better) during both the weekday PM peak hour and weekend mid-day peak hour periods. At shown in Table 4, intersection LOS would remain unchanged from existing conditions with proportional increases in overall vehicle delay.

[12] *County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012.*

TABLE 3
PEAK HOUR AND DAILY TRIP GENERATION:
PROPOSED YOUNTVILLE HILL WINERY PROJECT

Weekday Daily Traffic:		
110 visitors/2.6 persons per vehicle x 2 one-way trips	=	85 daily trips
19 full time employees x 3.05 one-way trips	=	58 daily trips
0 part-time employees x 1.90 one-way trips	=	0 daily trips
100,000 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	2 daily trips
Total Weekday Daily Trips	**=**	**145 daily trips**
Weekday PM Peak Hour Traffic:		
(85 daily visitor trips + 2 daily truck trips) x 0.38 peak	=	33 peak hour trips
6 full time employees x 1 trip/employee	=	6 peak hour trips
0 part-time employees/2	=	0 peak hour trips
Total Weekday PM Peak Hour Trips	**=**	**39 trips (16 in, 23 out)**
Weekend (Saturday) Daily Traffic:		
285 visitors/2.8 persons per vehicle x 2 one-way trips	=	204 daily trips
8 full time employees x 3.05 one-way trips	=	24 daily trips
0 part-time employees x 1.90 one-way trips	=	0 daily trips
Total Weekend (Saturday) Daily Trips	**=**	**224 daily trips**
Weekend (Saturday) Peak Hour Traffic:		
204 daily visitor trips x 0.25 peak	=	51 peak hour trips
8 full time employees x 1 trip/employee	=	8 peak hour trips
0 part-time employees/2	=	0 peak hour trips
Total Weekend (Saturday) Peak Hour Trips	**=**	**59 trips (30 in, 29 out)**
Weekend (Saturday) Daily Harvest/Crush Traffic:		
285 visitors/2.8 persons per vehicle x 2 one-way trips	=	204 daily trips
9 full time employees x 3.05 one-way trips	=	27 daily trips
4 part-time employees x 1.90 one-way trips	=	4 daily trips
20,000 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	1 daily trips
0 annual ton grapes (on-haul)/144 daily trucks x 2 o-w trips	=	0 daily trips
Total Weekend (Saturday) Daily Harvest/Crush Trips	**=**	**55 daily trips**
Largest Marketing Event – Additional Traffic		
6 event staff x 2 one-way trips per person	=	12 event trips
125 visitors / 2.8 visitors per vehicle x 2 o-w trips	=	89 event trips
4 trucks x 2 one-way trips	=	8 event trips
Total Largest Event Marketing Trips:	**=**	**109 event trips**

Source: Production, employee, and visitor data provided by Mr. Eric Sklar (project applicant) and Mr. Lester Hardy (Attorney).



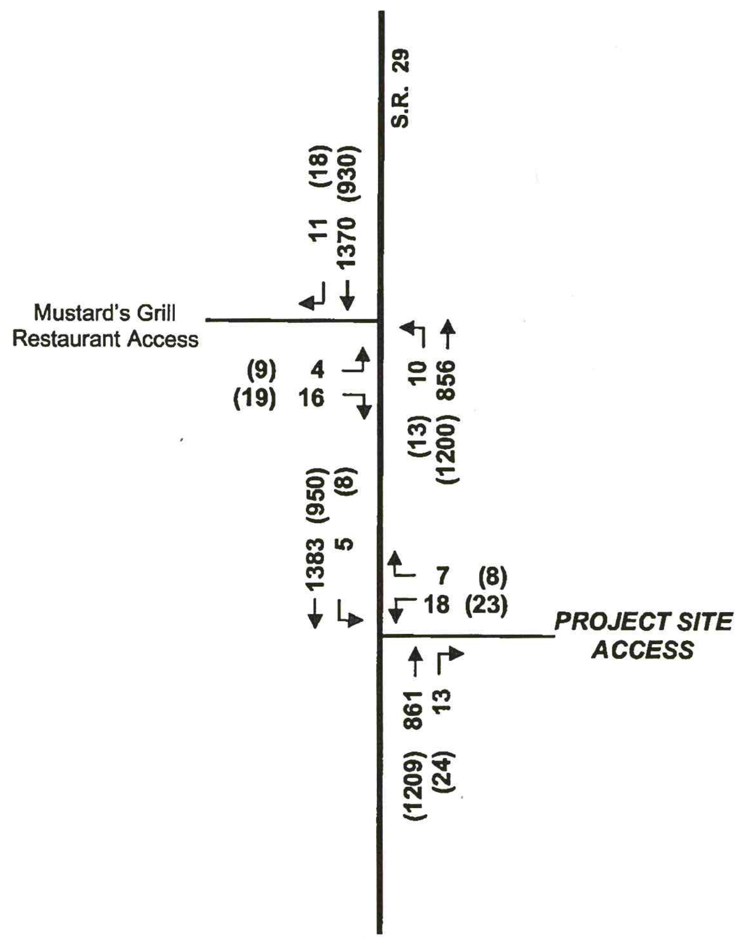
NOT TO SCALE

Existing + Project Weekday P.M. and (Weekend Mid-day)
Peak Hour Volumes

North

omni-means

figure 4



Near Term + Project Weekday P.M. and (Weekend Mid-day)
Peak Hour Volumes

omni-means

figure 5

B. Near-Term Plus Project Conditions

With near-term plus project conditions, daily traffic volumes on State Route 29 would increase to 23,873 ADT. Again, this would represent LOS F conditions for a two-lane, rural arterial roadway based on County thresholds. However, the existing continuous two-way-left-turn-lane on SR-29 improves overall vehicle delay and adds some additional capacity to the roadway.

Both driveway study intersections would operate at acceptable levels (LOS C or better) during both the weekday PM peak hour and weekend mid-day peak hour under near-term with project conditions.

TABLE 4
EXISTING PLUS PROJECT AND NEAR-TERM PLUS PROJECT CONDITIONS:
INTERSECTION LEVELS-OF-SERVICE
WEEKDAY PM PEAK AND WEEKEND MID-DAY PEAK HOUR

#	Intersection	Control Type	Wkdy. PM LOS/Delay		Wknd. Mid-Day LOS/Delay	
			Existing + Project	Near-Term + Project	Existing + Project	Near-Term + Project
1	Yountville Hill Driveway/SR-29	Stop	C 21.1 secs.	C 23.6 secs.	C 21.4 secs.	C 24.2 secs.

Based on Highway Capacity Manual (HCM) 2000, Operations methodology for stop-sign controlled (unsignalized) intersections using Synchro-Simtraffic software. Intersection calculation yields an LOS and vehicle delay in seconds. Stated LOS refers to the minor street (stop-sign) controlled movement.

5. SITE ACCESS/DESIGN PARAMETERS

Sight Distance

As noted in the discussion of existing conditions, sight distances to the north and the south are well in excess of the minimum sight distances needed for the measured vehicle speeds. Based on radar surveys conducted in the vicinity of the proposed Yountville Hill Winery project, the "critical" vehicle speed (85% of all surveyed vehicles travel at or below the critical speed) along SR-29 at the winery were observed to be 49-54 miles per hour (mph).[13] Based on Caltrans design standards, these vehicle speeds require a stopping sight distance of 400-450 feet, measured along the travel lanes on SR-29.[14]

The Yountville Hill winery access intersection is located on a straight section of SR-29. Field observations indicate sight distances to the north and south are well in excess of the 450 feet needed for the measured vehicle speeds with the existing southerly and new northern driveway locations. However, a large shrub/tree (volunteer) would need to be removed on the north side of the driveway entrance to ensure unobstructed views to the north up SR-29.

Two-Way-Left-Turn-Lane-Operation

The proposed project's driveway intersects SR-29 at a point where a TWLTL exists. As shown on Figures 4 and 5, the driveway would have 5 inbound left-turns during a weekday PM peak hour and 8 inbound left turns during a Saturday afternoon peak hour. During these same periods, the inbound left turns counted at the Mustard's Grill driveway were 10 vehicles and 13 vehicles, respectively. Based on Caltrans guidelines for left turn queuing, the Mustard's Grill volumes would require a maximum of one vehicle storage during the

[13] *George W. Nickelson, P.E., Radar speed surveys on State Route 29 at Yountville Hill Winery driveway(s) October 30 and November 5, 2009*
[14] *Caltrans, Ibid....*

peak hours.[15] During the peak period counts, the actual observed left turn queues never exceeded one vehicle. The very low inbound left turn volumes at the project driveway would not be expected to significantly conflict with the left turns into Mustard's Grill.

Project Access and Circulation

Based on the Yountville Hill Winery site plan, a new driveway (improved) would extend to parking and winery facilities located on the hillside east of SR-29 (see Figure 6--Project Site Plan). The project driveway would have a minimum width of 20-feet to provide for two-way travel and comply with County standards. Approximately mid-way up the hillside, the driveway would provide access to a parking area and visitor entrance to the winery. The parking area would have a 25-foot drive aisle and multiple access points (three) from the driveway to allow for vehicle entry/exit and return to SR-29. Continuing up the hill, the driveway would terminate in a large cul-de-sac at the winery's visitor tasting room/office. There would be limited parking spaces at this building (two). This area would primarily be for project staff and/or ADA visitors not parking in the lower parking areas. The large cul-de-sac would allow vehicles to turn around and/or back out of parking spaces to exit the site.

The proposed project driveway has been evaluated for right-turn lane warrants. Caltrans guidelines suggest that the combination of northbound through volumes on SR-29 and the expected inbound right turn volumes would <u>not</u> warrant a separate right turn lane at the site driveway. However, the driveway would have inbound right turn volumes that would warrant a right turn taper (not a separate right turn lane). The right turn volume would just meet the minimum volume threshold during only the Saturday afternoon peak hour (with visitor activity at the maximum permitted levels).

The Napa County Transportation & Planning Agency (NCTPA) in cooperation with Napa County and local City agencies is developing bicycle routes as outlined in the Napa Countywide Bicycle Plan.[16] The plan encourages new developments to incorporate bicycle friendly design. State Route 29 has wide striped shoulder areas (unofficial Class II bike lanes) in both directions. Some visitors may utilize bicycles to access the proposed project. The project would provide bicycle racks for visitors to the proposed winery.

Marketing Events

With regard to special event traffic, the largest (200 visitors) event would be an all day event on a weekend. This event would involve visitors arriving and departing throughout the entire day. The event would be scheduled to ensure that the majority of visitor arrivals and/or departures would not coincide with the Saturday afternoon peak hour background traffic flows on SR-29.

Based on standard auto occupancy rates, the largest special event (200 people) would generate up to 191 trips (96 in, 95 out). As noted, these events are typically of sufficient duration in length that the inbound and outbound trips occur in separate hours, thus the number of trips on the street network at one time are half of the total volume. These events are usually held outside of typical peak traffic periods (throughout the entire day or later than 6:00 p.m.) and therefore generally do not impact peak hour operations during the weekday/weekend peak periods.

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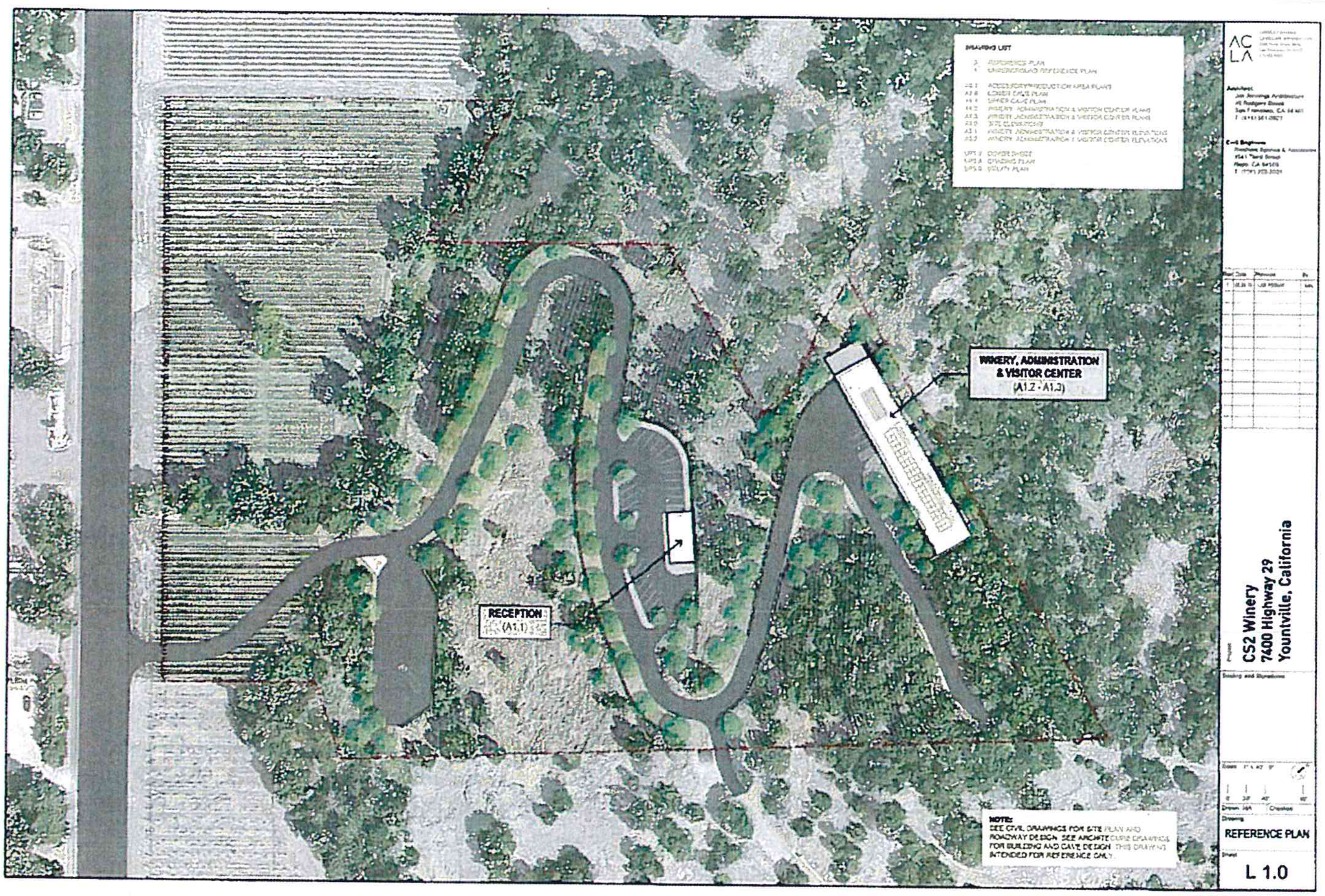
[15] Caltrans, Guidelines for Reconstruction of Intersections, August 1985. The maximum peak hour northbound left-turn volume is 13 vehicles, requiring 1 vehicle storage calculated as follows: 13 hourly vehicles/60 x 2 minutes of storage = 0.43 or 1 vehicle.

[16] Napa County, Countywide Bicycle Plan (2012), Planning Area-North Valley, May 2012.



Project Site Plan

North

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figure 6

Construction Impacts

With regard to construction impacts, the contractor responsible for cave construction has estimated an 18-month schedule during which time approximately 28,400 cubic yards of cave spoils would be hauled off-site. Based on an 18-month schedule, the spoils quantity would equate to approximately 75 cubic yards daily or 7-8 trucks each day. Truck volumes of this magnitude would not be measurably affect traffic flows on SR-29 during the weekday PM peak period.

6. Cumulative Conditions

Cumulative Year 2030 Projections

Model Forecast

Cumulative (Year 2030) volume projections on State Route 29 (SR-29) were derived from the Napa County Transportation & Planning Agency's traffic volume forecasts in the Napa County General Plan Update EIR. The forecast increase in volume-to-capacity (v/c) ratio from Year 2003 to Year 2030 on SR-29 in the project vicinity between Madison Street and Oakville Grade Road was applied to the provided Year 2003 peak hour two-way volume (2,017 trips) on SR-29, yielding a volume of 4,098 weekday PM peak hour trips on SR-29 in Year 2030.

The projected PM peak hour cumulative volume on SR-29 represents a large (200%) increase compared to the existing (Year 2013) peak hour counted volume of 2,042 trips on SR-29 at the project driveway. With projected cumulative forecasts, the existing daily volume on SR-29 would increase from 22,800 trips to 45,600 daily trips.

Historical Data

For comparison, average annual daily traffic volumes on SR-29 between Madison Street and Oakville Grade Road over the previous twenty years were reviewed. The average annual daily traffic (AADT) on SR-29 in 1992 was 15,500 trips. By comparison, the AADT on SR-29 2012 was 22,800 trips. Daily volumes were highest in the year 2007, reaching 26,500 AADT. Daily volumes on SR-29 have since declined and are lower today than they were in 2002. Increases in daily volumes between year 1992 and the highest year of 2007 equates to an annual increase of 4.5% per year on SR-29. Applying the same annual increase to the current ADT on SR-29 of 22,800 results in about 38,760 ADT in year 2030 (4.1% per year added for 17 years).

Cumulative volumes based on historical data are approximately 85% of the model forecast volumes on SR-29. The difference between the model numbers and historical growth trends indicates volumes are not increasing to the model's forecasted levels. However, in order to proactively address potential traffic volumes under cumulative conditions, the County has adopted several measures identified in the General Plan to improve the street network and also reduce vehicle trips.

In order to identify weekend cumulative conditions, the General Plan Update provides a ratio of weekday to weekend peak hour volumes on key streets within the valley. Several segments on SR-29 in the vicinity of the project were shown to have an average ratio of 0.76-0.80, indicating weekend peak hour volumes are expected to be about 80% of weekday volumes. Therefore the future weekend peak hour volumes would be expected to remain roughly in the same ratio as the existing volumes and lower than the weekday volume projections.