

Appendix G: Supplemental Water Supply Information

- Zone 7 Purchase Agreement
- DWR Bulletin 118, San Francisco Bay Hydrologic Region

CONTRACT BETWEEN
ZONE 7 WATER AGENCY
AND
CALIFORNIA WATER SERVICE COMPANY
FOR A MUNICIPAL & INDUSTRIAL WATER SUPPLY



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MUNICIPAL & INDUSTRIAL WATER SUPPLY CONTRACT

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**CONTRACT BETWEEN
ZONE 7 OF ALAMEDA COUNTY FLOOD CONTROL AND WATER
CONSERVATION DISTRICT AND CALIFORNIA WATER SERVICE COMPANY
FOR A MUNICIPAL & INDUSTRIAL WATER SUPPLY**

THIS CONTRACT, made and entered into this 16th day of NOVEMBER, 1994, by and between ZONE 7 OF ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, commonly known as the Zone 7 Water Agency, hereinafter referred to as "Zone 7" and the CALIFORNIA WATER SERVICE COMPANY, hereinafter referred to as "Contractor."

W I T N E S S E T H:

For and in consideration of the terms and conditions herein contained, Zone 7 agrees to furnish and provide a water supply to Contractor, and Contractor agrees to purchase and accept such water supply consistent with the provisions herein.

A. INTRODUCTORY PROVISIONS

1. Definitions

When used in this contract, the following terms shall have the meanings hereinafter set forth:

- a. "Board" shall mean the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District.
- b. "Each Contractor" or "Other Contractor" shall mean any entity, public or private, contracting with Zone 7 for a Municipal & Industrial Water Supply.
- c. "Extract," "Extraction" or "Extracting" shall mean obtaining groundwater, by pumping or any other means, from wells, shafts, tunnels, excavations or other sources of such groundwater, for domestic, municipal, irrigation, industrial or other use.

- d. "Groundwater Pumping Quota" shall mean that quantity of water that the Contractor is entitled to extract from the Main Basin without paying a recharge fee to Zone 7.
- e. "In-Lieu Treated Water" shall mean that quantity of treated water delivered from Zone 7 in exchange for an equal reduction in Contractor's extraction of its Groundwater Pumping Quota.
- f. "Main Basin" shall mean that part of the Livermore-Amador Valley groundwater basin located essentially within the valley floor sections of the Castle, Bernal, Amador and Mocho (II) Subbasins as defined in Bulletin No. 118-2, Evaluation of Groundwater Resources: Livermore and Sunol Valleys, State of California, Department of Water Resources and shown in Exhibit A attached.
- g. "Municipal & Industrial Water Supply" shall mean a supply of water from Zone 7 to Each Contractor regardless of the source of said water or Contractor's use of said water.
- h. "Other Sources" shall mean a water source from any person, corporation or entity, whether public or private, other than from Zone 7.
- i. "Recharge" or "Recharged" shall mean managed replenishment of the Main Basin including but not limited to spreading on natural or improved channels or basins or well injection with imported, locally developed, or recycled water, or through In-Lieu Treated Water. Applied irrigation water percolation shall not be considered recharge.

- j. "Recycled Water" shall mean wastewater treated for reuse as permitted by the California Department of Health Services, the Regional Water Quality Control Board and other agencies that from time to time may have jurisdiction.
 - k. "Safe Yield" shall mean the quantity of water that can be successfully extracted from the Main Basin on an annual basis over an extended number of years without reducing groundwater storage. Such safe yield is the net quantity of groundwater added to the Main Basin by stream percolation (including percolation from stream releases required for prior water rights), rainfall percolation, applied irrigation water percolation, and net subsurface inflow.
 - l. "Treated Water" shall mean water that is processed as necessary to comply with drinking water requirements of the California Department of Health Services, the United States Environmental Protection Agency and other agencies that from time to time may have jurisdiction.
 - m. "Turnout Facilities" shall mean the facilities required to provide treated water deliveries from Zone 7's water system to the Contractor's water system. See Exhibit B for a schematic of a typical turnout facility.
 - n. "Zone 7 Boundary" shall mean the boundary of Zone 7 as shown on Exhibit C and as may be revised from time to time.
2. Term of Contract
- This contract shall become fully effective upon execution of the duly authorized signatures of the parties hereto and shall remain in effect for a period of thirty (30) years from

the date hereof, unless terminated or extended prior to expiration of term by mutual agreement at an earlier date.

B. WATER SERVICE PROVISIONS

3. Quantity of Water

Contractor shall purchase from Zone 7 all water required by Contractor for use within Contractor's service area as defined in Section 6 except that Contractor may extract groundwater as provided in the Groundwater Extraction Provisions herein or obtain water from Other Sources under the conditions in Section 5. No quantity of water purchased from Zone 7 or extracted as part of Contractor's Groundwater Pumping Quota shall be delivered by or provided from Contractor to any area other than Contractor's service area, except for short-term emergency and/or public health purposes.

4. Quality of Water

All treated water to be delivered by Zone 7 to Contractor shall be of a quality that complies with the Requirements for Drinking Water of the California Department of Health Services and the United States Environmental Protection Agency or their successor regulatory agencies. Zone 7 will endeavor to provide treated water that is aesthetically acceptable to the Contractor's customers. Zone 7 will blend its different sources of water within its operational capabilities to provide water of approximately equal quality to Each Contractor.

5. Water from Other Sources

In order to protect Zone 7's financial interest, Contractor shall not contract for, purchase or receive, with or without compensation, either directly or indirectly, any water for use in its service area from any source other than by

extraction of its Groundwater Pumping Quota or from purchase from Zone 7, except for any one or more of the following:

- (a) The water received is for fire flow or fire storage requirements or other emergency purposes;
- (b) The water delivered through Zone 7's turnout facility does not comply with drinking water requirements of California Department of Health Services, United States Environmental Protection Agency, or successor regulatory agencies. The quantity of water obtained shall be limited to that necessary to meet Contractor's treated water needs as a result of Zone 7's non-compliance with said drinking water requirements;
- (c) Zone 7 is unable to deliver the quantity of treated water necessary to satisfy the requirements of Contractor. Zone 7 shall specify the quantity of treated water that it cannot deliver and the time period for which it cannot satisfy the Contractor's requirements. Contractor is otherwise obligated to secure all water from Zone 7 to the extent Zone 7 can provide it;
- (d) Zone 7 is able to meet Contractor's water delivery request, and Contractor has paid Zone 7 for obligated fixed costs of Zone 7 associated with the quantity of water the Contractor will obtain from Other Sources. These obligated fixed costs shall include but are not limited to water facility improvements, water contract obligations, and debt service thereto incurred by Zone 7 in supplying water that would have gone to the Contractor, and for which said costs would have been recovered through the sale of said water to Contractor. The Contractor shall obtain the prior written approval from the Board which approval shall not be unreasonably withheld;

- (e) The source of water is groundwater extracted within Zone 7's boundary but outside the Main Basin provided said extraction does not cause an adverse impact on the Main Basin; or
- (f) The source of water is recycled water from Contractor's or Other Contractors' treated wastewater.

6. Contractor's Service Area

As used herein, the Contractor's service area shall include all areas presently served water by Contractor. Contractor's service area shall also include any future areas to be served by the Contractor within the boundaries of Zone 7 subject to Subsection 32c. Contractor may include any future areas outside the boundaries of Zone 7 upon a finding of the Board that providing water to said area is in the best interests of Zone 7 and after written modification of this contract providing for said service area. The Contractor's present service area is designated on the map attached hereto as Exhibit D. Contractor shall promptly notify Zone 7 of changes in its service area, as may occur from time to time, by furnishing a map to Zone 7 showing any change in said service area so that Zone 7 can maintain a map indicating the most recent Zone 7 water service area. Said changes in service area shall be in accordance with the requirements of the Local Agency Formation Commission, Public Utility Commission or other agency having authority to set service areas.

Any future areas outside Zone 7 boundaries to be served by Contractor which receive water from sources other than Zone 7 or the Main Basin shall not be considered part of the Contractor's service area under the terms of this contract.

7. Turnout Facilities

- a. Turnout facilities shall be constructed at the general location requested by Contractor. The exact location shall be determined by Zone 7 after consultation with Contractor. Turnout facilities shall be designed and/or constructed either by Zone 7 or by Contractor (upon the written approval of Zone 7) based on the ranges of flow set forth in Section 9. Turnout facilities shall include the necessary valves, piping, meter and recording equipment, vaults, telemetry equipment and any other appurtenances necessary to meet the standards and operational needs of Zone 7. Zone 7 shall submit its design of new turnout facilities to contractor for review and written approval.
- b. Contractor shall reimburse Zone 7 for all costs incurred by Zone 7 related to the new turnout facilities including but not limited to design, engineering, design review, construction, right-of-way and acquisition thereof, inspection, and contract administration. Contractor shall also pay all costs for the installation of all associated landscaping and recognizes that Zone 7 shall not be responsible for maintenance of landscaping under the terms and conditions of this contract. Contractor further agrees to grant or cause to be granted to Zone 7 the necessary permanent right-of-way and right of ingress thereto and egress therefrom, as determined by Zone 7, for the purposes of constructing, operating and maintaining said turnout facilities.
- c. Zone 7 shall install the nozzle outlet portion of all turnout facilities requested by Contractor prior to the construction of the transmission pipeline. For turnout facilities requested by Contractor subsequent to the construction of Zone 7's transmission pipeline, Contractor shall pay for the nozzle outlet portion of the

turnout facility, and all costs set forth in subsection b. above. Ownership of turnout facility, including the shut off valve downstream of the turnout facility, shall be with Zone 7, and Contractor shall have no obligation to operate, maintain, repair, replace or relocate the same.

8. Measurement of Treated Water Deliveries

At any time or times, Contractor may, upon request, inspect said turnout facilities (in the presence of a Zone 7 representative), and the measurements and records taken therefrom. Zone 7 shall test and calibrate the instrumentation at each turnout meter at least annually and furnish such results to the Contractor. When requested by the Contractor, Zone 7 shall test and calibrate any meter through which treated water is served to Contractor. The Contractor shall have the right to be represented by a qualified observer at and during any instrumentation and/or meter tests and/or calibration. Whenever testing and/or calibration of the instrumentation and/or the meter is requested by Contractor, and in the event that any such test shall disclose an error exceeding two percent (2.0%), an adjustment shall be made in charges against the Contractor covering the known or estimated period of duration of such error, but in no event exceeding six (6) months, and the expenses of such test shall be borne by Zone 7; otherwise, such expenses shall be borne by Contractor requesting such tests.

9. Ranges of Flow

a. It is recognized that the range of flow rates of water through a turnout facility may vary considerably over the contract term. A normal range of flow rates for a turnout facility is hereby established as from ten percent (10%) to one hundred percent (100%) of a maximum design flow rate. Contractor shall provide Zone 7 with

the following information for each turnout facility prior to the design of such facilities:

- (1) Anticipated ultimate (future) maximum flow rate,
- (2) Anticipated present design range of flow rates. (The maximum design flow rate shall not exceed ten (10) times the minimum design flow rate for this range in normal installations.)
- (3) Anticipated pressure ranges for (1) and (2) above on the Contractor's side of the turnout facility.

b. Zone 7 shall design the metering and/or recording installation for the range set forth in accordance with Subsections (2) and (3) above with provisions for future modifications in accordance with a range based on Subsections (1) and (3) above.

c. Contractor shall regulate the flow demands through the turnout facility such that the range of flow rates set forth in accordance with Subsection b above will be maintained insofar as such regulation is reasonable and practicable. Zone 7 shall make modification of the metering and/or recording equipment upon request of Contractor or at such time that the actual flow rate exceeds the maximum design flow rate or is less than the minimum design flow rate; provided, however, that flow rates resulting from emergencies shall not apply to such requirement for modification. Said modification will be at the expense of the Contractor and payment thereof shall be in accordance with Section 27.

10. Delivery Schedule of Municipal & Industrial Water

Each year, the Contractor shall submit in writing to Zone 7 a preliminary water delivery schedule on a form provided by Zone 7 indicating the anticipated quantity of treated water and groundwater in excess of its Groundwater Pumping Quota required by Contractor during each month of the succeeding

five (5) calendar years and the anticipated peak day treated water demand from Zone 7 for each such year. Zone 7 shall review such schedule, and after consultation with Contractor, shall approve such schedule in a timely manner or make such revisions in the same as may, in the judgment of Zone 7, be necessary to make such deliveries. To the extent water is available to Zone 7, Zone 7 will approve in writing, a delivery schedule each year for delivery to Contractor during the next succeeding calendar year of an amount of water not less than the amount of water set forth in the approved schedule for the then-current calendar year. The amount of water set forth in the approved delivery schedule for the next succeeding calendar year shall be the basis for which Zone 7 shall contract with the State of California or other entity for delivery to Zone 7. Zone 7 shall identify the reason for any revisions or disapproval of Contractor's delivery request. Zone 7 shall only revise or disapprove Contractor's delivery request for the reasons set forth in Sections 12, 13, 14 or 15.

11. Reporting Use of Water

The Contractor shall report to Zone 7 on or before the tenth day of each month the total volume, in acre-feet, of groundwater extracted from the Main Basin and any water obtained from Other Sources (including any water recharged to the Main Basin) for the preceding month. The report shall become the basis for which water charge determinations and hydrologic inventory calculations of the Main Basin are made by Zone 7. Said report shall be made on a form or forms provided by or acceptable to Zone 7. The measurement and recordation of such flows shall be subject to the same provisions for inspection and testing of meters and instrumentation by Zone 7 as is provided to Contractor in Section 8.

12. Peak Demands

The Zone 7 system is not designed to serve all Contractor's peak demands. As water demands increase, it may be necessary to curtail peak deliveries to conform to Zone 7 system capacity as it exists from time to time. However, so long as water and line capacity are available, Zone 7 will endeavor to meet all reasonable demands for peak deliveries and will use reasonable diligence to provide a regular and uninterrupted supply of water from its turnout facility, but shall not be liable to Contractor for damages, breach of contract, or otherwise, for failure, suspension, diminution, or other variations of service occasioned by any cause beyond the control of, or without the fault or negligence of Zone 7. Such causes may include, but are not restricted to, acts of God, acts of war, or criminal acts of others, acts of Contractor or Other Contractors, water shortages, fires, floods, earthquakes, epidemics, quarantine restrictions, strikes, or failure or breakdown of transmission or other facilities.

13. Curtailment of Delivery During Maintenance Periods

Zone 7 will make all reasonable effort to provide continuous service to Contractor but may schedule to temporarily discontinue or reduce the delivery of water to Contractor for the purpose of necessary investigation, inspection, maintenance, repair or replacement of any of the facilities necessary for the delivery of treated water to Contractor. Zone 7 shall notify Contractor as far in advance as possible of any scheduled discontinuance or reduction and the estimated duration of such discontinuance or reduction. Recognizing that Contractor may rely on Zone 7 for deliveries of water with minimal interruption, particularly during the high water consumption months, Zone 7 shall use its best efforts to make any such discontinuance or reduction in the delivery of water only during the period of November through March. In the event of any discontinuance or reduction in

delivery of water, Contractor may elect to receive the amount of water that otherwise would have been delivered to it during such period under the approved water delivery schedule at other times during the year, consistent with Zone 7's delivery ability considering the then current delivery schedules of all Other Contractors.

14. Availability of Water

In any year in which a shortage occurs due to drought or other cause in the supply of water available for delivery to Each Contractor such that the supply to Zone 7 is less than the total amount included in the approved delivery schedule of Each Contractor for that year, Zone 7 shall reduce deliveries to Each Contractor in an amount that results in a reduction of total water used within Contractor's service area that is equal to the percent reduction for total water used within Zone 7's service area for that year, all as determined by Zone 7; provided, that Zone 7 may apportion on another basis if such is required to meet minimum demands for domestic supply, fire protection, or public health during the year.

The amount of water available under this contract and Zone 7's obligation to supply water shall be subject to the terms and conditions of the contract between Zone 7 and the State of California for water service via the South Bay Aqueduct and any other contracts Zone 7 may enter into for water supply; provided, further, that wherever the provisions of the contract with the State of California or other entity as to the availability of water conflict with the provisions of this contract, the terms and provisions of this contract shall prevail. Zone 7 shall give Contractor written notice as far in advance as possible of any reduction in deliveries that would be necessary because of a shortage in water supply. Neither Zone 7 nor any of its officers, agents, or employees shall be liable for any damage, direct or indirect,

arising from this contract caused by drought, regulatory constraints, operation of area of origin statutes, or any other cause beyond the control or without the negligence of Zone 7.

15. Suspension of Service

In the event that Contractor shall be delinquent in the payment for water for more than ninety (90) days after the due date (as said due date is defined in Section 28), such delinquency shall be called to the attention of the Board and the Board may, in its discretion and after giving Contractor an opportunity to be heard, order the suspension or reduction of service to Contractor.

C. GROUNDWATER EXTRACTION PROVISIONS

16. Groundwater Pumping from the Main Basin

Zone 7 acknowledges Contractor's right to extract groundwater based on Contractor's historical groundwater extractions and based on the mutually agreed upon limitations in Contractor's original water supply contract with Zone 7. Contractor acknowledges that Zone 7 manages the Main Basin and that Zone 7 recharges, stores, and extracts from the Main Basin as necessary to supply water to Each Contractor. Accordingly, Contractor shall not extract under this agreement, more than 3,069 acre-feet (1,000 million gallons), its Groundwater Pumping Quota, from the Main Basin in any calendar year except as follows:

- (a) The Contractor pays Zone 7 a recharge fee for recharging the Main Basin as set forth in Section 17;
- (b) The groundwater extracted is Contractor's accumulated carry-over of its Groundwater Pumping Quota from prior years as provided in Section 18; or

(c) The source of the groundwater extracted is from Other Sources obtained by Contractor pursuant to 5(c), 5(d), and 5(f) herein and the Contractor has previously recharged said groundwater into the Main Basin. Said recharged water shall not adversely impact Zone 7's use of the Main Basin, including the recharge, storage or extraction thereof.

17. Recharge Water

In any calendar year, if Contractor should extract groundwater from the Main Basin in an amount in excess of its Groundwater Pumping Quota plus any accumulated carry-over and any groundwater recharged by Contractor per 16 (c), Contractor shall pay Zone 7, in addition to other payments required by this contract, a recharge fee as set forth in the rate schedule and Sections 23 and 24 herein, for each acre-foot of water (or portion thereof) in excess of said amount. In express consideration of Contractor's agreement to pay such recharge fee, as aforesaid, Zone 7 shall recharge the Main Basin in an amount aggregating the quantity of such excess water.

Because said recharge fee would be in the nature of an assessment fee upon annual extractions in excess of the Groundwater Pumping Quota, if Zone 7 (or any other public body or agency) shall impose a valid replenishment assessment fee or other charge upon or measured by the pumping or extraction of water for use in Contractor's service area, then the provisions of this Section shall be superseded accordingly, except as to any payment attributable to a period prior to the effective date of any such assessment fee or other charge.

18. Carry-over of Groundwater Pumping Quota

If, in any calendar year, Contractor does not extract its entire Groundwater Pumping Quota from the Main Basin,

Contractor may carry-over from that calendar year the unextracted portion of Groundwater Pumping Quota for extraction from the Main Basin during subsequent calendar years. Said carry-over or accumulated carry-over shall not exceed 20 percent of the Contractor's Groundwater Pumping Quota. Said carry-over shall not include any Groundwater Pumping Quota waived under the In-Lieu Treated Water provision of Section 19.

19. In-Lieu Treated Water

During periods when sufficient water is available to Zone 7 at reasonable cost and Zone 7 desires to raise or maintain groundwater levels, Zone 7 will offer delivery of treated water at a cost that is less than treated water rates to Contractor in lieu of Contractor extracting groundwater per its Groundwater Pumping Quota. The amount of In-Lieu Treated Water that Contractor may receive shall not exceed its Groundwater Pumping Quota plus any accumulated carry-over or its operational capability to extract said Groundwater Pumping Quota and accumulated carry-over. Zone 7's offer to deliver In-Lieu Treated Water for a given calendar year will be made on or about May 1 of that year, however, said rates may be retroactive for the entire calendar year or other mutually agreed upon portion thereof. Credit or payment for In-Lieu Treated Water will be as provided for under Section 25. Contractor is not required to take or purchase any In-Lieu Treated Water.

Contractor acknowledges that any credits or payments received under Section 25 are received in-lieu of the Contractor's right to extract its Groundwater Pumping Quota, and Contractor agrees that its Groundwater Pumping Quota and any accumulated carry-over shall be reduced by an amount equivalent to the amount of In-Lieu Treated Water delivered by Zone 7 to Contractor for the year in which the delivery is made.

20. Water Delivery Shortage Emergency Extractions

During a water supply emergency, as declared by the Board, in which Zone 7 is unable to deliver the quantity of treated water as approved on the delivery schedule, the Contractor may extract water from the Main Basin in excess of the Contractor's Groundwater Pumping Quota at a reduced recharge rate. Said rate shall be the same as the In-Lieu Treated Water rate.

21. Transfer of Groundwater Pumping Quota

Temporary or permanent transfer of Contractor's Groundwater Pumping Quota outside of the Zone 7 boundary shall not be permitted. Temporary or permanent transfer of Contractor's Groundwater Pumping Quota within Zone 7's boundary shall be permitted provided that it is transferred to an Other Contractor. Said transfer of Contractor's Groundwater Pumping Quota shall be permitted upon written notification to Zone 7 from each contractor that is a party to the transfer.

22. Changes in Contractor's Groundwater Pumping Quota

The annual Safe Yield of the Main Basin, estimated as approximately 13,200 acre-feet per year in 1993, is essentially the same as the long-term average extraction by existing groundwater producers. The Board shall not increase any Other Contractor's Groundwater Pumping Quota unless such increase in Groundwater Pumping Quota is acceptable to Each Contractor with a Groundwater Pumping Quota.

Neither Contractor nor Zone 7 waives any rights to pursue a court adjudication of the safe yield of the Main Basin or any other court action on extraction of groundwater from the Main Basin that may change Contractor's Groundwater Pumping Quota. Furthermore, Zone 7 reserves its authority to levy a replenishment assessment on the extraction of any groundwater, including Contractor's Groundwater Pumping Quota

(excluding any adjudication of the safe yield), as necessary to protect the water supplies for users within Zone 7.

D. CHARGE AND PAYMENT PROVISIONS

23. Rate Schedule

Zone 7 shall charge for water in accordance with a rate schedule for water service, as such rate schedule is established or amended by the Board. The Board shall review the rate schedule and establish a rate schedule for each calendar year period in accordance with the most recent costs and revenues of Zone 7. The Board shall review the rate schedule at the September regular meeting and endeavor to establish the rate schedule at the November regular meeting prior to January 1 of the following calendar year for which the rate schedule is to be effective. The rates, including but not limited to the treated water, in-lieu treated water, meter fee, and recharge fee, to be so established, shall be based on the cost of providing service, and shall not be unreasonable, arbitrary, or discriminatory. In the event the Board fails, in conformity to the preceding schedule, to establish a new rate schedule for any calendar year the rate schedule in effect for the prior calendar year shall be continued in full force and effect until otherwise modified by the Board.

24. Recharge Fee

The recharge fee shall be charged to Contractor in accordance with the rates included in the rate schedule. Contractor shall be invoiced by Zone 7 in accordance with Section 26 at the time in which Contractor exceeds its Groundwater Pumping Quota as provided in Section 17. Section 28 herein shall apply to said charges. The recharge fee shall be based upon Zone 7's costs including but not limited to the cost to purchase or develop the water, as well as the cost to construct, maintain, and operate the facilities needed to

import, distribute, store, treat and recharge said water into the Main Basin for the benefit of Each Contractor.

25. In-Lieu Treated Water Credit

In any calendar year in which the Contractor has foregone pumping of its Groundwater Pumping Quota, plus accumulated carry-over, as set forth in Section 19, Zone 7 shall determine the amount of delivered treated water that should be charged at the In-Lieu Treated Water rate, and shall credit or make payment to the Contractor the difference between the treated water rate and the In-Lieu Treated Water rate.

26. Time for Payment

Contractor shall be invoiced on a calendar month basis for charges. Contractor shall pay promptly all charges invoiced by Zone 7, such invoices to be rendered on or about the 5th day of each month for charges incurred in the preceding month and to become due and payable within 30 days from date of invoice. In the event that Contractor in good faith contests the accuracy of any invoices submitted to it pursuant to this Section, it shall give Zone 7 notice thereof at least ten (10) days prior to the day upon which payment of the stated amount is due. To the extent that Zone 7 finds Contractor's contentions regarding the statement to be correct, it shall revise the statement accordingly and Contractor shall make payment of the revised amounts on or before the due date. To the extent that Zone 7 does not find Contractor's contentions to be correct or where time is not available for a review of such contentions prior to the due date, Contractor shall make payment of the invoiced amount on or before the due date and make the contested part of such payment under protest and seek to recover the amount thereof from Zone 7.

27. Payment for Turnout Facilities

Prior to commencing with the design of a turnout facility, Contractor shall deposit with Zone 7 an amount of money estimated by Zone 7 to cover all costs to be incurred by Zone 7 for designing said turnout facility or shall request in writing to be invoiced for such design in accordance with Section 26. The option of invoicing Contractor shall be at the sole discretion of Zone 7. Prior to constructing said turnout facility, Contractor shall deposit with Zone 7 an amount of money estimated by Zone 7 to cover all costs to be incurred by Zone 7 for completion of turnout facility or request to be invoiced for such construction in accordance with Section 26. Following completion of the construction of the turnout facility, Zone 7 shall submit to Contractor a statement for the actual costs incurred for completion of the design and construction of said turnout facility as provided in Section 7. The deposit shall be applied to the actual costs incurred by Zone 7, and the appropriate refund or invoicing to Contractor will be made. Contractor shall make payment of any such invoicing to Zone 7 within thirty (30) days of submission of said statement. Zone 7 shall refund any deposit in excess of actual cost within thirty days of Zone 7's determination of said cost. Contractor shall have the right to audit the records of Zone 7 for the purpose of verifying actual costs.

28. Delinquent Payments

In the event that Contractor is delinquent in the payment of invoiced charges for more than thirty (30) days after the due date, delinquent amounts shall accrue at the legal rate of interest commencing on the due date and continuing each month thereafter until payment of both the principal amount of such charges and the interest thereon is paid in full insofar as permitted by law. Unless otherwise determined by law, the legal rate of interest shall be the combined per annum

discount rate of the Federal Reserve Bank of San Francisco on the 25th day of the current month and five percent (5%).

E. GENERAL PROVISIONS

29. Remedies

By reason of the specialized nature of the water service rendered, and for the further reason that the extent of any damage caused to either party by the other by reason of any breach of this contract or agreement may be extremely difficult to determine, it is agreed by the parties hereto that an action for damages is an inadequate remedy for any breach, and that specific performance, without precluding any other remedy available in equity or law, will be necessary to furnish either party hereto with an adequate remedy for the breach thereof.

30. Assignment

This contract is not for the benefit of any person, corporation or other entity, other than the parties hereto, and no person, corporation or other entity except the parties hereto, shall have any rights or interest in or under this contract unless otherwise specifically provided herein. Contractor shall not assign or transfer any rights or privileges under this contract, either in whole or in part, without the prior written consent of Zone 7, which consent shall not be unreasonably withheld, or make any transfer of all or any part of its water system, or allow the use thereof, in any manner whereby any provisions of this contract will not continue to be binding on it, its assignee or transferee, or such user of the system. This contract and the rights and responsibilities provided for herein shall be binding on the successors and assigns of the parties hereto.

31. Contract Modification

This contract may be amended or modified any time only by mutual written agreement of the parties.

32. Liabilities

- a. Zone 7 and/or any of its officers, agents or employees shall not be liable for the control, carriage, handling, use, disposal, or distribution of treated water supplied to Contractor by Zone 7, after such water has passed through the turnout facility or for claims of damage of any nature whatsoever, including but not limited to property damage, personal injury or death, arising out of or connected with the control, carriage, handling, use, disposal or distribution of such water beyond said turnout facility. Contractor shall indemnify, save and hold harmless Zone 7 and its officers, agents, and employees from any such damages or claims of damages. Contractor shall further reimburse Zone 7 for costs of repair of Zone 7's facilities and other damages resulting from the operations of Contractor.

- b. Contractor and/or any of its officers, agents, or employees shall not be liable for the control, carriage, handling, use, disposal, or distribution of water prior to such water being delivered through the turnout facility or for claims of damage of any nature whatsoever, including but not limited to property damage, personal injury or death, arising out of or connected with the control, carriage, handling, use, disposal, or distribution of such water prior to its delivery to Contractor, excepting, however, claims by Zone 7 for costs of repair to Zone 7's facilities and other damages resulting from the operations of the Contractor. Zone 7 shall indemnify, save and hold harmless the Contractor and its officers, agents, and employees from any such damages or claims of damages, except claims by Zone 7 for costs of repair of Zone 7's facilities and other damages resulting from the operations of Contractor.

- c. Zone 7 needs to be protected from any obligation to supply water to projects or consumers which the contractor has supplied from sources other than what has been directly purchased from Zone 7. Accordingly, any other provision herein notwithstanding, Zone 7 shall not be obligated nor liable to provide, without exception, that quantity of water obtained by Contractor pursuant to Subsections 5a-f, to Contractor or any customer of Contractor regardless of purpose. Accordingly, Contractor shall indemnify, save and hold harmless Zone 7 from any and all obligations, liability, responsibility, costs, expenses, or fees associated in any way with any claims, demands, requests, suits, causes of action of whatever type or nature concerning the provision of any quantity of water obtained by Contractor pursuant to Subsections 5a-f herein.
- d. Likewise, if pursuant to Section 3 herein, Contractor is instructed by Zone 7 to acquire water from Zone 7 which has been previously acquired from third parties pursuant to Subsections 5a-f herein, Zone 7 shall save and hold harmless Contractor from any and all obligations, liability, responsibility, costs, expenses, or fees that may arise from such third parties.

33. Renewability

At the expiration of the thirty (30) year term of this contract, said contract may be renewed upon the mutual consent of the parties hereto. If no such renewal shall take place and in the absence of any new contract, Zone 7 shall nevertheless continue delivery to Contractor in accordance with this contract, that quantity of water set forth in the approved delivery schedule for the last full calendar year before the expiration of the term of this contract. However, if a new contract is not entered into within two (2) years from the date of expiration of this contract, then the Board

may, at its option, set the terms and conditions for a Municipal & Industrial Water Supply.

34. Notices

All notices or other writings in this contract provided to be given or made or sent, or which may be given or made or sent, by one party hereto to another, shall be deemed to have been fully given or made or sent when made in writing and deposited in the United States mail, registered, certified or first class, postage prepaid, and addressed as follows:

To Zone 7: General Manager
Zone 7 Water Agency
5997 Parkside Drive
Pleasanton, CA 94588

To Contractor: President
California Water Service Company
1720 North First Street
San Jose, CA 95112-4598

The address to which any notice or other writing may be given or made or sent to any party may be changed upon written notice given by such party as provided above.

35. Severability

If any one or more of the terms or conditions set forth in this contract to be performed on the part of Zone 7 or Contractor, or either of them, should be contrary to any provisions of law or contrary to the policy of law to such an extent as to be unenforceable in any court of competent jurisdiction, then such terms or conditions, shall be null and void and shall be deemed severable from the remaining terms or conditions and shall not affect the validity of the remaining provisions of this contract.

36. Section Headings

Section headings in this contract are for convenience only and are not to be construed as a part of this contract or in any way limiting or amplifying the provisions hereof.

37. Waiver

None of these terms or conditions herein contained can be waived except by mutual written consent.

38. Water Conservation

In order to increase water supply by demand reduction or to comply with regulatory requirements, Zone 7 will undertake and support water conservation programs. To that end, Zone 7 will develop, implement or participate in such programs and enter into agreements with Other Contractors, and other entities to make more efficient use of water supplies through water conservation programs so long as such agreements serve a beneficial purpose to the residents of Zone 7.

39. Contracts to be Substantially Similar

Zone 7 agrees that each contract for a Municipal & Industrial Water Supply hereafter entered into by Zone 7 with any Other Contractor shall contain provisions substantially similar to those herein set forth and shall not contain any provisions of a material nature more favorable to the Other Contractor than the provisions herein applicable to Contractor. This section shall not restrict Zone 7 from considering other terms and conditions for subsequent Municipal & Industrial Water Supply contracts provided that if such other terms and conditions are not substantially similar, Zone 7 shall notify all Other Contractors and offer such other terms and conditions in accordance with Section 31 to Each Contractor. This section shall not limit Zone 7 from entering into other contracts for services not provided for under the terms and conditions of this contract.

IN WITNESS WHEREOF, the parties hereto and have executed this contract on the date and year first above written.

CALIFORNIA WATER SERVICE
COMPANY

ZONE 7 WATER AGENCY

BY Donald L. Houck
President

BY David W. Layton
Chairman, Board of Directors

ATTEST:

BY Helen Mary Kanley
Secretary

ATTEST:

BY Jim Dizon
Secretary

APPROVED AS TO FORM:
KELVIN H. BOOTY, JR.,
COUNTY COUNSEL

BY Sam Wolff
Deputy County Counsel

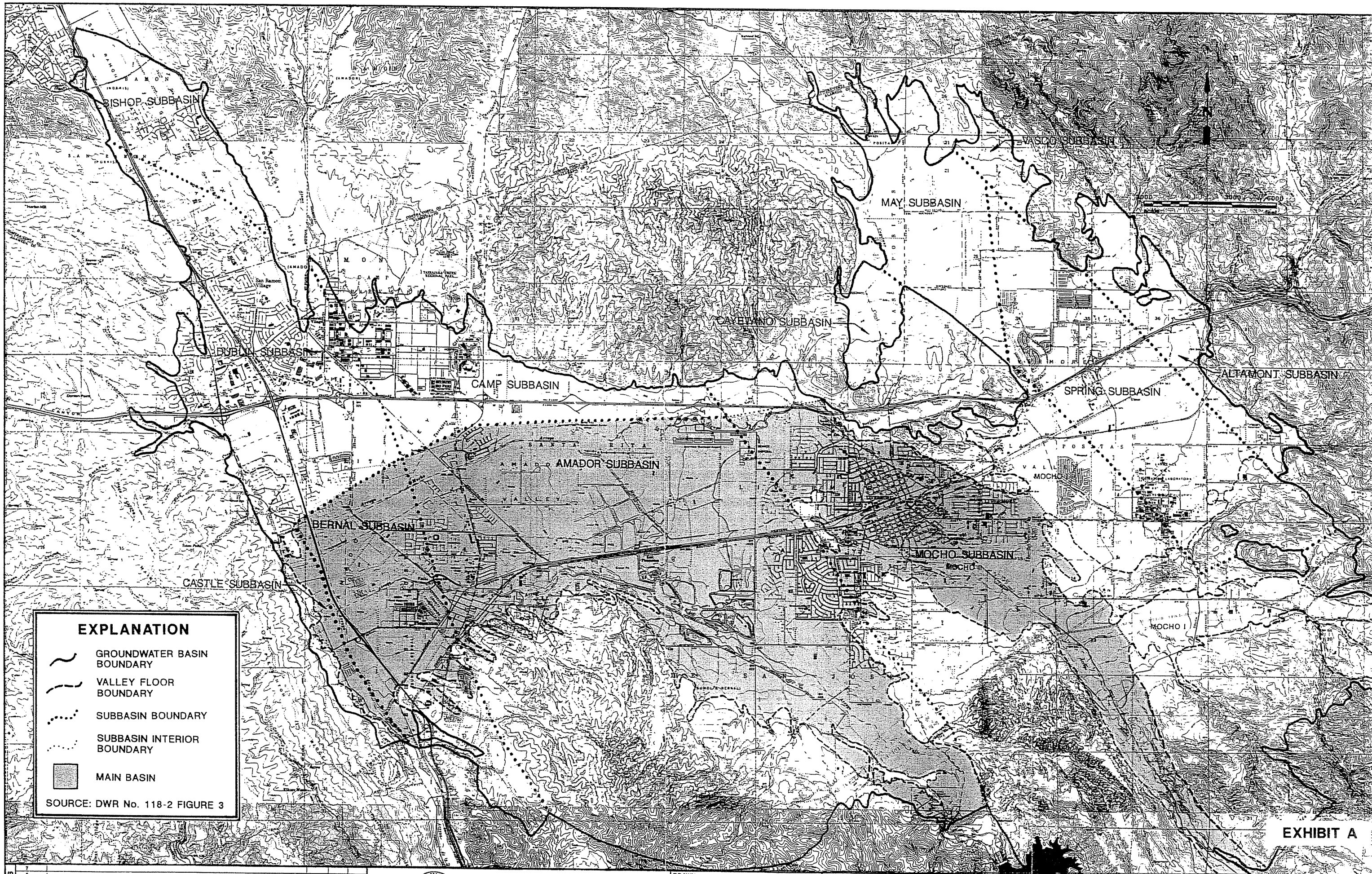


EXHIBIT A

REVISIONS	REVISIONS			
	NUMBER	DESCRIPTION	BY	DATE
7				
6				
5				
4				
3				
2				
1				



ZONE 7 WATER AGENCY
5997 PARKSIDE DRIVE PLEASANTON CA 94588

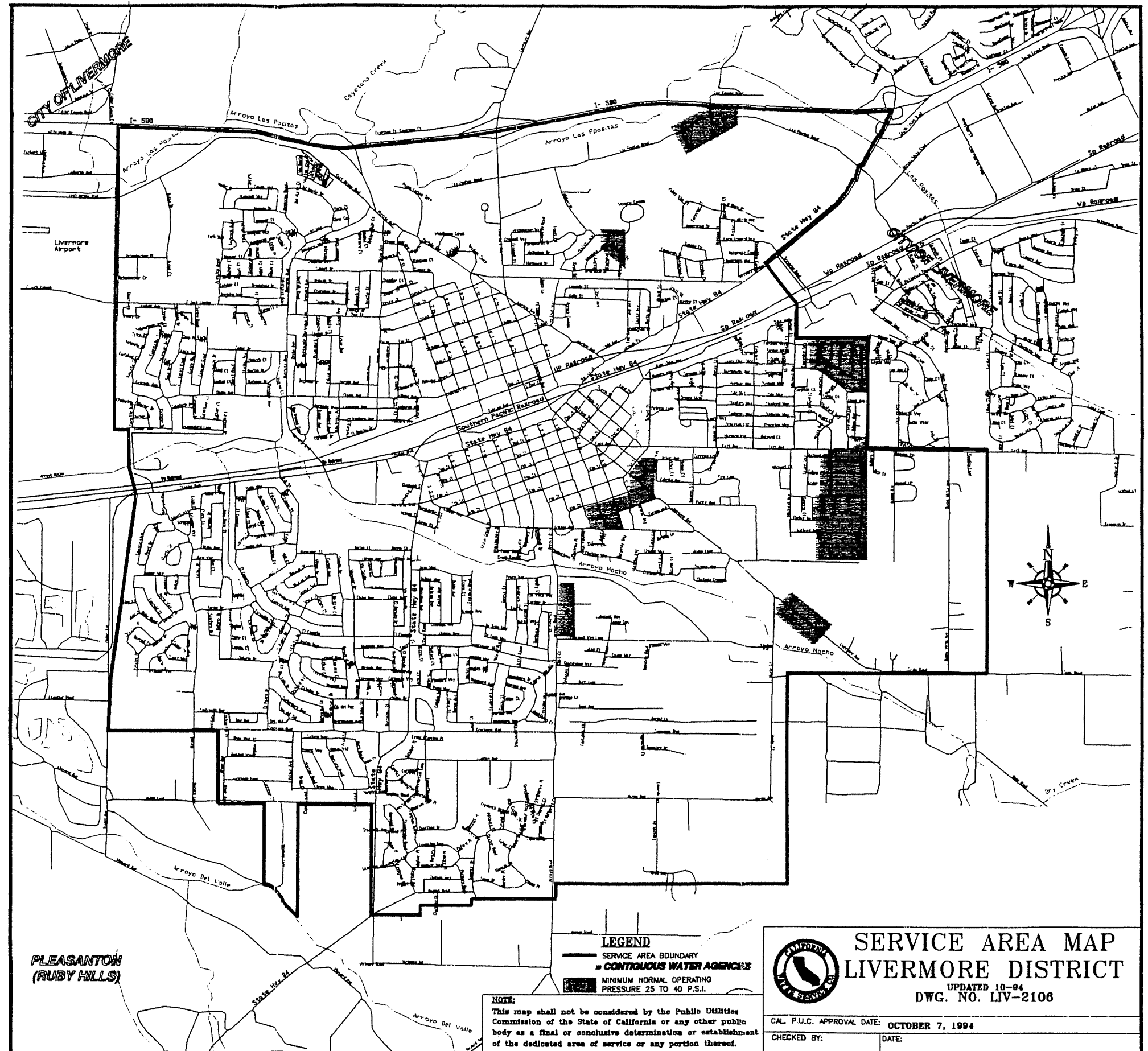
DRAWN	JAL
DESIGNED	
CHECKED	DWZ
APPROVED	

WATER RESOURCES ENGINEERING

LIVERMORE VALLEY GROUNDWATER BASIN BOUNDARIES

SCALE	1"=6,000'
DATE	12 MAY 1994
FILE NO.	M-321

SHEET	GW
OF SHEETS	



ZONE 7
OWNED & MAINTAINED

CONTRACTOR
OWNED
& MAINTAINED

CONTROL PANEL
FLOW RECORDER /
TOTALIZER
RTU (IF REQUIRED)

SCADA SYSTEM
(IF REQUIRED)

POWER SUPPLY

TRANSMISSION
PIPELINE

NOZZLE

ISOLATION
VALVE

SHUT OFF VALVE

M

FLOW METER

CONNECTING
PIPELINE

CHECK VALVE

FLOW CONTROL AND/OR
PRESSURE REGULATING
VALVE (IF REQUIRED)

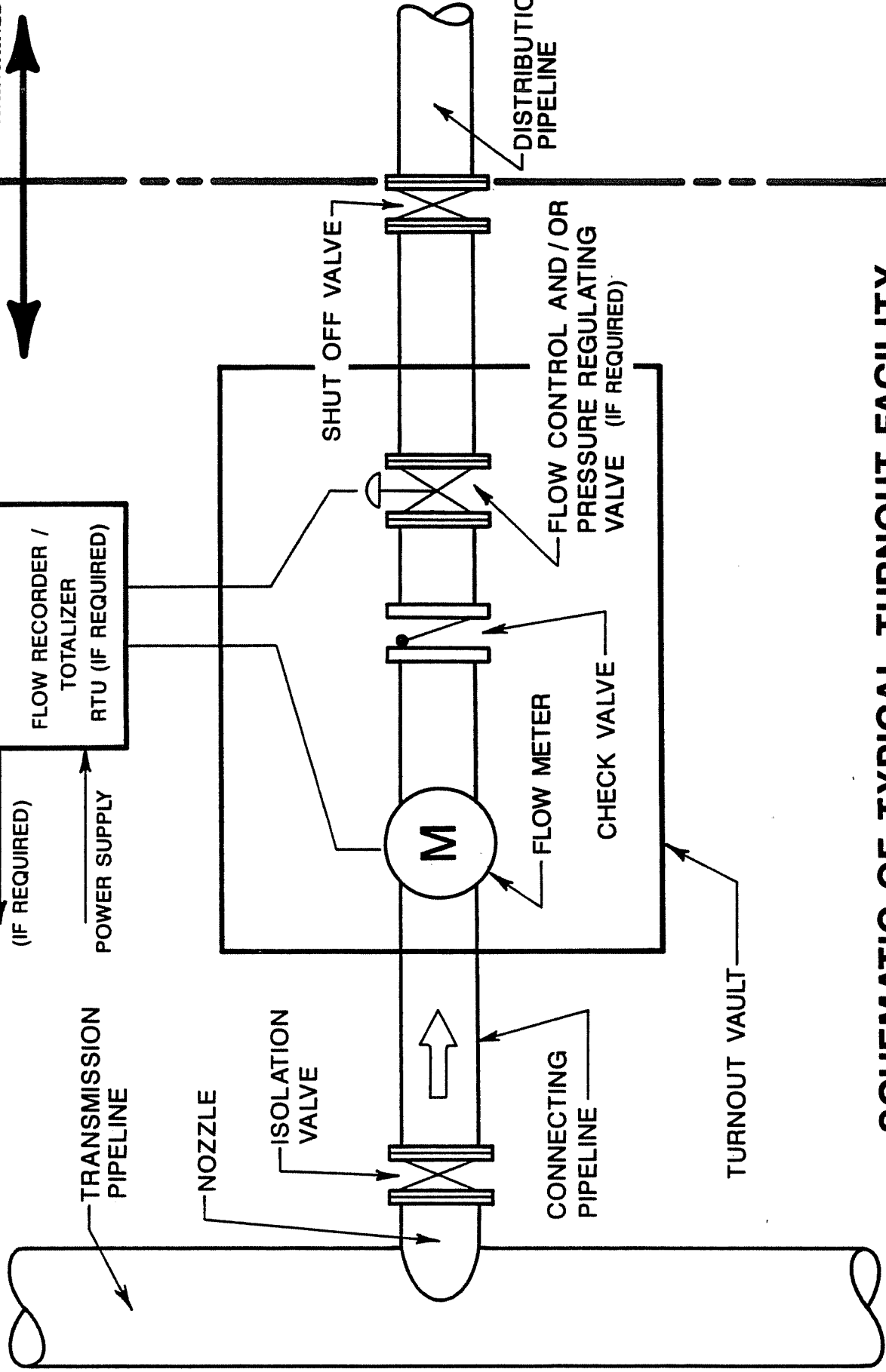
DISTRIBUTION
PIPELINE

TURNOUT VAULT

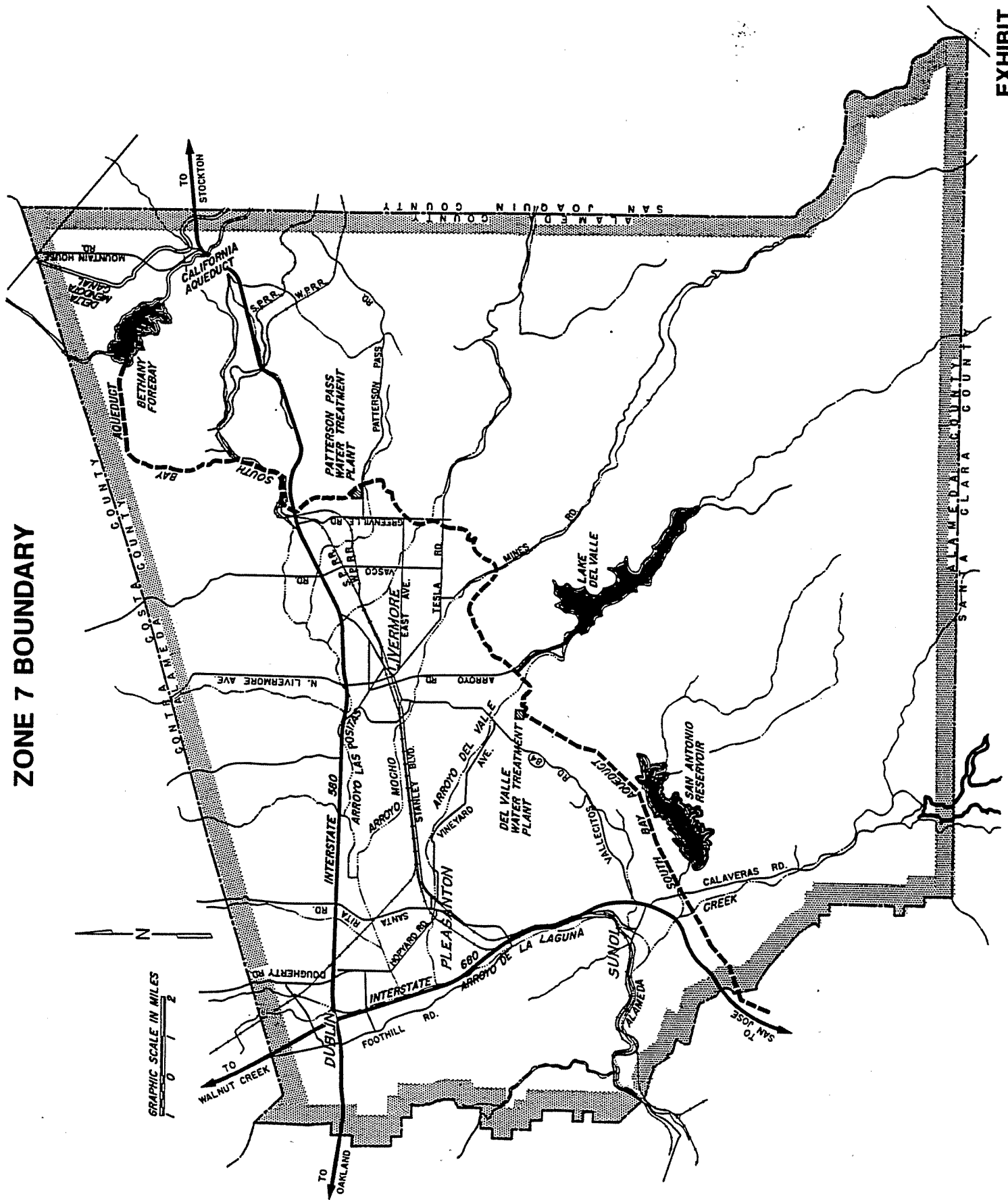
SCHEMATIC OF TYPICAL TURNOUT FACILITY

NOT TO SCALE

EXHIBIT B



ZONE 7 BOUNDARY



San Francisco Bay Hydrologic Region

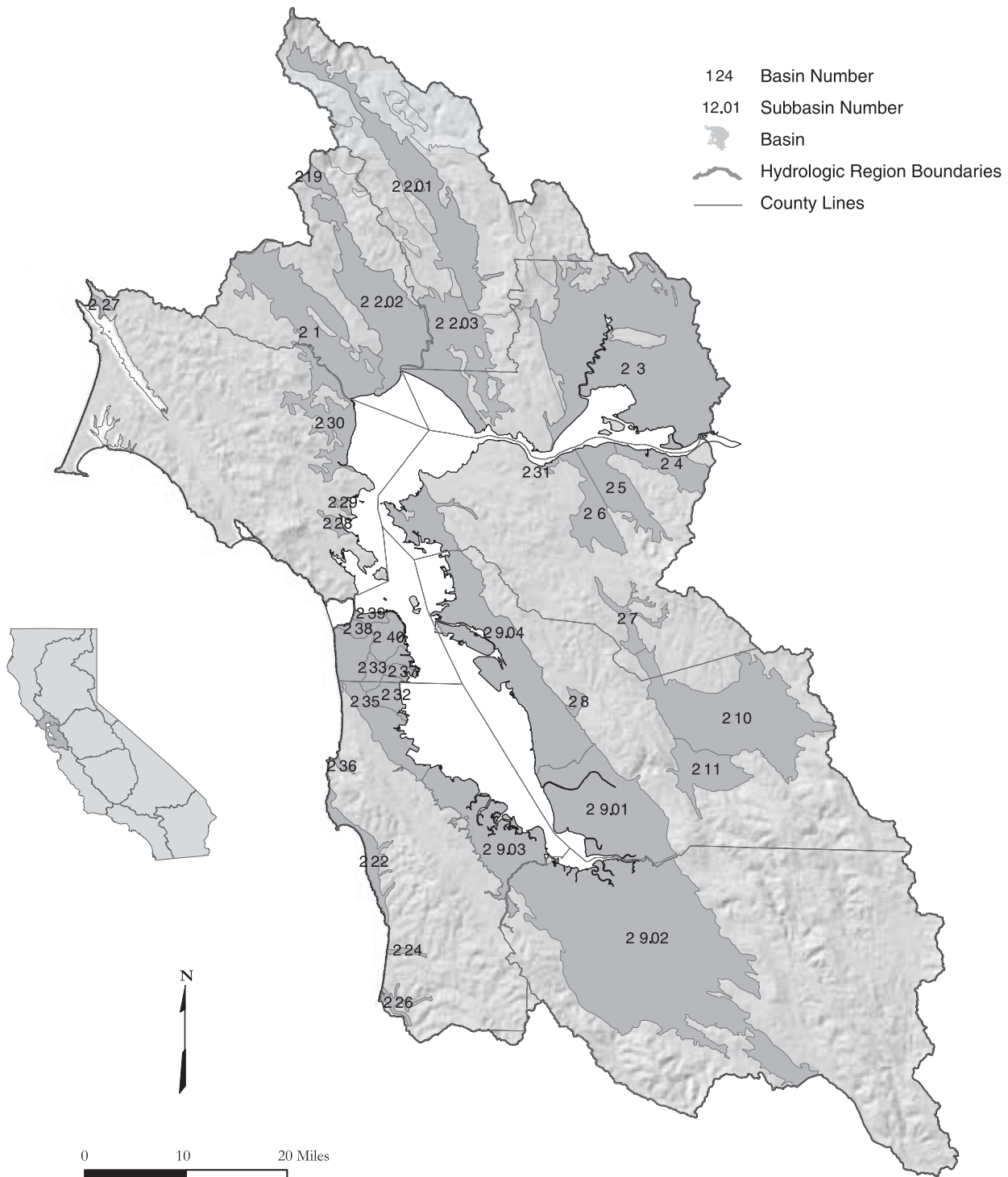


Figure 27 San Francisco Bay Hydrologic Region

Basins and Subbasins of the San Francisco Bay Hydrologic Region

Basin/subbasin	Basin name
2-1	Petaluma Valley
2-2	Napa-Sonoma Valley
2-2.01	Napa Valley
2-2.02	Sonoma Valley
2-2.03	Napa-Sonoma Lowlands
2-3	Suisun-Fairfield Valley
2-4	Pittsburg Plain
2-5	Clayton Valley
2-6	Ygnacio Valley
2-7	San Ramon Valley
2-8	Castro Valley
2-9	Santa Clara Valley
2-9.01	Niles Cone
2-9.02	Santa Clara
2-9.03	San Mateo Plain
2-9.04	East Bay Plain
2-10	Livermore Valley
2-11	Sunol Valley
2-19	Kenwood Valley
2-22	Half Moon Bay Terrace
2-24	San Gregorio Valley
2-26	Pescadero Valley
2-27	Sand Point Area
2-28	Ross Valley
2-29	San Rafael Valley
2-30	Novato Valley
2-31	Arroyo Del Hambre Valley
2-32	Visitacion Valley
2-33	Islais Valley
2-35	Merced Valley
2-36	San Pedro Valley
2-37	South San Francisco
2-38	Lobos
2-39	Marina
2-40	Downtown San Francisco

Description of the Region

The San Francisco Bay HR covers approximately 2.88 million acres (4,500 square miles) and includes all of San Francisco and portions of Marin, Sonoma, Napa, Solano, San Mateo, Santa Clara, Contra Costa, and Alameda counties (Figure 27). The region corresponds to the boundary of RWQCB 2.

Significant geographic features include the Santa Clara, Napa, Sonoma, Petaluma, Suisun-Fairfield, and Livermore valleys; the Marin and San Francisco peninsulas; San Francisco, Suisun, and San Pablo bays; and the Santa Cruz Mountains, Diablo Range, Bolinas Ridge, and Vaca Mountains of the Coast Range. While being the smallest in size of the 10 HRs, the region has the second largest population in the State at about 5.8 million in 1995 (DWR 1998). Major population centers include the cities of San Francisco, San Jose and Oakland.

Groundwater Development

The region has 28 identified groundwater basins. Two of those, the Napa-Sonoma Valley and Santa Clara Valley groundwater basins, are further divided into three and four subbasins, respectively. The groundwater basins underlie approximately 896,000 acres (1,400 square miles) or about 30 percent of the entire HR.

Despite the tremendous urban development in the region, groundwater use accounts for only about 5 percent (68,000 acre-feet) of the region's estimated average water supply for agricultural and urban uses, and accounts for less than one percent of statewide groundwater uses.

In general, the freshwater-bearing aquifers are relatively thin in the smaller basins and moderately thick in the more heavily utilized basins. The more heavily utilized basins in this region include the Santa Clara Valley, Napa-Sonoma Valley, and Petaluma Valley groundwater basins. In these basins, the municipal and irrigation wells have average depths ranging from about 200 to 500 feet. Well yields in these basins range from less than 50 gallons per minute (gpm) to approximately 3,000 gpm. In the smaller basins, most municipal and irrigation wells have average well depths in the 100- to 200-foot range. Well yields in the smaller and less utilized basins are typically less than 500 gpm.

Land subsidence has been a significant problem in the Santa Clara Valley Groundwater Basin in the past. An extensive annual monitoring program has been set up within the basin to evaluate changes in an effort to maintain land subsidence at less than 0.01 feet per year (SCVWD 2001). Additionally, groundwater recharge projects have been implemented in the Santa Clara Valley to ensure that groundwater will continue to be a viable water supply in the future.

Groundwater Quality

In general, groundwater quality throughout most of the region is suitable for most urban and agricultural uses with only local impairments. The primary constituents of concern are high TDS, nitrate, boron, and organic compounds.

The areas of high TDS (and chloride) concentrations are typically found in the region's groundwater basins that are situated close to the San Francisco Bay, such as the northern Santa Clara, southern Sonoma, Petaluma, and Napa valleys. Elevated levels of nitrate have been detected in a large percentage of private wells tested within the Coyote Subbasin and Llagas Subbasin of the Gilroy-Hollister Valley Groundwater Basin (in the Central Coast HR) located to the south of the Santa Clara Valley (SCVWD 2001). The shallow aquifer zone within the Petaluma Valley also shows persistent nitrate contamination. Groundwater with high TDS, iron, and boron levels is present in the Calistoga area of Napa Valley, and elevated boron levels in other parts of Napa Valley make the water unfit for agricultural uses. Releases of fuel hydrocarbons from leaking underground storage tanks and spills/leaks of organic solvents at industrial sites have caused minor to significant groundwater impacts in many basins throughout the region. Methyl tertiary-butyl ether (MTBE) and chlorinated solvent releases to soil and groundwater continue to be problematic. Environmental oversight for many of these sites is performed either by local city and county enforcement agencies, the RWQCB, the Department of Toxic Substances Control, and/or the U.S. Environmental Protection Agency.

Water Quality in Public Supply Wells

From 1994 through 2000, 485 public supply water wells were sampled in 18 of the 33 basins and subbasins in the San Francisco Bay HR. Analyzed samples indicate that 410 wells, or 85 percent, met the state primary MCLs for drinking water standards. Seventy-five wells, or 15 percent, have constituents that exceed one or more MCL. Figure 28 shows the percentages of each contaminant group that exceeded MCLs in the 75 wells.

Table 16 lists the three most frequently occurring contaminants in each contaminant group and the number of wells in the HR that exceeded the MCL for those contaminants.

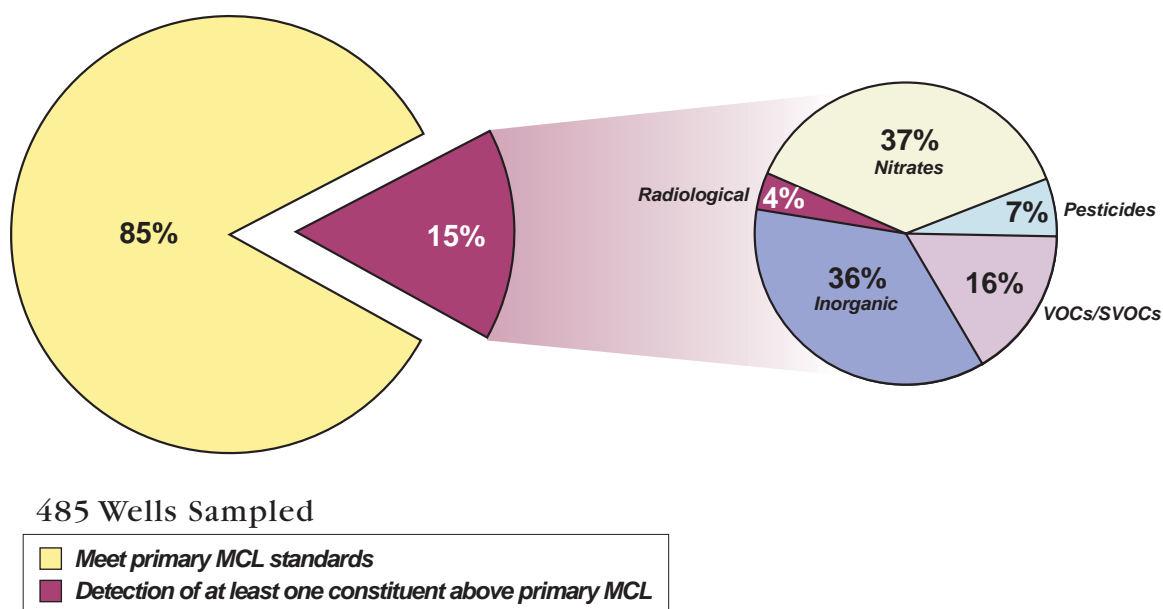


Figure 28 MCL exceedances in public supply wells in the San Francisco Bay Hydrologic Region

Table 16 Most frequently occurring contaminants by contaminant group in the San Francisco Bay Hydrologic Region

Contaminant group	Contaminant - # of wells	Contaminant - # of wells	Contaminant - # of wells
Inorganics	Iron – 57	Manganese – 57	Fluoride – 7
Radiological	Gross Alpha – 2	Radium 226 – 1	
Nitrates	Nitrate (as NO ₃) – 27	Nitrate + Nitrite – 3	Nitrite (as N) – 1
Pesticides	Di(2-Ethylhexyl)phthalate – 4	Heptachlor – 1	
VOCs/SVOCs	PCE – 4	Dichloromethane – 3	TCE – 2 Vinyl Chloride – 2

TCE = Trichloroethylene
PCE = Tetrachloroethylene
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound

Changes from Bulletin 118-80

Since Bulletin 118-80 was published, RWQCB 2 boundary has been modified. This resulted in several basins being reassigned to RWQCB 1. These are listed in Table 17.

Table 17 Modifications since Bulletin 118-80 of groundwater basins in San Francisco Bay Hydrologic Region

Basin name	New number	Old number
McDowell Valley	1-56	2-12
Knights Valley	1-50	2-13
Potter Valley	1-51	2-14
Ukiah Valley	1-52	2-15
Sanel Valley	1-53	2-16
Alexander Valley	1-54	2-17
Santa Rosa Valley	1-55	2-18
Lower Russian River Valley	1-60	2-20
Bodega Bay Area	1-57	2-21

No additional basins were assigned to the San Francisco Bay HR in this revision. However, the Santa Clara Valley Groundwater Basin (2-9) has been subdivided into four subbasins instead of two, and the Napa-Sonoma Valley Groundwater Basin is now three subbasins instead of two.

There are several deletions of groundwater basins from Bulletin 118-80. The San Francisco Sand Dune Area (2-34) was deleted when the San Francisco groundwater basins were redefined in a USGS report in the early 1990s. The Napa-Sonoma Volcanic Highlands (2-23) is a volcanic aquifer and was not assigned a basin number in this bulletin. This is considered to be a groundwater source area as discussed in Chapter 6. Bulletin 118-80 identified seven groundwater basins that were stated to differ from 118-75: Sonoma County Basin, Napa County Basin, Santa Clara County Basin, San Mateo Basin, Alameda Bay Plain Basin, Niles Cone Basin, and Livermore Basin. They were created primarily by combining several smaller basins and subbasins within individual counties. This report does not consider these seven as basins. There is no change in numbering because the basins were never assigned a basin number.

Table 18 San Francisco Bay Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Active Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
2-1	PETALUMA VALLEY	46,100	C	100	-	16	7	24	347	58-650
2-2	NAPA-SONOMA VALLEY									
2-2.01	NAPA VALLEY	45,900	A	3,000	223	19	10	23	272	150-370
2-2.02	SONOMA VALLEY	44,700	C	1,140	516	18	9	35	321	100-550
2-2.03	NAPA-SONOMA LOWLANDS	40,500	C	300	98	0	6	9	185	50-300
2-3	SUISUN-FAIRFIELD VALLEY	133,600	C	500	200	21	17	35	410	160-740
2-4	PITTSBURG PLAIN	11,600	C	-	-	-	-	9	-	-
2-5	CLAYTON VALLEY	17,800	C	-	-	-	-	48	-	-
2-6	YGNACIO VALLEY	15,500	C	-	-	-	-	-	-	-
2-7	SAN RAMON VALLEY	7,060	C	-	-	-	-	-	-	-
2-8	CASTRO VALLEY	1,820	C	-	-	-	-	-	-	-
2-9	SANTA CLARA VALLEY									
2-9.01	NILES CONE	57,900	A	3,000	2,000	350	120	20	-	-
2-9.02	SANTA CLARA	190,000	C	-	-	-	10	234	408	200-931
2-9.03	SAN MATEO PLAIN	48,100	C	-	-	-	2	14	407	300-480
2-9.04	EAST BAY PLAIN	77,400	A	1,000	UNK	29	16	7	638	364-1,420
2-10	LIVERMORE VALLEY	69,500	A	-	-	-	-	36	-	-
2-11	SUNOL VALLEY	16,600	C	-	-	-	-	2	-	-
2-19	KENWOOD VALLEY	3,170	C	-	-	-	-	13	-	-
2-22	HALF MOON BAY TERRACE	9,150	C	-	-	5	-	9	-	-
2-24	SAN GREGORIO VALLEY	1,070	C	-	-	-	-	-	-	-
2-26	PESCADERO VALLEY	2,900	C	-	-	3	-	4	-	-
2-27	SAND POINT AREA	1,400	C	-	-	-	-	6	-	-
2-28	ROSS VALLEY	1,770	C	-	-	-	-	-	-	-
2-29	SAN RAFAEL VALLEY	880	C	-	-	-	-	-	-	-
2-30	NOVATO VALLEY	20,500	C	-	-	-	-	1	-	-
2-31	ARROYO DEL HAMBRE VALLEY	790	C	-	-	-	-	-	-	-
2-32	VISITACION VALLEY	880	C	-	-	-	-	-	-	-
2-33	ISLAIS VALLEY	1,550	C	-	-	-	-	-	-	-
2-35	MERCED VALLEY	10,400	C	-	-	-	-	10	-	-
2-36	SAN PEDRO VALLEY	880	C	-	-	-	-	-	-	-
2-37	SOUTH SAN FRANCISCO	2,170	C	-	-	-	-	-	-	-
2-38	LOBOS	2,400	A	-	-	-	-	-	-	-
2-39	MARINA	220	A	-	-	-	-	-	-	-
2-40	DOWNTOWN SAN FRANCISCO	7,600	C	-	-	-	-	-	-	-

gpm - gallons per minute

mg/L - milligram per liter

TDS - total dissolved solids

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Livermore Valley Groundwater Basin

- Groundwater Basin Number: 2-10
- Counties: Alameda and Contra Costa
- Surface Area: 69,600 acres (109 square miles)

Basin Boundaries and Hydrology

The Livermore Valley lies about 40 miles east of San Francisco and 30 miles southwest of Stockton within a structural trough of the Diablo Range. The groundwater basin extends from the Pleasonton Ridge east to the Altamont Hills (about 14 miles) and from the Livermore Upland north to the Orinda Upland (about 3 miles). Surface drainage features include Arroyo Valle, Arroyo Mocho, and Arroyo las Positas as principal streams, with Alamo Creek, South San Ramon Creek, and Tassajara Creek as minor streams. All streams converge on the west side of the basin to form Arroyo de la Laguna, which flows south and joins Alameda Creek in Sunol Valley. Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is to the west, then south towards Arroyo de la Laguna. Elevations within the basin range from about 600 ft in the east, near the Altamont Hills, to about 280 ft in the southwest, where Arroyo de la Laguna flows into Sunol Groundwater Basin. Average annual precipitation ranges from 16 inches on the valley floor to more than 20 inches along the southeast and northwest basin margins.

Hydrogeologic Information

Water Bearing Formations

The entire floor of Livermore Valley and portions of the upland areas on all sides of the valley overly groundwater-bearing materials. The materials are continental deposits from alluvial fans, outwash plains, and lakes. They include valley-fill materials, the Livermore Formation, and the Tassajara Formation. Under most conditions, the valley-fill and Livermore sediments yield adequate to large quantities of groundwater to all types of wells. The quality of water produced from these rocks ranges from poor to excellent, with most waters in the good to excellent range.

The following information on the water bearing units is from Bulletin 118-2 (DWR 1966, DWR 1974).

Valley-fill. The Holocene age surficial valley-fill materials range in thickness from a few tens of feet to nearly 400 feet. They occur as stream channel deposits, alluvium, alluvial fan deposits, and terrace deposits, and are composed of unconsolidated sand, gravel, silt, and clay. In the central and southern portions of the valley, 50 to 80 percent of the valley-fill is comprised of aquifer material that yields significant quantities of water to wells. Clay deposits up to 40 feet thick cap the valley-fill in the western part of the Basin; where deep wells draw groundwater from underlying aquifer material. (Zone 7, 2002) Several gravel extraction pits have been dug into the upper portions of the valley fill material near the central portion of the basin. Dewatering activities related to the mining change ground water flow patterns and locally limit the storage capacity of the basin. Mining activities are scheduled to cease by 2030.

Livermore Formation. The Plio-Pleistocene Livermore Formation is primarily exposed over the south and southwest regions of the Livermore Valley groundwater basin, but occurs almost everywhere beneath the surface at depths up to 400 ft. This formation is up to 4,000 feet thick and consists of unconsolidated to semi-consolidated beds of gravel, sand, silt, and clay. Limey concretions are fairly common in its lower portion, and tuffaceous beds are present at its base. Erosion of Jurassic and Cretaceous rocks to the south of the basin produced the coarse-grained Livermore Formation. These grains consist of black to red chert, micaceous sandstone, black shale, and quartzite. (DWR, 1966) Deep wells in the eastern half of the basin produce from the Livermore Formation. Upland wells to the South have limited groundwater yields. (Zone 7, 2002) Generally, yields are adequate for most irrigation, industrial, or municipal purposes.

Tassajara Formation. The Pliocene-age Tassajara Formation surfaces in the uplands to the north of the Livermore Valley and occurs beneath the central portion of the valley at depths ranging from 200 to 750 feet. Beds of the Tassajara are composed of sandstone, siltstone, shale, conglomerate, and limestone. Coarse-grained beds typically contain tuff and clay particles, reducing their overall permeability. Wells tapping the Tassajara Formation yield only sufficient water for domestic or stock purposes. There is little hydrologic continuity between the Tassajara and overlying water-bearing units.

Restrictive Structures

Within the Livermore Valley groundwater basin, faults are the major structural features known to have marked affect on the movement of groundwater. Faults in this region tend to act as barriers to the lateral movement of groundwater. The resulting groundwater levels stand higher on the up-gradient side. The Livermore, Pleasanton and Parks faults act as such barriers, dividing the Quaternary Alluvium into 5 groundwater sub-basins.

Groundwater Level Trends

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity of the basin is estimated at about 500,000 af. (Zone 7, 2002)

Groundwater in Storage. Groundwater in storage in 1999 is estimated at 219,000 af.

Groundwater Budget (Type A)

Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7) has maintained an annual hydrologic inventory of supply and demand since 1974. The inventory describes the balance between groundwater supply and demand. Under average hydrologic conditions, the groundwater budget is essentially in balance. Groundwater budget inflow components include natural recharge of 10,000 af, artificial recharge of 10,900 af, applied water recharge of 1,740 af, and subsurface inflow of 1,000 af. Groundwater budget outflow components include urban extraction of

10,290 af, agricultural extraction of 190 af, other extraction and evaporation associated with gravel mining operations of 12,620 af, and subsurface outflow of 540 af.

Groundwater Quality

Characterization. Water chemistry is highly varied around the basin. Generally, the northern extent of the basin is dominated by a sodium cation water. Much of the water underlying the western part of the basin near Pleasanton has magnesium-sodium as the dominant cation. The area along the eastern portion of the basin beneath Livermore typically has magnesium as the dominant cation. Nearly the entire basin has bicarbonate as the dominant anion (Sorenson and others 1985). TDS ranges from 300 mg/L to 550 mg/L with an average of 450 mg/L based on analyses from 27 municipal wells.

Impairments. Some areas have boron concentrations exceeding 2 mg/L (16 wells of approximately 137 wells sampled in 1982). Boron is generally highest in shallow wells because of marine sediments adjacent to the basin. The most areally-extensive elevated boron concentrations occur in the northeast part of the basin (Sorenson and others 1985).

Water Quality in Public Supply Wells

Constituent Group ¹	Number of wells sampled ²	Number of wells with a concentration above an MCL ³
Inorganics – Primary	33	0
Radiological	24	0
Nitrates	33	5
Pesticides	31	1
VOCs and SVOCs	31	2
Inorganics – Secondary	33	5

¹ A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

² Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

³ Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

Well yields (gal/min)		
Municipal/Irrigation	Range: 500 – 4,500	Average: 1,500 (Well Completion Reports)
Main Basin: Valley Fill & Livermore Formation		
Irrigation:	Range: 2 – 300	Average: 40 (Zone 7 Monitoring Data)
Fringe Sub-basins:		
Tassajara Formation		
Total depths (ft)		
Domestic	Range: 100 - 350	Average: 180 (Well Completion Reports)
Municipal/Irrigation	Range: 315 - 810	Average: 500 (Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Zone 7 Water Agency	Groundwater levels	210 wells annually
	Mineral, nutrient, & minor element.	50 wells monthly
		10 wells continuously
DWR	Mineral, nutrient, & minor element.	27 wells every three years
Department of Health Services and cooperators	Coliform, nitrates, mineral, organic chemicals, and radiological.	36 wells as required in Title 22, Calif. Code of Regulations

Basin Management

Groundwater management:	Zone 7 manages groundwater in the basin under authority from California Water Code Section 30000 (County Water District). In 1995, Zone 7 created a Groundwater Management Advisory Committee comprised of 10 members of the public. The GMAC reviews groundwater-related issues and makes recommendations to the Zone 7 board and staff. Zone 7 adopted a groundwater management plan on September 21, 2005.
Water agencies	
Public	Zone 7, City of Pleasanton, City of Livermore, Dublin San Ramon CSD
Private	California Water Service Company

References Cited

- California Department of Water Resources, Bulletin No. 118-2, Evaluation of Groundwater Resources: Livermore and Sunol Valleys, Appendix A: Geology, August 1966.
- California Department of Water Resources, Bulletin No. 118-2, Evaluation of Groundwater Resources: Livermore and Sunol Valleys, June 1974.
- California Department of Water Resources, Memorandum Report, Livermore and Sunol Valleys, Evaluation of Groundwater Resources through 1968, June 1970.
- Sorenson SK, Cascos PV, Glass RL. 1985. Water-quality conditions and an evaluation of ground-and surface-water sampling programs in the Livermore-Amador Valley, California. Sacramento, Calif.: U.S. Geological Survey. v, 34 p.

Additional References

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Errata

- Updated groundwater management information and added hotlinks to applicable websites.
(1/20/06)