APPENDIX A

POLICY FOR WATER QUALITY CONTROL FOR RECYCLED WATER

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2009-0011

ADOPTION OF A POLICY FOR
WATER QUALITY CONTROL FOR RECYCLED WATER

WHEREAS:

1. The Strategic Plan Update 2008-2012 for the Water Boards includes a priority to increase sustainable local water supplies available for meeting existing and future beneficial uses by 1,725,000 acre-feet per year, in excess of 2002 levels, by 2015, and ensure adequate water flows for fish and wildlife habitat. This Recycled Water Policy (Policy) is intended to support the Strategic Plan priority to Promote Sustainable Local Water Supplies. Increasing the acceptance and promoting the use of recycled water is a means towards achieving sustainable local water supplies and can result in reduction in greenhouse gases, a significant driver of climate change. The Policy is also intended to encourage beneficial use of, rather than solely disposal of, recycled water.

2. California Water Code section 13140 authorizes the State Water Resources Control Board (State Water Board) to adopt state policy for water quality control.

3. On March 20, 2007, the State Water Board conducted a public workshop on recycled water.

4. On September 28, 2007, staff circulated a draft Recycled Water Policy and a draft staff report/certified regulatory program environmental analysis/California Environmental Quality Act (CEQA) checklist for public comment.

5. On October 2, 2007, the State Water Board conducted a public workshop on the draft Recycled Water Policy.

6. On February 15, 2008, the State Water Board circulated an updated version of the draft Policy and the draft staff report/certified regulatory program environmental analysis/CEQA checklist.

7. On November 21, 2008, the State Water Board circulated another updated version of the draft Policy and the draft staff report/certified regulatory program environmental analysis/ CEQA checklist.

8. Staff has responded to significant verbal and written comments received from the public and made revisions to the draft Policy in response to the comments.

9. On January 6, 2009, the State Water Board conducted a public hearing on the draft Policy. In response, staff has revised the draft Policy, which is available at http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/draft_recycled_water_policy_011609.pdf. Staff has also revised the draft staff report, which is available at http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/docs/020309_draftstaffreport_checklist_01162009.pdf.

10. The Policy includes findings, including findings related to compliance with State Water Board Resolution No. 68-16, that are hereby incorporated by reference.

11. The State Water Board received a letter from statewide water and wastewater entities dated December 19, 2008, strongly urging their member agencies to commit funding and in-kind resources to facilitate development of salt/nutrient management plans within the five-year timeframe established by the State Water Board in the Policy.

12. The Resources Agency has approved the State Water Board's and the Regional Water Quality Control Boards' water quality control planning process as a "certified regulatory program" that adequately satisfies the CEQA requirements for preparing environmental documents. State Water Board staff has prepared a "substitute environmental document" for this project that contains the required environmental documentation under the State Water Board's CEQA regulations. (California Code of Regulations, title 23, section 3777.) The substitute environmental documents include the "Draft Staff Report and Certified Regulatory Program Environmental Analysis Recycled Water Policy," which includes an environmental checklist, the comments and responses to comments, the Policy itself, and this resolution. The project is the adoption of a Recycled Water Policy.

13. In preparing the substitute environmental documents, the State Water Board has considered the requirements of Public Resources Code section 21159 and California Code of Regulations, title 14, section 15187, and intends these documents to serve as a Tier 1 environmental review. The State Water Board has considered the reasonably foreseeable consequences of adoption of the draft Policy; however, potential site-specific recycled water project impacts may need to be considered in any subsequent environmental analysis performed by lead agencies, pursuant to Public Resources Code section 21159.1.

14. Consistent with CEQA, the substitute environmental documents do not engage in speculation or conjecture but, rather, analyze the reasonably foreseeable environmental impacts related to methods of compliance with the draft Policy, reasonably foreseeable mitigation measures to reduce those impacts, and reasonably feasible alternative means of compliance that would avoid or reduce the identified impacts.

15. The draft Policy incorporates mitigation that reduces to a level that is insignificant any adverse effects on the environment. From a program-level perspective, incorporation of the mitigation measures described in the substitute environmental document will foreseeably reduce impacts to less than significant levels.

16. A policy for water quality control does not become effective until adopted by the State Water Board and until the regulatory provisions are approved by the Office of Administrative Law (OAL).

17. If, during the OAL approval process, OAL determines that minor, non-substantive modifications to the language of the Policy are needed for clarity or consistency, the Executive Director or designee may make such changes consistent with the State Water Board's intent in adopting this Policy, and shall inform the State Water Board of any such changes.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves and adopts the CEQA substitute environmental documentation, which includes the staff report/certified regulatory program environmental analysis/CEQA checklist, and the response to comments, which was prepared in accordance with the requirements of the State Water Board's certified regulatory CEQA process (as set forth in California Code of Regulations, title 23, section 3775, et seq.), Public Resources Code section 21159, and California Code of Regulations, title 14, section 15187, and directs the Executive Director or designee to sign the environmental checklist.

2. After considering the entire record, including oral testimony at the public hearing, adopts the Recycled Water Policy.

3. Authorizes the Executive Director or designee to submit the Recycled Water Policy to OAL for review and approval.

4. If, during the OAL approval process, OAL determines that minor, non-substantive modifications to the language of the Policy are needed for clarity or consistency, directs the Executive Director or designee to make such changes and inform the State Water Board of any such changes.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on February 3, 2009.

AYE:	Chair Tam M. Doduc Charles R. Hoppin Frances Spivy-Weber
NAY:	None
ABSENT:	Arthur G. Baggett, Jr.
ABSTAIN:	None

Jeanine Townsend

Jeanine Townsend
Clerk to the Board

STATE WATER RESOURCES CONTROL BOARD

RESOLUTION NO. 68-16

STATEMENT OF POLICY WITH RESPECT TO
MAINTAINING HIGH QUALITY OF WATERS IN CALIFORNIA

WHEREAS the California Legislature has declared that it is the policy of the State that the granting of permits and licenses for unappropriated water and the disposal of wastes into the waters of the State shall be so regulated as to achieve highest water quality consistent with maximum benefit to the people of the State and shall be controlled so as to promote the peace, health, safety and welfare of the people of the State; and

WHEREAS water quality control policies have been and are being adopted for waters of the State; and

WHEREAS the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature;

NOW, THEREFORE, BE IT RESOLVED:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

3. In implementing this policy, the Secretary of the Interior will be kept advised and will be provided with such information as he will need to discharge his responsibilities under the Federal Water Pollution Control Act.

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the Secretary of the Interior as part of California's water quality control policy submission.

CERTIFICATION

The undersigned, Executive Officer of the State Water Resources Control Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on October 24, 1968.

Dated: October 28, 1968

Kerry W. Mulligan
Executive Officer
State Water Resources
Control Board

Recycled Water Policy

1. *Preamble*

California is facing an unprecedented water crisis.

The collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

When used in compliance with this Policy, Title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. *Purpose of the Policy*

a. The purpose of this Policy is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

b. It is the intent of the State Water Board that all elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.

c. This Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects. The intent of this streamlined permit process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the Regional Water Boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.

d. By prescribing permitting criteria that apply to the vast majority of recycled water projects, it is the State Water Board's intent to maximize consistency in the permitting of recycled water projects in California while also reserving to the Regional Water Boards sufficient authority and flexibility to address site-specific conditions.

e. The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.

f. For purposes of this Policy, the term "permit" means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 *et seq*., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 *et seq*. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.

5. *Roles of the State Water Board, Regional Water Boards, CDPH and CDWR*

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the Regional Water Boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

a. The State Water Board establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and shall lead the effort to meet the recycled water use goals set forth in the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health.

c. The Regional Water Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement CDPH recommendations, this Policy, and applicable law and will, pursuant to paragraph 4 of this Policy, use their authority to the fullest extent possible to encourage the use of recycled water.

d. CDWR is charged with reviewing and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential for future uses of recycled water. In undertaking these tasks, CDWR may appropriately rely on urban water management plans and may share the data from those plans with the State Water Board and the Regional Water Boards. CDWR also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.

e. The CPUC is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.

6. *Salt/Nutrient Management Plans*

a. *Introduction.*

(1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable Water Quality Control Plans (Basin Plans), and not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt or nutrients. These conditions can be caused by natural soils/conditions, discharges of waste, irrigation using surface water, groundwater or recycled water and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

(2) It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects.

b. *Adoption of Salt/ Nutrient Management Plans.*

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff.

(a) It is the intent of this Policy for every groundwater basin/sub-basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. It is also the intent of the State Water Board that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans is critical to the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with State Water Board Resolution No. 2005-06, which establishes sustainability as a core value for State Water Board programs and also assists in implementing Resolution No. 2008-30, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(b) Salt and nutrient plans shall be tailored to address the water quality concerns in each basin/sub-basin and may include constituents other than salt and nutrients that impact water quality in the basin/sub-basin. Such plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

(e) The requirements of this paragraph shall not apply to areas that have already completed a Regional Water Board approved salt and nutrient plan for a basin, sub-basin, or other regional planning area that is functionally equivalent to paragraph 6(b)3.

(f) The plans may, depending upon the local situation, address constituents other than salt and nutrients that adversely affect groundwater quality.

(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

(3) Each salt and nutrient management plan shall include the following components:

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

(b) A provision for annual monitoring of Emerging Constituents/ Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.

(c) Water recycling and stormwater recharge/use goals and objectives.

(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.

(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

(4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the Basin Plan. No Regional Water Board, however, shall seek to modify Basin Plan objectives without full compliance with the process for such modification as established by existing law.

7. *Landscape Irrigation Projects*

a. *Control of incidental runoff.* Incidental runoff is defined as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

(1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

(4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

b. *Streamlined Permitting*

(1) The Regional Water Boards shall, absent unusual circumstances (i.e., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils over a shallow (5' or less) high quality groundwater aquifer), permit recycled water projects that meet the criteria set forth in this Policy, consistent with the provisions of this paragraph.

(2) If the Regional Water Board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances based on substantial evidence in the record, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

(4) Landscape irrigation projects that qualify for streamlined permitting shall not be required to include a project specific receiving water and groundwater monitoring component unless such project specific monitoring is required under the adopted salt/nutrient management plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, recycled water monitoring for CECs on an annual basis and priority pollutants on a twice annual basis. Except as requested by CDPH, State and Regional Water Board monitoring requirements for CECs shall not take effect until 18 months after the effective date of this Policy. In addition, any permits shall include a permit reopener to allow incorporation of appropriate monitoring requirements for CECs after State Water Board action under paragraph 10(b)(2).

(5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

c. *Criteria for streamlined permitting*. Irrigation projects using recycled water that meet the following criteria are eligible for streamlined permitting, and, if otherwise in compliance with applicable laws, shall be approved absent unusual circumstances:

(1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH pursuant to Water Code section 13523.

(2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site

supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures.

(3) Compliance with any applicable salt and nutrient management plan.

(4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

8. *Recycled Water Groundwater Recharge Projects*

a. The State Water Board acknowledges that all recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

b. Approved groundwater recharge projects will meet the following criteria:

(1) Compliance with regulations adopted by CDPH for groundwater recharge projects or, in the interim until such regulations are approved, CDPH's recommendations pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

(2) Implementation of a monitoring program for constituents of concern and a monitoring program for CECs that is consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy and that takes into account site-specific conditions. Groundwater recharge projects shall include monitoring of recycled water for CECs on an annual basis and priority pollutants on a twice annual basis.

c. Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.

d. Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

e. Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a Regional Water Board within one year of receipt of recommendations from CDPH. Furthermore, the Regional Water Board shall give a high priority to review and approval of such projects.

9. *Antidegradation*

a. The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.

b. Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

c. Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality within a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

(1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall calculate the impacts of the project or projects over at least a ten year time frame.

(2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

d. Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a groundwater basin).

10. *Emerging Constituents/Chemicals of Emerging Concern*

a. *General Provisions*

(1) Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.

(2) Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.

(3) The state of knowledge regarding CECs is incomplete. There needs to be additional research and development of analytical methods and surrogates to determine potential environmental and public health impacts. Agencies should minimize the likelihood of CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

b. *Research Program.* The State Water Board, in consultation with CDPH and within 90 days of the adoption of this Policy, shall convene a "blue-ribbon" advisory panel to guide future actions relating to constituents of emerging concern.

(1) The panel shall be actively managed by the State Water Board and shall be composed of at least the following: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemist, one civil engineer familiar with the design and construction of recycled water treatment facilities, and one chemist familiar with the design and operation of advanced laboratory methods for the detection of emerging constituents. Each of these panelists shall have extensive experience as a principal investigator in their respective areas of expertise.

(2) The panel shall review the scientific literature and, within one year from its appointment, shall submit a report to the State Water Board and CDPH describing the current state of scientific knowledge regarding the risks of emerging constituents to public health and the environment. Within six months of receipt of the panel's report the State Water Board, in coordination with CDPH, shall hold a public hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications. The panel or a similarly constituted panel shall update this report every five years.

(3) Each report shall recommend actions that the State of California should take to improve our understanding of emerging constituents and, as may be appropriate, to protect public health and the environment.

(4) The panel report shall answer the following questions: What are the appropriate constituents to be monitored in recycled water, including analytical methods and method detection limits? What is the known toxicological information for the above constituents? Would the above lists change based on level of treatment and use? If so, how? What are possible indicators that represent a suite of CECs? What levels of CECs should trigger enhanced monitoring of CECs in recycled water, groundwater and/or surface waters?

c. *Permit Provisions.* Permits for recycled water projects shall be consistent both with any CDPH recommendations to protect public health and with any actions by the State Water Board taken pursuant to paragraph 10(b)(2).

11. *Incentives for the Use of Recycled Water*

a. *Funding*

The State Water Board will request CDWR to provide funding ($20M) for the development of salt and nutrient management plans during the next three years (i.e., before FY 2010/2011). The State Water Board will also request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.

b. *Stormwater*

The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements for stormwater treatment and use projects than for projects involving untreated stormwater discharges.

c. TMDLs

Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.

Recycled Water Policy

1. *Preamble*

California is facing an unprecedented water crisis.

The collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

When used in compliance with this Policy, Title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. *Purpose of the Policy*

a. The purpose of this Policy is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

b. It is the intent of the State Water Board that all elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.

c. This Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects. The intent of this streamlined permit process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the Regional Water Boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.

d. By prescribing permitting criteria that apply to the vast majority of recycled water projects, it is the State Water Board's intent to maximize consistency in the permitting of recycled water projects in California while also reserving to the Regional Water Boards sufficient authority and flexibility to address site-specific conditions.

e. The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.

f. For purposes of this Policy, the term "permit" means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 *et seq*., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 *et seq*. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.

5. *Roles of the State Water Board, Regional Water Boards, CDPH and CDWR*

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the Regional Water Boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

a. The State Water Board establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and shall lead the effort to meet the recycled water use goals set forth in the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health.

c. The Regional Water Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement CDPH recommendations, this Policy, and applicable law and will, pursuant to paragraph 4 of this Policy, use their authority to the fullest extent possible to encourage the use of recycled water.

d. CDWR is charged with reviewing and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential for future uses of recycled water. In undertaking these tasks, CDWR may appropriately rely on urban water management plans and may share the data from those plans with the State Water Board and the Regional Water Boards. CDWR also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.

e. The CPUC is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.

6. *Salt/Nutrient Management Plans*

a. Introduction.

(1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable Water Quality Control Plans (Basin Plans), and not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt or nutrients. These conditions can be caused by natural soils/conditions, discharges of waste, irrigation using surface water, groundwater or recycled water and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

(2) It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects.

b. Adoption of Salt/ Nutrient Management Plans.

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff.

(a) It is the intent of this Policy for every groundwater basin/sub-basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. It is also the intent of the State Water Board that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans is critical to the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with State Water Board Resolution No. 2005-06, which establishes sustainability as a core value for State Water Board programs and also assists in implementing Resolution No. 2008-30, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(b) Salt and nutrient plans shall be tailored to address the water quality concerns in each basin/sub-basin and may include constituents other than salt and nutrients that impact water quality in the basin/sub-basin. Such plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

(e) The requirements of this paragraph shall not apply to areas that have already completed a Regional Water Board approved salt and nutrient plan for a basin, sub-basin, or other regional planning area that is functionally equivalent to paragraph 6(b)3.

(f) The plans may, depending upon the local situation, address constituents other than salt and nutrients that adversely affect groundwater quality.

(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

(3) Each salt and nutrient management plan shall include the following components:

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

(b) A provision for annual monitoring of Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.

(c) Water recycling and stormwater recharge/use goals and objectives.

(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.

(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

(4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the Basin Plan. No Regional Water Board, however, shall seek to modify Basin Plan objectives without full compliance with the process for such modification as established by existing law.

7. *Landscape Irrigation Projects*[1]

a. *Control of incidental runoff.* Incidental runoff is defined as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

(1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

(4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

[1] Specified uses of recycled water considered “landscape irrigation” projects include any of the following:
i. Parks, greenbelts, and playgrounds;
ii. School yards;
iii. Athletic fields;
iv. Golf courses;
v. Cemeteries;
vi. Residential landscaping, common areas;
vii. Commercial landscaping, except eating areas;
viii. Industrial landscaping, except eating areas; and
ix. Freeway, highway, and street landscaping.

b. Streamlined Permitting

(1) The Regional Water Boards shall, absent unusual circumstances (i.e., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils over a shallow (5' or less) high quality groundwater aquifer), permit recycled water projects that meet the criteria set forth in this Policy, consistent with the provisions of this paragraph.

(2) If the Regional Water Board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances based on substantial evidence in the record, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

(4) Landscape irrigation projects that qualify for streamlined permitting shall not be required to include a project specific receiving water and groundwater monitoring component unless such project specific monitoring is required under the adopted salt/nutrient management plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, recycled water monitoring for surrogates as specified in Attachment A of this Policy. For landscape irrigation projects, priority pollutants shall be monitored once per year, except for landscape irrigation projects with design production flows of one million gallons per day or less, which shall be monitored for priority pollutants once every five years.

(5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

c. *Criteria for streamlined permitting*. Irrigation projects using recycled water that meet the following criteria are eligible for streamlined permitting, and, if otherwise in compliance with applicable laws, shall be approved absent unusual circumstances:

(1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH pursuant to Water Code section 13523.

(2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures.

(3) Compliance with any applicable salt and nutrient management plan.

(4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

8. *Recycled Water Groundwater Recharge Projects*

a. The State Water Board acknowledges that all recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

b. Approved groundwater recharge projects will meet the following criteria:

(1) Compliance with regulations adopted by CDPH for groundwater recharge projects or, in the interim until such regulations are approved, CDPH's recommendations pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

(2) Implementation of a monitoring program for CECs that is consistent with Attachment A and any recommendations from CDPH. Groundwater recharge projects shall include monitoring of recycled water for priority pollutants twice per year.

c. Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.

d. Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

e. Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a Regional Water Board within one year of receipt of recommendations from CDPH. Furthermore, the Regional Water Board shall give a high priority to review and approval of such projects.

9. *Antidegradation*

a. The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.

b. Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

c. Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality within a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

(1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall

calculate the impacts of the project or projects over at least a ten year time frame.

(2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

d. Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin).

10. *Constituents of Emerging Concern*

a. General Provisions

(1) Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.

(2) Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.

(3) The state of knowledge regarding CECs is incomplete. There needs to be additional research and development of analytical methods and surrogates to determine potential environmental and public health impacts. Agencies should minimize the likelihood of CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

b. Research Program

(1) The State Water Board, in consultation with CDPH, convened a "blue-ribbon" advisory panel to guide future actions relating to CECs.

(a) The panel was actively managed by the State Water Board and was composed of the following: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemist, one civil engineer familiar with the design and construction of recycled water treatment facilities, and one chemist familiar with the design and operation of advanced laboratory methods for the detection of emerging constituents. Each of these panelists had extensive experience as a principal investigator in their respective areas of expertise.

(b) The panel reviewed the scientific literature and submitted a report to the State Water Board and CDPH that described the current state of scientific knowledge regarding the risks of CECs to public health and the environment. In December 2010, the State Water Board, in coordination with CDPH, held a public hearing to hear a presentation on the report and to receive comments from stakeholders.

(c) The State Water Board considered the panel report and the comments received and adopted an amendment to the Policy establishing monitoring requirements for CECs in recycled water. These monitoring requirements are prescribed in Attachment A.

(2) The panel or a similarly constituted panel shall update the report every five years The next update is due in June 2015.

(a) Each updated report shall recommend actions that the State of California should take to improve our understanding of CECs and, as may be appropriate, to protect public health and the environment.

(b) The updated reports shall answer the following questions: What are the appropriate constituents to be monitored in recycled water, including analytical methods and method detection limits? What is the known toxicological information for the above constituents? Would the above lists change based on level of treatment and use? If so, how? What are possible indicators that represent a suite of CECs? What levels of CEC's should trigger enhanced monitoring of CEC's in recycled water, groundwater and/surface waters?

(c) Within six months from receipt of an updated report, the State Water Board shall hold a hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications.

c. Permit Provisions

Permits for recycled water projects shall be consistent with any CDPH recommendations to protect public health and the monitoring requirements prescribed in Attachment A.

11. *Incentives for the Use of Recycled Water*

a. Funding

The State Water Board will request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.

b. Stormwater

The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements for stormwater treatment and use projects than for projects involving untreated stormwater discharges.

c. TMDLs

Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.

ATTACHMENT A

REQUIREMENTS FOR MONITORING CONSTITUENTS OF EMERGING CONCERN FOR RECYCLED WATER

The purpose of this attachment to the Recycled Water Policy (Policy) is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards) on monitoring requirements for constituents of emerging concern[1] (CECs) in recycled municipal wastewater, herein referred to as "recycled water". The monitoring requirements and criteria for evaluating monitoring results in the Policy are based on recommendations from a Science Advisory Panel[2]. The monitoring requirements pertain to the production and use of recycled water for groundwater recharge reuse[3] by surface and subsurface application methods, and for landscape irrigation. The monitoring requirements apply to recycled water producers, including entities that further treat or enhance the quality of recycled water supplied by municipal wastewater treatment facilities, and groundwater recharge reuse facilities.

Groundwater recharge by surface application is the controlled application of water to a spreading area for infiltration resulting in the recharge of a groundwater basin. Subsurface application is the controlled application of water to a groundwater basin or aquifer by a means other than surface application, such as direct injection through a well.

The California Department of Public Health (CDPH) shall be consulted for any additional monitoring requirements for recycled water use found necessary by CDPH to protect human health.

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[1] For this Policy, CECs are defined to be chemicals in personal care products, pharmaceuticals including antibiotics, antimicrobials; industrial, agricultural, and household chemicals; hormones; food additives; transformation products, inorganic constituents; and nanomaterials.
[2] The Science Advisory Panel was convened in accordance with provision 10.b. of the Policy. The panel's recommendations were presented in the report; *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.
[3] As used in this attachment, use of recycled water for groundwater recharge reuse has the same meaning as indirect potable reuse for groundwater recharge as defined in section 116275 of the Health and Safety Code (Water Code section 13561(c)), where it is defined as the planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system.

1. CECS AND SURROGATES

Within this Policy, CECs of toxicological relevance to human health are referred to as "health-based CECs."[4] CECs determined not to have human health relevance, but useful for monitoring treatment process efficacy, are referred to as "performance indicator CECs." An indicator CEC is an individual CEC used for evaluating a family of CECs with similar physicochemical or biodegradable characteristics. The removal of an indicator CEC through a treatment process provides an indication of removal of CECs with similar properties. The health-based CECs also serve as indicator CECs.

A surrogate is a measurable physical or chemical property, such as chlorine residual or electrical conductivity, that can be used to measure the efficiency of trace organic compounds removal by treatment process and/or provide an indication of a treatment process failure. In regards to surrogates, a reverse osmosis (RO) treatment process, for example, is expected to substantially reduce the electrical conductivity of the recycled water being treated; this reduction in the level of the surrogate also provides an indication that inorganic and organic compounds, including CECs, are being removed.

Recycled water monitoring programs used for groundwater recharge reuse shall include monitoring for: (1) human health-based CECs; (2) performance indicator CECs; and (3) surrogates. The purpose of monitoring performance indicator CECs and surrogates is to assess the removal efficiency of unit processes to remove CECs. Treatment processes designed to provide a barrier to CECs include, but are not limited to, advanced oxidation processes (AOPs), biologically active carbon, nanofiltration, and RO. In addition, soil aquifer treatment[5] is a natural treatment process that provides a level of removal of CECs. AOPs are treatment processes involving the use of hydrogen peroxide and ozone, commonly combined with ultraviolet light irradiation.

This Policy provides CEC monitoring requirements for recycled water which undergoes additional treatment by soil aquifer treatment or RO/AOPs. CEC monitoring requirements for groundwater recharge reuse projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or RO/AOPs shall be established on a case-by-case basis by the Regional Water Boards in consultation with CDPH.

Monitoring of health-based CECs or performance indicator CECs is not required for recycled water used for landscape irrigation due to the low risk for ingestion of the

[4] Determined through a screening process conducted by the CEC Science Advisory Panel; *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

[5] For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

water.[6] Monitoring programs for recycled water used for landscape irrigation, however, shall include monitoring for applicable surrogates, as presented in section 1.2, to evaluate the efficacy of filtration and disinfection systems.

1.1. CECs for Monitoring Programs

This Policy provides requirements for monitoring CECs in recycled water used for groundwater recharge reuse. The Regional Water Boards shall not issue requirements for monitoring of additional CECs, beyond the requirements provided in this Policy except when:

- recommended by CDPH;
- requested by the project proponent; or
- required by an adopted regional salt and nutrient management plan.

Table 1 provides the health-based CECs and performance indicator CECs to be monitored for recycled water uses along with their respective reporting limits. All CECs listed for a recycled water application shall be monitored during an initial assessment monitoring phase, as described in Section 3.1. Based on monitoring results and findings, the list of performance indicator CECs required for monitoring may be refined for subsequent monitoring phases. The health-based CECs listed in Table 1 shall be monitored during the entirety of the initial assessment and baseline monitoring phases (Sections 3.1 and 3.2). Based on the results of the baseline monitoring phase and/or subsequent monitoring, the list of health-based CECs required for monitoring may be revised. The method for evaluation of monitoring results for health-based CECs is provided in Section 4.2.

Quality Assurance and Quality Control measures shall be used for both collection of samples and laboratory analysis work. The project proponent shall develop a quality assurance project plan that includes the appropriate number of field blanks, laboratory blanks, replicate samples, and matrix spikes.

[6] "For monitoring programs to assess CEC threats for urban irrigation reuse, none of the chemicals for which measurement methods and exposure data are available exceeded the threshold for monitoring priority. This is largely attributable to higher Monitoring Trigger Levels (MTLs), because of reduced water ingestion in a landscape irrigation setting compared to drinking water." MTLs are health-based screening level values for CECs for a particular water reuse scenario. MTLs were established in, *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

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Table 1 – CECs to be Monitored

Constituent	Constituent Group	Relevance/Indicator Type	Reporting Limit (µg/L)
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION			
17β-estradiol	Steroid hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
N-Nitrosodimethylamine (NDMA)	Disinfection byproduct	Health	0.002
Triclosan	Antimicrobial	Health	0.05
Gemfibrozil	Pharmaceutical	Performance	0.01
Iopromide	Pharmaceutical	Performance	0.05
N,N-Diethyl-meta-toluamide (DEET)	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION			
17β-estradiol	Steroid hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
NDMA	Disinfection byproduct	Health & Performance	0.002
Triclosan	Antimicrobial	Health	0.05
DEET	Personal care product	Performance	0.01
Sucralose	Food additive	Performance	0.1
LANDSCAPE IRRIGATION			
None	--	--	--

µg/L – Micrograms per liter

Analytical methods for laboratory analysis of CECs shall be selected to achieve the reporting limits presented in Table 1 and shall be peer reviewed and published.

1.2. Surrogates for Monitoring Programs

Selection of appropriate surrogates shall be based on the types of treatment processes used, the recycled water use, and the measurable occurrence of surrogates in the treatment process. Table 2 presents a list of surrogates to be considered for monitoring treatment of recycled water used for groundwater recharge reuse and landscape irrigation.

Table 2: Surrogates

GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION
Ammonia
Total Organic Carbon (TOC)
Nitrate
Ultraviolet (UV) Light Absorption
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION
Electrical Conductivity
TOC
LANDSCAPE IRRIGATION
Chlorine Residual
Total Coliform
Turbidity

The project proponent shall propose surrogates to monitor on a case-by-case basis appropriate for the treatment process or processes. For example, chlorine residual is not an appropriate surrogate for projects that do not use chlorine-based compounds for disinfection. The Regional Water Board shall review and approve the selected surrogates in consultation with CDPH.

Where applicable, surrogates may be measured using on-line or hand-held instruments provided that instrument calibration procedures are implemented in accordance with the manufacturer's specifications and that calibration is documented.

2. MONITORING LOCATIONS

Monitoring locations for CECs and surrogates will depend on the unit treatment processes utilized and the recycled water use. Monitoring for CECs and surrogates shall be conducted before and after an individual treatment process or a combination of processes that provide removal of CECs; unit processes are presented in Section 1. Additionally, surface application recharge reuse projects relying on the process of soil aquifer treatment shall monitor for CECs in groundwater at a location prior to the point of extraction for drinking water supply. Monitoring locations for health-based and performance indicator CECs and surrogates are detailed below.

2.1. Health-Based CEC Monitoring Locations

2.1.1. Groundwater Recharge Reuse - Surface Application

For groundwater recharge reuse projects implementing surface application of recycled water, health-based CECs shall be monitored at these locations:

(1) Following tertiary treatment[7] prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels from the application site in thirty days.

Monitoring locations for health-based CECs for the phases of monitoring are presented in Tables 3 through 5.

2.1.2. Groundwater Recharge Reuse - Subsurface Application

For groundwater recharge reuse projects implementing subsurface application of recycled water, monitoring of health-based CECs shall be conducted at a location following RO/AOPs treatment prior to discharge into an aquifer.

2.1.3. Landscape Irrigation

Monitoring of health-based CECs is not required for municipal recycled water used for landscape irrigation.

2.2. Performance Indicator CEC and Surrogate Monitoring Locations

To allow evaluation of individual unit processes or a combination of unit processes that provide removal of CECs, performance indicator CECs and surrogates shall be monitored at the locations described below and presented in Tables 3 through 5.

2.2.1. Groundwater Recharge Reuse - Surface Application

For surface application practices, performance indicator CECs shall be monitored in recycled water and groundwater at these locations:

(1) Following tertiary treatment prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels from application site in thirty days.

Surrogates shall be monitored in recycled water and groundwater at these locations:

[7] Standards for disinfected tertiary recycled water presented in California Code of Regulations Title 22, section 60301.230 and 60301.320.

(1) Following tertiary treatment prior to application to the surface application area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels from application site in thirty days.

Monitoring locations for performance indicator CECs and surrogates for the phases of monitoring are presented in Tables 3 through 5.

2.2.2. Groundwater Recharge Reuse - Subsurface Application

For subsurface application, performance indicator CECs and surrogates shall be monitored in recycled water at these locations:

(1) Prior to treatment by RO/AOPs; and

(2) Following treatment by RO/AOPs prior to release to the aquifer.

2.2.3. Landscape Irrigation

For landscape irrigation, surrogates shall be monitored in municipal recycled water following treatment prior to distribution.

3. PHASED MONITORING REQUIREMENTS

The Regional Water Board shall phase the monitoring requirements for CECs and surrogates for groundwater recharge reuse projects. The purpose of phased monitoring is to allow monitoring requirements for health-based CECs, performance indicator CECs and surrogates to be refined based on the monitoring results and findings of the previous phase. An initial assessment monitoring phase, followed by a baseline monitoring phase, shall be conducted to determine the project-specific monitoring requirements for standard operations. The initial assessment and baseline monitoring phases shall be conducted after CDPH approval for groundwater recharge reuse project operation.

3.1. Initial Assessment Monitoring Phase

The purposes of the initial assessment phase are to: (1) identify the occurrence of health-based CECs, performance indicator CECs, and surrogates in recycled water and groundwater; (2) determine the treatment effectiveness of unit processes[9]; (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline phase; and (4) specify the expected removal percentages for indicator CECs and surrogates. The monitoring requirements for the initial assessment monitoring phase shall apply to the start-up of new facilities, piloting of new unit processes at existing facilities, and existing facilities where CECs and surrogates have not been

[9] Unit processes that remove CECs.

assessed equivalent[10] to the requirements of this Policy. The initial assessment monitoring phase shall be conducted for a period of one year.

During the initial assessment monitoring phase for the applicable recycled water application method, each of the health-based CECs and performance indicator CECs listed in Table 1, and the appropriate surrogates listed in Table 2, shall be monitored. Surrogates shall be selected to monitor individual unit processes or combinations of unit processes that remove CECs. Performance indicator CEC and surrogate monitoring results that demonstrate measurable removal for a given unit process shall be candidates for use in the monitoring programs for the baseline and standard operation phases. Monitoring requirements for the initial assessment phase are summarized in Table 3.

For existing groundwater recharge reuse projects, historic monitoring data may be used to assess the occurrence and removal of CECs and surrogates. Existing projects demonstrating prior assessment of CECs and surrogates equivalent to the initial assessment phase requirements of this Policy may skip the initial monitoring phase and initiate the baseline monitoring phase requirements in Section 3.2.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process. Additional actions also may be warranted, which may include but not be limited to resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operations. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.

Following completion of the initial assessment monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the baseline monitoring phase shall be determined on a project specific basis.

3.2. Baseline Monitoring Phase

Based on the findings of the initial assessment monitoring phase, project-specific performance indicator CECs and surrogates shall be selected for monitoring during the baseline monitoring phase. The purpose of the baseline monitoring phase is to assess and refine which health-based CECs, performance indicator CECs and surrogates are

[10] To be considered equivalent, data from prior assessment need not replicate the exact frequency and duration of the initial assessment phase requirements specified in Table 3, if the overall robustness and size of the data are sufficient to adequately characterize the surrogates and treatment performance under consideration.

appropriate to monitor removal of CECs and treatment system operational performance for the standard operation of a facility. Performance indicator CECs detected during the initial assessment phase shall be selected for monitoring during the baseline monitoring phase. Surrogates that exhibited reduction through a unit process and/or provide an indication of operational performance shall be selected for monitoring during the baseline monitoring phase. Those surrogates not reduced through a unit process are not good indicators of the unit's intended performance. For example, a filtration unit will not effectively lower electrical conductivity. Therefore, electrical conductivity is not a good surrogate for a filtration unit. The baseline monitoring phase shall be conducted for a period of three years following the initial assessment monitoring phase. Monitoring requirements for the baseline phase are summarized in Table 4.

For existing groundwater recharge reuse projects, historic monitoring data may be used to assess removal of health-based CECs, performance indicator CECs and surrogates. Existing projects that can demonstrate prior assessment of CECs and surrogates equivalent to the initial assessment phase and baseline phase requirements of this Policy may be eligible for standard operation monitoring requirements (Section 3.3).

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result; additional monitoring; implementation of a source identification program; toxicological studies; engineering removal studies; and/or modification of facility operation. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.

Following the baseline operation monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the standard operation of a project shall be determined on a project-specific basis.

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Table 3: Initial Assessment Phase Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
	Health-Based CECs and Performance Indicator CECs: All listed in Table 1	Quarterly	- Following tertiary treatment prior to application to surface spreading area. - At monitoring well locations designated in consultation with CDPH.[1]
		1st 3 months: To be determined on a project-specific basis.[2]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[1]
		3-12 months: To be determined on a project-specific basis.[2]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[1]
	Health-Based CECs: All listed in Table 1	Quarterly	Following treatment by RO/AOPs prior to release to aquifer.
	Performance Indicator CECs: All listed in Table 1	Quarterly	- Prior to RO treatment. - Following RO/AOPs prior to release to aquifer.
	Surrogates: To be selected on a project-specific basis.	To be determined on a project-specific basis.	- Prior to RO treatment. - Following RO/AOPs prior to release to aquifer.
Landscape Irrigation	Health-Based CECs and Performance Indicator CECs: Not applicable	Not applicable	Not applicable
	Surrogates: To be selected on a project-specific basis.	To be determined on a project-specific basis.	Following tertiary treatment prior to distribution.

1 - Groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

2 – The monitoring frequency shall be determined by the Regional Water Boards in consultation with CDPH. The intent is to have increased monitoring frequency during the first three months and then decrease the frequency after three months.

Table 4: Baseline Phase Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
	Health-Based CECs: All listed in Table 1. Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase. .	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
Groundwater Recharge Reuse – Subsurface Application	Health-Based CECs: All listed in Table 1.	Semi-Annually	Following treatment by RO/AOPs prior to release to the aquifer.
	Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually	- Prior to RO treatment. - Following treatment by RO/AOPs prior to release to the aquifer.
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase.	- Prior to RO treatment. - Following treatment by RO/AOPs prior to release to the aquifer.
Landscape Irrigation	Health-Based CECs and Performance Indicator CECs: Not applicable	Not applicable	Not applicable
	Surrogates: To be selected on a project-specific basis.	To be determined on a project-specific basis.	Following tertiary treatment prior to distribution.

1 - Groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

3.3. Standard Operation Monitoring

Based on the findings of the baseline monitoring phase, monitoring requirements for health-based CECs, performance indicator CECs and surrogates may be refined to establish project-specific requirements for monitoring the standard operating conditions of a groundwater recharge reuse project. Monitoring requirements for the standard operation phase are summarized in Table 5. The list of health-based CECs required for monitoring may be revised if monitoring results meet the conditions of the minimum threshold level presented in Table 7. Performance indicator CECs and surrogates detected during the baseline phase and that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations.

Monitoring locations for the standard operation phase shall be the same as the locations used for the baseline monitoring phase.

Monitoring for health-based CECs and performance indicator CECs shall be conducted on a semi-annual basis, unless the project demonstrates consistency in treatment efficacy in removal of CECs, treatment operational performance, and appropriate recycled water quality. These projects may be monitored for CECs on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are presented in Table 5.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.

Table 5: Standard Operation Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse -Surface Application	Health-Based CECs and Performance Indicator CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
	Surrogates: Selected based on the findings of the baseline phase.	Based on findings of the baseline assessment phase.	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
Groundwater Recharge Reuse -Subsurface Application	Health-Based CECs: Selected based on the findings of the baseline phase	Semi-Annually or Annually	-Following RO/AOPs treatment prior to release to the aquifer.
	Performance Indicator CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually	- Prior to RO treatment. - Following RO/AOPs prior to release to the aquifer.
	Surrogates: To be selected on a project–specific basis.	Based on findings of the baseline assessment phase.	- Prior to RO treatment. - Following RO/AOPs prior to release to the aquifer.
Landscape Irrigation	Health-Based CECs and Performance Indicator CECs: Not applicable	Not applicable	Not applicable
	Surrogates: To be selected on a project–specific basis.	Based on findings of the baseline assessment phase.	Following tertiary treatment prior to distribution.

1 - Groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

4. EVALUATION OF CEC AND SURROGATE MONITORING RESULTS

This section presents the approaches for evaluating treatment process performance and health-based CEC monitoring results. Monitoring results for performance indicator CECs and surrogates shall be used to evaluate the operational performance of a treatment process and the effectiveness of a treatment process in removing CECs. For evaluation of health-based CEC monitoring results, a multi-tiered approach of thresholds and corresponding response actions is presented in Section 4.2. The evaluation of monitoring results shall be included in monitoring reports submitted to the Regional Water Board and CDPH.

4.1 Evaluation of Performance Indicator CEC and Surrogate Results

The effectiveness of a treatment process to remove CECs shall be evaluated by determining the removal percentages for performance indicator CECs and surrogates. The removal percentage is the difference in the concentration of a compound in recycled water prior to and after a treatment process (e.g., soil aquifer treatment or RO/AOPS), divided by the concentration prior to the treatment process and multiplied by 100.

$$\text{Removal Percentage} = ([X_{in} – X_{out}]/X_{in})\ (100)$$

X_{in} - Concentration in recycled water prior to a treatment process
X_{out} - Concentration in recycled water after a treatment process

During the initial assessment, the recycled water project proponent shall monitor performance to determine removal percentages for performance indicator CECs and surrogates. The removal percentages shall be confirmed during the baseline monitoring phase. One example of removal percentages from Drews et. al. (2008) for each application scenario and their associated processes (i.e. soil aquifer treatment or RO/AOPs) is presented in Table 6. The established removal percentages for each project shall be used to evaluate treatment efficacy and operational performance.

4.1.1. Groundwater Recharge Reuse – Surface Application

For groundwater recharge reuse by surface application, the removal percentage shall be determined by comparing the quality of the recycled water applied to a surface spreading area to the quality of groundwater at monitoring wells. The distance between the application site and the monitoring wells shall be no more than the distance the groundwater travels in thirty days from the application site. The location of the monitoring wells shall be designated in consultation with CDPH. The removal percentage shall account for any effects from the presence of dilution water, such as potable water applied to the application site, storm water applied to the application site, or native groundwater.

4.1.2. Groundwater Recharge Reuse – Subsurface Application

For groundwater recharge reuse using subsurface application, the removal percentage shall be determined by comparing recycled water quality before treatment by RO/AOPs and after treatment prior to application to the aquifer.

4.1.3. Landscape Irrigation

For landscape irrigation projects, determination of removal percentages is not required for surrogates.

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Table 6: Monitoring Trigger Levels and Removal Percentages

Constituent/ Parameter	Relevance/Indicator Type/Surrogate	Monitoring Trigger Level (micrograms/liter)[1]	Removal Percentages (%)[2]
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION[3]			
17β-estradiol	Health	0.0009	--[4]
Caffeine	Health & Performance	0.35	>90
NDMA	Health	0.01	--
Triclosan	Health	0.35	--
Gemfibrozil	Performance	--	>90
Iopromide	Performance	--	>90
DEET	Performance	--	>90
Sucralose	Performance	--	<25[5]
Ammonia	Surrogate	--	>90
TOC	Surrogate	--	>30
Nitrate	Surrogate	--	>30
UV Absorption	Surrogate	--	>30
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION[6]			
17β-estradiol	Health	0.0009	--
Caffeine	Health & Performance	0.35	>90
NDMA	Health & Performance	0.01	25-50, >80[7]
Triclosan	Health	0.35	--
DEET	Performance	--	>90
Sucralose	Performance	--	>90
Electrical Conductivity	Surrogate	--	>90
TOC	Surrogate	--	>90
LANDSCAPE IRRIGATION			
Chlorine Residual	Surrogate	--	--
Total Coliform	Surrogate	--	--
Turbidity	Surrogate	--	--

1 - Monitoring trigger levels for groundwater recharge reuse and landscape irrigation applications were established in *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.
2 –The removal percentages presented in this table are from work by Drewes et.al. (2008) and provide an example of performance for that specific research. Project specific removal percentages will be developed for each groundwater recharge reuse project during the initial and baseline monitoring phases.
3 - Treatment process: Soil aquifer treatment. The stated removal percentages are examples and need to be finalized during the initial and baseline monitoring phases for a given site.
4 – Not applicable
5 - Sucralose degrades poorly during soil aquifer treatment. It is included here mainly as a tracer.
6 - Treatment process: Reverse osmosis and advanced oxidation process.
7- For treatment using reverse osmosis, removal percentage is between 25 and 50 percent. For treatment using reverse osmosis and advanced oxidation processes, removal percentage is greater than 80 percent.

`4.2. Evaluation of Health-Based CEC Results

The project proponent shall evaluate health-relevant CEC monitoring results. To determine the appropriate response actions, the project proponent shall compare measured environmental concentrations (MECs) to their respective monitoring trigger levels[12] (MTLs) listed in Table 6 to determine MEC/MTL ratios. The project proponent shall compare the calculated MEC/MTL ratios to the thresholds presented in Table 7 and shall implement the response actions corresponding to the threshold.

For surface application, the results shall be evaluated for groundwater collected from the monitoring wells. For subsurface application projects, results shall be evaluated for the recycled water released to the aquifer.

Table 7: MEC/MTL Thresholds and Response Actions

MC/MTL Threshold	Response Action
If greater than 75 percent of the MEC/MTL ratio results for a CEC are less than or equal to 0.1 during the baseline monitoring phase and/or subsequent monitoring -	A) Consider requesting removal of the CEC from the monitoring program.
If MEC/MTL ratio is greater than 0.1 and less than or equal to 1 -	B) Continue to monitor.
If MEC/MTL ratio is greater than 1 and less than or equal to 10 -	C) Check the data. Continue to monitor.
If MEC/MLT ratio is greater than 10 and less than or equal to 100 -	D) Resample immediately and analyze to confirm CEC result. Continue to monitor.
If MEC/MLT ratio is greater than 100 -	E) Resample immediately and analyze to confirm result. Continue to monitor. Contact the Regional Water Board and CDPH to discuss additional actions. (Additional actions may include, but are not limited to, additional monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.)

[12] Monitoring Trigger Level (MTL): Health-based screening level value for a CEC for a particular water reuse scenario. MTLs were established in, *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

APPENDIX B

REGIONAL BOARD ASSISTANCE IN GUIDING SALT AND NUTRIENT MANAGEMENT PLAN DEVELOPMENT IN THE LOS ANGELES REGION

Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region

Further clarification and information to assist development of Salt and Nutrient Management Plans set forth in the State Water Board's Recycled Water Policy

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

JUNE 28, 2012

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1. INTRODUCTION

The State Water Resources Control Board (State Water Board) adopted the Recycled Water Policy (State Water Board Resolution No. 2009-0011) on February 3, 2009. The purpose of the Recycled Water Policy (hereinafter, Policy) is to protect groundwater resources and increase the beneficial use of recycled water from municipal wastewater sources in a manner consistent with state and federal water quality laws and regulations. The Policy provides direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

The Policy recognizes the potential for increased salt and nutrient loading to groundwater basins as a result of increased recycled water use, and therefore, requires the development of regional or sub-regional salt and nutrient management plans.
In requiring such plans, the Policy acknowledges that recycled water may not be the sole cause of high concentrations of salts and nutrients in groundwater basins, and therefore regulation of recycled water alone will not address such conditions. The intent of this requirement is for salts and nutrients from all sources to be managed on a basin-wide or watershed-wide basis in a manner that ensures the attainment of water quality objectives and protection of beneficial use.

The Recycled Water Policy states:

a) Every basin/sub-basin shall have a consistent salt and nutrient management plan (hereinafter, SNMP);
b) SNMPs shall be tailored to address the water quality concerns in each basin;
c) Shall be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority;
d) SNMPs shall be completed and proposed to the Regional Water Board within five years from the adoption date of the Policy;
e) SNMPs are not required in areas where a Regional Water Board has approved a functionally equivalent salt and nutrient plan; and
f) SNMPs may address constituents other than salt and nutrients that adversely affect groundwater quality.

Within one year of the receipt of a proposed SNMP, the Regional Water Board is expected to consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans are to be based on the salt and nutrient plans required by the Policy.

The Policy spells out the required elements of an SNMP. In addition, State Water Board staff provided additional detail on the contents of a SNMP by developing “Suggested Elements” as a means of indicating the nature and extent of information to be provided in the plans. State Water Board staff also provided templates for Regional Water Board adoption of the implementation aspects of the SNMPs into each region’s Water Quality Control Plan (hereinafter, Basin Plan).

The Policy is clear that the SNMP process should be stakeholder-led and conducted in a collaborative manner among interested parties. The Regional Water Board’s role is that of an overseer and facilitator of the SNMP development process – providing regulatory guidance as necessary and technical and regulatory oversight of the process to ensure that the final product is compliant with the specific requirements of the Policy and state and federal water quality laws. Board staff has been attending stakeholder meetings for various groundwater basin/sub-basin groups to provide support and information as necessary.

The purpose of this document is to provide information and guidance to assist on certain aspects of the SNMP development identified by stakeholder groups. Recognizing that each basin has its own unique set of conditions and constraints, this document does not seek to dictate the methods by which stakeholders should manage salt and nutrient loads to their basins. It does, however, provide clarification of the regulatory requirements of SNMPs along with other considerations. By providing such information, the Regional Water Board will promote adherence with SNMP requirements for groundwater basins in the Los Angeles Region. This document is not a policy or regulation of the Regional Water Board and has no regulatory affect; it is intended to assist in the development of SNMPs.

2. GROUNDWATER BASINS IN THE LOS ANGELES REGION

The Los Angeles subregion overlies 24 groundwater basins and encompasses most of Ventura and Los Angeles counties (Figure 2-1). Within this subregion, the Ventura River Valley, Santa Clara River Valley, and Coastal Plain of Los Angeles basins are divided into sub-basins. The basins in the Los Angeles subregion underlie 1.01 million acres (1,580 square miles) or about 40 percent of the total surface area of the subregion (DWR, 2003). Groundwater is found in unconfined alluvial aquifers in most of the inland basins of the Los Angeles subregions. In some larger basins, such as those underlying the coastal plain, groundwater occurs in multiple aquifers separated by aquitards that create confined groundwater conditions (DWR, 2003). Coastal basins in this hydrologic region are prone to intrusion of seawater. Seawater intrusion barriers are maintained along the coastal plain. In Los Angeles County, imported and recycled water is injected to maintain a seawater intrusion barrier (DWR, 2003).

FIGURE 2-1: GROUNDWATER BASINS IN THE LOS ANGELES REGION

For purposes of regulation by the Regional Water Board pursuant to its authority under the California Water Code, the groundwater basins in the Los Angeles Region are identified in the Basin Plan. Basin descriptions in the Basin Plan were updated in 2011 based on the Department of Water Resources (DWR) 2003 revision of Bulletin 118 (Figure 2-1). The basins include the Central and West Coast Basins, which underlie the Los Angeles Coastal Plain; the San Fernando and San Gabriel Basins, which lie between the Santa Monica Mountains and the San Gabriel and Santa Susanna Range; and the Santa Clara and Ventura Basins, which lie between Oak Ridge and the Transverse Ranges.

General characteristics of the major basins/sub-basins are summarized in Table 2-1.

TABLE 2-1: GENERAL CHARACTERISTICS OF THE LOS ANGELES REGION GROUNDWATER BASINS

MAJOR GROUNDWATER BASIN(S) AND SUB-BASINS	STORAGE CAPACITY (AC-FT)	BASIN RECHARGE[1]
COASTAL PLAINS OF LOS ANGELES		
Santa Monica	~1,100,000	Natural/Recycled
Hollywood	200,000	Natural
West Coast Basin	~6,500,000	Natural/Recycled/Imported
Central	13,800,000	Natural/Recycled/Imported
SAN GABRIEL	10,740,000	Natural
RAYMOND	450,000	Natural
SAN FERNANDO	3,670,000	Natural/ Recycled
SANTA CLARA RIVER VALLEY		
Oxnard	7,140,000	Natural/ Recycled/ Septics
Mound	n.a	
Santa Paula	800,000	Recycled/Septics
Fillmore	1,100,000	Recycled/Septics
Piru	1,979,000	Recycled/Septics
Santa Clara River Valley East	n.a.	Natural/Recycled/Septics
PLEASANT VALLEY	1,886,000	Natural/Recycled/Septics
LAS POSAS VALLEY	345,000	Natural/Irrigation
ARROYO SANTA ROSA	103,600	Natural/Irrigation/Septics
UPPER/LOWER OJAI	~84,000	Natural/Septics
VENTURA RIVER VALLEY	10,000	
SIMI VALLEY	180,000	Natural/IRecycled/Septics
TIERRA REJADA	80,000	
THOUSAND OAKS	130,000	
CONEJO VALLEY	7,106	
RUSSELL VALLEY	10,570	
HIDDEN VALLEY	n.a.	
MALIBU VALLEY	n.a.	Natural/Irrigation/Septics

n.a: not available

The Central and West Coast Basins, San Gabriel and Raymond Basins, and the Piru, Fillmore, Mound and Oxnard Forebay sub-basins beneath the Santa Clara River Valley have large storage capacities with significant existing or proposed municipal groundwater use in both urbanized and agricultural areas. The water levels are stable or declining and imported and/or recycled water is used to replenish and help manage

[1] Managed and natural stormwater recharge takes place in most of these basins.

groundwater supplies. The hydrogeology and groundwater of the basins have been extensively studied and documented, and groundwater quality and transport have been studied using computer models. Potential groundwater management alternatives for these basins have also been extensively studied. The San Gabriel Basin has no confining layers, but the Regional Water Board and USEPA's management of twelve plumes of Volatile Organic Compounds (VOCs) and five plumes of nitrates, where groundwater exceeds the Maximum Contaminant Level (MCL), has limited the impact to adjudicated drinking water resources. Basin water quality has also benefited from management practices and implementation of groundwater remediation conducted by the Watermaster in conjunction with local water purveyors.
The San Fernando Basin and Santa Clara River also have large storage capacities, but have declining water levels, significantly less municipal groundwater use, and no existing conjunctive use. The groundwater quality is variable, but remains locally usable as a source of irrigation or municipal supply. Wastewater and recycling agencies within these basins experience periodic noncompliance with groundwater quality objectives. In general, the basins have been studied less extensively than the Central and West Coast, San Gabriel and Raymond and Lower Santa Clara River Valley basins, although the potential yields from these basins are equally large. In the San Fernando Basin, impacts from a VOC plume and four nitrate plumes along with the irregular presence of confining layers have impacted the use of the basin for drinking water uses. In the upgradient portion of Santa Clara River Valley, contamination of the groundwater and its exfiltrates by salts, nutrients and bacteria as a result of increasing urbanization has impacted the use of groundwater as a source of domestic supply.

Nine groundwater basins in rural areas[2] are the sole source of local drinking water supply. They have smaller storage capacities (less than 10,000 acre-feet) in unconsolidated sediment. Wastewater, recycling agencies and facilities with onsite wastewater treatment systems (hereinafter, OWTS) may experience periodic noncompliance with Basin Plan groundwater quality objectives in these basins. Fewer studies and resources exist to characterize basin hydrogeology, groundwater quality, and groundwater transport. The California Department of Public Health, the State Water Board's Division of Water Rights, and USEPA's drinking water protection programs identify problems with water quality upon delivery, and efforts to isolate pollutants from the underlying potable supply are implemented through waste discharge requirements from the Regional Water Board.

The Oxnard Plain, Ventura River, Sylmar, Pomona, and Thousand Oaks/Pleasant Valley/Fox Canyon basins are moderately sized agricultural and urbanized groundwater basins with higher salinity levels. Wastewater and recycled water can usually comply with Basin Plan groundwater quality objectives, but the quality is improved by potable water conjunctive use. The coastal areas of the Region are underlain by porous sediments or fractured bedrock, both of which may have been intruded by saltwater during historic municipal, agricultural and industrial use of the aquifers. Fresh or recycled water injection is used to limit seawater intrusion in the Central, West Coast and Oxnard Plain basins. The tidally influenced and impacted areas may be heavily studied or un-evaluated, but wastewater and recycled water permits generally require compliance with Basin Plan objectives for salt. Public water supplies are not currently developed within these areas.

[2] Ojai Valley, Acton, Sierra Pelona Valley, Lake Elizabeth, Santa Rosa Valley, Hidden Valley, Santa Susana Knolls, Lockwood Valley, and Hungry Valley.

Beneficial uses of the groundwater basins in the region include Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Services Supply (IND), Industrial Process Supply (PROC), and Aquaculture (AQUA). The designated beneficial uses for these basins are shown in Table 2-2.

TABLE 2-2: BENEFICIAL USES OF GROUND WATERS IN THE LOS ANGELES REGION.[1]

DWR[2] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
	PITAS POINT AREA[3]	E	E	P	E	
4-1	**UPPER OJAI VALLEY**	E	E	E	E	
4-2	**OJAI VALLEY**	E	E	E	E	
4-3	**VENTURA RIVER VALLEY**					
4-3.01	Upper Ventura	E	E	E	E	
4-3.02	Lower Ventura	P	E	P	E	
4-4	**SANTA CLARA RIVER VALLEY[4]**					
4-4.02	Oxnard					
4-4.02	Oxnard Forebay	E	E	E	E	
4-4.02	Confined aquifers	E	E	E	E	
4-4.02	Unconfined and perched aquifers	E	P		E	
4-4.03	Mound					
4-4.03	Confined aquifers	E	E	E	E	
4-4.03	Unconfined and perched aquifers	E	P		E	
4-4.04	Santa Paula					
4-4.04	East of Peck Road	E	E	E	E	
4-4.04	West of Peck Road	E	E	E	E	
4-4.05	Fillmore					
4-4.05	Pole Creek Fan area	E	E	E	E	
4-4.05	South side of Santa Clara River	E	E	E	E	
4-4.05	Remaining Fillmore area	E	E	E	E	E
4-4.05	Topa Tapa (upper Sespe) area	P	E	P	E	
4-4.06	Piru					
4-4.06	Upper area (upper Lake Piru)	P	E	E	E	
4-4.06	Lower area east of Piru Creek	E	E	E	E	
4-4.06	Lower area west of Piru Creek	E	E	E	E	
4-4.07	Santa Clara River Valley East					
4-4.07	Mint Canyon	E	E	E	E	
4-4.07	South Fork	E	E	E	E	
4-4.07	Placerita Canyon	E	E	E	E	
4-4.07	Bouquet and San Francisquito Canyons	E	E	E	E	
4-4.07	Castaic Valley	E	E	E	E	
4-4.07	Saugus Aquifer	E				
4-5	**ACTON VALLEY[4]**					
4-5	Acton Valley	E	E	E	E	
4-5	Sierra Pelona Valley (Agua Dulce)	E	E		E	
4-5	Upper Mint Canyon	E	E	E	E	
4-5	Upper Bouquet Canyon	E	P	P	E	

DWR[2] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
4-5	Green Valley	E	P	P	E	
4-5	Lake Elizabeth- Lake Hughes area	E	P	P	E	
4-6	**PLEASANT VALLEY[5]**					
4-6	Confined Aquifers	E	E	E	E	
4-6	Unconfined and perched aquifers	P	E	E	E	
4-7	**ARROYO SANTA ROSA VALLEY[5]**	E	E	E	E	
4-8	**LAS POSAS VALLEY[5]**	E	E	E	E	
4-9	**SIMI VALLEY**					
	Simi Valley Basin					
	Confined aquifers	E	E	E	E	
	Unconfined aquifers	E	E	E	E	
	Gillibrand Basin	E	E	P	E	
4-10	**CONEJO**	E	E	E	E	
4-11	**COASTAL PLAIN OF LOS ANGELES**					
4-11.01	Santa Monica	E	E	E	E	
4-11.02	Hollywood	E	E	E	E	
4-11.03	West Coast					
	Underlying Ports of Los Angeles & Long Beach		E	E	E	
4-11.03	Underlying El Segundo, Seaward of Barrier		E	E	E	
4-11.03	Remainder of Basin	E	E	E	E	
4-11.04	Central	E	E	E	E	
4-12	**SAN FERNANDO VALLEY**	E[6]	E	E	E	
4-13	**SAN GABRIEL VALLEY[7]**	E	E	E	E	
4-15	**TIERRA REJADA**	E	P	P	E	
4-16	**HIDDEN VALLEY**	E	P		E	
4-17	**LOCKWOOD VALLEY**	E	E		E	
4-18	**HUNGRY VALLEY**	E	P	E	E	
4-19	**THOUSAND OAKS AREA[8]**	E	E	E	E	
4-19	Triunfo Canyon area	P	P		E	
4-19	Lindero Canyon area	P	P		E	
4-19	Las Virgenes Canyon area	P	P		E	
4-20	**RUSSELL VALLEY**	E	P		E	
4-21	**CONEJO-TIERRA REJADA VOLCANIC[9]**	E			E	
4-22	**MALIBU VALLEY[10]**					
4-22	Camarillo area	E	P		E	
4-22	Point Dume area	E	P		E	
4-22	Malibu Valley	P	P		E	
4-22	Topanga Canyon area	P	P		E	
4-23	**RAYMOND**	E	E	E	E	
	SAN PEDRO CHANNEL ISLANDS[11]					
	Anacapa Island	P	P			
	San Nicolas Island	E	P			

DWR[2] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
	Santa Catalina Island	E	P		E	
	San Clemente Island	P	P			
	Santa Barbara Island	P	P			

E: Existing beneficial use
P: Potential beneficial use
1: Beneficial uses for ground waters outside of the major basins listed on this table have not been specifically listed. However, ground waters outside of the major basins are, in many cases, significant sources of water. Furthermore, ground waters outside of the major basins are either potential or existing source of water for downgradient basins, and as such, beneficial uses in the downgradient basins shall apply to these areas.
2: Basins are numbered according to DWR Bulletin No. 118-Update 2003 (DWR, 2003).
3: Ground waters in the Pitas Point area (between the lower Ventura River and Rincon Point) are not considered to comprise a major basin and, accordingly, have not been designated a basin number by the DWR or outlined on Fig. 2-1.
4: Santa Clara River Valley Basin was formerly Ventura Central Basin and Acton Valley Basin was formerly Upper Santa Clara Basin (DWR, 1980).
5: Pleasant Valley, Arroyo Santa Rosa Valley, and Las Posas Valley Basins were formerly sub-basins of Ventura Central (DWR, 1980).
6: Nitrite pollution in the groundwater of the Sunland-Tujunga area currently precludes direct MUN use. Since the groundwater in this area can be treated or blended (or both), it retains the MUN designation.
7: Raymond Basin was formerly a sub-basin of San Gabriel Valley and Monk Hill sub-basin is now part of San Fernando Valley Basin (DWR, 2003). The Main San Gabriel Basin was formerly separated into Eastern and Western areas. Since these areas had the same beneficial uses as Puente Basin all three areas have been combined into San Gabriel Valley. Any groundwater upgradient of these areas is subject to downgradient beneficial uses and objectives, as explained in Footnote 1.
8: These areas were formerly part of the Russell Valley Basin (DWR, 1980).
9: Groundwater in the Conejo-Tierra Rejada Volcanic Area occurs primarily in fractured volcanic rocks in the western Santa Monica Mountains and Conejo Mountain areas. These areas have not been delineated on Fig. 2-1.
10: With the exception of groundwater in Malibu Valley (DWR Basin No. 4-22) ground waters along the southern slopes of the Santa Monica Mountains are not considered to comprise a major basin and accordingly have not been designated a basin number by DWR.
11: DWR has not designated basins for ground waters on the San Pedro Channel Islands.

3. REGIONAL GROUNDWATER QUALITY OBJECTIVES

As set forth in the Policy, *SNMPs shall be tailored to address water quality concerns in each basin and may include constituents other than salt and nutrients that adversely impact basin/sub-basin water quality.*

GROUND WATER QUALITY OBJECTIVES

Water quality objectives for ground waters in the Los Angeles Region are contained in the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan). The same water quality objectives for Nitrogen, Chemical Constituents and Radioactivity, Bacteria, and Taste and Odor, apply to all ground waters in the region (Table 3-1).

TABLE 3-1: WATER QUALITY OBJECTIVES FOR GROUNDWATER BASINS IN THE LOS ANGELES REGION

PARAMETER	WATER QUALITY OBJECTIVE
Nitrogen NO3-N + NO2-N NO3 NO3-N NO2-N	 10 mg/L 45 mg/L 10 mg/L 1 mg/L
Chemical Constituents and Radioactivity	For ground waters designated for use as domestic or municipal supply, Maximum Contaminant Levels (MCLs) contained in Title 22 of the California Code of Regulations apply. In addition, ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use.
Bacteria	In ground waters used for domestic or municipal supply (MUN), the concentration of coliform organisms over any seven day period shall be less than 1.1/100 mL.
Taste and Odor	Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

The Basin Plan also contains site-specific objectives for mineral water quality for individual basins/sub-basins (Table 3-2).

TABLE 3-2: WATER QUALITY OBJECTIVES FOR SELECTED CONSTITUENTS IN REGIONAL GROUND WATERS

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
Upper Ojai Valley	**4-1**	**Ojai Valley**	**4-1**				
Upper Ojai Valley	4-1	Upper Ojai Valley	4-1				
Upper Ojai Valley	4-1	West of Sulfur Mountain Road	4-1	1000	300	200	1.0
Upper Ojai Valley	4-1	Central Area	4-1	700	50	100	1.0
Upper Ojai Valley	4-1	Sisar Area	4-1	700	250	100	0.5
Ojai Valley	**4-2**	**Lower Ojai Valley**	**4-2**				**0.5**
Ojai Valley	4-2	West of San Antonio-Senior Canyon	4-2	1000	300	200	0.5
Ojai Valley	4-2	East of San Antonio-Senior Canyon	4-2	700	200	50	
Ventura River Valley	**4-3**	**Ventura River Valley**	**4-3**				
Upper Ventura River	4-3.01	Upper Ventura	4-3	800	300	100	0.5
Upper Ventura River	4-3.01	San Antonio Creek Area	4-3	1000	300	100	1.0
Lower Ventura River	4-3.02	Lower Ventura	4-3	1500	500	30	1.5
Santa Clara River Valley	**4-4**	**Ventura Central**	**4-4**				
Piru	4-4.06	Santa Clara-Piru Creek Area	4-4				
Piru	4-4.06	Upper Area (above Lake Piru)	4-4	1100	400	200	2.0
Piru	4-4.06	Lower Area East of Piru Creek	4-4	2500	1200	200	1.5
Piru	4-4.06	Lower Area West of Piru Creek	4-4	1200	600	100	1.5
Fillmore	4-4.05	Santa Clara-Sespe Creek Area	4-4				
Fillmore	4-4.05	Topa Topa (upper Sespe) Area	4-4	900	350	30	2.0
Fillmore	4-4.05	Fillmore Area	4-4				
Fillmore	4-4.05	Pole Creek Fan Area	4-4	2000	800	100	1.0
Fillmore	4-4.05	South Side of Santa Clara River	4-4	1500	800	100	1.1
Fillmore	4-4.05	Remaining Fillmore Area	4-4	1000	400	50	0.7
Santa Paula	4-4.04	Santa Clara-Santa Paula Area	4-4				
Santa Paula	4-4.04	East of Peck Road	4-4	1200	600	100	1.0
Santa Paula	4-4.04	West of Peck Road	4-4	2000	800	110	1.0

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
Oxnard	4-4.02	Oxnard Plain	4-4				
Mound	4-4.03	Oxnard Plain	4-4				
Oxnard	4-4.02	Oxnard Forebay	4-4	1200	600	150	1.0
Oxnard	4-4.02	Confined Aquifers	4-4	1200	600	150	1.0
Oxnard	4-4.02	Unconfined & Perched Aquifers	4-4	3000	1000	500	
Pleasant Valley	**4-6**	**Pleasant Valley**	**4-6**				
Pleasant Valley	4-6	Confined Aquifers	4-6	700	300	150	1.0
Pleasant Valley	4-6	Unconfined & Perched Aquifers	4-6				
Arroyo Santa Rosa Valley	**4-7**	**Arroyo Santa Rosa**	**4-7**	900	300	150	1.0
Las Posas Valley	**4-8**	**Las Posas Valley**	**4-8**				
Las Posas Valley	4-8	South Las Posas Area	4-8				
Las Posas Valley	4-8	NW of Grimes Cyn Rd. & LA Ave. & Somis Rd.	4-8	700	300	100	0.5
Las Posas Valley	4-8	E of Grimes Cyn Rd & Hitch Blvd.	4-8	2500	1200	400	3.0
Las Posas Valley	4-8	S of LA Ave Between Somis Rd & Hitch Blvd.	4-8	1500	700	250	1.0
Las Posas Valley	4-8	Grimes Canyon Rd. & Broadway Area	4-8	250	30	30	0.2
Las Posas Valley	4-8	North Las Posas Area	4-8	500	250	150	1.0
Acton Valley	**4-5**	**Upper Santa Clara**	**4-5**				
Acton Valley	4-5	Acton Valley	4-5	550	150	100	1.0
Acton Valley	4-5	Sierra Pelona Valley (Agua Dulce)	4-5	600	100	100	0.5
Acton Valley	4-5	Upper Mint Canyon	4-5	700	150	100	0.5
Acton Valley	4-5	Upper Bouquet Canyon	4-5	400	50	30	0.5
Acton Valley	4-5	Green Valley	4-5	400	50	25	
Acton Valley	4-5	Lake Elizabeth-Lake Hughes Area	4-5	500	100	50	0.5
Santa Clara River Valley East	**4-4.07**	**Eastern Santa Clara**	**4-4.07**				
Santa Clara River Valley	4-4.07	Santa Clara-Mint Canyon	4-4.07	800	150	150	1.0

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
East							
Santa Clara River Valley East	4-4.07	South Fork	4-4.07	700	200	100	0.5
Santa Clara River Valley East	4-4.07	Placentia Canyon	4-4.07	700	150	100	0.5
Santa Clara River Valley East	4-4.07	Santa Clara-Bouquet & San Fransisquito Canyons	4-4.07	700	250	100	1.0
Santa Clara River Valley East	4-4.07	Castaic Valley	4-4.07	1000	350	150	1.0
Santa Clara River Valley East	4-4.07	Saugus Aquifer	4-4.07				
Simi Valley	**4-9**	**Simi Valley**	**4-9**				
Simi Valley	4-9	Simi Valley Basin	4-9				
Simi Valley	4-10	Confined Aquifers	4-9	1200	600	150	1.0
Simi Valley	4-11	Unconfined & Perched Aquifers	4-9				
Simi Valley	4-12	Gillibrand Basin	4-9	900	350	50	1.0
Conejo Valley	**4-10**	**Conejo Valley**	**4-10**	**800**	**250**	**150**	**1.0**
Coastal Plain of Los Angeles	**4-11**	**Los Angeles Coastal Plain**	**4-11**				
Central	4-11.04	Central Basin	4-11	700	250	150	1.0
West Coast	4-11.03	West Coast Basin	4-11	800	250	250	1.5
Hollywood	4-11.02	Hollywood Basin	4-11	750	100	100	1.0
Santa Monica	4-11.01	Santa Monica Basin	4-11	1000	250	200	0.5
San Fernando Valley	**4-12**	**San Fernando Valley**	**4-12**				
San Fernando Valley	4-12	Sylmar Basin	4-12	600	150	100	0.5
San Fernando Valley	4-12	Verdugo Basin	4-12	600	150	100	0.5
San Fernando Valley	4-12	San Fernando Basin	4-12				
San Fernando Valley	4-12	West of Highway 405	4-12	800	300	100	1.5
San Fernando Valley	4-12	East of Highway 405 (overall)	4-12	700	300	100	1.5
San Fernando Valley	4-12	Sunland-Tujunga Area	4-12	400	50	50	0.5
San Fernando Valley	4-12	Foothill Area	4-12	400	100	50	1.0
San Fernando Valley	4-12	Area Encompassing RT-Tujunga -Erwin-N. Hollywood-Whithall-LA/Verdugo-Crystal	4-12	600	250	100	1.5

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
		Springs-Headworks-Glendale/Burbank Well Fields					
San Fernando Valley	4-12	Narrows Area (below confluence of Verdugo Wash with the LA River	4-12	900	300	150	1.5
San Fernando Valley	4-12	Eagle Rock Basin	4-12	800	150	100	0.5
San Gabriel Valley/Raymond/San Fernando Valley	**4-13**	**San Gabriel Valley**	**4-13**				
Raymond	4-23	Raymond Basin	4-13				
San Fernando Valley	4-12	Monk Hill Sub-Basin	4-13	450	100	100	0.5
Raymond	4-23	Santa Anita Area	4-13	450	100	100	0.5
Raymond	4-23	Pasadena Area	4-13	450	100	100	0.5
San Gabriel Valley	4-13	Main San Gabriel Basin	4-13				
San Gabriel Valley	4-13	Western Area	4-13	450	100	100	0.5
San Gabriel Valley	4-13	Eastern Area	4-13	600	100	100	0.5
San Gabriel Valley	4-13	Puente Basin	4-13	1000	300	150	1.0
Upper Santa Ana Valley/San Gabriel Valley	**8-2.01**	**Upper Santa Ana Valley**	**4-14**				
San Gabriel Valley	4-13	Live Oak Area	8-2	450	150	100	0.5
San Gabriel Valley	4-13	Claremont Heights Area	8-2	450	100	50	
San Gabriel Valley	4-13	Pomona Area	8-2	300	100	50	0.5
Upper Santa Ana Valley/ San Gabriel Valley	8-2.01/4-13	Chino Area	8-2	450	20	15	
San Gabriel Valley	4-13	Spadra Area	8-2	550	200	120	1.0
Tierra Rejada	**4-15**	**Tierra Rejada**	**4-15**	**700**	**250**	**100**	**0.5**
Hidden Valley	**4-16**	**Hidden Valley**	**4-16**	**1000**	**250**	**250**	**1.0**
Lockwood Valley	**4-17**	**Lockwood Valley**	**4-17**	**1000**	**300**	**20**	**2.0**
Hungry Valley	**4-18**	**Hungry Valley & Peace Valley**	**4-18**	**500**	**150**	**50**	**1.0**
Conejo Valley	**4-10**	**Thousand Oaks Area**	**4-19**	**1400**	**700**	**150**	**1.0**
Russell Valley	**4-20**	**Russell Valley**	**4-20**				
Russell Valley	4-20	Russell Valley	4-20	1500	500	250	1.0
Thousand Oaks Area	4-19	Triunfo Canyon Area	4-20	2000	500	500	2.0

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
Thousand Oaks Area	4-20	Lindero Canyon Area	4-20	2000	500	500	2.0
Thousand Oaks Area	4-21	Las Virgenes Canyon Area	4-20	2000	500	500	2.0
Deleted	**Deleted**	**Conejo-Tierra Rejada Volcanic Area**	**4-21**				
Malibu Valley	**4-22**	**Santa Monica Mountains-Southern Slopes**	**4-22**				
Malibu Valley	4-22	Camarillo Area	4-22	1000	250	250	1.0
Malibu Valley	4-22	Point Dume Area	4-22	1000	250	250	1.0
Malibu Valley	4-22	Malibu Valley	4-22	2000	500	500	2.0
Malibu Valley	4-22	Topanga Canyon Area	4-22	2000	500	500	2.0
San Pedro Channel Islands		**San Pedro Channel Islands**					
Anacapa Island	No DWR#	Anacapa Island	No DWR#				
San Nicholas Island	No DWR#	San Nicholas Island	No DWR#	1100	150	350	
Santa Catalina Island	No DWR#	Santa Catalina Island	No DWR#	1000	100	250	1.0
San Clemente Island	No DWR#	San Clemente Island	No DWR#				
Santa Barbara	No DWR#	Santa Barbara Island	No DWR#				

GROUNDWATER BASIN WATER QUALITY

The following section presents information on general water quality conditions as provided by the Department of Water Resources in their Bulletin 118- 2003 update. This information is meant to provide a general overview of the conditions within the basins. It is anticipated that more current information will be provided in the Salt and Nutrient Management Plans developed for each basin.

According to DWR's Bulletin 118-2003, nitrate content is elevated in some parts of the subregion. Volatile organic compounds (VOCs) have caused groundwater impairments in some of the industrialized portions of the region. The San Gabriel Valley and San Fernando Valley groundwater basins both have multiple sites of contamination from VOCs. The main constituents in the contamination plumes are trichloroethylene (TCE) and tetrachloroethylene (PCE). Some of the locations have been declared federal Superfund sites. Contamination plumes containing high concentrations of TCE and PCE also occur in the Bunker Hill Sub-basin of the Upper Santa Ana Valley Groundwater Basin. Some of these plumes are also designated as Superfund sites. Also, perchlorate has been identified as a significant pollutant in some areas of the Los Angeles Region.

Basin-specific information on water quality in the region's major basins/sub-basins is provided in Table 3-3. This information is summarized from DWR's Bulletin 118-2003 and includes monitoring results from public supply wells sampled under the DHS Title 22 program from 1994 through 2000. Per this bulletin, the 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.

TABLE 3-3: WATER QUALITY IN MAJOR BASINS/SUB-BASINS IN THE LOS ANGELES REGION

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Central Basin		Range: 200-2500 mg/l Average: 453 mg/l (293 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	316 315 315 322 344 316	15 1 2 0 43 113
West Coast Basin	Injection wells create a groundwater ridge, which inhibits the inland flow of saltwater into the sub-basin to protect and maintain groundwater elevations.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	45 45 46 46 44 45	0 1 0 0 0 30
San Fernando Valley Basin	Groundwater contamination from VOCs and hexavalent chromium (CrVI) continues to be a serious problem for water supply in the eastern portion of the San Fernando Valley		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	129 122 129 134 134 129	6 13 44 3 90 17
San Gabriel[6]	Four areas of the San Gabriel Valley Basin are Superfund sites. Trichloroethylene, Perchloroethylene, and Carbon Tetrachloride contaminate the Whittier Narrows, Puente basin, Baldwin Park and El Monte areas.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	287 278 300 292 301 287	3 4 73 1 85 20

[3] 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).

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

[5] 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.

[6] There are six operable units (O.U.) within the Main San Gabriel Basin: the Baldwin Park O.U., the Puente Valley O.U., the Whittier Narrows O.U., the South El Monte O.U., and the Area 3 (Alhambra) O.U.

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Raymond	Fluoride content occasionally exceeds recommended levels of 1.6 mg/L, near the San Gabriel Mountain front. Volatile organic compounds are detected in wells near Arroyo Seco and radiation is occasionally detected near the San Gabriel Mountains.	Range: 38-780 mg/l Average: 346 mg/l (70 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	66 55 78 57 60 66	9 8 23 0 19 9
Santa Monica		Range: 729-1,156 mg/L Average: 916 mg/L (7 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	13 12 13 12 12 13	0 1 0 0 9 8
Hollywood	Public water supply from imported surface water, groundwater quality information scarce.	Single sample 526 mg/L (Truran, 2001).			
Oxnard	Nitrate concentrations can exceed the state Maximum Contaminant Level (MCL) of 45 mg/L. Intrusion of seawater has occurred near Pt. Mugu and Port Hueneme. Elevated levels of DDT and PCB are found near Pt. Mugu.	Range: 160-1,800 mg/L Average: 1,102 mg/L (69 public supply wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	73 69 80 63 68 73	6 8 14 1 2 49
Piru	Agricultural return flows may lead to high nitrate concentrations particularly during dry periods. Urban stormwater runoff within the Santa Clara River Watershed tends to concentrate salts and other contaminants. The most prominent natural contaminants in the sub-basin are boron and sulfate.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	3 3 3 3 3 3	0 0 0 0 0 1

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Fillmore	Agricultural return flows may lead to high nitrate concentrations particularly during dry periods. Urban stormwater runoff within the Santa Clara River Watershed tends to concentrate salts and other contaminants. Other contaminants in the sub-basin are boron, sulfate, and nitrates.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	13 10 14 10 10 13	0 1 1 0 1 3
Santa Paula	Nitrate concentrations can fluctuate significantly.	Range: 470-1,800 mg/L Average: 1,198 mg/L (13 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	16 12 16 9 9 16	3 1 2 0 0 15
Mound		Range: 1,498-1,908 mg/L Average: 1,644 mg/L (4 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	2 2 2 2 2 2	1 0 0 0 0 2
Las Posas		Range: 338-1,700 mg/L Average: 742 mg/L (23 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	22 22 24 22 22 22	1 2 0 1 0 16
Santa Rosa			Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	1 1 1 1 1 1	0 0 0 0 0 1

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Pleasant Valley		Range: 597-1,420 mg/L Average: 922 mg/L (10 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	10 10 10 10 10 10	0 1 0 0 0 10
Lower Santa Clara	Drinking water standards are met at public supply wells without the use of treatment methods. Areas with somewhat elevated mineral levels have been observed in the northern basin. Some wells with elevated nitrate concentration have been identified in the southern portion of the basin.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	257 234 268 253 252 257	9 1 10 3 4 29
Upper Santa Clara	Nitrate content has exceeded 45 mg/L in some parts of the sub-basin with a well in the central part of the sub-basin reaching 68 mg/L. Trichloroethylene and ammonium perchlorate have been detected in four wells in the eastern part of the sub-basin.	Range: 300-1,662 mg/L Average: 695 mg/L (59 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	67 56 74 66 66 67	4 2 2 4 0 7

4. CLARIFICATION OF SNMP REQUIREMENTS

The Policy states that SNMPs are to be developed for every groundwater basin in California. This will allow water purveyors and basin management agencies to take advantage of a streamlined permit process for recycled water projects that is intended to expedite the implementation of recycled water projects. The required elements of a SNMP, as specified by the Policy include:

a) Development of a basin-wide monitoring plan;
b) Annual monitoring of Constituents of Emerging Concern;
c) Consideration of Water Recycling/Stormwater Recharge/Use;
d) Source identification/Source loading and assimilative capacity estimates;
e) Implementation measures; and
f) Anti-degradation analyses.

Development of SNMPs will lead to a more comprehensive approach to basin water quality management. SNMP proponents will have the opportunity to collectively determine the implementation strategies necessary to comply with water quality objectives established to restore and maintain the beneficial use of the ground waters.

SNMPs are required for each groundwater basin in the state. However, there is flexibility in the level of detail required in each plan depending on the size, complexity and level of activity within the basin. That notwithstanding, an initial assessment of water quality (past and present) and use (including future use) is necessary in order to determine the level of specificity warranted in each basin. The following sections discuss the required SNMP elements in greater detail, providing clarification where communications with stakeholders have indicated it to be necessary.

STAKEHOLDER COLLABORATION

As stated in the Policy*:*
"…local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff."

Stakeholder collaboration may be within or between basins. While the Policy requires that every basin/sub-basin in the state have a SNMP, this does not preclude stakeholders working across basin boundaries to accommodate existing and future stakeholder structures and basin management efforts. Also, some differences exist between DWR Bulletin-118 basin/sub-basin definitions and court-adjudicated basins, which may influence formation of stakeholder groups.

Key stakeholders include local agencies involved in groundwater management, owners and operators of recharge facilities, water purveyors, water districts, water masters, and salt and nutrient contributing dischargers. These agencies have access to basin-specific data and information that is essential to the development of successful SNMPs. Private well owners may also have essential water quality information. Nongovernmental entities may have information about ecosystems associated with groundwater exfiltration. Other parties from regulatory agencies, environmental groups, industry, and interested persons may also provide important support. No single entity is wholly responsible for SNMP development. While a lead agency is necessary to coordinate the development effort, the point of a collaborative process is to take advantage of the collective expertise, resources and information of the participating entities. Therefore, participation to varying degrees by all stakeholders is encouraged. Table 4-1 lists the agencies already engaged in, and others that should consider being involved in salt and nutrient management for each groundwater basin or sub-basin group. This is not an exhaustive list.

TABLE 4-1: PARTICIPATING AND POTENTIAL STAKEHOLDERS FOR EACH BASIN/SUB-BASIN GROUP AS OF FEBRUARY 2012

Basin/sub-basin	**Participating and Potential Stakeholders**
Central and West Coast Basins	Water Replenishment District (WRD) of Southern California City of Los Angeles Department of Water & Power County Sanitation Districts of Los Angeles County Metropolitan Water District of Southern California West Basin Municipal Water District Central Basin Municipal Water District Los Angeles County Department of Public Works California Department of Public Health
San Fernando Basin	Upper Los Angeles River Area Water Master Los Angeles Department of Water and Power City of Glendale City of Burbank City of San Fernando City of La Crescenta Metropolitan Water District US Environmental Protection Agency California Department of Public Health
San Gabriel/	San Gabriel Basin Water Master City of Alhambra* City of Arcadia* City of Pasadena* Crescenta Valley Water District* Metropolitan Water District County Sanitation Districts of Los Angeles County
Raymond Basin	Raymond Basin Management Board City of Alhambra* City of Pasadena* Metropolitan Water District County Sanitation Districts of Los Angeles County
Three Valleys (Six Basins)	Three Valleys Municipal Water District*
Lower Santa Clara Pleasant Valley, Las Posas, Oxnard	Fox Canyon United Water Conservation District Metropolitan Water District City of Oxnard
Lower Santa Clara	Ventura County Watershed Protection District City of Fillmore County of Ventura City of Santa Paula United Water Conservation District
Eastern Santa Clara	Castaic Lake Water Agency

Basin/sub-basin	Participating and Potential Stakeholders
Saugus Aquifer, Santa Clara Castaic Valley, South Fork, Placerita Canyon, Santa Clara-Bouquet and San Francisquito Canyons, Santa Clara-Mint Canyon, Acton/Sierra Pelona/Upper Mint Canyon Basins	Los Angeles County Sanitation Districts City of Santa Clara
Tierra Rejada/Gillibrand/Simi/Thousand Oaks/Conejo/Hidden Valley/Russell Valley Basins	Calleguas Municipal Water District Calleguas Creek Watershed Management Plan
Hollywood and Santa Monica Basins	*City of Beverly Hills* City of Santa Monica**
Pleasant Valley, Las Posas, Oxnard and Tierra Rejada/Gillibrand/Simi/Thousand Oaks/Conejo/Hidden Valley/Russell Valley Basins	Calleguas Creek Watershed Management Plan, Fox Canyon, City of Oxnard, United Water Conservation District.
Ventura/Ojai	County of Ventura
Malibu Valley	City of Malibu* La Paz Treatment Facility

**Potentia Stakeholders*

Ideally, participation in the SNMP development process should not be limited to those agencies directly involved with basin management or salt and nutrient contributors. Other parties from regulatory agencies, environmental groups, industry, and interested persons may be included and/or kept informed; and their input solicited for each major task. Groundwater basin adjudication may impact the roles of stakeholders not identified as parties in the applicable judgments.

The Regional Water Board's role in preparing SNMPs is to:

a) Facilitate interaction and information sharing within and among groundwater basin stakeholder groups,
b) Provide regulatory guidance on the SNMP requirements of the Policy,
c) Provide technical and regulatory oversight of the SNMP process to maintain consistency in scope and content of these plans and ensure compliance with the Policy's requirements, and
d) Adopt, as appropriate, the implementation measures included in SNMPs into the Water Quality Control Plan for the Los Angeles Region.

The Regional Water Board conducted its first stakeholder workshop in November 2010 to introduce the SNMP requirement to stakeholders and initiate the development process. Since then stakeholder groups have been formed for the major groundwater basins and Regional Water Board staff have been made available to each group to provide basin-specific technical guidance and oversight of individual plans. A second stakeholder workshop was held in November 2011 to provide further clarification on certain regulatory aspects of the SNMP development process that were identified as issues of concern by stakeholders.

SPECIFIC SNMP REQUIREMENTS

It is the intent of the Policy "… *that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses*."

The Policy also specifies that each salt and nutrient management plan shall include:

a) *A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations to determine whether concentrations of salt, nutrients, and other constituents of concern are consistent with applicable water quality objectives.*
b) *A provision for annual monitoring of Emerging Constituents/Constituents of Emerging Concern*
c) *Water recycling and stormwater recharge/use goals and objectives.*
d) *Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.*
e) *Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.*
f) *An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of the Antidegradation Policy (Resolution No. 68-16).*

SNMP "SUGGESTED ELEMENTS"

In 2010, at the direction of the Executive Director, State Water Board staff provided a draft list of suggested elements for SNMPs that would assure that the requirements of the Policy were met (Appendix I). These elements are not considered additions to the requirements; rather they are meant to provide specifics as to how the requirements can be met, and indicate the appropriate level of detail necessary in a SNMP. They are purely recommendations and stakeholders have the option of arriving at the Policy's SNMP requirements via alternative means. This is illustrated in Table 4-2 where the suggested elements provided by State Water Board staff are lined up with the SNMP requirements as enumerated in the Policy.

TABLE 4-2: SNMP SUGGESTED ELEMENTS AND CORRESPONDING REQUIREMENTS FROM THE RECYCLED WATER POLICY

RECYCLED WATER POLICY SECTION	**RECYCLED WATER POLICY REQUIREMENT**	**SNMP SUGGESTED ELEMENTS**
6b(1)	…local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA …	**CEQA ANALYSIS**
6b(1)(a)	It is the intent of this Policy for every groundwater basin/sub-	**GROUNDWATER BASIN CHARACTERISTICS** GROUNDWATER BASIN OVERVIEW

RECYCLED WATER POLICY SECTION	RECYCLED WATER POLICY REQUIREMENT	SNMP SUGGESTED ELEMENTS

	basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality.	▪ Physiographic Description
		▪ Groundwater Basin and/or Sub-Basin Boundaries
		▪ Watershed Boundaries
		▪ Geology
		▪ Hydrogeology/Hydrology
		▪ Aquifers
		▪ Recharge Areas
		▪ Hydrologic Areas Tributary to the Groundwater Basin
		▪ Climate
		▪ Land Cover and Land Use
		▪ Water Sources
		
		GROUNDWATER INVENTORY
		▪ Groundwater Levels
		▪ Historical, Existing, Regional Changes
		▪ Groundwater Storage
		▪ Historical, Existing, Changes
		▪ Groundwater Production
		▪ Historical, Existing, Spatial and Temporal Changes, Safe Yield
		▪ Groundwater Mixing and Movement
		▪ Subsurface Inflow/Outflow
		▪ Horizontal and Vertical Movement and Mixing
		
		BASIN EVALUATION
		WATER BALANCE
		▪ Conceptual Model
		▪ Basin Inflow/Outflow
		▪ Groundwater, Surface Water, Imported Water, Water Transfers, Recycled Water Irrigation, Waste Water Discharges, Agricultural Runoff, Stormwater Runoff (Urban, Agriculture, Open Space), Precipitation
		▪ Infiltration, Evaporation, Evapotranspiration, Recharge, Surface Water and Groundwater Connectivity
		
		PROJECTED WATER QUALITY
		
		BASIN WATER QUALITY
		▪ Groundwater Quality
		    ▪ Background, Historical, Existing
		    ▪ Water Quality Objectives
		▪ Surface Water Quality
		▪ Delivered Water Quality
		▪ Imported Water Quality
		▪ Recycled Water Quality

6b(3)(a)	A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations.	**BASIN MANAGEMENT PLAN ELEMENTS** BASIN MONITORING PROGRAMS ▪ Identify Responsible Stakeholder(s) Implementing the Monitoring ▪ Monitoring Program Goals

RECYCLED WATER POLICY SECTION	**RECYCLED WATER POLICY REQUIREMENT**	**SNMP SUGGESTED ELEMENTS**

6b(3)(a)(i)
 	
6b(3)(a)(iii)
	The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
	
	The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data.
		▪ Sampling Locations
		▪ Water Quality Parameters
		▪ Sampling Frequency
		▪ Quality Assurance/Quality Control
		▪ Database Management
		▪ Data Analysis and Reporting
		▪ Groundwater Level Monitoring
		▪ Basin Water Quality Monitoring
		▪ Groundwater Quality Monitoring
		    ▪ Areas of Surface Water and Groundwater Connectivity
		    ▪ Areas of Large Recycled Water Projects
		    ▪ Recycled Water Recharge Areas
		▪ Surface Water Quality Monitoring
		▪ Stormwater Monitoring
		▪ Wastewater Discharge Monitoring
		▪ Recycled Water Quality Monitoring
		▪ Salt and Nutrient Source Loading Monitoring
		▪ Other Constituents of Concern
		▪ Water Balance Monitoring
		    ▪ Climatological Monitoring
		    ▪ Surface Water Flow Monitoring
		    ▪ Groundwater Production Monitoring

6b(3)(b)	A provision for annual monitoring of Emerging Constituents/ Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.	**BASIN EVALUATION** CONSTITUENTS OF EMERGING CONCERNS (CECs) ▪ Constituents ▪ CEC Source Identification
6b(3)(c)	Water recycling and stormwater recharge/use goals and objectives.	**BASIN MANAGEMENT PLAN ELEMENTS** GROUNDWATER MANAGEMENT GOALS ▪ Recycled Water and Stormwater Use/Recharge Goals and Objectives
6b(3)(d)	Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.	**BASIN EVALUATION** SALT AND NUTRIENT BALANCE ▪ Conceptual Model ▪ Salt and Nutrient Source Identification ▪ Salt and Nutrient Loading Estimates ▪ Historical, Existing, Projected ▪ Import/Export ▪ Basin/Sub-Basin Assimilative Capacity for Salt and Nutrients ▪ Fate and Transport of Salt and Nutrients
6b(3)(e)	Implementation measures to	**BASIN MANAGEMENT PLAN ELEMENTS**

RECYCLED WATER POLICY SECTION	RECYCLED WATER POLICY REQUIREMENT	SNMP SUGGESTED ELEMENTS

	manage salt and nutrient loading in the basin on a sustainable basis.	GROUNDWATER MANAGEMENT GOALS
		▪ Groundwater Management Goals
		
		SALT AND NUTRIENT LOAD ALLOCATIONS
		
		SALT AND NUTRIENT MANAGEMENT STRATEGIES
		▪ Load Reduction Goals
		▪ Future Land Development and Use
		▪ Salt/Nutrient Management Options
		▪ Salt/Nutrient Management Strategies and Modeling
		▪ Management Strategy Model Results
		▪ Feasibility
		▪ Cost
		
		PLAN IMPLEMENTATION
		SALT AND NUTRIENT MANAGEMENT PROGRAM
		▪ Organizational Structure
		▪ Stakeholder Responsibilities
		▪ Implementation Measures to Manage Salt and Nutrient Loading
		▪ Salt/Nutrient Management
		    ▪ Water Supply Quality
		    ▪ Regulations of Salt/Nutrients
		    ▪ Load Allocations
		    ▪ Salt and Nutrient Source Control
		    ▪ CEC Source Control
		    ▪ Site Specific Requirements
		▪ Groundwater Resource Protection
		▪ Additional Studies
		
		PERIODIC REVIEW OF SALT/NUTRIENT MANAGEMENT PLAN
		▪ Adaptive Management Plan
		▪ Performance Measures
		▪ Performance Evaluation
		
		COST ANALYSIS
		▪ CWC § 13141, "…prior to implementation of any agricultural water quality control program, an estimate of the total cost of such a program, together with an identification of potential sources of funding, shall be indicated in any regional water quality control plan."
		
		IMPLEMENTATION SCHEDULE

6b(3)(f)	An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.	**ANTIDEGRADATION ANALYSIS**
No specific reference	While the background information listed in State	**BACKGROUND** ▪ Purpose

RECYCLED WATER POLICY SECTION	RECYCLED WATER POLICY REQUIREMENT	SNMP SUGGESTED ELEMENTS
	Water Board's "Suggested Elements" is not specifically identified by the Recycled Water Policy, it would provide the necessary information in support of the conceptual basis for the plan.	▪ Protection of Beneficial Use ▪ Sustainability of Water Resources ▪ Problem Statement ▪ Salt/Nutrient Management Objectives ▪ Regulatory Framework ▪ Groundwater Beneficial Uses ▪ Stakeholder Roles and Responsibilities ▪ Process to Develop Salt/Nutrient Management Plan

The Policy recognizes that:
The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality.

In response to this, State Water Board staff has suggested three classes of basins in the context of SNMP development to assist in determining the extent of information required for each class: Major, Saline/Coastal, and No Threat basins. They are defined as follows:

a) Major: Large in size, complex land use, heavily used, water quality threatened;
b) Saline/Coastal: Basins with naturally saline groundwater not currently used as a source of water; and
c) Low threat: Basins with minimal or no known or current threat to water quality.

The State Water Board staff have also provided draft Basin Plan Amendment templates to indicate the amount of information necessary for each classification. The templates for each basin class are provided in Appendix I. Groundwater basins in the Los Angeles Region do not necessarily fit neatly into these classes; the scope of information for a SNMP will also be influenced by basin-specific attributes, conditions and water quality concerns. However, stakeholders are encouraged to use the templates as a guide.

Regardless of how a basin may be categorized, the Policy states that the SNMP must include "implementation measures to manage salt and nutrient loading in the basin on a sustainable basis."
Where applicable, implementation strategies may be developed to address issues such as pollution prevention, water quality restoration, basin recharge with storm water and recycled water and groundwater-surface water interaction.

A. BASIN/SUB-BASIN WIDE MONITORING PLAN

As set forth in the Policy Part 6(b)(3)(a), each SNMP shall include *"a basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water* *quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).*

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

The objective of this requirement is to develop a basin wide monitoring plan that would allow for a comprehensive assessment of basin water quality in relation to beneficial uses supported by the basin and applicable water quality objectives. Several localized and project-specific monitoring programs exist throughout the basins in the region. These include monitoring of ground and surface waters by various agencies to comply with regulatory requirements, as well as voluntary monitoring efforts by these agencies and environmental groups. In keeping with the Policy's preferred approach, it is recommended that all parties engaged in water quality monitoring and data collection within each groundwater basin be identified as a starting point in developing a basin-wide monitoring plan. Compilation and review of existing programs and groundwater quality reports will reduce the potential for redundancy, and also assist in identifying data gaps that need to be addressed.

Regulatory agencies are involved in statewide monitoring of groundwater quality for the purpose of assessing and protecting groundwater basins. These agencies include the State Water Board, the California Department of Public Health, Department of Water Resources, Department of Toxic Substances Control, Department of Pesticide Regulation, and the U.S. Geological Survey. State Water Board's online groundwater information system, GeoTracker GAMA provides access to groundwater quality monitoring data from these agencies as well as other Regional Boards and the Lawrence Livermore National Laboratory. This information is available on the Groundwater Ambient Monitoring and Assessment (GAMA) program website at: http://www.waterboards.ca.gov/water_issues/programs/gama/geotracker_gama.shtml. Results from these monitoring efforts may be used in conjunction with those generated by water purveyors, managers and private entities in determining the scope of the monitoring plan.

The monitoring plan should clearly define the areal extent of the basin or sub-basin to be monitored. The region's major basin boundaries were most recently updated by the Department of Water Resources in its 2003 update of Bulletin 118 (DWR, 2003). While this update omitted some of the sub-basins that were identified in the previous version, the Regional Water Board's Basin Plan still retains these basins/sub-basin as ground waters to be protected under the California Water Code.

In developing sampling locations within a given basin, stakeholders are encouraged to consider:

a) Location of existing monitoring locations;
b) Location of existing and potential contributing sources, including areas with significant groundwater-surface water interaction; and
c) Existing and proposed recycled water projects/facilities and groundwater recharge areas.

Stakeholders are also encouraged to use the 2003 U.S. Geological Survey report titled "Framework for a Ground Water Quality and Assessment Program for California" as a resource when developing the monitoring plan. This document is available at: http://www.waterboards.ca.gov/water_issues/programs/gama/docs/usgs_rpt_72903_wri034166.pdf

The parameters to be monitored should be reflective of the water quality conditions and applicable water quality objectives within a given basin or sub-basin. Per the Policy, salts, nutrients, and CECs will be monitored in all basins. It is recommended that a draft monitoring plan be submitted to the Regional Water Board for review prior to finalizing the SNMP of which it would be a component. As with other groundwater monitoring programs in the region, data generated from SNMP monitoring programs should be submitted to the State Water Board's online groundwater information system – GeoTracker.

The Policy also states that Salt and Nutrient Management Plans may include constituents other than salt and nutrients which may impact water quality in the basin/sub-basin. However, inclusion of additional parameters is at the discretion of stakeholders involved in the SNMP development process. Stakeholders are encouraged to consider existing groundwater quality information and their knowledge of localized conditions, in determining which other parameters of concern should be monitored. Table 4-3 lists some of the known parameters of concern in the major basins and sub-basins in the Los Angeles Region.

TABLE 4-3: PARAMETERS OF CONCERN IN THE LOS ANGELES REGION'S MAJOR BASINS

Groundwater Basin		**Primary Parameters of Concern***
West Coast Central		Seawater Intrusion
San Gabriel Raymond		VOCs, SVOCs
San Fernando		VOCs, Cr^{VI}
Santa Clara Watershed	Oxnard Mound Santa Paula Fillmore Piru East Santa Clara	Nitrate, Salts, TDS, DDT, PCBs
Pleasant Valley		Nitrates, TDS, Salts

Groundwater Basin		Primary Parameters of Concern*
Ojai Ventura River		Nitrates
Calleguas Watershed	Conejo Valley Russell Valley Hidden Valley Simi Valley Tierra Rejada Thousand Oaks	Nitrates, TDS, Salts
Malibu Valley		Seawater Intrusion

*This is not a complete list of parameters of concern.

B. MONITORING OF CONSTITUENTS OF EMERGING CONCERN

Constituents of emerging concerns (CECs) include several types of chemicals that may be classified as (i) persistent organic pollutants (ii) pharmaceuticals and personal care products, (iii) veterinary medicines, (iv) endocrine disruptors, and others. Such constituents present water quality concerns due to their large number and variety, their prevalence in the environment, and their potential for harmful effects on aquatic life. Much less is known about their potential effects on humans. Increasing recycled water use has the potential to increase the occurrence of CECs in ground water basins through indirect potable reuse or groundwater recharge reuse (i.e., augmentation of drinking water aquifers using recycled water), as well as urban landscape irrigation. Staff are coordinating with EPA, the Southern California Coastal Water Research Project, and others in studying this issue.

Recycled Water Policy CEC Monitoring Requirements:

As stated in the Policy, *"[e]ach Salt and Nutrient Management Plan shall include a provision for annual monitoring of Emerging Constituents/Constituents of Emerging Concern (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy."*

Paragraph 10(b) of the Policy directs the State Water Board, in consultation with the California Department of Public Health (CDPH), to convene a "blue-ribbon" advisory panel to guide future actions relating to constituents of emerging concern.

The advisory panel (Panel) completed its report (Panel Report) on CECs in June 2010. State Water Board staff developed a staff report (SWRCB, 2010) based on recommendations from the Panel and those provided by the CDPH. In December 2010, the State Water Board held a public hearing regarding proposed CEC monitoring requirements presented in the staff report.

The Panel Report employed a risk-based screening process to identify CECs of toxicological relevance to monitor for potable and non-potable recycled water use scenarios (i.e., groundwater recharge reuse and landscape irrigation). The screening approach focused the universe of CECs based on their potential for health effects and their occurrence in recycled water in California. The Panel Report recommends monitoring of selected performance indicator CECs to evaluate the performance of treatment processes to remove CECs; and recommends monitoring of surrogate parameters, such as turbidity, dissolved organic carbon, and conductivity, to verify that treatment units are working as designed.

Health-based CECs selected for monitoring include caffeine, 17-beta-estradiol (17β-estradiol), n-nitrosodimethylamine (NDMA), and triclosan.

The Panel also selected a set of performance-based indicator CECs. Each selected performance-based indicator CEC represents a group or a family of CECs. The removal of the performance-based indicator CEC through a treatment process provides an indication of the removal of the other CECs in the group, provide they have similar properties. The six compounds selected to serve as performance-based indicator CECs are caffeine, gemfibrozil, n,n-diethyl-meta-toluamide (DEET), iopromide, NDMA, and sucralose. Caffeine and NDMA serve as both health and performance-based indicator CECs.

Upon reviewing the oral and written comments received on the publicly noticed staff report, the State Water Board drafted an amendment to the Policy prescribing monitoring requirements for CECs in recycled water used for groundwater recharge reuse and landscape irrigation. The draft Policy amendment ("Requirements for Monitoring Emerging Constituents/Constituents of Emerging Concern for Recycled Water") was released for public comment on May 9, 2012. The proposed amendment and accompanying attachment can be found on the State Water Board's website at: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/draft_amendment_to_policy.shtml

Other Considerations

The California Department of Public Health has released a draft of their Groundwater Replenishment Reuse Regulations, which are used to regulate recycled water for replenishment projects. Upon adoption of the final regulation, where the CEC monitoring requirements differ from those specified by the State Water Board in the amendment to the Policy, monitoring for the additional constituents specified by California Department of Public Health regulations should be included where groundwater recharge using recycled water is a consideration.

Section 60320.120(c) of the draft regulations requires annual monitoring of indicator CECs specified by CDPH and the Regional Water Board by proponents of groundwater replenishment and reuse projects (GRRPs). Stakeholders may take this into consideration in developing CEC monitoring programs for each basin/sub-basin where such projects exist or are planned. .

Regional Board Considerations

The Los Angeles Regional Board has taken early actions to begin to address CECs. The Board currently includes CEC Special Study Requirements in NPDES permits for Publicly Owned Treatment Works (POTWs), during permit renewal.
In addition, the development of a CEC monitoring strategy for the region was identified as a priority project during the project-selection phase of the 2011-13 triennial review. The Regional Board has also directed resources toward establishing some baseline information on CEC occurrence, and fate and transport in inland surface waters throughout the region. The information gathered from on-going monitoring and other applicable studies will inform future monitoring strategies.

Where site specific CEC monitoring is required for existing or proposed projects within a groundwater basin or sub-basin, SNMP proponents are encouraged to consider including them as part of the CEC monitoring strategies developed for the basin or sub-basin

C. SALT AND NUTRIENT ANALYSIS

As stated in the Policy, *"[e]ach SNMPs shall include salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients…"* in order to *"… address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects."*

Identification of existing and planned future sources of salts and nutrients is an essential part of a SNMP. This allows for a more accurate assessment of the pollutant loads to the basin and analysis of the final impact on basin water quality as determined through fate and transport analysis. A comprehensive consideration of sources will lead to a robust assessment and a more effective implementation strategy for basin management. Table 4-5 provides examples of source considerations in conducting this analysis.

TABLE 4-6: LIKELY SOURCES OF SALTS, NUTRIENTS, AND OTHER POLLUTANTS OF CONCERN IN GROUNDWATER BASINS

Source Considerations	**Examples**
Land uses	Agricultural and landscape irrigation
Groundwater recharge	Recycled water, Municipal water supply, Stormwater
Point source discharges to groundwater	Municipal and Industrial facilities, Other permitted facilities (e.g. landfills)
Non-point source discharges	Agricultural and nursery facilities, on-site wastewater treatment system discharges
Specific point sources	Injection wells*, percolation basins*
Surface water-groundwater interaction	Percolation from stream flow, stormwater runoff infiltration
Sub-surface inflow	Seawater intrusion, upstream inflow
Discrete discharges	Chemical spills, leaking tanks, improper disposal

*associated with oil production

In order to estimate pollutant loads to these basins, it will be necessary to quantify the mass loadings of all identifiable sources to each basin/sub-basin, and evaluate their fate and transport Stakeholders have the flexibility to apply any scientifically defensible methodology to make these determinations.

D. WATER RECYCLING AND STORMWATER RECHARGE/USE GOALS AND OBJECTIVES

Recycled Water Use

As stated in the Policy, *"[e]ach SNMP shall include water recycling and stormwater recharge goals and objectives."* With the intent of moving towards sustainable management of surface waters and groundwater, the Policy adopts the goals of increasing the use of recycled water in California over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.

There are a significant number of recycled water facilities in the Los Angeles Region. The State Water Board conducted a 2009 survey of recycled water use throughout the state to determine the amount of recycled water used and the beneficial uses to which recycled water was put. Only publicly-owned wastewater and water recycling agencies were included in the survey. Due to the low response rate from agencies solicited (18%), data from a similar 2001 survey were included in the overall results. Table 4-6 shows survey results for responding agencies in the Los Angeles Region. More details on the survey are available on the State Water Board's website at http://www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/munirec.shtml.

TABLE 4-7: SURVEY RESULTS OF RECYCLED WATER USE BY POTWS AND WATER RECYCLING AGENCIES IN THE LOS ANGELES REGION

Agency	Total Reuse (AFY)	Beneficial Use
Burbank Water and Power	2090	Golf Course and Landscape Irrigation, Industrial
City of Burbank	879	Landscape Irrigation, Geothermal/Energy Production
City of Los Angeles Bureau of Sanitation	40,787	Recreational Impoundment, Natural systems restoration, Wetlands, Wildlife Habitat
City of Los Angeles Department of Water and Power	32,113	Golf Course & Landscape Irrigation, Industrial, Seawater Intrusion Barrier, Recreational Impoundment, Natural systems restoration, Wetlands, Wildlife Habitat
City of Los Angeles Department of Public Works	3,683	Landscape Irrigation, Geothermal/Energy Production
Camarillo Sanitation District/City of Camarillo	1,293	Agriculture Irrigation
Camrosa Water District	779	Agriculture Irrigation
City of Fillmore	110	Landscape Irrigation
County Sanitation Districts of Los Angeles County	80,000	Unspecified (likely groundwater recharge)
Las Virgenes Municipal Water District	5,174	Landscape Irrigation
Los Angeles County Department of Public Works	148	Landscape Irrigation
Long Beach Water Department	6,380	Golf Course & Landscape Irrigation, Commercial, Seawater Barrier
Ventura County Waterworks District 1	428	Golf Course Irrigation
Ventura County Waterworks District 1	63	Commercial
West Basin Municipal Water District	26,032	Landscape Irrigation, Industrial, Seawater Intrusion Barrier

While the majority of facilities surveyed used their recycled water for irrigation, a significant portion of the recycled water is used for groundwater recharge. In the Central and West Coast Groundwater Basins, recycled water is used extensively by the Water Replenishment District of Southern California for groundwater recharge and to maintain seawater intrusion barriers. An innovative form of recycling is practiced by the City of Santa Monica using its Santa Monica Urban Runoff Recycling Facility, which collects and treats 90% of the City's urban runoff in the dry season for use in landscape irrigation.

Substituting potable water with recycled water is another means of increasing recycled water use and reducing dependence on imported water supplies. This may be achieved by developing an indirect potable use program similar to the one initiated by the Orange County Water District.

SNMPs should include goals and objectives for water recycling. As part of developing these goals, it may be helpful to examine master plans for water recycling that have been developed by recycled water producers, distributors, and municipalities, as well as Urban Water Management Plans.

Stormwater Use

Another goal of the Policy, with the intent of increasing sustainable local water supplies, is to increase the use of stormwater over the levels in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.The Policy recognizes that stormwater is typically lower in nutrients and salts and can augment local water supplies, and therefore deems the inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans to be critical to the long-term sustainable use of water in California. In support of this, the State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

The Regional Water Board also recognizes stormwater as a valuable resource and contains a requirement in its Municipal Separate Stormwater Systems (MS4) permits that new developments and significant redevelopments retain stormwater onsite using low impact development (LID) best management practices (BMPs), with an allowance for regional and other alternative compliance approaches. MS4 permits require that land development projects be designed to infiltrate, harvest and use, evapotranspire, or bio-treat a specified volume of stormwater onsite using LID BMPs, if technically feasible. The intent of this requirement is twofold – first, to achieve improvements in water quality by preventing pollutants conveyed by stormwater from being discharged to receiving waters and, second, to increase the use of stormwater for groundwater recharge.

Since new developments and redevelopments will not necessarily occur in areas where infiltration or recharge is feasible, it is important that stormwater use be considered on a regional scale to maximize the potential for stormwater infiltration and use. Basin stakeholders are encouraged to consider such an approach in developing their implementation strategies for increasing stormwater use.

E. IMPLEMENTATION MEASURES

As stated in the Policy, *"[e]ach SNMP shall include implementation measures to manage salt and nutrient loading in the basin on a sustainable basis."*

Implementation strategies should integrate water quantity and quality, groundwater and surface water, and recharge area protection in order to maintain a sustainable long-term supply for multiple beneficial uses. These strategies will be dictated to a large degree by basin-specific characteristics and conditions. Depending on conditions within each basin/sub-basin, strategies may generally be geared towards:

a) Pollution prevention to maintain and protect ground water quality at levels consistent with Basin Plan objectives and the State's anti-degradation policy;
b) Source load reductions to groundwater basins;
c) Treatment and management of areas of impaired water quality;
d) Increasing groundwater recharge by storm water; and
e) Increasing recycled water use.

Based on water quality conditions within a basin and the results of the source loading and fate and transport analysis, salts and nutrients from identifiable non-point and point sources should be managed in a manner that will support attainment of applicable water quality objectives. Measurable parameters should be identified for evaluation of the effectiveness of the strategies, and an implementation schedule and monitoring program should be developed to track progress toward basin management goals. Implementation measures may also include, as appropriate, strategies for local water supply development including increasing the use of recycled water, and plans for stormwater retention for use or recharge.

The consideration of implementation alternatives should take into account the interest of all parties currently involved in basin use and management in order to resolve any potential competing or conflicting interests prior to finalizing the basin management approach. To the greatest extent feasible, input from all stakeholders and interested parties should be solicited as part of the development process.

The Regional Water Board recognizes that a number of agencies have developed basin management plans for specific basins; while others have developed specific management measures for salt and/or nutrient impairments. Existing basin or sub-basin management plans and salt and nutrient management strategies should be assessed to determine their applicability towards the SNMP requirements of the Policy. For the purpose of SNMP development, these efforts may be supplemented as necessary to provide missing elements or address inconsistencies and demonstrate compliance with SNMP requirements. In instances where water quality from a sub-basin or basin may impact or be impacted by that of adjacent basins, all stakeholders concerned are encouraged to collaborate in developing salt and nutrient management strategies.

F. ANTI-DEGRADATION REQUIREMENTS

As stated in the Policy, *"[e]ach Salt and Nutrient Management Plan shall include an antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16."*

Resolution No. 68-16 is the State Water Board's "Statement of Policy with respect to Maintaining High Quality of Waters in California" also known as the State Anti-degradation Policy. It requires that:

> *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*

Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The intent of Resolution 68-16 is to preserve the State's high quality waters. Any activity that results in the discharge of waste must be subject to treatment or controls that assure that the discharge will not cause the receiving water to exceed water quality objectives set forth in the applicable Basin Plan or cause pollution or nuisance. In addition, the discharge should be controlled to achieve the highest water quality feasible. In other words, water quality should be the best it can be, but at least not exceed water quality objectives or impact beneficial uses. The water quality objectives are set forth in the Regional Water Board Basin Plans, the State Water Board's Sources of Drinking Water Policy, and the California Ocean Plan. The baseline water quality to maintain refers to the highest existing quality since Resolution No. 68-16 was adopted in 1968, although if a lowering of water quality was formally approved in the past, this could adjust the baseline.

In some instances, degradation of existing water quality may be allowed so long as such degradation is consistent with the maximum benefit to the people of the state. Modification of existing water quality through the development of site specific objectives should only be considered when all other salt and nutrient management alternatives have been exhausted; and even so should be part of a larger salt and nutrient load reduction strategy. Such changes to water quality objectives may only occur where the existing water quality is better than that required to support the most sensitive beneficial use(s) of the basin (i.e. where there is assimilative capacity). Basin-wide management strategies should always be developed in a manner that would be protective of the most sensitive beneficial uses within a basin.
Where project(s) within SNMPs have the potential to degrade the water quality within a basin, stakeholders are required to conduct an anti-degradation analysis. The rigor of the analysis required depends on the nature and extent of the potential degradation. The guidelines and requirements for such analysis are provided below and parallel, to a large extent, those provided in the Policy for basins where plans are yet to be completed. This analysis will be part of the supporting documentation for the Basin Plan amendment incorporating the implementation plan(s) consistent with implementation measures identified in the SNMP. Implementation projects must be demonstrated to be consistent with Resolution 68-16 as supported by the anti-degradation analysis conducted as part of SNMP development.

The Policy recognizes that groundwater recharge and landscape irrigation projects are to the benefit of the people of the state, despite having the potential to lower water quality within the basin. As such, the Policy provides a threshold below which less rigorous analysis will be conducted for the anti-degradation analysis – during the period before SNMPs have been developed.
The Regional Water Board will apply the same considerations, on a basin-wide scale, once SNMPs are in place.

(1) Generally, a basin-wide implementation strategy that utilizes less than 20 percent of the available assimilative capacity in a basin/sub-basin need only conduct an anti-degradation analysis verifying the use of the assimilative capacity. For those basins /sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board. The available assimilative capacity shall be calculated by comparing the water quality objectives with the average concentration of the basin/sub-basin[7], either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. Though the Policy expresses assimilative capacity in units of concentration, the Regional Water Board recognizes that, depending on the complexity of the basin, it may be more appropriate to calculate and express assimilative capacity as a load. Historical groundwater quality data will be reviewed in order to inform decisions about assimilative capacity and conclusions drawn about anti-degradation requirements. In determining whether the available assimilative capacity will be exceeded by the basin-wide implementation strategy, the Regional Water Board will consider the impacts of the strategy over at least a ten-year time frame, based on an analysis of these impacts provided by the project proponent(s), and other relevant data and information.

(2) In the event a basin wide implementation strategy utilizes more than 20 percent of the available assimilative capacity in a basin/sub-basin), a more rigorous anti-degradation analysis shall be performed to comply with Resolution No. 68-16. Proponents of the strategy shall provide sufficient information for the Regional Water Board to make this determination.

    In addition to verification of the assimilative capacity to be used, the analysis should show:

    a) That the strategy is necessary to accommodate important economic or social development;
    b) Any reduction in water quality will be consistent with maximum benefit to people of the State;
    c) Reduction in water quality will not unreasonably affect actual or potential beneficial uses; and
    d) Water quality will not fall below water quality objectives set to protect beneficial uses as prescribed in the Basin Plan.

The severity and extent of water quality reduction will be considered when evaluating the benefits required to compensate for the degradation. The magnitude of the proposed strategy and potential reduction in water quality will also determine the scope of impact assessment. The Regional Water Board will ensure that a systematic impact assessment is conducted.

Factors that should be considered when determining whether a strategy is necessary to accommodate social or economic development and is consistent with maximum benefit to the people of the State, include:

1. Past, present, and probable beneficial uses of the water.

[7] More than one average concentration may be necessary for a given basin/sub-basin to fully evaluate variability between sub-areas or sub-basins.

2. Economic and social costs, tangible and intangible, of the proposed strategy compared to benefits. The economic impacts to be considered may include the cost of alternative actions in lieu of the proposed strategy, as well as the cost of any mitigation necessary to address degradation resulting from the proposed strategy. The long-term and short-term socioeconomic impacts of maintaining existing water quality must be considered. Examples of social and economic parameters that could be affected are employment, housing, community services, income, tax revenues, and land value. To accurately assess the impact of the proposed strategy, the projected baseline socioeconomic profile of the affected community without the strategy should be compared to the projected profile with the strategy.
3. The environmental aspects of the proposed discharge must be evaluated. The proposed discharge, while actually causing a reduction in water quality in a given water body, may be simultaneously causing an increase in water quality in a more environmentally sensitive body of water from which the discharge in question is being diverted.
4. The implementation of feasible alternative control measures, which might reduce, eliminate, or compensate for negative impacts of the proposed action.

Participation from the public and appropriate government agencies should be solicited in the “maximum benefit” determination to ensure that the environmental, social, and economic impacts of the strategy are accurately assessed.

The Regional Water Board will ultimately make the decision as to whether or not it is to the maximum benefit of the people of the State to use more than 20% of the assimilative capacity of a basin or sub-basin as part of a SNMP’s implementation strategy. Consideration will be given to providing buffers for varying environmental conditions such as droughts, as well as the needs of future generations.

Where no assimilative capacity exists for salts and/or nutrients within a basin/sub-basin, stakeholders may explore and implement strategies for creating such assimilative capacity. As previously mentioned, modifying water quality objectives should only be considered where all other alternatives have been exhausted and then only as part of a larger comprehensive salt and nutrient reduction strategy. Any modifications to water quality objectives shall be done in a manner that protects the most sensitive beneficial uses in a basin/ sub-basin.

The Policy includes an example of an approved method for conducting an anti-degradation analysis based on a numeric groundwater model. It was used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. However, stakeholders have the flexibility to use other methods that have been deemed acceptable by the Regional Board. SNMP proponents should vet any such other methods with Regional Board staff prior to embarking on an analysis using the method. The Policy also encourages an integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16.

An anti-degradation analysis will not be required where it has been demonstrated that implementation strategies are not expected to result in water quality degradation in a groundwater basin.

E. Discharges covered by the Recycled Water Policy

The Policy is specifically geared towards increasing the use of recycled water from municipal wastewater sources permitted through Wastewater Recycling Requirements (WRRs). Land discharges of wastewater are addressed through separate Waste Discharge Requirements (WDRs), however, this does not preclude them from the SNMP development process. Such discharges (existing and proposed) should be accounted for in determining source loading estimates, determination of assimilative capacity, and in basin management planning. In the same vein, recycled water projects already in progress should be considered during the same phases of SNMP development.

5. CEQA REQUIREMENTS

The Policy requires that salt and nutrient management plans developed for basin/sub-basins comply with the applicable California Environmental Quality Act (CEQA) requirements. The following outlines the CEQA requirements for the Regional Board adoption of SNMP implementation strategies into the Water Quality Control Plan for the Los Angeles Region (Basin Plan). SNMP proponents may be required to comply with other CEQA requirements related to specific implementation strategies for salt and nutrient management contained in their plans. SNMP proponents are to conduct the environmental analysis required for Regional Board adoption.

The CEQA requires state and local agencies determine the potential significant environmental impacts of proposed projects and identify measures to avoid or mitigate these impacts where feasible. The CEQA Guidelines, which provide the protocol by which state and local agencies comply with CEQA requirements, are detailed in California Code of Regulations, Title 14 § 15000 et seq.

The basic purposes of CEQA are to: 1) inform decision makers and public about the potential significant environmental effects of a proposed project, 2) identify ways that environmental damage may be mitigated, 3) prevent significant, avoidable damage to the environment by requiring changes in projects, through the selection of alternative projects or the use of mitigation measures when feasible, and 4) disclose to the public why an agency approved a project if significant effects are involved (Cal. Code Regs., tit. 14, § 15002(a)).

LEAD AND RESPONSIBLE AGENCIES UNDER CEQA

As set forth in the Policy, stakeholders will fund SNMP development including any necessary analysis and documentation to comply with CEQA. Stakeholders will develop implementation strategies, which may include projects requiring environmental analysis. Public agencies that carry out or implement projects associated with the SNMPs are considered the lead agencies under CEQA for these individual projects. However, in addition, the implementation measures identified in a SNMP may be adopted as amendments to the Basin Plan by the Regional Water Board, and CEQA analysis is a required part of the adoption process in accordance with the State Water Board's certified regulatory program. As such, for the purpose of Water Board adoption of a Basin Plan amendment, the Regional Water Board will be the lead agency for purposes of CEQA. Therefore, it will be necessary for stakeholders and Regional Water Board staff to work in collaboration.

REQUIRED ENVIRONMENTAL ANALYSIS

The California Secretary for Natural Resources has certified the State and Regional Water Boards' basin planning process as exempt from certain requirements of CEQA, including preparation of an initial study, negative declaration, and environmental impact report (California Code of Regulations, Title 14, Section 15251(g)).

The basin planning process is certified by the Secretary for Natural Resources as a regulatory program exempt from the requirements to prepare an Environmental Impact Report, Negative Declaration, and Initial Study (Title 14, California Code of Regulations (CCR), Section 15241(g)). However, a certified program is subject to other provisions in CEQA (Pub. Resources Code, Section 21000 et seq.), such as the requirement to avoid significant adverse effects to the environment where feasible. The Regional Board is required to comply with State Water Board regulations set forth in California Code of Regulations, Title 23, sections 3775 et. seq, and Public Resources Code section 21159.

Requirements of California Code of Regulations, Title 23, Section 3777(a)

The "certified regulatory program" of the Regional Water Board is also subject to the substantive requirements of California Code of Regulations, Title 23, Section 3777(a), which requires a written report that includes a description of the proposed activity, an analysis of reasonable alternatives, and an identification of mitigation measures to minimize any significant adverse environmental impacts. Section 3777(a) also requires the Regional Water Board to complete an environmental checklist as part of its substitute environmental documents.

Any water quality control plan, state policy for water quality control, and any other components of California's water quality management plan as defined in Code of Federal Regulations, title 40, sections 130.2(k) and 130.6, proposed for board approval or adoption must include or be accompanied by Substitute Environmental Documentation (SED) and supported by substantial evidence in the administrative record. The Draft SED may be comprised of a single document or a compilation of documents. The Draft SED must be circulated prior to board action approving or adopting a project, as specified in sections 3778 and 3779. The Draft SED shall consist of:

a) A written report prepared for the board, containing an environmental analysis of the project;
b) A completed Environmental Checklist (a sample of which is contained in Appendix II). The sample Environmental Checklist may be modified as appropriate to meet the particular circumstances of a project. The issues identified in the Environmental Checklist must be evaluated in the checklist or elsewhere in the SED; and
c) Other documentation as the board may include.

The Draft SED shall include, at a minimum, the following information:

a) A brief description of the proposed project;
b) An identification of any significant or potentially significant adverse environmental impacts of the proposed project;
c) An analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts; and
d) An environmental analysis of the reasonably foreseeable methods of compliance. The environmental analysis shall include, at a minimum, all of the following:
    i. An identification of the reasonably foreseeable methods of compliance with the project;

ii. An analysis of any reasonably foreseeable significant adverse environmental impacts associated with those methods of compliance;
iii. An analysis of reasonably foreseeable alternative methods of compliance that would have less significant adverse environmental impacts; and
iv. An analysis of reasonably foreseeable mitigation measures that would minimize any unavoidable significant adverse environmental impacts of the reasonably foreseeable methods of compliance.

In the preparation of the environmental analysis described in d) above, the board may utilize numerical ranges or averages where specific data are not available; however, the board shall not be required to engage in speculation or conjecture. The environmental analysis shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites, but the board shall not be required to conduct a site-specific project level analysis of the methods of compliance, which CEQA may otherwise require of those agencies who are responsible for complying with the plan or policy when they determine the manner in which they will comply.

As to each environmental impact, the SED shall contain findings as described in State CEQA Guidelines section 15091, and if applicable, a statement described in section 15093.

If the board determines that no fair argument exists that the project could result in any reasonably foreseeable significant adverse environmental impacts, the SED shall include a finding to that effect in lieu of the analysis of project alternatives and mitigation measures.

If the board determines that no fair argument exists that the reasonably foreseeable methods of compliance with the project could result in any reasonably foreseeable significant adverse environmental impacts, the SED shall include a finding to that effect in lieu of the analysis of alternative methods of compliance and associated mitigation measures.

Requirements of Public Resources Code section 21159

Public Resources Code section 21159 has the same minimum requirements for the environmental analysis which the Regional Water Board is also required to fulfill along with the same considerations. Section 21159(c) requires that the environmental analysis take into account a reasonable range of:

a) Environmental, economic, and technical factors,
b) Population and geographic areas, and
c) Specific sites.

A "reasonable range" does not require an examination of every site, but a reasonably representative sample of them. The statute specifically states that the section shall not require the agency to conduct a "project-level analysis" (Public Resources Code § 21159(d)). Rather, a project-level analysis must be performed by the local agencies that will implement the strategies and projects identified in the SNMP (Public Resources Code §21159.2). Notably, the Regional Water Board is prohibited from specifying the manner of compliance with its regulations (Cal. Water Code §13360), and accordingly, the actual environmental impacts will necessarily depend upon the compliance strategy selected by the local agencies and other permittees.

State Water Board Finding

As set forth in the Policy, the State Water Board finds that the use of recycled water which supports the sustainable use of groundwater and/or surface water that is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the CEQA.

Public Participation Requirements for the CEQA Process

Pursuant to California Public Resources Code section 21083.9, a CEQA Scoping Meeting will be held to receive comments on the appropriate scope and content of substitute environmental documents supporting amendments to the Basin Plan to incorporate salt and nutrient management plans for groundwater basins in the Los Angeles Region. The purpose of this meeting is to scope the proposed projects and/or strategies for groundwater basin management and to determine, with input from interested agencies and persons, if those means would result in significant adverse impacts to the environment. Information garnered from this process will be considered during development of the draft SED and, where applicable, may be incorporated into the final document.

ROLES OF STAKEHOLDER GROUPS AND REGIONAL WATER BOARD STAFF IN THE CEQA PROCESS

Both Regional Water Board staff and stakeholder groups will be significantly involved in the environmental analysis for the SNMPs. Table 5-1 lists the different aspects of the CEQA process and identifies the roles of each party.

TABLE 5-1: ROLES OF STAKEHOLDERS AND REGIONAL WATER BOARD STAFF IN THE CEQA PROCESS FOR BASIN PLAN AMENDMENTS

TASK	REGIONAL WATER BOARD	STAKEHOLDERS
LEAD AGENCY	Lead	
CEQA SCOPING MEETING	Co-Lead	Co-Lead
ENVIRONMENTAL ANALYSIS	Oversight	Lead
SED DEVELOPMENT	Oversight	Lead
DOCUMENT REVIEW	Lead	
RESPONSE TO COMMENTS	Lead - Regulatory	Lead - Technical
REVISIONS	Oversight/Review	Lead
PUBLIC HEARING	Lead	
PROJECT LEVEL EIR		Lead

The CEQA scoping meeting will be held jointly by Regional Water Board staff and stakeholder groups, while the environmental analysis will be conducted primarily by the groundwater basin stakeholder groups with oversight and review by Regional Water Board staff. Following the release of the draft environmental document for public review, it is anticipated that there will be comments on its technical and regulatory aspects. The Regional Water Board will take the lead in responding to the regulatory comments, while stakeholders will be the lead for responding to technical comments. Any revisions necessary in response to public comments will be the purview of the stakeholder groups with oversight by Regional Water Board staff. Preparation of the environmental documentation for consideration and adoption by the Regional Water Board will be the responsibility of Regional Water Board and staff. Finally, once the SNMPs have been adopted and specific projects are to be implemented, basin stakeholders will be responsible for the development of project-specific environmental analysis and other related CEQA requirements.

TIMELINE FOR THE CEQA PROCESS IN RELATION TO SNMP DEVELOPMENT

The SED will be considered by the Regional Water Board as part of the adoption of the implementation provisions contained in the SNMPs. Approval of the SED is separate from approval of a specific project alternative or a component of an alternative. Approval of the SED refers to the process of: (1) addressing comments, (2) confirming that the Regional Water Board considered the information in the SED, and (3) affirming that the SED reflects independent judgment and analysis by the Regional Water Board - CEQA Guidelines Section 10590 and 15090 (Title 14 of CCR).

Stakeholders are encouraged to begin the CEQA process once potential basin management strategies have been identified during SNMP development. The CEQA scoping meeting should be held early enough in the process for consideration of public comments during the development of the substitute environmental document. Ideally the SED should be completed at the same time as the SNMP for timely consideration and adoption by the Regional Water Board.

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6. BOARD ADOPTION OF SNMPS

As stated in the Policy: *Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.*

Stakeholders are encouraged to complete and submit SNMPs for each basin by May 2014 as specified in the Policy. However, the Policy allows for an extension where significant progress has been made but this deadline cannot be met. For this purpose, the Regional Water Board will consider "significant progress" as follows: (i) upon completion of a collaborative stakeholder developed basin wide monitoring plan that meets the requirements set forth in the Policy, (ii) completion of the salt/nutrient source identification, loading and linkage analysis, and (iii) commencement of the development of implementation strategies for basin management. Stakeholders will also be required to make a showing that completion by the May 2014 deadline is infeasible. SNMPs that have not achieved significant progress may warrant greater Regional Board involvement or Regional Board developed plans, and will be addressed on a case-by-case basis.

Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

The Regional Water Board expects to adopt the implementation provisions of each SNMP within one year of submission by basin/sub-basin stakeholders. State Water Board staff have provided templates for these Basin Plan amendments (see Appendix I) as a guide to the scope of information to be provided in the amendment language. Table 6-1 provides a tentative schedule of stakeholder tasks and submissions.

TABLE 6-1: TENTATIVE SCHEDULE OF STAKEHOLDER SUBMISSIONS

Tasks	Date
CEQA Scoping Meeting	June 2013
Initial Draft SNMP & CEQA submittal	November 2013
Final Draft SNMP & CEQA submittal	May 2014
Regional Water Board Consideration and Adoption	May 2015 and beyond

Regional and State Water Board Resources

Regional Water Board staff expects to continue working collaboratively with groundwater basin stakeholders during the SNMP development process, as well as through the Board adoption process. In addition to staff assigned for this purpose, the following resources are available to stakeholders to facilitate the process.

Regional Water Board SNMP website:

www.waterboards.ca.gov/losangeles/water_issues/programs/salt_and_nutrient_management/index.shtml

SNMP E-mail list subscription:
http://www.waterboards.ca.gov/resources/email_subscriptions/reg4_subscribe.shtml

Groundwater Ambient Monitoring and Assessment (GAMA) website:
www.waterboards.ca.gov/losangeles/water_issues/programs/sgama/geotracker_gama.html

State Water Board website:
http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/index.shtml

7. REFERENCES

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APPENDIX C

PRECIPITATION ON THE VALLEY FLOOR, MOUNTAIN WATERSHED, AND LOW HILLS WATERSHED

APPENDIX C. PRECIPITATION ON THE VALLEY FLOOR, MOUNTAIN WATERSHED, AND LOW HILLS WATERSHED

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	Annual precipitation at recording stations, inches																											
Water Year	San Gabriel Valley Floor										San Gabriel Mountains												San Gabriel Low Hills					
(Oct-Sept)	95	108	167	387	610	742	1037	1041	1140	mean	63	68	89	144	223	235	334	338	390	425	683	mean	96	201	356	1114	1260	mean
	in/yr									- in/yr -	in/yr											- in/yr -	in/yr					- in/yr -
1920/21																									17.87			17.87
1921/22																									23.29			23.29
1922/23																									12.48			12.48
1923/24																									10.21			10.21
1924/25					12.85					12.85															10.61			10.61
1925/26					22.42					22.42															18.61			18.61
1926/27					25.13					25.13		30.04										30.04		23.26	21.60			22.43
1927/28	14.47	12.92			13.59					13.66	16.37	15.28	14.90									15.52	14.66	16.64	15.03			15.44
1928/29	13.94	14.41	16.93		16.42					15.43	24.04	20.18	18.20	19.42								20.46	14.03	14.59	12.49			13.70
1929/30	15.16	13.90	16.69		15.79					15.39	21.85	18.19	19.33	19.44	22.26	20.89						20.33	13.49	13.43	13.80			13.57
1930/31	15.65	15.80	17.93		17.63					16.75	19.10	20.22	18.51	17.79	20.85	22.18			19.75			19.77	12.45	15.14	12.57			13.39
1931/32	22.56	19.22	24.23		22.37					22.10	28.13	31.28	26.59	27.69	28.63	27.74			30.59			28.66	20.88	18.74	19.55			19.72
1932/33	11.96	11.54	15.05		16.16					13.68	17.13	16.08	12.99	17.35	15.00	21.01	25.70		17.25			17.81	10.39	11.95	11.16			11.17
1933/34	20.61	18.75	21.97		21.38					20.68	22.40	24.23	24.59	23.76	25.10	24.12	27.16	30.68	26.57			25.40	19.20	16.21	14.00			16.47
1934/35	25.16	22.52	26.73	14.20	26.98					23.12	28.70	25.41	27.50	30.02	30.91	33.04	43.79	45.73	31.64			32.97	22.68	22.72	21.16			22.19
1935/36	15.69	13.16	17.80	14.03	15.73					15.28	20.29	19.91	21.05	20.79	21.57	23.79	24.07	28.72	23.29			22.61	14.55	13.88	11.69			13.37
1936/37	31.45	24.62	32.39	24.31	28.79					28.31	36.26	34.00	36.27	36.98	39.80	41.78	50.01	53.21	39.73			40.89	27.71	28.17	24.43			26.77
1937/38	28.28	25.09	32.92	24.95	31.39					28.53	36.97	39.83	36.76	39.22	40.44	42.47	55.34	58.89	40.62	44.33		43.49	27.34	26.09	24.54			25.99
1938/39	18.35	16.84	22.35	18.30	23.71					19.91	26.59	26.00	20.44	25.04	24.87	30.44	34.59	39.60	26.96	29.41	3.30	26.11	18.39	16.78	19.17			18.11
1939/40	16.11	13.78	14.98	14.43	17.05	14.38				15.12	21.22	20.46	18.65	19.49	21.45	22.09	23.02	27.84	21.19	20.11	19.74	21.39	14.58	14.01	12.98			13.86
1940/41	38.77	37.02	41.71	33.39	46.41	37.79				39.18	47.59	46.83	37.71	48.85	46.24	55.42	69.92	74.13	50.20	53.30	53.34	53.05	36.96	35.19	33.72			35.29
1941/42	12.61	13.23	14.75	11.50	15.13	14.51				13.62	18.24	18.32	14.62	16.88	16.16	19.06	20.57	21.84	17.50	17.59	16.48	17.93	12.31	13.73	12.45			12.83
1942/43	28.49	21.69	33.63	22.96	32.83	25.97				27.60	48.63	42.24	35.49	45.65	39.19	48.99	60.09	64.85	42.10	47.56	46.00	47.34	23.89	22.77	23.20			23.29
1943/44	21.42	20.38	24.19	20.47	25.55	22.05				22.34	28.60	29.76	25.00	27.30	29.78	34.55	45.73	42.50	29.49	33.23	29.69	32.33	18.78	19.96	10.14			16.29
1944/45	19.40	13.38	17.04	16.95	16.87	13.99				16.27	16.06	24.31	24.96	21.37	29.30	23.86	24.64	32.61	26.13	28.89		25.21	17.01	15.01	16.83			16.28
1945/46	16.05	13.07	15.81	14.61	16.50	13.91				14.99	20.21	21.58	19.37	20.13	23.70	22.38	34.93	33.25	26.81	28.88	20.73	24.72	14.98	15.22	15.31			15.17
1946/47	15.07	14.91	20.31	14.56	20.94	18.77				17.43	24.17	25.84	20.69	25.28	25.73	30.02	35.54	40.99	26.19	29.31	26.89	28.24	14.30	15.71	12.81			14.27
1947/48	10.53	9.88	10.92	10.16	10.50	9.90				10.32	12.24	13.33	11.63	12.60	14.60	13.52	16.43	18.73	12.91	13.88	12.16	13.82	10.31	10.30	8.61			9.74
1948/49	12.32	10.33	12.29	11.47	12.25	10.39				11.51	15.35	16.73	16.08	14.79	18.44	17.58	16.78	21.40	17.22	16.10	14.58	16.82	12.80	10.47	9.80			11.02
1949/50	14.00	13.46	16.12	12.14	15.66	13.88		13.60		14.12	19.07	20.25	17.93	19.75	20.81	21.31	21.46	25.72	19.58	20.61	17.05	20.32	14.08	13.14	11.57			12.93
1950/51	9.63	8.64	11.21	9.15	11.06	8.60	11.14	8.92		9.79	13.95	14.85	11.71	13.05	13.53	12.69	11.76	14.19	13.15	12.69	11.61	13.02	9.53	9.74	8.89			9.39
1951/52	29.01	27.38	35.06	28.15	36.75	32.63	34.76	28.35		31.51	40.00	41.74	34.41	38.29	41.87	44.17	54.99	57.17	42.46	49.19	37.47	43.80	27.45	32.26	26.93			28.88
1952/53	12.54	11.04	13.54	10.36	13.85	12.55	13.05	10.02		12.12	16.07	16.12	15.07	14.83	16.09	15.37	17.95	20.98	15.89	16.71	12.18	16.11	11.87	11.87	11.78			11.84
1953/54	17.50	13.97	17.34	15.63	16.47	14.55	16.57	12.95		15.62	20.52	19.75	21.30	19.62	23.39	21.75	27.67	28.28	22.62	25.60		23.05	16.45	16.94	16.10			16.50
1954/55	13.29	13.92	14.82		16.05	12.68	13.94	11.83		13.79	17.57	19.78	15.08	17.95	18.21	19.78	24.46	25.95	18.18	19.88		19.68	12.17	12.80	13.02			12.66
1955/56	16.44	17.63	19.12		18.66	17.74	18.64	16.32		17.79	21.26	22.61	19.43	21.48	22.40	22.07	22.96	27.99	24.43	24.32	18.40	22.49	15.84	17.82	14.53			16.06
1956/57	14.62	14.54	15.82		15.63	12.30	15.10	12.51		14.36	19.08	20.01	17.35	18.00	20.28	20.13	21.72	25.40	20.57	21.82	16.48	20.08	12.62	12.02	10.98	7.76		10.85
1957/58	34.25	27.73	33.67	29.56	30.88	27.65	31.09	26.69		30.19	34.66	36.28	39.88	35.05	44.62	37.53	55.29	57.23	39.93	45.95	33.10	41.77	31.92	28.52	28.91	24.82		28.54
1958/59	9.58	7.56	11.25	8.56	9.96	8.71	11.60	8.86		9.51	12.23	13.08	10.91	12.99	13.54	12.32	17.96	17.01	14.48	15.82	10.81	13.74	8.04	8.38	8.23	6.45		7.78
1959/60	10.35	11.50	11.24	10.39	9.58	10.56	11.35	8.77		10.47	13.28	14.02	12.50	12.73	14.51	13.11	15.79	16.94	14.17	14.24	9.96	13.75	10.18	10.62	10.11	9.74		10.16
1960/61	5.99	5.69	7.02	5.69	7.28	6.13	6.89	5.23	5.04	6.11	8.58	9.24	8.82	8.75	9.57	9.63	11.84	12.50	10.30	11.57	8.18	9.91	6.33	5.89	5.53	5.26		5.75
1961/62	20.80	24.31	26.44	19.52	24.24	22.47	25.89	22.64	22.45	23.20	27.61	31.58	23.23	30.37	26.89	29.56	46.62	45.90	31.51	33.73	21.44	31.68	19.52	23.74	17.57	19.84		20.17
1962/63	12.53	11.49	12.87	11.71	11.69	11.28	13.31	10.98	11.07	11.88	16.40	17.38	16.12	16.52	18.47	17.41	19.06	22.71	16.64	17.37	15.50	17.60	11.50	12.77	13.03	9.41		11.68
1963/64	10.20	8.87	13.95	8.86	10.51	10.36	12.94	10.30	9.65	10.63	15.59	15.64	13.70	16.13	15.02	15.10	18.01	20.15	14.47	15.73	12.16	15.61	9.22	10.11	8.81	7.77		8.98
1964/65	15.95	15.11	18.91	15.43	16.30	16.24	17.41	14.17	13.85	15.93	25.11	24.61	18.32	23.42	21.56	25.29	24.69	34.34	20.98	22.32	19.10	23.61	14.41	16.47	15.33	13.01		14.81
1965/66	18.14	19.67	25.71	18.12	24.18	22.04	24.90	19.80	21.17	21.53	32.37	31.59	23.60	32.86	27.66	38.46	48.11	56.30	31.43	39.56	36.04	36.18	16.59	18.50	15.50	18.95		17.39
1966/67	25.96	25.19	30.94	23.01	26.05	25.64	28.96	24.93	23.66	26.04	37.38	39.68	38.82	34.23	44.85	36.23	50.89	55.95	42.21	47.42	29.84	41.59	24.16	24.94	22.38	20.86		23.09
1967/68	14.93	14.48	13.77	13.42	16.07	13.26	13.43	13.74	14.59	14.19	16.63	19.44	15.95	16.25	17.80	17.95	23.75	26.30	16.37	19.04	19.90	19.03	14.71	14.05	13.66	11.63		13.51
1968/69	32.55	27.91	40.80	30.34	32.76	33.99	38.98	30.63	31.06	33.22	62.15	52.47	45.70	53.01	52.00	55.82	78.97	81.54	53.65	65.09	46.63	58.82	30.76	31.34	28.23	25.90		29.06
1969/70	11.38	10.77	14.54	10.72	11.42	12.22	13.99	12.96	12.03	12.23	19.21	20.15	13.52	17.20	16.48	17.42	23.98	21.37	18.12	20.35	15.63	18.49	11.51	11.04	11.57	9.38		10.88
1970/71	12.57	13.19	16.79	11.95	15.78	13.71	15.41	14.06	13.20	14.07	23.75	21.02	16.95	20.57	18.41	23.18	26.35	27.70	19.04	21.16	20.72	21.71	11.97	13.47	11.05	12.88		12.34
1971/72	9.29	8.55	8.60	8.84	8.76	8.85	8.10	7.95	7.81	8.53	11.98	10.86	10.40	10.40	12.48	11.31	16.27	13.25	10.60	13.15	10.67	11.94	9.04	8.90	8.11	6.82		8.22
1972/73	21.77	21.24	27.68	19.30	25.80	24.52	26.20	22.00	20.86	23.26	34.72	30.97	25.22	30.47	29.35	34.06	44.86	38.95	31.94	36.24	25.94	32.97	20.97	21.10	20.86	20.32		20.81
1973/74	16.08	16.69	18.91	15.17	18.70	17.11	17.56	15.58	15.77	16.84	25.62	24.08	19.09	23.05	22.44	28.23	28.34	37.01	23.00	25.33	22.50	25.34	15.05	16.04	14.78	13.63		14.88
1974/75	15.96	13.39	15.85	12.88	15.49	15.20	15.04	13.76	15.00	14.73	21.11	21.05	19.61	19.09	21.29	23.26	25.44	28.24	20.91	21.80	17.56	21.76	14.57	14.12	13.65	11.89		13.56
1975/76	12.04	11.47	16.00	10.81	13.77	14.15	15.19	11.13	12.26	12.98	19.98	20.20	15.86	20.23	19.95	25.96	26.90	31.53	17.77	20.33	19.37	21.64	10.92	13.10	11.07	10.48		11.39
1976/77	16.32	12.98	15.80	13.10	15.64	14.44	14.82	12.62	13.41	14.35	18.60	21.10	16.96	17.37	19.53	21.21	24.52	22.33	17.18	18.80	17.63	19.57	14.75	12.10	14.63	10.40		12.97
1977/78	41.53	35.01	45.74	37.70	41.59	39.61	40.17	37.93	38.72	39.78	55.71	55.39	51.42	54.00	56.15	59.12	83.69	79.34	56.89	62.60	47.66	60.18	39.06	40.00	35.65	32.01		36.68

APPENDIX C. PRECIPITATION ON THE VALLEY FLOOR, MOUNTAIN WATERSHED, AND LOW HILLS WATERSHED

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	Annual precipitation at recording stations, inches																											
Water Year	San Gabriel Valley Floor										San Gabriel Mountains												San Gabriel Low Hills					
(Oct-Sept)	95	108	167	387	610	742	1037	1041	1140	mean	63	68	89	144	223	235	334	338	390	425	683	mean	96	201	356	1114	1260	mean
1978/79	24.07	22.33	22.84	22.97	24.61	22.86	21.48	20.61	20.05	22.42	26.92	27.56	26.29	25.86	29.40	29.97	40.28	47.79	28.11	30.39	22.94	30.50	23.45	25.80	21.57	19.45		22.57
1979/80	36.24	33.62	40.95	30.81	39.63	34.59	35.10	32.46	32.72	35.12	51.09	49.47	42.96	47.29	48.35	51.56	60.43	55.81	50.42	58.22	39.13	50.43	33.76	30.00	31.36	27.90		30.76
1980/81	10.33	9.44	11.72	10.86	11.67	11.65	10.44	9.54	9.83	10.61	14.72	13.98	12.05	13.61	13.96	15.48	18.85	26.89	15.16	16.38	13.95	15.91	9.74	9.30	9.42	9.05		9.38
1981/82	22.08	16.72	23.38	18.71	20.56	14.46	18.73	16.22	16.34	18.58	28.79	28.79	26.68	26.31	31.66	30.08	37.61	40.03	30.46	33.70	26.12	30.93	19.94	15.20	17.24	13.66		16.51
1982/83	36.29	36.14	47.33	35.30	48.73	42.73	39.90	38.75	38.02	40.35	58.61	55.56	47.32	53.91	55.30	65.46	72.77	95.32	49.21	58.46	53.56	60.50	37.80	36.30	32.86	34.09		35.26
1983/84	10.50	8.78	12.82	9.44	11.28	9.27	10.82	8.35	8.19	9.94	19.87	16.77	15.19	17.54	15.19	16.01	19.62	23.99	14.14	15.63	13.40	17.03	10.67	11.10	9.25	8.53		9.89
1984/85	14.88	13.70	16.34	14.70	15.72	11.39	16.22	14.30	12.16	14.38	21.54	19.87	18.62	18.20	20.93	18.64	27.71	34.47	16.63	23.71	16.97	21.57	14.42	17.10	13.73	12.65		14.48
1985/86	22.97	20.39	26.11	19.83	24.28	24.06	23.76	21.56	27.33	23.37	32.90	31.47	27.94	28.16	30.91	30.54	41.14	49.42	29.36	34.19	29.88	33.26	23.33	23.90	20.73	18.82	21.25	21.61
1986/87	10.26	6.86	10.55	8.64	10.09	8.17	8.69	7.96	7.30	8.72	12.69	11.84	11.04	12.16	11.68	12.24	14.10		9.72	11.46	9.31	11.62	9.57	9.30	9.22	6.12	7.69	8.38
1987/88	16.65	13.31	21.14	15.05	17.74	16.96	16.93	15.24	13.39	16.27	27.82	26.42	23.20	25.92	26.81	27.58	38.13	45.52	24.38	30.13	19.99	28.72	16.79	15.90	13.38	11.06	13.72	14.17
1988/89	13.75	10.22	13.68	11.66	12.61	12.07	10.77	10.44	10.19	11.71	19.85	20.31	18.67	18.01	22.82	18.63	24.15	30.89	20.02	20.55	17.14	21.00	14.00	12.40	11.78	8.59	6.69	10.69
1989/90	12.04	11.41	12.34	11.21	11.62	11.34	11.56	9.37	10.35	11.25	17.90	16.25	13.61	14.89	15.95	15.78	17.13	19.69	12.87	15.42	13.43	15.72	12.11	11.00	9.62	10.04	10.36	10.63
1990/91	17.00	13.57	19.85	14.76	18.69	15.34	18.11	16.90	12.75	16.33	24.52	22.49	21.63	22.61	23.43	25.50	26.88	35.79	20.28	21.99	21.46	24.23	18.31	16.40	13.97	13.11	15.93	15.54
1991/92	20.02	18.02	27.08	22.42	30.61	23.43	23.43	20.61	16.57	22.47	36.04	34.30	28.21	35.92	32.59	44.88	52.35	48.69	31.12	36.66	32.59	37.58	24.27	22.70	20.96	17.41	20.48	21.16
1992/93	39.66	34.55	43.41	32.33	38.68	34.18	40.63	36.63	32.22	36.92	53.58	54.18	52.02	52.79	53.56	66.55	77.02	64.78	54.00	64.58	49.31	58.40	40.08	36.30	35.18	31.88	37.57	36.20
1993/94	13.81	9.91	13.54	10.99	10.95	10.55	12.67	10.54	12.01	11.66	17.36	16.31	15.13	16.77	17.13	16.69	18.92	20.03	14.38	16.95	18.64	17.12	12.44	11.80	10.89	10.53	10.47	11.23
1994/95	28.26	28.25	36.60	28.41	36.51	28.88	33.71	32.07	28.03	31.19	50.88	47.70	39.31	47.10	45.78	45.44	58.57	61.80	45.20	50.16	43.38	48.67	29.41	32.70	27.29	26.88	27.58	28.77
1995/96	17.46	15.07	21.13	14.30	16.59	16.03	19.48	17.08	16.02	17.02	29.41	29.29	21.73	28.64	25.66	22.64	25.37	34.39	26.02	27.86	21.44	26.59	15.89	16.40	12.96	15.69	13.34	14.86
1996/97	18.05	16.34	21.81	17.71	17.52	15.08	19.39	18.31	15.27	17.72	30.18	27.19	24.37	26.24	27.47	22.73	28.78	33.28	26.09	30.40	21.70	27.13	18.47	18.62	18.41	17.86		18.34
1997/98	33.82	35.91	40.28	33.29	39.02	37.74	38.98	35.47		36.81	48.80	47.81	41.31	48.43	49.29	52.29	67.41	64.38	46.47	54.64	38.45	50.84	35.84	35.81	35.01	36.84	37.69	36.24
1998/99	8.62	8.27	10.60	7.44	11.06	7.03	8.88	8.22		8.77	14.50	14.10	11.21	12.88	15.34	14.93	15.94	18.19	12.88	14.24	13.86	14.37	7.98	8.57	7.05	7.54	7.67	7.76
1999/00	14.22	14.44	15.95	13.10	18.28	13.93	15.28	15.27		15.06	20.71	19.59	17.80	18.17	20.17	18.82	29.41	31.96	18.62	21.11	20.02	21.49	14.30	13.48	11.87	12.18	13.12	12.99
2000/01	12.14	16.11	18.21	15.25	18.30	15.62	16.02	17.28		16.12	22.93	23.13	19.15	20.07	21.92	20.29	30.51	32.37	19.19	23.11	21.96	23.15	17.04	15.91	14.58	14.67	14.55	15.35
2001/02	5.96	6.22	7.37	6.52	7.82	6.47	7.30	7.16		6.85	9.81	11.72	10.33	9.63	10.60	7.88	9.80	13.26	9.63	10.93	9.78	10.31	6.60	6.01	5.48	4.65	5.54	5.66
2002/03	20.65	17.11	22.44	18.19	19.36	19.36	18.84	19.94		19.49	28.94	35.57	26.56	25.45	30.22	24.48	34.92	39.42	26.92	26.05	22.86	29.22	19.99	20.20	19.44	17.60	19.36	19.32
2003/04	14.26	11.25	16.84	10.58	13.56	11.46	12.03	12.88		12.86	16.71	20.08	14.12	16.86	15.94	16.79	22.57	12.47	15.55	18.07	13.88	16.64	12.77	12.24	12.99	11.38	12.78	12.43
2004/05	42.65	27.82	57.78	38.66	56.47		47.02	47.51		45.42	63.29	78.31	54.90	60.67	61.36	71.92	90.23	63.76	61.30	72.36	63.41	67.41	44.12	40.27	39.55	32.70	37.93	38.91
2005/06	15.64	12.42	22.71	13.33	17.56	16.24	17.68	17.26		16.61	28.53	34.33	22.90	24.85	27.98	26.64	30.23	17.86	23.31	28.18	21.95	26.07	16.25	13.94	13.61	13.28	13.90	14.20
2006/07	4.79	4.91	7.25	4.97	6.24	5.04	6.81	5.77		5.72	10.88	14.03	7.89	9.26	9.56	9.43	9.94	5.80	11.34	10.62	8.74	9.77	6.00	5.43	4.78	4.31	4.76	5.06
2007/08	17.30	14.64	21.17	14.29	20.77	13.07	15.28	21.06		17.20	28.06	20.35	23.97	26.93	24.45	29.10	36.98	24.17	26.92	31.81	25.40	27.10	16.17	12.63	13.45	14.67	12.85	13.95
2008/09	15.56	10.99	11.48	13.89	16.09	9.78	12.57	12.83		12.90	17.73	16.47	16.00		17.83	18.94	24.01	11.71	16.70	19.19	18.18	17.68	14.59	13.51	14.57	11.15	14.36	13.64
2009/10	20.76	16.78	21.66	18.74	25.11		16.29	19.20	22.47	20.13	30.56	24.81	25.37	28.81	27.05	31.95	45.83	38.71	28.06	33.42	6.22	29.16	20.04	16.53	18.27	17.03	17.96	17.97
2010/11	23.73	21.65	29.43	25.21	28.24			24.59	24.94	25.40	38.44	36.59	34.76	37.59	38.95	44.44	45.17	27.38	36.02	42.23		38.16	25.35	23.23	24.21	20.26	22.57	23.12
max	42.65	37.02	57.78	38.66	56.47	42.73	47.02	47.51	38.72	45.42	63.29	78.31	54.90	60.67	61.36	71.92	90.23	95.32	61.30	72.36	63.41	67.41	44.12	40.27	39.55	36.84	37.93	38.91
min	4.79	4.91	7.02	4.97	6.24	5.04	6.81	5.23	5.04	5.72	8.58	9.24	7.89	8.75	9.56	7.88	9.80	5.80	9.63	10.62	3.30	9.77	6.00	5.43	4.78	4.31	4.76	5.06
mean	18.50	16.63	21.28	17.03	20.36	17.30	19.19	17.43	17.63	18.57	26.25	26.25	22.89	25.23	26.25	27.67	34.37	36.07	25.87	28.97	22.98	27.28	17.84	17.67	16.34	15.29	16.80	16.84
2006-2011	16.43	13.79	18.20	15.42	19.29	9.30	12.74	16.69	23.71	16.27	25.13	22.45	21.60	25.65	23.57	26.77	32.39	21.55	23.81	27.45	14.64	24.37	16.43	14.27	15.06	13.48	14.50	14.75
2001-2011	18.13	14.38	21.81	16.44	21.12	11.63	17.09	18.82	23.71	18.26	27.30	29.23	23.68	26.67	26.39	28.16	34.97	25.45	25.58	29.29	21.16	27.15	18.19	16.40	16.64	14.70	16.20	16.43

Station Name

63 Santa Anita Dam - Debris Basin
68 Sawpit Dam
89 San Dimas Dam
95 San Dimas Fire Warden
96 Puddingstone Dam
108 El Monte Fire Station
144 Sierra Madre Dam

167 Arcadia Pumping Plant
201 Hacienda Heights Fire Station
223 Big Dalton Dam
235 Henninger Flats
334 Cogswell Dam
338 Mt. Wilson-Observatory
356 Cal Poly Pomona

387 Covina City Yard
390 Morris Dam
425 San Gabriel Dam
610 Pasadena City Hall
683 Sunset Ridge
742 San Gabriel Fire Station
1037 Arcadia Arboretum

1041 Santa Fe Dam
1114 Whittier Narrows Dam
1140 Rosemead Fire Station
1257 San Jose Creek Reclamation Plant
1260 Spadra Landfill

APPENDIX D

STREAMFLOW AT GAGING STATIONS

APPENDIX D. STREAMFLOW AT GAGING STATIONS (AF/YR)

column #	1	2	3	4	5	6	7	8	9	10	11 = sum(1 to 10)	12	13
WATER YEAR (OCT-SEP)	F81	F82	F318	F317	F193	F194	U8	F274	F304	F312	INFLOW TOTAL	Runoff Volume† (complete)	OUTFLOW TOTAL F263
	af/yr												
1949-50	3,092	1,690					51	306			5,140	n	4,127
1950-51	2,358	1,013					6,231	64			9,670	n	558
1951-52	9,046	5,299					66,123	2,090			82,560	n	50,929
1952-53	3,234	1,464					50,019	287	292		55,300	n	13,853
1953-54	3,776	2,484					25,029	1,064	25,413		57,770	n	10,989
1954-55	3,015	1,876					85	707	21,645		27,330	n	9,249
1955-56	5,526	2,882		1,831			177	2,268	49,625	4,071	66,380	n	23,900
1956-57	4,444	2,295	2,402	1,341			9,011	981	51,473	795	72,740	n	18,022
1957-58	9,271	5,607	7,444	3,331			174,130	4,691	8,494	14,058	227,030	n	82,189
1958-59	3,020	2,027	2,848	1,356			8,198	2,194	1,613	1,091	22,350	n	33,685
1959-60	2,723	1,819	2,416	1,225	465		0	2,260	1,303	3,428	15,640	n	36,102
1960-61	1,794	1,274	1,589	730	216	262	1,254	2,220	9,011	404	18,750	18,750	47,720
1961-62	6,245	4,117	6,881	3,390	5,906	11,991	73,599	7,201	4,798	9,533	133,660	133,660	103,060
1962-63	2,872	1,763	2,984	1,510	709	1,183	712	4,108	3,358	5,543	24,740	24,740	42,427
1963-64	2,874	1,875	3,044	1,614	651	1,195	160	2,747	2,856	4,899	21,910	21,910	45,715
1964-65	4,611	2,027	3,759	2,266	986	1,504	7,738	3,178	11,629	10,115	47,810	47,810	77,273
1965-66	7,749	4,656	8,992	3,425	8,725	9,240	162,883	6,312	7,934	15,295	235,210	235,210	55,318
1966-67	8,824	5,228	8,676	4,578	11,566	16,021	167,905	10,148	15,062	26,251	274,260	274,260	62,811
1967-68	4,748	0	0	0	0	0	23,060	4,306	16,903	17,866	66,880	n	26,235
1968-69	12,300	0	0	0	0	0	541,686	32,805	49,491	52,977	689,260	n	274,240
1969-70	3,712	0	0	0	2,333	4,831	37,925	0	3,255	20,916	72,970	n	79,090
1970-71	5,163	0	0	0	2,430	4,179	22,758	0	6,810	16,237	57,580	n	55,040
1971-72	3,045	0	0	0	319	1,454	11,084	0	2,996	12,923	31,820	n	32,721
1972-73	9,115	0	0	0	4,272	12,147	94,974	0	6,908	27,576	154,990	n	64,032
1973-74	5,720				2,084	6,491	44,025		6,672	24,093	89,080	n	60,510
1974-75	4,012	3,222	4,798	2,240	826	1,996	19,045	37,828	5,114	46,284	125,360	125,360	38,993
1975-76	3,724	2,870	3,894	2,537	1,046	1,276	20,127	40,674	2,733	17,693	96,570	96,570	32,850
1976-77	4,317	3,178	3,625	2,109	734	2,362	15,749	10,000	3,901	16,387	62,360	62,360	17,232
1977-78	12,255	9,336	21,317	6,787	25,506	51,106	419,954	67,873	47,042	53,042	714,220	714,220	256,747
1978-79	7,587	5,596	7,043	3,215	8,954	11,801	99,303	71,566	12,577	30,971	258,610	258,610	37,380
1979-80	12,989	8,352	27,838	6,969	49,912	33,216	326,271	59,830	38,290	56,812	620,480	620,480	202,740
1980-81	3,648	3,030	3,836	1,930	969	16,728	27,355	15,728	3,381	63,225	139,830	139,830	23,991
1981-82	4,289	2,870	5,412	3,094	2,473	9,551	57,241	36,455	8,028	24,016	153,430	153,430	23,133
1982-83	12,887	9,055	29,498	7,722	55,042	35,492	313,935	37,675	32,724	46,357	580,390	580,390	119,620
1983-84	2,654	2,006	3,252	2,263	6,375	14,746	48,853	23,395	4,101	17,658	125,300	125,300	22,365
1984-85	3,481	2,524	4,177	3,362	2,090	1,859	32,906	38,498	5,823	26,703	121,420	121,420	22,485
1985-86	6,571	4,395	4,800	5,962	4,895	11,773	94,725	26,385	9,391	36,711	205,610	205,610	31,363
1986-87	2,483	2,449	1,461	2,437	435	824	44,029	46,837	3,940	27,272	132,170	132,170	22,187
1987-88	4,994	3,089	3,035	3,884	1,123	2,394	54,899	31,099	5,363	25,137	135,020	135,020	23,583
1988-89	3,501	2,080	2,117	2,626	705	1,156	66,750	36,786	1,623	41,149	158,490	158,490	51,219
1989-90	3,431	3,228	2,273	2,480	618	897	46,061	38,559	1,714	53,774	153,030	153,030	28,247
1990-91	5,300	3,489	3,944	3,568	1,608	12,630	79,117	14,046	23,370	48,414	195,490	195,490	24,865
1991-92	9,899	4,115	10,304	8,043	13,964	26,731	149,508	7,252	20,383	60,221	310,420	310,420	30,472
1992-93	14,165	5,726	21,579	12,560	25,854	30,694	474,307	27,367	49,855	90,380	752,490	752,490	273,250
1993-94	5,040	1,640	2,123	4,662	1,623	2,671	41,858	4,471	4,808	7,186	76,080	76,080	25,990
1994-95	10,054	6,777	14,501	8,032	13,920	21,159	158,264	14,160	17,966	75,670	340,500	340,500	105,920
1995-96	5,075	5,466	5,729	3,758	3,267	31,993	89,814	9,922	12,333	32,245	199,600	199,600	34,717
1996-97	6,269	2,786	4,619	4,542	4,109	16,348	65,345	21,890	9,360	29,240	164,510	164,510	52,270
1997-98	14,647	6,593	14,056	9,637	15,993	23,538	263,960	16,232	28,234	51,165	444,060	444,060	168,620
1998-99	4,401	1,564	1,989	3,022	717	2,496	23,972	5,236	4,587	18,952	66,940	66,940	25,729
1999-00					1,511		42,950	20,527		58,896	123,880	n	42,575
2000-01	7,385	4,122	4,683	4,324	2,107	2,447	47,243	16,023	8,762	60,449	157,540	157,540	49,410
2001-02	5,453	2,187	1,683	1,902	818	710	47,415	21,442	1,995	53,820	137,430	137,430	34,238
2002-03	9,647	5,113	5,347	4,662	1,925	4,374	85,270	24,362	10,857	44,678	196,230	196,230	32,740
2003-04	7,532	2,809	3,582	3,276	1,261	2,116	64,257	21,141	6,011	38,398	150,380	150,380	24,880
2004-05	19,787	8,154	27,629	12,039	30,962	32,040	541,290	55,694	42,619	82,730	852,940	852,940	221,570
2005-06	8,596	3,434	4,597	4,173	3,044	9,033	155,590	12,467	14,063	75,230	290,230	290,230	51,930
2006-07	5,770	1,102	1,248	1,446	644	1,015	20,350	16,154	9,922	51,640	109,290	109,290	39,686
2007-08	7,539	3,718	5,014	5,455	11,220	8,026	78,250	7,128	11,076	33,889	171,320	171,320	36,632
2008-09	6,629	2,557	3,116	3,197	1,422	7,295	25,482	9,081	7,540	26,430	92,750	92,750	20,859
2009-10	9,263	3,898	6,355	4,725	3,352	3,890	129,207	15,461	13,746	70,659	260,560	260,560	26,524
2010-11	5,263	2,742	4,510	3,235	4,980	18,385	124,329	13,782	8,665	37,556	223,450	223,450	29,271
Maximum	19,787	9,336	29,498	12,560	55,042	51,106	541,686	71,566	51,473	90,380	852,940	852,940	274,240
Minimum	1,794	0	0	0	0	0	0	0	292	404	5,140	18,750	558
Mean: All data	6,374	3,244	6,151	3,564	6,667	10,505	95,545	17,426	13,783	33,913	188,052	226,299	58,324
Last 5 years Av	6,893	2,803	4,048	3,612	4,324	7,722	75,524	12,321	10,190	44,035	171,474	171,474	30,595
Last 10 years A	8,548	3,571	6,308	4,411	5,963	8,688	127,144	19,671	12,649	51,503	248,458	248,458	51,833

† Column 11 rounded to nearest 10 af

APPENDIX E

WATER YEAR AVERAGE OF SUBSURFACE FLOW FROM MAIN SAN GABRIEL BASIN TO CENTRAL BASIN

APPENDIX E. WATER YEAR AVERAGE OF SUBSURFACE FLOW INTO AND OUT OF SAN GABRIEL BASIN

column #	1	2	3	4	5
	To Central Basin				Puente Basin
WATER (OCT-SEP)	RIVER WATERMASTER CALCULATION	CDWR FALL	CALCULATION SPRING	mean	
		acre-feet			
1933-34	32,700			32,700	
1934-35	33,500			33,500	
1935-36	33,500			33,500	
1936-37	31,100			31,100	
1937-38	25,600			25,600	
1938-39	25,000			25,000	
1939-40	23,900			23,900	
1940-41	23,300			23,300	
1941-42	21,800			21,800	
1942-43	21,900			21,900	
1943-44	23,700			23,700	
1944-45	23,500			23,500	
1945-46	23,100			23,100	
1946-47	22,400			22,400	
1947-48	25,700			25,700	
1948-49	30,300			30,300	
1949-50	34,000			34,000	
1950-51	32,800			32,800	
1951-52	32,100			32,100	
1952-53	32,800			32,800	
1953-54	33,200			33,200	
1954-55	33,600			33,600	
1955-56	31,400			31,400	
1956-57	30,000			30,000	
1957-58	30,900			30,900	
1958-59	28,200			28,200	
1959-60	25,500			25,500	
1960-61					
1961-62					
1962-63					
1963-64					
1964-65		22,300	16,400	19,350	
1965-66		13,300	16,700	15,000	
1966-67		14,600	20,900	17,750	
1967-68		25,200	25,000	25,100	
1968-69		23,800	25,600	24,700	
1969-70		25,900	20,700	23,300	
1970-71		22,500	19,000	20,750	
1971-72		23,500	23,200	23,350	
1972-73		35,000	29,600	32,300	692
1973-74		25,000	21,800	23,400	796
1974-75		25,000	28,200	26,600	710
1975-76		24,300	31,800	28,050	732
1976-77		35,600	39,600	37,600	658
1977-78		30,900	23,200	27,050	730
1978-79		24,200	23,500	23,850	850
1979-80		23,000	24,500	23,750	930

APPENDIX E. WATER YEAR AVERAGE OF SUBSURFACE FLOW INTO AND OUT OF SAN GABRIEL BASIN

column #	1	2	3	4	5
	To Central Basin				Puente Basin
WATER (OCT-SEP)	RIVER WATERMASTER CALCULATION	CDWR FALL	CALCULATION SPRING	mean	
		acre-feet			
1980-81		33,200	30,700	31,950	820
1981-82		29,200	28,500	28,850	845
1982-83		33,200	25,300	29,250	850
1983-84		27,500	26,000	26,750	798
1984-85		28,500	32,100	30,300	820
1985-86		32,000	29,900	30,950	840
1986-87		34,300	31,900	33,100	850
1987-88		31,200	37,100	34,150	880
1988-89		35,000	30,000	32,500	890
1989-90		33,100	32,100	32,600	910
1990-91		25,200	20,300	22,750	905
1991-92		16,700	18,900	17,800	925
1992-93		22,900	25,000	23,950	890
1993-94		25,600	27,800	26,700	845
1994-95		24,000	23,000	23,500	860
1995-96		26,500	29,200	27,850	810
1996-97		33,700	27,100	30,400	820
1997-98		29,100	24,200	26,650	840
1998-99		23,900	28,500	26,200	750
1999-00		28,900	29,700	29,300	760
2000-01		28,300	23,500	25,900	860
2001-02		28,400	26,900	27,650	890
2002-03		27,500	19,300	23,400	940
2003-04		18,000	23,000	20,500	960
2004-05		30,100	18,100	24,100	960
2005-06		20,700	24,900	22,800	860
2006-07		28,900	23,300	26,100	950
2007-08		42,600	33,800	38,200	940
2008-09		28,500	26,100	27,300	960
2009-10		33,600	23,200	28,400	945
2010-11		31,400	15,000	23,200	985
Maximum	34,000	42,600	39,600	38,200	990
Minimum	21,800	13,300	15,000	15,000	660
All data	28,350	27,360	25,620	27,170	850
Last 5 years Ave.		33,000	24,280	28,640	960
Last 10 years Ave.		28,970	23,360	26,170	940

APPENDIX F

WATER PRODUCTION IN THE SAN GABRIEL BASIN

APPENDIX F. WATER PRODUCTION IN THE SAN GABRIEL BASIN, AS REPORTED BY SOURCE.

column #	1	2	3	4 = (1) -(2) -(3)	5 = (1) - (2)	6
	WATER PRODUCTION IN MAIN SAN GABRIEL BASIN (ACRE-FEET)					
		Production by Sources				
FISCAL YEAR (JULY-JUNE)	**Total Production (From Annual Reports)**	**USG-5 Diversion (From Annual Reports) (*1)**	**Well Extraction (From Five-Year Plans)**	**Surface Water (Calculated) (*2)**	**San Gabriel Production**	**REMARKS**
1973-74	235,438	0	221,089	14,349	235,438	
1974-75	223,131	0	207,648	15,483	223,131	
1975-76	242,246	2,239	226,016	13,992	240,008	
1976-77	212,886	2,655	196,034	14,197	210,231	
1977-78	198,388	2,982	181,237	14,169	195,406	
1978-79	218,456	3,486	198,534	16,436	214,970	
1979-80	226,111	3,191	207,493	15,427	222,920	
1980-81	233,970	3,131	213,549	17,290	230,840	
1981-82	222,396	2,854	203,540	16,003	219,543	
1982-83	212,206	2,256	192,389	17,560	209,949	
1983-84	238,655	1,907	218,028	18,721	236,748	
1984-85	244,682	2,396	224,500	17,786	242,286	
1985-86	248,802	2,601	229,077	17,124	246,201	
1986-87	256,147	2,484	235,370	18,293	253,663	
1987-88	251,855	3,751	233,165	14,939	248,104	
1988-89	256,667	3,727	233,250	19,691	252,940	
1989-90	253,977	1,716	238,896	13,365	252,261	
1990-91	234,807	2,734	221,270	10,802	232,073	
1991-92	223,691	2,214	201,750	19,727	221,477	
1992-93	239,353	3,214	214,544	21,596	236,139	
1993-94	246,831	3,224	220,786	22,820	243,606	
1994-95	246,657	3,178	226,251	17,229	243,479	
1995-96	272,100	3,150	250,011	18,940	268,951	
1996-97	282,786	3,305	256,789	22,693	279,481	
1997-98	257,432	3,393	235,986	18,054	254,039	
1998-99	268,505	3,353	242,937	22,215	265,152	
1999-00	282,195	3,508	261,676	17,011	278,687	
2000-01	274,204	3,285	250,889	20,031	270,919	
2001-02	267,133	3,439	247,876	15,818	263,694	
2002-03	240,509	3,018	241,682	4,687	237,491	(*3)
2003-04	255,908	3,058	258,384	7,196	252,850	(*4)
2004-05	250,264	2,998	234,978	12,289	247,266	
2005-06	262,755	2,816	246,691	13,249	259,940	
2006-07	287,294	2,963	270,383	13,948	284,330	
2007-08	261,194	3,027	250,239	7,928	258,167	
2008-09	253,612	3,065	236,716	13,832	250,547	
2009-2010	239,734	2,612	222,450	14,673	237,123	
2010-2011	229,367	2,428	213,396	13,543	226,939	
Maximum	287,290	3,750	270,380	22,820	284,330	
Minimum	198,390	0	181,240	4,690	195,410	
AVERAGE	246,110	2,770	228,040	15,870	243,340	
Last 5 years Ave.	254,240	2,820	238,640	12,780	251,420	
Last 10 years Ave.	254,780	2,940	242,280	11,720	251,830	

NOTES:

(*1) Exclusively for City of Alhambra (Watermaster considers as groundwater production; therefore, it is not included as imported water)

(*2) Surface Water = WM Total Production - USG-5 Diversion - Well Extraction (WM considers USG-5 Diversion as Groundwater Extraction)

(*3) Total Production did not include extraction from EPA's WNOU (8,878 acre-feet)

(*4) Total Production did not include extraction from EPA's WNOU (12,730 acre-feet)

APPENDIX G

IMPORTED WATER TO THE SAN GABRIEL BASIN

APPENDIX G. IMPORTED WATER TO MAIN SAN GABRIEL BASIN

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	IMPORTED WATER TO MAIN SAN GABRIEL BASIN (ACRE-FEET) (1)																
FISCAL YEAR (JULY-JUNE)	STATE WATER PROJECT FOR SPREADING (2)				USG-5 FOR MUNICIPAL USES			RAYMOND BASIN FOR MUNICIPAL USES (8)								Municipal	TOTAL
	USGVMWD (3)	SGVMWD (4)	TVMWD (5)	SUBTOTAL	USGVMWD (6)	TVMWD (7)	SUBTOTAL	ALHAMBRA	ARCADIA	CAWC	EPWC	MONROVIA	SGCWD	SSWC	SUBTOTAL	Total	
1963-64	0			0		465	465	1,020	0	499	147	359	1,198	1,618	4,840	5,305	5,305
1964-65	10,000			10,000		1,371	1,371	1,072	0	579	0	1,186	1,241	1,242	5,320	6,691	16,691
1965-66	15,000			15,000		1,245	1,245	842	0	1,070	0	1,205	1,000	1,686	5,803	7,048	22,048
1966-67	20,000			20,000		803	803	1,139	0	874	0	1,044	1,121	1,444	5,622	6,425	26,425
1967-68	30,000			30,000		252	252	292	1,794	381	195	953	1,113	1,470	6,198	6,450	36,450
1968-69	20,609			20,609	92	626	718	1,033	0	136	0	990	1,063	1,451	4,672	5,390	25,999
1969-70	0			0	327	366	693	769	163	0	1	1,050	1,106	1,460	4,549	5,242	5,242
1970-71	0			0	205	482	687	1,140	1,206	0	61	1,177	1,105	1,495	6,183	6,870	6,870
1971-72	2,916			2,916	217	248	466	902	323	0	0	681	1,073	897	3,875	4,341	7,256
1972-73	7,088			7,088	229	718	947	1,032	1,274	0	0	1,021	1,096	1,451	5,873	6,820	13,907
1973-74	8,835			8,835	184	446	630	1,075	388	212	148	0	943	1,881	4,648	5,277	14,113
1974-75	33,964	832		34,796	255	781	1,036	871	1,555	0	185	905	1,235	1,174	5,926	6,962	41,758
1975-76	20,780	8,275		29,055	227	3,312	3,539	0	621	570	199	0	1,091	1,782	4,262	7,801	36,857
1976-77	10,808	7,530		18,338	3,331	6,140	9,471	0	354	416	0	0	1,091	1,214	3,076	12,546	30,884
1977-78	14,963	5,586		20,549	4,694	6,733	11,427	0	927	1,504	148	0	859	1,539	4,976	16,403	36,951
1978-79	24,000	6,968		30,968	5,600	6,124	11,724	0	2,010	283	0	0	1,193	1,178	4,664	16,387	47,355
1979-80	4,741	1,064		5,805	6,130	6,902	13,032	0	1,916	419	4	0	1,100	1,592	5,031	18,063	23,867
1980-81	0	0		0	7,511	9,288	16,799	0	2,473	6	86	0	1,139	1,396	5,101	21,899	21,899
1981-82	40,825	1,798		42,623	6,825	10,576	17,402	0	76	345	0	0	973	913	2,307	19,708	62,331
1982-83	26,124	2,221		28,345	7,283	6,925	14,208	0	2,217	366	21	0	1,246	1,354	5,204	19,413	47,757
1983-84	3,247	79		3,326	8,277	10,021	18,298	0	3,343	250	13	0	873	1,223	5,702	24,000	27,325
1984-85	0	66		66	10,025	11,651	21,676	0	2,100	459	44	0	1,809	1,607	6,019	27,695	27,761
1985-86	50,405	5,457		55,862	10,220	10,652	20,872	0	2,380	0	0	0	1,164	1,399	4,942	25,814	81,676
1986-87	43,345	12,598		55,943	10,432	12,143	22,575	0	2,029	348	112	0	1,363	1,442	5,294	27,869	83,812
1987-88	34,162	9,827		43,989	13,319	15,218	28,537	0	497	376	133	0	893	1,385	3,284	31,821	75,810
1988-89	39,211	6,714		45,925	12,093	13,706	25,799	0	1,229	811	20	0	1,622	1,542	5,225	31,024	76,948
1989-90	32,740	14,764		47,504	13,969	17,509	31,478	0	981	290	8	0	1,004	1,266	3,549	35,027	82,531
1990-91	43,645	10,508		54,153	13,390	16,532	29,922	0	0	0	92	0	64	1,514	1,670	31,592	85,745
1991-92	34,324	8,903	25,077	68,304	10,622	7,984	18,606	0	0	0	0	0	4	1,294	1,298	19,904	88,208
1992-93	45,209	13,685	3,738	62,632	9,469	9,479	18,948	0	0	0	0	0	0	1,693	1,693	20,641	83,273
1993-94	23,051	15,245	0	38,296	7,635	10,777	18,412	0	0	0	0	0	0	2,101	2,101	20,513	58,809
1994-95	6,177	10,438	5,739	22,354	7,397	12,120	19,517	0	0	0	0	0	0	1,351	1,351	20,868	43,222
1995-96	15,553	13,095	3,832	32,480	6,817	10,114	16,931	0	0	0	0	0	0	1,553	1,553	18,483	50,963
1996-97	36,164	17,460	1,451	55,075	6,925	10,280	17,205	0	0	0	0	0	0	1,497	1,497	18,701	73,776
1997-98	46,280	15,654	953	62,887	7,404	6,804	14,208	0	0	0	0	0	0	1,440	1,440	15,647	78,534
1998-99	0	10,034	3,312	13,346	7,131	6,714	13,846	0	0	0	0	0	0	1,096	1,096	14,941	28,287
1999-00	38,062	19,204	4,419	61,684	11,151	9,911	21,062	0	0	154	0	0	0	1,831	1,985	23,046	84,731
2000-01	25,037	11,693	6,259	42,989	9,070	10,900	19,971	0	0	219	0	0	0	1,444	1,663	21,633	64,622
2001-02	27,177	13,388	5,514	46,079	18,346	16,806	35,153	0	0	0	0	0	0	1,026	1,026	36,178	82,258
2002-03	33,551	20,095	2,791	56,437	20,687	20,295	40,982	0	0	0	49	0	0	470	519	41,501	97,938
2003-04	47,769	18,632	1,920	68,322	27,675	23,084	50,758	0	0	0	0	0	0	553	553	51,311	119,633
2004-05	5,744	12,462	3,515	21,721	12,895	17,587	30,482	0	0	0	1	0	0	787	789	31,271	52,992
2005-06	64,970	13,711	357	79,038	10,981	12,144	23,125	0	0	0	2	0	0	1,494	1,496	24,621	103,659
2006-07	4,159	17,476	3,145	24,780	14,290	11,614	25,904	0	0	0	26	0	0	1,110	1,136	27,040	51,820
2007-08	5,724	2,003	0	7,727	16,958	13,216	30,174	0	0	0	54	0	0	1,065	1,118	31,292	39,020
2008-09	0	6,607	0	6,607	8,533	13,150	21,683	0	0	0	65	0	0	1,079	1,144	22,827	29,434
2009-10	16,076	15,204	1,428	32,708	6,557	9,773	16,329	0	0	0	68	0	0	613	681	17,010	49,719
2010-11	35,384	20,775	12,265	68,424	3,429	6,886	10,316	0	0	0	28	0	0	724	753	11,068	79,492
Maximum	64,970	20,780	25,080	79,040	27,670	23,080	50,760	1,140	3,340	1,500	200	1,210	1,810	2,100	6,200	51,310	119,630
Minimum	0	0	0	0	90	250	250	0	0	0	0	0	0	470	520	4,340	5,240
AVERAGE	21,830	10,000	4,290	31,320	8,340	8,560	16,030	230	620	220	40	220	640	1,330	3,310	19,340	50,670
Last 5 years Ave.	12,270	12,410	3,370	28,050	9,950	10,930	20,880	0	0	0	50	0	0	920	970	21,850	49,900
Last 10 years Ave.	24,060	14,040	3,090	41,180	14,040	14,460	28,490	0	0	0	30	0	0	890	920	29,410	70,600

NOTES:

(1) From Main San Gabriel Basin Watermaster's Annual Report 2010-2011
(2) This is part of spreading reported by Los Angeles County Department of Public Works
(3) Sum of columns 2,3,6, and 7 of Appendix D2
(4) Column 8 of Appendix D3
(5) Sum of columns 2,3,6, and 7 of Appendix D4
(6) Sum of columns 4 and 5 of Appendix D2
(7) Sum of columns 4 and 5 of Appendix D4
(8) From Raymond Basin Management Board's Annual Reports

USGVMWD: Upper San Gabriel Valley Municipal Water District
SGVMWD: San Gabriel Valley Municipal Water District
TVMWD: Three Valleys Municipal Water District
ALHAMBRA: City of Alhambra
ARCADIA: City of Arcadia
CAWC: California American Water Company
MONROVIA: City of Monrovia
SGCWD: San Gabriel County Water District

APPENDIX H

GROUNDWATER EXPORTED FROM THE SAN GABRIEL BASIN

APPENDIX H. GROUNDWATER EXPORTED FROM MAIN SAN GABRIEL BASIN

column #	1	2	3	4	5
WATER YEAR (OCT-SEP)	WATER EXPORTED FROM MAIN SAN GABRIEL BASIN (ACRE-FEET) *				
	CDWC	SGVWC	SWS	WHITTIER	TOTAL
1965-66	12,692		10,980	8,834	32,506
1966-67	12,204		11,574	8,195	31,973
1967-68	14,827		12,679	8,778	36,284
1968-69	11,889		13,155	11,112	36,156
1969-70	13,040	420	13,471	8,875	35,806
1970-71	12,687	1,315	14,038	8,177	36,217
1971-72	14,223	1,643	13,892	9,278	39,036
1972-73	12,236	2,004	12,126	8,610	34,976
1973-74	13,485	1,992	11,712	8,611	35,800
1974-75	13,494	1,968	9,474	8,339	33,275
1975-76	13,864	1,984	9,530	9,710	35,088
1976-77	15,125	1,560	9,196	7,507	33,388
1977-78	15,508	1,708	9,042	7,448	33,706
1978-79	13,864	1,193	9,655	6,969	31,681
1979-80	13,988	231	8,898	7,621	30,738
1980-81	11,263	261	11,536	8,330	31,390
1981-82	9,766	266	9,337	6,605	25,974
1982-83	10,120	269	8,914	6,207	25,510
1983-84	14,193	278	9,496	8,290	32,257
1984-85	16,335	270	8,649	8,572	33,826
1985-86	15,562	267	8,596	7,757	32,182
1986-87	14,078	321	10,590	8,589	33,578
1987-88	13,411	488	8,294	8,419	30,612
1988-89	12,817	357	8,833	7,643	29,650
1989-90	13,338	221	7,112	8,166	28,837
1990-91	14,184	181	7,840	6,961	29,166
1991-92	13,918	151	7,785	6,807	28,661
1992-93	16,328	155	8,474	7,117	32,074
1993-94	16,527	184	11,763	7,666	36,140
1994-95	17,355	199	11,755	7,313	36,622
1995-96	19,034	266	12,175	8,090	39,565
1996-97	18,396	260	13,303	8,476	40,435
1997-98	16,225	272	12,820	9,651	38,968
1998-99	17,587	279	12,969	8,335	39,170
1999-00	20,134	299	13,350	9,080	42,863
2000-01	18,240	1,493	13,103	8,163	40,999
2001-02	21,636	1,739	13,356	7,431	44,162
2002-03	21,474	1,454	11,381	7,283	41,592
2003-04	20,578	880	12,241	8,769	42,468
2004-05	20,204	1,752	12,138	7,490	41,584
2005-06	19,943	3,022	7,982	7,490	38,437
2006-07	19,410	2,731	13,651	8,127	43,919
2007-08	17,544	3,972	12,542	6,797	40,855
2008-09	18,384	3,404	13,681	8,277	43,746
2009-10	19,575	2,380	12,036	6,046	40,037
2010-11	16,364	3,065	13,910	5,805	39,144
Maximum	21,640	3,970	14,040	11,110	44,160
Minimum	9,770	150	7,110	5,810	25,510
AVERAGE	15,590	1,100	11,100	8,000	35,700
Last 5 years Ave.	18,260	3,110	13,160	7,010	41,540
Last 10 years Ave.	19,510	2,440	12,290	7,350	41,590

NOTES:

* From Annual Reports of the San Gabriel River Watermaster
CDWC: California Domestic Water Company
SGVWC: San Gabriel Valley Water Company
SWS: Suburban Water Systems/Lamirada District
WHITTIER: City of Whittier

APPENDIX I

SURFACE WATER SPREADING AT THE SPREADING GROUNDS

APPENDIX I. WATER SPREADING AT SPREADING GROUNDS IN SAN GABRIEL BASIN (ACRE-FEET)

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Water Year	Arroyo Seco	Ben Lomond	Big Dalton	Buena Vista	Citrus	Eaton SB	Eaton SG	Forbes	Irwindale	Little Dalton	Live Oak	Morris to F190	F190 to SF Dam	Peck Road	S. Dimas Canyon	S. Gabriel Canyon	Santa Anita	Santa Fe SG	Santa Fe Res.	Sf Dam to F261	Santa Fe Div.	Sawpit	Walnut	Sierra Madre	Fish Canyon	F261 to WN Dam	Total
1930-31	0	0	10	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				10
1931-32	0	0	394	0	0	0	0	0	0	160	0			0	0	0	0	0				0	0				550
1932-33	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				0
1933-34	0	0	100	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				100
1934-35	0	0	131	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				130
1935-36	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				0
1936-37	0	0	866	0	0	0	0	0	0	275	0			0	0	0	0	0				0	0				1,140
1937-38	0	0	397	0	0	0	0	0	0	287	0			0	0	0	0	0				0	0				680
1938-39	0	0	49	0	0	0	0	0	0	12	0			0	0	0	0	0				0	0				60
1939-40	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				0
1940-41	0	0	1,528	0	0	0	0	0	0	1,166	0			0	0	0	0	0				0	0				2,690
1941-42	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0				0	0				0
1942-43	0	0	1,191	0	0	0	0	0	0	1,084	0			0	0	0	0	0				0	0				2,280
1943-44	0	0	543	0	0	0	0	0	0	469	0			0	0	0	0	0				0	0				1,010
1944-45	0	0	64	0	0	0	0	0	0	290	0			0	0	0	337	0				0	0				690
1945-46	0	0	47	0	0	0	0	0	0	73	0			0	0	0	0	0				0	0				120
1946-47	0	0	174	0	0	0	0	0	0	89	0			0	0	0	141	0				89	0				490
1947-48	0	0	0	0	0	0	1	0	0	0	0			0	0	0	0	0				0	0				0
1948-49	108	0	88	0	0	0	0	0	0	0	0			0	0	0	0	0				8	0				200
1949-50	283	0	66	0	0	0	61	0	0	28	0			0	0	0	0	0				0	0				440
1950-51	19	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0				19	0				40
1951-52	986	0	856	0	0	0	1,196	0	0	563	0			0	0	0	448	0				517	0				4,570
1952-53	216	0	3	0	0	0	0	0	0	9	0			0	0	0	58	0				56	0				340
1953-54	455	0	370	0	0	0	190	0	0	161	0			0	0	0	265	3,500				0	0				4,940
1954-55	197	0	0	10	0	0	0	0	0	0	0			0	0	0	145	0				0	0				350
1955-56	301	0	180	227	0	0	181	0	0	30	0			0	0	0	161	0				180	0				1,260
1956-57	397	0	15	817	0	260	0	0	0	11	0			0	0	0	2	0				38	0				1,540
1957-58	2,088	0	2,380	2,730	0	1,236	861	0	0	658	0			0	0	0	1,576	12,752				978	0				25,260
1958-59	352	1,431	145	1,087	0	441	130	0	242	22	0			0	0	0	185	181				199	0				4,420
1959-60	0	1,055	0	1,234	0	501	0	0	934	0	0			986	0	0	810	59				38	0				5,620
1960-61	0	732	27	700	1,131	165	0	0	256	0	0			478	0	0	304	30				29	0				3,850
1961-62	1,103	2,857	1,212	869	2,194	902	1,021	0	1,817	394	38			8,876	50	0	664	11,818				547	292				34,650
1962-63	249	2,428	77	273	1,292	532	7	0	593	43	0			1,895	286	0	449	121				126	367				8,740
1963-64	317	1,008	165	195	906	869	24	5	1,126	18	0			1,841	62	0	327	120				135	502				7,620
1964-65	744	1,435	193	945	1,287	1,007	324	331	2,121	100	0			2,490	3	0	575	6,287				161	0				18,000
1965-66	1,036	3,799	2,063	854	4,010	783	2,000	0	3,317	987	89			13,018	2,413	0	1,641	23,502				1,367	1,412				62,290
1966-67	1,828	6,444	3,766	2,192	1,064	1,046	1,450	1,199	6,792	1,846	330			17,052	2,099	0	1,563	73,910				2,458	2,147				127,190
1967-68	855	5,096	848	262	0	605	305	0	4,603	187	0			2,616	2,180	0	638	17,501				790	1,201				37,690
1968-69	609	3,447	2,074	2,231	0	1,104	3,249	0	7,339	335	803			7,543	4,836	0	494	42,523				321	2,016				78,920
1969-70	195	5,912	562	299	0	333	483	0	490	220	45			4,044	2,604	19,583	1,415	8,396				769	1,120				46,470
1970-71	644	3,018	888	387	0	0	583	0	313	226	0			3,954	1,490	14,037	334	14,016				529	532				40,950
1971-72	173	1,414	44	195	0	359	0	0	879	23	0			1,555	484	6,481	31	6,755				216	233				18,840
1972-73	1,214	5,109	1,253	502	0	1,158	1,689	0	2,796	484	88			6,460	1,318	12,727	738	49,400				1,396	669				87,000
1973-74	1,478	3,936	1,130	386	0	1,096	1,581	0	1,624	136	0			5,895	1,052	14,223	427	31,113				1,043	547				65,670
1974-75	664	1,286	237	184	0	527	337	686	1,310	46	13			985	786	15,225	59	22,036				808	613				45,800
1975-76	344	1,267	390	864	0	716	295	16	1,118	19	3			2,023	333	9,905	36	17,408				581	310				35,630
1976-77	374	1,535	0	436	0	666	218	249	1,220	0	9			3,409	289	7,141	0	11,919				487	410				28,360
1977-78	3,475	3,304	3,601	777	0	1,130	3,686	1,197	7,553	0	943			19,204	4,183	9,960	724	86,647				2,254	1,540				150,180
1978-79	2,189	6,211	2,047	513	0	532	1,103	587	2,237	748	0			9,227	4,031	9,717	832	55,912				1,388	1,751				99,030
1979-80	1,727	4,963	2,938	481	0	727	1,694	646	5,627	694	188			14,113	3,817	9,083	782	52,329				2,340	1,079				103,230
1980-81	519	4,230	256	235	0	731	285	297	612	80	15	10,093	5,711	4,860	1,565	7,009	63	288	1,695	0	9,265	601	1,276				49,690
1981-82	1,315	2,975	1,036	611	0	2,033	1,148	629	2,833	206	200	28,062	10,981	7,303	2,265	8,571	196	35,045	7,711	0	13,050	1,008	1,720				128,900
1982-83	6,450	4,591	2,980	1,353	0	3,481	4,761	1,544	2,845	1,423	1,660	25,000	18,680	50,026	6,049	9,419	1,199	81,000	37,777	700	26,093	2,926	2,278				292,240
1983-84	665	2,926	772	990	0	1,394	683	589	1,441	183	631	10,569	5,723	7,903	2,404	8,219	541	12,123	2,000	0	6,362	719	2,202				69,040
1984-85	924	1,062	312	383	0	921	146	441	2,115	117	497	18,055	8,027	3,841	1,170	7,234	457	10,621	1,190	0	278	811	794				59,400
1985-86	2,260	3,630	484	829	529	2,370	1,220	2,600	11,787	351	215	12,199	11,726	6,553	811	12,500	686	43,783	8,920	0	2,563	1,113	2,042				129,170
1986-87	415	1,263	45	244	236	791	14	2,628	9,099	10	140	23,681	4,240	1,139	703	4,485	252	23,860	0	0	115	384	1,720				75,460
1987-88	1,575	3,531	309	1,539	486	1,254	706	1,364	3,699	155	73	25,962	1,130	6,214	773	13,318	524	19,120	1,844	581	1,001	612	1,691				87,460
1988-89	655	362	250	112	347	856	162	1,329	2,140	95	26	19,068	7,247	1,710	690	8,441	236	27,379	1,146	969	301	604	1,773				75,900

APPENDIX I. WATER SPREADING AT SPREADING GROUNDS IN SAN GABRIEL BASIN (ACRE-FEET)

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Water Year	Arroyo Seco	Ben Lomond	Big Dalton	Buena Vista	Citrus	Eaton SB	Eaton SG	Forbes	Irwindale	Little Dalton	Live Oak	Morris to F190	F190 to SF Dam	Peck Road	S. Dimas Canyon	S. Gabriel Canyon	Santa Anita	Santa Fe SG	Santa Fe Res.	Sf Dam to F261	Santa Fe Div.	Sawpit	Walnut	Sierra Madre	Fish Canyon	F261 to WN Dam	Total
1989-90	164	423	0	517	135	903	47	1,601	943	11	4	27,556	3,569	1,277	127	10,250	5	13,600	0	224	0	367	1,330			39,237	102,290
1990-91	942	1,136	297	781	277	1,084	1,527	1,181	6,489	170	186	32,675	4,954	7,219	2,008	8,192	404	14,419	0	15,490	6,207	462	1,223			48,098	155,420
1991-92	2,714	3,444	416	393	418	2,133	1,892	975	41,110	561	13	17,819	16,671	22,291	2,375	12,626	660	49,480	0	48,369	11,753	1,217	1,672			58,894	297,900
1992-93	4,197	5,780	651	445	3,827	2,102	3,190	2,007	16,200	1,530	819	54,212	24,087	9,311	3,034	5,919	919	73,526	0	50,577	3,020	2,767	3,063			23,688	294,870
1993-94	1,562	3,989	144	214	1,948	358	493	824	7,726	54	136	6,035	15,895	2,317	1,347	985	576	20,830	0	2,319	970	897	757			1,467	71,840
1994-95	5,678	2,875	674	250	6,477	1,445	3,459	1,357	9,165	1,766	437	44,219	20,052	10,759	5,555	13,825	956	56,250		53,561	1,841	2,539	1,047				244,190
1995-96	2,152	4,889	872	146	1,897	972	1,197	1,291	5,687	5,546	283	31,952	9,835	11,138	2,426	17,980	610	30,947		16,081	540	803	865	2,138	7,833		158,080
1996-97	3,241	2,064	551	172	696	1,271	946	1,502	14,367	1,365	257	26,691	8,424	9,112	1,497	13,867	736	19,403	0	25,076	0	1,085	1,203	1,680	6,657		141,860
1997-98	2,008	1,853	1,551	378	3,923	1,489	4,281	1,175	10,911	1,226	62	43,884	19,197	15,978	3,732	17,305	1,103	66,233	0	39,426	0	1,735	1,622	2,866	5,782		247,720
1998-99		2,397	80	137	1,733	595	54	843	10,666	3,846	48	5,589	15,388	1,329	1,292	14,166	242	0	0	10,909	0	909	948	1,560	6,131		78,860
1999-00		5,583	213	163	1,098	1,072	701	647	7,149	2,378	0	6,319	14,264	4,031	553	33,040	220	10,775	0	32,872	0	396	1,415	742	4,314		127,950
2000-01		567	250	248	876	1,763	754	234	3,437	2,724	74	11,328	6,783	4,554	820	22,617	366	26,496	0	28,311	0	473	2,682	1,200	5,740		122,300
2001-02		5,325	2	236	392	1,052	35	398	7,274	2,738	0	14,073	4,350	1,523	67	30,733	17	11,133	0	32,012	0	550	1,375	198	3,176		116,660
2002-03		5,301	0	455	29	1,325	413	661	9,652	620	11	15,732	4,292	6,313	52	33,577	291	31,388	0	3,988	0	584	2,287	1,106	2,236		120,310
2003-04		2,663	26	458	290	930	232	576	7,534	1,936	0	13,812	1,083	3,376	1,144	24,794	114	39,132	0	9,555	0	258	2,145	548	3,421		114,030
2004-05		8,160	1,778	248	3,111	2,464	4,197	1,627	11,822	354	783	59,594	20,146	43,312	2,455	31,030	1,603	115,319	0	103,347	0	2,440	3,261	3,460	7,283		427,790
2005-06		3,921	1,558	1,481	2,454	2,700	1,244	663	6,907	358	618	39,170	15,234	4,446	2,572	32,880	682	69,629	0	31,245	0	884	2,035	2,060	6,417		229,160
2006-07		523	414	125	1,119	1,142	0	55	1,277	207	0	6,618	1,382	3,037	378	17,890	31	1,981	0	30,929	0	50	1,693	486	3,268		72,610
2007-08		2,175	544	152	722	676	1,218	218	1,272	220	193	26,165	5,875	4,261	1,451	17,614	448	2,520	0	20,168	0	543	1,788	1,442	5,307		94,970
2008-09		388	543	28	625	1,050	297	60	375	394	164	10,290	1,406	3,493	897	27,366	137	26	0	42,439	0	171	750	946	5,923		97,770
2009-10		1,558	227	0	921	1,077	1,031	524	15,264	1,205	463	32,578	21,895	7,498	1,573	22,002	798	32,810	0	73,321	0	263	903	2,164	7,070		225,150
2010-11		3,058	2,157	0	3,840	1,628	2,462	894	14,385	2,534	233	55,085	52,592	16,578	2,097	25,940	672	79,340	0	53,509	0	585	1,031	2,533	6,479		327,630
max	6,450	8,160	3,770	2,730	6,480	3,480	4,760	2,630	41,110	5,550	1,660	59,590	52,590	50,030	6,050	33,580	1,640	115,320	37,780	103,350	26,090	2,930	3,260	3,460	7,830	58,890	427,790
min	0	0	0	0	0	0	0	0	0	0	0	5,590	1,080	0	0	0	0	0	0	0	0	0	0	200	2,240	1,470	0
mean	910	1,980	650	410	620	740	760	440	3,710	570	130	24,330	11,640	5,070	1,060	7,920	390	19,340	2,150	23,420	2,690	600	830	1,570	5,440	34,280	74,020
last 5 yr		1,540	780	60	1,450	1,110	1,000	350	6,510	910	210	26,150	16,630	6,970	1,280	22,160	420	23,340	0	44,070	0	320	1,230	1,510	5,610		163,630
last 10 yr		3,310	720	320	1,350	1,400	1,110	570	7,580	1,060	250	27,310	12,830	9,380	1,270	26,380	480	38,330	0	40,050	0	630	1,730	1,490	5,060		182,610

Station Name

63 Santa Anita Dam - Debris Basin
68 Sawpit Dam
89 San Dimas Dam
95 San Dimas Fire Warden
96 Puddingstone Dam
108 El Monte Fire Station
144 Sierra Madre Dam

167 Arcadia Pumping Plant
201 Hacienda Heights Fire Station
223 Big Dalton Dam
235 Henninger Flats
334 Cogswell Dam
338 Mt. Wilson-Observatory
356 Cal Poly Pomona

387 Covina City Yard
390 Morris Dam
425 San Gabriel Dam
610 Pasadena City Hall
683 Sunset Ridge
742 San Gabriel Fire Station
1037 Arcadia Arboretum

1041 Santa Fe Dam
1114 Whittier Narrows Dam
1140 Rosemead Fire Station
1257 San Jose Creek Reclamation Plant
1260 Spadra Landfill

APPENDIX J

INCIDENTAL PERCOLATION OF WATER DISCHARGED INTO SAN JOSE CREEK

APPENDIX J. INCIDENTAL PERCOLATION OF WATER DISCHARGE INTO SAN JOSE CREEK.

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	INFLOW (ACRE-FEET)												OUTFLOW (ACRE-FEET)				RECHARGE	INCIDENTAL RECYCLED WATER PERCOLATION	Ave Precip		Perc/Prec	San Jose WRP - F263
WATER YEAR	F81-Alhambra	F82-Rubio	F318-Eaton	F317-Arcadia	F193-SantaAnita	F194-Sawpit	U8-SanGabriel	F274-Dalton	F304-Walnut	F312-SanJose	San Jose WRP	Total	F263-SanGabriel	Spreading	Imported	Total	(ACRE-FEET)	(ACRE-FEET)	(Inches)	(acre-feet)	(%)	
1949-50	3,090	1,690					50	310				5,140	4,130	440		4,570	570		20	640,440	0.1	
1950-51	2,360	1,010					6,230	60				9,670	560	40		600	9,070		10	422,630	2.1	
1951-52	9,050	5,300					66,120	2,090				82,560	50,930	4,570		55,500	27,060		40	1,394,400	1.9	
1952-53	3,230	1,460					50,020	290	290			55,300	13,850	340		14,200	41,100		10	525,150	7.8	
1953-54	3,780	2,480					25,030	1,060	25,410			57,770	10,990	4,940		15,930	41,840		20	720,560	5.8	
1954-55	3,020	1,880					90	710	21,650			27,330	9,250	350		9,600	17,730		20	625,020	2.8	
1955-56	5,530	2,880		1,830			180	2,270	49,630	4,070		66,380	23,900	1,260		25,160	41,220		20	738,360	5.6	
1956-57	4,440	2,290	2,400	1,340			9,010	980	51,470	800		72,740	18,020	1,540		19,560	53,180		20	628,320	8.5	
1957-58	9,270	5,610	7,440	3,330			174,130	4,690	8,490	14,060		227,030	82,190	25,260		107,450	119,580		40	1,344,260	8.9	
1958-59	3,020	2,030	2,850	1,360			8,200	2,190	1,610	1,090		22,350	33,690	4,420		38,100	-15,750		10	430,960	-3.7	
1959-60	2,720	1,820	2,420	1,220	470		0	2,260	1,300	3,430		15,640	36,100	5,620		41,720	-26,080		10	446,450	-5.8	
1960-61	1,790	1,270	1,590	730	220	260	1,250	2,220	9,010	400		18,750	47,720	3,850		51,570	-32,820		10	295,830	-11.1	
1961-62	6,240	4,120	6,880	3,390	5,910	11,990	73,600	7,200	4,800	9,530		133,660	103,060	34,650		137,710	-4,050		30	992,250	-0.4	
1962-63	2,870	1,760	2,980	1,510	710	1,180	710	4,110	3,360	5,540		24,740	42,430	8,740		51,170	-26,420		10	538,100	-4.9	
1963-64	2,870	1,870	3,040	1,610	650	1,200	160	2,750	2,860	4,900		21,910	45,720	7,620		53,340	-31,420		10	478,030	-6.6	
1964-65	4,610	2,030	3,760	2,270	990	1,500	7,740	3,180	11,630	10,110		47,810	77,270	18,000	11,250	84,030	-36,220		20	713,220	-5.1	
1965-66	7,750	4,660	8,990	3,420	8,720	9,240	162,880	6,310	7,930	15,300		235,210	55,320	62,290	16,250	101,360	133,850		30	1,050,650	12.7	
1966-67	8,820	5,230	8,680	4,580	11,570	16,020	167,900	10,150	15,060	26,250		274,260	62,810	127,190	22,500	167,500	106,760		30	1,222,310	8.7	
1967-68	4,750	0	0	0	0	0	23,060	4,310	16,900	17,870		66,880	26,240	37,690	27,650	36,270	30,610		20	610,660	5.0	
1968-69	12,300	0	0	0	0	0	541,690	32,810	49,490	52,980		689,260	274,240	78,920	15,460	337,710	351,550		50	1,661,740	21.2	
1969-70	3,710	0	0	0	2,330	4,830	37,930	0	3,250	20,920		72,970	79,090	46,470	0	125,560	-52,590		20	552,970	-9.5	
1970-71	5,160	0	0	0	2,430	4,180	22,760	0	6,810	16,240		57,580	55,040	40,950	730	95,260	-37,690		20	644,550	-5.8	
1971-72	3,040	0	0	0	320	1,450	11,080	0	3,000	12,920		31,820	32,720	18,840	3,960	47,600	-15,780		10	378,370	-4.2	
1972-73	9,110	0	0	0	4,270	12,150	94,970	0	6,910	27,580	24,070	179,060	64,030	87,000	7,520	143,510	35,560		30	1,017,720	3.5	
1973-74	5,720	4,590	6,840	3,190	2,080	6,490	44,030	87,440	6,670	24,090	21,040	212,200	60,510	65,670	15,330	110,850	101,340		20	755,560	13.4	
1974-75	4,010	3,220	4,800	2,240	830	2,000	19,050	37,830	5,110	46,280	19,190	144,560	38,990	45,800	33,360	51,430	93,120		20	664,190	14.0	
1975-76	3,720	2,870	3,890	2,540	1,050	1,280	20,130	40,670	2,730	17,690	19,840	116,410	32,850	35,630	26,380	42,100	74,310		20	617,140	12.0	
1976-77	4,320	3,180	3,620	2,110	730	2,360	15,750	10,000	3,900	16,390	19,900	82,260	17,230	28,360	18,890	26,700	55,550	2,660	20	611,890	9.1	2,660
1977-78	12,250	9,340	21,320	6,790	25,510	51,110	419,950	67,870	47,040	53,040	29,000	743,220	256,750	150,180	23,150	383,770	359,450	0	50	1,821,010	19.7	0
1978-79	7,590	5,600	7,040	3,220	8,950	11,800	99,300	71,570	12,580	30,970	23,260	281,870	37,380	99,030	24,680	111,730	170,140	0	30	968,750	17.6	0
1979-80	12,990	8,350	27,840	6,970	49,910	33,220	326,270	59,830	38,290	56,810	19,590	640,060	202,740	103,230	4,350	301,610	338,450	0	40	1,543,880	21.9	0
1980-81	3,650	3,030	3,840	1,930	970	16,730	27,350	15,730	3,380	63,230	16,660	156,480	23,990	49,690	10,660	63,020	93,460	0	10	481,840	19.4	0
1981-82	4,290	2,870	5,410	3,090	2,470	9,550	57,240	36,450	8,030	24,020	17,520	170,940	23,130	128,900	39,050	112,980	57,970	0	20	909,700	6.4	0
1982-83	12,890	9,050	29,500	7,720	55,040	35,490	313,930	37,680	32,720	46,360	55,780	636,170	119,620	292,240	22,090	389,770	246,400	0	50	1,818,010	13.6	0
1983-84	2,650	2,010	3,250	2,260	6,370	14,750	48,850	23,390	4,100	17,660	42,110	167,410	22,370	69,040	2,510	88,890	78,520	19,750	10	483,300	16.2	19,750
1984-85	3,480	2,520	4,180	3,360	2,090	1,860	32,910	38,500	5,820	26,700	42,160	163,580	22,490	59,400	14,020	67,870	95,720	19,680	20	654,150	14.6	19,680
1985-86	6,570	4,390	4,800	5,960	4,900	11,770	94,720	26,390	9,390	36,710	52,610	258,220	31,360	129,170	55,880	104,650	153,570	21,250	30	980,940	15.7	21,250
1986-87	2,480	2,450	1,460	2,440	430	820	44,030	46,840	3,940	27,270	46,460	178,630	22,190	75,460	52,950	44,700	133,930	24,270	10	356,740	37.5	24,270
1987-88	4,990	3,090	3,040	3,880	1,120	2,390	54,900	31,100	5,360	25,140	43,420	178,430	23,580	87,460	44,470	66,570	111,860	19,840	20	799,110	14.0	19,840
1988-89	3,500	2,080	2,120	2,630	700	1,160	66,750	36,790	1,620	41,150	32,640	191,130	51,220	75,900	46,320	80,800	110,330	0	20	567,540	19.4	0
1989-90	3,430	3,230	2,270	2,480	620	900	46,060	38,560	1,710	53,770	34,440	187,480	28,250	102,290	49,170	81,370	106,110	6,200	10	489,350	21.7	6,200
1990-91	5,300	3,490	3,940	3,570	1,610	12,630	79,120	14,050	23,370	48,410	25,360	220,850	24,870	155,420	57,690	122,600	98,250	500	20	724,760	13.6	500
1991-92	9,900	4,110	10,300	8,040	13,960	26,730	149,510	7,250	20,380	60,220	38,670	349,090	30,470	297,900	66,890	261,480	87,610	8,200	30	1,076,830	8.1	8,200
1992-93	14,170	5,730	21,580	12,560	25,850	30,690	474,310	27,370	49,860	90,380	47,720	800,210	273,250	294,870	56,550	511,570	288,640	0	50	1,711,320	16.9	0
1993-94	5,040	1,640	2,120	4,660	1,620	2,670	41,860	4,470	4,810	7,190	41,220	117,300	25,990	71,840	34,310	63,520	53,780	15,230	10	518,760	10.4	15,230
1994-95	10,050	6,780	14,500	8,030	13,920	21,160	158,260	14,160	17,970	75,670	66,260	406,760	105,920	233,660	24,890	314,690	92,070	0	40	1,421,710	6.5	0
1995-96	5,080	5,470	5,730	3,760	3,270	31,990	89,810	9,920	12,330	32,250	48,510	248,110	34,720	143,870	38,130	140,460	107,650	13,790	20	758,690	14.2	13,790
1996-97	6,270	2,790	4,620	4,540	4,110	16,350	65,350	21,890	9,360	29,240	53,710	218,220	52,270	141,860	57,030	137,100	81,110	1,440	20	806,850	10.1	1,440
1997-98	14,650	6,590	14,060	9,640	15,990	23,540	263,960	16,230	28,230	51,170	60,450	504,500	168,620	247,720	50,500	365,840	138,670	0	40	1,573,710	8.8	0
1998-99	4,400	1,560	1,990	3,020	720	2,500	23,970	5,240	4,590	18,950	56,770	123,700	25,730	78,860	25,430	79,160	44,540	31,040	10	401,680	11.1	31,040
1999-00	5,300	2,960	3,360	3,100	1,510	1,750	42,950	20,530	11,220	58,900	65,830	217,400	42,580	127,950	57,010	113,510	103,890	23,250	20	647,410	16.0	23,250
2000-01	7,390	4,120	4,680	4,320	2,110	2,450	47,240	16,020	8,760	60,450	59,540	217,090	49,410	122,300	43,760	127,950	89,140	10,130	20	694,260	12.8	10,130
2001-02	5,450	2,190	1,680	1,900	820	710	47,420	21,440	2,000	53,820	38,000	175,420	34,240	116,660	48,670	102,230	73,190	3,760	10	299,650	24.4	3,760
2002-03	9,650	5,110	5,350	4,660	1,930	4,370	85,270	24,360	10,860	44,680	44,150	240,390	32,740	120,310	59,410	93,640	146,740	11,410	20	863,140	17.0	11,410
2003-04	7,530	2,810	3,580	3,280	1,260	2,120	64,260	21,140	6,010	38,400	53,620	204,010	24,880	114,030	56,670	82,240	121,770	28,740	10	523,440	23.3	28,740
2004-05	19,790	8,150	27,630	12,040	30,960	32,040	541,290	55,690	42,620	82,730	62,790	915,730	221,570	427,790	36,050	613,310	302,420	0	50	1,940,870	15.6	0
2005-06	8,600	3,430	4,600	4,170	3,040	9,030	155,590	12,470	14,060	75,230	57,380	347,610	51,930	229,160	65,470	215,610	132,000	5,450	20	759,310	17.4	5,450
2006-07	5,770	1,100	1,250	1,450	640	1,020	20,350	16,150	9,920	51,640	46,070	155,360	39,690	72,610	20,520	91,770	63,590	6,380	10	271,090	23.5	6,380
2007-08	7,540	3,720	5,010	5,460	11,220	8,030	78,250	7,130	11,080	33,890	47,070	218,380	36,630	94,970	7,450	124,160	94,230	10,440	20	777,740	12.1	10,440
2008-09	6,630	2,560	3,120	3,200	1,420	7,300	25,480	9,080	7,540	26,430	44,340	137,090	20,860	97,770	13,130	105,490	31,590	23,480	20	558,470	5.7	23,480
2009-10	9,260	3,900	6,350	4,730	3,350	3,890	129,210	15,460	13,750	70,660	26,120	286,680	26,520	225,150	41,640	210,030	76,650	0	20	879,250	8.7	0
2010-11	5,260	2,740	4,510	3,230	4,980	18,380	124,330	13,780	8,660	37,560	44,870	268,310	58,060	327,630	79,490	277,410	0	0	30	1,061,680	0.0	0
max	19,790	9,340	29,500	12,560	55,040	51,110	541,690	87,440	51,470	90,380	66,260	915,730	274,240	427,790	79,490	613,310	359,450	31,040	50	1,940,870	40.0	31,040
min	1,790	0	0	0	0	0	0	0	290	400	16,660	5,140	560	40	0	600	-52,590	0	10	271,090	-10.0	0
mean	6,360	3,260	6,110	3,550	6,670	10,330	95,550	18,560	13,740	33,910	40,720	215,760	58,790	96,140	32,540	129,800	86,110	8,770	20	820,430	10.0	8,770
last 5 yr	6,890	2,800	4,050	3,610	4,320	7,720	75,520	12,320	10,190	44,040	41,690	213,160	36,350	163,630	32,450	161,770	53,210	8,060	20	709,650	10.0	8,060
last 10 yr	8,550	3,570	6,310	4,410	5,960	8,690	127,150	19,670	12,650	51,500	46,440	294,900	54,710	182,610	42,850	191,590	104,220	8,970	20	793,460	10.0	8,970

estimated using F81 trend

estimated using U8 trend

estimated using F193 trend

estimated using F274 trend

Incidental Percolation = (Discharge from SJWRP to San Jose Creek - Flow at F263) if (Discharge from SJWRP to San Jose Creek - Flow at F263 > 0)

Incidental Percolation = 0 if (Discharge from SJWRP to San Jose Creek - Flow ar F263 < 0)

APPENDIX K

TOTAL DISSOLVED SOLIDS, NITRATE, CHLORIDE, AND SULFATE CONCENTRATIONS OF RECHARGE AND DISCHARGE WATERS

APPENDIX K. TOTAL DISSOLVED SOLIDS (TDS), NITRATE, CHLORIDE, AND SULFATE CONCENTRATIONS OF RECHARGE AND DISCHARGE WATERS

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Water Year (Oct-Sep)	Groundwater Extraction from San Gabriel Basin (1)				Surface Water in San Gabriel River at Azusa (2)				Recycled Water at Whittier Narrows WRP (Direct Use) (3)				Recycled Water at San Jose Creek WRP Discharged to River (3)				Untreated Imported Water from State Water Project (3)				Treated Imported from Weymouth Plant (4)			
	TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate
	---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------			
1973-74	324	19.6	21	48	184	1.2	6	21	635	15.4	101	104	681	96.3	175	109	307	0.4	59	42	533	1.1	85	203
1974-75	331	24.6	27	50	199	1.2	8	30	510	6.2	82	81	678	101.3	137	91	282	0.5	57	42	710	0.4	85	203
1975-76	353	34.7	29	50	196	1.5	9	19	539	4.9	94	98	645	60.8	145	88	214	0.9	51	37	441	0.6	85	203
1976-77	362	30.6	29	62	205	2.2	7	25	567	7.1	85	101	648	63.5	135	94	190	0.9	94	47	546	0.4	85	203
1977-78	357	22.0	25	53	180	2.4	6	21	510	11.3	90	124	656	69.8	161	97	303	1.4	41	43	610	0.2	85	203
1978-79	349	28.0	25	53	188	1.9	6	21	602	9.5	113	150	651	87.3	157	140	184	1.4	38	39	496	0.6	85	203
1979-80	337	26.6	25	45	179	1.5	8	14	489	6.8	80	90	635	88.7	153	159	242	1.4	17	22	502	1.2	85	203
1980-81	306	21.2	23	42	251	1.2	10	24	521	8.6	94	124	621	75.6	132	109	265	2.7	57	59	466	1.2	85	203
1981-82	354	29.7	29	56	216	1.3	8	19	467	5.0	150	75	578	79.2	117	77	217	3.2	40	45	490	1.6	85	203
1982-83	336	25.9	37	44	252	2.8	6	21	503	4.3	75	84	582	86.9	132	110	262	1.8	5	11	422	1.3	85	203
1983-84	308	20.9	21	39	226	6.0	6	21	529	12.2	70	142	565	91.8	146	111	167	1.4	27	35	608	0.9	85	203
1984-85	359	27.0	28	54	184	3.5	11	24	474	4.1	76	118	624	82.4	89	108	157	1.4	30	32	534	1.1	85	203
1985-86	381	30.0	29	52	240	1.8	6	21	506	5.0	74	134	595	75.6	110	150	174	2.3	80	37	492	1.1	85	203
1986-87	334	24.4	25	44	319	6.1	6	21	567	3.2	75	124	581	74.3	120	110	256	1.8	50	43	463	1.4	85	203
1987-88	340	28.6	23	48	256	3.1	6	21	485	9.5	89	86	604	70.2	89	128	321	2.3	98	47	504	0.9	67	191
1988-89	350	29.7	27	45	304	1.5	6	21	522	1.8	78	90	598	73.8	125	122	342	2.3	133	55	506	1.0	77	184
1989-90	325	23.9	23	45	390	0.9	4	26	714	1.4	89	114	619	84.2	129	122	315	2.7	96	46	511	1.2	83	179
1990-91	326	24.3	24	44	326	3.4	3	21	608	2.6	89	135	638	84.6	152	190	376	3.2	135	55	548	1.1	93	195
1991-92	305	23.5	28	45	263	1.3	4	15	589	5.0	110	164	647	77.0	149	147	367	2.7	86	83	620	1.0	88	245
1992-93	319	22.9	26	48	204	1.6	6	15	589	5.9	99	126	640	72.5	117	126	329	2.3	57	52	609	1.2	92	237
1993-94	373	26.1	28	53	284	1.0	7	22	509	10.3	95	110	645	61.7	132	125	247	1.8	53	35	624	1.2	91	250
1994-95	299	21.3	26	44	178	2.3	5	12	533	1.7	95	106	657	60.3	118	130	277	2.7	58	53	647	1.1	96	263
1995-96	354	22.2	29	58	290	2.2	2	18	519	1.8	95	79	647	71.1	110	102	210	2.3	44	37	612	1.0	91	246
1996-97	338	23.3	28	49	191	1.9	6	21	526	1.0	96	85	626	59.4	114	121	184	1.8	32	26	599	0.9	88	238
1997-98	289	24.5	27	46	160	2.0	6	21	587	24.8	91	83	599	64.4	107	104	181	2.1	54	27	557	0.8	80	217
1998-99	198	21.3	21	38	204	2.0	6	21	503	32.6	85	78	583	67.8	106	88	186	2.7	33	32	533	1.1	85	203
1999-00	320	21.5	24	47	208	2.5	5	25	551	27.7	94	95	581	64.3	103	78	226	2.9	43	37	533	1.1	85	203
2000-01	337	20.9	26	45	250	2.3	6	21	545	30.9	97	90	593	58.2	110	97	270	3.3	83	49	533	1.1	85	203
2001-02	358	21.5	33	56	240	2.2	5	24	552	69.8	95	98	626	57.1	113	101	286	3.1	74	44	533	1.1	85	203
2002-03	342	23.9	31	51	260	2.9	6	21	466	22.5	99	98	632	46.3	113	84	266	2.7	48	41	533	1.1	85	203
2003-04	366	21.5	29	50	240	2.8	6	21	550	29.3	98	91	612	32.7	106	87	243	3.8	46	41	533	1.1	85	203
2004-05	380	20.8	35	51	185	2.4	6	21	573	17.1	100	99	626	27.4	101	79	235	2.3	56	54	533	1.1	85	203
2005-06	373	20.3	32	54	240	2.0	6	21	531	28.4	113	93	609	24.9	105	79	188	2.8	37	34	533	1.1	85	203
2006-07	358	20.1	33	62	272	2.0	3	24	550	30.2	108	95	631	28.7	104	74	233	3.6	70	45	371	2.3	69	117
2007-08	353	24.6	32	49	200	2.4	6	21	540	28.8	110	98	649	28.5	112	81	276	2.4	68	48	491	2.1	91	166
2008-09	336	25.6	27	46	220	2.0	4	22	600	34.0	112	108	657	31.2	116	98	280	2.6	72	45	617	1.4	98	239
2009-10	385	24.8	36	70	197	2.2	4	22	582	32.7	94	128	618	28.7	108	85	238	2.6	59	42	562	1.3	91	208
2010-11	367	22.7	36	50	233	3.4	4	22	532	29.5	110	98	560	36.1	118	78	163	2.6	32	31	455	1.6	80	157
2011-12	306	19.0	24	44	232	2.3	4	22	544	15.3	116	93	622	64.3	107	75	249	2.2	80	37	380	1.6	70	122
Maximum	390	34.7	37	70	390	6.1	11	30	714	69.8	150	164	681	101.3	175	190	376	3.8	135	83	710	2.3	98	263
Minimum	200	19.0	21	38	160	0.9	2	12	466	1.0	70	75	560	24.9	89	74	157	0.4	5	11	371	0.2	67	117
AVERAGE	338	24.2	28	49	232	2.3	6	21	544	15.3	95	105	622	64.3	122	106	249	2.2	59	42	533	1.1	85	203
Last 5 years Ave.	349	23.3	31	52	216	2.5	4	22	560	28.1	108	105	621	37.8	112	83	241	2.5	62	41	501	1.6	86	178
Last 10 years Ave.	357	22.3	31	53	228	2.4	5	22	547	26.8	106	100	621	34.9	109	82	237	2.8	57	42	501	1.5	84	182

(1) From Main San Gabriel Basin Watermaster Database (Fiscal Year from July to June)
(2) From USGS to 1980-81 (Water Year), from Watermaster after 1980-81 (Fiscal Year) (Covina Irrigating Diversion and Upper San Gabriel Canyon Wells)
(3) From San Gabriel River Watermaster Database
(4) Metropolitan Water District of Southern California Annual Reports
(5) From Raymond Basin Management Control Board Database (average concentrations of wells owned by producers exporting water to Main San Gabriel Basin)
(6) From San Gabriel River Watermaster annual reports
(7) From San Gabriel Valley Water Company Well B7C
[grey shading] The longterm average was used for years when data was either not collected or not readily available.

25	26	27	28	29	30	31	32	33	34	35	36
Imported Water from Raymond Basin (5)				Subsurface Flow to Central Basin (6)				Subsurface flow from Puente Basin (7)			
TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate	TDS	Nitrate	Chloride	Sulfate
---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------				---------- Mean Concentration, mg/L ----------			
330	28.7	20	43	337	5.0	22	57	551	11.6	53	158
330	28.7	20	43	290	4.9	24	71	551	11.6	53	158
330	28.7	20	43	289	6.7	10	28	551	11.6	53	158
330	28.7	20	43	249	6.7	48	30	551	11.6	53	158
330	28.7	20	43	232	1.0	18	33	551	11.6	53	158
330	28.7	20	43	236	0.9	19	33	551	11.6	53	158
330	28.7	20	43	284	3.7	15	35	551	11.6	53	158
330	28.7	20	43	258	3.5	17	38	551	11.6	53	158
330	28.7	20	43	272	3.2	16	39	551	11.6	53	158
330	28.7	20	43	316	1.7	9	22	551	11.6	53	158
330	28.7	20	43	230	5.0	17	67	551	11.6	53	158
330	28.7	20	43	270	3.6	14	49	551	17.9	53	158
330	28.7	20	43	193	1.8	12	83	598	15.6	58	169
330	28.7	20	43	165	5.3	17	47	586	12.4	55	155
308	23.8	20	43	350	6.8	24	64	516	11.2	52	153
315	24.4	20	43	207	4.5	15	39	497	12.8	48	154
272	22.7	20	43	337	7.7	37	81	522	12.3	54	152
327	30.4	20	43	407	8.1	44	96	551	9.5	53	158
350	35.3	20	43	496	11.3	72	117	551	28.4	53	158
275	29.4	20	43	434	7.7	57	106	653	10.8	74	174
369	24.0	20	43	475	7.7	66	110	551	10.4	53	158
336	34.6	20	43	460	7.3	70	119	551	11.6	53	158
273	34.9	20	43	440	6.7	55	91	515	7.7	45	162
347	33.9	20	43	430	28.8	59	100	551	8.7	53	158
354	33.5	18	37	410	5.0	51	85	520	9.5	53	158
280	32.3	20	43	360	6.3	48	80	534	9.3	47	153
342	32.0	20	43	420	6.8	57	95	547	8.8	53	158
330	30.8	20	43	500	6.3	76	114	546	8.5	53	158
326	29.8	18	42	480	8.1	60	160	520	9.8	51	160
340	29.0	20	48	410	7.7	60	160	551	10.0	53	158
357	27.5	20	43	410	7.7	60	160	570	11.6	53	158
310	27.0	20	43	410	7.9	88	120	560	9.1	49	160
394	24.7	20	43	412	7.2	59	85	580	9.5	53	158
360	25.3	20	46	454	8.1	57	88	610	12.0	53	158
373	25.7	20	43	486	7.7	83	110	580	10.0	45	140
351	25.9	19	44	440	6.3	65	90	480	10.0	53	158
310	26.6	20	42	500	9.5	88	110	530	12.0	53	158
310	26.6	20	43	210	10.8	94	110	551	14.0	53	158
330	28.7	22	44	357	6.7	84	100	551	11.6	53	158
394	35.3	22	48	500	28.8	94	160	652.7	28.4	74	174
272	22.7	18	37	165	0.9	9	22	480.0	7.7	45	140
330	28.7	20	43	357	6.7	46	83	551	11.6	53	158
335	26.7	20	43	399	8.2	83	104	538.4	11.5	51	154
343	26.7	20	44	409	7.9	74	113	556.3	11.0	52	156

APPENDIX L

RECLAIMED WATER IN SAN GABRIEL BASIN

APPENDIX L. RECYCLED WATER IN SAN GABRIEL BASIN

column #	1	2	3	4	5	6	7	8	9	10	11	12
	RECYCLED WATER IN MAIN SAN GABRIEL BASIN (ACRE-FEET) (1)											
WATER YEAR (OCT-SEP)	WHITTIER NARROWS WRP		POMONA WRP				SAN JOSE CREEK WRP					RECYCLED WATER DIRECT USE (MAIN BASIN)
	PRODUCTION	DIRECT USE (MAIN BASIN) (3)	PRODUCTION	DIRECT USE (MAIN BASIN)	RECHARGE (MAIN BASIN) (2)	DISCHARGE TO OCEAN (2)	PRODUCTION	DIRECT USE (MAIN BASIN) (3)	RECHARGE (MAIN BASIN)	DISCHARGE TO SAN JOSE CREEK	DISCHARGE TO OCEAN	
1965-66	15,841											0
1966-67	16,320											0
1967-68	18,402		6,862	0		486						0
1968-69	17,124		7,840	0		1,659						0
1969-70	17,254		10,140	0		444						0
1970-71	19,558		8,500	0		196						0
1971-72	17,560		8,889	0		218						0
1972-73	13,678		9,246	0		562	32,400			24,073		0
1973-74	13,437		9,178	0	1,912	233	29,000			21,042		0
1974-75	14,676		7,850	0	2,180	180	26,400			19,192		0
1975-76	12,404		7,986	0	3,150	164	28,900			19,838		0
1976-77	10,124		7,895	0	5,203	203	32,600			19,895		0
1977-78	14,202		8,493	0	1,957	1,894	35,000			29,003		0
1978-79	10,985		7,990	0	159	406	35,000			23,259		0
1979-80	16,779		9,467	0	111	927	29,400			19,585		0
1980-81	11,532		10,679	0	587	64	31,300			16,655		0
1981-82	14,256		9,997	0	1,215	263	32,800			17,516		0
1982-83	15,535		10,785	0	1,625	1,625	60,000			55,783		0
1983-84	13,820		11,320	0	39	262	56,700			42,110		0
1984-85	13,111		12,036	0	1,280	171	56,200			42,161		0
1985-86	14,138		11,300	0	1,221	590	64,100			52,612		0
1986-87	15,750		10,764	0	627	173	66,500			46,459		0
1987-88	14,625		9,648	0	618	28	68,100			43,419		0
1988-89	14,251		10,286	0	745	169	68,770			32,638	304	0
1989-90	15,066		9,921	0	734	15	68,000			34,444	58	0
1990-91	13,916		10,410	0	1,715	67	64,000			25,364	33	0
1991-92	13,445		11,929	0	2,106	253	70,000			38,674	0	0
1992-93	13,668		14,674	0	1,119	1,705	78,200			47,722	667	0
1993-94	11,729		13,161	0	524	153	85,000			41,220	3,012	0
1994-95	12,238		12,732	0	577	1,133	92,500			66,260	7,809	0
1995-96	10,286		13,577	0	595	287	90,000			48,505	573	0
1996-97	10,144		13,798	0	495	357	92,000			53,712	1,291	0
1997-98	11,517		12,494	0	235	235	95,000			60,449	8,067	0
1998-99	11,093		12,649	0	359	128	92,000			56,767	451	0
1999-00	9,213		13,089	0	830	183	97,000			65,825	609	0
2000-01	8,315		12,509	0	970	233	99,000	1,268	0	59,542	896	1,268
2001-02	8,963		11,585	0	530	162	93,000	1,463	0	37,996	1,012	1,463
2002-03	8,652		10,068	0	428	201	94,000	1,329	0	44,151	11,140	1,329
2003-04	8,315		11,188	0	1,091	43	92,000	1,557	0	53,623	202	1,557
2004-05	8,423	38	11,570	0	518	913	92,000	1,262	0	62,790	5,391	1,300
2005-06	9,105	11	11,595	0	843	190	92,000	1,148	0	57,384	982	1,159
2006-07	7,392	834	10,264	0	779	9	86,000	1,451	0	46,069	114	2,285
2007-08	6,338	1,093	10,298	0	1,602	118	82,000	1,494	0	47,069	417	2,587
2008-09	5,344	882	9,668	0	2,909	74	79,000	1,434	0	44,337	11	2,316
2009-10	5,525	599	9,521	0	2,135	141	77,000	1,755	0	26,123	529	2,354
2010-11	7,935	359	10,249	0	1,416	326	75,000	1,955	0	44,866	601	2,314
max	19,560	1,090	14,670	0	5,200	1,890	99,000	1,960	0	66,260	11,140	2,590
min	5,340	10	6,860	0	40	10	26,400	1,150	0	16,660	0	0
mean	12,430	550	10,550	0	1,190	410	67,640	1,470	0	40,720	1,920	430
last 5 yr	6,510	750	10,000	0	1,770	130	79,800	1,620	0	41,690	330	2,370
last 10 yr	7,600	550	10,600	0	1,230	220	86,200	1,480	0	46,440	2,040	1,870

NOTES:

(1) From Annual Reports of the San Gabriel River Watermaster
(2) Determined by River Watermaster
(3) From Annual Reports of the Los Angeles County Sanitation Districts

http://www.lacsd.org/waterreuse/waterreusesummaries.asp

APPENDIX M

LOADING AND ASSIMILATIVE CAPACITY OF NITRATE IN SAN GABRIEL BASIN

APPENDIX M. LOADING AND ASSIMILATIVE CAPACITY OF NITRATE IN SAN GABRIEL BASIN

Nitrate loading

column #	1	2	3	4	5	6	7	8	9	10	11	12	13
			= 2.718 * (1) * (2)			= 2.718 * (4) * (5)	= (3) + (6)			= 2.718 * (8) * (9)			= 2.718 * (11) * (12)
	Loading from precipitation							Loading from subsurface inflow from Puente Basin			Incidental Percolation in San Gabriel River and San Jose Creek		
	From Valley Floor			From Watershed (Azusa)			total						
Water Year	VOLUME AF	NO3 MG/L	LOADING LBS	VOLUME AF	NO3 MG/L	LOADING LBS	LBS	VOLUME AF	NO3 MG/L	LOADING LBS	VOLUME AF	NO3 MG/L	LOADING LBS
1973-74	30,000	19	1,549,000	80,460	19	4,155,000	5,704,000	800	12	25,000	0	96	0
1974-75	26,240	19	1,355,000	69,620	19	3,595,000	4,950,000	710	12	22,000	0	101	0
1975-76	23,120	19	1,194,000	67,880	19	3,505,000	4,699,000	730	12	23,000	0	61	0
1976-77	25,560	19	1,320,000	63,110	19	3,259,000	4,579,000	660	12	21,000	2,660	63	459,000
1977-78	92,110	19	4,757,000	249,610	19	12,890,000	17,647,000	730	12	23,000	0	70	0
1978-79	45,940	19	2,372,000	114,160	19	5,895,000	8,267,000	850	12	27,000	0	87	0
1979-80	81,340	19	4,201,000	209,190	19	10,803,000	15,004,000	930	12	29,000	0	89	0
1980-81	18,900	19	976,000	50,560	19	2,611,000	3,587,000	820	12	26,000	0	76	0
1981-82	13,240	19	684,000	56,140	19	2,899,000	3,583,000	850	12	27,000	0	79	0
1982-83	39,540	19	2,042,000	130,930	19	6,761,000	8,803,000	850	12	27,000	0	87	0
1983-84	7,080	19	366,000	26,370	19	1,362,000	1,728,000	800	12	25,000	19,750	92	4,928,000
1984-85	10,250	19	529,000	33,910	19	1,751,000	2,280,000	820	18	40,000	19,680	82	4,405,000
1985-86	16,650	19	860,000	62,800	19	3,243,000	4,103,000	840	16	36,000	21,250	76	4,366,000
1986-87	6,220	19	321,000	18,420	19	951,000	1,272,000	850	12	29,000	24,270	74	4,898,000
1987-88	11,590	19	599,000	43,810	19	2,262,000	2,861,000	880	11	27,000	19,840	70	3,783,000
1988-89	8,340	19	431,000	32,120	19	1,659,000	2,090,000	890	13	31,000	0	74	0
1989-90	8,020	19	414,000	24,720	19	1,277,000	1,691,000	910	12	30,000	6,200	84	1,418,000
1990-91	11,640	19	601,000	37,900	19	1,957,000	2,558,000	910	10	23,000	500	85	115,000
1991-92	16,010	19	827,000	69,870	19	3,608,000	4,435,000	930	28	72,000	8,200	77	1,715,000
1992-93	36,170	19	1,868,000	127,170	19	6,567,000	8,435,000	890	11	26,000	0	72	0
1993-94	8,310	19	429,000	26,840	19	1,386,000	1,815,000	850	10	24,000	15,230	62	2,552,000
1994-95	22,220	19	1,147,000	105,470	19	5,447,000	6,594,000	860	12	27,000	0	60	0
1995-96	12,130	19	626,000	41,010	19	2,118,000	2,744,000	810	8	17,000	13,790	71	2,665,000
1996-97	12,630	19	652,000	43,870	19	2,266,000	2,918,000	820	9	19,000	1,440	59	232,000
1997-98	22,950	19	1,185,000	104,130	19	5,377,000	6,562,000	840	9	22,000	0	64	0
1998-99	0	19	0	0	19	0	0	750	9	19,000	31,040	68	5,723,000
1999-00	6,710	19	347,000	26,550	19	1,371,000	1,718,000	760	9	18,000	23,250	64	4,063,000
2000-01	7,180	19	371,000	28,860	19	1,490,000	1,861,000	860	9	20,000	10,130	58	1,603,000
2001-02	0	19	0	0	19	0	0	890	10	24,000	3,760	57	584,000
2002-03	10,410	19	538,000	45,840	19	2,367,000	2,905,000	940	10	26,000	11,410	46	1,435,000
2003-04	5,730	19	296,000	21,020	19	1,086,000	1,382,000	960	12	30,000	28,740	33	2,551,000
2004-05	28,320	19	1,463,000	135,070	19	6,975,000	8,438,000	960	9	24,000	0	27	0
2005-06	7,390	19	382,000	31,910	19	1,648,000	2,030,000	860	10	22,000	5,450	25	369,000
2006-07	0	19	0	0	19	0	0	950	12	31,000	6,380	29	498,000
2007-08	7,660	19	396,000	33,010	19	1,705,000	2,101,000	940	10	26,000	10,440	29	810,000
2008-09	5,740	19	296,000	22,420	19	1,158,000	1,454,000	960	10	26,000	23,480	31	1,991,000
2009-10	10,760	19	556,000	45,420	19	2,346,000	2,902,000	950	12	31,000	0	29	0
2010-11	13,570	19	701,000	59,320	19	3,063,000	3,764,000	990	14	38,000	15,590	36	1,528,000
Note: 2.718 is the approximate factor to convert acre feet into pounds.													
Max	92,100		4,757,000	249,600		12,890,000	17,647,000	1,000		72,000	31,000		5,723,000
Min	0		0	0		0	0	700		17,000	0		0
1973-74 to 2010-2011 mean	18,700		964,500	61,600		3,179,300	4,143,800	900		27,200	8,500		1,386,600
Last 5 yrs mean	7,500		389,800	32,000		1,654,400	2,044,200	1,000		30,400	11,200		965,400
Last 10 yrs mean	9,000		462,800	39,400		2,034,800	2,497,600	900		27,800	10,500		976,600
Last 10 yrs std deviation													
Last 10 yrs coefficient of variation													
Data Sources	Table III.6			Table III.6				Table III.6	App K		Table III.6	App K	
Column	5			14				16	34		17	14	

column #	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
				= 2.718 * (14) * (15)				= 2.718 * (18) * (19) * (20)				= 2.718 * (22) * (23) * (24)				= 2.718 * (26) * (27) * (28)							= 2.718 * ((30)*(31)*(32) +(33)*(34)*(35))	= (17) +(21) +(25) +(29) +(36)
	Loading from Returned flow																Recycled Water (irrigate golf courses, etc.)							
	San Gabriel Basin Water Uses		(Direct Uses)		Raymond Basin Water Use		(Direct Uses)		Surface Water Use		(Direct Uses_		Imported Water (blend of Weymouth)				Whittier Narrows			San Jose Creek				Total loading
Water Year	VOLUME AF	COEFF.	NO3 MG/L	LOADING LBS	VOLUME AF	COEFF.	NO3 MG/L	LOADING LBS	VOLUME AF	COEFF.	NO3 MG/L	LOADING LBS	VOLUME AF	COEFF.	NO3 MG/L	LOADING LBS	VOLUME AF	COEFF.	NO3 MG/L	VOLUME AF	COEFF.	NO3 MG/L	Loading LBS	LBS
1973-74	221,089	0.09	29	1,587,000	4,648	0.09	43	49,000	14,349	0.09	19	67,000	630	0.09	19	3,000	0	0.09	19	0	0.09	144	0	1,706,000
1974-75	207,648	0.09	37	1,874,000	5,926	0.09	43	63,000	15,483	0.09	19	72,000	1,036	0.09	19	5,000	0	0.09	19	0	0.09	152	0	2,014,000
1975-76	226,016	0.09	52	2,879,000	4,262	0.09	43	45,000	13,992	0.09	19	65,000	3,539	0.09	19	16,000	0	0.09	19	0	0.09	91	0	3,005,000
1976-77	196,034	0.09	46	2,199,000	3,076	0.09	43	32,000	14,197	0.09	19	66,000	9,471	0.09	19	44,000	0	0.09	19	0	0.09	95	0	2,341,000
1977-78	181,237	0.09	33	1,461,000	4,976	0.09	43	52,000	14,169	0.09	19	66,000	11,427	0.09	19	53,000	0	0.09	19	0	0.09	105	0	1,632,000
1978-79	198,534	0.09	42	2,040,000	4,664	0.09	43	49,000	16,436	0.09	19	76,000	11,724	0.09	19	54,000	0	0.09	19	0	0.09	131	0	2,219,000
1979-80	207,493	0.09	40	2,026,000	5,031	0.09	43	53,000	15,427	0.09	19	72,000	13,032	0.09	19	61,000	0	0.09	19	0	0.09	133	0	2,212,000
1980-81	213,549	0.09	32	1,659,000	5,101	0.09	43	54,000	17,290	0.09	19	80,000	16,799	0.09	19	78,000	0	0.09	19	0	0.09	113	0	1,871,000
1981-82	203,540	0.09	45	2,218,000	2,307	0.09	43	24,000	16,003	0.09	19	74,000	17,402	0.09	19	81,000	0	0.09	19	0	0.09	119	0	2,397,000
1982-83	192,389	0.09	39	1,828,000	5,204	0.09	43	55,000	17,560	0.09	19	82,000	14,208	0.09	19	66,000	0	0.09	19	0	0.09	130	0	2,031,000
1983-84	218,028	0.09	31	1,674,000	5,702	0.09	43	60,000	18,721	0.09	19	87,000	18,298	0.09	19	85,000	0	0.09	19	0	0.09	138	0	1,906,000
1984-85	224,500	0.09	41	2,227,000	6,019	0.09	43	63,000	17,786	0.09	19	83,000	21,676	0.09	19	101,000	0	0.09	19	0	0.09	124	0	2,474,000
1985-86	229,077	0.09	45	2,517,000	4,942	0.09	43	52,000	17,124	0.09	19	80,000	20,872	0.09	19	97,000	0	0.09	19	0	0.09	113	0	2,746,000
1986-87	235,370	0.09	37	2,104,000	5,294	0.09	43	56,000	18,293	0.09	19	85,000	22,575	0.09	19	105,000	0	0.09	19	0	0.09	111	0	2,350,000
1987-88	233,165	0.09	43	2,450,000	3,284	0.09	36	29,000	14,939	0.09	19	69,000	28,537	0.09	19	133,000	0	0.09	19	0	0.09	105	0	2,681,000
1988-89	233,250	0.09	45	2,544,000	5,225	0.09	37	47,000	19,691	0.09	19	92,000	25,799	0.09	19	120,000	0	0.09	19	0	0.09	111	0	2,803,000
1989-90	238,896	0.09	36	2,091,000	3,549	0.09	34	30,000	13,365	0.09	19	62,000	31,478	0.09	19	146,000	0	0.09	19	0	0.09	126	0	2,329,000
1990-91	221,270	0.09	36	1,974,000	1,670	0.09	46	19,000	10,802	0.09	19	50,000	29,922	0.09	19	139,000	0	0.09	19	0	0.09	127	0	2,182,000
1991-92	201,750	0.09	35	1,737,000	1,298	0.09	53	17,000	19,727	0.09	19	92,000	18,606	0.09	19	86,000	0	0.09	19	0	0.09	115	0	1,932,000
1992-93	214,544	0.09	34	1,801,000	1,693	0.09	44	18,000	21,596	0.09	19	100,000	18,948	0.09	19	88,000	0	0.09	19	0	0.09	109	0	2,007,000
1993-94	220,786	0.09	39	2,112,000	2,101	0.09	36	18,000	22,820	0.09	19	106,000	18,412	0.09	19	86,000	0	0.09	19	0	0.09	92	0	2,322,000
1994-95	226,251	0.09	32	1,769,000	1,351	0.09	52	17,000	17,229	0.09	19	80,000	19,517	0.09	19	91,000	0	0.09	19	0	0.09	90	0	1,957,000
1995-96	250,011	0.09	33	2,033,000	1,553	0.09	52	20,000	18,940	0.09	19	88,000	16,931	0.09	19	79,000	0	0.09	19	0	0.09	107	0	2,220,000
1996-97	256,789	0.09	35	2,193,000	1,497	0.09	51	19,000	22,693	0.09	19	105,000	17,205	0.09	19	80,000	0	0.09	19	0	0.09	89	0	2,397,000
1997-98	235,986	0.09	37	2,121,000	1,440	0.09	50	18,000	18,054	0.09	19	84,000	14,208	0.09	19	66,000	0	0.09	25	0	0.09	97	0	2,289,000
1998-99	242,937	0.09	32	1,896,000	1,096	0.09	48	13,000	22,215	0.09	19	103,000	13,846	0.09	19	64,000	0	0.09	33	0	0.09	102	0	2,076,000
1999-00	261,676	0.09	32	2,061,000	1,985	0.09	48	23,000	17,011	0.09	19	79,000	21,062	0.09	19	98,000	0	0.09	28	0	0.09	96	0	2,261,000
2000-01	250,889	0.09	31	1,927,000	1,663	0.09	46	19,000	20,031	0.09	19	93,000	19,971	0.09	19	93,000	0	0.09	31	1,268	0.09	87	27,093	2,159,093
2001-02	247,876	0.09	32	1,959,000	1,026	0.09	45	11,000	15,818	0.09	19	74,000	35,153	0.09	19	163,000	0	0.09	70	1,463	0.09	86	30,668	2,237,668
2002-03	241,682	0.09	36	2,123,000	519	0.09	43	6,000	4,687	0.09	19	22,000	40,982	0.09	19	190,000	0	0.09	23	1,329	0.09	69	22,559	2,363,559
2003-04	258,384	0.09	32	2,036,000	553	0.09	41	6,000	7,196	0.09	19	33,000	50,758	0.09	19	236,000	0	0.09	29	1,557	0.09	49	18,659	2,329,659
2004-05	234,978	0.09	31	1,791,000	789	0.09	40	8,000	12,289	0.09	19	57,000	30,482	0.09	19	142,000	38	0.09	17	1,262	0.09	41	12,847	2,010,847
2005-06	246,691	0.09	30	1,838,000	1,496	0.09	37	14,000	13,249	0.09	19	62,000	23,125	0.09	19	107,000	11	0.09	28	1,148	0.09	37	10,565	2,031,565
2006-07	270,383	0.09	30	1,989,000	1,136	0.09	38	11,000	13,948	0.09	19	65,000	25,904	0.09	19	120,000	834	0.09	30	1,451	0.09	43	21,442	2,206,442
2007-08	250,239	0.09	37	2,259,000	1,118	0.09	39	11,000	7,928	0.09	19	37,000	30,174	0.09	19	140,000	1,093	0.09	29	1,494	0.09	43	23,346	2,470,346
2008-09	236,716	0.09	38	2,225,000	1,144	0.09	39	11,000	13,832	0.09	19	64,000	21,683	0.09	19	101,000	882	0.09	34	1,434	0.09	47	23,752	2,424,752
2009-10	222,450	0.09	37	2,026,000	681	0.09	40	7,000	14,673	0.09	19	68,000	16,329	0.09	19	76,000	599	0.09	33	1,755	0.09	43	23,299	2,200,299
2010-11	213,396	0.09	34	1,774,000	753	0.09	40	7,000	13,543	0.09	19	63,000	10,316	0.09	19	48,000	359	0.09	30	1,955	0.09	54	28,451	1,920,451
Max	270,400			2,879,000	6,000			63,000	22,800			106,000	50,800			236,000	1,100			2,000			30,700	3,005,000
Min	181,200			1,461,000	500			6,000	4,700			22,000	600			3,000	0			0			0	1,632,000
1973-74 to 2010-2011 mean	228,000			2,026,900	2,800			29,100	15,900			73,800	20,100			93,200	100			400			6,400	2,229,300
Last 5 yrs mean	238,600			2,054,600	1,000			9,400	12,800			59,400	20,900			97,000	800			1,600			24,100	2,244,500
Last 10 yrs mean	242,300			2,002,000	900			9,200	11,700			54,500	28,500			132,300	400			1,500			21,600	2,219,600
Last 10 yrs std deviation																								
Last 10 yrs coefficient of variation																								
Data Sources	F		App K		G		App K		F		App K		G				L		App K	L		App K		
Column	3		2		15		26		4		6		7				3		10	11		14		

See Table III.8 for calibration coefficients/concentrations and minimum concentrations.

38	39	40 = 2.718 * (38) * (39)	41	42	43 = 2.718 * (41) * (42)	44 = (40) +(33)	45 = (7) +(10) +(13) +(37) +(44)	46	47	48 = 2.718 * (46) *(47)	49	50	51 = 2.718 * (49) *(50)	52 = (48) +(51)	53 = (45) -(52)	54 =(54)i + (53)	55 =(54) / (56) / 2.718	56 = 0.75 * GW in storage	57	58 = 2.718 * (56) *(57)	59 = (58) - (54)	60 = (57) - (55)
Loading from direct spreading (spreading grounds)								Nitrate unloading								Groundwater mixing model Using 75% of groundwater in storage						
Local Runoff (Azusa) (diverted stormwater runoff)			Imported Water (State Water Project)			Spreading Total	Total	Groundwater extraction			Subsurface outflow Flow			Total	Nitrate	Nitrate stored in groundwater		75% of groundwater in storage	Allowable loading Basin Plan Objective		Assimilative capacity	
VOLUME AF	NO3 MG/L	LOADING LBS	VOLUME AF	NO3 MG/L	LOADING LBS	LBS	loading LBS	VOLUME AF	NO3 MG/L	UNLOADING LBS	VOLUME AF	NO3 MG/L	UNLOADING LBS	unloading LBS	balance LBS	LBS	MG/L	AF	NO3 MG/L	LBS	LBS	MG/L
56,830	19	2,935,000	8,840	19.0	457,000	3,392,000	10,827,000	221,090	20	11,754,000	23,400	5	318,000	12,072,000	-1,245,000	316,277,000	20	5,949,075	45	727,631,000	411,354,000	25
11,010	19	569,000	34,800	19.0	1,797,000	2,366,000	9,352,000	207,650	25	13,884,000	26,600	5	354,000	14,238,000	-4,886,000	311,391,000	19	5,893,448	45	720,828,000	409,437,000	26
6,570	19	339,000	29,060	19.0	1,501,000	1,840,000	9,567,000	226,020	35	21,329,000	28,050	7	510,000	21,839,000	-12,272,000	299,119,000	19	5,812,770	45	710,960,000	411,841,000	26
10,020	19	517,000	18,340	19.0	947,000	1,464,000	8,864,000	196,030	31	16,288,000	37,600	7	684,000	16,972,000	-8,108,000	291,011,000	19	5,740,598	45	702,132,000	411,121,000	26
129,630	19	6,694,000	20,550	19.0	1,061,000	7,755,000	27,057,000	181,240	22	10,823,000	27,050	1	74,000	10,897,000	16,160,000	307,171,000	19	5,965,875	45	729,686,000	422,515,000	26
68,060	19	3,515,000	30,970	19.0	1,599,000	5,114,000	15,627,000	198,530	28	15,114,000	23,850	1	58,000	15,172,000	455,000	307,626,000	19	6,007,553	45	734,784,000	427,158,000	26
97,420	19	5,031,000	5,800	19.0	300,000	5,331,000	22,576,000	207,490	27	15,007,000	23,750	4	241,000	15,248,000	7,328,000	314,954,000	19	6,144,330	45	751,513,000	436,559,000	26
49,690	19	2,566,000	0	19.0	0	2,566,000	8,050,000	213,550	21	12,288,000	31,950	4	305,000	12,593,000	-4,543,000	310,411,000	19	6,065,123	45	741,825,000	431,414,000	26
86,280	19	4,456,000	42,620	19.0	2,201,000	6,657,000	12,664,000	203,540	30	16,431,000	28,850	3	247,000	16,678,000	-4,014,000	306,397,000	19	6,054,578	45	740,535,000	434,138,000	26
263,890	19	13,628,000	28,340	19.0	1,464,000	15,092,000	25,953,000	192,390	26	13,538,000	29,250	2	133,000	13,671,000	12,282,000	318,679,000	19	6,249,780	45	764,411,000	445,732,000	26
65,710	19	3,393,000	3,330	19.0	172,000	3,565,000	12,152,000	218,030	21	12,397,000	26,750	5	360,000	12,757,000	-605,000	318,074,000	19	6,173,895	45	755,129,000	437,055,000	26
59,330	19	3,064,000	70	19.0	4,000	3,068,000	12,267,000	224,500	27	16,493,000	30,300	4	293,000	16,786,000	-4,519,000	313,555,000	19	6,091,778	45	745,085,000	431,530,000	26
73,310	19	3,786,000	55,860	19.0	2,885,000	6,671,000	17,922,000	229,080	30	18,648,000	30,950	2	148,000	18,796,000	-874,000	312,681,000	19	6,085,973	45	744,375,000	431,694,000	26
19,520	19	1,008,000	55,940	19.0	2,889,000	3,897,000	12,446,000	235,370	24	15,584,000	33,100	5	477,000	16,061,000	-3,615,000	309,066,000	19	5,995,275	45	733,282,000	424,216,000	26
43,470	19	2,245,000	43,990	19.0	2,272,000	4,517,000	13,869,000	233,170	29	18,151,000	34,150	7	627,000	18,778,000	-4,909,000	304,157,000	19	5,934,300	45	725,824,000	421,667,000	26
29,970	19	1,548,000	45,920	19.0	2,371,000	3,919,000	8,843,000	233,250	30	18,842,000	32,500	5	398,000	19,240,000	-10,397,000	293,760,000	19	5,840,093	45	714,302,000	420,542,000	26
54,790	19	2,829,000	47,500	19.0	2,453,000	5,282,000	10,750,000	238,900	24	15,487,000	32,600	8	678,000	16,165,000	-5,415,000	288,345,000	18	5,760,518	45	704,569,000	416,224,000	27
101,270	19	5,230,000	54,150	19.0	2,796,000	8,026,000	12,904,000	221,270	24	14,620,000	22,750	8	501,000	15,121,000	-2,217,000	286,128,000	18	5,748,105	45	703,051,000	416,923,000	27
229,590	19	11,856,000	68,300	19.0	3,527,000	15,383,000	23,537,000	201,750	23	12,864,000	17,800	11	544,000	13,408,000	10,129,000	296,257,000	18	5,892,480	45	720,709,000	424,452,000	27
232,240	19	11,993,000	62,630	19.0	3,234,000	15,227,000	25,695,000	214,540	23	13,342,000	23,950	8	498,000	13,840,000	11,855,000	308,112,000	19	6,073,103	45	742,801,000	434,689,000	26
33,550	19	1,733,000	38,300	19.0	1,978,000	3,711,000	10,424,000	220,790	26	15,645,000	26,700	8	559,000	16,204,000	-5,780,000	302,332,000	19	5,995,178	45	733,270,000	430,938,000	26
221,830	19	11,456,000	22,350	19.0	1,154,000	12,610,000	21,188,000	226,250	21	13,105,000	23,500	7	463,000	13,568,000	7,620,000	309,952,000	19	6,102,795	45	746,433,000	436,481,000	26
125,600	19	6,486,000	32,480	19.0	1,677,000	8,163,000	15,809,000	250,010	22	15,058,000	27,850	7	507,000	15,565,000	244,000	310,196,000	19	6,080,498	45	743,706,000	433,510,000	26
86,790	19	4,482,000	55,080	19.0	2,844,000	7,326,000	12,892,000	256,790	23	16,241,000	30,400	29	2,380,000	18,621,000	-5,729,000	304,467,000	19	6,032,970	45	737,893,000	433,426,000	26
184,830	19	9,545,000	62,890	19.0	3,248,000	12,793,000	21,666,000	235,990	25	15,715,000	26,650	5	359,000	16,074,000	5,592,000	310,059,000	19	6,133,290	45	750,163,000	440,104,000	26
65,520	19	3,384,000	13,350	19.0	689,000	4,073,000	11,891,000	242,940	21	14,045,000	26,200	6	449,000	14,494,000	-2,603,000	307,456,000	19	6,030,683	45	737,613,000	430,157,000	26
66,260	19	3,422,000	61,680	19.0	3,185,000	6,607,000	14,667,000	261,680	21	15,270,000	29,300	7	541,000	15,811,000	-1,144,000	306,312,000	19	5,968,838	45	730,049,000	423,737,000	26
79,310	19	4,096,000	42,990	19.0	2,220,000	6,316,000	11,959,093	250,890	21	14,273,000	25,900	6	443,000	14,716,000	-2,756,907	303,555,093	19	5,905,305	45	722,278,000	418,723,000	26
70,580	19	3,645,000	46,080	19.0	2,380,000	6,025,000	8,870,668	247,880	22	14,512,000	27,650	8	609,000	15,121,000	-6,250,332	297,304,761	19	5,806,995	45	710,254,000	412,949,000	26
63,880	19	3,299,000	56,440	19.0	2,915,000	6,214,000	12,943,559	241,680	24	15,726,000	23,400	8	487,000	16,213,000	-3,269,441	294,035,320	19	5,765,985	45	705,238,000	411,203,000	26
45,710	19	2,361,000	68,320	19.0	3,528,000	5,889,000	12,181,659	258,380	21	15,078,000	20,500	8	426,000	15,504,000	-3,322,341	290,712,979	19	5,702,453	45	697,467,000	406,754,000	26
406,070	19	20,970,000	21,720	19.0	1,122,000	22,092,000	32,564,847	234,980	21	13,265,000	24,100	8	516,000	13,781,000	18,783,847	309,496,826	19	5,968,335	45	729,987,000	420,490,000	26
150,120	19	7,752,000	79,040	19.0	4,082,000	11,834,000	16,286,565	246,690	20	13,611,000	22,800	7	446,000	14,057,000	2,229,565	311,726,391	19	5,988,983	45	732,512,000	420,786,000	26
47,830	19	2,470,000	24,780	19.0	1,280,000	3,750,000	6,485,442	270,380	20	14,735,000	26,100	8	575,000	15,310,000	-8,824,558	302,901,833	19	5,844,788	45	714,876,000	411,974,000	26
87,240	19	4,505,000	7,730	19.0	399,000	4,904,000	10,311,346	250,240	25	16,732,000	38,200	8	794,000	17,526,000	-7,214,654	295,687,178	19	5,755,673	45	703,976,000	408,289,000	26
91,160	19	4,708,000	6,610	19.0	341,000	5,049,000	10,944,752	236,720	26	16,484,000	27,300	6	467,000	16,951,000	-6,006,248	289,680,931	19	5,686,095	45	695,466,000	405,785,000	26
192,440	19	9,938,000	32,710	19.0	1,689,000	11,627,000	16,760,299	222,450	25	15,007,000	28,400	10	733,000	15,740,000	1,020,299	290,701,230	19	5,724,278	45	700,136,000	409,435,000	26
259,210	19	13,386,000	68,420	19.0	3,533,000	16,919,000	24,169,451	213,400	23	13,137,000	23,200	11	681,000	13,818,000	10,351,451	301,052,681	19	5,873,235	45	718,355,000	417,302,000	26
406,100		20,970,000	79,000		4,082,000	22,092,000	32,564,800	270,400		21,329,000	38,200		2,380,000	21,839,000	18,783,800	318,679,000		6,249,800		764,411,000	445,732,000	27
6,600		339,000	0		0	1,464,000	6,485,400	181,200		10,823,000	17,800		58,000	10,897,000	-12,272,000	286,128,000		5,686,100		695,466,000	405,785,000	25
104,400		5,390,500	36,800		1,899,800	7,290,400	15,077,300	228,000		15,013,800	27,500		496,900	15,510,700	-433,400	303,968,400		5,943,300		726,923,800	422,955,400	26
135,600		7,001,400	28,100		1,448,400	8,449,800	13,734,300	238,600		15,219,000	28,600		650,000	15,869,000	-2,134,700	296,004,800		5,776,800		706,561,800	410,557,000	26
141,400		7,303,400	41,200		2,126,900	9,430,300	15,151,900	242,300		14,828,700	26,200		573,400	15,402,100	-250,200	298,330,000		5,811,700		710,826,700	412,496,700	26
																7,817,213		106,171			5,405,265	0
																0.03		0.02			0.01	0.01
Table III.6 28			Table III.6 29					Table III.6 33	App K 2		Table III.6 34	App K 30						Table III.6 36				

APPENDIX N

LOADING AND ASSIMILATIVE CAPACITY OF CHLORIDE IN SAN GABRIEL BASIN

APPENDIX N. LOADING AND ASSIMILATIVE CAPACITY OF CHLORIDE IN SAN GABRIEL BASIN

Chloride loading

column #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
			= 2.718 * (1) * (2)			= 2.718 * (4) * (5)	= (3) + (6)			= 2.718 * (8) * (9)			= 2.718 * (11) * (12)				= 2.718 * (14) * (15)
	Loading from precipitation							Loading from subsurface inflow			Incidental Percolation in San Gabriel River and San Jose Creek			Loading from Returned flow			
	From Valley Floor			From Watershed (Azusa)			total	from Puente Basin						San Gabriel Basin Water Uses		(Direct Uses)	
Water Year	VOLUME AF	Cl MG/L	LOADING LBS	VOLUME AF	Cl MG/L	LOADING LBS	LBS	VOLUME AF	Cl MG/L	LOADING LBS	VOLUME AF	Cl MG/L	LOADING LBS	VOLUME AF	COEFF.	Cl MG/L	LOADING LBS
1973-74	30,000	28	2,270,000	80,460	28	6,123,000	8,393,000	800	53	114,000	0	175	0	221,089	0.09	28	1,514,000
1974-75	26,240	28	1,985,000	69,620	28	5,298,000	7,283,000	710	53	101,000	0	137	0	207,648	0.09	28	1,422,000
1975-76	23,120	28	1,749,000	67,880	28	5,166,000	6,915,000	730	53	104,000	0	145	0	226,016	0.09	28	1,548,000
1976-77	25,560	28	1,934,000	63,110	28	4,803,000	6,737,000	660	53	94,000	2,660	135	976,000	196,034	0.09	28	1,343,000
1977-78	92,110	28	6,969,000	249,610	28	18,996,000	25,965,000	730	53	104,000	0	161	0	181,237	0.09	28	1,241,000
1978-79	45,940	28	3,476,000	114,160	28	8,688,000	12,164,000	850	53	121,000	0	157	0	198,534	0.09	28	1,360,000
1979-80	81,340	28	6,154,000	209,190	28	15,920,000	22,074,000	930	53	133,000	0	153	0	207,493	0.09	28	1,421,000
1980-81	18,900	28	1,430,000	50,560	28	3,848,000	5,278,000	820	53	117,000	0	132	0	213,549	0.09	28	1,463,000
1981-82	13,240	28	1,002,000	56,140	28	4,272,000	5,274,000	850	53	121,000	0	117	0	203,540	0.09	28	1,394,000
1982-83	39,540	28	2,991,000	130,930	28	9,964,000	12,955,000	850	53	121,000	0	132	0	192,389	0.09	28	1,318,000
1983-84	7,080	28	536,000	26,370	28	2,007,000	2,543,000	800	53	114,000	19,750	146	7,837,000	218,028	0.09	28	1,493,000
1984-85	10,250	28	775,000	33,910	28	2,581,000	3,356,000	820	53	117,000	19,680	89	4,761,000	224,500	0.09	28	1,538,000
1985-86	16,650	28	1,260,000	62,800	28	4,779,000	6,039,000	840	58	132,000	21,250	110	6,353,000	229,077	0.09	28	1,569,000
1986-87	6,220	28	471,000	18,420	28	1,402,000	1,873,000	850	55	127,000	24,270	120	7,916,000	235,370	0.09	28	1,612,000
1987-88	11,590	28	877,000	43,810	28	3,334,000	4,211,000	880	52	124,000	19,840	89	4,799,000	233,165	0.09	28	1,597,000
1988-89	8,340	28	631,000	32,120	28	2,444,000	3,075,000	890	48	116,000	0	125	0	233,250	0.09	28	1,598,000
1989-90	8,020	28	607,000	24,720	28	1,881,000	2,488,000	910	54	133,000	6,200	129	2,174,000	238,896	0.09	28	1,636,000
1990-91	11,640	28	881,000	37,900	28	2,884,000	3,765,000	910	53	130,000	500	152	207,000	221,270	0.09	28	1,516,000
1991-92	16,010	28	1,211,000	69,870	28	5,317,000	6,528,000	930	53	133,000	8,200	149	3,321,000	201,750	0.09	28	1,382,000
1992-93	36,170	28	2,736,000	127,170	28	9,678,000	12,414,000	890	74	179,000	0	117	0	214,544	0.09	28	1,469,000
1993-94	8,310	28	629,000	26,840	28	2,043,000	2,672,000	850	53	121,000	15,230	132	5,464,000	220,786	0.09	28	1,512,000
1994-95	22,220	28	1,681,000	105,470	28	8,027,000	9,708,000	860	53	123,000	0	118	0	226,251	0.09	28	1,550,000
1995-96	12,130	28	918,000	41,010	28	3,121,000	4,039,000	810	45	99,000	13,790	110	4,123,000	250,011	0.09	28	1,712,000
1996-97	12,630	28	956,000	43,870	28	3,339,000	4,295,000	820	53	117,000	1,440	114	446,000	256,789	0.09	28	1,759,000
1997-98	22,950	28	1,736,000	104,130	28	7,925,000	9,661,000	840	53	120,000	0	107	0	235,986	0.09	28	1,616,000
1998-99	0	28	0	0	28	0	0	750	47	97,000	31,040	106	8,943,000	242,937	0.09	28	1,664,000
1999-00	6,710	28	508,000	26,550	28	2,021,000	2,529,000	760	53	108,000	23,250	103	6,509,000	261,676	0.09	28	1,792,000
2000-01	7,180	28	543,000	28,860	28	2,196,000	2,739,000	860	53	123,000	10,130	110	3,029,000	250,889	0.09	28	1,718,000
2001-02	0	28	0	0	28	0	0	890	51	123,000	3,760	113	1,155,000	247,876	0.09	28	1,698,000
2002-03	10,410	28	788,000	45,840	28	3,489,000	4,277,000	940	53	134,000	11,410	113	3,504,000	241,682	0.09	28	1,655,000
2003-04	5,730	28	434,000	21,020	28	1,600,000	2,034,000	960	53	137,000	28,740	106	8,280,000	258,384	0.09	28	1,770,000
2004-05	28,320	28	2,143,000	135,070	28	10,279,000	12,422,000	960	49	128,000	0	101	0	234,978	0.09	28	1,609,000
2005-06	7,390	28	559,000	31,910	28	2,428,000	2,987,000	860	53	123,000	5,450	105	1,555,000	246,691	0.09	28	1,690,000
2006-07	0	28	0	0	28	0	0	950	53	136,000	6,380	104	1,803,000	270,383	0.09	28	1,852,000
2007-08	7,660	28	580,000	33,010	28	2,512,000	3,092,000	940	45	115,000	10,440	112	3,178,000	250,239	0.09	28	1,714,000
2008-09	5,740	28	434,000	22,420	28	1,706,000	2,140,000	960	53	137,000	23,480	116	7,403,000	236,716	0.09	28	1,621,000
2009-10	10,760	28	814,000	45,420	28	3,457,000	4,271,000	950	53	136,000	0	108	0	222,450	0.09	28	1,524,000
2010-11	13,570	28	1,027,000	59,320	28	4,514,000	5,541,000	990	53	141,000	15,590	118	5,000,000	213,396	0.09	28	1,462,000
Note: 2.718 is the approximate factor to convert acre feet into pounds.																	
Max	92,100		6,969,000	249,600		18,996,000	25,965,000	1,000		179,000	31,000		8,943,000	270,400			1,852,000
Min	0		0	0		0	0	700		94,000	0		0	181,200			1,241,000
1973-74 to 2010-2011 mean	18,700		1,413,000	61,600		4,685,300	6,098,300	900		122,400	8,500		2,598,300	228,000			1,561,900
Last 5 yrs mean	7,500		571,000	32,000		2,437,800	3,008,800	1,000		133,000	11,200		3,476,800	238,600			1,634,600
Last 10 yrs mean	9,000		677,900	39,400		2,998,500	3,676,400	900		131,000	10,500		3,187,800	242,300			1,659,500
Last 10 yrs std deviation																	
Last 10 yrs coefficient of variation																	
Data Sources	Table III.6	App K		Table III.6				Table III.6	App K		Table III.6	App K		F			
Column	5	Average of 3		14				16	35		17	15		3			

column #	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
				= 2.718 * (18) * (19) * (20)				= 2.718 * (22) * (23) * (24)				= 2.718 * (26) * (27) * (28)							= 2.718 * ((30)*(31)*(32) +(33)*(34)*(35))	= (17) +(21) +(25) +(29) +(36)
	Loading from Returned flow												Recycled Water (irrigate golf courses, etc.)							
	Raymond Basin Water Use		(Direct Uses)		Surface Water Use		(Direct Uses)		Imported Water (blend of Weymouth)				Whittier Narrows			San Jose Creek				Total loading
Water Year	VOLUME AF	COEFF.	Cl MG/L	LOADING LBS	VOLUME AF	COEFF.	Cl MG/L	LOADING LBS	VOLUME AF	COEFF.	Cl MG/L	LOADING LBS	VOLUME AF	COEFF.	CL MG/L	VOLUME AF	COEFF.	CL MG/L	Loading LBS	LBS
1973-74	4,648	0.09	28	32,000	14,349	0.09	28	98,000	630	0.09	85	13,000	0	0.09	101	0	0.09	175	0	1,657,000
1974-75	5,926	0.09	28	41,000	15,483	0.09	28	106,000	1,036	0.09	85	22,000	0	0.09	82	0	0.09	137	0	1,591,000
1975-76	4,262	0.09	28	29,000	13,992	0.09	28	96,000	3,539	0.09	85	74,000	0	0.09	94	0	0.09	145	0	1,747,000
1976-77	3,076	0.09	28	21,000	14,197	0.09	28	97,000	9,471	0.09	85	197,000	0	0.09	85	0	0.09	135	0	1,658,000
1977-78	4,976	0.09	28	34,000	14,169	0.09	28	97,000	11,427	0.09	85	238,000	0	0.09	90	0	0.09	161	0	1,610,000
1978-79	4,664	0.09	28	32,000	16,436	0.09	28	113,000	11,724	0.09	85	244,000	0	0.09	113	0	0.09	157	0	1,749,000
1979-80	5,031	0.09	28	34,000	15,427	0.09	28	106,000	13,032	0.09	85	271,000	0	0.09	80	0	0.09	153	0	1,832,000
1980-81	5,101	0.09	28	35,000	17,290	0.09	28	118,000	16,799	0.09	85	349,000	0	0.09	94	0	0.09	132	0	1,965,000
1981-82	2,307	0.09	28	16,000	16,003	0.09	28	110,000	17,402	0.09	85	362,000	0	0.09	150	0	0.09	117	0	1,882,000
1982-83	5,204	0.09	28	36,000	17,560	0.09	28	120,000	14,208	0.09	85	295,000	0	0.09	75	0	0.09	132	0	1,769,000
1983-84	5,702	0.09	28	39,000	18,721	0.09	28	128,000	18,298	0.09	85	380,000	0	0.09	70	0	0.09	146	0	2,040,000
1984-85	6,019	0.09	28	41,000	17,786	0.09	28	122,000	21,676	0.09	85	451,000	0	0.09	76	0	0.09	89	0	2,152,000
1985-86	4,942	0.09	28	34,000	17,124	0.09	28	117,000	20,872	0.09	85	434,000	0	0.09	74	0	0.09	110	0	2,154,000
1986-87	5,294	0.09	28	36,000	18,293	0.09	28	125,000	22,575	0.09	85	469,000	0	0.09	75	0	0.09	120	0	2,242,000
1987-88	3,284	0.09	28	22,000	14,939	0.09	28	102,000	28,537	0.09	67	468,000	0	0.09	89	0	0.09	89	0	2,189,000
1988-89	5,225	0.09	28	36,000	19,691	0.09	28	135,000	25,799	0.09	77	486,000	0	0.09	78	0	0.09	125	0	2,255,000
1989-90	3,549	0.09	28	24,000	13,365	0.09	28	92,000	31,478	0.09	83	639,000	0	0.09	89	0	0.09	129	0	2,391,000
1990-91	1,670	0.09	28	11,000	10,802	0.09	28	74,000	29,922	0.09	93	681,000	0	0.09	89	0	0.09	152	0	2,282,000
1991-92	1,298	0.09	28	9,000	19,727	0.09	28	135,000	18,606	0.09	88	401,000	0	0.09	110	0	0.09	149	0	1,927,000
1992-93	1,693	0.09	28	12,000	21,596	0.09	28	148,000	18,948	0.09	92	426,000	0	0.09	99	0	0.09	117	0	2,055,000
1993-94	2,101	0.09	28	14,000	22,820	0.09	28	156,000	18,412	0.09	91	410,000	0	0.09	95	0	0.09	132	0	2,092,000
1994-95	1,351	0.09	28	9,000	17,229	0.09	28	118,000	19,517	0.09	96	458,000	0	0.09	95	0	0.09	118	0	2,135,000
1995-96	1,553	0.09	28	11,000	18,940	0.09	28	130,000	16,931	0.09	91	377,000	0	0.09	95	0	0.09	110	0	2,230,000
1996-97	1,497	0.09	28	10,000	22,693	0.09	28	155,000	17,205	0.09	88	370,000	0	0.09	96	0	0.09	114	0	2,294,000
1997-98	1,440	0.09	28	10,000	18,054	0.09	28	124,000	14,208	0.09	80	278,000	0	0.09	91	0	0.09	107	0	2,028,000
1998-99	1,096	0.09	28	8,000	22,215	0.09	28	152,000	13,846	0.09	85	288,000	0	0.09	85	0	0.09	106	0	2,112,000
1999-00	1,985	0.09	28	14,000	17,011	0.09	28	117,000	21,062	0.09	85	438,000	0	0.09	94	0	0.09	103	0	2,361,000
2000-01	1,663	0.09	28	11,000	20,031	0.09	28	137,000	19,971	0.09	85	415,000	0	0.09	97	1,268	0.09	110	34,120	2,315,120
2001-02	1,026	0.09	28	7,000	15,818	0.09	28	108,000	35,153	0.09	85	731,000	0	0.09	95	1,463	0.09	113	40,440	2,584,440
2002-03	519	0.09	28	4,000	4,687	0.09	28	32,000	40,982	0.09	85	852,000	0	0.09	99	1,329	0.09	113	36,736	2,579,736
2003-04	553	0.09	28	4,000	7,196	0.09	28	49,000	50,758	0.09	85	1,055,000	0	0.09	98	1,557	0.09	106	40,373	2,918,373
2004-05	789	0.09	28	5,000	12,289	0.09	28	84,000	30,482	0.09	85	634,000	38	0.09	100	1,262	0.09	101	32,107	2,364,107
2005-06	1,496	0.09	28	10,000	13,249	0.09	28	91,000	23,125	0.09	85	481,000	11	0.09	113	1,148	0.09	105	29,791	2,301,791
2006-07	1,136	0.09	28	8,000	13,948	0.09	28	96,000	25,904	0.09	69	437,000	834	0.09	108	1,451	0.09	104	58,948	2,451,948
2007-08	1,118	0.09	28	8,000	7,928	0.09	28	54,000	30,174	0.09	91	672,000	1,093	0.09	110	1,494	0.09	112	70,342	2,518,342
2008-09	1,144	0.09	28	8,000	13,832	0.09	28	95,000	21,683	0.09	98	520,000	882	0.09	112	1,434	0.09	116	64,856	2,308,856
2009-10	681	0.09	28	5,000	14,673	0.09	28	100,000	16,329	0.09	91	363,000	599	0.09	94	1,755	0.09	108	60,095	2,052,095
2010-11	753	0.09	28	5,000	13,543	0.09	28	93,000	10,316	0.09	80	202,000	359	0.09	110	1,955	0.09	118	66,091	1,828,091
Max	6,000			41,000	22,800			156,000	50,800			1,055,000	1,100			2,000			70,300	2,918,400
Min	500			4,000	4,700			32,000	600			13,000	0			0			0	1,591,000
1973-74 to 2010-2011 mean	2,800			19,100	15,900			108,700	20,100			417,900	100			400			14,000	2,121,600
Last 5 yrs mean	1,000			6,800	12,800			87,600	20,900			438,800	800			1,600			64,100	2,231,900
Last 10 yrs mean	900			6,400	11,700			80,200	28,500			594,700	400			1,500			50,000	2,390,800
Last 10 yrs std deviation																				
Last 10 yrs coefficient of variation																				
Data Sources	G				F				G		App K		L		App K	L		App K		
Column	15				4				7		23		3		11	11		15		

See Table III.8 for calibration coefficients/concentrations and minimum concentrations.

38	39	40 = 2.718 * (38) * (39)	41	42	43 = 2.718 * (41) * (42)	44 = (40) +(33)	45 = (7) +(10) +(13) +(37) +(44)	46	47	48 = 2.718 * (46) *(47)	49	50	51 = 2.718 * (49) *(50)	52 = (48) +(51)	53 = (45) -(52)	54 =(54)i + (53)	55 =(54) / (56) / 2.718	56 = 0.75 * GW in storage	57	58 = 2.718 * (56) *(57)	59 = (58) - (54)	60 = (57) - (55)
								Chloride unloading								Groundwater mixing model						
Loading from direct spreading (spreading grounds)								Groundwater extraction			Subsurface outflow					Using 75% of groundwater in storage						
Local Runoff (Azusa) (diverted stormwater runoff)			Untreated Imported Water (State Water Project)			Spreading Total	Total				Flow			Total	Cl	Chloride stored in groundwater		75% of groundwater in storage	Allowable loading Basin Plan Objective Cl		Assimilative capacity	
VOLUME	Cl	LOADING	VOLUME	Cl	LOADING		loading	VOLUME	Cl	UNLOADING	VOLUME	Cl	UNLOADING	unloading	balance							
AF	MG/L	LBS	AF	MG/L	LBS	LBS	LBS	AF	MG/L	LBS	AF	MG/L	LBS	LBS	LBS	LBS	MG/L	AF	MG/L	LBS	LBS	MG/L
56,830	28	4,325,000	8,840	59	1,412,000	5,737,000	15,901,000	221,090	21	12,651,000	23,400	22	1,399,000	14,050,000	1,851,000	340,406,000	21	5,949,075	100	1,616,959,000	1,276,553,000	79
11,010	28	838,000	34,800	57	5,391,000	6,229,000	15,204,000	207,650	27	15,010,000	26,600	24	1,721,000	16,731,000	-1,527,000	338,879,000	21	5,893,448	100	1,601,839,000	1,262,960,000	79
6,570	28	500,000	29,060	51	4,028,000	4,528,000	13,294,000	226,020	29	17,784,000	28,050	10	762,000	18,546,000	-5,252,000	333,627,000	21	5,812,770	100	1,579,911,000	1,246,284,000	79
10,020	28	763,000	18,340	94	4,686,000	5,449,000	14,914,000	196,030	29	15,646,000	37,600	48	4,905,000	20,551,000	-5,637,000	327,990,000	21	5,740,598	100	1,560,294,000	1,232,304,000	79
129,630	28	9,865,000	20,550	41	2,290,000	12,155,000	39,834,000	181,240	25	12,363,000	27,050	18	1,323,000	13,686,000	26,148,000	354,138,000	22	5,965,875	100	1,621,525,000	1,267,387,000	78
68,060	28	5,180,000	30,970	38	3,199,000	8,379,000	22,413,000	198,530	25	13,628,000	23,850	19	1,232,000	14,860,000	7,553,000	361,691,000	22	6,007,553	100	1,632,853,000	1,271,162,000	78
97,420	28	7,414,000	5,800	17	268,000	7,682,000	31,721,000	207,490	25	14,056,000	23,750	15	968,000	15,024,000	16,697,000	378,388,000	23	6,144,330	100	1,670,029,000	1,291,641,000	77
49,690	28	3,782,000	0	57	0	3,782,000	11,142,000	213,550	23	13,455,000	31,950	17	1,476,000	14,931,000	-3,789,000	374,599,000	23	6,065,123	100	1,648,500,000	1,273,901,000	77
86,280	28	6,566,000	42,620	40	4,634,000	11,200,000	18,477,000	203,540	29	15,896,000	28,850	16	1,255,000	17,151,000	1,326,000	375,925,000	23	6,054,578	100	1,645,634,000	1,269,709,000	77
263,890	28	20,083,000	28,340	5	385,000	20,468,000	35,313,000	192,390	37	19,308,000	29,250	9	716,000	20,024,000	15,289,000	391,214,000	23	6,249,780	100	1,698,690,000	1,307,476,000	77
65,710	28	5,001,000	3,330	27	244,000	5,245,000	17,779,000	218,030	21	12,675,000	26,750	17	1,236,000	13,911,000	3,868,000	395,082,000	24	6,173,895	100	1,678,065,000	1,282,983,000	76
59,330	28	4,515,000	70	30	6,000	4,521,000	14,907,000	224,500	28	16,907,000	30,300	14	1,153,000	18,060,000	-3,153,000	391,929,000	24	6,091,778	100	1,655,745,000	1,263,816,000	76
73,310	28	5,579,000	55,860	80	12,146,000	17,725,000	32,403,000	229,080	29	18,241,000	30,950	12	1,009,000	19,250,000	13,153,000	405,082,000	24	6,085,973	100	1,654,167,000	1,249,085,000	76
19,520	28	1,486,000	55,940	50	7,602,000	9,088,000	21,246,000	235,370	25	16,099,000	33,100	17	1,529,000	17,628,000	3,618,000	408,700,000	25	5,995,275	100	1,629,516,000	1,220,816,000	75
43,470	28	3,308,000	43,990	98	11,717,000	15,025,000	26,348,000	233,170	23	14,705,000	34,150	24	2,209,000	16,914,000	9,434,000	418,134,000	26	5,934,300	100	1,612,943,000	1,194,809,000	74
29,970	28	2,281,000	45,920	133	16,600,000	18,881,000	24,327,000	233,250	27	17,060,000	32,500	15	1,325,000	18,385,000	5,942,000	424,076,000	27	5,840,093	100	1,587,337,000	1,163,261,000	73
54,790	28	4,170,000	47,500	96	12,394,000	16,564,000	23,750,000	238,900	23	15,098,000	32,600	37	3,278,000	18,376,000	5,374,000	429,450,000	27	5,760,518	100	1,565,709,000	1,136,259,000	73
101,270	28	7,707,000	54,150	135	19,869,000	27,576,000	33,960,000	221,270	24	14,466,000	22,750	44	2,721,000	17,187,000	16,773,000	446,223,000	29	5,748,105	100	1,562,335,000	1,116,112,000	71
229,590	28	17,473,000	68,300	86	15,965,000	33,438,000	45,347,000	201,750	28	15,296,000	17,800	72	3,483,000	18,779,000	26,568,000	472,791,000	30	5,892,480	100	1,601,576,000	1,128,785,000	70
232,240	28	17,674,000	62,630	57	9,703,000	27,377,000	42,025,000	214,540	26	15,212,000	23,950	57	3,710,000	18,922,000	23,103,000	495,894,000	30	6,073,103	100	1,650,669,000	1,154,775,000	70
33,550	28	2,553,000	38,300	53	5,517,000	8,070,000	18,419,000	220,790	28	16,871,000	26,700	66	4,790,000	21,661,000	-3,242,000	492,652,000	30	5,995,178	100	1,629,489,000	1,136,837,000	70
221,830	28	16,882,000	22,350	58	3,523,000	20,405,000	32,371,000	226,250	26	15,760,000	23,500	70	4,471,000	20,231,000	12,140,000	504,792,000	30	6,102,795	100	1,658,740,000	1,153,948,000	70
125,600	28	9,559,000	32,480	44	3,884,000	13,443,000	23,934,000	250,010	29	19,460,000	27,850	55	4,163,000	23,623,000	311,000	505,103,000	31	6,080,498	100	1,652,679,000	1,147,576,000	69
86,790	28	6,605,000	55,080	32	4,791,000	11,396,000	18,548,000	256,790	28	19,457,000	30,400	59	4,875,000	24,332,000	-5,784,000	499,319,000	30	6,032,970	100	1,639,761,000	1,140,442,000	70
184,830	28	14,066,000	62,890	54	9,230,000	23,296,000	35,105,000	235,990	27	17,346,000	26,650	51	3,694,000	21,040,000	14,065,000	513,384,000	31	6,133,290	100	1,667,028,000	1,153,644,000	69
65,520	28	4,986,000	13,350	33	1,197,000	6,183,000	17,335,000	242,940	21	13,716,000	26,200	48	3,418,000	17,134,000	201,000	513,585,000	31	6,030,683	100	1,639,140,000	1,125,555,000	69
66,260	28	5,043,000	61,680	43	7,209,000	12,252,000	23,759,000	261,680	24	17,257,000	29,300	57	4,547,000	21,804,000	1,955,000	515,540,000	32	5,968,838	100	1,622,330,000	1,106,790,000	68
79,310	28	6,036,000	42,990	83	9,698,000	15,734,000	23,940,120	250,890	26	17,978,000	25,900	76	5,350,000	23,328,000	612,120	516,152,120	32	5,905,305	100	1,605,062,000	1,088,910,000	68
70,580	28	5,371,000	46,080	74	9,268,000	14,639,000	18,501,440	247,880	33	22,560,000	27,650	60	4,509,000	27,069,000	-8,567,560	507,584,560	32	5,806,995	100	1,578,341,000	1,070,756,000	68
63,880	28	4,862,000	56,440	48	7,363,000	12,225,000	22,719,736	241,680	31	20,235,000	23,400	60	3,816,000	24,051,000	-1,331,264	506,253,296	32	5,765,985	100	1,567,195,000	1,060,942,000	68
45,710	28	3,479,000	68,320	46	8,542,000	12,021,000	25,390,373	258,380	29	20,096,000	20,500	60	3,343,000	23,439,000	1,951,373	508,204,669	33	5,702,453	100	1,549,927,000	1,041,722,000	67
406,070	28	30,904,000	21,720	56	3,306,000	34,210,000	49,124,107	234,980	35	22,456,000	24,100	88	5,777,000	28,233,000	20,891,107	529,095,776	33	5,968,335	100	1,622,193,000	1,093,097,000	67
150,120	28	11,425,000	79,040	37	7,949,000	19,374,000	26,340,791	246,690	32	21,293,000	22,800	59	3,656,000	24,949,000	1,391,791	530,487,567	33	5,988,983	100	1,627,805,000	1,097,317,000	67
47,830	28	3,640,000	24,780	70	4,715,000	8,355,000	12,745,948	270,380	33	24,577,000	26,100	57	4,044,000	28,621,000	-15,875,052	514,612,514	32	5,844,788	100	1,588,613,000	1,074,000,000	68
87,240	28	6,639,000	7,730	68	1,429,000	8,068,000	16,971,342	250,240	32	21,575,000	38,200	83	8,618,000	30,193,000	-13,221,658	501,390,857	32	5,755,673	100	1,564,392,000	1,063,001,000	68
91,160	28	6,938,000	6,610	72	1,294,000	8,232,000	20,220,856	236,720	27	17,365,000	27,300	65	4,823,000	22,188,000	-1,967,144	499,423,712	32	5,686,095	100	1,545,481,000	1,046,057,000	68
192,440	28	14,645,000	32,710	59	5,226,000	19,871,000	26,330,095	222,450	36	21,936,000	28,400	88	6,793,000	28,729,000	-2,398,905	497,024,807	32	5,724,278	100	1,555,859,000	1,058,834,000	68
259,210	28	19,727,000	68,420	32	5,951,000	25,678,000	38,188,091	213,400	36	20,741,000	23,200	94	5,927,000	26,668,000	11,520,091	508,544,899	32	5,873,235	100	1,596,345,000	1,087,800,000	68
406,100		30,904,000	79,000		19,869,000	34,210,000	49,124,100	270,400		24,577,000	38,200		8,618,000	30,193,000	26,568,000	530,487,600		6,249,800		1,698,690,000	1,307,476,000	79
6,600		500,000	0		0	3,782,000	11,142,000	181,200		12,363,000	17,800		716,000	13,686,000	-15,875,100	327,990,000		5,686,100		1,545,481,000	1,041,722,000	67
104,400		7,943,900	36,800		6,121,900	14,065,800	25,006,500	228,000		17,269,300	27,500		3,263,800	20,533,100	4,473,400	448,088,600		5,943,300		1,615,386,200	1,167,297,500	72
135,600		10,317,800	28,100		3,723,000	14,040,800	22,891,300	238,600		21,238,800	28,600		6,041,000	27,279,800	-4,388,500	504,199,400		5,776,800		1,570,138,000	1,065,938,400	68
141,400		10,763,000	41,200		5,504,300	16,267,300	25,653,300	242,300		21,283,400	26,200		5,130,600	26,414,000	-760,700	510,262,300		5,811,700		1,579,615,100	1,069,352,600	68
																11,472,286		106,171			18,966,449	0
																0.02		0.02			0.02	0.00
Table III.6	App K		Table III.6	App K				Table III.6	App K		Table III.6	App K						Table III.6				
28	7		29	19				33	3		34	31						36				

APPENDIX O

LOADING AND ASSIMILATIVE CAPACITY OF SULFATE IN SAN GABRIEL BASIN

APPENDIX O. LOADING AND ASSIMILATIVE CAPACITY OF SULFATE IN SAN GABRIEL BASIN

column #	1	2	3 = 2.718 * (1) * (2)	4	5	6 = 2.718 * (4) * (5)	7 = (3) + (6)	8	9	10 = 2.718 * (8) * (9)	11	12	13 = 2.718 * (11) * (12)	14	15	16	17 = 2.718 * (14) * (15)
	Sulfate loading																
	Loading from precipitation							Loading from subsurface inflow from Puente Basin			Incidental Percolation in San Gabriel River and San Jose Creek			Loading from Returned flow			
	From Valley Floor			From Watershed (Azusa)			total							San Gabriel Basin Water Uses		(Direct Uses)	
Water Year	VOLUME AF	SO4 MG/L	LOADING LBS	VOLUME AF	SO4 MG/L	LOADING LBS	LBS	VOLUME AF	SO4 MG/L	LOADING LBS	VOLUME AF	SO4 MG/L	LOADING LBS	VOLUME AF	COEFF.	SO4 MG/L	LOADING LBS
1973-74	30,000	49	3,995,000	80,460	49	10,716,000	14,711,000	800	158	342,000	0	109	0	221,089	0.09	72	3,895,000
1974-75	26,240	49	3,495,000	69,620	49	9,272,000	12,767,000	710	158	304,000	0	91	0	207,648	0.09	75	3,827,000
1975-76	23,120	49	3,079,000	67,880	49	9,040,000	12,119,000	730	158	313,000	0	88	0	226,016	0.09	74	4,110,000
1976-77	25,560	49	3,404,000	63,110	49	8,405,000	11,809,000	660	158	283,000	2,660	94	680,000	196,034	0.09	93	4,450,000
1977-78	92,110	49	12,267,000	249,610	49	33,244,000	45,511,000	730	158	313,000	0	97	0	181,237	0.09	79	3,497,000
1978-79	45,940	49	6,118,000	114,160	49	15,204,000	21,322,000	850	158	364,000	0	140	0	198,534	0.09	79	3,829,000
1979-80	81,340	49	10,833,000	209,190	49	27,860,000	38,693,000	930	158	398,000	0	159	0	207,493	0.09	67	3,395,000
1980-81	18,900	49	2,517,000	50,560	49	6,734,000	9,251,000	820	158	351,000	0	109	0	213,549	0.09	63	3,294,000
1981-82	13,240	49	1,763,000	56,140	49	7,477,000	9,240,000	850	158	364,000	0	77	0	203,540	0.09	84	4,171,000
1982-83	39,540	49	5,266,000	130,930	49	17,438,000	22,704,000	850	158	364,000	0	110	0	192,389	0.09	67	3,133,000
1983-84	7,080	49	943,000	26,370	49	3,512,000	4,455,000	800	158	342,000	19,750	111	5,959,000	218,028	0.09	59	3,156,000
1984-85	10,250	49	1,365,000	33,910	49	4,516,000	5,881,000	820	158	351,000	19,680	108	5,777,000	224,500	0.09	81	4,425,000
1985-86	16,650	49	2,217,000	62,800	49	8,364,000	10,581,000	840	169	386,000	21,250	150	8,664,000	229,077	0.09	79	4,400,000
1986-87	6,220	49	828,000	18,420	49	2,453,000	3,281,000	850	155	358,000	24,270	110	7,256,000	235,370	0.09	66	3,777,000
1987-88	11,590	49	1,544,000	43,810	49	5,835,000	7,379,000	880	153	366,000	19,840	128	6,902,000	233,165	0.09	72	4,095,000
1988-89	8,340	49	1,111,000	32,120	49	4,278,000	5,389,000	890	154	373,000	0	122	0	233,250	0.09	68	3,862,000
1989-90	8,020	49	1,068,000	24,720	49	3,292,000	4,360,000	910	152	377,000	6,200	122	2,056,000	238,896	0.09	67	3,925,000
1990-91	11,640	49	1,550,000	37,900	49	5,048,000	6,598,000	910	158	390,000	500	190	258,000	221,270	0.09	67	3,603,000
1991-92	16,010	49	2,132,000	69,870	49	9,305,000	11,437,000	930	158	398,000	8,200	147	3,276,000	201,750	0.09	67	3,299,000
1992-93	36,170	49	4,817,000	127,170	49	16,937,000	21,754,000	890	174	420,000	0	126	0	214,544	0.09	72	3,767,000
1993-94	8,310	49	1,107,000	26,840	49	3,575,000	4,682,000	850	158	364,000	15,230	125	5,174,000	220,786	0.09	80	4,333,000
1994-95	22,220	49	2,959,000	105,470	49	14,047,000	17,006,000	860	158	368,000	0	130	0	226,251	0.09	65	3,616,000
1995-96	12,130	49	1,615,000	41,010	49	5,462,000	7,077,000	810	162	358,000	13,790	102	3,823,000	250,011	0.09	88	5,360,000
1996-97	12,630	49	1,682,000	43,870	49	5,843,000	7,525,000	820	158	351,000	1,440	121	474,000	256,789	0.09	73	4,615,000
1997-98	22,950	49	3,057,000	104,130	49	13,868,000	16,925,000	840	158	360,000	0	104	0	235,986	0.09	69	3,998,000
1998-99	0	49	0	0	49	0	0	750	153	312,000	31,040	88	7,424,000	242,937	0.09	57	3,370,000
1999-00	6,710	49	894,000	26,550	49	3,536,000	4,430,000	760	158	325,000	23,250	78	4,929,000	261,676	0.09	71	4,543,000
2000-01	7,180	49	956,000	28,860	49	3,844,000	4,800,000	860	158	368,000	10,130	97	2,671,000	250,889	0.09	67	4,133,000
2001-02	0	49	0	0	49	0	0	890	160	387,000	3,760	101	1,032,000	247,876	0.09	83	5,054,000
2002-03	10,410	49	1,386,000	45,840	49	6,105,000	7,491,000	940	158	402,000	11,410	84	2,605,000	241,682	0.09	76	4,514,000
2003-04	5,730	49	763,000	21,020	49	2,799,000	3,562,000	960	158	411,000	28,740	87	6,796,000	258,384	0.09	75	4,760,000
2004-05	28,320	49	3,772,000	135,070	49	17,989,000	21,761,000	960	160	417,000	0	79	0	234,978	0.09	76	4,394,000
2005-06	7,390	49	984,000	31,910	49	4,250,000	5,234,000	860	158	368,000	5,450	79	1,167,000	246,691	0.09	82	4,926,000
2006-07	0	49	0	0	49	0	0	950	158	407,000	6,380	74	1,280,000	270,383	0.09	93	6,138,000
2007-08	7,660	49	1,020,000	33,010	49	4,396,000	5,416,000	940	140	358,000	10,440	81	2,296,000	250,239	0.09	73	4,480,000
2008-09	5,740	49	764,000	22,420	49	2,986,000	3,750,000	960	158	411,000	23,480	98	6,248,000	236,716	0.09	69	3,971,000
2009-10	10,760	49	1,433,000	45,420	49	6,049,000	7,482,000	950	158	407,000	0	85	0	222,450	0.09	105	5,706,000
2010-11	13,570	49	1,807,000	59,320	49	7,900,000	9,707,000	990	158	424,000	15,590	78	3,284,000	213,396	0.09	75	3,924,000
Note: 2.718 is the approximate factor to convert acre feet into pounds.																	
Max	92,100		12,267,000	249,600		33,244,000	45,511,000	1,000		424,000	31,000		8,664,000	270,400			6,138,000
Min	0		0	0		0	0	700		283,000	0		0	181,200			3,133,000
1973-74 to 2010-2011 mean	18,700		2,487,100	61,600		8,199,400	10,686,600	900		367,200	8,500		2,369,200	228,000			4,151,200
Last 5 yrs mean	7,500		1,004,800	32,000		4,266,200	5,271,000	1,000		401,400	11,200		2,621,600	238,600			4,843,800
Last 10 yrs mean	9,000		1,192,900	39,400		5,247,400	6,440,300	900		399,200	10,500		2,470,800	242,300			4,786,700
Last 10 yrs std deviation																	
Last 10 yrs coefficient of variation																	
Data Sources	Table III.6	App K		Table III.6				Table III.6	App K		Table III.6	App K		F			
Column	5	Average of 4		14				16	36		17	16		3			

column #	18	19	20	21 = 2.718 * (18) * (19) * (20)	22	23	24	25 = 2.718 * (22) * (23) * (24)	26	27	28	29 = 2.718 * (26) * (27) * (28)	30	31	32	33	34	35	36 = 2.718 * ((30)*(31)*(32) +(33)*(34)*(35))	37 = (17) +(21) +(25) +(29) +(36)
	Loading from Returned flow																			
	Raymond Basin Water Use		(Direct Uses)		Surface Water Use		(Direct Uses)		Imported Water (blend of Weymouth)				Recycled Water (irrigate golf courses, etc.)							
													Whittier Narrows			San Jose Creek				Total loading
Water Year	VOLUME AF	COEFF.	SO4 MG/L	LOADING LBS	VOLUME AF	COEFF.	SO4 MG/L	LOADING LBS	VOLUME AF	COEFF.	SO4 MG/L	LOADING LBS	VOLUME AF	COEFF.	SO4 MG/L	VOLUME AF	COEFF.	SO4 MG/L	Loading LBS	LBS
1973-74	4,648	0.09	65	74,000	14,349	0.09	49	172,000	630	0.09	305	47,000	0	0.09	156	0	0.09	164	0	4,188,000
1974-75	5,926	0.09	65	94,000	15,483	0.09	49	186,000	1,036	0.09	305	77,000	0	0.09	122	0	0.09	137	0	4,184,000
1975-76	4,262	0.09	65	68,000	13,992	0.09	49	168,000	3,539	0.09	305	264,000	0	0.09	147	0	0.09	132	0	4,610,000
1976-77	3,076	0.09	65	49,000	14,197	0.09	49	170,000	9,471	0.09	305	706,000	0	0.09	152	0	0.09	141	0	5,375,000
1977-78	4,976	0.09	65	79,000	14,169	0.09	49	170,000	11,427	0.09	305	852,000	0	0.09	186	0	0.09	146	0	4,598,000
1978-79	4,664	0.09	65	74,000	16,436	0.09	49	197,000	11,724	0.09	305	874,000	0	0.09	225	0	0.09	210	0	4,974,000
1979-80	5,031	0.09	65	80,000	15,427	0.09	49	185,000	13,032	0.09	305	972,000	0	0.09	135	0	0.09	239	0	4,632,000
1980-81	5,101	0.09	65	81,000	17,290	0.09	49	207,000	16,799	0.09	305	1,252,000	0	0.09	186	0	0.09	164	0	4,834,000
1981-82	2,307	0.09	65	37,000	16,003	0.09	49	192,000	17,402	0.09	305	1,297,000	0	0.09	113	0	0.09	116	0	5,697,000
1982-83	5,204	0.09	65	82,000	17,560	0.09	49	210,000	14,208	0.09	305	1,059,000	0	0.09	126	0	0.09	165	0	4,484,000
1983-84	5,702	0.09	65	90,000	18,721	0.09	49	224,000	18,298	0.09	305	1,364,000	0	0.09	213	0	0.09	167	0	4,834,000
1984-85	6,019	0.09	65	95,000	17,786	0.09	49	213,000	21,676	0.09	305	1,616,000	0	0.09	177	0	0.09	162	0	6,349,000
1985-86	4,942	0.09	65	78,000	17,124	0.09	49	205,000	20,872	0.09	305	1,556,000	0	0.09	201	0	0.09	225	0	6,239,000
1986-87	5,294	0.09	65	84,000	18,293	0.09	49	219,000	22,575	0.09	305	1,683,000	0	0.09	186	0	0.09	165	0	5,763,000
1987-88	3,284	0.09	65	52,000	14,939	0.09	49	179,000	28,537	0.09	287	2,000,000	0	0.09	129	0	0.09	192	0	6,326,000
1988-89	5,225	0.09	65	83,000	19,691	0.09	49	236,000	25,799	0.09	276	1,742,000	0	0.09	135	0	0.09	183	0	5,923,000
1989-90	3,549	0.09	65	56,000	13,365	0.09	49	160,000	31,478	0.09	269	2,068,000	0	0.09	171	0	0.09	183	0	6,209,000
1990-91	1,670	0.09	65	26,000	10,802	0.09	49	129,000	29,922	0.09	293	2,141,000	0	0.09	203	0	0.09	285	0	5,899,000
1991-92	1,298	0.09	65	21,000	19,727	0.09	49	236,000	18,606	0.09	368	1,673,000	0	0.09	246	0	0.09	221	0	5,229,000
1992-93	1,693	0.09	65	27,000	21,596	0.09	49	259,000	18,948	0.09	356	1,648,000	0	0.09	189	0	0.09	189	0	5,701,000
1993-94	2,101	0.09	65	33,000	22,820	0.09	49	274,000	18,412	0.09	375	1,689,000	0	0.09	165	0	0.09	188	0	6,329,000
1994-95	1,351	0.09	65	21,000	17,229	0.09	49	207,000	19,517	0.09	395	1,883,000	0	0.09	159	0	0.09	195	0	5,727,000
1995-96	1,553	0.09	65	25,000	18,940	0.09	49	227,000	16,931	0.09	369	1,528,000	0	0.09	119	0	0.09	153	0	7,140,000
1996-97	1,497	0.09	65	24,000	22,693	0.09	49	272,000	17,205	0.09	357	1,502,000	0	0.09	128	0	0.09	182	0	6,413,000
1997-98	1,440	0.09	56	20,000	18,054	0.09	49	216,000	14,208	0.09	326	1,131,000	0	0.09	125	0	0.09	156	0	5,365,000
1998-99	1,096	0.09	65	17,000	22,215	0.09	49	266,000	13,846	0.09	305	1,032,000	0	0.09	117	0	0.09	132	0	4,685,000
1999-00	1,985	0.09	65	31,000	17,011	0.09	49	204,000	21,062	0.09	305	1,570,000	0	0.09	143	0	0.09	117	0	6,348,000
2000-01	1,663	0.09	65	26,000	20,031	0.09	49	240,000	19,971	0.09	305	1,489,000	0	0.09	135	1,268	0.09	146	45,131	5,933,131
2001-02	1,026	0.09	62	16,000	15,818	0.09	49	190,000	35,153	0.09	305	2,621,000	0	0.09	147	1,463	0.09	152	54,219	7,935,219
2002-03	519	0.09	72	9,000	4,687	0.09	49	56,000	40,982	0.09	305	3,055,000	0	0.09	147	1,329	0.09	126	40,963	7,674,963
2003-04	553	0.09	65	9,000	7,196	0.09	49	86,000	50,758	0.09	305	3,784,000	0	0.09	137	1,557	0.09	131	49,704	8,688,704
2004-05	789	0.09	65	12,000	12,289	0.09	49	147,000	30,482	0.09	305	2,272,000	38	0.09	148	1,262	0.09	119	38,146	6,863,146
2005-06	1,496	0.09	65	24,000	13,249	0.09	49	159,000	23,125	0.09	305	1,724,000	11	0.09	139	1,148	0.09	118	33,568	6,866,568
2006-07	1,136	0.09	69	19,000	13,948	0.09	49	167,000	25,904	0.09	176	1,112,000	834	0.09	143	1,451	0.09	111	68,425	7,504,425
2007-08	1,118	0.09	65	18,000	7,928	0.09	49	95,000	30,174	0.09	249	1,838,000	1,093	0.09	146	1,494	0.09	121	83,492	6,514,492
2008-09	1,144	0.09	66	18,000	13,832	0.09	49	166,000	21,683	0.09	359	1,901,000	882	0.09	162	1,434	0.09	147	86,465	6,142,465
2009-10	681	0.09	63	10,000	14,673	0.09	49	176,000	16,329	0.09	312	1,246,000	599	0.09	192	1,755	0.09	127	82,806	7,220,806
2010-11	753	0.09	65	12,000	13,543	0.09	49	162,000	10,316	0.09	236	594,000	359	0.09	146	1,955	0.09	116	68,451	4,760,451
Max	6,000			95,000	22,800			274,000	50,800			3,784,000	1,100			2,000			86,500	8,688,700
Min	500			9,000	4,700			56,000	600			47,000	0			0			0	4,184,000
1973-74 to 2010-2011 mean	2,800			44,100	15,900			190,200	20,100			1,496,400	100			400			17,100	5,898,900
Last 5 yrs mean	1,000			15,400	12,800			153,200	20,900			1,338,200	800			1,600			77,900	6,428,500
Last 10 yrs mean	900			14,700	11,700			140,400	28,500			2,014,700	400			1,500			60,600	7,017,100
Last 10 yrs std deviation																				
Last 10 yrs coefficient of variation																				
Data Sources	G				F				G				L			L				
Column	15				4				7				3			11				

See Table III.8 for calibration coefficients/concentrations and minimum concentrations.

38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
		= 2.718 * (38) * (39)			= 2.718 * (41) * (42)	= (40) +(33)	= (7) +(10) +(13) +(37) +(44)			= 2.718 * (46) *(47)			= 2.718 * (49) *(50)	= (48) +(51)	= (45) -(52)	=(54)i + (53)	=(54) / (56) / 2.718	= 0.75 * GW in storage		= 2.718 * (56) *(57)	= (58) - (54)	= (57) - (55)
								Sulfate unloading								Groundwater mixing model						
Loading from direct spreading (spreading grounds)								Groundwater extraction			Subsurface outflow					Using 75% of groundwater in storage						
Local Runoff (Azusa) (diverted stormwater runoff)			Untreated Imported Water (State Water Project)			Spreading Total	Total				Flow			Total	SO4	Sulfate stored in groundwater		75% of groundwater in storage	Allowable loading Basin Plan Objective		Assimilative capacity	
VOLUME	SO4	LOADING	VOLUME	SO4	LOADING		loading	VOLUME	SO4	UNLOADING	VOLUME	SO4	UNLOADING	unloading	balance				SO4			
AF	MG/L	LBS	AF	MG/L	LBS	LBS	LBS	AF	MG/L	LBS	AF	MG/L	LBS	LBS	LBS	LBS	MG/L	AF	MG/L	LBS	LBS	MG/L
56,830	49	7,569,000	8,840	49	1,177,000	8,746,000	27,987,000	221,090	48	28,854,000	23,400	57	3,625,000	32,479,000	-4,492,000	776,406,000	48	5,949,075	100	1,616,959,000	840,553,000	52
11,010	49	1,466,000	34,800	49	4,635,000	6,101,000	23,356,000	207,650	50	28,346,000	26,600	71	5,140,000	33,486,000	-10,130,000	766,276,000	48	5,893,448	100	1,601,839,000	835,563,000	52
6,570	49	875,000	29,060	49	3,870,000	4,745,000	21,787,000	226,020	50	30,443,000	28,050	28	2,135,000	32,578,000	-10,791,000	755,485,000	48	5,812,770	100	1,579,911,000	824,426,000	52
10,020	49	1,334,000	18,340	49	2,443,000	3,777,000	21,924,000	196,030	62	32,961,000	37,600	30	3,066,000	36,027,000	-14,103,000	741,382,000	48	5,740,598	100	1,560,294,000	818,912,000	52
129,630	49	17,264,000	20,550	49	2,737,000	20,001,000	70,423,000	181,240	53	25,906,000	27,050	33	2,426,000	28,332,000	42,091,000	783,473,000	48	5,965,875	100	1,621,525,000	838,052,000	52
68,060	49	9,064,000	30,970	49	4,125,000	13,189,000	39,849,000	198,530	53	28,364,000	23,850	33	2,139,000	30,503,000	9,346,000	792,819,000	49	6,007,553	100	1,632,853,000	840,034,000	51
97,420	49	12,975,000	5,800	49	772,000	13,747,000	57,470,000	207,490	45	25,148,000	23,750	35	2,259,000	27,407,000	30,063,000	822,882,000	49	6,144,330	100	1,670,029,000	847,147,000	51
49,690	49	6,618,000	0	49	0	6,618,000	21,054,000	213,550	42	24,401,000	31,950	38	3,300,000	27,701,000	-6,647,000	816,235,000	50	6,065,123	100	1,648,500,000	832,265,000	50
86,280	49	11,491,000	42,620	49	5,676,000	17,167,000	32,468,000	203,540	56	30,900,000	28,850	39	3,058,000	33,958,000	-1,490,000	814,745,000	50	6,054,578	100	1,645,634,000	830,889,000	50
263,890	49	35,145,000	28,340	49	3,774,000	38,919,000	66,471,000	192,390	44	23,211,000	29,250	22	1,749,000	24,960,000	41,511,000	856,256,000	50	6,249,780	100	1,698,690,000	842,434,000	50
65,710	49	8,751,000	3,330	49	443,000	9,194,000	24,784,000	218,030	39	23,382,000	26,750	67	4,871,000	28,253,000	-3,469,000	852,787,000	51	6,173,895	100	1,678,065,000	825,278,000	49
59,330	49	7,902,000	70	49	9,000	7,911,000	26,269,000	224,500	54	32,781,000	30,300	49	4,035,000	36,816,000	-10,547,000	842,240,000	51	6,091,778	100	1,655,745,000	813,505,000	49
73,310	49	9,764,000	55,860	49	7,440,000	17,204,000	43,074,000	229,080	52	32,594,000	30,950	83	6,982,000	39,576,000	3,498,000	845,738,000	51	6,085,973	100	1,654,167,000	808,429,000	49
19,520	49	2,600,000	55,940	49	7,450,000	10,050,000	26,708,000	235,370	44	27,981,000	33,100	47	4,228,000	32,209,000	-5,501,000	840,237,000	52	5,995,275	100	1,629,516,000	789,279,000	48
43,470	49	5,789,000	43,990	49	5,859,000	11,648,000	32,621,000	233,170	48	30,336,000	34,150	64	5,950,000	36,286,000	-3,665,000	836,572,000	52	5,934,300	100	1,612,943,000	776,371,000	48
29,970	49	3,991,000	45,920	49	6,116,000	10,107,000	21,792,000	233,250	45	28,607,000	32,500	39	3,445,000	32,052,000	-10,260,000	826,312,000	52	5,840,093	100	1,587,337,000	761,025,000	48
54,790	49	7,297,000	47,500	49	6,326,000	13,623,000	26,625,000	238,900	45	29,077,000	32,600	81	7,177,000	36,254,000	-9,629,000	816,683,000	52	5,760,518	100	1,565,709,000	749,026,000	48
101,270	49	13,487,000	54,150	49	7,212,000	20,699,000	33,844,000	221,270	44	26,686,000	22,750	96	5,936,000	32,622,000	1,222,000	817,905,000	52	5,748,105	100	1,562,335,000	744,430,000	48
229,590	49	30,577,000	68,300	49	9,096,000	39,673,000	60,013,000	201,750	45	24,437,000	17,800	117	5,661,000	30,098,000	29,915,000	847,820,000	53	5,892,480	100	1,601,576,000	753,756,000	47
232,240	49	30,930,000	62,630	49	8,341,000	39,271,000	67,146,000	214,540	48	27,900,000	23,950	106	6,900,000	34,800,000	32,346,000	880,166,000	53	6,073,103	100	1,650,669,000	770,503,000	47
33,550	49	4,468,000	38,300	49	5,101,000	9,569,000	26,118,000	220,790	53	32,094,000	26,700	110	7,983,000	40,077,000	-13,959,000	866,207,000	53	5,995,178	100	1,629,489,000	763,282,000	47
221,830	49	29,544,000	22,350	49	2,977,000	32,521,000	55,622,000	226,250	44	26,782,000	23,500	119	7,601,000	34,383,000	21,239,000	887,446,000	54	6,102,795	100	1,658,740,000	771,294,000	46
125,600	49	16,728,000	32,480	49	4,326,000	21,054,000	39,452,000	250,010	58	39,704,000	27,850	91	6,888,000	46,592,000	-7,140,000	880,306,000	53	6,080,498	100	1,652,679,000	772,373,000	47
86,790	49	11,559,000	55,080	49	7,336,000	18,895,000	33,658,000	256,790	49	34,188,000	30,400	100	8,263,000	42,451,000	-8,793,000	871,513,000	53	6,032,970	100	1,639,761,000	768,248,000	47
184,830	49	24,616,000	62,890	49	8,376,000	32,992,000	55,642,000	235,990	46	29,612,000	26,650	85	6,157,000	35,769,000	19,873,000	891,386,000	53	6,133,290	100	1,667,028,000	775,642,000	47
65,520	49	8,726,000	13,350	49	1,778,000	10,504,000	22,925,000	242,940	38	24,962,000	26,200	80	5,697,000	30,659,000	-7,734,000	883,652,000	54	6,030,683	100	1,639,140,000	755,488,000	46
66,260	49	8,825,000	61,680	49	8,215,000	17,040,000	33,072,000	261,680	47	33,654,000	29,300	95	7,597,000	41,251,000	-8,179,000	875,473,000	54	5,968,838	100	1,622,330,000	746,857,000	46
79,310	49	10,563,000	42,990	49	5,725,000	16,288,000	30,060,131	250,890	45	30,612,000	25,900	114	8,025,000	38,637,000	-8,576,869	866,896,131	54	5,905,305	100	1,605,062,000	738,166,000	46
70,580	49	9,400,000	46,080	49	6,137,000	15,537,000	24,891,219	247,880	56	37,440,000	27,650	160	12,024,000	49,464,000	-24,572,781	842,323,350	53	5,806,995	100	1,578,341,000	736,018,000	47
63,880	49	8,508,000	56,440	49	7,517,000	16,025,000	34,197,963	241,680	51	33,438,000	23,400	160	10,176,000	43,614,000	-9,416,037	832,907,312	53	5,765,985	100	1,567,195,000	734,288,000	47
45,710	49	6,088,000	68,320	49	9,099,000	15,187,000	34,644,704	258,380	50	35,256,000	20,500	160	8,915,000	44,171,000	-9,526,296	823,381,016	53	5,702,453	100	1,549,927,000	726,546,000	47
406,070	49	54,081,000	21,720	49	2,893,000	56,974,000	86,015,146	234,980	51	32,552,000	24,100	120	7,860,000	40,412,000	45,603,146	868,984,163	54	5,968,335	100	1,622,193,000	753,209,000	46
150,120	49	19,993,000	79,040	49	10,527,000	30,520,000	44,155,568	246,690	54	36,492,000	22,800	85	5,267,000	41,759,000	2,396,568	871,380,730	54	5,988,983	100	1,627,805,000	756,424,000	46
47,830	49	6,370,000	24,780	49	3,300,000	9,670,000	18,861,425	270,380	62	45,466,000	26,100	88	6,243,000	51,709,000	-32,847,575	838,533,155	53	5,844,788	100	1,588,613,000	750,080,000	47
87,240	49	11,619,000	7,730	49	1,029,000	12,648,000	27,232,492	250,240	49	33,187,000	38,200	110	11,421,000	44,608,000	-17,375,508	821,157,647	52	5,755,673	100	1,564,392,000	743,234,000	48
91,160	49	12,141,000	6,610	49	880,000	13,021,000	29,572,465	236,720	46	29,415,000	27,300	90	6,678,000	36,093,000	-6,520,535	814,637,112	53	5,686,095	100	1,545,481,000	730,844,000	47
192,440	49	25,630,000	32,710	49	4,356,000	29,986,000	45,095,806	222,450	70	42,267,000	28,400	110	8,491,000	50,758,000	-5,662,194	808,974,918	52	5,724,278	100	1,555,859,000	746,884,000	48
259,210	49	34,522,000	68,420	49	9,112,000	43,634,000	61,809,451	213,400	50	29,068,000	23,200	110	6,936,000	36,004,000	25,805,451	834,780,369	52	5,873,235	100	1,596,345,000	761,565,000	48
406,100		54,081,000	79,000		10,527,000	56,974,000	86,015,100	270,400		45,466,000	38,200		12,024,000	51,709,000	45,603,100	891,386,000		6,249,800		1,698,690,000	847,147,000	52
6,600		875,000	0		0	3,777,000	18,861,400	181,200		23,211,000	17,800		1,749,000	24,960,000	-32,847,600	741,382,000		5,686,100		1,545,481,000	726,546,000	46
104,400		13,901,800	36,800		4,899,600	18,801,400	38,123,400	228,000		30,750,100	27,500		5,955,400	36,705,500	1,418,000	834,535,700		5,943,300		1,615,386,200	780,850,500	48
135,600		18,056,400	28,100		3,735,400	21,791,800	36,514,300	238,600		35,880,600	28,600		7,953,800	43,834,400	-7,320,100	823,616,600		5,776,800		1,570,138,000	746,521,400	48
141,400		18,835,200	41,200		5,485,000	24,320,200	40,647,600	242,300		35,458,100	26,200		8,401,100	43,859,200	-3,211,600	835,706,000		5,811,700		1,579,615,100	743,909,200	47
																20,983,069		106,171			11,686,823	1
																0.03		0.02			0.02	0.01
Table III.6	App K		Table III.6	App K				Table III.6	App K		Table III.6	App K						Table III.6				
28	8		29	20				33	4		34	32						36				

APPENDIX P

LOADING AND ASSIMILATIVE CAPACITY OF TDS IN SAN GABRIEL BASIN

APPENDIX P. LOADING AND ASSIMILATIVE CAPACITY OF TDS IN SAN GABRIEL BASIN

TDS loading

column #	1	2	3 = 2.718 * (1) * (2)	4	5	6 = 2.718 * (4) * (5)	7 = (3) + (6)	8	9	10 = 2.718 * (8) * (9)
	Loading from precipitation							Loading from subsurface inflow from Puente Basin		
	From Valley Floor			From Watershed (Azusa)			total			
Water Year	VOLUME AF	TDS MG/L	LOADING LBS	VOLUME AF	TDS MG/L	LOADING LBS	LBS	VOLUME AF	TDS MG/L	LOADING LBS
1973-74	30,000	324	26,419,000	80,460	324	70,856,000	97,275,000	800	551	1,197,000
1974-75	26,240	324	23,108,000	69,620	324	61,310,000	84,418,000	710	551	1,063,000
1975-76	23,120	324	20,360,000	67,880	324	59,777,000	80,137,000	730	551	1,093,000
1976-77	25,560	324	22,509,000	63,110	324	55,577,000	78,086,000	660	551	988,000
1977-78	92,110	324	81,115,000	249,610	324	219,815,000	300,930,000	730	551	1,093,000
1978-79	45,940	324	40,456,000	114,160	324	100,533,000	140,989,000	850	551	1,272,000
1979-80	81,340	324	71,631,000	209,190	324	184,219,000	255,850,000	930	551	1,392,000
1980-81	18,900	315	16,182,000	50,560	315	43,288,000	59,470,000	820	551	1,227,000
1981-82	13,240	315	11,336,000	56,140	315	48,065,000	59,401,000	850	551	1,272,000
1982-83	39,540	315	33,853,000	130,930	315	112,098,000	145,951,000	850	551	1,272,000
1983-84	7,080	301	5,792,000	26,370	301	21,574,000	27,366,000	800	551	1,197,000
1984-85	10,250	315	8,776,000	33,910	315	29,033,000	37,809,000	820	551	1,227,000
1985-86	16,650	315	14,255,000	62,800	315	53,767,000	68,022,000	840	598	1,365,000
1986-87	6,220	301	5,089,000	18,420	301	15,070,000	20,159,000	850	586	1,354,000
1987-88	11,590	315	9,923,000	43,810	315	37,509,000	47,432,000	880	516	1,234,000
1988-89	8,340	315	7,140,000	32,120	315	27,500,000	34,640,000	890	497	1,202,000
1989-90	8,020	390	8,501,000	24,720	390	26,204,000	34,705,000	910	522	1,291,000
1990-91	11,640	306	9,681,000	37,900	306	31,522,000	41,203,000	910	551	1,362,000
1991-92	16,010	306	13,316,000	69,870	306	58,111,000	71,427,000	930	551	1,392,000
1992-93	36,170	306	30,083,000	127,170	306	105,768,000	135,851,000	890	653	1,579,000
1993-94	8,310	306	6,911,000	26,840	293	21,375,000	28,286,000	850	551	1,272,000
1994-95	22,220	306	18,481,000	105,470	306	87,720,000	106,201,000	860	551	1,287,000
1995-96	12,130	306	10,089,000	41,010	306	34,108,000	44,197,000	810	515	1,134,000
1996-97	12,630	306	10,504,000	43,870	306	36,487,000	46,991,000	820	551	1,227,000
1997-98	22,950	306	19,088,000	104,130	306	86,606,000	105,694,000	840	520	1,187,000
1998-99	0	293	0	0	293	0	0	750	534	1,089,000
1999-00	6,710	293	5,344,000	26,550	293	21,144,000	26,488,000	760	547	1,130,000
2000-01	7,180	398	7,767,000	28,860	398	31,220,000	38,987,000	860	546	1,276,000
2001-02	0	362	0	0	362	0	0	890	520	1,258,000
2002-03	10,410	452	12,789,000	45,840	452	56,316,000	69,105,000	940	551	1,407,000
2003-04	5,730	398	6,199,000	21,020	362	20,682,000	26,881,000	960	570	1,487,000
2004-05	28,320	452	34,792,000	135,070	452	165,938,000	200,730,000	960	560	1,461,000
2005-06	7,390	398	7,994,000	31,910	398	34,519,000	42,513,000	860	580	1,356,000
2006-07	0	362	0	0	362	0	0	950	610	1,575,000
2007-08	7,660	452	9,411,000	33,010	452	40,554,000	49,965,000	940	580	1,482,000
2008-09	5,740	398	6,209,000	22,420	362	22,059,000	28,268,000	960	480	1,252,000
2009-10	10,760	452	13,219,000	45,420	452	55,800,000	69,019,000	950	530	1,369,000
2010-11	13,570	452	16,671,000	59,320	452	72,877,000	89,548,000	990	551	1,482,000
Max	92,100		81,115,000	249,600		219,815,000	300,930,000	1,000		1,579,000
Min	0		0	0		0	0	700		988,000
1973-74 to 2010-2011 mean	18,700		16,973,500	61,600		56,552,700	73,526,200	900		1,284,300
Last 5 yrs mean	7,500		9,102,000	32,000		38,258,000	47,360,000	1,000		1,432,000
Last 10 yrs mean	9,000		10,728,400	39,400		46,874,500	57,602,900	900		1,412,900
Last 10 yrs std deviation										
Last 10 yrs coefficient of variation										
Data Sources	Table III.6			Table III.6				Table III.6	App K	
Column	5			14				16	33	

column #	11	12	13 = 2.718 * (11) * (12)	14	15	16	17 = 2.718 * (14) * (15)	18	19	20	21 = 2.718 * (18) * (19) * (20)
	Incidental Percolation in San Gabriel River and San Jose Creek			Loading from Returned flow							
				San Gabriel Basin Water Uses		(Direct Uses)		Raymond Basin Water Use		(Direct Uses)	
Water Year	VOLUME AF	TDS MG/L	LOADING LBS	VOLUME AF	COEFF.	TDS MG/L	LOADING LBS	VOLUME AF	COEFF.	TDS MG/L	LOADING LBS
1973-74	0	681	0	221,089	0.09	324	17,523,000	4,648	0.09	324	368,000
1974-75	0	678	0	207,648	0.09	324	16,458,000	5,926	0.09	324	470,000
1975-76	0	645	0	226,016	0.09	353	19,517,000	4,262	0.09	324	338,000
1976-77	2,660	648	4,685,000	196,034	0.09	362	17,359,000	3,076	0.09	324	244,000
1977-78	0	656	0	181,237	0.09	357	15,827,000	4,976	0.09	324	394,000
1978-79	0	651	0	198,534	0.09	349	16,949,000	4,664	0.09	324	370,000
1979-80	0	635	0	207,493	0.09	324	16,445,000	5,031	0.09	324	399,000
1980-81	0	621	0	213,549	0.09	315	16,455,000	5,101	0.09	315	393,000
1981-82	0	578	0	203,540	0.09	354	17,626,000	2,307	0.09	315	178,000
1982-83	0	582	0	192,389	0.09	336	15,813,000	5,204	0.09	315	401,000
1983-84	19,750	565	30,329,000	218,028	0.09	315	16,800,000	5,702	0.09	315	439,000
1984-85	19,680	624	33,378,000	224,500	0.09	359	19,715,000	6,019	0.09	315	464,000
1985-86	21,250	595	34,366,000	229,077	0.09	381	21,350,000	4,942	0.09	315	381,000
1986-87	24,270	581	38,326,000	235,370	0.09	315	18,137,000	5,294	0.09	315	408,000
1987-88	19,840	604	32,557,000	233,165	0.09	340	19,393,000	3,284	0.09	315	253,000
1988-89	0	598	0	233,250	0.09	350	19,970,000	5,225	0.09	315	403,000
1989-90	6,200	619	10,426,000	238,896	0.09	315	18,408,000	3,549	0.09	315	273,000
1990-91	500	638	866,000	221,270	0.09	306	16,563,000	1,670	0.09	327	134,000
1991-92	8,200	647	14,409,000	201,750	0.09	306	15,102,000	1,298	0.09	350	111,000
1992-93	0	640	0	214,544	0.09	306	16,059,000	1,693	0.09	306	127,000
1993-94	15,230	645	26,679,000	220,786	0.09	373	20,145,000	2,101	0.09	369	190,000
1994-95	0	657	0	226,251	0.09	306	16,936,000	1,351	0.09	336	111,000
1995-96	13,790	647	24,243,000	250,011	0.09	354	21,650,000	1,553	0.09	306	116,000
1996-97	1,440	626	2,450,000	256,789	0.09	338	21,232,000	1,497	0.09	347	127,000
1997-98	0	599	0	235,986	0.09	306	17,664,000	1,440	0.09	354	125,000
1998-99	31,040	583	49,171,000	242,937	0.09	306	18,185,000	1,096	0.09	306	82,000
1999-00	23,250	581	36,736,000	261,676	0.09	306	19,587,000	1,985	0.09	342	166,000
2000-01	10,130	593	16,327,000	250,889	0.09	452	27,740,000	1,663	0.09	452	184,000
2001-02	3,760	626	6,397,000	247,876	0.09	452	27,407,000	1,026	0.09	452	113,000
2002-03	11,410	632	19,584,000	241,682	0.09	452	26,722,000	519	0.09	452	57,000
2003-04	28,740	612	47,839,000	258,384	0.09	366	23,133,000	553	0.09	452	61,000
2004-05	0	626	0	234,978	0.09	380	21,842,000	789	0.09	452	87,000
2005-06	5,450	609	9,014,000	246,691	0.09	373	22,509,000	1,496	0.09	394	144,000
2006-07	6,380	631	10,942,000	270,383	0.09	452	29,896,000	1,136	0.09	452	126,000
2007-08	10,440	649	18,402,000	250,239	0.09	452	27,669,000	1,118	0.09	373	102,000
2008-09	23,480	657	41,897,000	236,716	0.09	452	26,173,000	1,144	0.09	452	127,000
2009-10	0	618	0	222,450	0.09	385	20,950,000	681	0.09	452	75,000
2010-11	15,590	560	23,729,000	213,396	0.09	367	19,158,000	753	0.09	452	83,000
Max	31,000		49,171,000	270,400			29,896,000	6,000			470,000
Min	0		0	181,200			15,102,000	500			57,000
1973-74 to 2010-2011 mean	8,500		14,019,800	228,000			20,001,800	2,800			226,900
Last 5 yrs mean	11,200		18,994,000	238,600			24,769,200	1,000			102,600
Last 10 yrs mean	10,500		17,780,400	242,300			24,545,900	900			97,500
Last 10 yrs std deviation											
Last 10 yrs coefficient of variation											
Data Sources	Table III.6	App K		F		App K		G			
Column	17	13		3		1		15			

column #	22	23	24	25 = 2.718 * (22) * (23) * (24)	26	27	28	29 = 2.718 * (26) * (27) * (28)	30	31	32	33	34	35	36 = 2.718 * ((30)*(31)*(32) +(33)*(34)*(35))	37 = (17) +(21) +(25) +(29) +(36)
	Surface Water Use		(Direct Uses_		Imported Water (blend of Weymouth)				Recycled Water (irrigate golf courses, etc.)							Total loading
									Whittier Narrows			San Jose Creek				
Water Year	VOLUME AF	COEFF.	TDS MG/L	LOADING LBS	VOLUME AF	COEFF.	TDS MG/L	LOADING LBS	VOLUME AF	COEFF.	TDS MG/L	VOLUME AF	COEFF.	TDS MG/L	Loading LBS	LBS
1973-74	14,349	0.09	324	1,137,000	630	0.09	533	82,000	0	0.09	635	0	0.09	681	0	19,110,000
1974-75	15,483	0.09	324	1,227,000	1,036	0.09	710	180,000	0	0.09	510	0	0.09	678	0	18,335,000
1975-76	13,992	0.09	324	1,109,000	3,539	0.09	441	382,000	0	0.09	539	0	0.09	645	0	21,346,000
1976-77	14,197	0.09	324	1,125,000	9,471	0.09	546	1,265,000	0	0.09	567	0	0.09	648	0	19,993,000
1977-78	14,169	0.09	324	1,123,000	11,427	0.09	610	1,705,000	0	0.09	510	0	0.09	656	0	19,049,000
1978-79	16,436	0.09	324	1,303,000	11,724	0.09	496	1,422,000	0	0.09	602	0	0.09	651	0	20,044,000
1979-80	15,427	0.09	324	1,223,000	13,032	0.09	502	1,600,000	0	0.09	489	0	0.09	635	0	19,667,000
1980-81	17,290	0.09	315	1,332,000	16,799	0.09	466	1,915,000	0	0.09	521	0	0.09	621	0	20,095,000
1981-82	16,003	0.09	315	1,233,000	17,402	0.09	490	2,086,000	0	0.09	467	0	0.09	578	0	21,123,000
1982-83	17,560	0.09	315	1,353,000	14,208	0.09	422	1,467,000	0	0.09	503	0	0.09	582	0	19,034,000
1983-84	18,721	0.09	315	1,443,000	18,298	0.09	608	2,721,000	0	0.09	529	0	0.09	565	0	21,403,000
1984-85	17,786	0.09	315	1,371,000	21,676	0.09	534	2,831,000	0	0.09	474	0	0.09	624	0	24,381,000
1985-86	17,124	0.09	315	1,319,000	20,872	0.09	492	2,512,000	0	0.09	506	0	0.09	595	0	25,562,000
1986-87	18,293	0.09	315	1,410,000	22,575	0.09	463	2,557,000	0	0.09	567	0	0.09	581	0	22,512,000
1987-88	14,939	0.09	315	1,151,000	28,537	0.09	504	3,518,000	0	0.09	485	0	0.09	604	0	24,315,000
1988-89	19,691	0.09	315	1,517,000	25,799	0.09	506	3,193,000	0	0.09	522	0	0.09	598	0	25,083,000
1989-90	13,365	0.09	390	1,275,000	31,478	0.09	511	3,935,000	0	0.09	714	0	0.09	619	0	23,891,000
1990-91	10,802	0.09	306	809,000	29,922	0.09	548	4,011,000	0	0.09	608	0	0.09	638	0	21,517,000
1991-92	19,727	0.09	306	1,477,000	18,606	0.09	620	2,822,000	0	0.09	589	0	0.09	647	0	19,512,000
1992-93	21,596	0.09	306	1,617,000	18,948	0.09	609	2,823,000	0	0.09	589	0	0.09	640	0	20,626,000
1993-94	22,820	0.09	306	1,708,000	18,412	0.09	624	2,810,000	0	0.09	509	0	0.09	645	0	24,853,000
1994-95	17,229	0.09	306	1,290,000	19,517	0.09	647	3,089,000	0	0.09	533	0	0.09	657	0	21,426,000
1995-96	18,940	0.09	306	1,418,000	16,931	0.09	612	2,535,000	0	0.09	519	0	0.09	647	0	25,719,000
1996-97	22,693	0.09	306	1,699,000	17,205	0.09	599	2,521,000	0	0.09	526	0	0.09	626	0	25,579,000
1997-98	18,054	0.09	306	1,351,000	14,208	0.09	557	1,936,000	0	0.09	587	0	0.09	599	0	21,076,000
1998-99	22,215	0.09	306	1,663,000	13,846	0.09	533	1,806,000	0	0.09	503	0	0.09	583	0	21,736,000
1999-00	17,011	0.09	306	1,273,000	21,062	0.09	533	2,747,000	0	0.09	551	0	0.09	581	0	23,773,000
2000-01	20,031	0.09	452	2,215,000	19,971	0.09	533	2,604,000	0	0.09	545	1,268	0.09	593	183,936	32,926,936
2001-02	15,818	0.09	452	1,749,000	35,153	0.09	533	4,584,000	0	0.09	552	1,463	0.09	626	224,004	34,077,004
2002-03	4,687	0.09	452	518,000	40,982	0.09	533	5,344,000	0	0.09	466	1,329	0.09	632	205,301	32,846,301
2003-04	7,196	0.09	452	796,000	50,758	0.09	533	6,619,000	0	0.09	550	1,557	0.09	612	233,254	30,842,254
2004-05	12,289	0.09	452	1,359,000	30,482	0.09	533	3,975,000	38	0.09	573	1,262	0.09	626	198,579	27,461,579
2005-06	13,249	0.09	452	1,465,000	23,125	0.09	533	3,016,000	11	0.09	531	1,148	0.09	609	172,310	27,306,310
2006-07	13,948	0.09	452	1,542,000	25,904	0.09	371	2,351,000	834	0.09	550	1,451	0.09	631	336,177	34,251,177
2007-08	7,928	0.09	452	877,000	30,174	0.09	491	3,624,000	1,093	0.09	540	1,494	0.09	649	381,382	32,653,382
2008-09	13,832	0.09	452	1,529,000	21,683	0.09	617	3,273,000	882	0.09	600	1,434	0.09	657	359,743	31,461,743
2009-10	14,673	0.09	452	1,622,000	16,329	0.09	562	2,245,000	599	0.09	582	1,755	0.09	618	350,664	25,242,664
2010-11	13,543	0.09	452	1,497,000	10,316	0.09	455	1,148,000	359	0.09	532	1,955	0.09	560	314,529	22,200,529
Max	22,800			2,215,000	50,800			6,619,000	1,100			2,000			381,400	34,251,200
Min	4,700			518,000	600			82,000	0			0			0	18,335,000
1973-74 to 2010-2011 mean	15,900			1,345,400	20,100			2,611,900	100			400			77,900	24,263,900
Last 5 yrs mean	12,800			1,413,400	20,900			2,528,200	800			1,600			348,500	29,161,900
Last 10 yrs mean	11,700			1,295,400	28,500			3,617,900	400			1,500			277,600	29,834,300
Last 10 yrs std deviation																
Last 10 yrs coefficient of variation																
Data Sources	F		App K		G		App K		L		App K	L		App K		
Column	4		5		7		21		3		9	11		13		

Note: 2.718 is the approximate factor to convert acre feet into pounds.

See Table III.12 for calibration coefficients/concentrations.

38	39	40 = 2.718 * (38) * (39)	41	42	43 = 2.718 * (41) * (42)	44 = (40) +(33)	45 = (7) +(10) +(13) +(37) +(44)	46	47	48 = 2.718 * (46) *(47)	49	50	51 = 2.718 * (49) *(50)	52 = (48) +(51)	53 = (45) -(52)	54 =(54)i + (53)	55 =(54) / (56) / 2.718	56 = 0.75 * GW in storage	57	58 = 2.718 * (56) *(57)	59 = (58) - (54)	60 = (57) - (55)
								TDS unloading								Groundwater mixing model Using 75% of groundwater in storage						
Loading from direct spreading (spreading grounds)								Groundwater extraction			Subsurface outflow Flow											
Local Runoff (Azusa) (diverted stormwater runoff)			Imported Water (State Water Project)			Spreading Total	Total							Total	TDS	TDS stored in groundwater		75% of groundwater in storage	Allowable loading Basin Plan Objective		Assimilative capacity	
VOLUME AF	TDS MG/L	LOADING LBS	VOLUME AF	TDS MG/L	LOADING LBS	LBS	loading LBS	VOLUME AF	TDS MG/L	UNLOADING LBS	VOLUME AF	TDS MG/L	UNLOADING LBS	unloading LBS	balance LBS	LBS	MG/L	AF	TDS MG/L	loading LBS	LBS	MG/L
56,830	324	50,046,000	8,840	324	7,785,000	57,831,000	175,413,000	221,090	324	194,981,000	23,400	337	21,434,000	216,415,000	-41,002,000	5,246,546,000	324	5,949,075	450	7,276,314,000	2,029,768,000	126
11,010	324	9,696,000	34,800	324	30,646,000	40,342,000	144,158,000	207,650	331	186,577,000	26,600	290	20,967,000	207,544,000	-63,386,000	5,183,160,000	324	5,893,448	450	7,208,276,000	2,025,116,000	126
6,570	324	5,786,000	29,060	324	25,591,000	31,377,000	133,953,000	226,020	353	217,046,000	28,050	289	22,033,000	239,079,000	-105,126,000	5,078,034,000	321	5,812,770	450	7,109,599,000	2,031,565,000	129
10,020	324	8,824,000	18,340	324	16,151,000	24,975,000	128,727,000	196,030	362	192,781,000	37,600	249	25,447,000	218,228,000	-89,501,000	4,988,533,000	320	5,740,598	450	7,021,325,000	2,032,792,000	130
129,630	324	114,156,000	20,550	324	18,097,000	132,253,000	453,325,000	181,240	357	175,616,000	27,050	232	17,057,000	192,673,000	260,652,000	5,249,185,000	324	5,965,875	450	7,296,862,000	2,047,677,000	126
68,060	324	59,936,000	30,970	324	27,273,000	87,209,000	249,514,000	198,530	349	188,198,000	23,850	236	15,299,000	203,497,000	46,017,000	5,295,202,000	324	6,007,553	450	7,347,837,000	2,052,635,000	126
97,420	324	85,791,000	5,800	324	5,108,000	90,899,000	367,808,000	207,490	337	190,105,000	23,750	284	18,333,000	208,438,000	159,370,000	5,454,572,000	327	6,144,330	450	7,515,130,000	2,060,558,000	123
49,690	315	42,543,000	0	301	0	42,543,000	123,335,000	213,550	306	177,780,000	31,950	258	22,405,000	200,185,000	-76,850,000	5,377,722,000	326	6,065,123	450	7,418,251,000	2,040,529,000	124
86,280	315	73,870,000	42,620	315	36,490,000	110,360,000	192,156,000	203,540	354	195,675,000	28,850	272	21,329,000	217,004,000	-24,848,000	5,352,874,000	325	6,054,578	450	7,405,354,000	2,052,480,000	125
263,890	315	225,935,000	28,340	315	24,264,000	250,199,000	416,456,000	192,390	336	175,695,000	29,250	316	25,122,000	200,817,000	215,639,000	5,568,513,000	328	6,249,780	450	7,644,106,000	2,075,593,000	122
65,710	315	56,259,000	3,330	315	2,851,000	59,110,000	139,405,000	218,030	308	182,718,000	26,750	230	16,722,000	199,440,000	-60,035,000	5,508,478,000	328	6,173,895	450	7,551,291,000	2,042,813,000	122
59,330	315	50,797,000	70	315	60,000	50,857,000	147,652,000	224,500	359	218,882,000	30,300	270	22,236,000	241,118,000	-93,466,000	5,415,012,000	327	6,091,778	450	7,450,853,000	2,035,841,000	123
73,310	315	62,766,000	55,860	315	47,826,000	110,592,000	239,907,000	229,080	381	237,114,000	30,950	193	16,236,000	253,350,000	-13,443,000	5,401,569,000	327	6,085,973	450	7,443,753,000	2,042,184,000	123
19,520	315	16,712,000	55,940	315	47,894,000	64,606,000	146,957,000	235,370	334	213,640,000	33,100	165	14,844,000	228,484,000	-81,527,000	5,320,042,000	326	5,995,275	450	7,332,821,000	2,012,779,000	124
43,470	315	37,218,000	43,990	315	37,663,000	74,881,000	180,419,000	233,170	340	215,655,000	34,150	350	32,487,000	248,142,000	-67,723,000	5,252,319,000	326	5,934,300	450	7,258,242,000	2,005,923,000	124
29,970	315	25,659,000	45,920	342	42,685,000	68,344,000	129,269,000	233,250	350	221,770,000	32,500	207	18,285,000	240,055,000	-110,786,000	5,141,533,000	324	5,840,093	450	7,143,017,000	2,001,484,000	126
54,790	390	58,078,000	47,500	315	40,668,000	98,746,000	169,059,000	238,900	325	210,915,000	32,600	337	29,860,000	240,775,000	-71,716,000	5,069,817,000	324	5,760,518	450	7,045,689,000	1,975,872,000	126
101,270	306	84,227,000	54,150	376	55,340,000	139,567,000	204,515,000	221,270	326	196,000,000	22,750	407	25,167,000	221,167,000	-16,652,000	5,053,165,000	323	5,748,105	450	7,030,507,000	1,977,342,000	127
229,590	306	190,952,000	68,300	367	68,130,000	259,082,000	365,822,000	201,750	305	167,413,000	17,800	496	23,997,000	191,410,000	174,412,000	5,227,577,000	326	5,892,480	450	7,207,092,000	1,979,515,000	124
232,240	306	193,156,000	62,630	329	56,005,000	249,161,000	407,217,000	214,540	319	186,114,000	23,950	434	28,252,000	214,366,000	192,851,000	5,420,428,000	328	6,073,103	450	7,428,012,000	2,007,584,000	122
33,550	306	27,904,000	38,300	306	31,854,000	59,758,000	140,848,000	220,790	373	223,552,000	26,700	475	34,471,000	258,023,000	-117,175,000	5,303,253,000	325	5,995,178	450	7,332,702,000	2,029,449,000	125
221,830	306	184,498,000	22,350	306	18,589,000	203,087,000	332,001,000	226,250	299	183,666,000	23,500	460	29,382,000	213,048,000	118,953,000	5,422,206,000	327	6,102,795	450	7,464,329,000	2,042,123,000	123
125,600	306	104,463,000	32,480	306	27,014,000	131,477,000	226,770,000	250,010	354	240,675,000	27,850	440	33,306,000	273,981,000	-47,211,000	5,374,995,000	325	6,080,498	450	7,437,056,000	2,062,061,000	125
86,790	306	72,184,000	55,080	306	45,810,000	117,994,000	194,241,000	256,790	338	236,014,000	30,400	430	35,530,000	271,544,000	-77,303,000	5,297,692,000	323	6,032,970	450	7,378,926,000	2,081,234,000	127
184,830	306	153,725,000	62,890	306	52,306,000	206,031,000	333,988,000	235,990	289	185,454,000	26,650	410	29,698,000	215,152,000	118,836,000	5,416,528,000	325	6,133,290	450	7,501,627,000	2,085,099,000	125
65,520	306	54,494,000	13,350	306	11,103,000	65,597,000	137,593,000	242,940	198	130,590,000	26,200	360	25,636,000	156,226,000	-18,633,000	5,397,895,000	329	6,030,683	450	7,376,128,000	1,978,233,000	121
66,260	306	55,109,000	61,680	306	51,300,000	106,409,000	194,536,000	261,680	320	227,734,000	29,300	420	33,448,000	261,182,000	-66,646,000	5,331,249,000	329	5,968,838	450	7,300,485,000	1,969,236,000	121
79,310	452	97,435,000	42,990	452	52,815,000	150,250,000	239,766,936	250,890	337	229,739,000	25,900	500	35,198,000	264,937,000	-25,170,064	5,306,078,936	331	5,905,305	450	7,222,779,000	1,916,700,000	119
70,580	452	86,710,000	46,080	452	56,611,000	143,321,000	185,053,004	247,880	358	241,198,000	27,650	480	36,073,000	277,271,000	-92,217,996	5,213,860,939	330	5,806,995	450	7,102,536,000	1,888,675,000	120
63,880	452	78,479,000	56,440	452	69,339,000	147,818,000	270,760,301	241,680	342	224,438,000	23,400	410	26,076,000	250,514,000	20,246,301	5,234,107,240	334	5,765,985	450	7,052,376,000	1,818,269,000	116
45,710	452	56,156,000	68,320	452	83,934,000	140,090,000	247,139,254	258,380	366	257,061,000	20,500	410	22,845,000	279,906,000	-32,766,746	5,201,340,494	336	5,702,453	450	6,974,670,000	1,773,330,000	114
406,070	452	498,872,000	21,720	452	26,684,000	525,556,000	755,208,579	234,980	380	242,582,000	24,100	410	26,857,000	269,439,000	485,769,579	5,687,110,073	351	5,968,335	450	7,299,871,000	1,612,761,000	99
150,120	452	184,428,000	79,040	452	97,103,000	281,531,000	361,720,310	246,690	373	250,225,000	22,800	412	25,532,000	275,757,000	85,963,310	5,773,073,384	355	5,988,983	450	7,325,124,000	1,552,051,000	95
47,830	452	58,761,000	24,780	452	30,443,000	89,204,000	135,972,177	270,380	358	263,364,000	26,100	454	32,207,000	295,571,000	-159,598,823	5,613,474,560	353	5,844,788	450	7,148,760,000	1,535,285,000	97
87,240	452	107,177,000	7,730	452	9,497,000	116,674,000	219,176,382	250,240	353	239,849,000	38,200	486	50,460,000	290,309,000	-71,132,618	5,542,341,942	354	5,755,673	450	7,039,763,000	1,497,421,000	96
91,160	452	111,993,000	6,610	452	8,121,000	120,114,000	222,992,743	236,720	336	216,184,000	27,300	440	32,649,000	248,833,000	-25,840,257	5,516,501,685	357	5,686,095	450	6,954,663,000	1,438,161,000	93
192,440	452	236,419,000	32,710	452	40,185,000	276,604,000	372,234,664	222,450	385	232,869,000	28,400	500	38,596,000	271,465,000	100,769,664	5,617,271,350	361	5,724,278	450	7,001,364,000	1,384,093,000	89
259,210	452	318,449,000	68,420	452	84,056,000	402,505,000	539,464,529	213,400	367	212,792,000	23,200	210	13,242,000	226,034,000	313,430,529	5,930,701,879	372	5,873,235	450	7,183,554,000	1,252,852,000	78
406,100		498,872,000	79,000		97,103,000	525,556,000	755,208,600	270,400		263,364,000	38,200		50,460,000	295,571,000	485,769,600	5,930,701,900		6,249,800		7,644,106,000	2,085,099,000	130
6,600		5,786,000	0		0	24,975,000	123,335,000	181,200		130,590,000	17,800		13,242,000	156,226,000	-159,598,800	4,988,533,000		5,686,100		6,954,663,000	1,252,852,000	78
104,400		103,675,300	36,800		36,507,700	140,183,000	253,277,200	228,000		210,070,000	27,500		26,282,100	236,352,100	16,925,100	5,362,735,800		5,943,300		7,269,238,000	1,906,502,200	118
135,600		166,559,800	28,100		34,460,400	201,020,200	297,968,100	238,600		233,011,600	28,600		33,430,800	266,442,400	31,525,700	5,644,058,300		5,776,800		7,065,620,800	1,421,562,400	91
141,400		173,744,400	41,200		50,597,300	224,341,700	330,972,200	242,300		238,056,200	26,200		30,453,700	268,509,900	62,462,300	5,532,978,400		5,811,700		7,108,268,100	1,575,289,800	100
									16							248,254,765		106,171			201,495,471	13
									#DIV/0!							0.04		0.02			0.13	0.13
Table III.6			Table III.6					Table III.6	App K		Table III.6	App K						Table III.6				
28			29					33	1		34	29						36				

APPENDIX Q

HIGHLIGHTS OF TETRACHLOROETHYLENE, TRICHLOROETHYLENE, CARBON TETRACHLORIDE, AND PERCHLORATE

Appendix Q
HIGHLIGHTS OF TDS CONCENTRATIONS AT PRODUCTION WELLS IN SAN GABRIEL BASIN

PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONCENTRATION (MG/L)				
				CONSTITUENT	HISTORIC HIGH		MOST RECENT	
					VALUE	DATE	VALUE	DATE
ADAMS RANCH MWC	01	1902106	WEST	TDS	261	02/97	261	02/97
	02	1902689	WEST	TDS	294.2	09/92	294.2	09/92
	03	8000182	WEST	TDS	320	11/06	310	08/10
ALHAMBRA, CITY OF	07	1903097	WEST	TDS	500	08/05	430	07/10
	09	1900011	WEST	TDS	460	09/05	440	04/11
	10	1900012	WEST	TDS	620	01/07	500	10/10
	11	1903014	WEST	TDS	300	08/05	260	07/10
	12	1900013	WEST	TDS	490	07/10	450	08/11
	13	1900014	WEST	TDS	380	09/09	370	11/10
	14	1900015	WEST	TDS	310	08/05	290	11/10
	15	1900016	WEST	TDS	269	04/98	210	07/09
	GARF	1900018	WEST	TDS	521	08/87	390	06/91
	LON 1	1902789	WEST	TDS	280	09/06	280	09/11
	LON 2	1900017	WEST	TDS	330	08/05	260	10/10
	MOEL (8)	1900010	WEST	TDS	430	07/09	330	07/11
AMARILLO MWC	01	1900791	WEST	TDS	440	08/06	260	08/10
	02	1900792	WEST	TDS	440	08/06	330	08/10
ARCADIA, CITY OF	BAL 1	1901015	WEST	TDS	361	04/78	361	04/78
	BAL 2	1902791	WEST	TDS	300	07/09	300	07/09
	CAM REAL 1	1902077	WEST	TDS	230	03/84	199	05/92
	CAM REAL 2	1902078	WEST	TDS	296	08/89	237	06/98
	CAM REAL 3	8000213	WEST	TDS	240	02/10	240	09/12
	L OAK 1	8000127	WEST	TDS	333	06/95	290	06/11
	LGY	1902084	WEST	TDS	543	01/08	543	01/08
	LGY 3	8000214	WEST	TDS	230	06/11	230	06/11
	LON 1	1901013	WEST	TDS	411	04/74	250	06/11
	LON 2	1901014	WEST	TDS	370	06/95	340	06/11
	PECK 1	1902854	WEST	TDS	320	09/03	260	06/11
	ST JO 1	1902358	WEST	TDS	414	09/99	400	08/01
	ST JO 2	8000177	WEST	TDS	460	09/03	320	06/11
ATTALLA, MARY L.	NA	8000119	WEST	TDS	475	04/98	475	04/98
AZUSA ASSOCIATES LLC	DALTON	1900390	WEST	TDS	253	06/99	253	06/99
AZUSA LIGHT AND WATER	05 (OLD 01)	1902533	WEST	TDS	375	06/75	270	05/09
	06 (OLD 03)	1902535	WEST	TDS	361	03/95	230	05/09
	GENESIS 1 (OLD 04)	1902536	WEST	TDS	650	06/86	513	06/89
	GENESIS 2 (OLD 05)	1902537	WEST	TDS	543	04/91	340	02/08
	GENESIS 3 (OLD 06)	1902538	WEST	TDS	646	06/86	575	03/97
	01 (OLD 07)	8000072	WEST	TDS	318	05/82	210	05/09
	03 (OLD 08)	8000086	WEST	TDS	315	03/92	230	05/09
	02 (O1 NORTH)	1902457	WEST	TDS	382	03/92	220	05/09
	04 (02 SOUTH)	1902458	WEST	TDS	354	06/89	200	05/09
	AVWC 01	1902113	WEST	TDS	416	08/87	380	09/97
	AVWC 02	1902114	WEST	TDS	400	01/98	400	01/98
	08 (AVWC 04)	1902115	WEST	TDS	354	10/84	300	08/10
	07 (AVWC 05)	1902116	WEST	TDS	378	04/95	210	05/09
	09 (AVWC 06)	1902117	WEST	TDS	555	12/85	473	01/99
	AVWC 07	1902425	WEST	TDS	470	02/74	365	11/85
	10 (AVWC 08)	8000103	WEST	TDS	500	08/06	310	05/09
	11	8000178	WEST	TDS	306	08/03	210	08/10
	12	8000179	WEST	TDS	308	08/03	203	08/10
BANKS, GALE & VICKI	NA	1900415	WEST	TDS	410	09/05	360	10/10
BASELINE WC	01	1901200	EAST	TDS	675	02/98	675	02/98
	02	1901201	EAST	TDS	391	11/98	391	11/98
BEVERLY ACRES MWUA	ROSE HILLS	8000004	WEST	TDS	758	08/86	717	08/91
CALIFORNIA-AMERICAN WC/DUARTE	B V	1900355	WEST	TDS	440	09/91	200	10/10
	B V 2	8000216	WEST	TDS	180	09/12	180	09/12
	BACON	1900497	WEST	TDS	368	07/86	250	12/10
	CR HV	1903018	WEST	TDS	520	09/91	330	10/10
	ENCANTO	8000139	WEST	TDS	504	10/94	270	10/10

Appendix Q
HIGHLIGHTS OF TDS CONCENTRATIONS AT PRODUCTION WELLS IN SAN GABRIEL BASIN

PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONCENTRATION (MG/L)				
				CONSTITUENT	HISTORIC HIGH		MOST RECENT	
					VALUE	DATE	VALUE	DATE
	FISH C	1900358	WEST	TDS	448	05/89	210	10/10
	LAS L	1900357	WEST	TDS	448	09/91	316	11/94
	LAS L2	8000140	WEST	TDS	344	03/95	290	10/10
	MT AVE	1900356	WEST	TDS	548	05/89	319	09/93
	STA FE	1900354	WEST	TDS	452	09/90	190	10/10
	WILEY	1902907	WEST	TDS	368	09/91	250	10/10
CALIFORNIA-AMERICAN WC/SAN MARINO	BR 1	1901441	WEST	TDS	330	07/93	323	12/96
	BR 2	1902787	WEST	TDS	309	08/93	296	12/96
	DELMAR	1903059	WEST	TDS	270	09/05	200	06/09
	GRAND	1900926	WEST	TDS	267	08/87	200	06/09
	GUESS	1900918	WEST	TDS	313	08/97	300	09/01
	HALL 2	8000175	WEST	TDS	280	09/05	230	06/09
	HOWLAND	1902424	WEST	TDS	261	08/85	210	06/09
	IVAR 1	1900923	WEST	TDS	464	11/94	440	09/01
	IVAR 2	1902867	WEST	TDS	332	12/85	332	12/85
	LONGDEN	1900935	WEST	TDS	416	11/94	310	06/09
	MAR 1	1900924	WEST	TDS	405	04/74	292	10/81
	MAR 2	1900925	WEST	TDS	265	04/74	216	10/81
	MAR 3	1903019	WEST	TDS	250	08/97	200	06/09
	MIVW 1	1900919	WEST	TDS	280	05/01	280	05/01
	MIVW 2	1900920	WEST	TDS	356	05/89	240	06/09
	RIC 1	1900921	WEST	TDS	282	11/94	282	11/94
	ROANOKE	1900934	WEST	TDS	390	08/97	325	05/00
	ROSEMEAD	1900927	WEST	TDS	310	09/08	290	06/09
CALIFORNIA COUNTRY CLUB	ARTES	1902531	EAST	TDS	440	10/10	440	10/10
	SYCAMORE	1903084	EAST	TDS	1000	09/01	720	08/10
CALIFORNIA DOMESTIC WC	02	1901181	WEST	TDS	558	08/73	270	10/11
	03	1903057	WEST	TDS	460	04/07	310	10/11
	05	1901183	WEST	TDS	476	08/73	460	07/85
	05A	8000100	WEST	TDS	280	10/05	240	10/11
	06	1902967	WEST	TDS	468	07/85	290	10/11
	08	1903081	WEST	TDS	432	08/73	330	10/11
	14	8000174	WEST	TDS	440	10/11	440	10/11
CEDAR AVENUE MWC	01 SOUTH	1901411	WEST	TDS	270	01/89	270	01/89
	02 NORTH	1902783	WEST	TDS	380	08/79	270	01/92
CEMEX CONS. (AZ TWO)	02	1900038	WEST	TDS	382	10/04	210	10/10
CHAMPION MWC	02	1902816	WEST	TDS	420	09/08	410	09/10
	03	8000121	WEST	TDS	400	09/08	400	09/10
CITRUS VALLEY MEDICAL CENTER	01	8000138	EAST	TDS	780	07/01	540	10/10
CLAYTON MANUFACTURING CO	02	1901055	WEST	TDS	600	08/01	350	09/03
COINER, JAMES W.	03	1902951	WEST	TDS	560	03/96	530	10/01
	05R	1903072	WEST	TDS	660	02/98	520	10/10
COVINA, CITY OF	01	1901685	EAST	TDS	518	01/99	518	01/99
	02 (GRAND)	1901686	EAST	TDS	569	08/87	499	04/99
	03	1901687	EAST	TDS	361	10/73	361	10/73
COVINA IRRIGATING CO	BAL 1	1900885	WEST	TDS	369	08/76	260	07/10
	BAL 2	1900883	WEST	TDS	420	08/07	370	07/10
	BAL 3	1900882	WEST	TDS	400	07/09	360	07/10
	CONTR	1900881	EAST	TDS	510	06/81	497	06/88
	VALEN	1900880	EAST	TDS	528	06/81	528	06/81
CROWN CITY PLATING CO	01	8000012	WEST	TDS	470	02/06	470	02/06
DEL RIO MWC	BURKETT	1900331	WEST	TDS	520	06/09	520	06/09
DRIFTWOOD DAIRY	01	1902924	WEST	TDS	404	06/98	404	06/98
EAST PASADENA WC	09	1901508	WEST	TDS	324	08/80	210	07/10
	11	8000217	WEST	TDS	210	03/11	210	03/11
EL MONTE, CITY OF	02A	1901692	WEST	TDS	364	12/10	200	06/11
	03	1901693	WEST	TDS	620	07/10	368	12/11
	04	1901694	WEST	TDS	565	03/76	350	07/06
	05	1901695	WEST	TDS	567	06/99	567	06/99

Appendix Q
HIGHLIGHTS OF TDS CONCENTRATIONS AT PRODUCTION WELLS IN SAN GABRIEL BASIN

PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONSTITUENT	CONCENTRATION (MG/L) HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE
	10	1901699	WEST	TDS	398	12/10	214	12/11
	11	1901700	WEST	TDS	351	10/78	308	09/79
	12	1903137	WEST	TDS	351	10/78	308	09/79
	13	8000101	WEST	TDS	409	08/94	154	12/11
	MT VW	1902612	WEST	TDS	368	02/87	344	01/01
GLENDORA, CITY OF	01-E	1901523	EAST	TDS	513	08/78	450	06/08
	02-E	1901526	EAST	TDS	473	08/86	390	09/10
	03-G	1901525	EAST	TDS	612	08/82	580	08/99
	04-E	1901524	WEST	TDS	591	05/84	591	05/84
	05-E	8000149	WEST	TDS	296	07/98	200	09/10
	07-G	1900831	WEST	TDS	528	04/98	528	04/98
	08-E	1900829	EAST	TDS	392	08/77	180	09/10
	09-E	1900830	WEST	TDS	342	12/89	200	09/10
	10-E	1900828	EAST	TDS	580	09/10	580	09/10
	11-E	1900826	EAST	TDS	550	09/07	530	09/10
	12-G	1900827	EAST	TDS	383	05/90	190	09/10
	13-E	8000184	EAST	TDS	460	09/10	460	09/10
GOLDEN STATE WC/SAN GABRIEL	AZU 1	1902020	WEST	TDS	473	08/86	372	08/94
	EARL 1	1902144	WEST	TDS	270	09/03	270	09/03
	ENC 1	1902024	WEST	TDS	300	03/06	240	08/10
	ENC 2	1902035	WEST	TDS	310	08/06	260	08/10
	ENC 3	8000073	WEST	TDS	280	08/10	280	08/10
	FAR 1	1902034	WEST	TDS	396	06/90	320	08/10
	FAR 2	1902948	WEST	TDS	365	01/90	280	08/10
	GAR 1	1900513	WEST	TDS	270	09/03	270	09/03
	GAR 2	1900512	WEST	TDS	270	08/97	220	07/02
	GID 1	1902032	WEST	TDS	299	09/93	299	09/93
	GID 2	1902031	WEST	TDS	293	09/93	293	09/93
	GRA 1	1902030	WEST	TDS	514	08/87	364	08/94
	GRA 2	1902461	WEST	TDS	437	09/87	362	08/94
	JEF 1	1902017	WEST	TDS	554	03/86	554	03/86
	JEF 2	1902018	WEST	TDS	530	06/79	530	06/79
	JEF 3	1902019	WEST	TDS	416	08/86	251	08/92
	JEF 4	8000111	WEST	TDS	290	08/06	280	08/10
	PER 1	1902027	WEST	TDS	407	08/86	390	08/10
	S G 1	1900510	WEST	TDS	720	11/05	230	06/09
	S G 2	1900511	WEST	TDS	560	10/05	560	10/05
	SAX 1	1900515	WEST	TDS	286	10/97	286	10/97
	SAX 3	1900514	WEST	TDS	324	08/73	220	08/10
	SAX 4	8000146	WEST	TDS	213	08/99	200	08/10
GOLDEN STATE WC/SAN DIMAS	ART-1	1902151	EAST	TDS	360	01/73	360	01/73
	ART-2	1902152	EAST	TDS	510	01/73	390	05/10
	ART-3	1902842	EAST	TDS	510	01/73	390	05/10
	BAS-3	1902148	EAST	TDS	520	05/09	420	05/10
	BAS-4	1902149	EAST	TDS	530	05/09	530	05/10
	CITY	1902286	EAST	TDS	720	10/01	700	08/08
	COL-1	1902266	EAST	TDS	513	09/75	463	10/76
	COL-2	1902267	EAST	TDS	530	01/73	447	05/76
	COL-4	1902268	EAST	TDS	500	02/11	500	02/11
	COL-6	1902270	EAST	TDS	640	01/73	470	02/11
	COL-7	1902271	EAST	TDS	630	05/81	547	01/00
	COL-8	1902272	EAST	TDS	658	06/80	519	12/96
	HIGHWAY	1902150	EAST	TDS	500	05/07	350	05/10
	HIGHWAY 2	8000212	EAST	TDS	410	10/10	330	08/11
	MALON	1902287	EAST	TDS	658	06/80	519	12/96
HANSON AGGREGATES WEST, INC.	EL 1	1901492	WEST	TDS	540	03/97	310	09/02
	EL 3	1901493	WEST	TDS	420	07/01	310	09/02
	EL 4	1903006	WEST	TDS	340	07/01	340	09/02
HARTLEY, DAVID	NA	8000085	EAST	TDS	580	10/95	580	10/95

Appendix Q
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PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONCENTRATION (MG/L)				
				CONSTITUENT	HISTORIC HIGH		MOST RECENT	
					VALUE	DATE	VALUE	DATE
HEMLOCK MWC	NORTH	1901178	WEST	TDS	286	09/05	200	06/09
	SOUTH	1902806	WEST	TDS	290	09/05	190	06/09
INDUSTRY, CITY OF	01	1902581	EAST	TDS	514	02/86	510	10/92
	02	1902582	EAST	TDS	554	01/80	537	02/86
	03	8000078	EAST	TDS	343	08/00	200	10/05
	04	8000096	EAST	TDS	456	08/04	440	04/07
	05	8000097	EAST	TDS	360	04/10	360	04/10
LA PUENTE VALLEY COUNTY WD	02	1901460	EAST	TDS	400	11/07	330	09/10
	03	1902859	EAST	TDS	554	01/80	310	09/10
	04	8000062	EAST	TDS	323	10/87	176	09/04
	05	8000209	EAST	TDS	340	03/08	310	09/10
LOS ANGELES, COUNTY OF	02	1902580	WEST	TDS	398	09/04	398	09/04
	03A	8000150	WEST	TDS	550	07/01	480	10/08
	05	1902665	WEST	TDS	440	09/02	370	10/08
	06	1902666	WEST	TDS	678	11/99	678	11/99
	600	8000090	WEST	TDS	731	07/98	731	07/98
	BIG RED	8000088	WEST	TDS	710	09/02	560	10/09
	NEW LAKE	8000089	WEST	TDS	748	09/98	650	11/10
	SF 1	8000070	WEST	TDS	360	09/02	270	10/10
	WHI 1	1902579	WEST	TDS	500	11/10	500	11/10
MILLER COORS LLC	01	8000075	WEST	TDS	330	09/05	230	09/09
	02	8000076	WEST	TDS	328	09/04	210	11/10
MONROVIA, CITY OF	01	1900417	WEST	TDS	580	08/86	548	10/00
	02	1900418	WEST	TDS	552	05/87	410	07/09
	03	1900419	WEST	TDS	442	05/85	320	07/09
	04	1900420	WEST	TDS	309	05/84	260	07/09
	05	1940104	WEST	TDS	310	07/02	240	07/09
	06	8000171	WEST	TDS	342	08/04	310	07/09
MONROVIA NURSERY	DIV 4	1902456	WEST	TDS	790	09/03	700	02/07
MONTEREY PARK, CITY OF	01	1900453	WEST	TDS	450	05/04	330	05/09
	02	1900454	WEST	TDS	390	0/97	390	07/97
	03	1900455	WEST	TDS	400	05/04	270	05/10
	04	1900456	WEST	TDS	396	08/77	240	09/87
	05	1900457	WEST	TDS	620	08/02	540	08/10
	06	1900458	WEST	TDS	570	08/01	552	02/05
	07	1902372	WEST	TDS	299	08/77	220	08/10
	08	1902373	WEST	TDS	450	08/05	450	08/05
	09	1902690	WEST	TDS	350	08/01	180	08/11
	10	1902818	WEST	TDS	490	05/04	330	05/10
	12	1903033	WEST	TDS	630	02/04	500	03/10
	14	1903092	WEST	TDS	420	12/03	350	07/06
	15	8000196	WEST	TDS	570	08/08	540	08/10
	FERN	8000126	WEST	TDS	310	08/02	260	08/10
OWL ROCK PRODUCTS CO	NA	1903119	WEST	TDS	550	06/99	190	10/09
	NA	1902241	WEST	TDS	550	06/99	190	10/09
POLOPOLUS ET AL.	01	1902169	WEST	TDS	405	09/92	405	09/92
RICHWOOD MWC	NORTH 2	1901522	WEST	TDS	330	02/76	323	06/99
	SOUTH 1	1901521	WEST	TDS	396	06/99	396	06/99
RURBAN HOMES MWC	NORTH 1	1900120	WEST	TDS	390	03/01	290	06/09
	SOUTH 2	1900121	WEST	TDS	410	09/08	330	06/09
SAN GABRIEL COUNTRY CLUB	01	1900547	WEST	TDS	480	10/04	480	10/04
	02	1902979	WEST	TDS	251	06/99	158	10/04
SAN GABRIEL COUNTY WD	05 BRA	1901669	WEST	TDS	369	08/90	328	09/00
	07	1901671	WEST	TDS	356	07/03	310	06/09
	08	1901672	WEST	TDS	671	08/93	671	08/93
	09	1902785	WEST	TDS	316	08/04	240	07/10
	10	1902786	WEST	TDS	300	05/89	212	11/98
	11	8000067	WEST	TDS	306	08/04	250	07/10
	12	8000123	WEST	TDS	250	11/06	220	07/10

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PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONSTITUENT	CONCENTRATION (MG/L) HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE
	14	8000133	WEST	TDS	480	11/06	220	07/10
SAN GABRIEL VALLEY WC	B4B	1902858	EAST	TDS	458	10/79	390	11/07
	B4C	1902947	EAST	TDS	370	07/72	314	08/00
	B5A	1900718	EAST	TDS	513	08/76	460	09/05
	B5B	1900719	EAST	TDS	490	08/10	490	08/10
	B5C	8000112	EAST	TDS	320	05/07	280	08/07
	B5D	8000160	EAST	TDS	460	08/08	220	11/09
	B5E	8000205	EAST	TDS	310	08/10	310	08/10
	B6B	1900721	EAST	TDS	370	09/92	370	09/92
	B6C	1903093	EAST	TDS	570	08/10	570	08/10
	B6D	8000098	EAST	TDS	390	11/07	340	08/10
	11A	1900739	WEST	TDS	416	08/78	230	08/10
	11B	1900745	WEST	TDS	430	08/08	240	08/10
	11C	1902713	WEST	TDS	396	08/06	280	08/10
	1B	1900729	WEST	TDS	372	09/92	320	08/10
	1C	1902946	WEST	TDS	304	07/89	240	11/09
	1D	8000102	WEST	TDS	279	04/99	250	08/10
	1E	8000172	WEST	TDS	275	08/06	240	08/10
	2C	1900749	WEST	TDS	332	05/80	280	11/05
	2D	1902857	WEST	TDS	324	07/86	230	11/09
	2E	8000065	WEST	TDS	370	07/03	260	11/09
	2F	8000197	WEST	TDS	300	07/07	230	11/09
	8A	1900736	WEST	TDS	380	07/72	330	08/89
	8B	1900746	WEST	TDS	420	08/08	380	08/10
	8C	1900747	WEST	TDS	390	11/09	390	11/09
	8D	1903103	WEST	TDS	480	07/07	400	06/09
	8E	8000113	WEST	TDS	300	07/03	200	11/09
	8F	8000169	WEST	TDS	390	08/08	210	11/09
	B1	1902635	WEST	TDS	750	08/06	750	08/06
	B2	1902525	WEST	TDS	677	11/98	677	11/98
	B11A	1901439	EAST	TDS	550	08/04	550	08/04
	B11B	8000108	EAST	TDS	594	02/97	430	08/10
	B7B	1901440	EAST	TDS	606	09/76	398	08/85
	B7C	8000068	EAST	TDS	653	08/92	530	11/09
	B7E	8000122	EAST	TDS	320	06/06	300	08/10
	B9	1901437	EAST	TDS	1184	02/86	963	02/87
	B9B	8000099	EAST	TDS	300	08/03	210	08/10
	G4A	1900725	WEST	TDS	460	08/06	340	08/10
	B24A	8000203	EAST	TDS	540	01/07	490	11/09
	B24B	8000204	EAST	TDS	500	01/07	410	11/09
	B25A (SA3-1S)	8000187	EAST	TDS	490	11/07	430	08/10
	B25B (SA3-1D)	8000188	EAST	TDS	380	11/07	300	08/10
	B26A (SA3-2S)	8000189	EAST	TDS	490	11/07	420	08/10
	B26B (SA3-2D)	8000190	EAST	TDS	380	11/07	320	08/10
SIERRA LA VERNE COUNTRY CLUB	01	8000124	EAST	TDS	1360	09/04	1340	10/07
	02	8000125	EAST	TDS	1400	10/08	200	10/10
SONOCO PRODUCTS CO	01	1912786	EAST	TDS	860	07/04	790	12/05
	02	1902971	EAST	TDS	860	10/03	740	12/05
SOUTHERN CALIFORNIA EDISON CO	110RH	8000046	WEST	TDS	380	08/98	275	02/07
	2EB76	1900343	WEST	TDS	470	07/01	415	02/07
	MURAT	8000047	WEST	TDS	474	09/04	310	10/08
SOUTH PASADENA, CITY OF	GRAV 2	1901679	WEST	TDS	500	05/06	470	08/10
	WIL 2	1901681	WEST	TDS	432	08/99	393	09/00
	WIL 3	1901682	WEST	TDS	298	08/99	290	08/10
	WIL 4	1903086	WEST	TDS	262	08/04	250	08/10
STERLING MWC	NEW SO.	8000132	WEST	TDS	300	09/04	280	07/07
	NORTH	1902096	WEST	TDS	380	07/07	310	08/09
	SOUTH	1902085	WEST	TDS	320	08/09	320	08/09
SUBURBAN WATER SYSTEMS	101W-1	41901605	WEST	TDS	442	02/88	442	02/88

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PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONSTITUENT	CONCENTRATION (MG/L) HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE
	102W-2	1901606	WEST	TDS	345	10/75	345	10/75
	103W-1	1901607	WEST	TDS	425	01/80	425	01/80
	105W-1	1901608	WEST	TDS	491	06/86	421	06/94
	111W-1	1901610	WEST	TDS	491	03/73	491	03/73
	113W-1	1901612	WEST	TDS	407	02/86	407	02/86
	114W-1	1901613	WEST	TDS	400	11/94	400	11/94
	120W-1	1901615	WEST	TDS	478	08/96	478	08/96
	121W-1	8000181	WEST	TDS	300	08/10	300	08/11
	122W-1	1901616	WEST	TDS	782	05/86	601	08/96
	123W-1	1901617	WEST	TDS	1100	08/96	1100	08/96
	124W-1	1901618	WEST	TDS	422	07/89	422	07/89
	125W-1	1901619	WEST	TDS	511	04/82	511	04/82
	125W-2	8000087	WEST	TDS	621	05/94	621	05/94
	126W-1	1901620	WEST	TDS	435	05/75	435	05/75
	126W-2	8000092	WEST	TDS	760	08/00	760	08/00
	131W-1	1901621	WEST	TDS	1040	10/93	1040	10/93
	133W-1	1901622	WEST	TDS	532	04/88	532	04/88
	134W-1	1901623	WEST	TDS	491	10/93	491	10/93
	135W-1	1901624	WEST	TDS	504	10/75	481	09/86
	136W-1	1901625	WEST	TDS	1060	10/93	1060	10/93
	139W-1	1901598	WEST	TDS	540	05/94	540	05/95
	139W-2	1901599	WEST	TDS	483	09/99	420	08/01
	139W-4	8000069	WEST	TDS	360	08/07	290	03/11
	139W-5	8000095	WEST	TDS	322	06/86	280	08/01
	139W-6	8000152	WEST	TDS	300	09/97	298	08/00
	140W-1	1901602	WEST	TDS	543	05/75	260	01/76
	140W-3	1903067	WEST	TDS	440	02/04	420	12/09
	140W-4	8000093	WEST	TDS	530	10/03	530	10/03
	140W-5	8000145	WEST	TDS	430	03/09	310	08/10
	142W-1	1901597	WEST	TDS	476	06/81	476	06/81
	142W-2	8000183	WEST	TDS	305	08/07	240	02/12
	147W-1	1901596	WEST	TDS	913	03/85	913	03/85
	147W-2	1902760	WEST	TDS	300	09/76	300	09/76
	147W-3	8000077	WEST	TDS	407	09/88	330	08/11
	148W-1	1901604	WEST	TDS	536	04/97	536	04/97
	150W-1	1902519	WEST	TDS	348	05/90	316	07/92
	151W-1	1902518	WEST	TDS	701	03/98	701	03/98
	151W-2	8000207	WEST	TDS	300	12/06	260	08/10
	152W-1	1900337	WEST	TDS	839	05/86	839	05/86
	154W-1	1902762	WEST	TDS	572	05/79	572	05/79
	155W-1	1902819	WEST	TDS	1130	11/98	1130	11/98
	155W-2	1902820	WEST	TDS	1150	11/98	1150	11/98
	157W-1	1902763	WEST	TDS	378	02/86	378	02/86
	201W-2	1901430	WEST	TDS	520	09/05	500	08/06
	201W-4	1901433	WEST	TDS	620	08/10	620	08/10
	201W-5	1901432	WEST	TDS	534	08/06	510	08/07
	201W-6	1901434	WEST	TDS	700	09/05	700	09/05
	201W-7	8000195	WEST	TDS	580	08/10	580	08/10
	201W-8	8000198	WEST	TDS	620	07/06	620	08/10
	201W-9	8000208	WEST	TDS	530	02/11	530	02/11
	201W-10	8000210	WEST	TDS	570	09/07	520	05/09
	202W-1	1901627	WEST	TDS	474	08/76	383	09/88
SUNNY SLOPE WC	08	1900026	WEST	TDS	330	09/07	260	03/10
	09	1902792	WEST	TDS	359	08/73	250	09/10
	10	8000048	WEST	TDS	300	06/84	271	03/94
	13	8000157	WEST	TDS	230	06/09	200	08/11
TEXACO INC.	14	1900001	WEST	TDS	750	09/02	680	09/03
TYLER NURSERY	NA	8000049	WEST	TDS	790	10/03	750	09/04
UNITED ROCK PRODUCTS CO	IRW-1	1900106	WEST	TDS	330	09/97	210	10/09

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PRODUCER NAME	WELL NAME	RECORD. NUMBER	MAIN BASIN AREA	CONCENTRATION (MG/L)				
				CONSTITUENT	HISTORIC HIGH		MOST RECENT	
					VALUE	DATE	VALUE	DATE
	IRW-2	1903062	WEST	TDS	314	10/04	200	11/05
VALENCIA HEIGHTS WC	01	8000051	EAST	TDS	903	08/00	854	08/07
	02	8000052	EAST	TDS	930	09/01	898	08/07
	03A	8000055	EAST	TDS	854	08/81	854	08/81
	04	8000054	EAST	TDS	853	08/00	560	09/01
	05	8000120	EAST	TDS	990	10/10	990	10/10
	06	8000180	EAST	TDS	810	05/08	760	10/10
	07	8000211	EAST	TDS	880	12/09	850	09/10
VALLEY COUNTY WC	ARROW	1900034	WEST	TDS	405	08/77	370	02/97
	B DALTON	1900035	WEST	TDS	540	06/84	470	09/07
	E NIXON (E JOAN)	1900032	WEST	TDS	326	06/84	240	08/10
	E MAINE	1900027	WEST	TDS	320	08/90	260	09/10
	LANTE (SA1-3)	8000060	WEST	TDS	770	10/04	470	05/11
	MORADA	1900029	WEST	TDS	559	09/96	559	09/96
	PADDY LN	1900031	WEST	TDS	359	08/93	327	08/94
	PALM	8000039	WEST	TDS	300	07/85	216	08/93
	W NIXON (W JOAN)	1902356	WEST	TDS	275	06/84	200	08/10
	W MAINE	1900028	WEST	TDS	312	08/04	290	08/10
	SA1-1	8000185	WEST	TDS	590	09/07	370	05/11
	SA1-2	8000186	WEST	TDS	540	09/07	410	06/09
VALLEY VIEW MWC	01	1900363	WEST	TDS	326	01/79	280	09/10
	02	1900364	WEST	TDS	308	01/80	270	09/09
	03	1900365	WEST	TDS	339	01/78	306	03/98
VULCAN CO (CALMAT CO)	DUR E	1902920	WEST	TDS	312	09/03	240	10/10
	DUR W	8000063	WEST	TDS	319	08/98	270	10/09
	REL 1	1903088	WEST	TDS	382	10/04	210	10/10
ROSE HILLS MEMORIAL PARK	04	1902790	WEST	TDS	950	10/07	940	10/10
	02	1900095	WEST	TDS	1130	10/04	1130	10/04
	01	1900094	WEST	TDS	1060	10/04	930	10/10
	03	1900052	WEST	TDS	810	09/03	630	09/05
WHITTIER, CITY OF	09	1901745	WEST	TDS	384	01/88	384	01/88
	10	1901746	WEST	TDS	380	01/74	380	01/74
	11	1901747	WEST	TDS	394	01/90	394	01/90
	12	1901748	WEST	TDS	361	01/88	361	01/88
	13	1901749	WEST	TDS	640	09/10	600	03/11
	15	8000071	WEST	TDS	640	09/05	540	03/11
	16	8000110	WEST	TDS	550	09/05	510	03/11
	17	8000135	WEST	TDS	740	09/05	460	03/08
	18	8000136	WEST	TDS	700	09/05	540	03/11

MAXIMUM	1,400	1,340
MINIMUM	180	154
AVERAGE	470	397

TDS: total dissolved solids
MG/L: milligrams per liter
CO: Company
MWC: Mutual Water Company
MWUA: Mutual Water Users Association
WC: Water Company
WD: Water District

APPENDIX R

CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

Main San Gabriel Basin
WATERMASTER

CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

January 1996

(Adopted by Resolution 4-96-138 April 3, 1996)

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MAIN SAN GABRIEL BASIN WATERMASTER

CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

INTRODUCTION

At the Basin Water Quality Management Committee (BWQMC) meeting on April 12, 1995, Watermaster staff was requested to prepare a scope of work, schedule, and list of references to develop draft criteria for the delivery of supplemental water to the Basin, based upon water quality. (A copy of the Scope of Work is included as Appendix A.) At the May 16, 1995 BWQMC meeting, Watermaster staff presented a Scope of Work, Schedule and List of References, and was instructed to proceed with the study. Progress reports 1, 2 and 3 were provided to the Committee on June 14, 1995, July 12, 1995 and August 9, 1995, respectively. At the Committee's August 9, 1995 meeting, Watermaster staff was instructed to prepare a discussion draft report summarizing progress reports 1,2 and 3 and to distribute the draft report to committee members prior to the September 1995 Watermaster meeting.

In accordance with the approved scope of work, this report is organized as follows:

Section I. Review of Regulatory Standards for Supplemental Water Quality

Section II. Availability of Water Supply

Section III. Review of Water Quality

Section IV. Economic Analysis

Section V. Development of Supplemental Water Quality Criteria

The review of criteria for delivery of supplemental water based upon water quality is primarily intended to formalize and document the procedures that are currently used by the Watermaster. Generally, no new policies are developed through this review report.

SECTION I

REVIEW OF REGULATORY STANDARDS FOR SUPPLEMENTAL WATER QUALITY

BACKGROUND

There are three primary agencies responsible for setting guidelines and regulations associated with replenishing the ground water of the Main San Gabriel Basin (Basin). They are the Main San Gabriel Basin Watermaster (Watermaster), the Regional Water Quality Control Board (RWQCB) and the State Department of Health Services (DOHS). A review of these agencies and their authority to regulate ground water replenishment is discussed below.

MAIN SAN GABRIEL BASIN WATERMASTER AMENDED JUDGMENT

The Watermaster must approve the delivery of any supplemental water to the Basin for ground-water replenishment purposes. Presented below is a review of relevant provisions of the Basin Judgment and Watermaster Rules and Regulations associated with ground-water replenishment with supplemental water.

Definition of Terms

The Basin Judgment includes the definition of various terms important to the understanding of supplemental water deliveries to the Basin, as shown below.

(a) Supplemental Water -
Nontributary water imported through a Responsible Agency and Reclaimed Water.

(b) Responsible Agency -
The municipal water district which is the normal and appropriate source from whom Watermaster shall purchase Supplemental Water for replacement purposes under the Physical Solution. The three municipal water districts are: Upper San Gabriel Valley Municipal Water District, San Gabriel Valley Municipal Water District, and Three Valleys Municipal Water District.

(c) Replacement Water -
Water purchased by Watermaster to replace: (1) Production in excess of a Pumper's Share of Operating Safe Yield; (2) The consumptive use portion

resulting from the exercise of an Overlying Right; and (3) Production in excess of a Diverter's right to Divert for Direct Use.

(d) Reclaimed Water -
Water which as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would otherwise not occur.

(e) Stored Water -
Supplemental Water stored in the Basin pursuant to a contract with Watermaster as authorized by Section 34(n) of the Judgment.

Provisions Governing Supplemental Water Delivery

There are various portions of the Judgment that address supplemental water delivery. They include: Section 34, Powers and Duties, Part F, Physical Solution and Exhibit H, Watermaster Operating Criteria. Pertinent excerpts from these three sections of the Judgment are presented below.

Section 34, Power and Duties

Section 34 (h), Purchase of and Recharge with Supplemental Water, allows Watermaster to purchase Supplemental Water, including a maximum of 30,000 acre-feet per year of Reclaimed Water, and to introduce the same into the Basin for replacement or cyclic storage purposes. However, DOHS and the RWQCB must give approval for the use of reclaimed water for ground water replenishment.

Section 34 (m), Water Quality, stipulates that water quality in the Basin shall be a concern of Watermaster, and all reasonable steps shall be taken to assist and encourage appropriate regulatory agencies to enforce reasonable water quality regulations affecting the Basin.

Section 34 (n) Cyclic Storage Agreements, allows Watermaster to enter into cyclic storage agreements with court approval. This section also gives Watermaster control of all spreading and extraction of Supplemental Water, and allows Watermaster to account for all losses in stored water.

Part F, Physical Solution

The purpose of the Physical Solution "...is to provide a legal and practical means for accomplishing the most economic, long-term, conjunctive utilization of surface, ground water, supplemental water and ground water storage capacity..." (Section 38). The Basin Operating Criteria, intended to guide the Watermaster, are contained in Exhibit H of the Judgment. Pertinent sections under the Physical Solution include Sections 40, 47 and 48. Section 40 states that the withdrawal and replenishment of supplies of the Basin and the use of available Basin storage must be subject to procedures established by Watermaster. As a result "both the quantity and quality of said water resource are thereby preserved..." Section 47 allows Watermaster to collect and carry over funds in the event a Responsible Agency "...for any reason...(is) unable to deliver Supplemental Water to Watermaster...." Section 48 allows Watermaster to accumulate Replacement Water assessments, "...to give Watermaster flexibility in Basin Management...."

Watermaster Operating Criteria (Exhibit H)

Exhibit H provides direction to the Watermaster concerning the management of the Basin, with particular emphasis on the sources of Supplemental Water and recharge criteria. This portion of the Judgment specifies that Watermaster shall purchase the best quality of supplemental water available for replenishment of the Basin (emphasis added) (Section 3(b)). The Judgment was amended in 1991 to clarify that use of reclaimed water would be consistent with the spirit of this Section 3(b).

With regard to use of reclaimed water as supplemental water, Section 3(c) notes that, "...water quality problems involved in the reuse of water within the Basin pose serious questions of increased costs and other problems to the pumpers, their customers and all water users. Accordingly, Watermaster is authorized to gather information, make and review studies, and make recommendations on the feasibility of the use of reclaimed water for replacement purposes; provided that no reclaimed water shall be recharged in the Basin by Watermaster without prior approval of the Court, after notice to all parties and hearing thereon." In 1991, the court approved the use of a maximum of 30,000 acre-feet per year of Reclaimed Water as Supplemental Water for the Basin.

MAIN SAN GABRIEL BASIN WATERMASTER - RULES AND REGULATIONS

There are two sections in the current Rules and Regulations that address control of ground-water basin recharge. Section 23 states that, "Except for the exercise of non-consumptive uses and performance of Cyclic Storage Agreements with Watermaster, no Party shall spread water within the Basin or Relevant Watershed for subsequent recovery or Watermaster credit without prior Watermaster written permission to do so because Watermaster has sole custody and control of all Ground Water storage rights in the Basin."

Section 26 of the Rules and Regulations provides the guidelines concerning the development of Cyclic Storage Agreements. Of particular importance is Section 26(d)(1)a), which states that, "The time, place and amount of said spreading shall be approved in advance by Watermaster provided, however, that when the water level of the Baldwin Park Key Well is at or above elevation two-hundred fifty (250) feet, spreading activities shall be restricted to the easterly portion of the Basin at water spreading facilities designated in advance by Watermaster, unless otherwise approved by the Court."

Section 26 also provides priorities for spreading supplemental water. That section indicates that direct delivery of Replacement Water has the highest priority followed by delivery by a responsible agency to a cyclic storage account and the delivery to a party's individual cyclic storage account. (Emphasis added.) While Section 26 identifies priorities for delivery, it does not associate water quality with each priority.

REGIONAL WATER QUALITY CONTROL BOARD - WATER QUALITY CONTROL PLAN

The Regional Water Pollution Control Board, predecessor to the Regional Water Quality Control Board (RWQCB), was created in 1949 by the Dickey Act. By 1952, the Regional Water Pollution Control Board began adopting water quality objectives. With the adoption of the Porter-Cologne Act in 1969, the name was changed to the Regional Water Quality Control Board (RWQCB) and a Water Quality Control Plan was thereafter adopted. The most recent amendments to that Plan were adopted by the RWQCB in June 1994.

The Water Quality Control Plan is "...designed to preserve and enhance water quality and protect the beneficial uses of all regional waters." The Water Quality Control Plan is used by the RWQCB to maintain water quality in the region and regulate discharges to receiving water and ground water. The general policy of the RWQCB is to ensure that water quality degradation does not occur.

The RWQCB, in the interest of protecting the water supply of the Main San Gabriel Basin, has developed water quality objectives for ground water and surface water. The Water Code defines water quality objectives as, "The allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses...." The RWQCB has developed the water quality objectives to govern any discharge so that the quality of surface and ground water will not be degraded. The RWQCB does not regulate the use of imported water for ground-water replenishment because it is not considered a waste product (e.g. reclaimed water). The RWQCB water quality objectives for ground water are shown in Table 1. (A more inclusive review of water quality objectives is shown in Appendix B.)

In addition to establishing water quality objectives for ground water and surface water RWQCB entered into a Memorandum of Agreement (MOA) with the DOHS to regulate the use of Reclaimed Water for ground water recharge. This MOA is discussed herein.

TABLE 1

WATER QUALITY OBJECTIVES FOR SELECTED CONSTITUENTS

GROUND-WATER BASIN	WATER QUALITY OBJECTIVES (mg/L)			
	TDS	SULFATE	CHLORIDE	BORON
Main San Gabriel Basin				
Western Area	450	100	100	0.5
Eastern Area	600	100	100	0.5

Source: Table 3-10, Water Quality Control Plan, Los Angeles Region 1994

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

The California Department of Health Services (DOHS) is charged with ensuring that drinking water standards are met by water companies to protect the health of consumers. Drinking water standards are contained in the Domestic Water Quality and Monitoring Regulations, Chapter 15, Title 22, California Code of Regulations. Many of these standards are shown in Appendix B. The DOHS is also involved with the permitting of Reclaimed Water projects, as discussed below.

RWQCB/DOHS REGULATIONS FOR USE OF RECLAIMED WATER

The State Water Resources Control Board, along with the nine Regional Water Quality Control Boards, entered into a Memorandum of Agreement with the Department of Health Services in December 1988 to regulate the use of reclaimed water. The MOA sets forth principles and procedures that are to be followed when evaluating an application to use reclaimed water for ground-water recharge.

A reclaimed water ground-water recharge project applicant submits an application to the RWQCB for issuance of Water Reclamation Requirements (WRR). The RWQCB provides a copy of the application to DOHS for review and comments. DOHS comments are then included in the RWQCB WRRs that may be issued. The WRRs are issued on a case-by-case basis to ensure that the reclaimed water is of such quality that it fully protects public health at all times. An Engineering Report is required with the application. The Engineering Report must include relevant aspects of the project including, but not limited to:

1. A plan of the reclamation plant and project facilities;
2. a hydrogeological study of the project area;
3. a description of how the project will be operated;
4. a description of methods to determine maximum reclaimed water contribution; and
5. a water quality monitoring plan.

Furthermore, an applicant must comply with other requirements, which consist of (1) site requirements (distance from a potable water well, depth to ground water, percolation rates and retention time); (2) water quality monitoring requirements; and (3) treatment performance standards (limitations on Total Organic Carbon, Coliform, turbidity and biochemical oxygen demand). The RWQCB requires an assessment to evaluate potential impacts of the project on the objectives and beneficial uses from the RWQCB's Basin Plan.

SECTION II

AVAILABILITY OF SUPPLY

BACKGROUND

The Judgment states that the three Responsible Agencies are to provide supplemental water to the Basin. The current sources of supply to those agencies includes the State Water Project (SWP) and/or the Colorado River (CR). In the future, supplemental water may be provided from other sources, including reclaimed water. A brief review of various sources of supply is provided below.

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

The Metropolitan Water District of Southern California (MWD) provides both SWP water and CR water as supplemental water to the Basin. Through a series of interconnected feeders, MWD has the capability of providing 100 percent SWP water, 100 percent CR water, or a blend.

MWD's Foothill Feeder provides supplemental water to service connection PM-26 and service connection USG-3. Both of these service connections provide similar quality of supplemental water. In a recent letter to the Three Valleys Municipal Water District (Three Valleys District), MWD clarified that each year, between April and September, when demands are highest, any supplemental water delivery would typically be 100 percent SWP water. Between October and March, MWD indicated that supplemental water delivery through the Foothill Feeder could be 100 percent SWP water, 100 percent CR water, or a blend of the two water supplies. The letter further clarified that the greatest potential of providing 100 percent CR water occurs between January and March. A copy of that letter is included as Appendix C.

Service connection USG-3 is located at the westerly end of the Glendora Tunnel portion of the Foothill Feeder, about 1,000 feet south of Morris Dam, where Supplemental Water is released into the San Gabriel River. USG-3 can be equipped with two different orifice plates which permit a flow rate of about 225 cubic feet per second (cfs) or about 400 cfs. However, in 1975 an agreement between the Los Angeles County Flood Control District (currently part of the County of Los Angeles Department of Public Works (DPW)) and Watermaster limited recharge to 250 cfs. Therefore, in compliance with this agreement, the USG-3 orifice plate limits flow to about 225 cfs. Service Connection PM-26 is located on the Foothill Feeder and may deliver water to Little Dalton Wash at a rate of about 20 cfs.

MWD can also deliver supplemental water through service connection Cen B-48, which is located on the La Verne pipeline and allows water to flow to San Dimas Wash. Cen B-48 also has the capability of delivering CR water, SWP water or a blend of the two sources.

MWD also has the right to request access to the unused portion of the San Gabriel Districts Devil Canyon-Azusa Pipeline under the provisions of the Cooperative Water Exchange Agreement. The delivery capabilities of the Devil Canyon-Azusa Pipeline are described below.

Table 2 provides a summary of the source of supply from MWD.

SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

The San Gabriel Valley Municipal Water District (San Gabriel District) constructed the Devil Canyon-Azusa Pipeline from the State Water Project at Devil Canyon to the Basin. San Gabriel District currently has the capability of providing State water through four different outlets. The San Dimas Turnout has a capacity of about 35 cfs and delivers water to the San Dimas Wash. The San Dimas Hydroelectric Plant turnout has a capacity of about 45 cfs and also delivers water to San Dimas Wash. The San Gabriel Flow Control Structure has a capacity of 55 cfs and delivers water to the San Gabriel River above Foothill Boulevard. The Azusa Canyon Flow Control Facility has a capacity of 50 cfs and delivers water to the San Gabriel Canyon Spreading Grounds. A summary is shown on Table 2.

RECLAIMED WATER

The amended Judgment allows up to 30,000 acre-feet per year of reclaimed water to be used as a source of Supplemental Water. Historically, no reclaimed water has been delivered as Supplemental Water to the Basin.

There are three water reclamation plants (WRPs) which are potential sources of reclaimed water to the Basin. They are the Pomona WRP, Whittier Narrows WRP and San Jose Creek WRP. All water from the Pomona and Whittier Narrows WRPs has been fully contracted. San Jose Creek WRP has been constructed in stages with Stage I and II located adjacent to the San Jose Creek, just east of the I-605 Freeway. The total capacity of these two stages is 62.5 million gallons per day (MGD). The San Jose Creek WRP Stage III is located adjacent to the San Jose Creek and westerly of the I-605 Freeway. Stage III has a capacity of 37.5 MGD. The San Jose Creek WRP has a total capacity of 100 MGD. There are existing contracts for the use of this water with the California County Club (0.09 MGD), the City of Industry (4 MGD) and the Water

TABLE 2

SOURCES OF SUPPLEMENTAL WATER

DELIVERING AGENCY	SERVICE CONNECTION	SOURCE OF WATER 1/	DELIVERY RATE (CFS)	DELIVERY LOCATION
Metropolitan Water District of Southern California 2/	USG-3	SWPW, CRW Blend	225/400	San Gabriel River below Morris Dam
	PM-26	SWPW, CRW Blend	20	Little Dalton Wash
	Cen-B48	SWPW, CRW Blend	300	San Dimas Wash
	USG-SGP	SWPW	55	(All San Gabriel Valley MWD locations)
San Gabriel Valley Municipal Water District	San Dimas Turnout	SWPW	35	San Dimas Wash
	San Dimas Hydroelectric Plant Turnout	SWPW	45	San Dimas Wash
	San Gabriel Flow Control Structure	SWPW	55	San Gabriel River via Beatty Canyon Storm Drain
	Azusa Canyon Flow Control Facility	SWPW	50	San Gabriel Canyon Spreading Grounds

1/ SWPW = State Water Project water
CRW = Colorado River water
Blend = Blend of SWPW and CRW

2/ Provides water for Upper District and Three Valleys District

Replenishment District of Southern California (25 MGD). The total contracted capacity is about 30 MGD, resulting in available capacity of about 70 MGD. Furthermore, there are daily and seasonal supply fluctuations from the San Jose Creek WRP, which may affect the availability of supply.

OTHER SOURCES

Currently, SWP water and CR water are the only sources of Basin water supply as Supplemental Water. Local agencies have contemplated the use of reclaimed water for both direct use and supplemental water for Basin replenishment. There may be the opportunity in the future to obtain Supplemental Water from other sources. Therefore, the supplemental water criteria adopted by the Watermaster should be broad enough to consider a wide range of sources of supply.

SECTION III

REVIEW OF WATER QUALITY

BACKGROUND

The development of supplemental water quality criteria must consider the existing (background) water quality in the Basin. Where proposed supplemental water for Basin replenishment is of inferior quality to the background water quality, an investigation of potential impacts must be performed. This may include solute transport modeling.

Typical background ground-water quality at various wells located in various Basin hydrogeologic subunits is shown on Table 3. The locations of the hydrologic subunits are shown on Plate 1. The background ground-water quality in these hydrogeologic subunits of the Basin may be impacted by imported supplemental water that is recharged in nearby spreading grounds. In the report entitled, "Reconnaissance Report Background Water Quality, Main San Gabriel Basin," dated March 1994, a historic review of background water quality and the apparent impacts of supplemental water replenishment is reviewed. That report identifies the historic water quality trends in selected wells within the Basin with specific emphasis on TDS, chlorides, sulfate and nitrate. The report indicates that delivery of imported water impacts background water quality.

SOURCES OF SUPPLY

As noted earlier there are currently two sources of supplemental water supply (CR water and SWP water). A summary of SWP water and CR water quality is shown on Table 4.

State Water Project Water

The quality of State Water Project water is shown on Table 4. State Water Project water quality currently complies with the specified RWQCB basin objectives and DOHS water quality requirements. State water is currently considered the best quality of water available for Basin replenishment purposes.

Colorado River Water

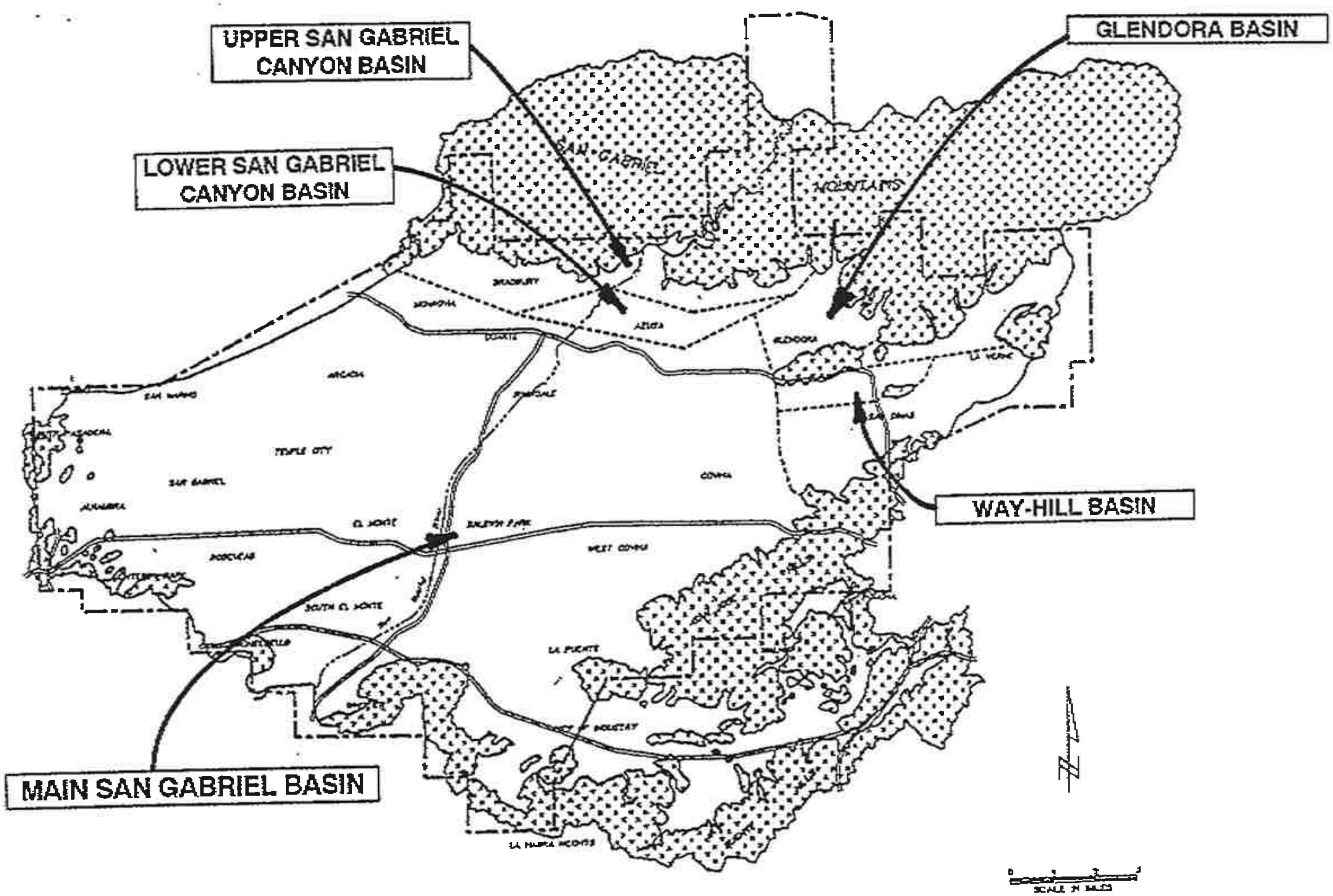
The quality of Colorado River water (CR water) is shown on Table 4. This table shows the water quality parameters that exceed RWQCB objectives are TDS and sulfate.

TABLE 3

MAIN SAN GABRIEL BASIN
BACKGROUND WATER QUALITY

PRODUCER	WELL	HYDROLOGIC SUBUNIT OF MAIN SAN GABRIEL BASIN	IMPORTED WATER SERVICE CONNECTION	BACKGROUND WATER QUALITY (MG/L)			
				TDS 1/	CHLORIDE	SULFATE	NITRATE
California-American Water Company	Buena Vista	Main Basin	USG-3, Beatty Canyon	216.0	19.6	33.5	2.6
Glendora	2-E	Glendora Basin	PM-26	361.1	22.5	52.9	17.0
Glendora	12-G	Upper Canyon Basin Lower Canyon Basin	USG-3 San Gabriel Canyon	225.7	16.7	38.0	2.5
San Gabriel Valley Water Company	B5A	Main Basin	USG-3, Cen B-48, San Dimas	378.1	34.1	53.7	31.3
Southern California Water Company	Columbia 7	Way-Hill Basin	Cen B-48, San Dimas	402.8	37.5	76.1	50.5

1/ TDS = Total Dissolved Solids



LEGEND

- Groundwater basin boundary
- Relevant watershed boundary
- Freeway
- Bedrock (non-alluvial hill and mountain areas)

STETSON ENGINEERS INC.

MAIN SAN GABRIEL BASIN WATERMASTER

LOCATION MAP OF HYDROLOGIC SUBUNITS OF MAIN SAN GABRIEL BASIN

WEST COVINA SAN RAFAEL MESA, AZ

TABLE 4

SUPPLEMENTAL IMPORTED WATER QUALITY

Water Quality Parameter (Unit)	Sources of Supply		
	Colorado River (Mathews) 1/	State Water Project (Silverwood) 1/	Average of Mathews & Silverwood
Total Dissolved Solids (ppm)	656	324	490
Chloride (ppm)	88	84	86
Sulfate (ppm)	268	65	166.5
Nitrate (ppm)	0.8	2.8	1.8
Total Hardness as CaCO3 (ppm)	312	118	215
Total Alkalinity as CaCO3 (ppm)	129	73	101
Turbidity (NTU)	0.3	2.3	1.3
Calcium (ppm)	75	24	49.5
Magnesium (ppm)	30	14	22
Sodium (ppm)	100	68	84
Potassium (ppm)	5	3.4	4.2
pH	8.24	7.96	8.1
Iron (ppm)	0.032	0.071	0.0515
Manganese (ppm)	ND	0.024	0.012
Boron (ppm)	0.18	0.22	0.2
PCE (ppm)	ND	ND	ND
TCE (ppm)	ND	ND	ND
CTC (ppm)	ND	ND	ND
Total Organic Carbon (ppm)	3.54	3.39	3.46
Other VOCs	ND	ND	ND
Gross Alpha (pCi/l)	3.1	1.8	2.45
Gross Beta (pCi/l)	4.7	3.8	4.25
Langlier Index	0.8	- 0.2	0.3
Arsenic (ppm)	0.003	0.003	0.003
Cadmium (ppm)	0.001	ND	0.0005
Chromium (ppm)	ND	ND	ND
Copper (ppm)	0.04	ND	0.02
Lead (ppm)	ND	ND	ND
Mercury (ppm)	ND	ND	ND
Nickel (ppm)	ND	ND	ND
Silver (ppm)	ND	ND	ND
Zinc (ppm)	0.02	ND	0.01

Footnotes:

1/ Two-year average (calendar year 1992 and 1993). Source, annual water quality repor to MWD member agencies.

NTU = NephelometricTurbidity Units

CFU = Colony - Forming Units

pCi/l = pico Curies per liter

ND = Non-Detected

ppm = parts per million

ppb = parts per billion

Blended Imported Water

MWD can provide a blend of SWP water and CR water. Recently, MWD staff indicated that the supplemental water supply to the San Gabriel Basin for replenishment will vary depending upon the time of year and MWD operational conditions.

Reclaimed Water

Similar to Colorado River water, reclaimed water does not meet all of the water quality parameters established in the RWQCB's Basin Plan for Basin replenishment. In addition, reclaimed water use must be permitted by the RWQCB and approved by DOHS and the Watermaster. Use of reclaimed water for Basin replenishment must be evaluated on a case-by-case basis by the RWQCB.

COMPATIBILITY WITH REGULATORY STANDARDS

The Regional Water Quality Control Board has established water quality objectives for the Main San Gabriel Basin. Those water quality objectives are listed on Table 1. Supplemental water for ground-water recharge should be consistent with RWQCB's ground-water objectives.

Based upon the water quality of existing sources of supplemental water, the water quality parameters of concern are total dissolved solids (TDS), chloride, sulfates, nitrate and boron. This is consistent with the water quality parameters for reclaimed water evaluated in the draft report entitled "Evaluation of Potential Impacts of the San Gabriel River Water Reuse Demonstration Project," dated May 1995. These water quality parameters were selected primarily to conform to RWQCB's water quality objectives for ground water and because compliance with these objectives will help maintain beneficial uses of ground water in the Basin. Furthermore, municipal use of potable water tends to add about 300 parts per million of TDS to waste waters. Maintaining a high quality water in the ground-water basin contributes to maintaining high quality of reclaimed water produced at water reclamation facilities.

Under a variety of circumstances, the quality of available supplemental water may exceed one or more of the selected water quality criteria. Under those circumstances, the impact of the quality and quantity of the available supplemental water for Basin replenishment should be reviewed on a case-by-case basis.

SECTION IV

ECONOMIC ANALYSIS

Watermaster purchases supplemental water from the Responsible Agency from whose service area a Replacement Water requirement has been incurred. Watermaster can order supplemental imported water from Upper San Gabriel Valley Municipal Water District (Upper District), Three Valleys District and San Gabriel District. Upper District and Three Valleys District receive water supply from MWD, which has established water rates for replenishment water. As a result, the rate that Upper District and Three Valleys District charges Watermaster for supplemental water have been very similar. San Gabriel District has a contract for SWP water and develops its own rates. In the future, supplemental water may also be available from Responsible Agencies as reclaimed water or new sources from other watersheds. The most important criteria for selecting alternative supplemental water supplies is the quality of the supplemental water. However, the Judgment does not obligate Responsible Agencies to charge the same rate for different sources of supplemental water.

Two important economic evaluation criteria are contained in the Judgment. Section 4 of Exhibit H of the Judgment states that, "Replacement Assessment rates shall be in an amount calculated to allow Watermaster to purchase one acre-foot of supplemental water for each acre-foot of excess Production to which such Assessment applies." Should Watermaster defer purchase of supplemental water and subsequently purchase supplemental water at a different cost, Section 4 of Exhibit H must be addressed. Additionally, Section 48 of the amended Judgment states that "...Watermaster may make reasonable accumulations of Replacement Water Assessments. Such monies and any interest accrued thereon shall only be used for the purchase of Replacement Water." In the interest of managing the Basin, Watermaster may choose to defer purchase of supplemental water for various reasons, including quality, price, availability, etc. Such deferral is evaluated along with the increase in water rates and the interest income that may be generated by leaving Replacement Water funds in an investment.

In the future, a Responsible Agency may choose to offer two or more different sources of supply at different rates. To demonstrate this, Table 5 and Figure 1 show that Upper District could offer imported CR water or reclaimed water, both of which are similar in quality, at differing rates.

TABLE 5

PROJECTED SUPPLEMENTAL WATER RATES

FISCAL YEAR	UPPER DISTRICT/ THREE VALLEYS DISTRICT PROJECTED RATE 1/	RECLAMED WATER RATE 90 PERCENT OF UPPER DISTRICT RATE 2/	RECLAMED WATER RATE WATERMASTER DEMONSTRATION PROJECT 3/
1990-91	$115.00	--	--
1991-92	$136.50	--	--
1992-93	$178.40	--	--
1993-94	$220.40	--	--
1994-95	$235.10	--	--
1995-96	$242.45	--	--
1996-97	$279.15	$251.24	$177.58
1997-98	$314.00	$282.60	$195.00
1998-99	$328.20	$295.38	$202.10
1999-2000	$334.45	$301.01	$205.23
2000-2001	$340.90	$306.81	$208.45
2001-2002	$343.55	$309.20	$209.78
2002-2003	$346.90	$312.21	$211.45

1/ Upper District/Three Valleys District Rate (MWD) - Includes new MWD charges and assumes Watermaster will pay all charges.

2/ Upper District Reclaimed Water Project - Assumes rate set at 90 percent of Upper District MWD rate.

3/ Watermaster Demonstration Project - Assumes cost of water consists of annual facility costs ($76) plus 50 percent of savings compared to Upper District MWD rate.

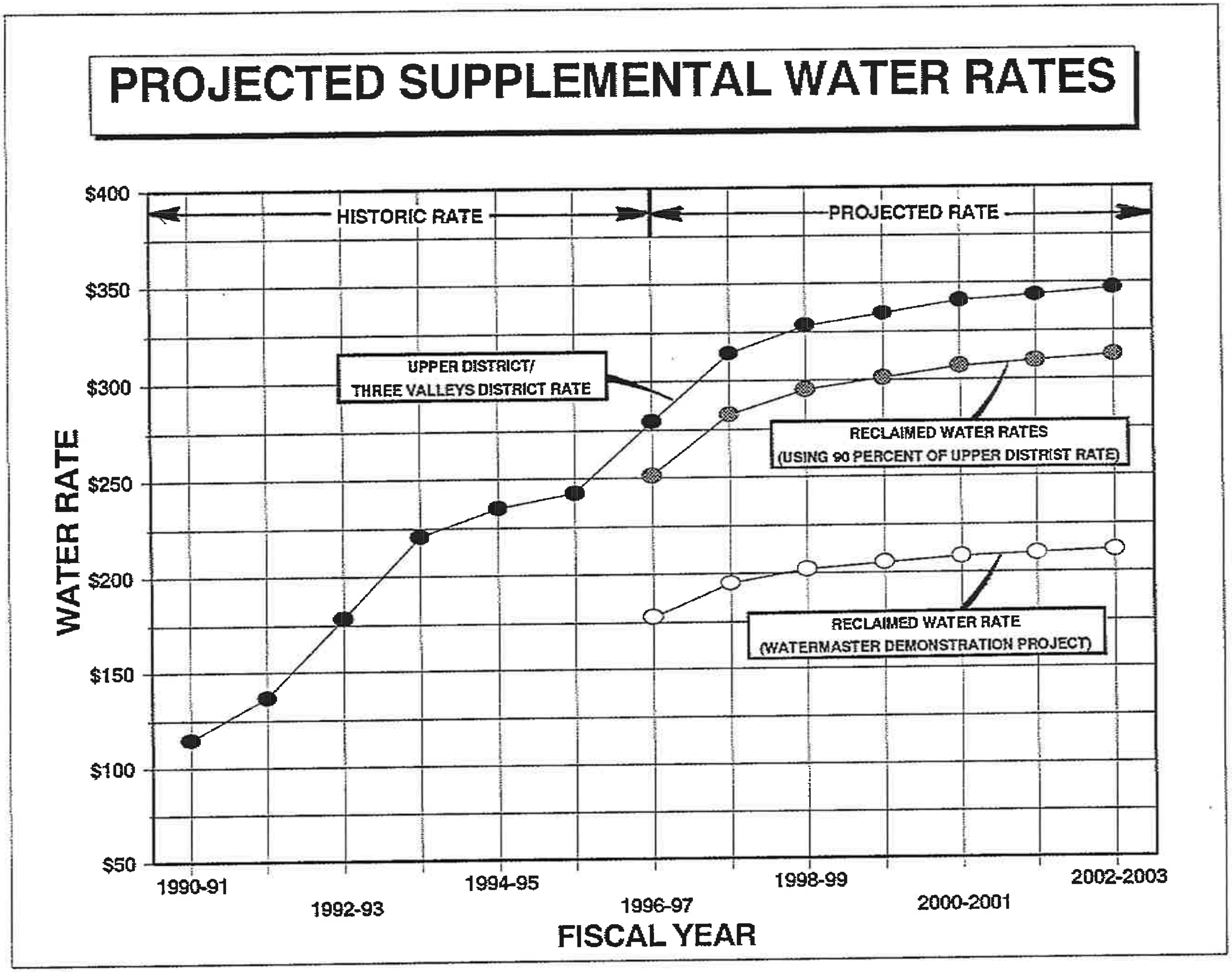


FIGURE 1

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SECTION V

DEVELOPMENT OF SUPPLEMENTAL WATER QUALITY CRITERIA

BACKGROUND

Supplemental water quality criteria must be consistent with the Watermaster Judgment and Rules and Regulations. Furthermore, delivery of such water must comply with regulatory standards established by the RWQCB and DOHS, particularly in the case of reclaimed water.

The Judgment and Rules and Regulations place an emphasis on the delivery of Replacement Water. Specifically, Section 26(d)(5) of the Rules and Regulations states, "The priorities for spreading of Supplemental Water are hereby established as follows in the order of priority: First: Supplemental Water ordered by Watermaster...as Replacement Water...." Consequently, separate criteria have been developed for delivery of Replacement Water and Cyclic Storage Water.

REPLACEMENT WATER CRITERIA

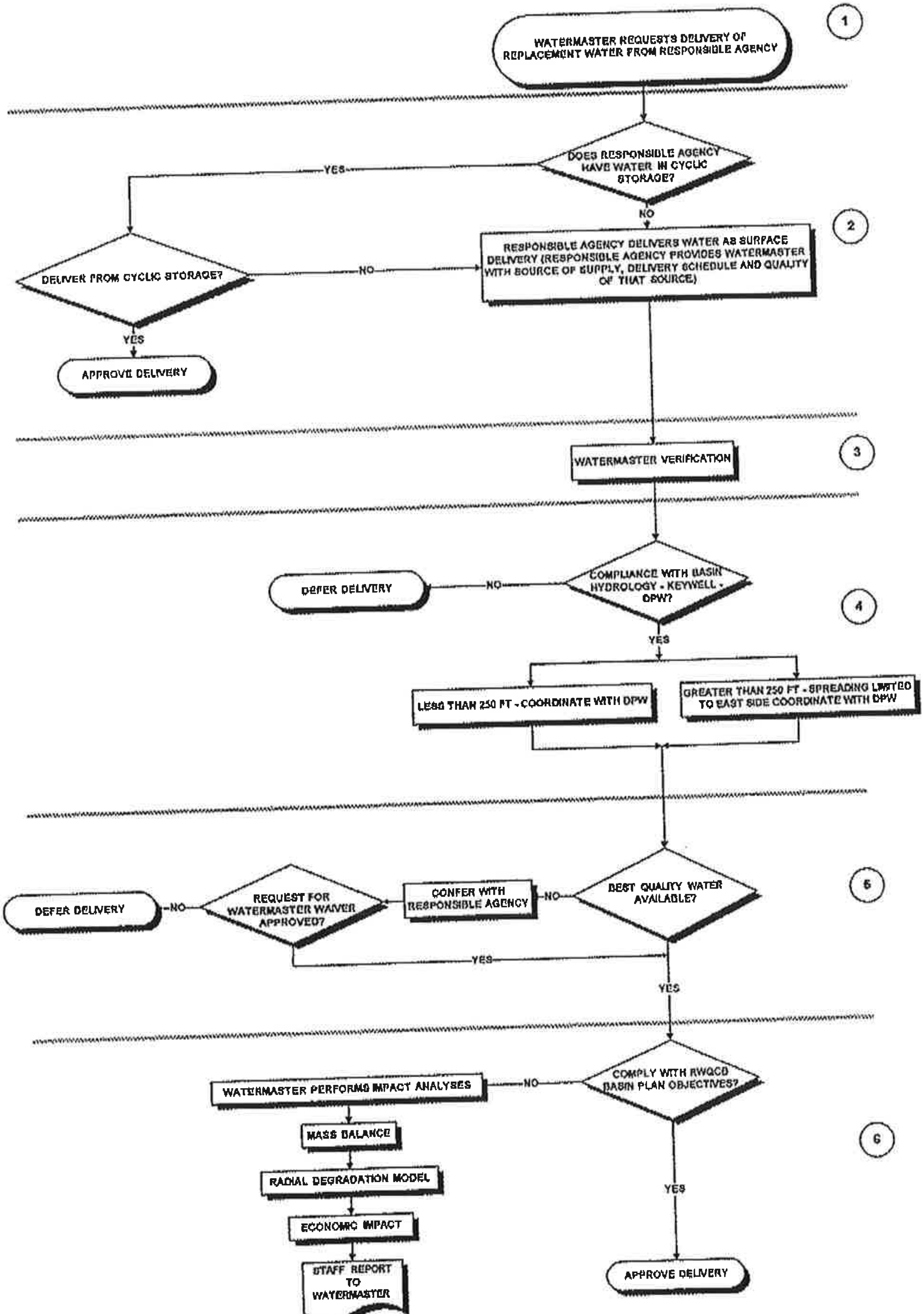
When requesting Replacement Water deliveries from a Responsible Agency Watermaster should, in an attempt to receive the best quality of water available, request deliveries from cyclic storage. In the event water from cyclic storage is not available, then Watermaster should request surface deliveries, provided the recharge of such water is consistent with Watermaster Basin management and can be accomplished by the Los Angeles County Department of Public Works (DPW). Watermaster should immediately approve delivery of Supplemental Water for Replacement Water purposes if the water is the best quality available and complies with all other regulatory agencies' requirements.

Figure 2 provides a detailed flow-chart of the decision process that should be followed when requesting Replacement Water. Figure 2 is divided into discrete sections 1 through 6 as described below.

1. Replacement Water requirements are determined by Watermaster staff by August 15 of each year for the prior year's production (July through June). Replacement Water delivery requests are submitted to the Responsible Agencies based upon the water rates set by the Responsible Agency in May of that year. The Agency normally delivers the water before a water rate change occurs -- usually by the following May. Watermaster's request will

FIGURE 2

WATERMASTER STAFF FLOWCHART FOR REPLACEMENT WATER DELIVERIES



include the best quality of water available, must meet basin plan objectives and specify selected minimum water quality criteria.

2. When a Responsible Agency is notified of its Replacement Water obligation, it will first determine if it has adequate supplies in cyclic storage and then determine if the water will be transferred from storage or be a surface delivery. Deliveries from cyclic storage are administrative and require no further approval. Surface deliveries must be coordinated through Watermaster. The Responsible Agency should submit the quantity, spreading location, source, quality, and schedule to Watermaster for approval prior to delivery. (Note: It is generally expected that if a basin replenishment/reclaimed water project is developed, most, if not all, deliveries will be made into cyclic storage.)

3. Watermaster staff will formally review each proposed surface water delivery.

4. Watermaster staff will review the water delivery request and the Baldwin Park Key Well provisions. If Replacement Water delivery is not in compliance with the Judgment and Rules and Regulations, a staff report will be prepared and Watermaster will make a determination. Any proposed delivery will be confirmed with the DPW in writing on a standardized form.

5. The Judgment requires that Replacement Water deliveries be the "best quality of water available." Watermaster will consider <u>all</u> water quality parameters to determine the best quality of water available, however, the primary indicators are Title 22 standards and the Regional Board Basin Plan objectives. If the proposed delivery is not the best quality of water available, Watermaster staff will determine if the Responsible Agency would like to request a written waiver from Watermaster. Without a written waiver request, the staff will recommend deferral of the delivery. A written waiver request will require further staff review and Watermaster approval. Except for reclaimed water, Watermaster may require court approval to accept Replacement Water that is not the "best quality of water available."

   With regard to the use of reclaimed water as supplemental water for basin replenishment purposes, Watermaster will exempt from this criteria an annual amount of reclaimed water delivered from a project approved pursuant to Section 34 (h) of the Judgment. The amount of reclaimed water exempted will be agreed upon by both Watermaster and the Responsible Agency (or Agencies).

6. If the proposed Replacement Water does not meet the RWQCB Basin Plan Objectives, Watermaster staff will perform an impact analysis and submit a

staff report and recommendation to Watermaster. (Except for reclaimed water delivered as approved and agreed upon, Watermaster may require Court approval to accept Replacement Water that is not the best quality of water available.) The impact analysis will include at least:

Mass Balance - If the proposed delivery is not the best quality of water available, a mass balance will be performed comparing the proposed supplemental water to either the best quality of water available or the Basin Plan objectives -- whichever results of the better water quality (comparing each key constituent). The mass balance may suggest a prorated reduction in the requested delivery. An example of a mass balance determination is shown on Plate 2.

Radial Degradation Model - A maximum radial degradation (area of impact) allowance will be standardized for each spreading facility. Each key constituent will be modeled according to the applicant's delivery plan.

If the modeling demonstrates that the spreading plan will not cause degradation to occur (at levels exceeding the Basin Plan) beyond the standardized degradation allowance, it will pass the radial degradation model test. An example of a radial degradation model as shown on Plates 3, 4 and 5.

Economic Impact - In the event that alternative water supplies are available, an economic analysis may also be used as a guide to recommend the Replacement Water supply to Watermaster.

If Watermaster approves the delivery of any supplemental water, staff will coordinate spreading with DPW .

CYCLIC STORAGE CRITERIA

Watermaster should follow a similar decision process when authorizing delivery of Supplemental Water into Cyclic Storage. However, since there is not a legal requirement to deliver such water, Watermaster may be more selective concerning the quality of water delivered into cyclic storage. Figure 3 is a detailed flow chart of the decision process that should be followed when authorizing delivery of water into Cyclic Storage. It is anticipated that if a basin replenishment/reclaimed water project is developed, a new, separate cyclic storage account will be required. Figure 3 is also divided into sections 1 through 5 which are described below.

MASS BALANCE ANALYSES

REQUEST FOR DELIVERY

DELIVERY AMOUNT	45000	ACRE-FEET
TDS CONCENTRATION	617	MILLIGRAMS PER LITER

MASS BALANCED DELIVERY USING BEST WATER QUALITY AVAILABLE (STATE WATER)

DELIVERY AMOUNT	22536	ACRE-FEET
TDS CONCENTRATION	309	MILLIGRAMS PER LITER

MASS BALANCED DELIVERY USING RWQCB BASIN OBJECTIVES

DELIVERY AMOUNT	32820	ACRE-FEET
TDS CONCENTRATION	450	MILLIGRAMS PER LITER

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

CRITERIA FOR SUPPLEMENTAL WATER
MASS BALANCE ANALYSES FOR ALTERNATIVE SOURCES

08/03/95

DELIVERY : AT SFSG, 15,000 AF/MO FOR 3 CONSECUTIVE MONTHS, TDS OF REPLACEMENT WATER = 617 MG/L

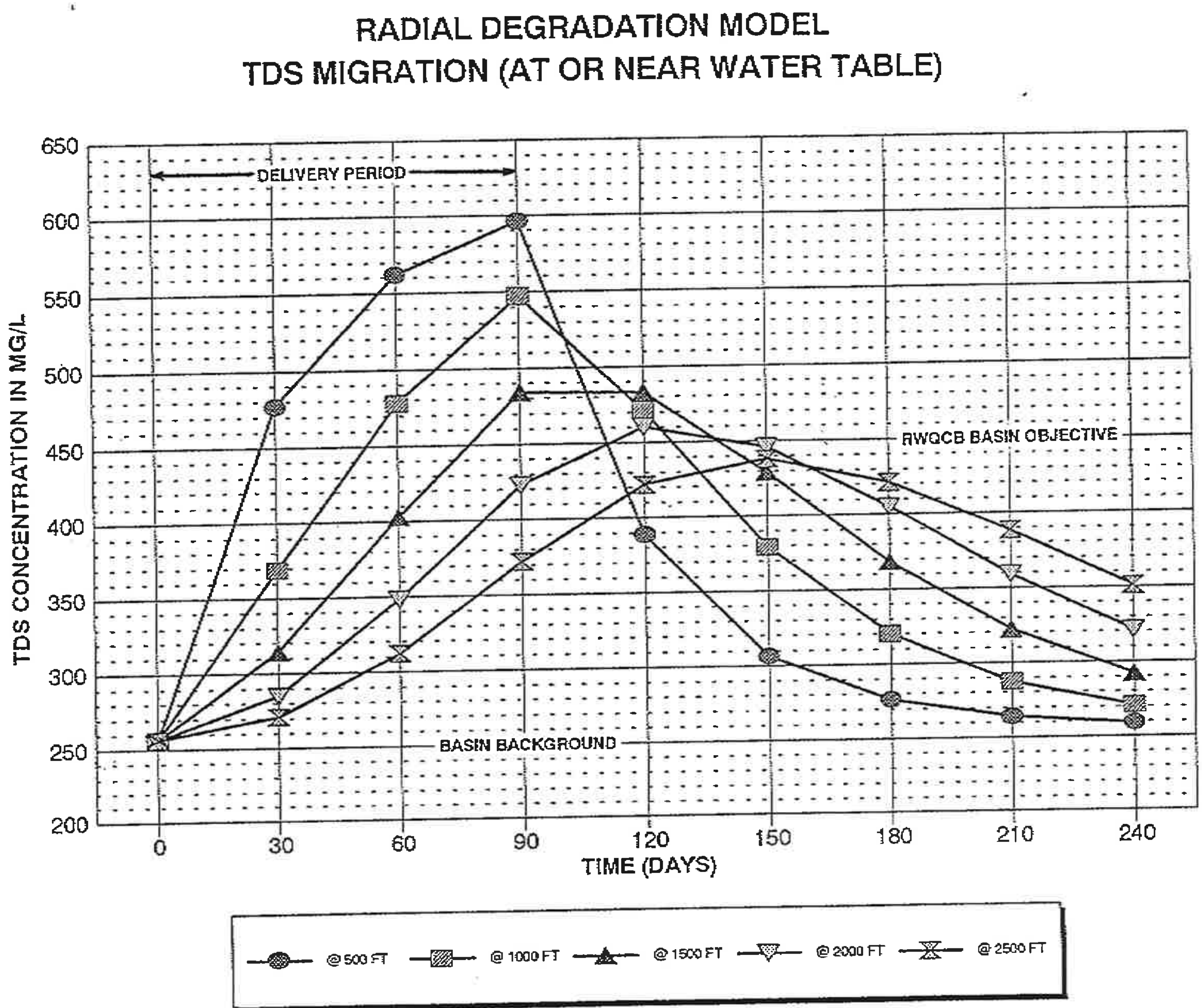


PLATE 3

08/08/95

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PLATE 4

***** CONCENTRATION AT ELEMENTS *****

TIME/DISTANCE (Days/Feet)		0.	500.	1000.	1500.	2000.	2500.	3000.	3500.	4000.
DELIVERY PERIOD	30.	617.00	477.08	368.77	313.59	285.49	271.17	263.87	260.16	258.27
	60.	617.00	562.39	478.35	403.10	348.24	311.88	289.07	275.26	267.11
	90.	617.00	595.58	546.48	483.70	422.77	372.03	333.63	306.39	287.94
	120.	256.30	387.79	470.50	483.25	459.69	421.78	382.40	347.85	320.32
	150.	256.30	307.58	379.07	428.82	446.28	438.04	414.69	385.36	356.22
	180.	256.30	276.40	319.59	368.13	404.66	421.82	420.64	406.26	384.63
	210.	256.30	264.21	287.08	321.97	358.85	387.99	404.09	406.57	397.96
	240.	256.30	259.42	270.74	292.40	321.30	351.08	375.44	390.44	394.97

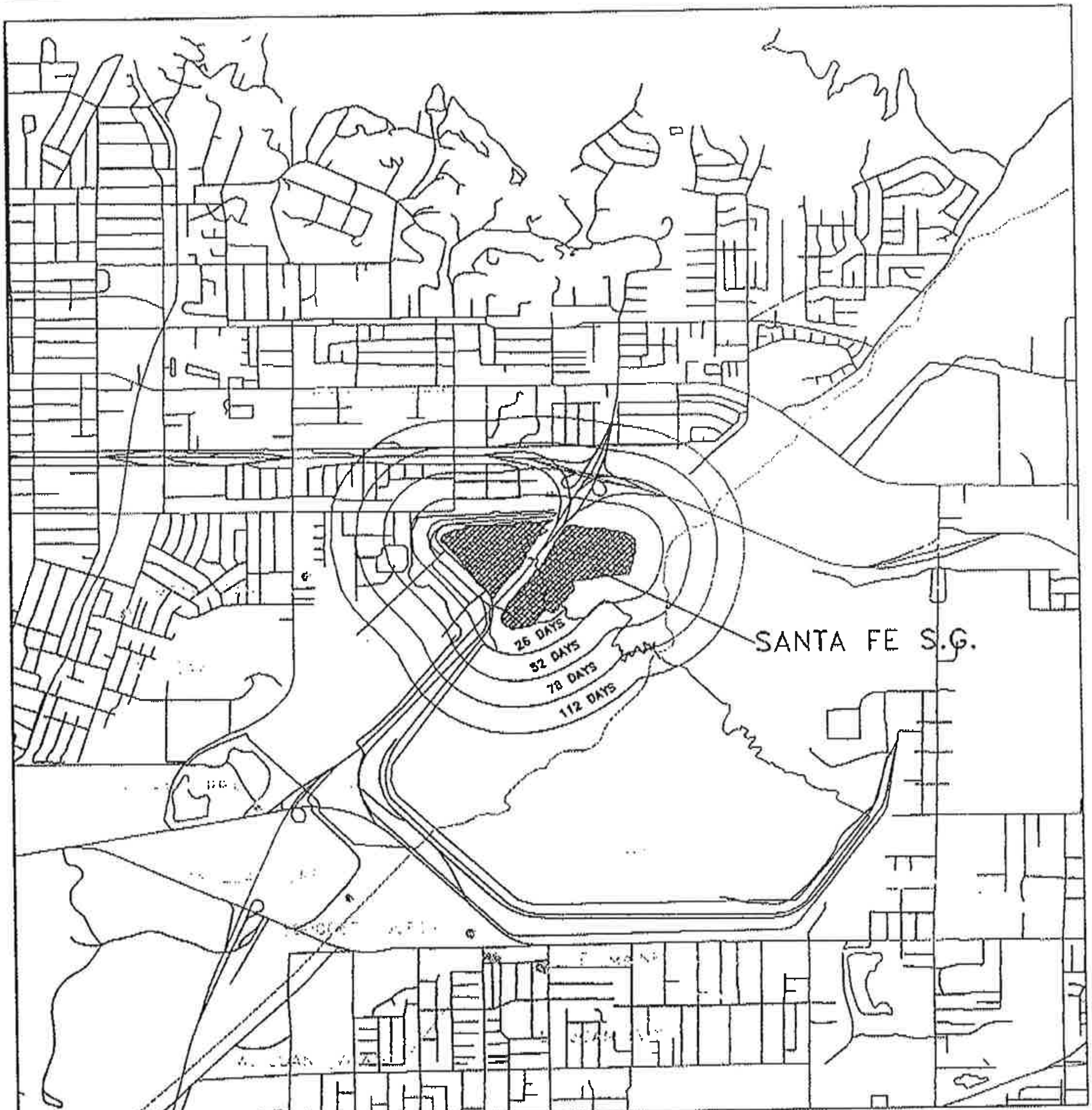
DELIVERY: AT SFSG, 15,000 AF/MO FOR THREE CONSECUTIVE MONTHS, TDS OF REPLACEMENT WATER = 617 MG/L

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

RADIAL DEGRADATION MODEL
OUTPUT FROM THE 1D-SOLUTE TRANSPORT PROGRAM

08/08/95



CAWC CALIFORNIA AMERICAN WATER COMPANY
LACDPW LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
ORP OWL ROCK PRODUCTS
UCPC UNITED CONCRETE PIPE COMPANY
URP UNITED ROCK PRODUCTS
VCWD VALLEY COUNTY WATER DISTRICT

DELIVERY:
- AT SANTA FE SPREADING GROUNDS
- 15,000 AF/MO FOR 3 CONSECUTIVE MONTHS
- TDS OF REPLACEMENT WATER = 617 MG/L

APPROXIMATE SCALE: 1" = 2,900'

STETSON ENGINEERS INC.

MAIN SAN GABRIEL BASIN WATERMASTER

RADIAL DEGRADATION MODEL
MIGRATION OF THE 450 MG/L–TDS CONTOUR

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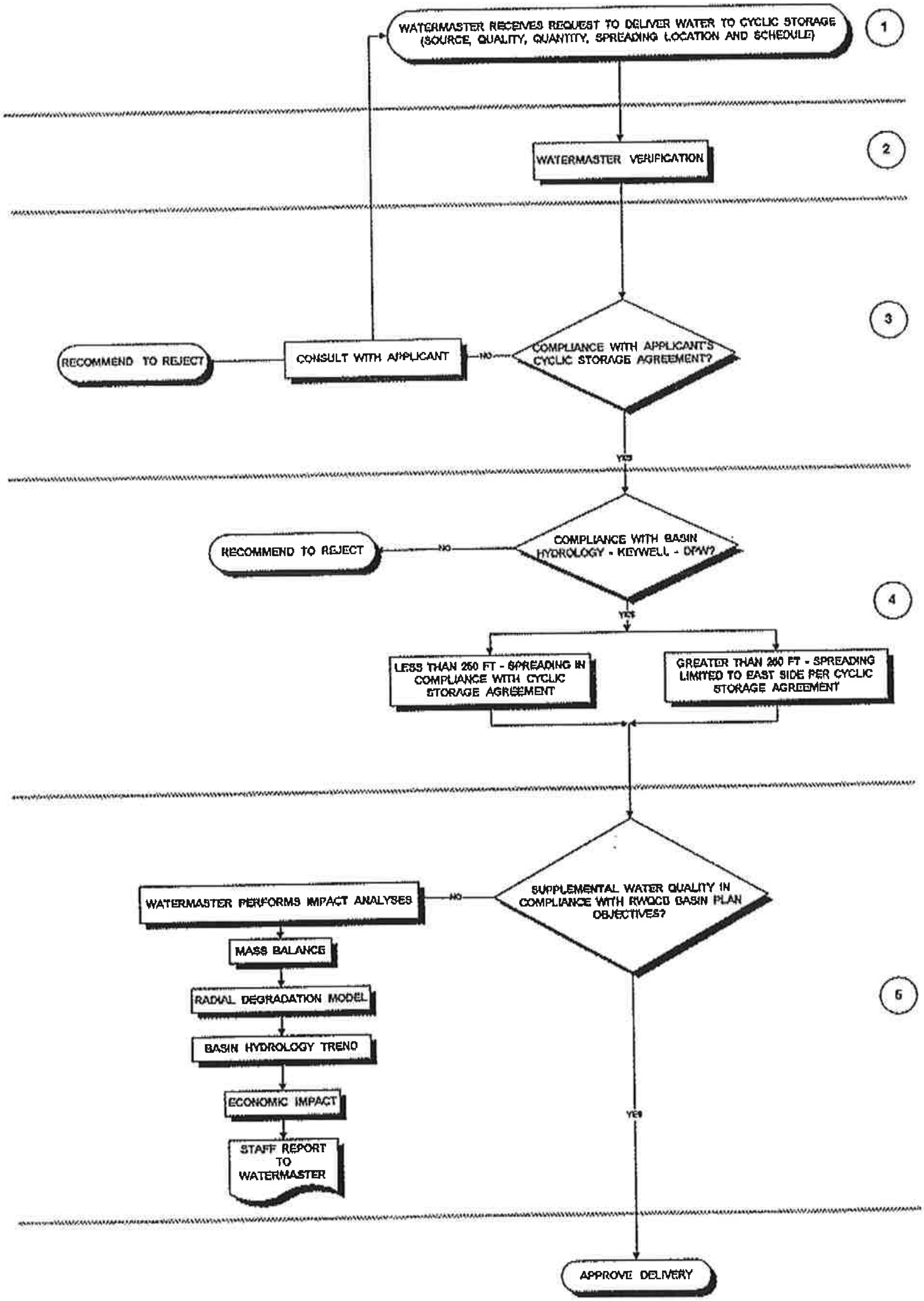
FIGURE 3

WATERMASTER STAFF FLOWCHART FOR CYCLIC STORAGE DELIVERIES



1. A more formalized process is suggested for application to deliver supplemental water to the Basin for cyclic storage purposes. The application form may be standardized to include items such as: identification of cyclic storage account and expiration date, best quality of water available data, quantity of water proposed for delivery, source and specific quality data, spreading location and schedule of deliveries. Any modifications would be formalized by the applicant.

2. Watermaster staff will formally review each application.

3. Watermaster staff will first confirm that the request is in full compliance with applicant's current cyclic storage agreement. If request is in compliance, further review follows. If not in compliance, staff consults with applicant for revisions. If staff and applicant cannot modify the application to comply with the cyclic storage agreement, applicant submits a written request for waiver to Watermaster for Watermaster determination.

4. Watermaster staff will review the application and the Baldwin Park Key Well provisions. If application is not in compliance with the Judgment and Rules and Regulations, a staff report will be prepared and Watermaster will make a determination. Any proposed delivery will be confirmed with DPW in writing on a standardized form.

5. If the supplemental water quality does not meet RWQCB Basin Plan objectives, the staff will perform an impact analysis and submit a staff report and recommendation to the Watermaster. (Except for reclaimed water delivered as approved and agreed upon, Watermaster may require Court approval to accept supplemental water that is not the best quality of water available.) The impact analyses will include <u>at least</u>:

   <u>Mass Balance</u> - If the proposed delivery is <u>not</u> the best quality of water available, a mass balance will be performed comparing the proposed supplemental water to either the best quality of water available <u>or</u> the Basin Plan objectives -- whichever results in the better water quality (comparing each key constituent). The mass balance may suggest a prorated reduction in the requested delivery. An example of a mass balance determination is shown on Plate 2.

   <u>Radial Degradation Model</u> - A maximum radial degradation (area of impact) allowance will be standardized for each spreading facility. Each key constituent will be modeled according to the applicant's delivery plan.

If the modeling demonstrates that the spreading plan will not cause degradation to occur (at levels exceeding the Basin Plan) beyond the standardized degradation allowance, it will pass the radial degradation model test. An example of a radial degradation model is shown on Plates 3, 4 and 5.

Basin Hydrology Trend - Supplemental water proposed for cyclic storage spreading will be subject to a basinwide review of hydrologic trends. This review may suggest that abundant local supplies and current storage conditions reduce the need for supplemental water that does not meet Basin Plan Objectives.

Economic Impact - A review will be made to determine if alternative supplies are available and the economic and legal impacts of selecting an alternative, if any. If the applicant intends to sell the cyclic storage water back to Watermaster in the future, a review will be made of the appropriate water rate.

If Watermaster approves the delivery of water, staff will coordinate spreading with DPW.

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APPENDIX A

SCOPE OF WORK

1205-12

September 1, 1995

SCOPE OF WORK
CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER
BASED ON WATER QUALITY

I. Review Regulatory Standards for water quality

A. Main San Gabriel Basin Watermaster Judgment/Rules and Regulations

1. Definition of Terms
2. Provisions Governing Supplemental Water Delivery
   a. Physical solution
   b. Engineering criteria (Exhibit H) of Judgment
   c. Cyclic Storage Agreements

B. Water Quality Control Plan - Regional Water Quality Control Board

1. Surface Water Objectives
2. Ground Water Objectives
   a. Flexibility
   b. Applicability of standards
      i. imported water
      ii. reclaimed water

C. Department of Health Services

1. Drinking Water Standards
2. Reclaimed Water Recharge Standards

II. Availability of Supply

A. MWD (SWP/CRW)
1. Delivery Rate
2. Delivery Location
3. Quality

B. SGVMWD (SWP)
1. Delivery Rate
2. Delivery Location
3. Quality

C. Reclaimed Water
   1. Delivery Rate
   2. Delivery Location
   3. Quality

III. Water Quality Analyses

   A. Compatibility with Regulatory Standards
   B. Impacts to Existing Basin Quality

      1. Solute Transport Model/Basin Impacts

IV. Economic Analyses

   A. MWD Rates and Charges

      1. Assess Impacts of
         a. Readiness-to-Serve Charge
         b. New Demand Charge
         c. Connection Maintenance Charge
         d. Commodity Charge
         e. Projections

   B. SGVMWD

      1. Projected Rates

   C. Reclaimed Water

      1. Capital Cost of Facilities
      2. Annual O & M
      3. Water Quality Monitoring
      4. Cost of Water from RWQCB

   D. Comparison of Costs

V. Develop Supplemental Water Delivery Criteria (Ranking)

   A. Request Deliveries to Commence October 1 of Each Year
   B. Deliver Highest Quality Available

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APPENDIX B

WATER QUALITY OBJECTIVES

DOHS TITLE 22, DOHS RECLAIMED WATER STANDARDS AND RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	DOHS Title 22	DOHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
BACTERIA (MCL in coliforms per 100 ml)				
COLIFORM	5% OF SAMPLES 1/	2.2	1.1	200
INORGANICS CHEMICALS (MCLS in mg/l)				
ALUMINUM	1.000	1.000	NR	1.000
AMMONIA, UN-IONIZED (as NITROGEN)	NR	NR	NR	0.21
AMMONIA, TOTAL (as NITROGEN)	NR	NR	NR	5.60
ANTIMONY	0.006	0.006	NR	NR
ARSENIC	0.05	0.050	0.050	0.050
ASBESTOS (In Million Fibers per Liter (MFL))	7.000	7.000	NR	NR
BARIUM	1.0	1.000	1.000	1.000
BERYLLIUM	0.004	0.004	NR	NR
CADMIUM	0.005	0.005	0.010	0.010
CHROMIUM	0.05	0.050	0.050	0.050
CYANIDE	0.2	0.200	NR	NR
FLUORIDE	1.4-2.4	1.400-2.400	1.400-2.400	1.400-2.400
LEAD	0.05	NR	0.050	0.050
MERCURY	0.002	0.002	0.002	0.002
NICKEL	0.1	0.100	NR	NR
NITRATE (as NITRATE)	45	NR	45.000	45.000
NITRITE (as NITROGEN)	1.000	NR	1.000	1.000
NITRATE + NITRITE (as NITROGEN)	10.0	NR	10.000	8.000
TOTAL NITROGEN (as NITROGEN)	NR	10.000	NR	NR
SELENIUM	NR	0.050	0.010	0.010
SILVER	0.1	NR	0.050	0.050
THALLIUM	0.002	0.002	NR	NR
RADIOACTIVITY (MCLS in pCi/L)				
RADIUM-226 + RADIUM-228	5	5	5	5
GROSS ALPHA PARTICLE ACTIVITY	15	15	15	15
TRITIUM	20,000	20,000	20,000	20,000
STRONTIUM-90	8	8	8	8
GROSS BETA PARTICLE ACTIVITY	50	50	50	50
URANIUM	20	20	20	20
VOLATILE ORGANIC CHEMICALS (MCLS in mg/l)				
BENZENE	0.001	0.0010	0.0010	0.0010
CARBON TETRACHLORIDE	0.0005	0.0005	0.0005	0.0005

DOHS TITLE 22, DOHS RECLAIMED WATER STANDARDS AND RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	DOHS Title 22	DOHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
1,2-DICHLOROBENZENE	0.6	0.6000	NR	NR
1,4-DICHLOROBENZENE	0.005	0.0050	0.0050	0.0050
1,1-DICHLOROETHANE	0.005	0.0050	0.0050	0.0050
1,2-DICHLOROETHANE	0.0005	0.0005	0.0005	0.0005
1,1-DICHLOROETHYLENE	0.006	0.0060	0.0060	0.0060
cis-1,2-DICHLOROERTHYLENE	0.006	0.0060	0.0060	0.0060
trans-1,2-DICHLOROETHYLENE	0.01	0.0100	0.0100	0.0100
DICHLOROMETHANE	0.005	0.0050	NR	NR
1,2-DICHLOROPROPANE	0.005	0.0050	0.0050	0.0050
1,3-DICHLOROPROPENE	0.0005	0.0005	0.0005	0.0005
ETHYLBENZENE	0.7	0.7000	0.6800	0.6800
ETHYLENE DIBROMIDE	0.00005	NR	0.00005	0.00005
MONOCHLOROBENZENE	0.07	0.0700	0.0300	0.0300
STYRENE	0.1	0.1000	NR	NR
1,1,2,2-TETRACHLOROETHANE	0.001	0.0010	0.0010	0.0010
TETRACHLOROETHYLENE	0.005	0.0050	0.0050	0.0050
TOLUENE	0.15	0.1500	NR	NR
1,2,4-TRICHLOROBENZENE	0.07	0.0700	NR	NR
VOLATILE ORGANIC CHEMICALS (MCLS in mg/l)				
1,1,1-TRICHLOROETHANE	0.2	0.2000	0.2000	0.2000
1,1,2-TRICHLOROETHANE	0.005	0.0050	0.0050	0.0050
TRICHLOROETHYLENE	0.005	0.0050	0.0050	0.0050
TRICHLOROFLUOROMETHANE (FREON 11)	0.15	0.1500	0.1500	0.1500
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	1.2	1.2000	1.2000	1.2000
VINYL CHLORIDE	0.0005	0.0005	0.0005	0.0005
XYLENES	1.750*	1.7500	1.7500	1.7500
NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (MCLS in mg/l)				
ALACHLOR	0.002	0.0020	NR	NR
ATRAZINE	0.003	0.0030	0.0030	0.0030
BENTAZON	0.018	0.0180	0.0180	0.0180
BENZO(A)PYRENE	0.0002	0.0002	NR	NR
CARBOFURAN	0.018	0.0180	0.0180	0.0180
CHLORDANE	0.0001	0.0001	0.0001	0.0001
2,4-D	0.07	0.0700	0.07	0.07
DALAPON	0.2	0.2000	NR	NR
1,2-DIBROMO-3-CHLOROPROPANE	0.0002	0.0002	0.0002	0.0002
DI (2-ETHYLHEXYL) ADIPATE	0.4	0.4000	NR	NR
DI (2-ETHYLHEXYL) PHTHALATE	0.004	0.0040	0.0040	0.0040
DINOSEB	0.007	0.0070	NR	NR

DOHS TITLE 22,
DOHS RECLAIMED WATER STANDARDS AND
RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	DOHS Title 22	DOHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
DIQUAT	0.02	0.0200	NR	NR
ENDOTHALL	0.1	0.1000	NR	NR
ENDRIN	0.002	0.0020	0.0002	0.0002
ETHYLENE DIBROMIDE	0.00005	0.0001	NR	NR
GLYPHOSATE	0.7	0.7000	0.7000	0.7000
HEPTACHLOR	0.00001	0.00001	0.00001	0.00001
NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (MCLS In mg/l)				
HEPTACHLOR EPOXIDE	0.00001	0.00001	0.00001	0.00001
HEXACHLOROBENZENE	0.001	0.0010	NR	NR
HEXACHLOROCYCLOPENTADIENE	0.05	0.0500	NR	NR
LINDANE	0.0002	0.0002	0.0002	0.0002
METHOXYCHLOR	0.04	0.0400	0.04	0.04
MOLINATE	0.02	0.0200	0.0200	0.0200
OXAMYL	0.2	0.2000	NR	NR
PENTACHLOROPHENOL	0.001	0.0010	NR	NR
PICLORAM	0.5	0.5000	NR	NR
POLYCHLORNATED BIPHENOLS	0.0005	0.0005	NR	NR
POLYCHLORINATED BIPHENYLS (PCBs) (in ng/l)		NR	NR	14.0-30.0
SIMAZINE	0.004	0.0040	0.004	0.004
THIOBENCARB	0.07	0.0700	0.0700	0.0700
TOXAPHENE	0.003	0.0030	0.003	0.003
2,3,7,8-TCDD (DIOXIN)	3E-08	3E-08	NR	NR
2,4,5-TP (SILVEX)	0.05	0.0500	0.0100	0.0100
SECONDARY STANDARDS (MCLS In mg/l)				
ALUMINUM	0.2	0.2000	1.0000	1.0000
BORON	NR	NR	0.5	0.5
CHLORIDE	250-500	250-500	100	100
COLOR (Units)	15	15	NR	NR
COPPER	1	1.0000	NR	NR
CORROSIVITY	Non-corrosive	NR	NR	NR
FOAMING AGENTS (MBAS)	0.5	0.5000	NR	0.5
IRON	0.3	0.3000	NR	NR
MANGANESE	0.05	0.0500	NR	NR
SECONDARY STANDARDS (MCLS In mg/l)				
ODOR-THRESHOLD (Units)	3	3	NR	NR
pH (Units)	6.5-8.85	6.5-8.5	NR	6.5-8.5

DOHS TITLE 22,
DOHS RECLAIMED WATER STANDARDS AND
RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	DOHS Title 22	DOHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
SULFATE	250-500	250-500	100	100
THIOBENCARB	0.001	0.0010	NR	NR
TOTAL DISSOLVED SOLIDS (TDS)	500-1000	500-1,000	450-600	450
TOTAL ORGANIC CARBON (TOC)	NR	20.0	NR	NR
SUSPENDED SOLIDS (SS)	NR	30.0	NR	NR
BIOCHEMICAL OXYGEN DEMAND (BOD)	NR	30.0	NR	NR
TURBIDITY (Units)	5	2	NR	10%-20%
ZINC	5	5.0000	NR	NR
DISSOLVED OXYGEN (DO)	NR	NR	NR	5.0
TEMPERATURE (F)	NR	NR	NR	5-80

NOTES

DOHS : STATE DEPARTMENT OF HEALTH SERVICES
RWQCB : CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD/LOS ANGELES REGION
MCL : MAXIMUM CONTAMINANT LEVEL
mg/l : MILLIGRAMS PER LITER
ng/l : NANOGRAMS PER LITER
pCI/L : PICOCURIES PER LITER
NR : NOT REQUIRED
TOTAL NITROGEN = AMMONIA NITROGEN + ORGANIC NITROGEN + NITRATE (AS NITROGEN) + NITRITE (AS NITROGEN)
1/ IF AT LEAST 40 OR MORE SAMPLES COLLECTED PER MONTH, OTHERWISE NO MORE THAN ONE SAMMPLE PER MONTH SHALL BE BE POSITIVE, SEE PAGE 11 DOHS TITLE 22.
*MCL IS FOR EITHER A SINGLE ISOMER OR THE SUM OF THE ISOMERS.

APPENDIX C

FUTURE BLENDS OF IMPORTED WATER

MAY 1 4

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Office of the General Manager

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 3

To Carol Williams	From Rick Hansen
Co. Watermaster	Co. Three Valleys MWD
Dept.	Phone # 909-621-5568
Fax # 818/305-1506	Fax #

Mr. Richard W. Hansen
General Manager
Three Valleys Municipal
Water District
P.O. Box 1300
Claremont, California 91711

Dear Mr. Hansen:

Future Blends on Foothill Feeder/Rialto Pipeline at USG-3

You have asked that Metropolitan provide information on our plans for deliveries of State project and Colorado River water at Service Connection USG-3. This memo can serve as an indication of what to expect for a source of supply at your new spreading connection, PM-26. In particular, you have requested information as to our operating plans for the next five years. The recently adopted blending policy of Metropolitan will potentially add some new ramifications in this regard as well.

Historical Operation

Historically, water supplied to USG-3 has been either 100-percent State project water or 100-percent Colorado River water, virtually at all times. (On some very rare occasions, blending has occurred below the La Verne Pipeline-Rialto Pipeline junction through the Glendora Tunnel for short time periods.) Prior to construction of the Etiwanda Pipeline and Control Facility, the configuration of our system in that area did not permit us to routinely provide "blended" water to USG-3. Flows into the east portal of the Glendora Tunnel came from *either* the Rialto Pipeline (State project water) or the La Verne Pipeline (Colorado River water, flowing northward from the Upper Feeder), but normally not both at the same time. When the Rialto Pipeline was in operation, it delivered flow into the La Verne Pipeline (flowing southward) to supply the Weymouth Filtration Plant. With this configuration, in order to produce a blended flow from the Weymouth and Diemer plants, State project water is supplied via the Rialto Pipeline and La Verne Pipeline and no Colorado River water can reach USG-3.

350 South Grand Avenue, Los Angeles, California • Mailing address: Box 54153, Los Angeles, California 90054 • Telephone (213) 217-6000

The vast majority of the time, historical deliveries to USG-3 have been 100-percent State project water. Operationally, this has been considered our "normal" mode of operation. Only on limited occasions has it been necessary to deliver Colorado River water to USG-3. In recent years, this has typically occurred at times of the year when demands were very low and the level of Lake Mathews had to be controlled in order to avoid laying off Colorado River water. This has usually occurred in the January-March time frame. This has typically been the only foreseeable circumstance under which Colorado River water would have been delivered to USG-3.

Operational Changes for Blending

With the addition of the Etiwanda Pipeline and Control Facility, it is now physically possible to move State project water through either the Rialto Pipeline or the Upper Feeder and La Verne Pipeline to USG-3. Further, this latter route can provide a true blend of State project water and Colorado River water to USG-3 under normal operations, but only when State project water is being delivered to the Upper Feeder (and no deliveries are being made on the Rialto Pipeline west of Live Oak Reservoir). This, however, will not materially increase the probability of Colorado River water reaching USG-3. Typically, the blending of Upper Feeder flows will occur in the high-demand periods of the year, while the historical need to deliver Colorado River water to USG-3 has occurred in low-demand periods when blending is not required. Thus, when blending is occurring in the Upper Feeder, it will normally be done to augment supplies to meet Weymouth demands, not solely to meet the requirements of the new blending policy.

The new blending policy also calls for approximately equal blends at Weymouth, Diemer, and Skinner. The only way to assure that such is the case for Weymouth and Diemer is to provide State project water to both plants via the La Verne Pipeline. The most desirable way to provide State project water to Diemer (without blending in Lake Mathews) is via the La Verne Pipeline and the Yorba Linda Feeder. While the facilities exist to provide State project water to Diemer via the Etiwanda Pipeline, Upper Feeder, and Yorba Linda Feeder, this mode of operation makes it very difficult to balance the Weymouth and Diemer blends. Thus, as long as a blending operation is occurring (typically in the April-September period), all flows to USG-3 (and PM-26) will be 100-percent State project water.

Conclusion

It is anticipated that the likelihood of a change in the frequency of deliveries of Colorado River water to USG-3 in the next five years will not be materially different from recent years. Such deliveries have typically only occurred in the January-March period when there was a need to control the level of Lake Mathews and avoid laying off Colorado River water. The new blending policy will not affect the frequency of such deliveries, as the operational changes necessitated for blending occur in the April-September period when there has historically been no need to make deliveries of Colorado River water to USG-3.

If you have any additional questions concerning this issue, please contact Michael B. Young at (213) 217-6440 or Jim Daber at (213) 217-6885.

Edward G. Means
Chief of Operations

JVD\cj
(OPSEXEC\USG3_TV.DOC)

cc: Mr. Bruce J. Milne

APPENDIX S

WATER QUALITY SAMPLING SCHEDULE

GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION: SOURCE NAME	WELL IDENTIFICATION: SOURCE CODE	SAMPLING SCHEDULE: TYPE AND FREQUENCY	SAMPLING SCHEDULE: LAST TEST (month/year)	SAMPLING SCHEDULE: NEXT TEST (month/year)	COMMENTS
ADAMS RANCH MUTUAL WATER COMPANY						
	3	1910009-003	GM 3 YR	06 / 10	06 / 13	
			TDS 1 YR	06 / 10	06 / 13	
			NO_3 1 YR	06 / 10	06 / 13	
			GP 3 YR	06 / 10	06 / 13	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION: SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE: TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
ALHAMBRA, CITY OF						
	7	1910001-006	GM 3 YR	06 / 13	06 / 16	
			TDS 1 YR	06 / 13	06 / 16	
			NO_3 1 YR	06 / 13	06 / 16	
			GP 3 YR	06 / 13	06 / 16	
	8	1910001-007	GM 3 YR	07 / 11	07 / 14	
			TDS 1 YR	07 / 11	07 / 14	
			NO_3 1 YR	07 / 11	07 / 14	
			GP 3 YR	07 / 11	07 / 14	
	9	1910001-008	GM 3 YR	04 / 11	04 / 14	
			TDS 1 YR	04 / 11	04 / 14	
			NO_3 1 YR	04 / 11	04 / 14	
			GP 3 YR	04 / 11	04 / 14	
	11	1910001-010	GM 3 YR	05 / 12	05 / 15	
			TDS 1 YR	05 / 12	05 / 15	
			NO_3 1 YR	05 / 12	05 / 15	
			GP 3 YR	05 / 12	05 / 15	
	12	1910001-011	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	13	1910001-012	GM 3 YR	11 / 10	11 / 13	
			TDS 1 YR	11 / 10	11 / 13	
			NO_3 1 YR	11 / 10	11 / 13	
			GP 3 YR	11 / 10	11 / 13	
	14	1910001-013	GM 3 YR	11 / 10	11/ / 13	
			TDS 1 YR	11 / 10	11/ / 13	
			NO_3 1 YR	11 / 10	11/ / 13	
			GP 3 YR	11 / 10	11 / 13	
	15	1910001-014	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	GARFIELD	1910001-001	GM 3 YR	06 / 92	/	INACTIVE
			GP 3 YR	09 / 91	/	
	LONGDEN 1	1910001-002	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	LONGDEN 2	1910001-003	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
AMARILLO MUTUAL WATER COMPANY						
	1	1910002-001	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	2	1910002-002	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
ARCADIA, CITY OF						
	BALDWIN 2	1910003-002	GM 3 YR	03 / 09	/	INACTIVE
			GP 3 YR	03 / 09	/	
	Camino Real 3	1910003-041	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	LIVE OAK 1	1910003-007	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	LONGDEN 1	1910003-008	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	LONGDEN 2	1910003-009	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	LONGLEY 2	1910003-010	GM 3 YR	04 / 78	/	INACTIVE
			GP 3 YR	04 / 78	/	
	LONGLEY 3	1910003-040	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	PECK ROAD 1	1910003-015	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	ST JOSEPH 2	1910003-018	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
AZUSA LIGHT AND WATER						
	1 (CITY 7)	1910007-001	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	2	1910007-002	GM 3 YR	06 / 13	06 / 16	
			TDS 1 YR	06 / 13	06 / 16	
			NO_3 1 YR	06 / 13	06 / 16	
	(CITY NORTH)		GP 3 YR	06 / 13	06 / 16	
	3 (CITY 8)	1910007-003	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	4	1910007-004	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
	(CITY SOUTH)		GP 3 YR	09 / 13	09 / 16	
	5 (CITY 1)	1910007-005	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	6 (CITY 3)	1910007-006	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	7 (AVWC 5)	1910007-007	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	8 (AVWC 4)	1910007-008	GM 3 YR	05 / 12	05 / 15	
			TDS 1 YR	05 / 12	05 / 15	
			NO_3 1 YR	05 / 12	05 / 15	
			GP 3 YR	05 / 12	05 / 15	
	9 (AVWC 6)	1910007-039	GM 3 YR	11 / 90	/	INACTIVE
			GP 3 YR	11 / 90	/	
	10 (AVWC 8)	1910007-010	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	11	1910007-033	GM 3 YR	10 / 11	10 / 14	
			TDS 1 YR	10 / 11	10 / 14	
			NO_3 1 YR	10 / 11	10 / 14	
			GP 3 YR	10 / 11	10 / 14	
	12	1910007-034	GM 3 YR	10 / 11	10 / 14	
			TDS 1 YR	10 / 11	10 / 14	
			NO_3 1 YR	10 / 11	10 / 14	
			GP 3 YR	10 / 11	10 / 14	
	DIVERSION	1910007-014	GM 1 YR	12 / 12	12 / 13	
			TDS 1 YR	12 / 12	12 / 13	
			NO_3 1 YR	12 / 12	12 / 13	
			GP 1 YR	12 / 12	12 / 13	

* Old well numbers are in parentheses behind re-numbered Azusa Light and Water wells.

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GROUND AND SURFACE WATER
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CALIFORNIA AMERICAN WATER COMPANY / DUARTE						
	BACON	1910186-002	GM 3 YR	12 / 10	12 / 13	
			TDS 1 YR	12 / 10	12 / 13	
			NO_3 1 YR	12 / 10	12 / 13	
			GP 3 YR	12 / 10	12 / 13	
	BUENA VISTA	1910186-001	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	BUENA VISTA 2	1910186-019	GM 3 YR	04 / 11	04 / 14	
			TDS 1 YR	04 / 11	04 / 14	
			NO_3 1 YR	04 / 11	04 / 14	
			GP 3 YR	04 / 11	04 / 14	
	CROWN HAVEN	1910186-003	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	ENCANTO	1910186-009	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	FISH CANYON	1910186-004	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	LAS LOMAS 2	1910186-010	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	MOUNTAIN AVE	1910186-006	GM 3 YR	/	/	INACTIVE
			GP 3 YR	/	/	
	SANTA FE	1910186-007	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	WILEY	1910186-008	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

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CALIFORNIA AMERICAN WATER COMPANY / SAN MARINO						
	BLUE RIBBON 1	1910139-015	GM 3 YR	12 / 84	/	
			GP 3 YR	05 / 84	/	INACTIVE
	BLUE RIBBON 2	1910139-016	GM 3 YR	12 / 84	/	
			GP 3 YR	03 / 81	/	INACTIVE
	DEL MAR	1910139-017	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR			
			GP 3 YR	09 / 13	09 / 16	
	GRAND	1910139-010	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	GUESS	1910139-018	GM 3 YR	05 / 01	/	
			GP 3 YR	05 / 01	/	INACTIVE
	HALL 2	1910139-032	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	HOWLAND	1910139-020	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	LONGDEN	1910139-007	GM 3 YR	09 / 10	09 / 13	OUT OF SERVICE
			GP 3 YR	09 / 10	09 / 13	
	MARIPOSA 2	1910139-022	GM 3 YR	/	/	INACTIVE
			GP 3 YR	/	/	
	MARIPOSA 3	1910139-023	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	MISSION VIEW 2	1910139-011	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	RICHARDSON 1	1910139-025	GM 3 YR	11 / 94	/	INACTIVE
			GP 3 YR	11 / 94	/	
	ROANOKE	1910139-009	GM 3 YR	05 / 00	/	INACTIVE
			GP 3 YR	05 / 00	/	
	ROSEMEAD	1910139-014	GM 3 YR	09 / 13	09 / 16	
			TDS 1 YR	09 / 13	09 / 16	
			NO_3 1 YR	09 / 13	09 / 16	
			GP 3 YR	09 / 13	09 / 16	
	PATTON	1910139-044	GM 3 YR	07 / 09	07 / 12	INACTIVE
			GP 3 YR	07 / 09	07 / 12	

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GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

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CALIFORNIA DOMESTIC WATER COMPANY						
	2	1910199-004	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	3	1910199-005	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	5A	1910199-006	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	6	1910199-007	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	
	8	1910199-008	GM 3 YR	10 / 12	10 / 15	
			TDS 1 YR	10 / 12	10 / 15	
			NO_3 1 YR	10 / 12	10 / 15	
			GP 3 YR	10 / 12	10 / 15	
	14	1910199-014	GM 3 YR	04 / 13	04 / 16	
			TDS 1 YR	04 / 13	04 / 16	
			NO_3 1 YR	04 / 13	04 / 16	
			GP 3 YR	04 / 13	04 / 16	

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CHAMPION MUTUAL WATER COMPANY						
	1	1900706-001	GM 3 YR	/	/	INACTIVE
			GP 3 YR	/	/	
	2	1900706-002	GM 3 YR	10 / 09	10 / 12	
			TDS 1 YR	10 / 09	10 / 12	
			NO_3 1 YR	10 / 09	10 / 12	
			GP 3 YR	10 / 09	10 / 12	
	3	1900706-003	GM 3 YR	10 / 09	10 / 12	
			TDS 1 YR	10 / 09	10 / 12	
			NO_3 1 YR	10 / 09	10 / 12	
			GP 3 YR	10 / 09	10 / 12	

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GROUND AND SURFACE WATER
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WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
COVINA, CITY OF						
	2 (Grand)	1910127-003	GM 3 YR	04 / 99	/	INACTIVE
			GP 3 YR	04 / 99	/	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION: SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE: TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
COVINA IRRIGATING COMPANY						
	BALDWIN 1	1910128-001	GM 3 YR	01 / 13	01 / 16	producer samples quarterly
			TDS 1 YR	01 / 13	01 / 16	
			NO_3 1 YR	01 / 13	01 / 16	
			GP 3 YR	01 / 13	01 / 16	
	BALDWIN 2	1910128-002	GM 3 YR	01 / 13	01 / 16	producer samples quarterly
			TDS 1 YR	01 / 13	01 / 16	
			NO_3 1 YR	01 / 13	01 / 16	
			GP 3 YR	01 / 13	01 / 16	
	BALDWIN 3	1910128-003	GM 3 YR	01 / 13	01 / 16	producer samples quarterly
			TDS 1 YR	01 / 13	01 / 16	
			NO_3 1 YR	01 / 13	01 / 16	
			GP 3 YR	01 / 13	01 / 16	
	CONTRACT	1910128-004	GM 3 YR	06 / 88	/	INACTIVE
			GP 3 YR	06 / 88	/	
	VALENCIA	1910128-006	GM 3 YR	06 / 81	/	INACTIVE
			GP 3 YR	06 / 81	/	
	DIVERSION	1910128-011	GM 1 YR	07 / 10	07 / 14	producer samples quarterly after treatment
			TDS 1 YR	07 / 10	07 / 14	
			NO_3 1 YR	07 / 10	07 / 14	
			GP 1 YR	07 / 10	07 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
DEL RIO MUTUAL WATER COMPANY						
	BURKETT	1900130-001	GM 3 YR	07 / 10	07 / 13	
			TDS 1 YR	07 / 10	07 / 13	
			NO_3 1 YR	07 / 10	07 / 13	
			GP 3 YR	07 / 10	07 / 13	
	KLINGERMAN	1900130-002	GM 3 YR	/	/	INACTIVE
			GP 3 YR	/	/	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
EAST PASADENA WATER COMPANY						
	9	1910020-005	GM 3 YR	03 / 12	03 / 15	
			TDS 1 YR	03 / 12	03 / 15	
			NO_3 1 YR	03 / 12	03 / 15	
			GP 3 YR	03 / 12	03 / 15	
	11	1910020-012	GM 3 YR	09 / 12	09 / 15	
			TDS 1 YR	09 / 12	09 / 15	
			NO_3 1 YR	09 / 12	09 / 15	
			GP 3 YR	09 / 12	09 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
EL MONTE, CITY OF						
	2A	1910038-002	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 12	
	3	1910038-003	GM 9 YR	12 / 12	12 / 21	STANDBY
			GP 9 YR	12 / 12	12 / 21	
	4	1910038-004	GM 9 YR	06 / 08	06 / 17	Out of Service 4/08
			GP 9 YR	06 / 08	06 / 17	(STANDBY)
	10	1910038-006	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 15	
	12	1910038-008	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 15	
	13	1910038-009	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
GLENDORA, CITY OF						
	1-E	1910044-001	GM 3 YR	06 / 08	06 / 11	DESTROYED
			GP 3 YR	06 / 08	06 / 11	
	2-E	1910044-002	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	3-G	1910044-003	GM 3 YR	08 / 86	/	INACTIVE
			GP 3 YR	08 / 83	/	
	4-E	1910044-004	GM 3 YR	05 / 84	/	INACTIVE
			GP 3 YR	06 / 84	/	
	5-E	1910044-015	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	7-G	1910044-005	GM 3 YR	03 / 96	/	INACTIVE
			GP 3 YR	03 / 96	/	
	8-E	1910044-006	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	9-E	1910044-007	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	10-E	1910044-008	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	11-E	1910044-009	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	12-G	1910044-010	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	13-E	1910044-020	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
GOLDEN STATE WATER COMPANY / SAN DIMAS						
	ARTESIA 3	1910142-003	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	BASELINE 3	1910142-004	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	BASELINE 4	1910142-005	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	CITY	1910142-006	GM 3 YR	08 / 06	08 / 09	INACTIVE
			GP 3 YR	08 / 06	08 / 09	
	COLUMBIA 1	1910142-007	GM 3 YR	10 / 76	/	INACTIVE
			GP 3 YR	10 / 76	/	
	COLUMBIA 2	1910142-008	GM 3 YR	10 / 76	/	INACTIVE
			GP 3 YR	/	/	
	COLUMBIA 4	1910142-017	GM 3 YR	02 / 11	02 / 14	
			TDS 1 YR	02 / 11	02 / 14	
			NO_3 1 YR	02 / 11	02 / 14	
			GP 3 YR	02 / 11	02 / 14	
	COLUMBIA 6	1910142-009	GM 3 YR	02 / 11	02 / 14	INACTIVE
			GP 3 YR	02 / 11	02 / 14	
	COLUMBIA 8	1910142-011	GM 3 YR	06 / 83	/	INACTIVE
			GP 3 YR	06 / 82	/	
	HIGHWAY	1910142-013	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	HIGHWAY 2	1910142-051	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	MALONE	1910142-014	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION: SOURCE NAME	WELL IDENTIFICATION: SOURCE CODE	SAMPLING SCHEDULE: TYPE AND FREQUENCY	SAMPLING SCHEDULE: LAST TEST (month/year)	SAMPLING SCHEDULE: NEXT TEST (month/year)	COMMENTS
GOLDEN STATE WATER COMPANY / SOUTH ARCADIA						
	ENCINITA 1	1910212-002	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	ENCINITA 2	1910212-003	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	ENCINITA 3	1910212-004	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	FARNA 1	1910212-005	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	FARNA 2	1910212-006	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	GRAYDON 1	1910212-009	GM 3 YR	08 / 94	/	INACTIVE
			GP 3 YR	08 / 94	/	
	GRAYDON 2	1910212-010	GM 3 YR	08 / 94	/	INACTIVE
			GP 3 YR	08 / 94	/	
	JEFFRIES 1	1910212-011	GM 3 YR	07 / 83	/	INACTIVE
			GP 3 YR	07 / 83	/	
	JEFFRIES 3	1910212-013	GM 3 YR	08 / 86	/	INACTIVE
			GP 3 YR	12 / 84	/	
	JEFFRIES 4	1910212-014	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	PERSIMMON 1	1910212-015	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
GOLDEN STATE WATER COMPANY / SOUTH SAN GABRIEL						
	SAN GABRIEL 1	1910223-004	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	SAN GABRIEL 2	1910223-005	GM 3 YR	07 / 12	07 / 15	
			TDS 1 YR	07 / 12	07 / 15	
			NO_3 1 YR	07 / 12	07 / 15	
			GP 3 YR	07 / 12	07 / 15	
	SAXON 3	1910223-008	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	SAXON 4	1910223-009	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
HEMLOCK MUTUAL WATER COMPANY						
	NORTH	1910053-001	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	SOUTH	1910053-002	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
INDUSTRY PUBLIC UTILITIES						
	3	1910029-005	GM 9 YR	07 / 16	08 / 15	STANDBY
			TDS 1 YR	07 / 16	08 / 15	
			NO_3 1 YR	07 / 16	08 / 15	
			GP 9 YR	07 / 06	08 / 15	
	4	1910029-006	GM 9 YR	04 / 07	04 / 16	STANDBY
			TDS 1 YR	04 / 07	04 / 16	
			NO_3 1 YR	04 / 07	04 / 16	
			GP 9 YR	04 / 07	04 / 16	
	5	1910029-007	GM 3 YR	01 / 12	01 / 15	
			TDS 1 YR	01 / 12	01 / 15	
			NO_3 1 YR	01 / 12	01 / 15	
			GP 3 YR	01 / 12	01 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
LA PUENTE VALLEY COUNTY WATER DISTRICT						
	2	1910060-002	GM 3 YR	10 / 12	10 / 15	
			TDS 1 YR	10 / 12	10 / 15	
			NO_3 1 YR	10 / 12	10 / 15	
			GP 3 YR	10 / 12	10 / 15	
	3	1910060-003	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 15	
	4	1910060-004	GM 9 YR	03 / 97	03 / 06	INACTIVE
			GP 9 YR	03 / 97	03 / 06	OUT OF SERVICE (01/05 - 06/08)
	5	1910060-023	GM 3 YR	01 / 12	01 / 15	
			TDS 1 YR	01 / 12	01 / 15	
			NO_3 1 YR	01 / 12	01 / 15	
			GP 3 YR	01 / 12	01 / 15	

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GROUND AND SURFACE WATER
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	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
MONROVIA, CITY OF						
	2	1910090-002	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	3	1910090-003	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	4	1910090-004	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	5	1910090-005	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	6	1910090-008	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	

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GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
MONTEREY PARK, CITY OF						
	1	1910092-002	GM 3 YR	12 / 11	12 / 14	
			TDS 1 YR	12 / 11	12 / 14	
			NO_3 1 YR	12 / 11	12 / 14	
			GP 3 YR	12 / 11	12 / 14	
	3	1910092-004	GM 3 YR	05 / 10	05 / 13	INACTIVE
			GP 3 YR	05 / 10	05 / 13	
	5	1910092-006	GM 3 YR	10 / 12	10 / 15	
			TDS 1 YR	10 / 12	10 / 15	
			NO_3 1 YR	10 / 12	10 / 15	
			GP 3 YR	10 / 12	10 / 15	
	6	1910092-007	GM 9 YR	09 / 03	09 / 12	INACTIVE
			GP 9 YR	09 / 03	09 / 12	OUT OF SERVICE (08/05 - 06/08)
	7	1910092-008	GM 9 YR	08 / 08	08 / 17	INACTIVE
			GP 9 YR	08 / 08	08 / 17	
	8	1910092-009	GM 9 YR	10 / 08	10 / 17	INACTIVE
			GP 9 YR	10 / 08	10 / 17	
	9	1910092-010	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	10	1910092-011	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	12	1910092-013	GM 3 YR	03 / 13	03 / 16	
			TDS 1 YR	03 / 13	03 / 16	
			NO_3 1 YR	03 / 13	03 / 16	
			GP 3 YR	03 / 13	03 / 16	
	14	1910092-014	GM 9 YR	01 / 07	01 / 16	INACTIVE
			GP 9 YR	01 / 07	01 / 16	
	15	1910092-038	GM 3 YR	07 / 12	07 / 15	
			TDS 1 YR	07 / 12	07 / 15	
			NO_3 1 YR	07 / 12	07 / 15	
			GP 3 YR	07 / 12	07 / 15	
	FERN	1910092-001	GM 9 YR	10 / 12	10 / 15	
			TDS 1 YR	10 / 12	10 / 15	
			NO_3 1 YR	10 / 12	10 / 15	
			GP 9 YR	10 / 12	10 / 15	

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GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

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WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
RURBAN HOMES MUTUAL WATER COMPANY						
	1-NOR	1910141-001	GM 3 YR	11 / 11	11 / 14	
			TDS 1 YR	11 / 11	11 / 14	
			NO_3 1 YR	11 / 11	11 / 14	
			GP 3 YR	11 / 11	11 / 14	
	2-SOU	1910141-002	GM 3 YR	11 / 11	11 / 14	
			TDS 1 YR	11 / 11	11 / 14	
			NO_3 1 YR	11 / 11	11 / 14	
			GP 3 YR	11 / 11	11 / 14	

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	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
SAN GABRIEL COUNTY WATER DISTRICT						
	5 BRA	1910144-003	GM 3 YR	06 / 00	/	INACTIVE
			GP 3 YR	06 / 00	/	
	7	1910144-005	GM 3 YR	06 / 09	06 / 12	DESTROYED
			GP 3 YR	06 / 09	06 / 12	
	8	1910144-006	GM 3 YR	08 / 93	/	INACTIVE
			GP 3 YR	08 / 93	/	
	9	1910144-007	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	
	10	1910144-008	GM 3 YR	08 / 93	/	INACTIVE
			GP 3 YR	08 / 93	/	
	11	1910144-009	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	
	12	1910144-010	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	
	14	1910144-011	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
SAN GABRIEL VALLEY WATER COMPANY						
	1B	1910039-001	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	1C	1910039-002	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	1D	1910039-003	GM 3 YR	06 / 11	06 / 14	
			TDS 1 YR	06 / 11	06 / 14	
			NO_3 1 YR	06 / 11	06 / 14	
			GP 3 YR	06 / 11	06 / 14	
	1E	1910039-070	GM 3 YR	11 / 11	11 / 14	
			TDS 1 YR	11 / 11	11 / 14	
			NO_3 1 YR	11 / 11	11 / 14	
			GP 3 YR	11 / 11	11 / 14	
	2D	1910039-005	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	2E	1910039-006	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	2F	1910039-076	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	8A	1910039-008	GM 3 YR	08 / 89	/	INACTIVE
			GP 3 YR	06 / 87	/	
	8B	1910039-009	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	8C	1910039-010	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	8D	1910039-011	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	8E	1910039-012	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	8F	1910039-066	GM 3 YR	10 / 10	10 / 13	
			TDS 1 YR	10 / 10	10 / 13	
			NO_3 1 YR	10 / 10	10 / 13	
			GP 3 YR	10 / 10	10 / 13	
	11A	1910039-013	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	11B	1910039-014	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 15	
	11C	1910039-015	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	B1	1910039-016	GM 3 YR	03 / 05	/	INACTIVE
			GP 3 YR	03 / 05	/	
	B2	1910039-019	GM 3 YR	07 / 82	/	INACTIVE
			GP 3 YR	08 / 82	/	
	B4B	1910039-020	GM 3 YR	03 / 08	/	INACTIVE
			GP 3 YR	03 / 08	/	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION: SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE: TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
SAN GABRIEL VALLEY WATER COMPANY						
	B4C	1910039-021	GM 3 YR	03 / 99	/	INACTIVE
			GP 3 YR	03 / 99	/	
	B5A	1910039-022	GM 3 YR	09 / 05	09 / 08	INACTIVE
			GP 3 YR	09 / 05	09 / 08	
	B5B	1910039-023	GM 3 YR	04 / 11	04 / 14	
			TDS 1 YR	04 / 11	04 / 14	
			NO_3 1 YR	04 / 11	04 / 14	
			GP 3 YR	04 / 11	04 / 14	
	B5C	1910039-024	GM 3 YR	05 / 07	05 / 10	INACTIVE
			GP 3 YR	05 / 07	05 / 10	
	B5D	1910039-069	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	B5E	1910039-077	GM 3 YR	04 / 11	04 / 14	
			TDS 1 YR	04 / 11	04 / 14	
			NO_3 1 YR	04 / 11	04 / 14	
			GP 3 YR	04 / 11	04 / 14	
	B6C	1910039-026	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	B6D	1910039-027	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	B7C	1910039-029	GM 3 YR	08 / 13	08 / 16	
			TDS 1 YR	08 / 13	08 / 16	
			NO_3 1 YR	08 / 13	08 / 16	
			GP 3 YR	08 / 13	08 / 16	
	B7E	1910039-030	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	
	B9	1910039-032	GM 3 YR	02 / 87	/	INACTIVE
			GP 3 YR	06 / 84	/	
	B9B	1910039-033	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	B11A	1910039-017	GM 3 YR	02 / 03	02 / 06	INACTIVE
			GP 3 YR	02 / 03	02 / 06	
	B11B	1910039-018	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	
	B24A	1910039-117	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
	B24B	1910039-116	GM 3 YR	09 / 11	09 / 14	
			TDS 1 YR	09 / 11	09 / 14	
			NO_3 1 YR	09 / 11	09 / 14	
			GP 3 YR	09 / 11	09 / 14	
	B25A	1910039-112	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	B25B	1910039-113	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	B26A	1910039-114	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	B26B	1910039-115	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	G4A	1910039-036	GM 3 YR	12 / 12	12 / 15	
			TDS 1 YR	12 / 12	12 / 15	
			NO_3 1 YR	12 / 12	12 / 15	
			GP 3 YR	12 / 12	12 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION: SOURCE NAME	WELL IDENTIFICATION: SOURCE CODE	SAMPLING SCHEDULE: TYPE AND FREQUENCY	SAMPLING SCHEDULE: LAST TEST (month/year)	SAMPLING SCHEDULE: NEXT TEST (month/year)	COMMENTS
SOUTH PASADENA, CITY OF						
	GRAVES 2	1910154-002	GM 3 YR	05 / 12	05 / 15	
			TDS 1 YR	05 / 12	05 / 15	
			NO_3 1 YR	05 / 12	05 / 15	
			GP 3 YR	05 / 12	05 / 15	
	WILSON 2	1910154-004	GM 3 YR	01 / 99	01 / 02	INACTIVE
			GP 3 YR	07 / 00	07 / 03	
	WILSON 3	1910154-005	GM 3 YR	05 / 12	05 / 15	
			TDS 1 YR	05 / 12	05 / 15	
			NO_3 1 YR	05 / 12	05 / 15	
			GP 3 YR	05 / 12	05 / 15	
	WILSON 4	1910154-006	GM 3 YR	05 / 12	05 / 15	
			TDS 1 YR	05 / 12	05 / 15	
			NO_3 1 YR	05 / 12	05 / 15	
			GP 3 YR	05 / 12	05 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
STERLING MUTUAL WATER COMPANY						
	NEW SOUTH	1910158-003	GM 3 YR	09 / 10	09 / 13	
			TDS 1 YR	09 / 10	09 / 13	
			NO_3 1 YR	09 / 10	09 / 13	
			GP 3 YR	09 / 10	09 / 13	
	NORTH	1910158-001	GM 3 YR	09 / 10	09 / 13	
			TDS 1 YR	09 / 10	09 / 13	
			NO_3 1 YR	09 / 10	09 / 13	
			GP 3 YR	09 / 10	09 / 13	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
SUBURBAN WATER SYSTEMS / SAN JOSE						
	121W1	1910205-064	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	126W2	1910205-018	GM 3 YR	04 / 00	04 / 03	INACTIVE
			GP 3 YR	04 / 00	04 / 03	
	139W2	1910205-025	GM 3 YR	03 / 01	03 / 04	INACTIVE
			GP 3 YR	03 / 01	03 / 04	
	139W4	1910205-027	GM 9 YR	03 / 11	03 / 20	STANDBY
			TDS 1 YR	03 / 11	03 / 20	
			NO_3 1 YR	03 / 11	03 / 20	
			GP 9 YR	03 / 11	03 / 20	
	139W5	1910205-028	GM 3 YR	06 / 01	06 / 04	INACTIVE
			GP 3 YR	06 / 01	06 / 04	
	140W3	1910205-030	GM 9 YR	12 / 06	12 / 15	STANDBY
			TDS 1 YR	12 / 06	12 / 15	
			NO_3 1 YR	12 / 06	12 / 15	
			GP 9 YR	12 / 06	12 / 15	
	140W4	1910205-031	GM 3 YR	07 / 01	07 / 04	INACTIVE
			GP 3 YR	07 / 01	07 / 04	
	140W5	1910205-045	GM 3 YR	11 / 12	11 / 15	
			TDS 1 YR	11 / 12	11 / 15	
			NO_3 1 YR	11 / 12	11 / 15	
			GP 3 YR	11 / 12	11 / 15	
	142W2	1910205-065	GM 3 YR	02 / 12	02 / 15	
			TDS 1 YR	02 / 12	02 / 15	
			NO_3 1 YR	02 / 12	02 / 15	
			GP 3 YR	02 / 12	02 / 15	
	147W3	1910205-034	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	151W2	1910205-075	GM 3 YR	11 / 12	11 / 15	
			TDS 1 YR	11 / 12	11 / 15	
			NO_3 1 YR	11 / 12	11 / 15	
			GP 3 YR	11 / 12	11 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION		SAMPLING SCHEDULE			COMMENTS
	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	
SUBURBAN WATER SYSTEMS / WHITTIER						
	201W4	1910174-003	GM 3 YR	08 / 10	08 / 19	STANDBY
			TDS 1 YR	08 / 10	08 / 19	
			NO_3 1 YR	08 / 10	08 / 19	
			GP 3 YR	08 / 10	08 / 19	
	201W5	1910174-004	GM 3 YR	05 / 05	05 / 08	INACTIVE
			GP 3 YR	05 / 05	05 / 08	
	201W7	1919174-020	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	201W8	1910174-031	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	201W9	1910174-033	GM 3 YR	02 / 11	02 / 14	
			TDS 1 YR	02 / 11	02 / 14	
			NO_3 1 YR	02 / 11	02 / 14	
			GP 3 YR	02 / 11	02 / 14	
	201W10	1910174-035	GM 3 YR	06 / 12	06 / 15	
			TDS 1 YR	06 / 12	06 / 15	
			NO_3 1 YR	06 / 12	06 / 15	
			GP 3 YR	06 / 12	06 / 15	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
SUNNY SLOPE WATER COMPANY						
	8	1910157-003	GM 3 YR	03 / 10	03 / 13	
			TDS 1 YR	03 / 10	03 / 13	
			NO_3 1 YR	03 / 10	03 / 13	
			GP 3 YR	03 / 10	03 / 13	
	9	1910157-004	GM 3 YR	08 / 12	08 / 15	
			TDS 1 YR	08 / 12	08 / 15	
			NO_3 1 YR	08 / 12	08 / 15	
			GP 3 YR	08 / 12	08 / 15	
	13	1910157-017	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
VALENCIA HEIGHTS WATER COMPANY						
	5	1910163-005	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	6	1910163-010	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	
	7	1910163-012	GM 3 YR	08 / 11	08 / 14	
			TDS 1 YR	08 / 11	08 / 14	
			NO_3 1 YR	08 / 11	08 / 14	
			GP 3 YR	08 / 11	08 / 14	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

WATER SYSTEM	WELL IDENTIFICATION SOURCE NAME	SOURCE CODE	SAMPLING SCHEDULE TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
VALLEY COUNTY WATER DISTRICT						
	CLINTON O. NIXON EAST	1910009-005	GM 3 YR	10 / 12	10 / 15	
			TDS 1 YR	10 / 12	10 / 15	
			NO_3 1 YR	10 / 12	10 / 15	
			GP 3 YR	10 / 12	10 / 15	
	CLINTON O. NIXON WEST	1910009-006	GM 3 YR	02 / 12	02 / 15	
			TDS 1 YR	02 / 12	02 / 15	
			NO_3 1 YR	02 / 12	02 / 15	
			GP 3 YR	02 / 12	02 / 15	
	LANTE	1910009-007	GM 3 YR	05 / 11	05 / 14	
			TDS 1 YR	05 / 11	05 / 14	
			NO_3 1 YR	05 / 11	05 / 14	
			GP 3 YR	05 / 11	05 / 14	
	MAINE EAST	1910009-001	GM 3 YR	02 / 12	02 / 15	
			TDS 1 YR	02 / 12	02 / 15	
			NO_3 1 YR	02 / 12	02 / 15	
			GP 3 YR	02 / 12	02 / 15	
	MAINE WEST	1910009-002	GM 3 YR	02 / 12	02 / 15	
			TDS 1 YR	02 / 12	02 / 15	
			NO_3 1 YR	02 / 12	02 / 15	
			GP 3 YR	02 / 12	02 / 15	
	SA1-1	1910009-033	GM 3 YR	05 / 11	05 / 14	
			TDS 1 YR	05 / 11	05 / 14	
			NO_3 1 YR	05 / 11	05 / 14	
			GP 3 YR	05 / 11	05 / 14	
	SA1-2	1910009-034	GM 3 YR	03 / 08	03 / 11	
			TDS 1 YR	03 / 08	03 / 11	
			NO_3 1 YR	03 / 08	03 / 11	
			GP 3 YR	03 / 08	03 / 11	

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	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
VALLEY VIEW MUTUAL WATER COMPANY						
	1	1910165-001	GM 3 YR	01 / 09	01 / 12	
			TDS 1 YR	01 / 09	01 / 12	
			NO_3 1 YR	01 / 09	01 / 12	
			GP 3 YR	01 / 09	01 / 12	
	2	1910165-002	GM 3 YR	05 / 13	05 / 16	
			TDS 1 YR	05 / 13	05 / 16	
			NO_3 1 YR	05 / 13	05 / 16	
			GP 3 YR	05 / 13	05 / 16	
	3	1910165-003	GM 3 YR	09 / 87	/	INACTIVE
			GP 3 YR	02 / 84	/	

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GROUND AND SURFACE WATER
GENERAL MINERAL AND GENERAL PHYSICAL SAMPLING SCHEDULE

	WELL IDENTIFICATION		SAMPLING SCHEDULE			
WATER SYSTEM	SOURCE NAME	SOURCE CODE	TYPE AND FREQUENCY	LAST TEST (month/year)	NEXT TEST (month/year)	COMMENTS
WHITTIER, CITY OF						
	12	1910173-007	GM 3 YR	01 / 87	/	INACTIVE
			GP 3 YR	12 / 86	/	
	13	1910173-008	GM 3 YR	03 / 11	03 / 14	
			TDS 1 YR	03 / 11	03 / 14	
			NO_3 1 YR	03 / 11	03 / 14	
			GP 3 YR	03 / 11	03 / 14	
	15	1910173-010	GM 3 YR	03 / 11	03 / 14	
			TDS 1 YR	03 / 11	03 / 14	
			NO_3 1 YR	03 / 11	03 / 14	
			GP 3 YR	03 / 11	03 / 14	
	16	1910173-011	GM 3 YR	03 / 11	03 / 14	
			TDS 1 YR	03 / 11	03 / 14	
			NO_3 1 YR	03 / 11	03 / 14	
			GP 3 YR	03 / 11	03 / 14	
	17	1910173-012	GM 3 YR	03 / 08	03 / 11	INACTIVE
			GP 3 YR	03 / 08	03 / 11	
	18	1910173-013	GM 3 YR	03 / 11	03 / 14	
			TDS 1 YR	03 / 11	03 / 14	
			NO_3 1 YR	03 / 11	03 / 14	
			GP 3 YR	03 / 11	03 / 14	

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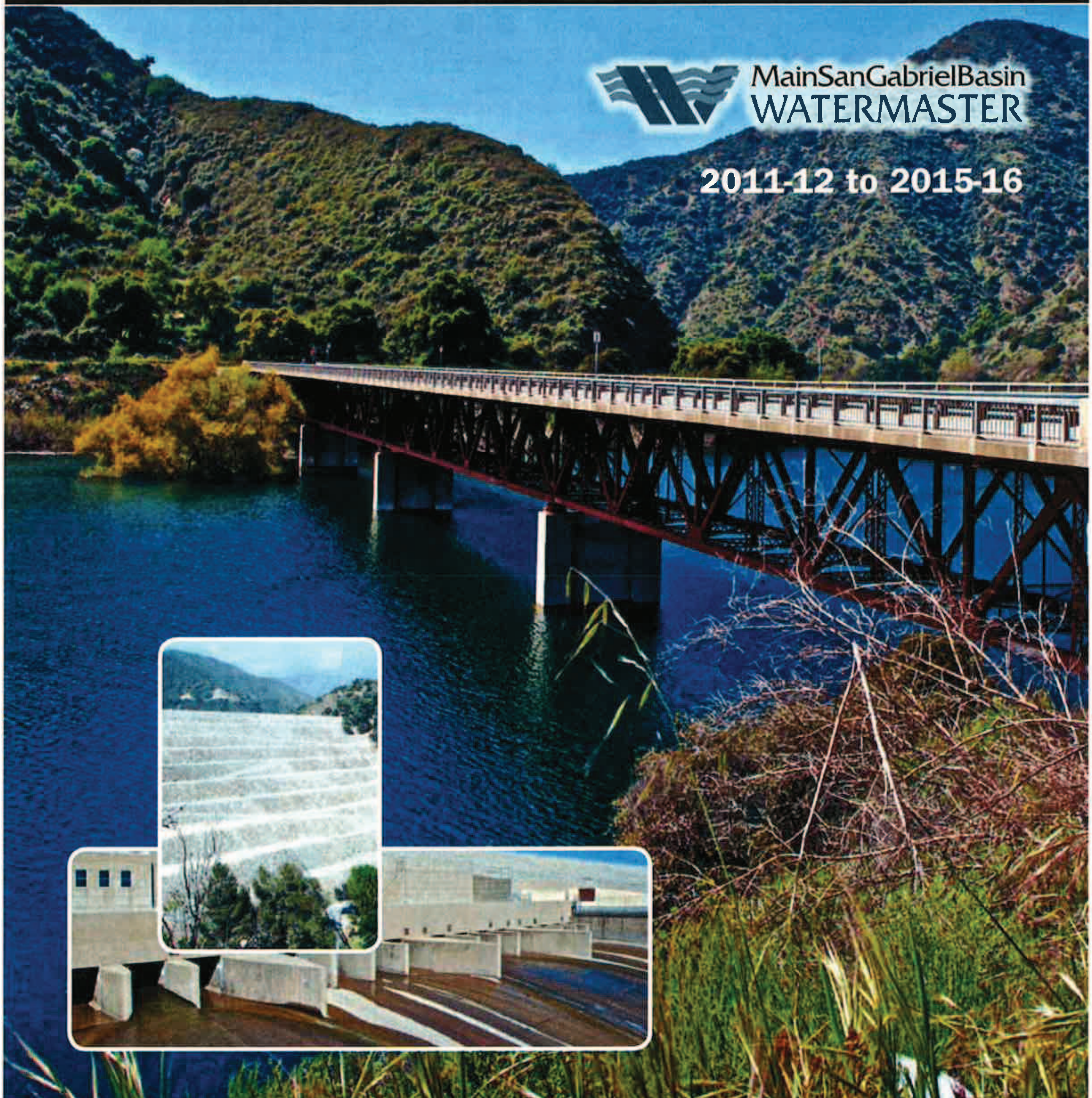
APPENDIX T

FIVE-YEAR WATER QUALITY AND SUPPLY PLAN

Five-Year
Water Quality and Supply Plan



MainSanGabrielBasin
WATERMASTER

2011-12 to 2015-16

DRAFT

"To assure that pumping does not lead to further degradation of water quality in the Basin, a Five-Year Water Quality and Supply Plan must be prepared and updated annually by Watermaster..."

Section 28 of Watermaster's Rules and Regulations

Five-Year Water Quality and Supply Plan

November 2011

MainSanGabrielBasin WATERMASTER

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INTRODUCTION

Watermaster prepares and annually updates this Five-Year Water Quality and Supply Plan (Five-Year Plan) in accordance with the requirements of Section 28 of its Rules and Regulations. The objective is to coordinate groundwater-related activities so that both water supply and water quality in the Main San Gabriel Basin (Basin) are protected and improved.

PURPOSE OF THE FIVE-YEAR PLAN

Many important issues are detailed in the Five-Year Plan, including how Watermaster plans to:

1. monitor groundwater supply and quality;
2. develop projections of future groundwater supply and quality;
3. ensure adequate supplemental water is available for groundwater replenishment;
4. review and cooperate on cleanup projects, and provide technical assistance to other agencies;
5. assure that pumping does not lead to further degradation of water quality in the Basin;
6. address emerging contaminants in the Basin;
7. develop a cleanup and water supply program consistent with the U.S. Environmental Protection Agency (USEPA) plans for its San Gabriel Basin Superfund sites; and
8. continue to perform responsibilities under the Baldwin Park Operable Unit (BPOU) Project Agreement relating to project administration and performance evaluation.

WATERMASTER BACKGROUND

The Los Angeles County Superior Court created the Main San Gabriel Basin Watermaster in 1973 to resolve water issues that had arisen among water users in the San Gabriel Valley. Watermaster's mission was to generally manage the water supply of the Main San Gabriel Groundwater Basin.

During the late 1970s and early 1980s, significant groundwater contamination was discovered in the Basin. The contamination was caused in part by past practices of local industries that had inappropriately disposed of industrial solvents, as well as by infiltration of nitrates from an earlier agricultural period. Cleanup efforts for industrial contamination were undertaken at the local, state, and federal levels.

WATERMASTER RECEIVES WATER QUALITY RESPONSIBILITIES

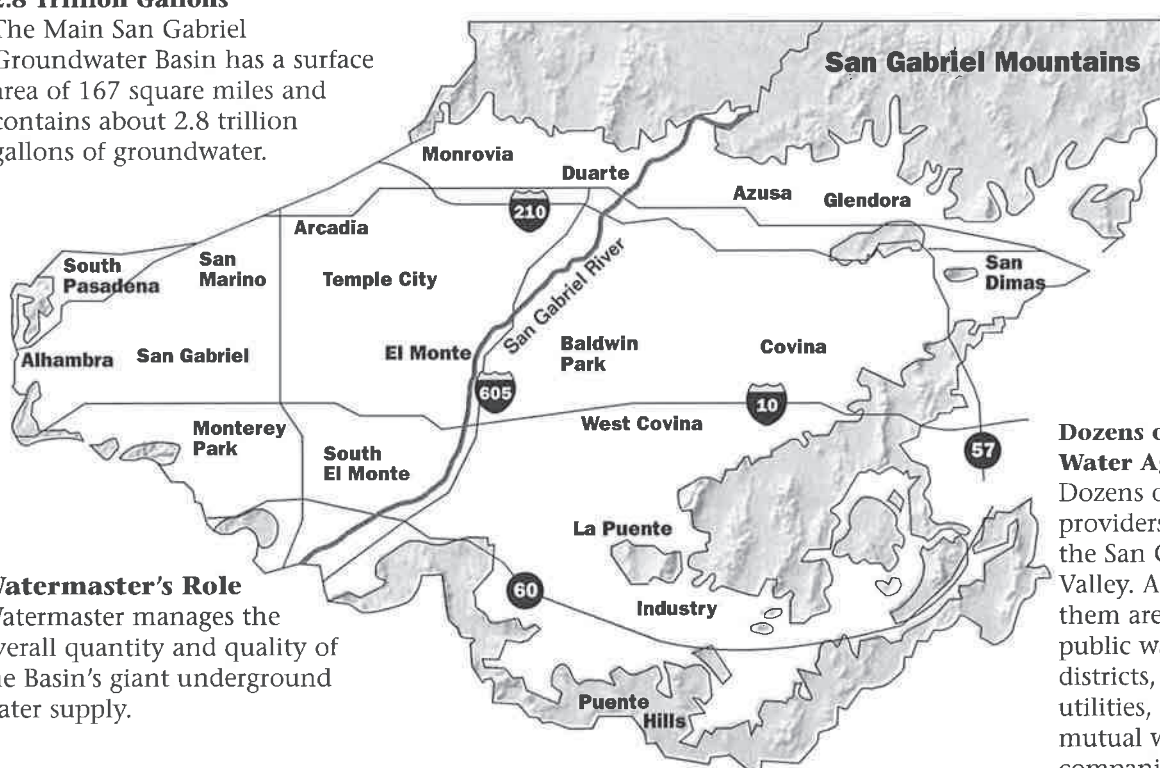
By 1989, local water agencies adopted a joint resolution regarding water quality issues that stated that Watermaster should coordinate local activities aimed at preserving and restoring the quality of groundwater in the Basin. The joint resolution also called for a cleanup plan.

In 1991, the Los Angeles County Superior Court granted Watermaster the authority to control pumping for water quality purposes. Accordingly, Watermaster added Section 28 to its Rules and Regulations regarding water quality management. The new responsibilities included: developing this Five-Year Water Quality and Supply Plan; updating it annually, and submitting it to the California Regional Water Quality Control Board, Los Angeles Region (Regional Board); and making it available for public review by November 1 of each year.

Figure 1. AREA COVERED BY MAIN SAN GABRIEL BASIN

Precious Underground Water Supply
The Main San Gabriel Basin provides up to 90 billion gallons of groundwater annually, enough to meet 80 percent or more of San Gabriel Valley's 1.4 million residents' demand for water.

2.8 Trillion Gallons
The Main San Gabriel Groundwater Basin has a surface area of 167 square miles and contains about 2.8 trillion gallons of groundwater.



Watermaster's Role
Watermaster manages the overall quantity and quality of the Basin's giant underground water supply.

Dozens of Water Agencies
Dozens of water providers serve the San Gabriel Valley. Among them are cities, public water districts, private utilities, and mutual water companies.

CURRENT WATER SUPPLY CONDITIONS

Rainfall in the San Gabriel Valley averaged about 24 inches during 2010-11, or about 130 percent of the long-term average. The above-average rainfall resulted in above-average replenishment of storm runoff. In addition, a significant amount of untreated imported water was delivered to and replenished in the Basin as a result of increased statewide water supply. As a result, the groundwater level increased by about 29 feet during fiscal year 2010-11.

WATER SUPPLY INFLOWS DURING 2010-11

VALLEY RECEIVES ABOVE-AVERAGE RAINFALL

In 2010-11, the San Gabriel Valley received about 24 inches of rain, which is about 130 percent of the long-term average of 18.52 inches.

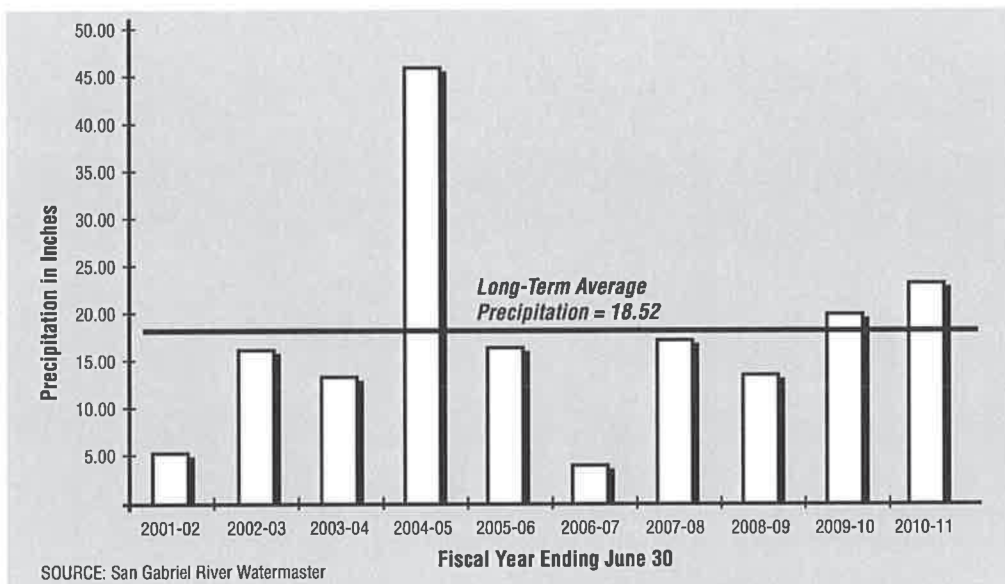


Figure 2. AVERAGE RAINFALL DURING THE LAST TEN YEARS
Rainfall in 2010-11 was about 24 inches. Average precipitation in the Main San Gabriel Basin for the 10-year period from 2001-02 to 2010-11 was 18.1 inches. The long-term average rainfall is 18.52 inches. The rainfall total is made up of an average taken from four stations located in San Dimas, Diamond Bar, El Monte, and Pasadena.

LOCAL STORMWATER CAPTURE 200 PERCENT OF AVERAGE

During fiscal year 2010-11, rainfall was about 130 percent of average and contributed to stormwater capture of about 220,000 acre-feet, which is about 200 percent of average. Fiscal year 2010-11 represents the second consecutive year of above-average rainfall and runoff after four consecutive years of below-average rainfall and three consecutive years of below-average storm water runoff. In addition, as of June 30, 2011, about 58,000 acre-feet of local storm runoff remained in storage in reservoirs in the San Gabriel Canyon, compared to about 13,000 acre-feet which typically remains in storage. As a result, approximately 45,000 acre-feet of water was available for groundwater replenishment purposes and potentially represents about an additional six-foot increase in groundwater elevations within the Main Basin.

LOCAL WATER USE BELOW AVERAGE

Total water use within the San Gabriel Valley consists of groundwater production, surface water diversions, and treated imported water deliveries. During fiscal year 2010-11, total water use was about 239,700 acre-feet, consisting of about 216,000 acre-feet of groundwater production, 13,400 acre-feet of treated local surface water and 10,300 acre-feet of treated imported water. This total is about 15 percent lower than the 10-year average of about 283,000 acre-feet. The reduction is partly due to above-average rainfall in 2010-11, which generally decreases water demands. The reduction is also a result of Watermaster's and others' efforts to promote and encourage water conservation.

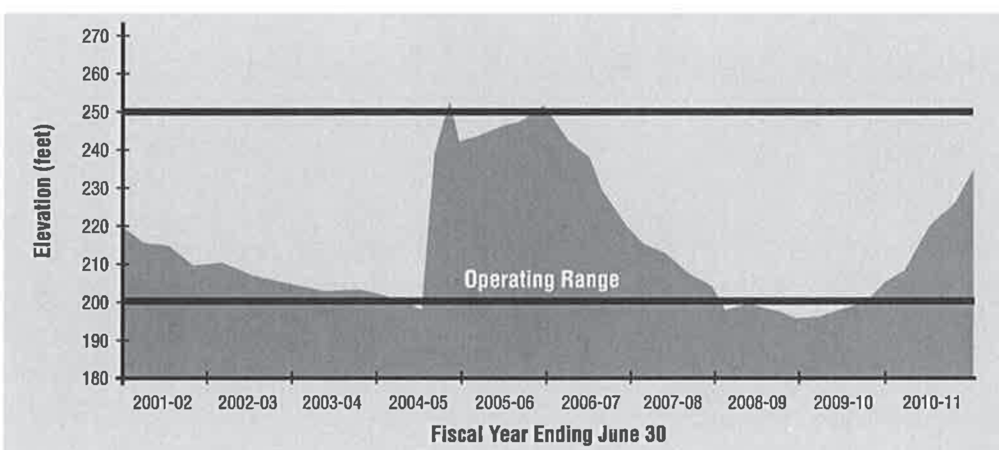
Main San Gabriel Basin Watermaster annually establishes an Operating Safe Yield, which is based on prevailing hydrologic conditions in the San Gabriel Valley. Production in excess of the Operating Safe Yield is subject to an assessment that is used to purchase untreated imported water to replenish the Basin. Overproduction during fiscal year 2010-11 was 48,500 acre-feet, which is above the 10-year average of 45,100 acre-feet.

KEY WELL WITHIN OPERATING RANGE

The Baldwin Park Key Well is used as the benchmark for determining the groundwater level for the entire Basin. Pursuant to the Judgment, Watermaster works to keep the Key Well water level between 200 feet and 250 feet to the extent possible. Below-average rainfall between fiscal years 2005-06 and 2008-09, coupled with below-average storm runoff, contributed to the Baldwin Park Key Well water level falling from about 248.4 feet in June 2005 to 195.6 feet in June 2009. The Key Well water level fell to a historical low of 189.2 feet on December 3, 2009. However, two consecutive years of above-average rainfall (20 inches during fiscal year 2009-10 and 24 inches during fiscal year 2010-11), along with delivery and replenishment of about 68,000 acre-feet of untreated imported water during fiscal year 2010-11, contributed to an increase in the groundwater elevation at the Key Well to about 233.5 feet as of June 30, 2011. This level is 29 feet higher than the year before and above the mid-point of the operating range.

Figure 3. KEY WELL ELEVATIONS DURING THE LAST TEN YEARS

The groundwater elevation at the Key Well on June 30, 2011 was about 233.5 feet, which is above the middle of the Basin's operating range of 200 to 250 feet.

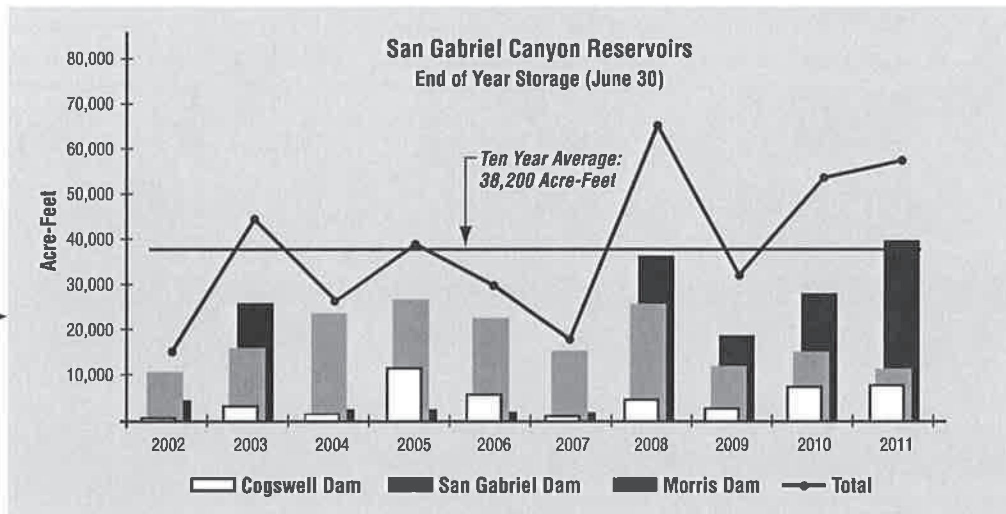


INCREASE IN WATER STORED IN CANYON RESERVOIRS

Cogswell, San Gabriel, and Morris Reservoirs have a combined maximum storage capacity of about 85,000 acre-feet. At the end of the 2010-11 fiscal year, about 58,000 acre-feet of water was stored in these reservoirs. This is an increase from the previous year and represents about 150 percent of the 10-year average of about 38,200 acre-feet of water in storage at the end of the fiscal year. In addition, about 220,000 acre-feet of local runoff was released from storage in local reservoirs for recharge into the groundwater basin during fiscal year 2010-11.

Total water stored in San Gabriel Canyon reservoirs at the end of the fiscal year was 58,000 acre-feet and is150 percent of the 10-year average .

Figure 4. WATER STORED IN SAN GABRIEL CANYON RESERVOIRS



BASIN REPLENISHMENT ACTIVITIES

Basin management continues to encourage producers to maximize groundwater production instead of relying on treated imported water. Under normal conditions, Watermaster quantifies groundwater production in excess of Producers' water rights and arranges to have an equal amount of untreated imported water delivered to replenish the overproduction from the Basin at a "Replenishment Water" rate. This practice takes advantage of historically lower-cost water and allows water agencies to deliver untreated imported water on a flexible basis instead of requiring a continuous flow, as is the case of "Full Service" treated water demands. Deliveries of untreated imported water at the "Replenishment Water" rate for groundwater replenishment had been suspended by Metropolitan Water District since May 2007. However, as the result of statewide above-average rainfall and significant water stored in MWD's various facilities, MWD reinstated the "Replenishment Rate" in May 2011 for the balance of the calendar year. Consequently, Watermaster and other local producers ordered over 60,000 acre-feet of untreated imported water at the "Replenishment Rate". MWD has indicated untreated imported water at the "Replenishment Rate" may be available in only 3 out of 10 years in the future. Watermaster is actively pursuing alternative means of Basin replenishment including:

- encouraging reduced groundwater production through conservation efforts;

- securing alternative supplemental supplies and maximizing delivery of imported water from State Water Project contractors; and

- securing a firm supply of advanced treated recycled water.

PROJECTED GROUNDWATER DEMANDS

PRODUCER ESTIMATES

Section 28 requires that each Producer submit a report to Watermaster detailing its projected water supply and water production requirements over the following five years. Projections were received from 27 Producers, accounting for about 90 percent of the groundwater production from the Basin.

For those Producers who did not submit projections, Watermaster provided an estimate based on the assumption that each Producer had an aggregate projected growth rate that was the same as those Producers who did submit projections. Projected groundwater production is shown in Appendix A.

Figure 5 shows the total projected and historical groundwater production from the Basin since 2003-04.

Water production has decreased over the prior year, due in part to above-average rainfall and Basinwide water conservation efforts.

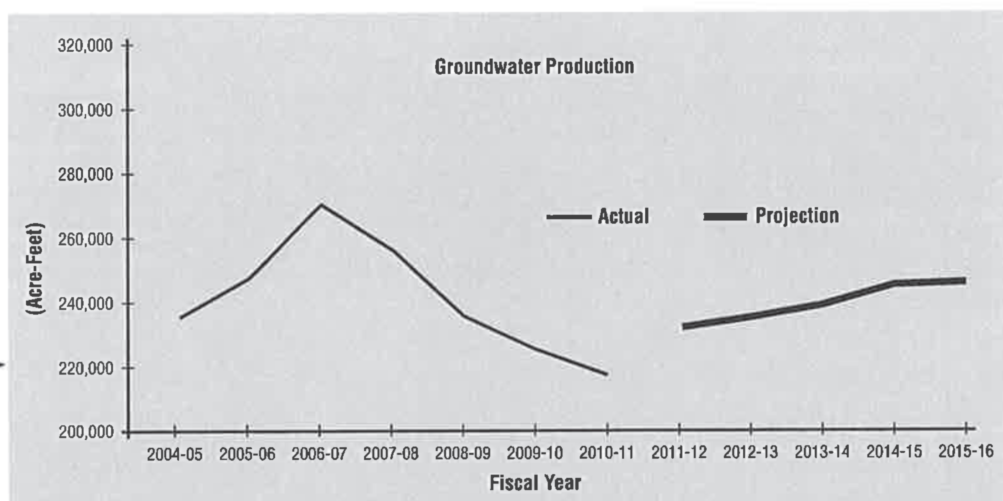


Figure 5. PROJECTED AND HISTORICAL WATER PRODUCTION

Total groundwater production for the 2010-11 fiscal year from the Basin was 216,000 acre-feet, which is lower than the previous year's production of 225,200 acre-feet. The decrease in groundwater production is due partially to Basinwide water conservation and partially to above-average rainfall.

Groundwater production is influenced by a variety of conditions, including population, seasonal precipitation, groundwater contamination, and availability of surface water. Excluding the impacts of seasonal precipitation, groundwater production had been experiencing a gradual long-term increase consistent with increasing population. The impacts of groundwater contamination during the 1980s and 1990s resulted in reduced groundwater production, offset by an equal increase of treated imported water purchases. During the past 10 years various groundwater production and treatment facilities have become operational, enabling water purveyors to resume use of groundwater and again reflecting a gradual increase. However, since 2008 the economic downturn and above average rainfall have significantly reduced groundwater production.

CURRENT WATER QUALITY CONDITIONS

Groundwater delivered to customers continues to be of high quality and always meets state and federal drinking water standards. However, a number of contaminants in areas of the Basin require careful monitoring and treatment before the water is served for domestic use. These contaminants include a variety of industrial solvents referred to as volatile organic compounds, or VOCs. Another common contaminant found in the Basin is nitrate, primarily from fertilizers used during the Valley's agricultural period. Since 1997, additional contaminants have been detected: perchlorate, a solid rocket fuel ingredient; N-nitrosodimethylamine (NDMA), associated with liquid rocket fuel; 1,2,3-trichloropropane (1,2,3-TCP), a degreasing agent; and 1,4-dioxane, a stabilizer for chlorinated solvents.

In response to the detection of these contaminants, Watermaster and local water entities aggressively pursued construction of treatment facilities to control the spread of contaminants and continue providing high quality water to consumers. This policy of remediation and reuse both preserves a valuable resource and reduces the overall cost of groundwater cleanup. Initially, a number of VOC treatment facilities were constructed, while excessive nitrate concentrations were blended with higher quality water to acceptable levels. Since the detection of perchlorate and NDMA, Watermaster has been instrumental in the successful operation of treatment facilities to treat VOCs, perchlorate, and NDMA.

While only present in limited parts of the Basin, these chemicals pose difficult challenges to water Producers. When the chemicals were initially detected, Watermaster responded vigorously by working closely with the local water community to sponsor research, as well as to design, fund, and construct cleanup projects as rapidly as possible rather than wait for the USEPA and the firms named as responsible for the contamination. Watermaster subsequently led negotiations that resulted in the Baldwin Park Operable Unit (BPOU) Project Agreement, including an initial reimbursement for groundwater cleanup costs from certain parties responsible for the contamination. Under the BPOU Agreement, Watermaster is responsible for overall project coordination and administration, groundwater monitoring, and compliance with USEPA reporting requirements. Watermaster also participates in decisions regarding technology selection, construction, and operations. Now that all of the BPOU treatment facilities are operational, Watermaster also monitors the BPOU project's performance in containing and removing contamination.

PRIMARY CONTAMINANTS IN THE GROUNDWATER BASIN

VOLATILE ORGANIC COMPOUNDS AND NITRATES

VOCs and nitrates are the most prevalent contaminants found in the Basin. Intensive monitoring and research concerning these two types of contaminants have been underway for many years. The location and cleanup methods for VOCs are generally well understood; during fiscal year 2010-11, 30 plants treated about 30 billion gallons of VOC-contaminated water. Water containing nitrates above the Maximum Contaminant Level (MCL) is either blended with other sources or not used.

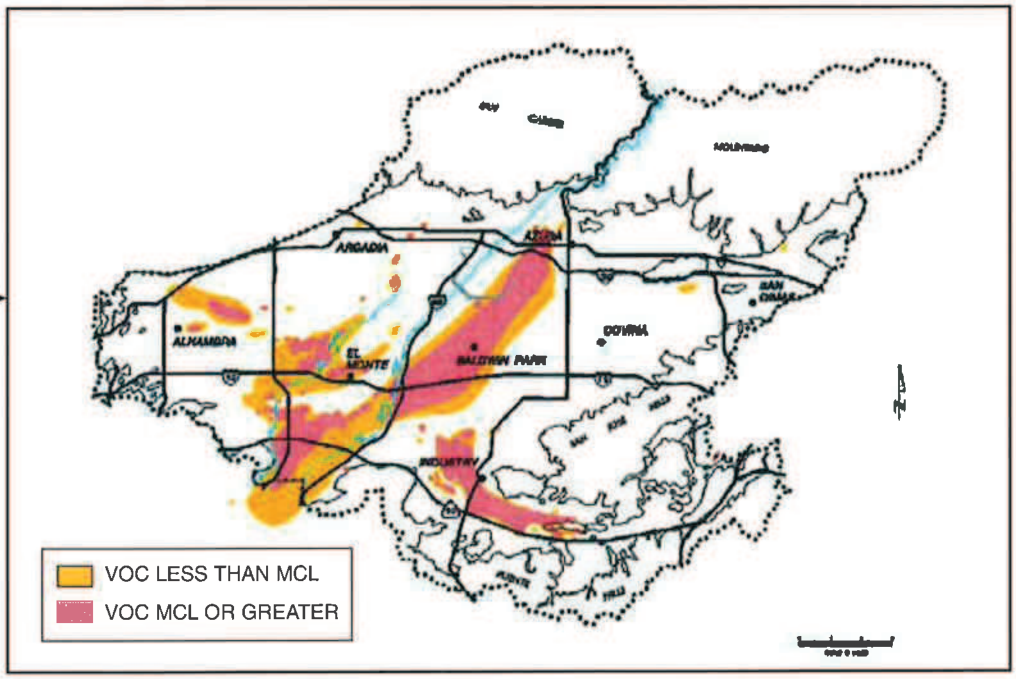
Note in Figure 6 that although VOC contamination is substantial, it is centered in just a few areas, leaving a substantial portion of the Basin unaffected. The same is true for nitrates, which have the highest concentrations in the eastern portion of the Basin, away from the most productive pumping areas (see Figure 7).

PERCHLORATE

In January 2002, California Department of Public Health (CDPH), formerly the California Department of Health Services, lowered the Notification Level (NL) for perchlorate from 18 to 4 parts per billion, and a total of 22 wells were removed from service due to unacceptable levels of perchlorate. CDPH subsequently raised the NL to 6 parts per billion in March 2004 and later established an MCL of 6 parts per billion during October 2007. Watermaster played a key role in development of the first treatment technology to remove perchlorate from drinking water; ion-exchange technology is now operational at five sites in the BPOU and at two facilities in other parts of the Basin.

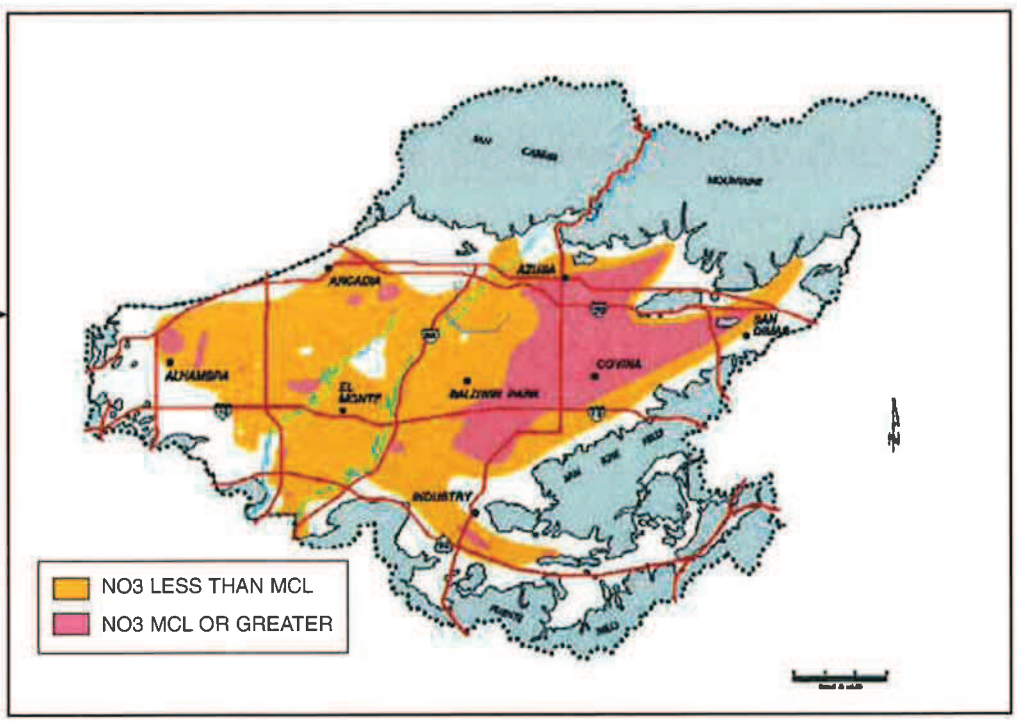
Extensive cleanup programs are underway in the areas affected by VOC contamination. Because the main plumes of contamination are centered in just a few areas, much of the Basin remains unaffected.

Figure 6. VOLATILE ORGANIC COMPOUND LEVELS IN GROUNDWATER THROUGHOUT THE BASIN



Nitrate (NO3) contamination is highest in the eastern portion of the Basin, away from the San Gabriel River, the area of most intensive groundwater pumping.

Figure 7. NITRATE LEVELS IN GROUNDWATER THROUGHOUT THE BASIN



NDMA

During 1998, eight local wells were found to contain levels of NDMA above the NL at that time of 2 parts per trillion. Five of the wells with measurable levels of NDMA had already been taken out of service for other reasons, and the other three were put on inactive status once NDMA was detected. CDPH subsequently raised the NL to 10 parts per trillion. As with perchlorate, Watermaster played a key role in the construction of NDMA treatment facilities in the BPOU area of the Basin. Five facilities were operational during fiscal year 2010-11.

1,2,3-TRICHLOROPROPANE

The compound 1,2,3-trichloropropane is a degreasing agent that has been detected in the groundwater above the NL of 5 parts per trillion, primarily in the BPOU and the Area 3 OU. It was detected in the BPOU during the winter of 2006, and its presence delayed use of one treatment facility for potable purposes. Following detection, CDPH indicated the appropriate treatment technology is liquid phase granular activated carbon. Subsequently, Watermaster, in cooperation with its BPOU project partners, worked to construct treatment facilities to remove 1,2,3-TCP from the groundwater to make it suitable for potable uses. That treatment facility was operational during fiscal year 2010-11.

WELLS ASSESSED FOR VULNERABILITY TO CONTAMINATION

One of the primary purposes of the Five-Year Plan is to identify wells in the Basin that are vulnerable to contamination. A well is considered vulnerable if the concentration of contaminants reaches 50 percent of the NL or MCL allowed by state drinking water regulations. Watermaster reviews water quality tests performed on each well, regional water quality conditions, and contaminant migration patterns in an effort to project which wells may be vulnerable over the next five years and prepare plans to construct treatment facilities, as needed. (See Figures 11a, 11b and 11c in Appendix F).

WATER QUALITY PROTECTION PLAN

Watermaster maintains a Water Quality Protection Plan that provides an early warning to Producers of potential increases in contaminant levels. The Water Quality Protection Plan also provides suggested alternative sources of supply, and proposes long-term actions to solve the contamination problem(s) without contributing to the migration of contaminants in the Basin.

FIVE-YEAR WATER QUALITY AND SUPPLY PLAN

The Main San Gabriel Basin's designation as a federal Superfund site was prompted by the discovery of widespread VOC contamination. Cleanup plans were developed to contain and remove VOCs from groundwater, and Watermaster, along with various other local water agencies, water Producers and regulators, has worked to develop the expertise, financing and treatment technologies to effectively address Basinwide cleanup of VOCs.

The discovery of perchlorate and NDMA, however, complicated the existing VOC cleanup approach by creating a number of challenges. Most important, these new contaminants could not be removed using existing treatment facilities, and new, additional treatment methods had to be identified, financed and implemented.

Watermaster facilitates groundwater cleanup projects that also meet water supply needs.

This report outlines a combined cleanup and water supply plan for each of the USEPA Operable Units. Watermaster's plan for each area is consistent with the USEPA plans, and its goal is to implement cleanup as promptly as possible, with or without the cooperation of the Responsible Parties.

GROUNDWATER MONITORING PROGRAMS

Monitoring involves measuring groundwater levels, groundwater quality, and groundwater flow. Watermaster continuously refines its understanding of the groundwater Basin to increase the safe yield of the Basin, and to protect and improve local water quality.

GROUNDWATER ELEVATION MONITORING

CONTINUE KEY WELL AND SUPPLEMENTAL KEY WELL OPERATION AND DATA PROCESSING

The entire 167-square-mile groundwater Basin is managed as one unit based on the groundwater levels as measured at a single Key Well in Baldwin Park. Water levels have been measured at this well since 1903 and are currently measured every three hours by an automated recorder.

Additional groundwater level recorders have been installed near the Santa Fe Spreading Grounds; adjacent to the San Gabriel River above the I-210 Freeway; in the City of Rosemead; in the City of Covina; and near the Whittier Narrows Dam. These water level records are synchronized with the record in the Key Well. Collectively, water level data from these wells provides a better understanding of impacts of recharge operations at the Santa Fe Spreading Grounds on Basin hydrogeology. Water elevation data are collected semi-annually at about 170 additional wells throughout the Basin, and water level recorders may be installed in those wells over the next five years.

CONTINUE BASINWIDE GROUNDWATER ELEVATION MONITORING PROGRAM (BGWEMP)

The purpose of the BGWEMP is to obtain groundwater level measurements from a large number of wells across the Basin. The information is used to prepare groundwater contour maps showing the direction of groundwater flow. The data are also used in the Basin computer model to simulate future groundwater flow patterns.
The BGWEMP plan for the coming years includes:

- taking weekly measurements of water levels in nine primary wells;
- gathering semi-annual measurements of water levels in 170 primary wells;
- obtaining water levels in secondary wells from well owners or water Producers, the San Gabriel Valley Protective Association, Regional Board, USEPA, and others;
- updating the database with water level data; and
- preparing semi-annual groundwater contour maps of the entire Basin.

GROUNDWATER QUALITY MONITORING

CONTINUE BASINWIDE GROUNDWATER QUALITY MONITORING PROGRAM (BGWQMP)

Under the BGWQMP, all production wells in the Basin are sampled at least once a year for VOCs and nitrates. The frequency of BGWQMP sampling complements the monitoring requirements under state law and supplements information gathered through Regional Water Quality Control Board source investigations and USEPA remedial investigations. The data collected by BGWQMP are used to identify and evaluate the current locations and magnitude of contaminant levels.

CONTINUE TITLE 22 WATER QUALITY TESTING

Watermaster continues to perform CDPH-mandated Title 22 water quality sampling of groundwater from approximately 200 active wells in the Basin. Watermaster also continues to track regulations and inform local water purveyors about regulatory issues and requirements. Information from centralized water quality testing is added to Watermaster's water quality database, which contains data from many sources. The centralized testing enables Watermaster to identify water quality trends on a regional scale that might otherwise go unnoticed at a specific well, and also lowers monitoring costs to Producers.

GROUNDWATER FLOW AND CONTAMINANT MIGRATION STUDIES

Groundwater level and quality data are entered into the Basin computer model, which simulates where contamination is projected to flow in the future. The goal is to project contaminant levels by areas in advance of the actual event, and identify remedial steps to be taken.

GROUNDWATER ELEVATION SIMULATIONS SHOW FUTURE PUMPING WILL NOT SIGNIFICANTLY CHANGE GROUNDWATER MOVEMENT

To determine the direction of groundwater flow through the Basin, Watermaster compiles the daily average 2010-11 production for each well, enters the data into the groundwater model, and simulates how production impacts water levels throughout the Basin. A computer simulation is then run using estimated production for 2015-16. These simulations indicate that the estimated increase in groundwater production during the next five years will not significantly change the overall direction of Basin groundwater movement, which continues to flow generally from east to west to a pumping trough in the western portion of the Basin, and also northeast to

Simulations of the direction of groundwater flow in 2010-11 and projections for 2015-16 show that the estimated increase in groundwater pumping during this period would not significantly change the overall direction of Basin groundwater movement.

southwest, exiting through Whittier Narrows. The simulation for 2015-16 also shows localized pumping depressions in the Baldwin Park area, which are expected to be created by continuous pumping from groundwater extraction wells associated with the BPOU contaminant cleanup project to contain and control groundwater contaminant movement. Contaminated groundwater from those wells is treated at several treatment facilities and the CDPH-permitted water is provided for potable use.

SIMULATE IMPACTS OF GROUNDWATER PUMPING ON CONTAMINANT MIGRATION

Simulations similar to the ones described above were used to make the finding that pumping particularly from USEPA mandated cleanup projects and managed by Watermaster helps to control and contain contaminant migration.

Groundwater quality data collected during 2010-11 and projected quality data for 2015-16 were entered into the groundwater model for the contamination migration studies. The computer model is used to simulate how the flow of water would affect the migration of contamination. The simulation showed that changes in groundwater flow did not have major impacts on the migration of contaminants (refer to Figures 12 and 13 in Appendix G).

GROUNDWATER CLEANUP PROJECTS

Watermaster coordinates and provides technical assistance on many cleanup projects in the Basin, although the cleanup facilities are owned and operated by local water utilities. Watermaster's involvement includes coordinating proposed USEPA cleanup programs to ensure, to the extent feasible, that treated water is put to beneficial use within the Basin, and that projects are consistent with the Judgment.

REVIEW OF SECTION 28 APPLICATIONS

Watermaster reviews every proposal to construct, destroy, or modify a well or build a treatment plant pursuant to Section 28 of its Rules and Regulations.

Watermaster's review ensures that any new or increased extractions from the Basin or any changes in production patterns are consistent with contamination cleanup efforts and will not adversely affect Basin water quality. In conjunction with the evaluation of an application to construct a new well or a treatment facility, Watermaster uses a computer model to predict the potential future impacts of each project on contaminant migration and Basin cleanup.

BASIN CLEANUP PROJECTS/USEPA OPERABLE UNIT PLANS

The USEPA established Operable Units for the various areas within the Basin that have been contaminated and require groundwater cleanup. The Operable Units are Area 3 (Alhambra area), Baldwin Park, Puente Valley, El Monte, South El Monte, and Whittier Narrows (See Figure 8). USEPA has established a methodical process that includes a review of the extent of contamination (Remedial Investigation), development of clean-up alternatives (Feasibility Study) and selection of the most appropriate cleanup plan (Proposed Plan). Following these activities, the USEPA issues a report identifying the agreed upon Cleanup Plan (Record of Decision). Subsequently, the project facilities are designed and constructed.

With USEPA plans generally in place, Watermaster is working with others to ensure cleanup plans also address local water supply needs.

The USEPA has identified cleanup plans for nearly all the Operable Units. Unlike the USEPA, Watermaster is not only concerned with cleaning up the Basin, but also wants to ensure that the water supply needs of the region are met. With USEPA plans generally in place, Watermaster continues to work with affected Producers, Responsible Parties, and others to implement solutions that not only provide effective cleanup and conform to the USEPA plans, but also meet local water supply needs.

This Five-Year Plan describes each of the Operable Units along with the USEPA proposed cleanup plan. In addition, Appendix A identifies current and projected groundwater production to address the contamination and to implement the clean-up plans. In areas where the groundwater supply has been affected by contamination, Watermaster works with affected Producers and other local water agencies to implement cleanup as quickly as possible, with or without the cooperation of the Responsible Parties. Watermaster and affected Producers continue to seek cost recovery from the Responsible Parties for any cleanup costs they incur.

BALDWIN PARK OPERABLE UNIT (BPOU)

The BPOU is a seven-mile-long, one-mile-wide area of groundwater contamination that lies east of the San Gabriel River, stretching from an area north of the I-210 freeway in Azusa to south of the I-10 freeway in Baldwin Park (see Figure 8). The contamination primarily has been the result of improper use and disposal of industrial chemicals in the Azusa area, and it continues to spread generally in a southwesterly direction.

The USEPA originally issued its Record of Decision (ROD), or cleanup plan, for the BPOU in the mid-1990s. The ROD calls for pumping and treating groundwater in the northern area, where contaminant concentrations are highest, and also in the southern area to limit further migration of contaminants. The ROD involves pumping and treating an average of about 7,000 gallons per minute in the northern area and 16,000 gallons per minute in the southern area. The ROD also recommends the use of existing water supply wells, treatment systems, and pipelines when feasible. Importantly, the plan encourages adding the treated water to the potable supply, rather than simply recharging it back into the ground or disposing of it to storm drains.

Figure 8. LOCATION MAP OF USEPA OPERABLE UNITS

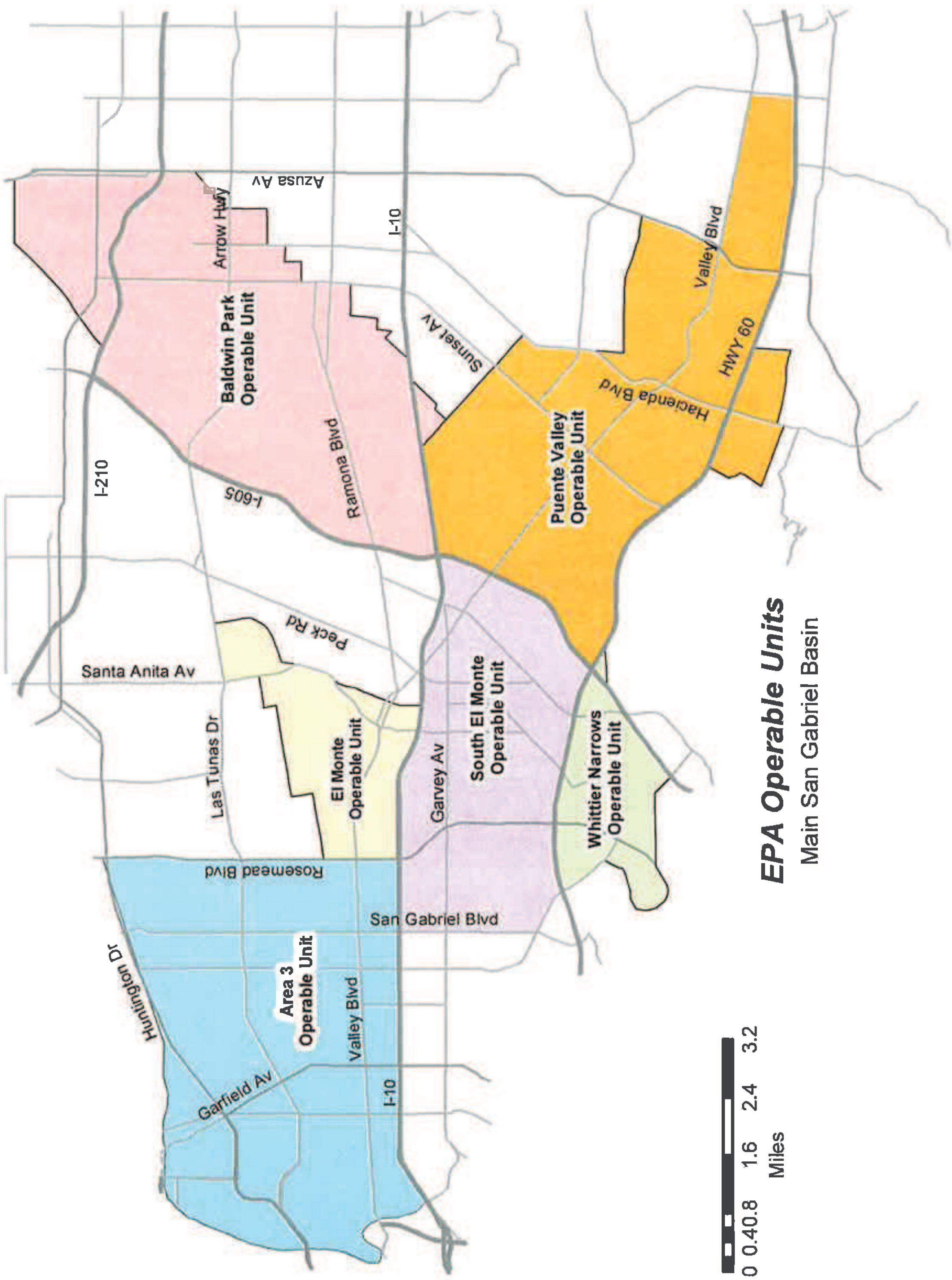


Figure 9. VOC PLUME MAP IN BPOU

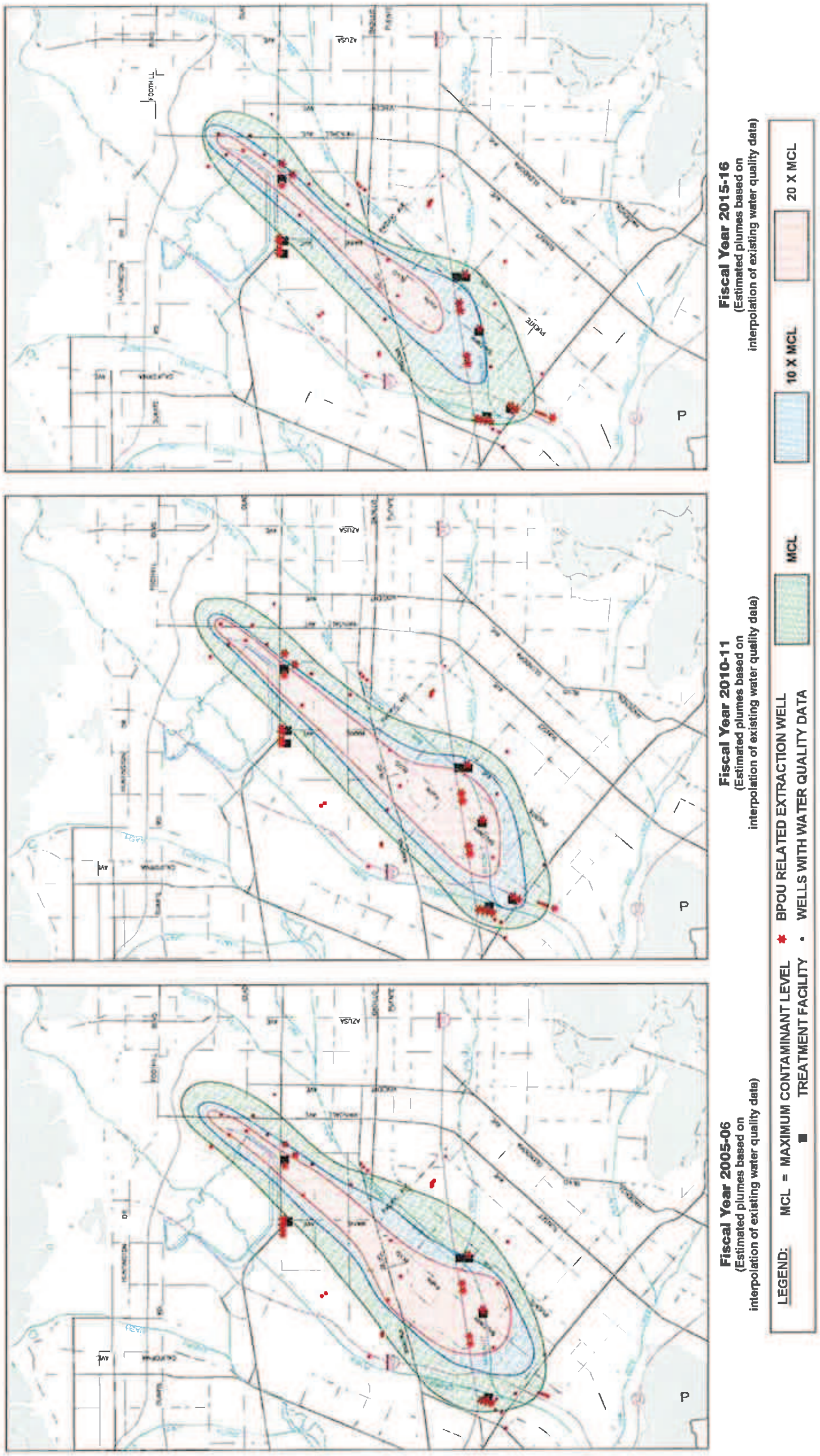
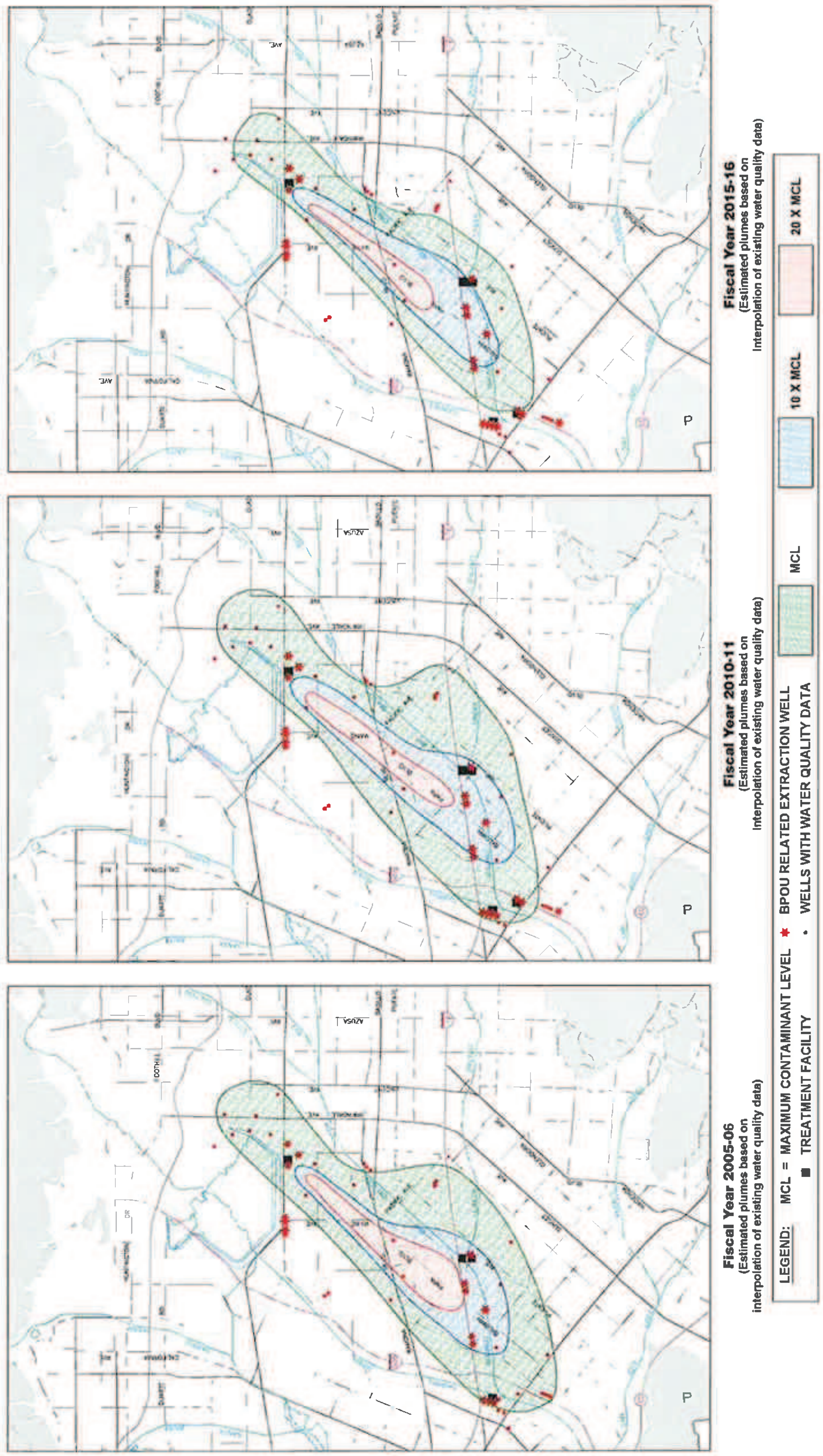


Figure 10. PERCHLORATE PLUME MAP IN BPOU



The discovery of perchlorate and NDMA during the late 1990s resulted in the shutdown of numerous treatment facilities, including the La Puente Valley County Water District (LPVCWD) Plant and San Gabriel Valley Water Company (SGVWC) Plant B6 that were designed by local water agencies to remove VOCs but not the new contaminants. Shutting down the VOC treatment plants allowed contaminants to migrate southward into previously unaffected areas, in turn forcing the shutdown of other water supply wells.

In 2002, after several years of negotiation led by Watermaster, eight of the BPOU Responsible Parties (called Cooperating Respondents, or CRs) and seven water entities signed the BPOU Project Agreement. Under this landmark agreement, Watermaster continues to provide overall project management and project coordination services. The CRs have paid the cost to construct, and will continue to provide funding to operate, the USEPA-required BPOU cleanup facilities for about 15 years. Several water purveyors own and operate the facilities and use the highly treated water in their water systems. The San Gabriel Basin Water Quality Authority (WQA) has also obtained outside funds to help construct necessary BPOU treatment facilities, extraction wells and pipelines.

The BPOU Project consists of four centralized treatment facilities with a combined extraction and treatment capacity of up to 25,900 gpm. Those treatment facilities are located at Valley County Water District's Lante Plant (7,800 gpm), San Gabriel Valley Water Company's Plant B6 (7,800 gpm) and Plant B5 (7,800 gpm), and La Puente Valley County Water District's (LPVCWD) site (2,500 gpm). The location of these treatment facilities is shown on Figures 9 and 10.

VALLEY COUNTY WATER DISTRICT (VCWD) PROJECT. In the northerly portion of the BPOU, the VCWD Project consists of three extraction wells, including two new wells, pumping up to 7,800 gpm (average annual rate of 7,000 gpm) to a centralized treatment facility at the VCWD Lante Plant. The VCWD Project consists of separate facilities to treat VOCs, 1,2,3-TCP, perchlorate, NDMA, and 1,4-dioxane. In addition, a treated water pipeline provides up to 6,000 gpm of fully treated water to Suburban Water Systems (SWS) to offset production lost due to contamination of some of its wells; VCWD can use the remaining portion of the treated water. The VCWD Project began operation for contamination cleanup in 2006 and received its CDPH operating permit in July 2007 to provide potable water to customers, and is operational. Since operation began in 2006, the VCWD treatment facility has treated about 40,300 acre-feet and has removed about 29,700 pounds of contaminants.

VCWD and its BPOU partners are coordinating the construction of a new single-pass ion-exchange facility that will remove perchlorate more cost effectively. Construction of the new system is nearly complete, but start-up has been pushed back while the parties determine the most cost-effective way to address high nitrate concentrations. Meanwhile, the existing VCWD treatment facility continues to provide treated water for municipal use.

LPVCWD PROJECT. The LPVCWD consists of three existing production wells. Well pumping capacity is limited to 2,500 gpm to equal the capacity of the treatment facility. The LPVCWD project consists of separate facilities to treat VOCs, perchlorate, NDMA and 1,4-dioxane. The LPVCWD project is permitted by CDPH and has been operating since March 2001. Treated water in excess of LPVCWD's needs is provided to SWS to enable the treatment facility to be operated on a continuous basis. Since operation began, the LPVCWD treatment facility has treated about 46,400 acre-feet (including prior operations with only VOC treatment) and removed about 9,100 pounds of contaminants.

SGVWC B6 PROJECT. The SGVWC B6 project is permitted by CDPH and has been operational since July 2005. The B6 project consists of four new extraction wells and a centralized treatment facility that treats up to 7,800 gpm (average annual rate of 7,000 gpm). The facility treats the contaminated groundwater for VOCs, perchlorate, NDMA, and 1,4-dioxane. The treated water is provided to SGVWC customers. Since operation began, the SGVWC B6 treatment facility has treated about 75,300 acre-feet, (including prior operations with only VOC treatment), and removed about 12,900 pounds of contaminants.

The BPOU project partners are coordinating the construction of a new single pass ion-exchange facility, similar to the ones at the LPVCWD project and the VCWD Project. Construction of the new ion-exchange facility was completed during fiscal year 2009-10 while the existing treatment facility continued to provide treated water for municipal use. Treatment facility operational testing, CDPH permitting and full scale operation for municipal use is anticipated to occur during fiscal year 2011-12.

SGVWC B5 PROJECT. The SGVWC B5 Project consists of one new extraction well and two existing wells that provide up to 7,800 gpm (average annual rate of 7,000 gpm) to a centralized treatment facility located at the SGVWC B5 site. The treatment facility treats the contaminated water for VOCs, perchlorate, NDMA, and 1,4-dioxane. The treated water is provided to City of Industry customers (1,200 gpm) and the balance (6,600 gpm) is provided to SGVWC customers. The SGVWC B5 Project was permitted by CDPH in fiscal year 2007-08. Since operation began in 2007, the SGVWC B5 treatment facility has treated about 40,700 acre-feet and has removed about 1,100 pounds of contaminants.

PURVEYOR PROJECTS. In addition to the USEPA-required BPOU facilities, several water purveyors have built treatment facilities at other wells within the BPOU area to meet water supply needs until the USEPA remedy prevents the continued spread of contamination. California Domestic Water Company (CDWC) has constructed facilities at its wellfield to remove VOCs, perchlorate and NDMA. Similarly, Watermaster has issued permits under Section 28 of its Rules and Regulations to SWS to construct new wells that also are being used to blend with wells impacted by contaminants. These activities reduce reliance on expensive imported water and contribute to contaminant removal.

BPOU CLEANUP PROGRESS. Watermaster regularly reviews water quality data to evaluate the impact the production wells and specially-constructed extraction wells have on control of contamination migration. It is difficult to develop a precise picture of the geographic extent of contamination because water quality is obtained from numerous wells that produce water from different depths below the groundwater table. Figure 9 shows the approximate geographic extent of VOC contamination and operating VOC treatment facilities from about five years ago, and from current data. In addition, the anticipated treatment facilities and the approximate geographic extent of VOC contamination, using engineering judgment, for five years in the future is also shown on Figure 9. The 2010-11 plume indicates the treatment facilities have begun to control plume movement. It also indicates that, as a result of above-average groundwater replenishment, groundwater flow has shifted VOC contamination to the east in the northwesterly portion of the plume. In the future, Watermaster anticipates the area of the VOC plume will begin to decrease, as shown on the 2015-16 plume. Similarly, Figure 10 shows the approximate geographic extent of perchlorate. The series of three plume characterizations and facility indicators show that in 2005-06 treatment existed at four sites. With the construction and operation of treatment facilities (2010-11), plume movement is expected to be controlled and, similar to VOCs, begin to decrease in the future (2015-16).

The term of the BPOU Project Agreement is 15 years and extends through 2017. Watermaster will continue to coordinate BPOU cleanup activities among the various parties to the BPOU Project Agreement over at least the next six years, including interfacing with USEPA, overseeing agreements between water purveyors to use the treated water, and providing accounting services to track BPOU Project costs and funds received. With all of the BPOU facilities now operational, Watermaster is also coordinating collection of field data, such as water production, water quality and water levels, and is providing BPOU Project performance reports to USEPA in cooperation with the CRs.

The projects will ensure that there is an adequate water supply for the BPOU area. These projects are consistent with the USEPA ROD, meet contaminant removal and containment requirements, and meet local water supply needs.

SOUTH EL MONTE OPERABLE UNIT (SEMOU)

The SEMOU covers approximately eight square miles in the south-central portion of the Basin. It is bounded by the I-10 Freeway, the 60 Freeway, the I-605 Freeway, and San Gabriel Boulevard. (See Figure 8). A ROD for the SEMOU was issued in 2000 addressing VOC contamination in a limited area. Subsequently, additional water supply wells became contaminated and new contaminants, including perchlorate, were detected in wells in the SEMOU area. In November 2005, USEPA revisited its ROD and issued an Explanation of Significant Differences (ESD) indicating that SEMOU cleanup projects would also address treatment of perchlorate. Since a perchlorate source has not yet been identified in that area, the Responsible Parties (RPs) objected to a requirement to pay for perchlorate treatment, and negotiations for the RPs to fund SEMOU groundwater cleanup activities have been moving slowly.

In the meantime, area water purveyors who were impacted by contaminant migration and new perchlorate detections were forced to construct new or additional treatment facilities to maintain safe, reliable water supplies. The City of Monterey Park, San Gabriel Valley Water Company, and Golden State Water Company (GSWC) have all constructed new or additional treatment facilities within SEMOU. The San Gabriel Basin Water Quality Authority (WQA) has assisted these Producers by providing outside funding to help offset project costs.

MONTEREY PARK PROJECT. Monterey Park constructed a water treatment facility at its Delta Plant to treat VOCs and perchlorate. Monterey Park Well No. 9 (which only had detectable concentrations of VOCs) began operating through the VOC treatment facility in April 2002. Following construction and permitting of the perchlorate treatment facility, Monterey Park Well No. 12 began operation in spring 2005. Monterey Park began operation of Well No. 15 in summer 2006. Production is from Monterey Park Wells No. 12 and No. 15 to operate consistent with the SEMOU ROD. Watermaster and Monterey Park maintain data on water quality in monitoring wells located upgradient of Wells No. 9, 12, and 15. Since the treatment facility began operation, over 38,500 acre-feet of water has been treated and about 5,400 pounds of contaminants removed from the groundwater.

SAN GABRIEL VALLEY WATER COMPANY (SGVWC) PLANT 8 PROJECT. SGVWC Plant 8 VOC Treatment Facility has a capacity of 5,000 gpm and has been in operation since fiscal year 2001-02. In response to increasing VOC concentrations, SGVWC voluntarily constructed supplemental VOC treatment at Plant 8. The supplemental VOC treatment facility was permitted by CDPH in September 2006 and went online in December 2006. Since the original VOC treatment facility operation, over 26,600 acre-feet of water has been treated and about 2,700 pounds of contaminants have been removed from the groundwater.

GOLDEN STATE WATER COMPANY (GSWC) PROJECT. GSWC VOC treatment facility at San Gabriel Wells No. 1 and 2 had been permitted and operating. However, with the establishment of the revised Perchlorate NL in 2002, GSWC voluntarily removed the wells from operation. Subsequently, GSWC installed an ion-exchange system to remove perchlorate and has resumed operation at its San Gabriel Well No. 1. The treatment facility has treated about 9,000 acre-feet of water and removed about 340 pounds of contaminants.

EL MONTE OPERABLE UNIT (EMOU)

The EMOU covers an area of about 10 square miles in the south-central portion of the Basin. It is bounded by the I-10 Freeway in the south, Rosemead Boulevard in the west, and Santa Anita Avenue and Rio Hondo on the east. The northern boundary generally follows Lower Azusa Road (see Figure 8). While shallow contamination is found throughout the EMOU, deep (intermediate zone) contamination is found in the northwest and easterly area of the EMOU.

The USEPA's ROD for the EMOU includes numerous small, shallow extraction wells and treatment, along with two areas of deep extraction and treatment. Due to generally poor water quality in the area, the shallow groundwater will not be used for a potable supply. The deep extractions are recommended for potable use by local water purveyors. The remediation efforts are separated into "Westside" and "Eastside" activities.

EMOU Westside Projects. On the Westside there are plans to clean up contaminants occurring in the shallow aquifer. Watermaster is coordinating with the Westside entities to address the disposition of the treated water. The deep zone extraction and treatment in the northwest area is being accomplished by the existing Encinita Wellfield and Treatment Facility owned by GSWC, which began operation during 1998. During July 2002, USEPA issued an Explanation of Significant Differences (ESD), which indicated that perchlorate, NDMA, 1,4-dioxane, and hexavalent chromium had been detected in excess of CDPH notification levels. In the event water from extraction wells cannot be blended to acceptable levels, additional treatment facilities will need to be installed, significantly increasing cleanup costs. Thus far, extraction and treatment of VOCs at GSWC Encinita Plant have not been impacted. The GSWC treatment facility has treated about 16,000 acre-feet of water and has removed about 380 pounds of contaminants.

EMOU Eastside Projects. The remediation on the Eastside will also involve clean-up of contaminants in the shallow aquifer. Final disposition of the water has not yet been determined and is still being coordinated by Watermaster. The VOC contamination in the deep aquifer is anticipated to be produced from three wells and the fully treated water will be provided to the City of El Monte. Watermaster will continue to assist with data collection and permitting of facilities over the next five years.

PUENTE VALLEY OPERABLE UNIT (PVOU)

The PVOU lies in the southeastern portion of the Basin, essentially bounded by the 60 Freeway in the south, Azusa Avenue in the east, and the I-10 Freeway in the north (see Figure 8). The PVOU encompasses the Puente Valley, which is tributary to the southeasterly portion of the Basin. Contamination in the PVOU includes various VOCs. All aquifers within the PVOU (shallow, intermediate, and deep) are considered sources for municipal water supplies. The USEPA has issued a ROD for the PVOU. The plan identified in the ROD includes extraction and treatment of groundwater within the shallow and intermediate zones from wells located in the center of the PVOU.

PVOU Shallow Zone Project. The cleanup plan for shallow zone contamination includes nine wells that will collectively produce about 1,000 gpm. Due to the poor quality of shallow zone water (which is high in naturally-occurring dissolved solids), the water will not be used as drinking water, but will instead be treated to remove VOCs and will then be recharged back into the Basin. Watermaster is currently working with USEPA and the Responsible Party to develop an agreement to allow production and discharge of the PVOU shallow zone water. The shallow zone project is currently anticipated to be operational during fiscal year 2012-13.

PVOU Intermediate Zone. Watermaster is working with USEPA, Responsible Parties and local water entities to develop a cleanup solution that meets potable water supply needs. Approximately 1,000 gpm will be produced from the intermediate zone extraction wells, treated and used for potable purposes by a local water purveyor. The intermediate zone project is currently anticipated to be operational during fiscal year 2012-13.

WHITTIER NARROWS OPERABLE UNIT (WNOU)

The USEPA has declared that the WNOU is a "fund-lead" project, meaning that the USEPA (with the state) has funded the design, construction, and operation of the remedy and will seek cost recovery from Responsible Parties later. The USEPA cleanup plan involves a series of shallow and intermediate zone extraction wells with treatment (see Figure 8). The total extractions are estimated to be about 11,000 gallons per minute (5,000 gpm shallow and 6,000 gpm intermediate zone).

WNOU Intermediate Zone Project. The City of Whittier has obtained a CDPH permit to use the 6,000 gpm of treated intermediate zone water for municipal use instead of producing water from its existing wells. Since production began in late 2005, about 29,000 acre-feet of groundwater has been treated and about 1,100 pounds of contaminants removed.

WNOU Shallow Zone Project. During fiscal year 2002-03, NDMA was detected in some of the shallow extraction wells, prolonging the testing and review process for the shallow zone water through June 2007. Studies indicated the shallow zone contamination could be adequately contained at an extraction rate of 2,500 gpm. Treated shallow zone water is discharged for conservation and recreational use at Legg Lake, and Watermaster has entered into a production agreement with USEPA and the County of Los Angeles regarding the accounting of that water.

Since production began at the WNOU facility, over 27,300 acre-feet of groundwater has been treated, and over 1,620 pounds of contaminants have been removed.

AREA 3 OPERABLE UNIT

The Area 3 Operable Unit is located in the westerly portion of the Basin. It is generally bounded on the south by the I-10 Freeway, on the east by Rosemead Boulevard, on the North by Huntington Drive and on the west by the boundary of the Main Basin (see Figure 8). EPA has installed a series of monitoring wells to collect water quality data to supplement data collected from water supply wells and has initiated a Remedial Investigation and Feasibility Study to identify the extent of the contamination and to evaluate appropriate cleanup remedies. In addition, Watermaster issued a permit during 2005-06 to the City of Alhambra to construct a treatment facility to remove VOCs from wells No. 7, 8, 11 and 12. The treatment facility became operational in April 2009 prior to USEPA's development of a final remedy but is necessary for Alhambra to receive a reliable source of supply from the groundwater basin. The facility has treated about 8,100 acre-feet and has removed about 230 pounds of contaminants.

PRODUCERS' WATER SUPPLY PLANS

Watermaster's Water Quality Protection Plan provides early warning to Producers before their wells are found to exceed drinking water quality standards. The Plan also contains pre-analyzed suggestions to the Producers for responding to the presence of contaminants.

WATER SUPPLY PLANS TO MEET PROJECTED DEMANDS

Water Producers propose to construct 12 new wells and build six treatment plants during the next five years. Watermaster will continue providing the following services to assist Producers in meeting water demand:

- investigate all new or increased water extractions;
- provide computer modeling and technical support on treatment issues concerning the impact of extractions on contaminant migration;
- prioritize areas requiring further investigation, and coordinate with Producers on water supply modifications; and
- direct changes in pumping or treatment as necessary.

CONDUCT STUDIES, MONITORING AND INVESTIGATIONS

The Main San Gabriel Groundwater Basin is very complex, covering 167 square miles and holding about 2.8 trillion gallons of water. Water enters the Basin from countless natural and man-made locations, and is extracted from over 200 wells operated by dozens of independent Producers. Watermaster conducts special studies to identify projected water demands and to increase understanding of the Basin, so that it can be managed in a way that preserves and improves water supply and quality. In addition, Watermaster routinely reviews available data and is prepared to construct new monitoring wells to obtain supplemental water level and water quality data to better manage the Basin. As a result of these activities, and the cooperative activities with the Regional Board (noted below), there is no longer on-going VOC or Perchlorate contamination occurring; rather the focus and emphasis are on clean-up activities.

LANDFILL INSPECTIONS

Watermaster routinely conducts on-site inspections of area landfills to ensure they are operated in a way that does not allow contaminants to seep into the groundwater. Watermaster reports any violations of Waste Discharge Requirements to the Regional Water Quality Control Board for enforcement.

IDENTIFY AND REDUCE POTENTIAL SOURCES OF CONTAMINATION

COOPERATE WITH THE REGIONAL WATER QUALITY CONTROL BOARD

Since 1993, Watermaster has obtained information from the Regional Board about sources of VOC contamination in the Basin as part of the Regional Board investigations of potential contaminated sites. The information includes a description of all potential sources of contamination investigated by the Regional Board, including:

- maps showing the location of all investigation sites;
- available cause-and-effect relationships between pollution sources and contaminated wells; and
- plans and tentative schedules to abate the source of pollution and to clean up the soil and water.

Watermaster has reviewed a large amount of information gathered in Regional Board files and entered it into a database. This information is used in Watermaster's Section 28 process to help evaluate changes in pumping practices in relation to known contamination sources.

AQUIFER PERFORMANCE TESTS

Watermaster has developed a groundwater flow model for the entire Basin that assists in evaluating the potential impacts of changes in groundwater production.

Although Watermaster completed its three-year Aquifer Performance Test investigation, additional tests will be conducted as required for Section 28 applications or for other needs. A tabulation of potential Aquifer Performance Test investigation sites is included in Appendix D. The sites identified include a pumping well and at least one monitoring well. The tests provide information on the characteristics of the aquifer, such as transmissivity, hydraulic conductivity, and coefficient of storage. The information gathered on aquifer characteristics will support cleanup activities including groundwater model development and calibration (see Appendix D).

DIRECTORY TO APPENDICES

The Following Appendices Are Found in This Section:

APPENDIX A.

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
ADAMS RANCH MUTUAL WATER COMPANY									
1902106	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902689	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000182	3	NA	NA	65.94	75.00	75.00	75.00	75.00	75.00
SUBTOTAL:		NA	NA	65.94	75.00	75.00	75.00	75.00	75.00
ALHAMBRA, CITY OF (1)									
1900010	MOELR (8)	3,145	1,950	2,384.36	2,900.78	2,942.10	2,983.98	3,026.16	3,068.90
1900011	9	887	550	0.00	0.00	0.00	0.00	0.00	0.00
1900012	10	323	200	14.15	17.21	17.46	17.71	17.96	18.21
1900013	12	968	600	1.03	1.25	1.27	1.29	1.31	1.33
1900014	13	2,371	1,470	0.06	0.07	0.07	0.08	0.08	0.08
1900015	14	2,016	1,250	1,061.56	1,291.48	1,309.87	1,328.52	1,347.30	1,366.33
1900016	15	1,823	1,130	1,452.80	1,767.46	1,792.63	1,818.15	1,843.85	1,869.89
1900017	2 LON	2,355	1,460	1,620.17	1,971.08	1,999.15	2,027.61	2,056.27	2,085.31
1900018	GARF	763	473	0.00	0.00	0.00	0.00	0.00	0.00
1902789	1 LON	1,529	948	368.26	448.02	454.40	460.87	467.38	473.99
1903014	11	839	520	568.55	691.69	701.54	711.53	721.59	731.78
1903097	7	2,581	1,600	896.74	1,090.96	1,106.50	1,122.25	1,138.11	1,154.19
SUBTOTAL:		19,600	12,151	8,367.68	10,180.00	10,325.00	10,472.00	10,620.00	10,770.00
AMARILLO MUTUAL WATER COMPANY (SAN GABRIEL VALLEY WATER COMPANY) (1)									
1900791	1	644	399	357.48	406.51	414.64	422.93	431.38	431.38
1900792	2	424	263	0.24	0.47	0.48	0.48	0.50	0.50
SUBTOTAL:		1,068	662	357.72	406.98	415.11	423.42	431.88	431.88
ANDERSON, RAY L. AND HELEN									
8000085	NA	18	11	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		18	11	0.00	0.00	0.00	0.00	0.00	0.00
ARCADIA, CITY OF									
1901013	1 LON	3,629	2,250	770.15	800.00	800.00	800.00	800.00	800.00
1901014	2 LON	3,629	2,250	390.35	500.00	500.00	500.00	500.00	500.00
1901015	1 BAL	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902077	1 CAM	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902078	2 CAM	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902084	2 LGY	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902358	1 STJ	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902791	2 BAL	323	200	0.00	0.00	0.00	0.00	0.00	0.00
1902854	1 PEC	5,646	3,500	4,089.79	4,200.00	4,200.00	4,200.00	4,200.00	4,200.00
8000127	1 LO	7,097	4,400	3,930.68	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
8000177	2 STJ	4,839	3,000	41.62	100.00	100.00	100.00	100.00	100.00
8000213	3 CAM	4,033	2,500	261.78	800.00	800.00	800.00	800.00	800.00
8000214	3 LGY	4,033	2,500	356.21	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
SUBTOTAL:		33,228	20,600	9,840.58	11,400.00	11,400.00	11,400.00	11,400.00	11,400.00
ATTALLA, MARY L.									
8000119	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
AZUSA, CITY OF (AZUSA AGRICULTURE WATER COMPANY, AZUSA VALLEY WATER COMPANY) (1)									
1902533	5 (1)	1,613	1,000	360.52	1,514.00	1,514.00	1,514.00	1,514.00	1,514.00
1902535	6 (3)	4,839	3,000	133.57	397.00	397.00	397.00	397.00	397.00
1902536	GENESIS 1 (4)	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902537	GENESIS 2 (5)	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902538	GENESIS 3 (6)	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000072	1 (7)	5,242	3,250	722.55	1,692.00	1,692.00	1,692.00	1,692.00	1,692.00
8000086	3 (8)	4,516	2,800	3,877.38	2,980.00	2,980.00	2,980.00	2,980.00	2,980.00
1902457	2 (1 NORTH)	4,516	2,800	1,084.30	4,079.00	4,079.00	4,079.00	4,079.00	4,079.00
1902458	4 (2 SOUTH)	4,033	2,500	2,932.46	3,314.00	3,314.00	3,314.00	3,314.00	3,314.00
1902113	AVWC 1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902114	AVCW 2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902115	8 (AVWC 4)	2,984	1,850	53.40	38.00	38.00	38.00	38.00	38.00
1902116	7 (AVWC 5)	1,694	1,050	74.31	258.00	258.00	258.00	258.00	258.00
1902117	9 (AVWC 6)	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902425	AVWC 7	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000103	10 (AVWC 8)	4,194	2,600	3.41	6.00	6.00	6.00	6.00	6.00
8000178	11	3,549	2,200	2,181.74	1,076.00	1,076.00	1,076.00	1,076.00	1,076.00
8000179	12	2,581	1,600	1,372.80	1,136.00	1,136.00	1,136.00	1,136.00	1,136.00
1903119	VULCAN			0.94	50.00	50.00	50.00	50.00	50.00
SUBTOTAL:		15,001	9,300	12,797.38	16,540.00	16,540.00	16,540.00	16,540.00	16,540.00
CEMEX CONSTRUCTION MATERIALS L.P. (AZ-TWO INC.)									
1900038	2	2,305	1,429	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		2,305	1,429	0.00	0.00	0.00	0.00	0.00	0.00
B & B RED-I-MIX CONCRETE INC.									
1902589	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
BANKS, GALE & VICKI (1)									
1900415	NA	560	347	23.14	25.00	25.00	25.00	25.00	25.00
SUBTOTAL:		560	347	23.14	25.00	25.00	25.00	25.00	25.00
BASELINE WATER COMPANY									
1901200	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901201	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901202	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
BEVERLY ACRES MUTUAL									
8000004	ROSE HILLS	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
BIRENBAUM, MAX									
8000005	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY		2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS				
		ACRE-FEET	GPM		2011-12	2012-13	2013-14	2014-15	2015-16
BROOKS, GIFFORD JR.									
1902144	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
BURBANK DEVELOPMENT COMPANY									
1900093	BURB	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
CALIFORNIA-AMERICAN WATER COMPANY/DUARTE SYSTEM (1)									
1900354	STA FE	3,226	2,000	412.73	484.78	492.05	499.46	507.02	514.57
1900355	B-V	3,468	2,150	559.35	657.00	666.85	676.89	687.13	697.37
1900356	MT AVE	1,936	1,200	0.00	0.00	0.00	0.00	0.00	0.00
1900357	LAS L	1,113	690	0.00	0.00	0.00	0.00	0.00	0.00
1900358	FISH C	1,936	1,200	0.00	0.00	0.00	0.00	0.00	0.00
1902907	WILEY	2,581	1,600	1,254.36	1,473.34	1,495.43	1,517.96	1,540.91	1,563.87
1903018	CR HV	2,823	1,750	941.38	1,105.72	1,122.30	1,139.21	1,156.43	1,173.66
8000139	ENCTO	3,549	2,200	1,794.78	2,108.11	2,139.72	2,171.94	2,204.79	2,237.64
8000140	LASL 2	2,742	1,700	741.25	870.66	883.71	897.02	910.59	924.15
11900497	BACON	726	450	88.02	103.39	104.94	106.52	108.13	109.74
SUBTOTAL:		24,098	14,940	5,791.87	6,803.00	6,905.00	7,009.00	7,115.00	7,221.00
CALIFORNIA-AMERICAN WATER COMPANY/SAN MARINO SYSTEM (1)									
1900917	HALL	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900918	GUESS	634	393	0.00	0.00	0.00	0.00	0.00	0.00
1900919	MISVW	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900920	MISVW	2,571	1,594	1,701.45	1,816.80	1,844.11	1,871.81	1,899.72	1,928.02
1900921	RIC-1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900922	RIC-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900923	IVR-1	1,339	830	0.00	0.00	0.00	0.00	0.00	0.00
1900924	MAR-1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900925	MAR-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900926	GRAND	1,816	1,126	502.64	536.72	544.78	552.97	561.21	569.57
1900927	ROSE	929	576	505.89	540.19	548.31	556.54	564.84	573.26
1900934	ROAN	1,952	1,210	0.00	0.00	0.00	0.00	0.00	0.00
1900935	LONG	3,152	1,954	753.99	805.11	817.21	829.49	841.85	854.39
1901441	BR-1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902424	HOWL	1,707	1,058	521.29	556.63	565.00	573.49	582.04	590.71
1902787	BR-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902867	IVR-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1903019	MAR-3	2,766	1,715	1,834.10	1,958.45	1,987.88	2,017.75	2,047.83	2,078.34
1903059	DELMAR	1,571	974	1,167.35	1,246.49	1,265.23	1,284.24	1,303.38	1,322.80
8000175	HALL-2	NA	NA	1,549.56	1,654.61	1,679.48	1,704.72	1,730.13	1,755.91
SUBTOTAL:		18,437	11,430	8,536.27	9,115.00	9,252.00	9,391.00	9,531.00	9,673.00
CALIFORNIA COUNTRY CLUB									
1902529	CLUB	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902531	ARTES	1,129	700	0.01	4.12	4.12	4.12	4.12	4.12
1903084	SYC	1,290	800	0.03	0.88	0.88	0.88	0.88	0.88
SUBTOTAL:		2,420	1,500	0.04	5.00	5.00	5.00	5.00	5.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
CALIFORNIA DOMESTIC WATER COMPANY (1)									
1901181	2	5,404	3,350	894.45	1,037.51	1,121.63	1,233.79	1,385.21	1,413.25
1901182	1-E	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901183	5	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901185	13-N	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902967	6	6,775	4,200	2,789.13	3,235.22	3,497.53	3,847.29	4,319.46	4,406.89
1903057	3	7,581	4,700	6,852.03	7,947.93	8,592.36	9,451.60	10,611.57	10,826.38
1903081	8	5,162	3,200	308.03	357.30	386.27	424.89	477.04	486.69
8000100	5A	7,742	4,800	5,105.48	5,922.04	6,402.21	7,042.43	7,906.73	8,066.78
8000174	14	4,516	2,800	0.00	0.00	0.00	0.00	0.00	0.00
11900092		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		37,180	23,050	15,949.12	18,500.00	20,000.00	22,000.00	24,700.00	25,200.00
CEDAR AVENUE MUTUAL WATER COMPANY									
1901411	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902783	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		0	0	0.00	0.00	0.00	0.00	0.00	0.00
CHAMPION MUTUAL WATER COMPANY (1)									
1900908	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902816	2	516	320	0.58	0.57	0.57	0.57	0.57	0.57
8000121	3	145	90	88.20	86.93	86.93	86.93	86.93	86.93
SUBTOTAL:		661	410	88.78	87.50	87.50	87.50	87.50	87.50
CHEVRON USA									
1900250	TEMP1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
CLAYTON MANUFACTURING COMPANY									
1901055	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000170	MW-4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
COLLISON, E.O.									
1902968	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
VULCAN MATERIALS COMPANY (CALMAT COMPANY)									
1902920	E DUR	6,386	3,959	78.85	73.82	83.05	92.28	101.51	110.74
1903088	1 REL	4,068	2,522	309.01	289.31	325.48	361.64	397.81	433.97
8000063	W DUR	NA	NA	39.37	36.86	41.47	46.08	50.68	55.29
SUBTOTAL:		10,454	6,481	427.23	400.00	450.00	500.00	550.00	600.00
CORCORAN BROS.									
1902814	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY		2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS				
		ACRE-FEET	GPM		2011-12	2012-13	2013-14	2014-15	2015-16
COUNTY SANITATION DISTRICT NO. 18									
8000008	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000009	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000104	LE 1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000105	LE 2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000106	LE 3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000107	LE 4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000128	EO8A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000129	E09A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000130	E10A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000131	E11A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000141	EX1	NA	NA	0.61	0.63	0.63	0.63	0.63	0.63
8000142	EX2	NA	NA	0.64	0.66	0.66	0.66	0.66	0.66
8000143	EX3	NA	NA	0.02	0.02	0.02	0.02	0.02	0.02
8000144	EX4	NA	NA	0.07	0.07	0.07	0.07	0.07	0.07
8000153	E16A	NA	NA	1.10	1.14	1.14	1.14	1.14	1.14
8000154	E17A	NA	NA	7.11	7.35	7.35	7.35	7.35	7.35
8000155	E18A	NA	NA	0.62	0.64	0.64	0.64	0.64	0.64
8000156	E19A	NA	NA	0.98	1.01	1.01	1.01	1.01	1.01
8000173	E20A	NA	NA	1.45	1.50	1.50	1.50	1.50	1.50
8000161	E01R	NA	NA	0.23	0.24	0.24	0.24	0.24	0.24
8000162	E03R	NA	NA	0.14	0.14	0.14	0.14	0.14	0.14
8000163	E05R	NA	NA	0.68	0.70	0.70	0.70	0.70	0.70
8000164	E07R	NA	NA	1.72	1.78	1.78	1.78	1.78	1.78
8000165	E02R	NA	NA	1.91	1.97	1.97	1.97	1.97	1.97
8000166	E04R	NA	NA	0.71	0.73	0.73	0.73	0.73	0.73
8000167	E06R	NA	NA	0.28	0.29	0.29	0.29	0.29	0.29
8000168	E08R	NA	NA	1.09	1.13	1.13	1.13	1.13	1.13
SUBTOTAL:		NA	NA	19.36	20.00	20.00	20.00	20.00	20.00
AZUSA ASSOCIATES LLC (COVELL, ET AL)									
1900390	DALTON	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
COVINA, CITY OF									
1901685	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901686	2	968	600	0.00	0.00	0.00	0.00	0.00	0.00
1901687	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		968	600	0.00	0.00	0.00	0.00	0.00	0.00
COVINA IRRIGATING COMPANY (1)									
1900881	CONTR	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900882	3 BAL	3,549	2,200	907.97	1,200.00	1,200.00	1,500.00	1,500.00	2,000.00
1900883	2 BAL	3,226	2,000	871.86	1,200.00	1,200.00	1,500.00	1,500.00	1,500.00
1900885	1 BAL	2,420	1,500	952.17	1,600.00	2,000.00	2,000.00	2,400.00	2,400.00
11900880	VALEN	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
21900880	VALEN	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		9,194	5,700	2,732.00	4,000.00	4,400.00	5,000.00	5,400.00	5,900.00
CREVOLIN, A.J.									
8000011	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
CROWN CITY PLATING COMPANY									
8000012	01	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
DAVIDSON OPTRONICS INC.									
8000013	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
DAWES, MARY K.									
1902952	04	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
DEL RIO MUTUAL WATER COMPANY (2)									
1900331	BURKE	261	162	110.34	150.00	150.00	150.00	150.00	150.00
1900332	KLING	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		261	162	110.34	150.00	150.00	150.00	150.00	150.00
DRIFTWOOD DAIRY									
1902924	01	298	185	57.02	80.00	80.00	80.00	80.00	80.00
SUBTOTAL:		298	185	57.02	80.00	80.00	80.00	80.00	80.00
DUNNING, GEORGE									
1900091	1910	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
EAST PASADENA WATER COMPANY, LTD. (1)									
11901508	9	2,500	1,550	1,474.01	1,536.21	1,543.87	1,551.59	1,559.36	1,567.15
SUBTOTAL:		2,500	1,550	1,474.01	1,536.21	1,543.87	1,551.59	1,559.36	1,567.15
EL MONTE, CITY OF (1)									
1901692	2A	1,532	950	395.65	496.55	496.55	496.55	496.55	496.55
1901693	3	1,936	1,200	0.00	0.00	0.00	0.00	0.00	0.00
1901694	4	2,258	1,400	0.00	0.00	0.00	0.00	0.00	0.00
1901695	5	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901699	10	2,420	1,500	733.56	920.63	920.63	920.63	920.63	920.63
1901700	11	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902612	MT VW	807	500	0.00	0.00	0.00	0.00	0.00	0.00
1903137	12	3,468	2,150	742.33	931.63	931.63	931.63	931.63	931.63
8000066		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000101	13	4,678	2,900	382.62	480.19	480.19	480.19	480.19	480.19
SUBTOTAL:		17,098	10,600	2,254.16	2,829.00	2,829.00	2,829.00	2,829.00	2,829.00
EL MONTE CEMETERY ASSOCIATION									
8000017	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
FRUIT STREET WATER COMPANY									
1901199	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
GATES, JAMES RICHARD									
8000215	GATES 1	NA	NA	1.60	4.00	4.00	4.00	4.00	4.00
SUBTOTAL:		NA	NA	1.60	4.00	4.00	4.00	4.00	4.00
GLENDORA, CITY OF (1)									
1900826	11-E	1,281	794	78.66	99.71	102.67	102.67	102.67	102.67
1900827	12-G	2,957	1,833	2,746.66	3,481.76	3,584.93	3,584.93	3,584.93	3,584.93
1900828	10-E	629	390	150.35	190.59	196.24	196.24	196.24	196.24
1900829	8-E	2,258	1,400	2,070.35	2,624.45	2,702.21	2,702.21	2,702.21	2,702.21
1900830	9-E	2,757	1,709	2,175.17	2,757.32	2,839.02	2,839.02	2,839.02	2,839.02
1900831	7-G	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901523	1-E	347	215	0.00	0.00	0.00	0.00	0.00	0.00
1901524	4-E	3,549	2,200	0.00	0.00	0.00	0.00	0.00	0.00
1901525	3-G	3,307	2,050	0.00	0.00	0.00	0.00	0.00	0.00
1901526	2-E	484	300	195.71	248.09	255.44	255.44	255.44	255.44
8000003		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000149	5-E	3,039	1,884	2,227.97	2,824.25	2,907.94	2,907.94	2,907.94	2,907.94
8000184	13-E	1,168	724	1,004.88	1,273.82	1,311.56	1,311.56	1,311.56	1,311.56
SUBTOTAL:		21,774	13,499	10,649.75	13,500.00	13,900.00	13,900.00	13,900.00	13,900.00
GOEDERT, LILLIAN									
8000027	GOEDERT	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
GREEN, WALTER									
8000027	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000028	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
HANSEN, ALICE									
8000029	2946	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
HARTLEY, DAVID									
8000029	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
HEMLOCK MUTUAL WATER COMPANY									
1901178	NORTH	219	136	17.82	20.20	20.20	20.20	20.20	20.20
1902806	SOUTH	516	320	70.41	79.80	79.80	79.80	79.80	79.80
SUBTOTAL:		736	456	88.23	100.00	100.00	100.00	100.00	100.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY		2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS				
		ACRE-FEET	GPM		2011-12	2012-13	2013-14	2014-15	2015-16
INDUSTRY WATERWORKS SYSTEM, CITY OF (1)									
1902581	1	2,887	1,790	0.00	0.00	0.00	0.00	0.00	0.00
1902582	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902583	5TH AVE	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000078	3	2,420	1,500	0.00	0.00	0.00	0.00	0.00	0.00
8000096	4	3,871	2,400	0.00	0.00	0.00	0.00	0.00	0.00
8000097	5	1,936	1,200	1,394.78	1,840.00	1,840.00	1,840.00	1,840.00	1,840.00
SUBTOTAL:		11,114	6,890	1,394.78	1,840.00	1,840.00	1,840.00	1,840.00	1,840.00
KIYAN, HIDEO									
1902970	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
LA PUENTE VALLEY COUNTY WATER DISTRICT (1)									
1901459	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901460	2	2,016	1,250	994.53	4.00	4.00	4.00	4.00	4.00
1902859	3	2,016	1,250	1,085.17	4.00	4.00	4.00	4.00	4.00
8000062	4	807	500	0.00	0.00	0.00	0.00	0.00	0.00
8000209	5	4,033	2,500	1,573.32	3,628.00	3,628.00	3,628.00	3,628.00	3,628.00
SUBTOTAL:		8,872	5,500	3,653.02	3,636.00	3,636.00	3,636.00	3,636.00	3,636.00
LA VERNE, CITY OF									
1902322	SNIDO	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
LAKIN, KELLY									
8000158	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
LANDEROS, JOHN									
8000031	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
HANSON AGGREGATES WEST, INC. (LIVINGSTON-GRAHAM)									
1900961	1 DUA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900963	1 KIN	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901492	1 EL	3,302	2,047	245.09	279.24	325.78	372.32	418.86	465.40
1901493	3 EL	4,563	2,829	18.16	20.69	24.14	27.59	31.04	34.48
1903006	4 EL	356	221	0.06	0.07	0.08	0.09	0.10	0.11
SUBTOTAL:		8,221	5,097	263.31	300.00	350.00	400.00	450.00	500.00
LOS ANGELES, COUNTY OF									
1902579	1 WHI	2,710	1,680	0.00	0.00	0.00	0.00	0.00	0.00
1902580	2	1,697	1,052	0.00	0.00	0.00	0.00	0.00	0.00
1902663	3	566	351	0.00	0.00	0.00	0.00	0.00	0.00
1902664	4	832	516	0.00	0.00	0.00	0.00	0.00	0.00
1902665	5	652	404	0.00	0.00	0.00	0.00	0.00	0.00
1902666	6	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000070	1 SF	3,349	2,076	81.32	83.54	83.54	83.54	83.54	83.54
8000074	2 SF	458	284	24.68	25.35	25.35	25.35	25.35	25.35
8000088	B RED	174	108	0.00	0.00	0.00	0.00	0.00	0.00
8000089	N LK	1,323	820	0.01	0.01	0.01	0.01	0.01	0.01
8000090	600	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
11902158	BN PK	2,087	1,294	0.00	0.00	0.00	0.00	0.00	0.00
8000150	3A	1,936	1,200	0.00	0.00	0.00	0.00	0.00	0.00
NA	WNOU	NA	NA	2,619.60	2,691.10	2,691.10	2,691.10	2,691.10	2,691.10
SUBTOTAL:		15,783	9,785	2,725.61	2,800.00	2,800.00	2,800.00	2,800.00	2,800.00
LOS FLORES MUTUAL WATER COMPANY									
11902098	1-LO	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
21902098	1-HI	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
LOUCKS, DAVID									
8000032	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
MAECHTLEN, J.J. TRUSTEE									
1902321	OLD60	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902322	SNIDO	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902323	M & N	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
MANNING BROS. ROCK & SAND COMPANY									
1900117	36230	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
MAPLE WATER COMPANY (SUBURBAN WATER SYSTEMS)									
1900042	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000109	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
MARTINEZ, FRANCES MERCY									
8000033	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA									
1900693	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900694	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
MILLER BREWERIES WEST, L.P. (MILLER BREWING COMPANY)									
8000034		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000075	1	5,533	3,430	589.18	600.00	600.00	600.00	600.00	600.00
8000076	2	5,533	3,430	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		11,065	6,860	589.18	600.00	600.00	600.00	600.00	600.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
MONROVIA, CITY OF (1)									
1900417	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900418	2	3,549	2,200	1,374.78	1,393.26	1,400.88	1,386.84	1,375.81	1,363.78
1900419	3	2,581	1,600	1,034.68	1,048.59	1,054.33	1,043.76	1,035.46	1,026.40
1900420	4	3,226	2,000	1,300.37	1,317.85	1,325.06	1,311.78	1,301.35	1,289.96
1940104	5	4,678	2,900	2,059.42	2,087.10	2,098.52	2,077.49	2,060.97	2,042.94
8000171	6	4,516	2,800	1,085.60	1,100.19	1,106.21	1,095.13	1,086.42	1,076.91
SUBTOTAL:		18,550	11,500	6,854.85	6,947.00	6,985.00	6,915.00	6,860.00	6,800.00
MONROVIA NURSERY									
1902456	DIV 4	NA	NA	0.04	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.04	0.00	0.00	0.00	0.00	0.00
MONTEREY PARK, CITY OF (2)									
1900453	1	1,613	1,000	20.71	22.02	22.02	22.02	22.02	22.02
1900454	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900455	3	1,532	950	187.38	199.23	199.23	199.23	199.23	199.23
1900456	4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900457	5	2,903	1,800	1,181.46	1,256.19	1,256.19	1,256.19	1,256.19	1,256.19
1900458	6	968	600	0.00	0.00	0.00	0.00	0.00	0.00
1902372	7	1,290	800	67.95	72.25	72.25	72.25	72.25	72.25
1902373	8	2,903	1,800	0.00	0.00	0.00	0.00	0.00	0.00
1902690	9	2,903	1,800	1,055.02	1,121.75	1,121.75	1,121.75	1,121.75	1,121.75
1902818	10	2,903	1,800	1,308.91	1,391.70	1,391.70	1,391.70	1,391.70	1,391.70
1903033	12	3,226	2,000	2,975.44	3,163.65	3,163.65	3,163.65	3,163.65	3,163.65
1903092	14	1,129	700	0.00	0.00	0.00	0.00	0.00	0.00
8000126	FERN	1,613	1,000	145.71	154.93	154.93	154.93	154.93	154.93
8000196	15	3,226	2,000	1,460.63	1,553.02	1,553.02	1,553.02	1,553.02	1,553.02
SUBTOTAL:		26,211	16,250	8,403.21	8,934.75	8,934.75	8,934.75	8,934.75	8,934.75
NAMIMATSU FARMS INC.									
1901034	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
NICK TOMOVICH & SON									
8000037	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
NO. 17 WALNUT PLACE MUTUAL WATER COMPANY									
8000038	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
OWL ROCK PRODUCTS (ROBERTSON'S READY MIX)									
1900043	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902241	NA	3,205	1,987	0.00	0.00	0.00	0.00	0.00	0.00
1903119	NA	NA	NA		0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		3,205	1,987	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
PARK WATER CO.									
1901307	26-A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000039	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
PICO COUNTY WATER DISTRICT									
8000040	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
POLOPOLUS, ET AL									
1902169	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
CITRUS VALLEY MEDICAL CENTER, QUEEN OF THE VALLEY CAMPUS (QUEEN OF THE VALLEY HOSPITAL)									
8000138	NA	NA	NA	2.88	20.00	20.00	20.00	20.00	20.00
SUBTOTAL:		NA	NA	2.88	20.00	20.00	20.00	20.00	20.00
RICHWOOD MUTUAL WATER COMPANY									
1901521	1 SOUTH	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901522	2 NORTH	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
WORKMAN MILL INVESTMENT COMPANY (RINCON DITCH COMPANY)									
1902790	4	2,153	1,335	307.12	300.00	300.00	300.00	300.00	100.00
SUBTOTAL:		2,153	1,335	307.12	300.00	300.00	300.00	300.00	100.00
WORKMAN MILL INVESTMENT COMPANY (RINCON IRRIGATION COMPANY)									
1900132	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
11900095	2	1,428	885	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		1,428	885	0.00	0.00	0.00	0.00	0.00	0.00
WORKMAN MILL INVESTMENT COMPANY (ROSE HILLS MEMORIAL PARK)									
1900052	3	1,192	739	14.60	14.78	14.78	14.78	14.78	14.78
1900094	1	673	417	182.96	185.22	185.22	185.22	185.22	185.22
SUBTOTAL:		1,865	1,156	197.56	200.00	200.00	200.00	200.00	200.00
ROWLAND WATER DISTRICT									
NA	NA	NA	NA	117.43	69.76	69.76	69.76	69.76	69.76
SUBTOTAL:		NA	NA	117.43	69.76	69.76	69.76	69.76	69.76
RURBAN HOMES MUTUAL WATER COMPANY (2)									
1900120	1-NORTH	484	300	195.59	196.28	196.28	196.28	196.28	196.28
1900121	2-SOUTH	484	300	3.71	3.72	3.72	3.72	3.72	3.72
SUBTOTAL:		968	600	199.30	200.00	200.00	200.00	200.00	200.00
RUTH, ROY									

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
8000041	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
S.L.S. & N. INC.									
8000151	NA	NA	NA	4.77	50.00	50.00	50.00	50.00	50.00
SUBTOTAL:		NA	NA	4.77	50.00	50.00	50.00	50.00	50.00
SAN GABRIEL COUNTRY CLUB									
1900547	1	NA	NA	0.01	16.51	16.51	16.51	16.51	16.51
1902979	2	750	465	226.08	283.49	283.49	283.49	283.49	283.49
SUBTOTAL:		750	465	226.09	300.00	300.00	300.00	300.00	300.00
SAN GABRIEL COUNTY WATER DISTRICT (1)									
1901669	5 BRA	1,613	1,000	0.00	0.00	0.00	0.00	0.00	0.00
1901670	6 BRA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901671	7	1,048	650	913.62	1,330.00	1,330.00	1,330.00	1,330.00	1,330.00
1901672	8	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902785	9	2,258	1,400	1,827.24	2,100.00	2,100.00	2,100.00	2,100.00	2,100.00
1902786	10	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000067	11	1,532	950	674.59	1,090.00	1,110.00	1,130.00	1,150.00	1,170.00
8000123	12	3,387	2,100	1,432.84	1,770.00	1,790.00	1,810.00	1,830.00	1,850.00
8000133	14	3,549	2,200	1,241.31	1,295.00	1,315.00	1,335.00	1,355.00	1,375.00
SUBTOTAL:		13,388	8,300	6,089.60	7,585.00	7,645.00	7,705.00	7,765.00	7,825.00
SAN GABRIEL VALLEY WATER COMPANY (1)									
1900725	G4A	1,855	1,150	148.26	420.00	420.00	420.00	420.00	420.00
1900733	5A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902635	B1	1,815	1,125	0.00	0.00	0.00	0.00	0.00	0.00
8000112	B5C	3,186	1,975	0.00	0.00	0.00	0.00	0.00	0.00
8000038		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
211900729	1B	2,742	1,700	342.70	240.00	240.00	240.00	240.00	240.00
11902946	1C	2,452	1,520	4.56	40.00	40.00	40.00	40.00	40.00
18000081	1B4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
18000082	1B5	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
18000102	1D	4,678	2,900	260.11	240.00	240.00	240.00	240.00	240.00
21900749	2C	1,924	1,193	0.00	0.00	0.00	0.00	0.00	0.00
21902857	2D	3,226	2,000	285.61	240.00	240.00	240.00	240.00	240.00
28000065	2E	4,436	2,750	1,741.04	240.00	240.00	240.00	240.00	240.00
31900736	8A	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
31900746	8B	2,016	1,250	7.52	1,345.00	1,345.00	1,345.00	1,345.00	1,345.00
31900747	8C	2,097	1,300	826.58	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
31903103	8D	5,000	3,100	1,569.63	1,650.00	1,650.00	1,650.00	1,650.00	1,650.00
38000113	8E	4,839	3,000	23.31	580.00	580.00	580.00	580.00	580.00
41900739	11A	4,436	2,750	299.10	195.00	195.00	195.00	195.00	195.00
41900745	11B	2,984	1,850	646.51	340.00	340.00	340.00	340.00	340.00
41902713	11C	1,742	1,080	12.49	140.00	140.00	140.00	140.00	140.00
48000083	11B7	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
51902858	B4B	3,629	2,250	0.00	0.00	0.00	0.00	0.00	0.00
51902947	B4C	3,629	2,250	0.00	0.00	0.00	0.00	0.00	0.00
61900718	B5A	3,065	1,900	0.00	0.00	0.00	0.00	0.00	0.00
61900719	B5B	5,323	3,300	4,766.11	5,200.00	5,200.00	5,200.00	5,200.00	5,200.00
71900721	B6B	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
71903093	B6C	3,226	2,000	0.21	40.00	40.00	40.00	40.00	40.00
78000084	B6B2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
78000098	B6D	3,226	2,000	0.77	40.00	40.00	40.00	40.00	40.00
81902525	B2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000122	B7E	968	600	251.41	150.00	150.00	150.00	150.00	150.00
91901435		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
91901436	B8	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
91901437	B9	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
91901439	B11A	968	600	0.00	0.00	0.00	0.00	0.00	0.00

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PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
91901440	B7B	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
98000068	B7C	3,791	2,350	1,197.24	360.00	360.00	360.00	360.00	360.00
98000094	B7D	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
98000099	B9B	1,613	1,000	551.16	320.00	320.00	320.00	320.00	320.00
98000108	B11B	4,033	2,500	1,439.74	460.00	460.00	460.00	460.00	460.00
8000172	1E	5,283	3,275	3,660.21	240.00	240.00	240.00	240.00	240.00
8000160	B5D	4,839	3,000	916.76	200.00	200.00	200.00	200.00	200.00
8000169	8F	5,646	3,500	112.02	180.00	180.00	180.00	180.00	180.00
NA	G4B	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
NA	1F	NA	NA	0.00	240.00	240.00	240.00	240.00	240.00
8000197	2F	NA	2,200	1,304.60	200.00	200.00	200.00	200.00	200.00
NA	B11C	3,226	2,000	0.00	0.00	0.00	0.00	0.00	0.00
8000203	B24A	4,033	2,500	120.70	380.00	380.00	380.00	380.00	380.00
8000204	B24B	4,033	2,500	122.93	380.00	380.00	380.00	380.00	380.00
8000187	B25A	4,516	2,800	2,474.68	4,400.00	4,400.00	4,400.00	4,400.00	4,400.00
8000188	B25B	4,516	2,800	2,087.08	4,400.00	4,400.00	4,400.00	4,400.00	4,400.00
8000189	B26A	1,774	1,100	1,597.62	1,600.00	1,600.00	1,600.00	1,600.00	1,600.00
8000190	B26B	1,774	1,100	1,570.39	1,600.00	1,600.00	1,600.00	1,600.00	1,600.00
8000205	B5E	5,565	3,450	4,095.48	5,200.00	5,200.00	5,200.00	5,200.00	5,200.00
NA	11D			0.00	140.00	140.00	140.00	140.00	140.00
SUBTOTAL:		128,101	81,618	32,436.53	32,600.00	32,600.00	32,600.00	32,600.00	32,600.00
SLOAN RANCHES									
1901198	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000045	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SIERRA LA VERNE COUNTRY CLUB									
8000124	1	NA	NA	12.15	34.82	34.82	34.82	34.82	34.82
8000125	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000192	15 OFFSITE	NA	NA	12.83	15.18	15.18	15.18	15.18	15.18
SUBTOTAL:		NA	NA	24.98	50.00	50.00	50.00	50.00	50.00
SIERRA MADRE, CITY OF									
8000193	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SONOCO PRODUCTS COMPANY									
1902786	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902971	2	NA	NA	154.90	150.00	150.00	150.00	150.00	150.00
SUBTOTAL:		NA	NA	154.90	150.00	150.00	150.00	150.00	150.00
SOUTH COVINA WATER SERVICE									
1901606	102	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SOUTH PASADENA, CITY OF (1)									

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
1901679	GRAV 2	1,290	800	522.80	1,190.73	1,190.73	1,190.73	540.12	540.12
1901681	2 WIL	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901682	3 WIL	3,387	2,100	2,957.75	0.00	0.00	1,141.91	2,537.59	2,537.59
1903086	4 WIL	1,774	1,100	873.11	0.00	0.00	598.15	1,329.21	1,329.21
SUBTOTAL:		6,452	4,000	4,353.66	1,190.73	1,190.73	2,930.79	4,406.92	4,406.92
SOUTHERN CALIFORNIA EDISON COMPANY									
1900342	1EB86	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1900343	2EB76	211	131	0.00	0.00	0.00	0.00	0.00	0.00
8000046	110RH	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000047	MURAT	2,420	1,500	0.00	0.00	0.00	0.00	0.00	0.00
11900344	38EIS	1,415	877	0.00	0.00	0.00	0.00	0.00	0.00
21900344	38W	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		4,045	2,508	0.00	0.00	0.00	0.00	0.00	0.00
GOLDEN STATE WATER COMPANY (SOUTHERN CALIFORNIA WATER COMPANY)/SAN DIMAS DISTRICT (1)									
1902148	BAS-3	968	600	947.65	969.07	969.07	969.07	969.07	969.07
1902149	BAS-4	1,210	750	939.83	961.07	961.07	961.07	961.07	961.07
1902150	HWY	1,129	700	1,070.43	1,094.63	1,094.63	1,094.63	1,094.63	1,094.63
1902151	ART-1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902152	ART-2	484	300	0.00	0.00	0.00	0.00	0.00	0.00
1902154	L H-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902266	COL-1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902267	COL-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902268	COL-4	726	450	71.55	73.17	73.17	73.17	73.17	73.17
1902269	COL-5	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902270	COL-6	686	425	3.30	3.37	3.37	3.37	3.37	3.37
1902271	COL-7	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902272	COL-8	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902286	CITY	323	200	111.11	113.62	113.62	113.62	113.62	113.62
1902842	ART-3	403	250	398.68	407.69	407.69	407.69	407.69	407.69
31902287	MALON	605	375	619.75	633.76	633.76	633.76	633.76	633.76
8000212	HWY 2	1,613	1,000	482.70	493.61	493.61	493.61	493.61	493.61
SUBTOTAL:		8,146	5,050	4,645.00	4,750.00	4,750.00	4,750.00	4,750.00	4,750.00
GOLDEN STATE WATER COMPANY (SOUTHERN CALIFORNIA WATER COMPANY)/SAN GABRIEL DISTRICT (2)									
1900510	1 S G	1,774	1,100	1,048.89	1,047.79	1,049.86	1,051.92	1,053.99	1,056.06
1900511	2 S G	1,452	900	1.49	1.49	1.49	1.49	1.50	1.50
1900512	2 GAR	327	203	0.00	0.00	0.00	0.00	0.00	0.00
1900513	1 GAR	321	199	0.00	0.00	0.00	0.00	0.00	0.00
1900514	3 SAX	565	350	254.13	253.86	254.36	254.87	255.37	255.87
1900515	1 SAX	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000146	4 SAX	1,532	950	1,009.87	1,008.81	1,010.80	1,012.79	1,014.78	1,016.77
1902144	1 EAR	589	365	0.00	0.00	0.00	0.00	0.00	0.00
1902017	1 JEF	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902018	2 JEF	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902019	3 JEF	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902020	1 AZU	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902024	1 ENC	1,936	1,200	865.31	864.40	866.11	867.81	869.52	871.22
1902027	1 PER	697	432	81.88	81.79	81.96	82.12	82.28	82.44
1902030	1 GRA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902031	2 GID	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902032	1 GID	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902034	1 FAR	1,936	1,200	406.52	406.09	406.90	407.70	408.50	409.30
1902035	2 ENC	968	600	288.24	287.94	288.51	289.07	289.64	290.21
1902461	2 GRA	494	306	0.00	0.00	0.00	0.00	0.00	0.00
1902948	2 FAR	1,210	750	19.98	19.96	20.00	20.04	20.08	20.12
8000073	3 ENC	1,048	650	595.13	594.51	595.68	596.85	598.02	599.20
8000111	4 JEF	2,097	1,300	1,115.71	1,114.54	1,116.74	1,118.94	1,121.13	1,123.33
SUBTOTAL:		10,384	6,438	5,687.15	5,681.20	5,692.40	5,703.60	5,714.80	5,726.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY		2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS				
		ACRE-FEET	GPM		2011-12	2012-13	2013-14	2014-15	2015-16
STERLING MUTUAL WATER COMPANY									
1902085	SOUTH	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902096	NORTH	397	246	67.11	80.30	80.30	80.30	80.30	80.30
8000132	NEW SO	NA	NA	58.25	69.70	69.70	69.70	69.70	69.70
SUBTOTAL:		397	246	125.36	150.00	150.00	150.00	150.00	150.00
SUBURBAN WATER SYSTEMS (1)									
1900337	152W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901429	201W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901430	201W2	2,049	1,270	0.00	0.00	0.00	0.00	0.00	0.00
1901431	201W3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901432	201W5	3,123	1,936	0.00	0.00	0.00	0.00	0.00	0.00
1901433	201W4	4,083	2,531	0.00	0.00	0.00	0.00	0.00	0.00
1901434	201W6	3,302	2,047	0.00	0.00	0.00	0.00	0.00	0.00
1901596	147W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901597	142W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901598	139W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901599	139W2	4,049	2,510	0.00	0.00	0.00	0.00	0.00	0.00
1901600	139W3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901602	140W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901604	148W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901608	105W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901609	106W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901610	111W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901611	112W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901612	113W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901613	114W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901614	117W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901615	120W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901616	122W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901617	123W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901618	124W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901619	125W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901620	126W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901621	131W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901622	133W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901623	134W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901624	135W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901625	136W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901627	202W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902119	149W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902519	150W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902760	147W2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902761	153W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902762	154W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902763	157W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1903067	140W3	1,774	1,100	0.00	0.00	0.00	0.00	0.00	0.00
8000069	139W4	4,749	2,944	0.00	0.00	0.00	0.00	0.00	0.00
8000077	147W3	1,860	1,153	1,463.60	2,025.58	2,025.58	2,025.58	2,025.58	2,025.58
8000087	125W2	1,286	797	0.00	0.00	0.00	0.00	0.00	0.00
8000092	126W2	1,234	765	0.00	0.00	0.00	0.00	0.00	0.00
8000093	140W4	4,286	2,657	0.00	0.00	0.00	0.00	0.00	0.00
8000145	140W5	6,468	4,010	1,649.15	1,740.24	1,740.24	1,740.24	1,740.24	1,740.24
8000095	139W5	5,323	3,300	0.00	0.00	0.00	0.00	0.00	0.00
8000152	139W6	5,647	3,501	0.00	0.00	0.00	0.00	0.00	0.00
11902518	151W1	5,162	3,200	0.00	0.00	0.00	0.00	0.00	0.00
21902518	151W2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
31902819	155W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
31902820	155W2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
41901605	101W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
41901607	103W1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000181	121W1	3,624	2,247	2,767.30	2,213.37	2,213.37	2,213.37	2,213.37	2,213.37
8000183	142W2	4,194	2,600	4,314.96	4,331.95	4,331.95	4,331.95	4,331.95	4,331.95
8000195	201W7	4,615	2,861	4,639.09	4,725.65	4,725.65	4,725.65	4,725.65	4,725.65
8000198	201W8	4,263	2,643	4,383.02	4,396.64	4,396.64	4,396.64	4,396.64	4,396.64
8000207	151W2	5,162	3,200	4,968.12	4,766.16	4,766.16	4,766.16	4,766.16	4,766.16

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY ACRE-FEET	WELL CAPACITY GPM	2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS 2011-12	2012-13	2013-14	2014-15	2015-16
8000208	201W9	4,121	2,555	2,668.67	652.86	652.86	652.86	652.86	652.86
8000210	201W10	4,408	2,733	2,273.50	3,678.66	3,678.66	3,678.66	3,678.66	3,678.66
SUBTOTAL:		84,779	52,560	29,127.41	28,531.11	28,531.11	28,531.11	28,531.11	28,531.11
SUNNY SLOPE WATER COMPANY (1)									
1900026	8	2,932	1,818	989.54	998.46	1,071.68	1,144.88	1,218.07	1,283.76
1902792	9	3,094	1,918	870.44	878.31	942.69	1,007.08	1,071.47	1,129.25
8000048	10	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000157	13	3,060	1,897	1,165.03	1,175.56	1,261.74	1,347.92	1,434.09	1,511.43
SUBTOTAL:		9,086	5,633	3,025.01	3,052.35	3,276.11	3,499.88	3,723.64	3,924.45
TEXACO INC.									
1900001	14	519	322	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		519	322	0.00	0.00	0.00	0.00	0.00	0.00
TYLER NURSERY									
8000049	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
UNITED CONCRETE PIPE CORPORATION									
8000067	NA	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
UNITED ROCK PRODUCTS CORPORATION									
1900106	IRW-1	NA	NA	374.71	398.05	422.92	447.80	472.68	497.56
1902532	SIERRA	NA	NA	1.84	1.95	2.08	2.20	2.32	2.44
1903062	IRW-2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	376.55	400.00	425.00	450.00	475.00	500.00
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY									
NA	EW4-3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
NA	EW4-4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
NA	EW4-8	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
NA	EW4-9	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		0	0	0.00	0.00	0.00	0.00	0.00	0.00
VALENCIA HEIGHTS WATER COMPANY (1)									
8000051	1	524	325	1,142.17	0.00	0.00	0.00	0.00	0.00
8000052	2	526	326	0.00	0.00	0.00	0.00	0.00	0.00
8000054	4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000055	3A	205	127	0.00	0.00	0.00	0.00	0.00	0.00
8000120	5	1,613	1,000	0.00	362.79	362.79	373.95	373.95	382.33
8000180	6	1,331	825	0.00	332.56	332.56	342.79	342.79	350.47
8000211	7	2,420	1,500	0.00	604.65	604.65	623.26	623.26	637.21
SUBTOTAL:		6,618	4,103	1,142.17	1,300.00	1,300.00	1,340.00	1,340.00	1,370.00

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY		2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS				
		ACRE-FEET	GPM		2011-12	2012-13	2013-14	2014-15	2015-16
VALECITO WATER COMPANY									
1901435	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901436	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901437	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901438	4	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901439	5	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901440	6	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
VALLEY COUNTY WATER DISTRICT (1)									
1900027	E MAIN	3,387	2,100	2,238.51	2,413.16	2,413.16	2,413.16	2,413.16	2,413.16
1900028	W MAIN	2,178	1,350	1,312.80	1,415.23	1,415.23	1,415.23	1,415.23	1,415.23
1900029	MORADA	1,936	1,200	0.00	0.00	0.00	0.00	0.00	0.00
1900031	PADDY	2,360	1,463	0.00	0.00	0.00	0.00	0.00	0.00
1900032	E NIXON (JOAN)	5,162	3,200	2,533.64	2,731.32	2,731.32	2,731.32	2,731.32	2,731.32
1900034	ARROW	4,839	3,000	0.00	0.00	0.00	0.00	0.00	0.00
1900035	B DAL	4,839	3,000	0.00	0.00	0.00	0.00	0.00	0.00
1901307	11	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902356	W NIXON (JOAN)	5,242	3,250	1,697.23	1,829.65	1,829.65	1,829.65	1,829.65	1,829.65
8000039	PALM	1,194	740	0.00	0.00	0.00	0.00	0.00	0.00
8000060	LANTE (SA1-3)	5,484	3,400	4,900.40	5,282.74	5,282.74	5,282.74	5,282.74	5,282.74
8000185	SA1-1	5,484	3,400	2,118.60	2,283.90	2,283.90	2,283.90	2,283.90	2,283.90
8000186	SA1-2	3,871	2,400	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		45,975	28,503	14,801.18	15,956.00	15,956.00	15,956.00	15,956.00	15,956.00
VALLEY VIEW MUTUAL WATER COMPANY (1)									
1900363	1	768	476	331.10	327.07	327.07	327.07	327.07	327.07
1900364	2	310	192	345.14	340.93	340.93	340.93	340.93	340.93
1900365	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		1,077	668	676.24	668.00	668.00	668.00	668.00	668.00
VIA TRUST									
1903012	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
VIETNAMESE AMERICAN BUDDHIST TEMPLE									
8000191	NA	NA	NA	15.48	15.00	15.00	15.00	15.00	15.00
SUBTOTAL:		NA	NA	15.48	15.00	15.00	15.00	15.00	15.00
WHITTIER, CITY OF (1)									
1901745	9	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901746	10	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901747	11	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901748	12	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1901749	13	1,774	1,100	1.45	1.76	1.76	1.76	1.76	1.76
8000021	FROM	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
8000071	15	5,968	3,700	4.72	5.73	5.73	5.73	5.73	5.73
8000110	16	5,968	3,700	16.67	20.23	20.23	20.23	20.23	20.23
8000135	17	6,452	4,000	0.00	0.00	0.00	0.00	0.00	0.00
8000136	18	6,452	4,000	0.00	0.00	0.00	0.00	0.00	0.00
8000200	EW4-5	4,355	2,700	2,397.42	2,909.48	2,909.48	2,909.48	2,909.48	2,909.48
8000201	EW4-6	4,516	2,800	1,410.81	1,712.14	1,712.14	1,712.14	1,712.14	1,712.14
8000202	EW4-7	4,516	2,800	2,307.76	2,800.67	2,800.67	2,800.67	2,800.67	2,800.67
SUBTOTAL:		26,615	16,500	6,138.83	7,450.00	7,450.00	7,450.00	7,450.00	7,450.00
WILMOTT, ERMA M.									

APPENDIX A

PROJECTED GROUNDWATER DEMANDS FROM 2011-12 TO 2015-16

RECORDATION NUMBER	WELL NAME	WELL CAPACITY		2010-11 PRODUCTION	PROJECTED GROUNDWATER DEMANDS				
		ACRE-FEET	GPM		2011-12	2012-13	2013-14	2014-15	2015-16
8000006	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
WOODLAND, RICHARD									
1902949	1	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1902950	2	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL:		NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
COINER, JAMES W., DBA COINER NURSERY (WOODLAND FARMS INC.)									
1902951	3	NA	NA	0.00	0.00	0.00	0.00	0.00	0.00
1903072	5R	NA	NA	101.71	100.00	100.00	100.00	100.00	100.00
SUBTOTAL:		NA	NA	101.71	100.00	100.00	100.00	100.00	100.00
TOTAL		**695,978**	**433,681**	**213,493.13**	**231,583.59**	**234,741.34**	**239,877.39**	**245,228.72**	**246,801.53**

NOTES :

GROUNDWATER PRODUCTION AND DEMANDS IN ACRE-FEET
GPM : GALLONS PER MINUTE
NA : NOT AVAILABLE
(1) PROJECTED GROUND-WATER DEMANDS PROVIDED BY PRODUCER
(2) PROJECTED GROUND-WATER DEMANDS PROVIDED BY PRODUCER AND ADJUSTED BY WATERMASTER

APPENDIX B.

Simulated Changes in Groundwater Elevations at Wells or Wellfields in Main San Gabriel Basin

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
ADAMS RANCH MUTUAL WATER COMPANY						
01	1902106	INACTIVE	202.15	201.85	-0.30	
02	1902689	INACTIVE				
03	8000182	ACTIVE				
ALHAMBRA, CITY OF						
MOEL (08)	1900010	ACTIVE	163.61	160.07	-3.54	PRODUCTION INCREASED
09	1900011	INACTIVE	167.38	166.57	-0.81	
10	1900012	ACTIVE	170.01	168.21	-1.80	
12	1900013	INACTIVE	167.47	165.81	-1.66	
13	1900014	ACTIVE	175.25	173.55	-1.70	
14	1900015	ACTIVE	168.30	164.95	-3.35	PRODUCTION INCREASED
15	1900016	ACTIVE	181.12	179.09	-2.03	PRODUCTION INCREASED
LON 1	1903014	ACTIVE	168.25	163.37	-4.88	PRODUCTION INCREASED
LON 2	1900017	ACTIVE				
GARF	1900018	INACTIVE	166.49	166.20	-0.29	
11	1903014	ACTIVE	166.8	163.59	-3.21	PRODUCTION INCREASED
07	1903097	STANDBY	164.22	160.78	-3.44	PRODUCTION INCREASED
AMARILLO MUTUAL WATER COMPANY						
01	1900791	ACTIVE	200.87	199.91	-0.96	
02	1900792	ACTIVE				
ARCADIA, CITY OF						
LON 1	1901013	ACTIVE	221.60	221.34	-0.26	
LON 2	1901014	ACTIVE	221.96	221.64	-0.32	
CAM REAL 3	8000213	ACTIVE	219.32	218.23	-1.09	
ST JO 2	8000177	ACTIVE	223.15	222.99	-0.16	
BAL 2	1902791	INACTIVE	207.31	206.97	-0.34	
PECK 1	1902854	ACTIVE	222.79	222.72	-0.07	
L OAK 1	8000127	ACTIVE	218.82	218.72	-0.10	
LGY 3	8000214	ACTIVE	213.65	212.36	-1.29	
AZUSA, CITY OF (AZUSA AGRICULTURE WATER COMPANY, AZUSA VALLEY WATER COMPANY)						
05 (01)	1902533	ACTIVE	600.27	595.60	-4.67	PRODUCTION INCREASED
06 (03)	1902535	ACTIVE	602.54	598.83	-3.71	PRODUCTION INCREASED
GENESIS 1 (04)	1902536	DESTROYED	251.27	251.36	0.09	
GENESIS 2 (05)	1902537	DESTROYED	248.14	248.19	0.05	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1) 2010-11	SIMULATED ELEVATION (1) 2015-16	CHANGE (2) (FEET)	REMARKS
GENESIS 3 (06)	1902538	DESTROYED	251.96	252.05	0.09	
01 (07)	8000072	ACTIVE	630.80	625.52	-5.28	PRODUCTION INCREASED
03 (08)	8000086	ACTIVE	628.07	625.46	-2.61	PRODUCTION INCREASED
02 (1 NORTH)	1902457	ACTIVE	627.46	621.69	-5.77	PRODUCTION INCREASED
04 (2 SOUTH)	1902458	ACTIVE	626.69	621.51	-5.18	PRODUCTION INCREASED
AVWC 01	1902113	DESTROYED	239.94	239.82	-0.12	
AVWC 02	1902114	DESTROYED	244.73	244.74	0.01	
08 (AVWC 04)	1902115	ACTIVE	600.78	597.92	-2.86	PRODUCTION INCREASED
07 (AVWC 05)	1902116	ACTIVE	598.00	594.94	-3.06	PRODUCTION INCREASED
09 (AVWC 06)	1902117	INACTIVE	248.80	248.85	0.05	
10 (AVWC 08)	8000103	ACTIVE	248.32	248.37	0.05	
11	8000178	ACTIVE	627.81	626.34	-1.47	
12	8000179	ACTIVE	628.52	627.95	-0.57	
BASELINE WATER COMPANY						
01	1901200	INACTIVE	976.65	977.10	0.45	
02	1901201	INACTIVE				
03	1901202	INACTIVE	979.25	979.69	0.44	
CALIFORNIA-AMERICAN WATER COMPANY/DUARTE SYSTEM						
STA FE	1900354	ACTIVE	284.12	284.49	0.37	
B V	1900355	ACTIVE	242.16	242.17	0.01	
MT AVE	1900356	DESTROYED	231.89	231.91	0.02	
FISH C	1900358	INACTIVE	640.91	639.15	-1.76	
WILEY	1902907	ACTIVE	623.25	621.30	-1.95	
CR HV	1903018	ACTIVE	268.36	268.28	-0.08	
ENCANTO	8000139	ACTIVE	624.33	622.25	-2.08	PRODUCTION INCREASED
LAS L2	8000140	ACTIVE	607.88	606.72	-1.16	
BACON	1900497	ACTIVE	610.73	610.03	-0.70	
CALIFORNIA-AMERICAN WATER COMPANY/SAN MARINO SYSTEM						
GUESS	1900918	INACTIVE	200.89	200.52	-0.37	
MIVW 2	1900920	ACTIVE	198.92	198.29	-0.63	
RIC 1	1900921	INACTIVE	193.59	192.72	-0.87	
IVAR 1	1900923	INACTIVE	205.10	204.45	-0.65	
GRAND	1900926	ACTIVE	195.12	194.45	-0.67	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
ROSEMEAD	1900927	ACTIVE	194.36	193.62	-0.74	
ROANOKE	1900934	INACTIVE	166.81	166.43	-0.38	
LONGDEN	1900935	ACTIVE	166.35	162.69	-3.66	IMPACT FROM SGCWD EXTRACTION
BR 1	1901441	INACTIVE	212.80	212.56	-0.24	
HOWLAND	1902424	ACTIVE	208.11	207.79	-0.32	
BR 2	1902787	INACTIVE	211.87	211.60	-0.27	
MAR 3	1903019	ACTIVE	205.09	204.45	-0.64	
DELMAR	1903059	ACTIVE	160.10	155.69	-4.41	IMPACT FROM ALHAMBRA EXTRACTION
HALL 2	8000175	ACTIVE	209.82	209.21	-0.61	
CALIFORNIA COUNTRY CLUB						
ARTES	1902531	STANDBY	226.77	226.57	-0.20	
SYCAMORE	1903084	STANDBY	226.69	226.51	-0.18	
CALIFORNIA DOMESTIC WATER COMPANY						
02	1901181	ACTIVE	221.24	216.49	-4.75	PRODUCTION INCREASED
06	1902967	ACTIVE	219.94	213.09	-6.85	PRODUCTION INCREASED
03	1903057	ACTIVE	217.56	209.93	-7.63	PRODUCTION INCREASED
08	1903081	ACTIVE	222.93	219.64	-3.29	PRODUCTION INCREASED
05A	8000100	ACTIVE	219.89	212.77	-7.12	PRODUCTION INCREASED
14	8000174	INACTIVE	220.80	215.18	-5.62	PRODUCTION INCREASED
CHAMPION MUTUAL WATER COMPANY						
02 03	1902816 8000121	ACTIVE ACTIVE	227.58	229.94	2.36	IMPACT FROM SGVWC EXTRACTION
VULCAN MATERIALS COMPANY (CALMAT COMPANY)						
DUR E DUR W	1902920 8000063	ACTIVE ACTIVE	234.44	234.39	-0.05	
REL 1	1903088	ACTIVE	257.19	257.18	-0.01	
COVINA, CITY OF						
01	1901685	INACTIVE	262.99	263.14	0.15	
02 (GRAND)	1901686	INACTIVE	337.54	337.64	0.10	
COVINA IRRIGATING COMPANY						
CONTR	1900881	STANDBY	248.08	248.13	0.05	
BAL 3	1900882	ACTIVE	235.78	235.06	-0.72	
BAL 1 BAL 2	1900885 1900883	ACTIVE ACTIVE	235.92	235.05	-0.87	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
VALEN	1900880	INACTIVE	531.96	532.28	0.32	
CROWN CITY PLATING COMPANY						
01	8000012	INACTIVE	208.13	207.89	-0.24	
DEL RIO MUTUAL WATER COMPANY						
BURKETT	1900331	ACTIVE	224.43	224.17	-0.26	
DRIFTWOOD DAIRY						
01	1902924	ACTIVE	216.41	216.85	0.44	
EAST PASADENA WATER COMPANY, LTD.						
09	1901508	ACTIVE	199.81	199.46	-0.35	
EL MONTE, CITY OF						
02A	1901692	ACTIVE	216.49	216.10	-0.39	
03	1901693	INACTIVE	217.49	217.18	-0.31	
04	1901694	INACTIVE	218.47	218.15	-0.32	
05	1901695	INACTIVE	215.16	215.01	-0.15	
10	1901699	STANDBY	218.42	217.86	-0.56	
MT VW	1902612	DESTROYED	223.40	222.41	-0.99	
12	1903137	STANDBY	214.80	214.31	-0.49	
13	8000101	ACTIVE	215.16	214.76	-0.40	
GLENDORA, CITY OF						
11-E	1900826	ACTIVE	581.62	581.45	-0.17	
08-E 09-E 12-G	1900829 1900830 1900827	ACTIVE ACTIVE ACTIVE	612.28	605.05	-7.23	PRODUCTION INCREASED
10-E	1900828	ACTIVE	589.33	589.00	-0.33	
07-G	1900831	INACTIVE	247.94	247.98	0.04	
01-E 13-E	1901523 8000184	INACTIVE ACTIVE	599.07	598.42	-0.65	
02-E	1901526	ACTIVE	600.15	599.54	-0.61	
03-G 04-E	1901525 1901524	INACTIVE INACTIVE	245.99	246.01	0.02	
05-E	8000149	ACTIVE	627.97	624.56	-3.41	PRODUCTION INCREASED
HARTLEY, DAVID						
NA	8000085	INACTIVE	647.58	647.26	-0.32	
HEMLOCK MUTUAL WATER COMPANY						
NORTH	1901178	ACTIVE	230.04	230.86	0.82	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
SOUTH	1902806	ACTIVE				
INDUSTRY WATERWORKS SYSTEM, CITY OF						
01	1902581	INACTIVE	225.11	223.68	-1.43	
03	8000078	INACTIVE				
04	8000096	INACTIVE				
02	1902582	INACTIVE	225.09	223.71	-1.38	
05	8000097	ACTIVE				(BPOU EXTRACTION WELL)
LA PUENTE VALLEY COUNTY WATER DISTRICT						
02	1901460	ACTIVE	230.20	230.43	0.23	(BPOU EXTRACTION WELL)
04	8000062	INACTIVE				
03	1902859	ACTIVE	229.53	228.91	-0.62	(BPOU EXTRACTION WELL)
05	NA	ACTIVE				(BPOU EXTRACTION WELL)
HANSON AGGREGATES WEST, INC. (LIVINGSTON-GRAHAM)						
EL 4	1903006	ACTIVE	232.11	231.88	-0.23	
EL 1	1901492	ACTIVE	232.45	232.06	-0.39	
EL 3	1901493	ACTIVE				
LOS ANGELES, COUNTY OF						
KEY WELL	3030F	MONITORING	234.42	234.33	-0.09	
WHI 1	1902579	INACTIVE	211.44	211.08	-0.36	
02	1902580	DESTROYED	215.09	214.79	-0.30	
03A	8000150	DESTROYED	210.41	209.99	-0.42	
04	1902664	DESTROYED	208.46	207.86	-0.60	
05	1902665	DESTROYED	207.00	206.08	-0.92	
06	1902666	DESTROYED	207.34	206.82	-0.52	
SF 1	8000070	ACTIVE	246.46	246.63	0.17	
BIG RED	8000088	INACTIVE	216.99	216.65	-0.34	
NEW LAKE	8000089	INACTIVE	209.39	208.99	-0.40	
MILLER BREWERIES WEST, L.P. (MILLER BREWING COMPANY)						
01	8000075	ACTIVE	252.81	253.02	0.21	
02	8000076	INACTIVE	258.15	258.39	0.24	
MONROVIA, CITY OF						
02	1900418	ACTIVE	219.19	219.08	-0.11	
03	1900419	ACTIVE				
04	1900420	ACTIVE	223.67	223.60	-0.07	
05	1940104	ACTIVE	220.85	220.77	-0.08	
06	8000171	ACTIVE	220.34	220.23	-0.11	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1) 2010-11	SIMULATED ELEVATION (1) 2015-16	CHANGE (2) (FEET)	REMARKS
MONROVIA NURSERY						
DIV 4	1902456	ACTIVE	531.96	532.28	0.32	
MONTEREY PARK, CITY OF						
01	1900453	ACTIVE	196.60	195.78	-0.82	
03	1900455	ACTIVE	191.63	190.66	-0.97	
05	1900457	ACTIVE	185.95	184.72	-1.23	
06	1900458	INACTIVE	193.36	192.50	-0.86	
07	1902372	ACTIVE	205.63	204.78	-0.85	
08	1902373	INACTIVE	207.09	206.13	-0.96	
09	1902690	ACTIVE	204.81	203.95	-0.86	
10	1902818	ACTIVE	181.84	180.61	-1.23	
12	1903033	ACTIVE	203.37	202.49	-0.88	
14	1903092	INACTIVE	203.02	202.47	-0.55	
FERN	8000126	ACTIVE	191.67	190.68	-0.99	
15	8000196	ACTIVE	206.72	205.82	-0.90	
OWL ROCK PRODUCTS COMPANY						
NA	1902241	INACTIVE	238.84	238.83	-0.01	
NA	1903119	INACTIVE	639.17	636.55	-2.62	IMPACT FROM GLENDORA EXTRACTION
POLOPOLUS ET AL.						
01	1902169	INACTIVE	235.57	235.24	-0.33	
CITRUS VALLEY MEDICAL CENTER, QUEEN OF THE VALLEY CAMPUS (QUEEN OF THE VALLEY HOSPITAL)						
NA	8000138	ACTIVE	233.94	233.96	0.02	
WORKMAN MILL INVESTMENT COMPANY (RINCON DITCH COMPANY)						
04	1902790	ACTIVE	210.55	211.12	0.57	
WORKMAN MILL INVESTMENT COMPANY (RINCON IRRIGATION COMPANY)						
02	1900095	INACTIVE	211.83	212.08	0.25	
WORKMAN MILL INVESTMENT COMPANY (ROSE HILLS MEMORIAL PARK)						
03	1900052	ACTIVE	211.15	211.50	0.35	
01	1900094	ACTIVE	210.28	210.51	0.23	
RURBAN HOMES MUTUAL WATER COMPANY						
NORTH 1 SOUTH 2	1900120 1900121	ACTIVE ACTIVE	230.37	231.42	1.05	
SAN GABRIEL COUNTRY CLUB						

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
01 02	1900547 1902979	ACTIVE ACTIVE	174.38	171.44	-2.94	IMPACT FROM ALHAMBRA EXTRACTION
SAN GABRIEL COUNTY WATER DISTRICT						
05 BRA	1901669	INACTIVE	197.94	197.51	-0.43	
07	1901671	ACTIVE	166.69	161.82	-4.87	PRODUCTION INCREASED
08	1901672	INACTIVE	167.51	166.27	-1.24	
09	1902785	ACTIVE	180.41	178.70	-1.71	
10	1902786	INACTIVE	187.23	186.24	-0.99	
11	8000067	ACTIVE	189.36	187.35	-2.01	PRODUCTION INCREASED
12	8000123	ACTIVE	190.15	188.48	-1.67	
14	8000133	ACTIVE	180.83	179.32	-1.51	
SAN GABRIEL VALLEY WATER COMPANY						
G4A	1900725	ACTIVE	200.50	199.30	-1.20	
B1	1902635	INACTIVE	221.22	221.10	-0.12	
B5A B5B B5C	1900718 1900719 8000112	INACTIVE ACTIVE INACTIVE	220.53	217.84	-2.69	PRODUCTION INCREASED (BPOU EXTRACTION WELL)
B5D	8000160	ACTIVE	221.78	219.29	-2.49	IMPACT FROM BPOU EXTRACTION
B5E	NA	ACTIVE	220.75	218.04	-2.71	(BPOU EXTRACTION WELL)
B25A B25B	8000187 8000188	ACTIVE ACTIVE	221.07	212.31	-8.76	PRODUCTION INCREASED
B26A B26B	8000189 8000190	ACTIVE ACTIVE	226.08	225.08	-1.00	
8A 8B 8C 8E	1900736 1900746 1900747 8000113	INACTIVE ACTIVE ACTIVE ACTIVE	207.82	206.05	-1.77	
8D 8F	1903103 8000169	ACTIVE ACTIVE	207.58	206.22	-1.36	
1B 1C 1D 1E	1900729 1902946 8000102 8000172	ACTIVE ACTIVE ACTIVE ACTIVE	221.68	227.49	5.81	PRODUCTION REDUCED
2C 2D 2E 2F	1900749 1902857 8000065 8000197	DESTROYED ACTIVE ACTIVE ACTIVE	218.17	220.83	2.66	PRODUCTION REDUCED
11A 11B	1900739 1900745	ACTIVE ACTIVE	224.25	224.64	0.39	
11C	1902713	ACTIVE	225.27	225.17	-0.10	
B4B	1902858	INACTIVE	227.45	224.91	-2.54	IMPACT FROM BPOU EXTRACTION

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
B4C	1902947	INACTIVE				
B6C	1903093	ACTIVE	230.95	230.80	-0.15	(BPOU EXTRACTION WELL)
B6D	8000098	ACTIVE				(BPOU EXTRACTION WELL)
B7C	8000068	ACTIVE	228.63	230.24	1.61	
B7E	8000122	ACTIVE				
B2	1902525	INACTIVE	220.73	220.56	-0.17	
B11A	1901439	INACTIVE	226.54	228.82	2.28	PRODUCTION REDUCED
B11B	8000108	ACTIVE				
B11C	NA	PLANNED				
B9B	8000099	ACTIVE	228.50	229.61	1.11	
B24A	8000203	ACTIVE	230.29	230.58	0.29	
B24B	8000204	ACTIVE				
SIERRA LA VERNE COUNTRY CLUB						
01	8000124	ACTIVE	1080.22	1080.66	0.44	
02	8000125	ACTIVE	1099.24	1099.64	0.40	
SONOCO PRODUCTS COMPANY						
01	1912786	ACTIVE	226.68	225.50	-1.18	
02	1902971	ACTIVE				
SOUTHERN CALIFORNIA EDISON COMPANY						
110RH	8000046	ACTIVE	236.19	236.15	-0.04	
2EB76	1900343	ACTIVE	235.10	235.38	0.28	
MURAT	8000047	ACTIVE	198.63	197.80	-0.83	
GOLDEN STATE WATER COMPANY (SOUTHERN CALIFORNIA WATER COMPANY)/SAN DIMAS DISTRICT						
BAS-3	1902148	ACTIVE	896.54	896.51	-0.03	
BAS-4	1902149	ACTIVE	877.92	877.75	-0.17	
HIGHWAY	1902150	ACTIVE	889.38	889.21	-0.17	
HWY-2		ACTIVE	895.91	895.82	-0.09	
ART-3	1902842	ACTIVE	883.25	883.08	-0.17	
COL-4	1902268	ACTIVE	512.92	512.69	-0.23	
COL-6	1902270	ACTIVE	511.37	511.14	-0.23	
COL-7	1902271	DESTROYED	547.51	547.45	-0.06	
COL-8	1902272	INACTIVE	734.48	733.85	-0.63	
CITY	1902286	ACTIVE	1035.85	1036.45	0.60	
MALON	1902287	ACTIVE	1003.38	1003.93	0.55	
GOLDEN STATE WATER COMPANY (SOUTHERN CALIFORNIA WATER COMPANY)/SAN GABRIEL VALLEY DISTRICT						
S G 1	1900510	ACTIVE	181.99	180.95	-1.04	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1) 2010-11	SIMULATED ELEVATION (1) 2015-16	CHANGE (2) (FEET)	REMARKS
S G 2	1900511	INACTIVE				
GAR 1	1900513	INACTIVE	193.40	192.56	-0.84	
GAR 2	1900512	INACTIVE				
SAX 1	1900515	DESTROYED	184.55	183.65	-0.90	
SAX 3	1900514	ACTIVE				
SAX 4	8000146	ACTIVE				
EARL 1	1902144	INACTIVE	199.79	199.01	-0.78	
JEF 1	1902017	DESTROYED	220.59	220.41	-0.18	
JEF 3	1902019	INACTIVE				
JEF 4	8000111	ACTIVE				
AZU 1	1902020	DESTROYED	213.18	213.19	0.01	
ENC 1	1902024	ACTIVE	200.13	199.83	-0.30	
ENC 2	1902035	ACTIVE	199.33	199.01	-0.32	
ENC 3	8000073	ACTIVE				
PER 1	1902027	ACTIVE	216.26	216.68	0.42	
GRA 1	1902030	INACTIVE	225.80	225.68	-0.12	
GRA 2	1902461	INACTIVE				
GID 1	1902032	DESTROYED	213.98	213.89	-0.09	
GID 2	1902031	DESTROYED				
FAR 1	1902034	ACTIVE	226.39	227.01	0.62	
FAR 2	1902948	ACTIVE	224.90	225.54	0.64	
SOUTH PASADENA, CITY OF						
GRAV 2	1901679	ACTIVE	163.54	163.24	-0.30	
WIL 2	1901681	INACTIVE	166.25	165.10	-1.15	
WIL 3	1901682	ACTIVE	164.42	163.24	-1.18	
WIL 4	1903086	ACTIVE				
STERLING MUTUAL WATER COMPANY						
NEW SO.	8000132	ACTIVE	225.58	225.98	0.40	
NORTH	1902096	ACTIVE				
SUBURBAN WATER SYSTEMS						
114W-1	1901613	INACTIVE	244.91	244.93	0.02	
121W-1	8000181	ACTIVE	234.32	234.74	0.42	
125W-2	8000087	INACTIVE	255.17	255.17	0.00	
126W-2	8000092	INACTIVE	257.58	257.58	0.00	
139W-2	1901599	INACTIVE	234.96	234.96	0.00	
139W-4	8000069	INACTIVE				
139W-5	8000095	INACTIVE	234.80	234.78	-0.02	
139W-6	8000152	INACTIVE				
140W-3	1903067	INACTIVE	230.01	229.83	-0.18	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
140W-4	8000093	INACTIVE				
140W-5	8000145	ACTIVE				
142W-2	8000183	ACTIVE	232.11	232.18	0.07	
147W-3	8000077	ACTIVE	226.63	227.32	0.69	
151W-2	8000207	ACTIVE	229.04	229.24	0.20	
155W-1	1902819	INACTIVE	270.05	270.29	0.24	
201W-2	1901430	ACTIVE	206.53	206.65	0.12	
201W-4	1901433	ACTIVE	206.11	208.02	1.91	
201W-9	8000208	ACTIVE				
201W-5	1901432	INACTIVE	208.97	209.54	0.57	
201W-6	1901434	INACTIVE	210.53	210.24	-0.29	
201W-7	8000195	ACTIVE	205.24	205.46	0.22	
201W-8	8000198	ACTIVE	205.47	205.40	-0.07	
201W-10	NA	ACTIVE	209.33	207.84	-1.49	
SUNNY SLOPE WATER COMPANY						
08	1900026	ACTIVE	188.41	186.63	-1.78	
09	1902792	ACTIVE				
10	8000048	INACTIVE	199.71	199.41	-0.30	
13	8000157	ACTIVE	189.22	187.63	-1.59	
TYLER NURSERY						
NA	8000049	INACTIVE	217.61	217.41	-0.20	
UNITED CONCRETE PIPE CORPORATION						
NA	8000067	INACTIVE	236.93	236.82	-0.11	
UNITED ROCK PRODUCTS CORPORATION						
IRW-1	1900106	ACTIVE	235.34	235.17	-0.17	
IRW-2	1903062	ACTIVE	234.89	234.82	-0.07	
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY						
MW4-1	NA	MONITORING	207.31	206.67	-0.64	SOUTH EL MONTE OPERABLE UNIT
MW4-2	NA	MONITORING	208.48	207.65	-0.83	
MW4-3	NA	MONITORING	206.53	205.61	-0.92	
MW4-4	NA	MONITORING	199.71	199.61	-0.10	
MW4-5	NA	MONITORING	200.29	200.18	-0.11	
MW4-6	NA	MONITORING	200.87	200.75	-0.12	
MW4-7	NA	MONITORING	212.06	211.60	-0.46	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
MW4-8	NA	MONITORING	214.41	214.08	-0.33	
MW4-9	NA	MONITORING	214.92	214.58	-0.34	
MW4-10	NA	MONITORING	219.21	218.97	-0.24	
MW4-11	NA	MONITORING	223.48	223.41	-0.07	
MW5-1	NA	MONITORING	236.76	236.40	-0.36	BALDWIN PARK OPERABLE UNIT
MW5-3	NA	MONITORING	240.15	240.11	-0.04	
MW5-5	NA	MONITORING	232.75	232.51	-0.24	
MW5-8	NA	MONITORING	233.29	233.14	-0.15	
MW5-11	NA	MONITORING	241.23	241.26	0.03	
MW5-13	NA	MONITORING	244.06	244.13	0.07	
MW5-15	NA	MONITORING	233.97	233.89	-0.08	
MW5-17	NA	MONITORING	243.53	243.63	0.10	
MW5-18	NA	MONITORING	241.62	241.64	0.02	
MW5-19	NA	MONITORING	223.54	220.76	-2.78	IMPACT FROM BPOU EXTRACTION
MW5-20	NA	MONITORING	229.81	229.18	-0.63	
MW5-22	NA	MONITORING	226.19	224.78	-1.41	
MW5-23	NA	MONITORING	226.32	223.52	-2.80	IMPACT FROM BPOU EXTRACTION
MW6-1	NA	MONITORING	229.31	229.17	-0.14	PUENTE VALLEY OPERABLE UINT
MW6-2	NA	MONITORING	226.99	226.88	-0.11	
MW6-4	NA	MONITORING	233.75	234.04	0.29	
MW6-5	NA	MONITORING	235.40	235.70	0.30	
MW6-6	NA	MONITORING	243.28	243.48	0.20	
MW6-7	NA	MONITORING	326.28	326.43	0.15	
MW6-8	NA	MONITORING	447.94	448.25	0.31	
EW4-3	NA	REMEDIAL	209.36	208.60	-0.76	
EW4-4	NA	REMEDIAL	206.36	205.22	-1.14	WNOU EXTRACTION
EW4-5 EW4-9	8000200 NA	REMEDIAL REMEDIAL	204.75	203.35	-1.40	WNOU EXTRACTION
EW4-6 EW4-10	8000201 NA	REMEDIAL REMEDIAL	206.36	205.43	-0.93	WNOU EXTRACTION
EW4-7	8000202	REMEDIAL	204.92	203.51	-1.41	WNOU EXTRACTION
EW4-8	NA	REMEDIAL	209.36	208.62	-0.74	
VALENCIA HEIGHTS WATER COMPANY						
01	8000051	INACTIVE	265.17	265.02	-0.15	

APPENDIX B

SIMULATED CHANGES IN GROUNDWATER ELEVATION AT WELLS OR WELLFIELDS IN MAIN SAN GABRIEL BASIN

WELL OR WELLFIELD	RECORDATION NUMBER	WELL STATUS	SIMULATED ELEVATION (1)		CHANGE (2) (FEET)	REMARKS
			2010-11	2015-16		
02	8000052	ACTIVE				
06	8000180	ACTIVE				
04	8000054	ACTIVE	256.40	256.44	0.04	
05	8000120	ACTIVE	276.29	276.12	-0.17	
07	8000211	ACTIVE				
VALLEY COUNTY WATER DISTRICT						
E MAINE	1900027	ACTIVE	234.44	234.22	-0.22	
W MAINE	1900028	ACTIVE				
MORADA	1900029	STANDBY	243.39	243.38	-0.01	
E NIXON (JOAN)	1900032	ACTIVE	234.61	234.38	-0.23	
W NIXON (JOAN)	1902356	ACTIVE				
ARROW	1900034	INACTIVE	235.42	235.16	-0.26	
LANTE (SA1-3)	8000060	ACTIVE				
PALM	8000039	INACTIVE	233.85	233.80	-0.05	
B DALTON	1900035	INACTIVE	234.31	234.22	-0.09	
PADDY LN	1900031	STANDBY	232.81	232.67	-0.14	
SA1-1	8000185	ACTIVE	237.29	237.11	-0.18	
SA1-2	8000186	ACTIVE	237.03	236.87	-0.16	
VALLEY VIEW MUTUAL WATER COMPANY						
01	1900363	ACTIVE	234.44	234.39	-0.05	
02	1900364	ACTIVE				
WHITTIER, CITY OF						
13	1901749	ACTIVE	211.34	210.98	-0.36	
15	8000071	ACTIVE	210.27	210.01	-0.26	
16	8000110	ACTIVE	209.59	209.41	-0.18	
17	8000135	INACTIVE				
18	8000136	INACTIVE	209.20	209.06	-0.14	
WOODLAND, RICHARD						
01	1902949	INACTIVE	224.87	223.31	-1.56	
02	1902950	INACTIVE				
COINER, JAMES W., DBA COINER NURSERY (WOODLAND FARM INC.)						
03	1902951	INACTIVE	225.11	223.60	-1.51	
05R	1903072	ACTIVE	226.35	225.49	-0.86	
				AVERAGE CHANGE	**-0.75**	

(1) SIMULATED ELEVATION IN FEET ABOVE MEAN SEA LEVEL
(2) DIFFERENCE BETWEEN 2015-16 AND 2010-11 SIMULATED ELEVATIONS

APPENDIX C.

Highlights of Volatile Organic Compounds and Nitrate Concentrations and Wells Vulnerable to Contamination

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
ADAMS RANCH MUTUAL WATER COMPANY									
01	1902106	MUNICIPAL	INACTIVE	TCE	2.2	05/88	ND	02/97	VULNERABLE
				NO3	97.0	04/92	38.9	02/97	(NO3)
				CLO4	NA	NA	NA	NA	
02	1902689	MUNICIPAL	INACTIVE	TCE	3.5	08/86	2.5	09/86	VULNERABLE
				NO3	NA	NA	NA	NA	(VOCS)
				CLO4	NA	NA	NA	NA	
03	8000182	MUNICIPAL	ACTIVE	TCE	18.5	11/06	6.5	02/11	(1)
				PCE	6.2	08/10	4.0	02/11	
				NO3	21.0	03/04	13.0	05/09	
				CLO4	ND	08/08	ND	08/10	
ALHAMBRA, CITY OF									
07	1903097	MUNICIPAL	STANDBY	TCE	13.4	08/91	4.5	01/11	VULNERABLE
				PCE	0.8	04/07	ND	04/11	(VOCS AND NO3) (1)
				C-1,2-DCE	1.6	02/05	0.5	04/11	
				CTC	0.6	02/85	ND	01/11	
				NO3	53.2	07/93	44.0	07/10	
				CLO4	2.4	10/07	ND	04/11	
09	1900011	MUNICIPAL	INACTIVE	TCE	21.1	08/08	5.3	04/11	
				C-1,2-DCE	2.3	10/07	0.7	04/11	
				CF	1.6	04/11	1.6	04/11	
				NO3	57.3	06/93	55.0	04/11	
				CLO4	2.2	10/07	ND	04/11	
10	1900012	IRRIGATION	ACTIVE	TCE	30.1	02/09	22.0	10/10	
				C-1,2-DCE	5.8	03/05	ND	10/10	
				1,1-DCE	0.5	03/05	ND	10/10	
				NO3	56.3	01/07	55.0	10/10	
				CLO4	ND	08/97	ND	08/97	
11	1903014	MUNICIPAL	ACTIVE	PCE	1.9	08/02	1.3	04/11	VULNERABLE
				TCE	4.2	05/89	ND	07/10	(VOCS AND NO3) (1)
				C-1,2-DCE	1.5	04/08	ND	07/10	
				NO3	41.3	07/90	21.0	09/09	
				CLO4	ND	08/97	ND	04/11	
12	1900013	MUNICIPAL	INACTIVE	TCE	39.4	08/08	30.0	07/10	VULNERABLE
				PCE	1.1	10/10	0.7	04/11	(NO3) (1)
				C-1,2-DCE	33.6	08/08	33.0	07/10	
				1,1-DCE	0.8	09/08	0.7	04/11	
				T-1,2-DCE	0.9	09/08	0.7	01/11	
				NO3	34.1	08/89	32.0	08/08	
				CLO4	ND	08/08	ND	04/11	
13	1900014	MUNICIPAL	INACTIVE	TCE	0.5	08/07	ND	11/10	
				NO3	57.0	11/10	57.0	11/10	
				CLO4	ND	03/97	ND	11/10	
14	1900015	MUNICIPAL	ACTIVE	TCE	2.4	08/08	0.9	04/11	VULNERABLE
				NO3	42.4	08/89	33.0	11/10	(NO3)
				CLO4	ND	08/97	ND	11/10	
15	1900016	MUNICIPAL	ACTIVE	VOCS	ND	05/89	ND	11/08	
				NO3	18.0	11/02	5.9	04/07	
				CLO4	ND	08/97	ND	04/09	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L) CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	REMARKS
GARF	1900018	MUNICIPAL	INACTIVE	TCE	11.0	08/82	ND	09/93	VULNERABLE (VOCS)
				PCE	0.5	11/87	ND	09/93	
				CTC	0.1	04/80	ND	09/93	
				1,1,2,2-PCA	1.0	11/87	ND	09/93	
				NO3	68.1	08/89	53.6	09/93	
				CLO4	NA	NA	NA	NA	
LON 1	1902789	MUNICIPAL	ACTIVE	PCE	0.3	07/81	ND	07/10	VULNERABLE (NO3 AND CLO4)
				NO3	23.0	09/04	22.0	07/10	
				CLO4	5.0	12/97	ND	04/09	
LON 2	1900017	MUNICIPAL	ACTIVE	PCE	1.3	06/10	1.3	07/10	VULNERABLE (VOCS, NO3, AND CLO4)
				MC	4.3	05/87	ND	07/10	
				NO3	50.4	04/86	23.0	07/10	
				CLO4	5.6	07/97	ND	04/11	
MOEL (8)	1900010	MUNICIPAL	ACTIVE	TCE	16.0	07/09	11.0	07/10	
				PCE	1.6	07/08	ND	04/11	
				C-1,2-DCE	1.8	07/09	0.9	04/11	
				NO3	76.0	07/08	76.0	07/08	
				CLO4	ND	12/99	ND	04/11	
AMARILLO MUTUAL WATER COMPANY									
01	1900791	MUNICIPAL	ACTIVE	PCE	5.5	10/99	3.3	02/11	VULNERABLE (VOCS AND NO3)
				TCE	1.2	02/08	ND	02/11	
				CTC	0.1	08/82	ND	08/10	
				MC	3.2	06/89	ND	08/10	
				NO3	27.4	10/99	23.0	02/11	
				CLO4	ND	08/97	ND	08/10	
02	1900792	MUNICIPAL	INACTIVE	PCE	5.7	02/02	3.0	02/11	VULNERABLE (VOCS AND NO3)
				TCE	1.5	01/99	ND	02/11	
				MC	2.0	06/89	ND	08/10	
				NO3	29.9	02/96	23.0	02/11	
				CLO4	ND	08/97	ND	08/10	
ANDERSON FAMILY MARITAL TRUST									
01	8000079	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
ARCADIA, CITY OF									
BAL 1	1901015	MUNICIPAL	INACTIVE	VOCS	ND	09/98	ND	09/98	VULNERABLE (NO3)
				NO3	52.0	04/78	3.0	09/98	
				CLO4	NA	NA	NA	NA	
BAL 2	1902791	MUNICIPAL	INACTIVE	VOCS	ND	05/89	ND	06/09	VULNERABLE (NO3)
				NO3	33.4	05/08	28.0	06/09	
				CLO4	ND	08/97	ND	07/08	
CAM REAL 1	1902077	MUNICIPAL	DESTROYED	VOCS	ND	01/85	ND	05/92	
				NO3	28.1	05/91	22.4	08/92	
				CLO4	NA	NA	NA	NA	
CAM REAL 2	1902078	MUNICIPAL	DESTROYED	VOCS	ND	05/89	ND	06/98	
				NO3	58.0	05/92	39.0	05/98	
				CLO4	ND	08/97	ND	12/97	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
CAM REAL 3		MUNICIPAL	ACTIVE	VOCS	ND	03/11	ND	03/11	
				NO3	NA	NA	NA	NA	
				CLO4	ND	03/11	ND	03/11	
L OAK 1	8000127	MUNICIPAL	ACTIVE	PCE	1.4	01/08	ND	06/09	
				TCE	3.6	09/10	ND	03/11	
				NO3	21.5	03/91	16.0	09/09	
				CLO4	ND	08/97	ND	09/10	
LGY	1902084	MUNICIPAL	DESTROYED	CF	1.0	01/08	1.0	01/08	
				NO3	104.0	01/08	104.0	01/08	
				CLO4	6.0	01/08	6.0	01/08	
LON 1	1901013	MUNICIPAL	ACTIVE	TCE	30.0	07/87	ND	03/11	VULNERABLE (VOCS AND NO3) (1)
				PCE	2.7	07/87	0.8	03/11	
				1,1-DCE	4.1	06/87	ND	12/09	
				1,2-DCA	1.4	07/87	ND	12/09	
				1,1,1-TCA	4.6	07/87	ND	06/09	
				MC	25.0	09/87	ND	06/09	
				NO3	43.0	12/09	14.0	03/11	
				CLO4	ND	12/97	ND	09/10	
LON 2	1901014	MUNICIPAL	ACTIVE	TCE	62.0	01/85	1.2	03/11	VULNERABLE (VOCS AND NO3) (1)
				PCE	7.7	01/82	2.1	03/11	
				CTC	2.6	09/87	ND	03/11	
				1,1-DCE	0.9	05/87	ND	03/11	
				1,1,1-TCA	12.0	01/85	ND	03/11	
				NO3	109.1	05/85	31.0	03/11	
				CLO4	ND	07/97	ND	09/10	
PECK 1	1902854	MUNICIPAL	ACTIVE	VOCS	ND	05/89	ND	06/09	
				NO3	11.0	08/09	7.4	12/09	
				CLO4	ND	08/97	ND	09/10	
ST JO 1	1902358	MUNICIPAL	DESTROYED	TCE	5.4	01/02	4.8	02/02	
				PCE	2.7	08/91	2.2	02/02	
				NO3	60.0	06/96	46.0	06/02	
				CLO4	1.0	08/97	ND	01/02	
ST JO 2	8000177	MUNICIPAL	ACTIVE	TCE	2.4	12/09	1.2	03/11	VULNERABLE (VOCS AND CLO4)
				PCE	7.7	12/09	3.5	03/11	
				NO3	51.0	12/04	49.0	02/11	
				CLO4	8.6	06/02	ND	09/10	
ATTALLA, MARY L.									
NA	8000119	IRRIGATION	ACTIVE	VOCS	ND	09/96	ND	04/98	
				NO3	19.4	04/98	19.4	04/98	
				CLO4	ND	04/98	ND	04/98	
AZUSA ASSOCIATES LLC									
DALTON	1900390	IRRIGATION	DESTROYED	VOCS	ND	03/98	ND	03/98	
				NO3	4.7	03/98	4.7	03/98	
				CLO4	ND	03/98	ND	03/98	
AZUSA, CITY OF									
05 (OLD 01)	1902533	MUNICIPAL	ACTIVE	TCE	1.0	12/80	ND	08/10	VULNERABLE (NO3)
				PCE	0.3	12/80	ND	08/10	
				CF	1.5	08/04	1.3	08/09	
				NO3	22.9	07/95	11.0	08/10	
				CLO4	ND	07/97	ND	08/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
06 (OLD 03)	1902535	MUNICIPAL	ACTIVE	VOCS	ND	03/85	ND	08/10	
				NO3	14.2	03/95	3.4	08/10	
				CLO4	ND	07/97	ND	08/10	
GENESIS 1 (OLD 04)	1902536	MUNICIPAL	DESTROYED	MTBE	1.2	11/98	1.1	11/98	
				NO3	126.6	06/87	109.8	11/98	
				CLO4	7.2	11/98	7.2	11/98	
GENESIS 2 (OLD 05)	1902537	MUNICIPAL	DESTROYED	TCE	250.0	12/79	3.7	02/08	VULNERABLE (NO3)
				PCE	95.0	04/80	1.0	02/08	
				1,1-DCE	18.0	02/08	18.0	02/08	
				CF	2.6	02/08	2.6	02/08	
				1,1,1-TCA	2.5	02/08	2.5	02/08	
				NO3	105.5	02/93	15.9	02/08	
				CLO4	ND	11/98	ND	02/08	
GENESIS 3 (OLD 06)	1902538	MUNICIPAL	DESTROYED	PCE	3.5	03/97	ND	03/97	
				TCE	0.1	01/80	ND	03/97	
				NO3	112.9	06/86	ND	04/01	
				CLO4	NA	NA	NA	NA	
01 (OLD 07)	8000072	MUNICIPAL	ACTIVE	VOCS	ND	06/87	ND	08/10	
				NO3	4.5	07/97	2.5	08/10	
				CLO4	ND	07/97	ND	08/10	
03 (OLD 08)	8000086	MUNICIPAL	ACTIVE	VOCS	ND	06/87	ND	08/10	
				NO3	4.4	03/95	ND	08/10	
				CLO4	ND	07/97	ND	08/10	
02 (01 NORTH)	1902457	MUNICIPAL	ACTIVE	VOCS	ND	06/89	ND	08/10	
				NO3	5.5	03/92	2.3	08/10	
				CLO4	ND	07/97	ND	08/10	
04 (02 SOUTH)	1902458	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	08/10	
				NO3	5.5	06/89	2.1	08/10	
				CLO4	ND	07/97	ND	08/10	
AVWC 01	1902113	MUNICIPAL	DESTROYED	VOCS	ND	09/97	ND	09/97	
				NO3	55.0	08/87	32.1	09/97	
				CLO4	5.6	09/97	5.6	09/97	
AVWC 02	1902114	MUNICIPAL	DESTROYED	VOCS	ND	01/98	ND	01/98	
				NO3	43.1	01/98	43.1	01/98	
				CLO4	6.9	01/98	6.9	01/98	
08 (AVWC 04)	1902115	MUNICIPAL	ACTIVE	TCE	0.8	03/94	ND	08/10	
				CF	0.5	08/04	ND	08/10	
				NO3	12.1	09/94	8.0	08/10	
				CLO4	ND	07/97	ND	08/10	
07 (AVWC 05)	1902116	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	08/10	VULNERABLE (NO3)
				NO3	24.7	04/95	4.3	08/10	
				CLO4	ND	06/97	ND	08/10	
09 (AVWC 06)	1902117	MUNICIPAL	INACTIVE	PCE	7.4	12/87	0.6	01/99	VULNERABLE (VOCS)
				NO3	117.7	12/89	84.0	01/99	
				CLO4	NA	NA	NA	NA	
AVWC 07	1902425	MUNICIPAL	DESTROYED	TCE	4.5	01/80	ND	03/85	
				NO3	107.0	02/77	39.4	12/85	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
10 (AVWC 08)	8000103	MUNICIPAL	ACTIVE	PCE	0.9	02/09	ND	02/11	
				CF	1.4	03/94	ND	11/10	
				NO3	66.0	05/08	61.0	02/11	
				CLO4	12.6	08/05	8.4	02/11	
11	8000178	MUNICIPAL	ACTIVE	VOCS	ND	06/02	ND	08/10	
				NO3	3.7	08/08	2.9	08/10	
				CLO4	ND	06/02	ND	08/10	
12	8000179	MUNICIPAL	ACTIVE	VOCS	ND	06/02	ND	08/10	
				NO3	3.9	08/08	2.9	08/10	
				CLO4	ND	06/02	ND	08/10	
B & B RED-I-MIX CONCRETE INC.									
03	1902589	INDUSTRIAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
BANKS, GALE & VICKI									
NA	1900415	IRRIGATION	ACTIVE	VOCS	ND	08/96	ND	10/10	
				NO3	20.7	10/98	17.0	10/10	
				CLO4	ND	09/97	ND	09/97	
BASELINE WATER COMPANY									
01	1901200	IRRIGATION	DESTROYED	VOCS	ND	02/98	ND	02/98	
				NO3	99.7	02/98	99.7	02/98	
				CLO4	12.9	02/98	12.9	02/98	
02	1901201	IRRIGATION	DESTROYED	VOCS	ND	11/98	ND	11/98	
				NO3	74.3	11/98	74.3	11/98	
				CLO4	10.6	11/98	10.6	11/98	
03	1901202	IRRIGATION	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
BEVERLY ACRES MUTUAL WATER USERS ASSOCIATION									
ROSE HILLS	8000004	MUNICIPAL	DESTROYED	TCE	8.4	10/88	2.5	03/93	
				PCE	6.0	10/88	2.8	03/93	
				C-1,2-DCE	8.0	08/86	2.4	03/93	
				NO3	22.5	08/86	14.6	09/90	
				CLO4	NA	NA	NA	NA	
BIRENBAUM, MAX									
NA	8000005	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
BOTELLO WATER COMPANY									
NA	1900635	MUNICIPAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
BURBANK DEVELOPMENT COMPANY									
BURB	1900093	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
CALIFORNIA-AMERICAN WATER COMPANY/DUARTE SYSTEM									
B V	1900355	MUNICIPAL	ACTIVE	VOCS	ND	02/85	ND	09/10	
				NO3	3.9	10/10	3.9	10/10	
				CLO4	ND	06/97	ND	07/10	
BACON	1900497	MUNICIPAL	ACTIVE	BF	1.8	09/08	1.8	09/08	
				DBCM	1.0	10/06	ND	09/08	
				MC	0.6	06/89	ND	09/08	
				NO3	10.0	10/81	3.3	10/10	
				CLO4	ND	06/97	ND	09/09	
CR HV	1903018	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	09/10	
				NO3	7.8	07/86	5.5	10/10	
				CLO4	ND	06/97	ND	09/10	
ENCANTO	8000139	MUNICIPAL	ACTIVE	VOCS	ND	12/92	ND	12/10	
				NO3	11.3	12/92	4.5	10/10	
				CLO4	ND	06/97	ND	09/10	
FISH C	1900358	MUNICIPAL	INACTIVE	VOCS	ND	02/85	ND	03/11	
				NO3	6.7	11/94	2.8	03/11	
				CLO4	ND	06/97	ND	03/11	
LAS L	1900357	MUNICIPAL	DESTROYED	VOCS	ND	02/85	ND	06/91	
				NO3	12.1	08/80	4.1	09/91	
				CLO4	NA	NA	NA	NA	
LAS L2	8000140	MUNICIPAL	ACTIVE	TCE	1.6	08/96	ND	09/10	
				NO3	16.6	12/92	6.3	10/10	
				CLO4	ND	06/97	ND	09/10	
MT AVE	1900356	MUNICIPAL	DESTROYED	TCE	16.5	07/87	ND	09/93	
				PCE	1.0	08/82	ND	09/93	
				1,1,1-TCA	8.4	04/85	ND	09/93	
				1,1-DCE	3.4	07/87	ND	09/93	
				T-1,2-DCE	2.0	04/85	ND	09/93	
				NO3	65.0	05/89	10.1	09/93	
				CLO4	NA	NA	NA	NA	
STA FE	1900354	MUNICIPAL	ACTIVE	TCE	3.3	04/84	ND	09/10	VULNERABLE (VOCS AND NO3)
				CF	0.5	07/87	ND	09/10	
				MC	0.5	09/08	ND	09/10	
				NO3	59.0	01/80	2.2	10/10	
				CLO4	ND	06/97	ND	09/10	
WILEY	1902907	MUNICIPAL	ACTIVE	CF	4.2	09/01	ND	09/10	
				NO3	11.0	03/81	3.5	10/10	
				CLO4	ND	06/97	ND	09/10	
CALIFORNIA-AMERICAN WATER COMPANY/SAN MARINO SYSTEM									
BR 1	1901441	MUNICIPAL	INACTIVE	CTC	0.5	12/96	0.5	12/96	VULNERABLE (NO3)
				TCE	27.0	07/93	27.0	12/96	
				PCE	9.0	07/93	7.7	12/96	
				NO3	31.4	12/96	31.4	12/96	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
BR 2	1902787	MUNICIPAL	INACTIVE	TCE	17.0	12/96	17.0	12/96	VULNERABLE (NO3)
				PCE	6.4	12/96	6.4	12/96	
				NO3	25.3	07/93	25.1	12/96	
				CLO4	NA	NA	NA	NA	
DELMAR	1903059	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	09/10	
				NO3	14.0	9/2010	14.0	09/10	
				CLO4	ND	06/97	ND	09/10	
GRAND	1900926	MUNICIPAL	ACTIVE	TCE	4.8	03/07	2.2	03/11	VULNERABLE (VOCS)
				PCE	2.1	12/08	1.1	03/11	
				NO3	10.9	09/03	9.5	12/10	
				CLO4	ND	08/97	ND	12/10	
GUESS	1900918	MUNICIPAL	INACTIVE	TCE	5.2	09/99	5.2	12/01	
				PCE	5.4	12/01	5.4	12/01	
				NO3	20.0	05/01	19.0	09/01	
				CLO4	ND	08/97	ND	03/00	
HALL	1900917	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
HALL 2	8000175	MUNICIPAL	ACTIVE	VOCS	ND	03/01	ND	06/09	VULNERABLE (NO3)
				NO3	23.6	04/01	15.0	09/10	
				CLO4	ND	03/00	ND	09/10	
HOWLAND	1902424	MUNICIPAL	ACTIVE	TCE	6.9	07/89	1.0	03/11	VULNERABLE (VOCS)
				PCE	3.6	03/01	ND	03/11	
				C-1,2-DCE	3.3	11/87	ND	07/10	
				MC	7.5	05/87	ND	07/10	
				NO3	12.4	09/91	5.8	09/10	
				CLO4	ND	08/97	ND	09/10	
IVAR 1	1900923	MUNICIPAL	DESTROYED	PCE	7.4	06/99	6.2	06/00	
				TCE	1.7	06/99	ND	06/00	
				NO3	29.2	09/94	26.0	09/01	
				CLO4	ND	08/97	ND	03/01	
IVAR 2	1902867	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	24.0	12/84	24.0	12/84	
				CLO4	NA	NA	NA	NA	
LONGDEN	1900935	MUNICIPAL	ACTIVE	PCE	8.6	12/09	3.7	03/11	VULNERABLE (CLO4)
				NO3	69.6	03/08	68.0	03/11	
				CLO4	5.1	10/09	ND	03/11	
MAR 1	1900924	MUNICIPAL	DESTROYED	VOCS	ND	01/85	ND	01/85	
				NO3	89.0	03/79	39.0	01/84	
				CLO4	NA	NA	NA	NA	
MAR 2	1900925	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	33.0	01/84	33.0	01/84	
				CLO4	NA	NA	NA	NA	
MAR 3	1903019	MUNICIPAL	ACTIVE	VOCS	ND	01/85	ND	09/10	
				NO3	6.1	09/09	5.9	09/10	
				CLO4	ND	06/97	ND	09/10	
MIVW 1	1900919	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	31.0	03/01	31.0	03/01	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
MIVW 2	1900920	MUNICIPAL	ACTIVE	VOCS	ND	07/87	ND	09/10	
				NO3	21.0	09/09	21.0	09/10	
				CLO4	ND	06/97	ND	09/10	
RIC 1	1900921	MUNICIPAL	INACTIVE	VOCS	ND	02/85	ND	12/90	VULNERABLE (NO3)
				NO3	23.4	08/89	11.8	11/94	
				CLO4	NA	NA	NA	NA	
RIC 2	1900922	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
ROANOKE	1900934	MUNICIPAL	INACTIVE	TCE	5.0	06/00	4.7	12/00	VULNERABLE (VOCS, NO3, AND CLO4)
				PCE	1.2	04/90	ND	09/00	
				C-1,2-DCE	0.5	09/00	ND	12/00	
				NO3	33.0	05/89	29.2	12/00	
				CLO4	5.6	06/97	ND	03/00	
ROSEMEAD	1900927	MUNICIPAL	ACTIVE	TCE	4.7	12/01	3.9	03/11	VULNERABLE (VOCS AND NO3)
				PCE	3.4	03/09	2.8	03/11	
				NO3	37.0	09/09	22.0	03/11	
				CLO4	ND	08/97	ND	09/10	
CALIFORNIA COUNTRY CLUB									
ARTES	1902531	IRRIGATION	STANDBY	VOCS	ND	05/87	ND	10/10	VULNERABLE (NO3)
				NO3	29.0	10/10	29.0	10/10	
				CLO4	NA	NA	NA	NA	
CLUB	1902529	IRRIGATION	INACTIVE	PCE	189.0	11/87	189.0	11/87	
				1,1,2,2-PCA	24.0	11/87	24.0	11/87	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
SYCAMORE	1903084	IRRIGATION	STANDBY	PCE	7.1	09/02	0.6	10/10	VULNERABLE (VOCS AND NO3)
				TCE	0.7	09/01	ND	10/10	
				NO3	128.0	10/07	19.0	10/10	
				CLO4	ND	02/98	ND	02/98	
CALIFORNIA DOMESTIC WATER COMPANY									
01-E	1901182	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
02	1901181	MUNICIPAL	ACTIVE	CTC	0.7	09/96	ND	04/11	VULNERABLE (VOCS, NO3, AND CLO4)
				PCE	2.0	04/08	ND	04/11	
				TCE	4.0	10/99	ND	04/11	
				NO3	24.3	08/96	16.0	04/11	
				CLO4	5.6	10/99	ND	05/11	
03	1903057	MUNICIPAL	ACTIVE	CTC	5.3	02/01	1.5	04/11	VULNERABLE (NO3) (1)
				PCE	21.0	05/10	12.0	04/11	
				TCE	34.0	05/10	19.0	04/11	
				1,1-DCE	3.7	07/09	2.6	04/11	
				C-1,2-DCE	2.9	05/10	1.8	04/11	
				CF	0.7	08/04	ND	04/11	
				NO3	47.6	01/07	21.0	04/11	
				CLO4	9.7	08/09	7.6	05/11	
05	1901183	MUNICIPAL	DESTROYED	PCE	2.0	02/85	ND	12/90	
				NO3	13.0	03/84	13.0	03/84	
				CLO4	NA	NA	NA	NA	

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
05A	8000100	MUNICIPAL	ACTIVE	CTC	1.9	08/96	ND	04/11	VULNERABLE (VOCS AND NO3) (1)
				PCE	14.6	10/08	3.7	04/11	
				TCE	17.8	10/08	4.2	04/11	
				1,1-DCE	2.7	10/08	0.7	04/11	
				C-1,2-DCE	1.6	10/08	ND	04/11	
				NO3	29.0	04/01	8.0	04/11	
				CLO4	ND	06/97	ND	05/11	
06	1902967	MUNICIPAL	ACTIVE	CTC	3.5	12/06	ND	04/11	VULNERABLE (VOCs, NO3, AND CLO4) (1)
				PCE	16.1	10/08	ND	04/11	
				TCE	23.7	10/08	ND	04/11	
				1,1-DCE	4.5	10/08	ND	04/11	
				C-1,2-DCE	2.6	10/08	ND	04/11	
				NO3	32.0	04/11	32.0	04/11	
				CLO4	5.1	10/06	3.9	05/11	
08	1903081	MUNICIPAL	ACTIVE	PCE	9.8	02/09	2.0	04/11	VULNERABLE (VOCS, NO3, AND CLO4)
				TCE	12.0	02/09	ND	04/11	
				CTC	1.1	09/93	ND	04/11	
				NO3	24.0	08/02	16.0	04/11	
				CLO4	5.6	08/02	ND	05/11	
13-N	1901185	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
14	8000174	MUNICIPAL	INACTIVE	CTC	4.4	10/07	ND	04/11	VULNERABLE (VOCs, NO3, AND CLO4) (1)
				PCE	3.9	04/01	0.8	04/11	
				TCE	18.0	05/01	1.9	04/11	
				1,2-DCA	1.0	06/08	ND	04/11	
				C-1,2-DCE	0.7	11/01	ND	01/11	
				1,1-DCE	0.6	08/02	ND	01/11	
				CF	1.3	06/08	0.8	01/11	
				NO3	41.7	02/00	25.0	04/11	
				CLO4	14.0	11/01	5.2	05/11	
CEDAR AVENUE MUTUAL WATER COMPANY									
01 SOUTH	1901411	MUNICIPAL	DESTROYED	PCE	2.2	09/90	ND	06/94	
				NO3	26.8	08/93	8.9	06/94	
				CLO4	NA	NA	NA	NA	
02 NORTH	1902783	MUNICIPAL	DESTROYED	PCE	0.8	04/92	ND	06/94	
				NO3	20.0	01/86	7.4	08/93	
				CLO4	NA	NA	NA	NA	
CEMEX CONSTRUCTION MATERIALS L.P. (AZ TWO)									
02	1900038	INDUSTRIAL	DESTROYED	PCE	700.0	01/85	2.8	09/03	
				TCE	940.0	04/85	6.3	09/03	
				CTC	2.2	09/02	ND	09/03	
				1,1-DCE	350.0	01/87	7.2	09/03	
				1,1-DCA	1.0	08/01	ND	09/03	
				1,1,1-TCA	430.0	01/87	3.6	09/03	
				VC	19.0	12/87	ND	09/03	
				NO3	79.0	09/02	73.1	09/03	
				CLO4	4.2	06/97	ND	09/98	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
CHAMPION MUTUAL WATER COMPANY									
01	1900908	MUNICIPAL	INACTIVE	PCE	3.0	09/86	2.1	09/91	VULNERABLE (VOCS)
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
02	1902816	MUNICIPAL	ACTIVE	PCE	0.6	06/88	ND	09/10	VULNERABLE (NO3)
				NO3	28.0	09/10	7.5	03/11	
				CLO4	ND	09/97	ND	09/10	
03	8000121	MUNICIPAL	ACTIVE	PCE	1.3	09/96	ND	09/10	VULNERABLE (NO3)
				FREON 113	18.0	03/07	ND	03/11	
				NO3	24.0	03/09	14.0	03/11	
				CLO4	ND	03/98	ND	09/10	
CHEVRON USA INC.									
TEMP 1	1900250	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
CITRUS VALLEY MEDICAL CENTER, QUEEN OF THE VALLEY CAMPUS									
01	8000138	NON-POTABLE	ACTIVE	VOCS	ND	09/96	ND	10/10	
				NO3	104.8	02/98	83.0	10/10	
				CLO4	24.0	02/98	24.0	02/98	
CLAYTON MANUFACTURING COMPANY									
02	1901055	INDUSTRIAL	DESTROYED	TCE	150.0	08/01	47.0	09/03	
				PCE	30.0	08/01	ND	09/03	
				1,1-DCE	10.0	08/01	1.7	09/03	
				C-1,2-DCE	1.7	08/01	ND	09/03	
				1,1-DCA	15.0	08/01	ND	09/03	
				1,2-DCA	13.0	08/01	ND	09/03	
				1,1,1-TCA	1.1	08/01	ND	09/03	
				NO3	87.0	08/01	39.7	09/03	
				CLO4	4.0	09/97	4.0	09/97	
COINER, JAMES W., DBA COINER NURSERY									
03	1902951	NON-POTABLE	INACTIVE	PCE	293.5	02/98	170.0	10/01	VULNERABLE (NO3 AND CLO4)
				TCE	10.2	11/87	3.4	10/01	
				CTC	1.6	08/87	1.6	10/01	
				1,1-DCE	6.7	02/98	4.6	10/01	
				C-1,2-DCE	6.8	07/96	2.7	10/01	
				1,1,1-TCA	22.0	02/98	12.0	10/01	
				NO3	67.0	10/01	44.7	09/07	
				CLO4	9.0	02/98	ND	09/98	
05R	1903072	NON-POTABLE	ACTIVE	PCE	7.7	02/98	3.6	10/10	VULNERABLE (VOCS AND CLO4)
				TCE	1.6	10/01	ND	10/10	
				CTC	2.7	07/96	ND	10/10	
				1,1-DCE	5.5	10/01	1.3	10/10	
				CF	6.7	02/98	1.1	10/10	
				NO3	110.0	10/09	72.0	10/10	
				CLO4	9.0	02/98	4.0	09/98	
CORCORAN BROTHERS									
01	1902814	NON-POTABLE	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L) CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	REMARKS
COUNTY SANITATION DISTRICT NO. 18									
E08A	8000128	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
E09A	8000129	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
E10A	8000130	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
E11A	8000131	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
EX1	8000141	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
EX2	8000142	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
EX3	8000143	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
EX4	8000144	REMEDIAL	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LE1	8000104	REMEDIAL	ACTIVE	TCE	4.2	06/86	3.7	09/86	VULNERABLE (VOCS)
				PCE	0.8	09/86	0.8	09/86	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LE2	8000105	REMEDIAL	ACTIVE	TCE	0.1	06/86	ND	09/86	
				PCE	NA	06/86	ND	09/86	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LE3	8000106	REMEDIAL	ACTIVE	TCE	1.5	06/86	1.2	09/86	
				PCE	1.6	06/86	0.8	09/86	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LE4	8000107	REMEDIAL	ACTIVE	TCE	5.1	09/86	5.1	09/86	
				PCE	2.0	09/86	2.0	09/86	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
COVINA, CITY OF									
01	1901685	MUNICIPAL	INACTIVE	PCE	0.6	01/99	0.6	01/99	
				NO3	120.0	01/99	120.0	01/99	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
02 (GRAND)	1901686	MUNICIPAL	INACTIVE	VOCS	ND	06/88	ND	09/98	
				NO3	116.0	08/89	103.0	04/99	
				CLO4	23.0	09/97	22.0	09/98	
03	1901687	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	72.0	10/73	72.0	10/73	
				CLO4	NA	NA	NA	NA	
COVINA IRRIGATING COMPANY									
BAL 1	1900885	MUNICIPAL	ACTIVE	TCE	200.0	07/80	ND	11/10	VULNERABLE (VOCS AND NO3)
				PCE	7.6	07/80	ND	11/10	
				1,1-DCE	0.5	10/06	ND	11/10	
				MC	0.9	10/06	ND	11/10	
				NO3	35.5	12/89	8.6	01/11	
				CLO4	1.5	10/06	ND	07/10	
BAL 2	1900883	MUNICIPAL	ACTIVE	TCE	195.0	06/80	ND	11/10	VULNERABLE (VOCS, NO3 AND CLO4)
				PCE	7.9	06/80	ND	11/10	
				1,1-DCE	0.8	07/07	ND	04/11	
				NO3	47.0	03/10	18.0	04/11	
				CLO4	5.5	03/09	ND	04/11	
BAL 3	1900882	MUNICIPAL	ACTIVE	TCE	225.0	01/80	ND	11/10	VULNERABLE (VOCS, NO3 AND CLO4)
				PCE	10.0	02/85	ND	11/10	
				CTC	3.0	04/85	ND	11/10	
				1,1-DCA	4.0	04/85	ND	11/10	
				1,2-DCA	3.7	02/85	ND	11/10	
				1,1-DCE	2.1	04/85	ND	11/10	
				T-1,2-DCE	2.9	02/85	ND	11/10	
				1,1,1-TCA	5.2	04/85	ND	11/10	
				NO3	57.3	08/89	22.0	04/11	
				CLO4	5.6	09/08	ND	04/11	
CONTR	1900881	MUNICIPAL	INACTIVE	PCE	1.4	12/92	1.3	03/94	
				NO3	125.3	12/89	108.0	03/94	
				CLO4	NA	NA	NA	NA	
VALEN	1900880	MUNICIPAL	INACTIVE	PCE	2.4	08/85	0.6	09/97	
				NO3	73.0	06/81	69.3	09/97	
				CLO4	6.4	09/97	6.4	09/97	
CREVOLIN, A.J.									
NA	8000011	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
CROWN CITY PLATING COMPANY									
01	8000012	INDUSTRIAL	INACTIVE	TCE	1.2	09/04	1.2	09/04	
				T-1,2-DCE	1.4	05/87	ND	09/04	
				NO3	7.4	09/04	3.4	09/08	
				CLO4	ND	09/97	ND	10/07	
DAVIDSON OPTRONICS INC.									
NA	8000013	INDUSTRIAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
DAWES, MARY K.									
04	1902952	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
DEL RIO MUTUAL WATER COMPANY									
BURKETT	1900331	MUNICIPAL	ACTIVE	TCE	2.2	06/90	ND	09/10	VULNERABLE (VOCS AND NO3)
				PCE	3.7	03/97	ND	09/10	
				NO3	31.0	12/03	7.3	09/10	
				CLO4	ND	09/97	ND	09/10	
KLING	1900332	MUNICIPAL	INACTIVE	PCE	1.3	08/86	ND	02/89	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
DRIFTWOOD DAIRY									
01	1902924	INDUSTRIAL	ACTIVE	PCE	13.9	06/98	13.9	06/98	
				1,1,1-TCA	0.3	03/93	ND	06/98	
				NO3	65.1	03/93	46.8	06/98	
				CLO4	ND	06/98	ND	06/98	
DUNNING, GEORGE									
1910	1900091	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
EAST PASADENA WATER COMPANY, LTD.									
09	1901508	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	07/10	
				NO3	4.1	03/98	3.6	03/09	
				CLO4	ND	07/97	ND	03/09	
EL MONTE, CITY OF									
02A	1901692	MUNICIPAL	ACTIVE	PCE	13.0	03/98	5.8	04/11	VULNERABLE (NO3) (1)
				TCE	5.3	01/95	1.5	04/11	
				NO3	29.0	10/09	9.1	03/11	
				CLO4	ND	07/97	ND	07/10	
03	1901693	MUNICIPAL	INACTIVE	PCE	23.6	12/00	2.7	03/11	VULNERABLE (NO3)
				1,1,1-TCA	1.0	11/93	ND	03/11	
				NO3	71.6	08/89	11.0	04/11	
				CLO4	ND	07/97	ND	07/10	
04	1901694	MUNICIPAL	INACTIVE	PCE	16.2	03/84	0.6	01/08	VULNERABLE (VOCS AND NO3)
				TCE	7.8	02/80	ND	12/07	
				NO3	44.4	12/07	40.3	01/08	
				CLO4	ND	07/97	ND	07/03	
05	1901695	MUNICIPAL	DESTROYED	TCE	150.0	07/93	70.0	12/96	
				PCE	51.0	07/93	32.0	12/96	
				CTC	4.3	07/93	1.4	12/96	
				NO3	53.9	12/96	26.3	06/99	
				CLO4	5.9	06/97	5.9	06/97	
10	1901699	MUNICIPAL	ACTIVE	TCE	7.2	09/81	0.8	04/11	VULNERABLE (VOCS) (1)
				PCE	17.7	12/93	3.1	04/11	
				NO3	21.0	01/10	8.2	04/11	
				CLO4	ND	06/97	ND	07/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
11	1901700	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	21.6	07/79	21.6	07/79	
				CLO4	NA	NA	NA	NA	
12	1903137	MUNICIPAL	ACTIVE	TCE	53.2	06/92	41.0	04/11	VULNERABLE (NO3) (1)
				PCE	21.0	01/11	21.0	04/11	
				CTC	1.0	06/92	0.7	04/11	
				NO3	41.0	06/05	35.0	04/11	
				CLO4	ND	06/97	ND	07/10	
13	8000101	MUNICIPAL	ACTIVE	PCE	3.2	07/09	1.2	04/11	VULNERABLE (VOCS)
				TCE	3.2	07/09	0.7	04/11	
				NO3	17.0	03/03	4.7	03/11	
				CLO4	ND	07/97	ND	07/10	
MT VW	1902612	IRRIGATION	DESTROYED	PCE	2.1	08/85	ND	01/01	
				TCE	2.0	01/85	ND	01/01	
				NO3	30.0	02/87	10.0	01/01	
				CLO4	ND	09/97	ND	11/97	
EL MONTE CEMETERY ASSOCIATION									
NA	8000017	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
FRUIT STREET WATER COMPANY									
NA	1901199	IRRIGATION	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
GATES, JAMES RICHARD									
GATES 1	8000215	IRRIGATION	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
GIFFORD, BROOKS JR.									
01	1902144	NA	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
GLENDORA, CITY OF									
01-E	1901523	MUNICIPAL	INACTIVE	TCE	0.8	12/80	ND	09/07	VULNERABLE (NO3)
				NO3	38.1	10/88	35.0	08/08	
				CLO4	ND	06/97	ND	03/03	
02-E	1901526	MUNICIPAL	ACTIVE	VOCS	ND	03/85	ND	09/10	VULNERABLE (NO3)
				NO3	70.0	05/78	10.0	09/10	
				CLO4	ND	07/97	ND	09/10	
03-G	1901525	MUNICIPAL	INACTIVE	TCE	0.5	12/79	ND	05/97	
				PCE	0.5	05/97	0.5	05/97	
				NO3	162.4	08/83	111.0	08/99	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
04-E	1901524	MUNICIPAL	INACTIVE	TCE	0.7	08/80	ND	08/91	
				PCE	0.1	07/81	ND	08/91	
				NO3	126.0	06/83	56.8	08/91	
				CLO4	NA	NA	NA	NA	
05-E	8000149	MUNICIPAL	ACTIVE	VOCS	ND	02/95	ND	09/10	
				NO3	3.2	05/95	2.1	06/09	
				CLO4	ND	07/97	ND	09/10	
07-G	1900831	MUNICIPAL	INACTIVE	TCE	302.0	01/81	ND	04/98	VULNERABLE (VOCS AND CLO4) (3)
				PCE	25.0	01/81	1.9	04/98	
				1,1-DCE	435.0	05/84	ND	04/98	
				C-1,2-DCE	21.0	05/82	ND	04/98	
				1,1-DCA	5.0	05/84	ND	04/98	
				1,2-DCA	12.1	12/93	ND	04/98	
				1,1,1-TCA	3200.0	05/84	64.0	04/98	
				NO3	106.0	04/98	75.9	04/98	
				CLO4	5.3	04/98	5.3	04/98	
08-E	1900829	MUNICIPAL	ACTIVE	MC	0.7	08/02	ND	03/11	
				NO3	6.6	08/86	ND	09/10	
				CLO4	ND	07/97	ND	09/10	
09-E	1900830	MUNICIPAL	ACTIVE	VOCS	ND	05/89	ND	09/10	
				NO3	4.1	08/96	ND	09/10	
				CLO4	ND	07/97	ND	09/10	
10-E	1900828	MUNICIPAL	ACTIVE	CF	1.9	07/97	ND	03/11	VULNERABLE (NO3)
				NO3	78.0	05/77	36.0	03/11	
				CLO4	ND	07/97	ND	09/10	
11-E	1900826	MUNICIPAL	ACTIVE	VOCS	ND	05/82	ND	09/10	VULNERABLE (NO3)
				NO3	117.5	08/73	47.0	03/11	
				CLO4	4.9	12/10	ND	03/11	
12-G	1900827	MUNICIPAL	ACTIVE	TCE	0.9	12/80	ND	09/10	
				MC	2.2	05/89	ND	09/10	
				NO3	4.7	07/98	ND	09/10	
				CLO4	ND	06/97	ND	09/10	
13-E	8000184	MUNICIPAL	ACTIVE	BF	0.7	06/04	ND	03/11	VULNERABLE (NO3)
				NO3	29.0	12/09	14.0	03/11	
				CLO4	ND	06/04	ND	09/10	
GOEDERT, LILLIAN									
GOEDERT	8000159	IRRIGATION	DESTROYED	VOCS	ND	06/98	ND	06/98	
				NO3	7.0	06/98	7.0	06/98	
				CLO4	ND	06/98	ND	06/98	
GOLDEN STATE WATER COMPANY/SAN GABRIEL VALLEY DISTRICT									
AZU 1	1902020	MUNICIPAL	DESTROYED	TCE	15.0	07/93	0.6	01/95	
				PCE	1.9	07/93	ND	01/95	
				NO3	72.9	12/90	35.0	07/02	
				CLO4	NA	NA	NA	10/02	
EARL 1	1902144	MUNICIPAL	INACTIVE	PCE	6.0	09/03	6.0	09/03	
				NO3	7.2	08/03	7.1	09/03	
				CLO4	ND	08/97	ND	08/03	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
ENC 1	1902024	MUNICIPAL	ACTIVE	TCE	21.0	04/03	4.2	04/11	VULNERABLE (VOCS, NO3 AND CLO4) (1)
				PCE	3.5	04/03	0.9	04/11	
				CF	0.9	08/00	ND	04/11	
				NO3	77.6	08/91	11.0	02/11	
				CLO4	4.2	12/03	ND	05/11	
ENC 2	1902035	MUNICIPAL	ACTIVE	TCE	29.1	02/01	3.0	04/11	VULNERABLE (VOCS) (1)
				PCE	6.1	02/01	1.5	04/11	
				NO3	21.0	02/09	11.0	02/11	
				CLO4	1.5	03/10	ND	05/11	
ENC 3	8000073	MUNICIPAL	ACTIVE	TCE	11.0	01/02	7.2	04/11	VULNERABLE (NO3) (1)
				PCE	4.7	01/02	2.6	04/11	
				NO3	43.2	07/93	16.0	02/11	
				CLO4	1.9	03/10	ND	05/11	
FAR 1	1902034	MUNICIPAL	ACTIVE	TCE	11.9	10/80	ND	03/11	VULNERABLE (VOCS)
				PCE	3.1	10/87	ND	03/11	
				NO3	13.0	07/89	ND	06/09	
				CLO4	ND	08/97	ND	06/09	
FAR 2	1902948	MUNICIPAL	ACTIVE	TCE	12.9	07/80	ND	08/10	VULNERABLE (VOCS)
				PCE	2.6	10/87	ND	08/10	
				NO3	12.2	07/90	4.1	08/10	
				CLO4	ND	08/97	ND	08/10	
GAR 1	1900513	MUNICIPAL	INACTIVE	CF	0.8	08/99	ND	07/03	VULNERABLE (VOCS)
				PCE	4.5	10/03	4.5	10/03	
				NO3	8.3	08/03	7.7	09/03	
				CLO4	ND	08/97	ND	08/03	
GAR 2	1900512	MUNICIPAL	INACTIVE	PCE	12.0	07/03	11.0	08/03	
				TCE	2.2	08/03	2.2	08/03	
				NO3	7.3	08/97	4.6	07/02	
				CLO4	ND	08/97	ND	08/03	
GID 1	1902032	MUNICIPAL	DESTROYED	TCE	6.6	04/85	4.1	09/93	
				PCE	0.9	09/93	0.9	09/93	
				NO3	40.6	09/93	40.6	09/93	
				CLO4	NA	NA	NA	NA	
GID 2	1902031	MUNICIPAL	DESTROYED	TCE	86.0	05/87	5.2	09/93	
				PCE	20.0	05/87	1.5	09/93	
				CTC	3.0	05/87	ND	09/93	
				NO3	45.8	09/93	45.8	09/93	
				CLO4	NA	NA	NA	NA	
GRA 1	1902030	MUNICIPAL	INACTIVE	TCE	33.0	09/88	25.4	11/94	VULNERABLE (NO3)
				PCE	2.5	11/93	0.6	11/94	
				NO3	86.8	08/89	44.4	07/95	
				CLO4	NA	NA	NA	NA	
GRA 2	1902461	MUNICIPAL	INACTIVE	TCE	31.3	08/89	24.6	08/94	VULNERABLE (NO3)
				PCE	3.3	09/94	3.3	09/94	
				1,1-DCE	4.8	08/94	4.8	08/94	
				NO3	82.1	07/90	44.2	07/95	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
JEF 1	1902017	MUNICIPAL	DESTROYED	TCE	340.0	01/80	98.0	01/85	
				PCE	23.0	03/81	8.0	01/85	
				1,1,1-TCA	31.0	01/85	31.0	01/85	
				MC	10.0	01/85	10.0	01/85	
				NO3	52.0	07/83	48.7	03/86	
				CLO4	NA	NA	NA	NA	
JEF 2	1902018	MUNICIPAL	DESTROYED	TCE	260.0	01/80	140.0	01/85	
				PCE	15.0	03/81	6.0	01/85	
				1,1-DCE	20.0	01/85	20.0	01/85	
				1,1,1-TCA	54.0	01/85	54.0	01/85	
				MC	6.0	01/85	6.0	01/85	
				NO3	68.0	06/77	61.0	06/79	
				CLO4	NA	NA	NA	NA	
JEF 3	1902019	MUNICIPAL	INACTIVE	TCE	121.0	02/81	4.9	08/92	VULNERABLE (VOCS AND NO3) (3)
				PCE	12.0	03/81	0.6	08/92	
				1,1,1-TCA	29.0	04/85	ND	08/92	
				T-1,2-DCE	2.4	04/85	ND	08/92	
				NO3	52.0	12/84	23.5	08/92	
				CLO4	NA	NA	NA	NA	
JEF 4	8000111	MUNICIPAL	ACTIVE	VOCS	ND	08/89	ND	08/10	
				NO3	14.7	07/89	4.5	08/10	
				CLO4	ND	08/97	ND	08/10	
PER 1	1902027	MUNICIPAL	ACTIVE	TCE	25.8	10/80	0.7	02/11	VULNERABLE (VOCS AND NO3) (3)
				PCE	6.8	07/87	ND	02/11	
				NO3	35.0	08/10	10.0	02/11	
				CLO4	ND	08/97	ND	08/10	
S G 1	1900510	MUNICIPAL	ACTIVE	PCE	46.0	04/06	13.0	03/11	VULNERABLE (NO3 AND CLO4) (1)
				TCE	6.8	12/03	0.6	03/11	
				C-1,2-DCE	1.8	11/04	ND	03/11	
				1,1-DCA	1.8	06/04	ND	03/11	
				1,1-DCE	0.7	11/04	ND	03/11	
				FREON 11	1.2	08/03	ND	03/11	
				NO3	27.0	04/02	19.0	03/11	
				CLO4	8.1	08/03	1.7	03/11	
S G 2	1900511	MUNICIPAL	INACTIVE	PCE	28.0	05/11	28.0	05/11	VULNERABLE (NO3 AND CLO4) (1)
				TCE	3.6	06/99	1.0	05/11	
				1,1-DCE	0.7	04/11	0.7	05/11	
				C-1,2-DCE	1.2	02/01	ND	05/11	
				NO3	53.1	10/05	33.0	05/11	
				CLO4	7.0	02/03	1.9	05/11	
SAX 1	1900515	MUNICIPAL	DESTROYED	PCE	1.4	04/97	0.9	12/97	
				MC	2.2	04/89	ND	08/97	
				NO3	33.1	10/97	33.1	10/97	
				CLO4	ND	08/97	ND	12/97	
SAX 3	1900514	MUNICIPAL	ACTIVE	VOCS	ND	04/89	ND	08/10	VULNERABLE (NO3)
				NO3	27.3	11/96	2.4	08/10	
				CLO4	ND	08/97	ND	08/10	
SAX 4	8000146	MINICIPAL	ACTIVE	VOCS	ND	03/92	ND	08/10	
				NO3	11.9	08/99	2.6	08/10	
				CLO4	ND	08/97	ND	08/10	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
GOLDEN STATE WATER COMPANY/SAN DIMAS DISTRICT									
ART-1	1902151	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	60.0	10/74	60.0	10/74	
				CLO4	NA	NA	NA	NA	
ART-2	1902152	MUNICIPAL	DESTROYED	VOCS	ND	06/89	ND	05/07	
				NO3	26.2	08/07	9.4	09/07	
				CLO4	ND	08/97	ND	09/07	
ART-3	1902842	MUNICIPAL	ACTIVE	VOCS	ND	05/89	ND	05/09	VULNERABLE (NO3 AND CLO4) (4)
				NO3	60.0	01/73	21.0	05/11	
				CLO4	4.7	02/09	1.7	05/11	
BAS-3	1902148	MUNICIPAL	ACTIVE	VOCS	ND	06/89	ND	05/09	VULNERABLE (NO3 AND CLO4) (4)
				NO3	67.0	01/03	25.0	05/11	
				CLO4	17.0	03/03	2.8	05/11	
BAS-4	1902149	MUNICIPAL	ACTIVE	VOCS	ND	03/85	ND	05/09	(4)
				NO3	106.0	05/76	65.0	05/11	
				CLO4	20.0	01/02	11.0	05/11	
CITY	1902286	MUNICIPAL	INACTIVE	VOCS	ND	06/88	ND	05/08	VULNERABLE (NO3)
				NO3	44.7	09/93	31.0	11/08	
				CLO4	ND	08/97	ND	08/08	
COL-1	1902266	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	93.0	09/75	10.0	10/76	
				CLO4	NA	NA	NA	NA	
COL-2	1902267	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	117.5	10/76	117.5	10/76	
				CLO4	NA	NA	NA	NA	
COL-4	1902268	MUNICIPAL	ACTIVE	CF	7.5	09/97	ND	08/10	VULNERABLE (NO3)
				NO3	64.0	03/83	33.0	04/11	
				CLO4	2.9	04/11	2.3	05/11	
COL-5	1902269	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
COL-6	1902270	MUNICIPAL	ACTIVE	PCE	7.2	07/85	ND	02/11	VULNERABLE (VOCS AND NO3)
				CF	0.6	09/97	ND	08/10	
				NO3	56.0	06/85	36.0	02/11	
				CLO4	ND	09/97	ND	08/10	
COL-7	1902271	MUNICIPAL	DESTROYED	PCE	22.0	12/87	3.1	11/99	
				TCE	9.9	01/80	ND	09/99	
				1,1-DCE	1.1	03/85	ND	09/99	
				1,1,1-TCA	1.7	07/85	ND	09/99	
				NO3	118.0	05/79	68.1	01/00	
				CLO4	4.2	01/02	4.2	01/02	
COL-8	1902272	MUNICIPAL	INACTIVE	PCE	0.2	09/80	ND	12/96	
				NO3	120.0	06/83	50.8	12/96	
				CLO4	NA	NA	NA	NA	
HIGHWAY	1902150	MUNICIPAL	ACTIVE	TCE	0.6	12/80	ND	05/09	VULNERABLE (NO3 AND CLO4) (4)
				PCE	0.1	12/80	ND	05/09	
				NO3	42.5	10/03	14.0	05/11	
				CLO4	8.0	10/03	ND	05/11	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
L HILL 2	1902154	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MALON	1902287	MUNICIPAL	ACTIVE	CF	1.7	08/96	ND	05/09	VULNERABLE (NO3)
				NO3	42.0	09/87	16.0	05/11	
				CLO4	ND	08/97	ND	08/10	
GREEN, WALTER									
NA	8000027	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
NA	8000028	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
HALL (W.E.) COMPANY									
NA	1902496	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
HANSEN, ALICE									
2946C	8000029	IRRIGATION	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
HANSON AGGREGATES WEST, INC.									
DUA 1	1900961	INDUSTRIAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
EL 1	1901492	INDUSTRIAL	ACTIVE	VOCS	ND	05/98	ND	09/02	
				NO3	17.0	02/93	2.2	09/02	
				CLO4	ND	03/98	ND	03/98	
EL 3	1901493	INDUSTRIAL	ACTIVE	VOCS	ND	06/98	ND	09/02	
				NO3	22.0	05/93	2.8	09/02	
				CLO4	ND	03/98	ND	03/98	
EL 4	1903006	INDUSTRIAL	ACTIVE	VOCS	ND	12/87	ND	09/02	
				NO3	6.3	06/98	ND	09/02	
				CLO4	NA	NA	NA	NA	
KIN 1	1900963	INDUSTRIAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
HARTLEY, DAVID									
NA	8000085	DOMESTIC	ACTIVE	VOCS	ND	10/95	ND	10/95	
				NO3	111.0	01/96	75.0	04/96	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
HEMLOCK MUTUAL WATER COMPANY									
NORTH	1901178	MUNICIPAL	ACTIVE	PCE	51.7	04/82	ND	09/10	VULNERABLE (VOCS) (1)
				TCE	0.7	12/87	ND	09/10	
				NO3	18.9	12/06	2.2	12/10	
				CLO4	ND	09/97	ND	09/10	
SOUTH	1902806	MUNICIPAL	ACTIVE	PCE	210.0	12/87	ND	03/11	VULNERABLE (VOCS AND NO3) (1)
				TCE	0.9	04/89	ND	06/09	
				NO3	32.7	12/94	7.2	03/11	
				CLO4	ND	09/97	ND	09/10	
INDUSTRY WATERWORKS SYSTEM, CITY OF									
01	1902581	MUNICIPAL	INACTIVE	TCE	40.0	01/80	1.7	10/92	
				PCE	9.0	04/80	5.0	10/92	
				CTC	5.7	10/92	5.7	10/92	
				1,1-DCE	15.3	10/92	15.3	10/92	
				1,2-DCA	0.6	10/92	0.6	10/92	
				NO3	60.2	10/92	60.2	10/92	
				CLO4	NA	NA	NA	NA	
02	1902582	MUNICIPAL	INACTIVE	TCE	19.0	01/80	2.3	04/81	
				PCE	10.0	04/81	10.0	04/81	
				NO3	55.5	02/86	55.5	02/86	
				CLO4	100.0	04/99	100.0	04/99	
03	8000078	MUNICIPAL	STANDBY	PCE	2.6	09/80	1.6	07/06	VULNERABLE (NO3, AND CLO4)
				TCE	12.0	07/06	12.0	07/06	
				CTC	0.5	07/06	0.5	07/06	
				1,2-DCA	0.5	07/06	0.5	07/06	
				BDCM	0.6	07/03	ND	07/06	
				BF	0.5	07/03	ND	07/06	
				CF	0.9	09/02	0.6	07/06	
				NO3	31.1	08/00	ND	07/06	
				CLO4	120.0	04/99	ND	07/06	
04	8000096	MUNICIPAL	STANDBY	PCE	2.4	08/01	0.5	07/06	VULNERABLE (VOCS AND NO3)
				TCE	8.0	11/01	1.7	07/06	
				1,1-DCE	0.9	09/02	0.6	07/06	
				1,2-DCA	1.0	11/01	ND	07/06	
				CTC	0.7	11/01	ND	07/05	
				MC	0.9	06/89	ND	07/05	
				NO3	42.0	06/02	33.0	04/07	
				CLO4	14.8	06/01	6.5	01/06	
05	8000097	MUNICIPAL	ACTIVE	PCE	3.3	04/11	3.0	05/11	VULNERABLE (VOCS, NO3, AND CLO4) (1,4)
				TCE	6.8	04/96	2.0	05/11	
				1,2-DCA	0.7	09/02	ND	05/11	
				1,1-DCE	0.6	12/10	ND	05/11	
				CF	0.6	01/07	ND	05/11	
				NO3	28.0	08/08	27.0	05/11	
				CLO4	11.0	04/04	4.5	05/11	
05TH AVE	1902583	MUNICIPAL	DESTROYED	TCE	0.3	12/80	0.3	12/80	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
KNIGHT, KATHRYN M.									
NA	1901688	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
LANDEROS, JOHN									
NA	8000031	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LA PUENTE VALLEY COUNTY WATER DISTRICT									
01	1901459	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
02	1901460	MUNICIPAL	ACTIVE	TCE	110.0	12/09	110.0	06/11	VULNERABLE (NO3) (1,4)
				PCE	6.6	03/00	5.0	06/11	
				CTC	8.5	12/02	5.7	06/11	
				1,1-DCA	2.1	11/03	0.7	06/11	
				1,2-DCA	6.1	03/00	4.0	06/11	
				1,1-DCE	1.6	12/00	0.5	06/11	
				C-1,2-DCE	1.9	04/10	1.9	06/11	
				CF	2.8	04/10	2.6	06/11	
				NO3	32.0	02/09	25.0	06/11	
				CLO4	183.0	02/98	81.0	06/11	
03	1902859	MUNICIPAL	ACTIVE	TCE	72.0	03/11	3.3	06/11	VULNERABLE (VOCs AND NO3) (1,4)
				PCE	6.3	04/85	0.9	06/11	
				CTC	8.5	11/04	ND	06/11	
				1,1-DCE	0.9	10/95	ND	06/11	
				1,2-DCA	6.7	02/99	ND	06/11	
				C-1,2-DCE	1.4	01/97	ND	06/11	
				1,1-DCA	0.5	09/01	ND	06/11	
				CF	1.9	03/11	ND	06/11	
				NO3	95.0	01/80	37.0	06/11	
				CLO4	174.0	02/98	11.0	06/11	
04	8000062	MUNICIPAL	STANDBY	TCE	84.3	03/00	46.0	04/04	VULNERABLE (NO3) (1,4)
				PCE	6.6	03/00	2.9	04/04	
				CTC	7.6	04/95	1.9	04/04	
				1,1-DCA	0.7	04/04	0.7	04/04	
				1,2-DCA	8.1	03/00	4.4	04/04	
				1,1-DCE	1.3	04/97	0.5	04/04	
				C-1,2-DCE	15.6	11/98	1.7	04/04	
				CF	2.3	04/04	2.3	04/04	
				NO3	24.9	04/95	18.1	04/04	
				CLO4	159.0	06/97	71.2	04/04	
05	8000209	MUNICIPAL	ACTIVE	TCE	43.0	03/08	24.0	06/11	VULNERABLE (NO3) (1,4)
				PCE	3.8	03/08	2.3	06/11	
				CTC	2.3	03/08	1.1	06/11	
				1,1-DCA	0.5	03/08	ND	06/11	
				1,2-DCA	2.7	03/08	1.0	06/11	
				1,1-DCE	0.5	03/08	ND	06/11	
				C-1,2-DCE	0.8	11/08	0.7	06/11	
				CF	1.7	03/08	ND	06/11	
				NO3	31.0	10/09	30.0	06/11	
				CLO4	65.0	03/08	26.0	06/11	
LA VERNE, CITY OF									
SNIDO	1902322	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

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WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L) CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	REMARKS
W15-L	1902769	MUNICUPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
W24-L	1901197	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LEE, PAUL									
01	8000018	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
02	8000019	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
03	8000020	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
04	8000021	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LOS ANGELES, COUNTY OF									
02	1902580	NON POTABLE	DESTROYED	PCE	6.6	09/04	6.6	09/04	
				TCE	1.3	09/04	1.3	09/04	
				1,2-DCA	0.5	01/96	ND	09/04	
				NO3	10.7	09/04	10.7	09/04	
				CLO4	ND	08/97	ND	08/97	
03	1902663	IRRIGATION	DESTROYED	PCE	2.1	06/94	2.1	06/94	
				TCE	0.7	06/94	0.7	06/94	
				NO3	4.8	06/94	4.8	06/94	
				CLO4	NA	NA	NA	NA	
03A	8000150	IRRIGATION	DESTROYED	PCE	2.5	11/99	ND	10/08	
				NO3	2.1	08/96	ND	10/08	
				CLO4	ND	08/97	ND	08/97	
04	1902664	IRRIGATION	DESTROYED	1,1,1-TCA	0.7	05/87	ND	11/87	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
05	1902665	IRRIGATION	DESTROYED	PCE	39.0	09/03	35.7	10/08	
				TCE	1.3	09/03	ND	10/08	
				NO3	18.0	09/03	14.0	10/08	
				CLO4	ND	08/97	ND	08/97	
06	1902666	IRRIGATION	DESTROYED	PCE	7.4	08/96	2.8	11/99	VULNERABLE (VOCS)
				TCE	8.3	08/96	2.9	11/99	
				1,1-DCA	2.0	08/96	ND	11/99	
				1,1-DCE	1.4	08/96	ND	11/99	
				C-1,2-DCE	4.5	08/96	0.8	11/99	
				NO3	11.6	08/96	8.4	11/99	
				CLO4	NA	NA	NA	NA	
600	8000090	IRRIGATION	INACTIVE	VOCS	ND	07/98	ND	07/98	
				NO3	4.8	07/98	4.8	07/98	
				CLO4	ND	07/98	ND	07/98	

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
BIG RED	8000088	NON POTABLE	INACTIVE	1,2-DCA	0.6	01/96	ND	10/09	VULNERABLE (VOCS)
				NO3	12.0	09/02	ND	10/09	
				CLO4	ND	08/97	ND	08/97	
NEW LAKE	8000089	NON POTABLE	INACTIVE	PCE	19.7	02/00	ND	11/10	VULNERABLE (VOCS)
				TCE	0.9	02/00	ND	11/10	
				CF	2.6	11/10	2.6	11/10	
				NO3	22.0	02/00	18.0	11/10	
				CLO4	ND	08/97	ND	08/97	
SF 1	8000070	NON POTABLE	ACTIVE	TCE	4.3	09/04	ND	10/10	VULNERABLE (VOCS)
				PCE	7.6	09/04	ND	10/10	
				VC	1.4	12/87	ND	10/10	
				NO3	16.0	09/02	6.3	10/10	
				CLO4	ND	06/97	ND	05/10	
WHI 1	1902579	NON POTABLE	INACTIVE	PCE	3.8	09/04	1.4	11/10	VULNERABLE (VOCS)
				TCE	1.0	09/04	ND	11/10	
				NO3	7.7	10/09	5.1	11/10	
				CLO4	ND	08/97	ND	08/97	
LOS FLORES MUTUAL WATER COMPANY									
HI 1	21902098	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LO 1	11902098	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
LOUCKS, DAVID									
NA	8000032	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MAECHTLEN ESTATE									
M-N	1902323	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
OLD60	1902321	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
SNIDO	1902322	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MANNING BROTHERS ROCK AND SAND COMPANY									
36230	1900117	INDUSTRIAL	DESTROYED	TCE	520.0	12/79	100.0	01/80	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MAPLE WATER COMPANY									
01	8000109	MUNICIPAL	DESTROYED	VOCS	ND	06/89	ND	07/96	
				NO3	68.0	09/94	55.5	07/96	
				CLO4	NA	NA	NA	NA	

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L) CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	REMARKS
02	1900042	MUNICIPAL	DESTROYED	VOCS	ND	06/89	ND	07/96	
				NO3	62.7	11/89	55.3	07/96	
				CLO4	NA	NA	NA	NA	
MARTINEZ, FRANCES M.									
NA	8000033	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA									
02	1900693	NON-POTABLE	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
03	1900694	NON-POTABLE	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MILLER COORS LLC (MILLER BREWING COMPANY)									
01	8000075	INDUSTRIAL	ACTIVE	VOCS	ND	01/92	ND	10/09	
				NO3	9.8	01/93	4.3	10/09	
				CLO4	ND	06/97	ND	06/08	
02	8000076	INDUSTRIAL	INACTIVE	VOCS	ND	01/92	ND	11/10	
				NO3	14.0	10/92	3.0	11/10	
				CLO4	ND	06/97	ND	05/08	
N BREWER	8000034	INDUSTRIAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MONROVIA, CITY OF									
01	1900417	MUNICIPAL	DESTROYED	TCE	46.8	11/92	12.0	04/02	
				PCE	3.9	03/81	0.8	04/02	
				1,1-DCE	1.2	08/96	0.9	04/02	
				1,1,1-TCA	2.1	08/87	ND	07/01	
				CF	3.2	07/01	3.2	07/01	
				NO3	78.0	02/01	60.0	03/02	
				CLO4	11.1	02/01	8.4	04/02	
02	1900418	MUNICIPAL	ACTIVE	TCE	167.0	08/82	2.9	04/11	VULNERABLE
				PCE	11.0	08/82	0.5	04/11	(VOCS, NO3 AND CLO4) (1)
				1,1,1-TCA	7.1	02/87	ND	07/10	
				1,1-DCE	3.4	06/87	ND	04/11	
				1,2-DCA	1.5	02/87	ND	07/10	
				CF	2.2	07/07	ND	07/10	
				NO3	65.6	12/91	15.0	04/11	
				CLO4	6.0	01/05	ND	04/11	
03	1900419	MUNICIPAL	ACTIVE	TCE	18.0	08/82	ND	04/11	VULNERABLE
				PCE	17.0	08/82	ND	04/11	(VOCS AND NO3) (1)
				1,1-DCE	0.8	12/08	ND	04/11	
				CF	1.8	07/08	ND	07/10	
				NO3	49.6	05/76	7.2	04/11	
				CLO4	ND	08/97	ND	07/10	

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
04	1900420	MUNICIPAL	ACTIVE	TCE	6.5	02/91	ND	04/11	VULNERABLE (VOCS AND NO3) (1)
				PCE	1.0	02/91	ND	04/11	
				1,1-DCE	1.1	01/05	ND	04/11	
				MC	2.5	05/89	ND	07/10	
				CF	0.7	07/02	ND	07/10	
				NO3	28.8	06/91	2.9	04/11	
				CLO4	ND	08/97	ND	07/10	
05	1940104	MUNICIPAL	ACTIVE	TCE	5.1	01/91	ND	04/11	VULNERABLE (VOCS AND NO3) (1)
				PCE	1.0	10/02	ND	04/11	
				1,1-DCE	1.0	10/02	ND	04/11	
				MC	4.9	05/89	ND	07/10	
				CF	1.2	07/02	ND	07/10	
				NO3	29.4	01/91	3.0	04/11	
				CLO4	ND	08/97	ND	07/10	
06	8000171	MUNICIPAL	ACTIVE	TCE	10.0	10/09	ND	04/11	VULNERABLE (VOC AND NO3) (1)
				PCE	2.3	01/10	1.0	04/11	
				1,1-DCE	0.8	10/07	ND	04/11	
				CF	1.0	08/04	ND	07/10	
				NO3	37.4	10/04	14.0	04/11	
				CLO4	ND	10/99	ND	07/10	
MONROVIA NURSERY									
DIV 4	1902456	IRRIGATION	DESTROYED	VOCS	ND	08/96	ND	02/07	
				NO3	213.0	09/04	202.0	02/07	
				CLO4	ND	02/98	ND	02/98	
DIV 8	1902455	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MONTEREY PARK, CITY OF									
01	1900453	MUNICIPAL	STANDBY	PCE	64.1	12/08	33.0	02/10	VULNERABLE (CLO4) (1)
				TCE	4.1	05/04	ND	02/10	
				1,1-DCE	0.6	05/04	ND	02/10	
				1,1-DCA	1.0	05/04	ND	02/10	
				C-1,2-DCE	1.0	03/04	ND	02/10	
				NO3	17.0	03/09	17.0	02/10	
				CLO4	4.7	05/04	ND	08/09	
02	1900454	MUNICIPAL	DESTROYED	PCE	6.4	04/98	6.4	04/98	
				NO3	18.3	07/95	13.0	07/97	
				CLO4	3.0	07/97	ND	03/98	
03	1900455	MUNICIPAL	STANDBY	PCE	21.0	05/04	17.0	02/11	VULNERABLE (CLO4) (1)
				TCE	2.7	05/04	1.0	02/11	
				C-1,2-DCE	0.8	05/04	ND	02/11	
				NO3	13.3	07/97	5.4	02/11	
				CLO4	4.2	05/04	ND	08/10	
04	1900456	MUNICIPAL	DESTROYED	PCE	0.4	01/80	ND	11/87	
				NO3	6.2	09/87	6.2	09/87	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
05	1900457	MUNICIPAL	ACTIVE	PCE	35.8	08/08	24.0	02/11	VULNERABLE (NO3 AND CLO4) (3)
				TCE	7.0	01/92	3.3	02/11	
				C-1,2-DCE	2.0	11/01	1.1	02/11	
				1,1-DCA	1.1	11/01	0.6	02/11	
				1,1-DCE	0.7	11/01	ND	02/11	
				NO3	23.0	02/10	19.0	02/11	
				CLO4	6.5	02/01	ND	02/11	
06	1900458	MUNICIPAL	STANDBY	PCE	13.6	03/01	3.1	05/05	VULNERABLE (VOCS, NO3, AND CLO4) (3)
				TCE	6.4	05/89	3.1	05/05	
				C-1,2-DCE	1.3	01/99	1.2	05/05	
				1,1-DCA	0.8	11/01	0.6	05/05	
				NO3	30.0	06/03	24.7	05/05	
				CLO4	5.9	04/02	5.9	04/02	
07	1902372	MUNICIPAL	ACTIVE	PCE	6.0	09/10	6.0	09/10	
				CF	3.6	07/98	ND	08/10	
				NO3	12.8	08/89	2.7	08/10	
				CLO4	ND	08/97	ND	08/10	
08	1902373	MUNICIPAL	INACTIVE	PCE	2.5	02/05	1.9	03/09	
				NO3	17.0	08/05	ND	11/08	
				CLO4	ND	08/97	ND	11/08	
09	1902690	MUNICIPAL	ACTIVE	PCE	11.0	03/04	7.6	11/10	(1,4)
				TCE	1.3	04/97	ND	11/10	
				NO3	6.8	08/01	2.4	11/10	
				CLO4	ND	08/97	ND	11/10	
10	1902818	MUNICIPAL	ACTIVE	PCE	16.0	02/10	11.0	02/11	VULNERABLE (NO3 AND CLO4) (1)
				TCE	2.6	05/04	0.6	02/11	
				C-1,2-DCE	0.8	05/04	ND	02/11	
				NO3	27.1	08/07	16.0	02/11	
				CLO4	4.3	05/04	ND	08/10	
12	1903033	MUNICIPAL	ACTIVE	PCE	85.0	05/02	33.0	11/10	VULNERABLE (NO3 AND CLO4) (1,4)
				TCE	5.4	10/95	2.9	11/10	
				1,1-DCA	1.0	11/08	0.8	11/10	
				C-1,2-DCE	1.1	08/05	1.1	11/10	
				NO3	27.2	08/07	14.0	11/10	
				CLO4	15.0	09/97	ND	11/10	
14	1903092	MUNICIPAL	INACTIVE	PCE	2.2	05/02	0.7	05/06	VULNERABLE (VOCS)
				TCE	2.9	11/02	1.5	05/06	
				1,1-DCA	0.8	08/02	ND	05/06	
				C-1,2-DCE	1.0	11/02	ND	05/06	
				NO3	10.0	10/06	10.0	10/06	
				CLO4	ND	08/97	ND	05/03	
15	8000196	MUNICIPAL	ACTIVE	PCE	128.0	11/08	86.0	08/10	VULNERABLE (NO3) (1,4)
				TCE	3.4	07/06	2.7	08/10	
				NO3	23.0	11/08	17.0	08/10	
				CLO4	2.4	07/06	ND	08/10	
FERN	8000126	MUNICIPAL	ACTIVE	PCE	12.0	08/10	8.8	02/11	(1)
				TCE	2.3	08/02	0.8	02/11	
				C-1,2-DCE	0.7	03/04	ND	02/11	
				NO3	6.5	03/04	2.3	08/10	
				CLO4	2.0	08/97	ND	02/11	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
NAMIMATSU FARMS									
NA	1901034	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
OWL ROCK PRODUCTS COMPANY									
NA	1903119	INDUSTRIAL	INACTIVE	VOCS	ND	05/87	ND	10/09	
				NO3	8.7	08/89	ND	10/09	
				CLO4	NA	NA	NA	NA	
NA	1900043	INDUSTRIAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
NA	1902241	INDUSTRIAL	ACTIVE	VOCS	ND	10/02	ND	11/04	
				NO3	ND	10/02	ND	11/04	
				CLO4	NA	NA	NA	NA	
PICO COUNTY WATER DISTRICT									
NA	8000040	MUNICIPAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
POLOPOLUS ET AL.									
01	1902169	IRRIGATION	INACTIVE	PCE	330.0	10/96	270.0	03/98	VULNERABLE (NO3)
				TCE	498.9	09/92	180.0	03/98	
				1,1-DCA	22.0	03/98	22.0	03/98	
				1,2-DCA	1.2	06/96	0.9	03/98	
				1,1-DCE	115.3	09/92	22.0	03/98	
				T-1,2-DCE	1.5	06/87	ND	03/98	
				1,1,1-TCA	53.0	09/92	12.0	03/98	
				CTC	0.8	06/96	0.6	03/98	
				NO3	50.8	07/91	29.7	03/98	
				CLO4	ND	03/98	ND	03/98	
RICHWOOD MUTUAL WATER COMPANY									
NORTH 2	1901522	MUNICIPAL	DESTROYED	PCE	93.0	05/83	4.0	12/93	
				TCE	3.0	03/81	ND	05/92	
				CTC	0.2	10/80	ND	05/92	
				NO3	25.0	02/84	19.7	06/99	
				CLO4	NA	NA	NA	NA	
SOUTH 1	1901521	MUNICIPAL	DESTROYED	PCE	96.0	05/83	3.4	12/93	
				TCE	0.7	12/82	ND	05/92	
				NO3	28.6	06/99	28.6	06/99	
				CLO4	NA	NA	NA	NA	
ROY, RUTH									
NA	8000041	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
RURBAN HOMES MUTUAL WATER COMPANY									
NORTH 1	1900120	MUNICIPAL	ACTIVE	PCE	16.0	11/80	ND	03/11	VULNERABLE (VOCS AND NO3)
				1,1-DCE	0.9	09/08	ND	03/11	
				CF	0.8	02/02	ND	09/10	
				FREON 11	13.3	05/04	ND	03/11	
				FREON 113	64.4	05/04	ND	03/11	
				NO3	30.0	03/01	22.0	09/10	
				CLO4	ND	09/97	ND	09/10	
SOUTH 2	1900121	MUNICIPAL	ACTIVE	PCE	24.3	02/81	ND	12/10	VULNERABLE (VOCS AND NO3)
				1,1-DCE	1.7	10/08	ND	12/10	
				CF	3.8	02/02	ND	09/09	
				FREON 11	14.1	05/04	ND	12/10	
				FREON 113	54.2	05/04	ND	12/10	
				MC	1.1	08/02	ND	09/09	
				NO3	38.2	03/07	17.0	12/09	
				CLO4	ND	09/97	ND	09/09	
SAN GABRIEL COUNTRY CLUB									
01	1900547	IRRIGATION	ACTIVE	VOCS	ND	05/85	ND	08/05	VULNERABLE (CLO4)
				NO3	67.0	07/96	54.0	08/05	
				CLO4	8.5	07/97	5.4	08/05	
02	1902979	IRRIGATION	ACTIVE	VOCS	ND	05/87	ND	08/05	VULNERABLE (NO3)
				NO3	23.0	10/02	20.3	08/05	
				CLO4	1.4	12/97	1.1	08/05	
SAN GABRIEL COUNTY WATER DISTRICT									
05 BRA	1901669	MUNICIPAL	INACTIVE	TCE	0.9	01/97	ND	03/01	
				PCE	1.9	02/99	1.0	03/01	
				NO3	83.9	08/89	70.7	03/01	
				CLO4	ND	09/97	ND	09/00	
06 BRA	1901670	MUNICIPAL	DESTROYED	VOCS	ND	02/99	ND	02/99	
				NO3	108.9	08/72	57.6	03/00	
				CLO4	3.0	02/99	3.0	02/99	
07	1901671	MUNICIPAL	ACTIVE	VOCS	ND	09/89	ND	10/10	VULNERABLE (NO3 AND CLO4)
				NO3	48.0	03/03	26.0	04/11	
				CLO4	5.6	03/03	ND	04/11	
08	1901672	MUNICIPAL	INACTIVE	VOCS	ND	01/90	ND	03/91	VULNERABLE (NO3)
				NO3	76.0	01/82	23.4	08/93	
				CLO4	NA	NA	NA	NA	
09	1902785	MUNICIPAL	ACTIVE	PCE	2.0	01/09	1.4	04/11	VULNERABLE (NO3)
				NO3	51.0	03/03	19.0	04/11	
				CLO4	ND	09/97	ND	07/10	
10	1902786	MUNICIPAL	INACTIVE	PCE	18.0	08/93	1.9	11/98	VULNERABLE (VOCS, NO3, AND CLO4)
				NO3	50.0	05/89	31.0	11/98	
				CLO4	5.5	11/98	5.5	11/98	
11	8000067	MUNICIPAL	ACTIVE	PCE	2.0	06/89	1.2	04/11	VULNERABLE (NO3)
				NO3	32.2	04/04	17.0	04/11	
				CLO4	ND	09/97	ND	07/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
12	8000123	MUNICIPAL	ACTIVE	TCE	0.8	09/02	ND	07/10	
				PCE	0.6	10/10	ND	04/11	
				MC	0.6	05/90	ND	07/10	
				NO3	7.0	10/01	3.9	01/11	
				CLO4	ND	09/97	ND	07/10	
14	8000133	MUNICIPAL	ACTIVE	PCE	0.6	09/02	ND	07/10	
				NO3	3.8	12/02	3.0	07/10	
				CLO4	ND	09/97	ND	07/10	
SAN GABRIEL VALLEY WATER COMPANY									
B4B	1902858	MUNICIPAL	INACTIVE	TCE	25.2	02/08	25.2	02/08	(1)
				PCE	43.0	11/07	5.8	02/08	
				CTC	10.0	11/03	6.6	02/08	
				1,2-DCA	1.0	09/07	0.5	02/08	
				1,1-DCE	3.2	11/07	2.3	02/08	
				C-1,2-DCE	4.2	11/07	2.7	02/08	
				NO3	13.1	11/07	13.1	11/07	
				CLO4	24.5	04/08	24.5	04/08	
B4C	1902947	MUNICIPAL	INACTIVE	CTC	22.3	02/01	14.0	08/01	VULNERABLE (CLO4) (1)
				TCE	15.5	02/01	9.3	08/01	
				PCE	3.4	02/01	2.2	08/01	
				1,1-DCE	2.3	09/01	2.3	09/01	
				C-1,2-DCE	2.4	09/01	2.4	09/01	
				NO3	14.2	02/01	14.2	02/01	
				CLO4	6.0	06/00	ND	07/00	
B5A	1900718	MUNICIPAL	INACTIVE	PCE	17.5	03/91	ND	11/05	VULNERABLE (VOCS, NO3, AND CLO4)
				TCE	5.2	03/98	ND	11/05	
				1,1-DCE	2.5	03/85	ND	08/05	
				CTC	1.1	12/91	ND	11/05	
				1,1,1-TCA	3.7	03/90	ND	08/05	
				CF	1.4	08/01	1.1	08/05	
				NO3	46.1	07/96	25.3	11/05	
				CLO4	14.0	06/97	4.0	08/05	
B5B	1900719	MUNICIPAL	ACTIVE	TCE	5.8	02/97	3.0	04/11	VULNERABLE (VOCS) (1,4)
				PCE	3.9	02/09	1.8	04/11	
				CTC	2.3	02/85	0.2	04/11	
				1,2-DCA	0.6	09/07	0.3	04/11	
				CF	2.4	01/07	0.7	04/11	
				NO3	54.0	11/08	50.0	05/11	
				CLO4	12.0	06/97	7.8	05/11	
B5C	8000112	MUNICIPAL	INACTIVE	VOCS	ND	05/89	ND	08/07	
				NO3	3.8	05/07	3.8	05/07	
				CLO4	ND	06/97	ND	03/08	
B5D	8000160	MUNICIPAL	ACTIVE	CTC	0.7	05/09	0.4	04/11	VULNERABLE (VOCS) (1,4)
				NO3	4.9	08/08	3.1	04/11	
				CLO4	ND	12/97	ND	04/11	
B5E	8000205	MUNICIPAL	ACTIVE	TCE	8.5	11/10	7.9	04/11	VULNERABLE (NO3) (1,4)
				PCE	1.3	11/10	1.3	04/11	
				CTC	5.2	05/07	2.1	04/11	
				CF	3.9	01/07	0.4	04/11	
				NO3	23.0	08/07	17.0	04/11	
				CLO4	11.0	12/10	9.2	04/11	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	
B6B	1900721	MUNICIPAL	DESTROYED	TCE	111.0	02/85	35.8	09/92	
				PCE	6.4	10/81	4.3	09/92	
				CTC	17.0	02/85	5.0	09/92	
				1,1-DCE	1.1	04/85	0.5	09/92	
				1,1-DCA	0.6	09/92	0.6	09/92	
				1,2-DCA	8.3	09/92	8.3	09/92	
				NO3	85.4	02/91	57.2	09/92	
				CLO4	NA	NA	NA	NA	
B6C	1903093	MUNICIPAL	ACTIVE	TCE	84.0	03/88	4.6	03/10	(1,4)
				PCE	12.0	11/81	0.6	03/10	
				CTC	13.0	02/85	ND	03/10	
				1,2-DCA	9.0	05/88	0.6	03/10	
				1,1-DCE	1.5	06/94	ND	03/10	
				C-1,2-DCE	6.2	04/88	ND	03/10	
				CF	1.7	04/04	ND	03/10	
				NO3	87.0	09/08	81.0	02/09	
				CLO4	370.0	11/05	27.0	02/09	
B6D	8000098	MUNICIPAL	ACTIVE	TCE	140.0	05/11	140.0	05/11	(1,4)
				PCE	7.1	05/09	2.0	05/11	
				CTC	14.0	05/11	14.0	05/11	
				1,1-DCA	1.1	05/09	ND	05/11	
				1,2-DCA	3.7	05/11	3.7	05/11	
				1,1-DCE	1.0	08/08	ND	05/11	
				C-1,2-DCE	2.8	05/09	ND	05/11	
				CF	2.9	05/09	2.5	05/11	
				NO3	21.6	11/08	15.3	05/11	
				CLO4	390.0	11/05	69.0	05/11	
11A	1900739	MUNICIPAL	ACTIVE	PCE	1.5	02/08	ND	02/11	
				NO3	14.7	07/89	2.2	08/10	
				CLO4	ND	08/97	ND	08/10	
11B	1900745	MUNICIPAL	ACTIVE	PCE	17.8	04/90	ND	02/11	VULNERABLE (VOCS) (1)
				TCE	4.0	04/90	ND	02/11	
				1,1-DCE	0.2	04/89	ND	11/10	
				C-1,2-DCE	3.0	04/89	ND	11/10	
				NO3	18.3	08/06	6.4	11/10	
				CLO4	ND	06/97	ND	08/10	
11C	1902713	MUNICIPAL	ACTIVE	PCE	4.1	12/91	ND	02/11	VULNERABLE (VOCS)
				TCE	0.6	12/91	ND	08/10	
				1,1-DCE	1.1	08/08	ND	08/10	
				C-1,2-DCE	2.5	03/92	ND	02/11	
				NO3	12.0	08/06	5.0	08/10	
				CLO4	ND	08/97	ND	08/10	
1B	1900729	MUNICIPAL	ACTIVE	PCE	46.0	04/81	ND	02/11	VULNERABLE (VOCS)
				TCE	1.8	02/80	ND	08/10	
				MC	7.1	04/87	ND	08/10	
				FREON 113	22.3	08/08	ND	02/11	
				NO3	22.4	05/08	15.0	02/11	
				CLO4	1.1	03/08	ND	08/10	
1C	1902946	MUNICIPAL	ACTIVE	VOCS	ND	07/98	ND	08/10	
				NO3	6.9	08/09	4.7	08/10	
				CLO4	ND	10/99	ND	08/10	
1D	8000102	MUNICIPAL	ACTIVE	VOCS	ND	07/98	ND	08/10	
				NO3	5.0	07/89	4.1	11/10	
				CLO4	ND	08/97	ND	08/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
1E	8000172	MUNICIPAL	ACTIVE	PCE	0.7	09/02	ND	02/11	VULNERABLE (CLO4)
				NO3	4.3	11/00	4.1	11/10	
				CLO4	5.0	06/00	ND	08/10	
2C	1900749	MUNICIPAL	DESTROYED	TCE	15.2	12/80	ND	11/05	
				PCE	3.0	10/87	ND	11/05	
				NO3	16.4	08/04	5.2	08/05	
				CLO4	ND	08/97	ND	02/03	
2D	1902857	MUNICIPAL	ACTIVE	TCE	25.0	12/80	ND	02/11	VULNERABLE (VOCS)
				PCE	0.7	01/88	ND	08/10	
				NO3	8.2	07/86	4.8	08/10	
				CLO4	ND	08/97	ND	08/10	
2E	8000065	MUNICIPAL	ACTIVE	TCE	18.0	01/80	ND	02/11	VULNERABLE (VOCS)
				PCE	0.9	01/88	ND	02/11	
				NO3	13.0	08/09	11.0	08/10	
				CLO4	ND	08/97	ND	08/10	
2F	8000197	MUNICIPAL	ACTIVE	TCE	0.8	06/08	0.7	02/11	
				NO3	5.3	08/10	5.3	08/10	
				CLO4	ND	09/06	ND	08/10	
8A	1900736	MUNICIPAL	INACTIVE	PCE	0.6	11/87	ND	02/97	VULNERABLE (NO3) (5)
				NO3	40.2	02/97	40.2	02/97	
				CLO4	NA	NA	NA	NA	
8B	1900746	MUNICIPAL	ACTIVE	PCE	220.0	02/09	100.0	02/11	VULNERABLE (NO3) (5)
				TCE	1.1	11/10	1.1	02/11	
				NO3	23.0	08/08	21.0	08/10	
				CLO4	3.0	08/97	ND	08/10	
8C	1900747	MUNICIPAL	ACTIVE	PCE	170.0	05/09	57.0	02/11	VULNERABLE (CLO4) (5)
				TCE	0.8	05/09	ND	02/11	
				NO3	20.0	07/98	10.0	08/10	
				CLO4	4.0	03/08	ND	08/10	
8D	1903103	MUNICIPAL	ACTIVE	PCE	62.3	02/09	59.0	02/11	VULNERABLE (NO3) (5)
				TCE	0.6	08/04	ND	02/11	
				C-1,2 DCE	0.8	05/04	ND	06/09	
				CTC	0.6	06/88	ND	06/09	
				NO3	29.0	06/09	23.0	02/11	
				CLO4	2.3	03/08	ND	08/10	
8E	8000113	MUNICIPAL	ACTIVE	PCE	10.0	03/03	ND	02/11	VULNERABLE (VOCS) (5)
				NO3	7.2	07/01	ND	08/10	
				CLO4	ND	08/97	ND	08/10	
8F	8000169	MUNICIPAL	ACTIVE	VOCS	ND	10/98	ND	08/10	(5)
				NO3	19.0	11/10	19.0	11/10	
				CLO4	ND	01/99	ND	08/10	
B1	1902635	MUNICIPAL	INACTIVE	TCE	12.0	04/85	ND	08/06	VULNERABLE (VOCS)
				PCE	7.3	05/88	ND	08/06	
				C-1,2-DCE	7.2	12/92	ND	08/06	
				1,1-DCE	2.1	08/89	ND	08/06	
				NO3	17.4	02/87	3.5	03/05	
				CLO4	ND	08/97	ND	02/03	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
B2	1902525	MUNICIPAL	INACTIVE	TCE	17.0	03/80	ND	11/98	VULNERABLE (VOCS)
				PCE	15.8	06/80	0.7	11/98	
				CTC	1.7	05/82	ND	11/98	
				1,2-DCA	7.7	07/82	ND	11/98	
				1,1,1-TCA	7.6	07/82	ND	11/98	
				C-1,2-DCE	2.6	08/93	ND	11/98	
				NO3	8.7	11/98	8.7	11/98	
				CLO4	ND	11/98	ND	11/98	
B11A	1901439	MUNICIPAL	INACTIVE	TCE	9.8	08/01	5.8	08/04	VULNERABLE (NO3 AND CLO4)
				PCE	21.7	05/92	8.5	08/04	
				1,1-DCE	14.0	08/01	2.8	08/04	
				CTC	0.9	01/88	ND	08/04	
				C-1,2-DCE	1.5	08/01	0.6	09/04	
				1,1-DCA	1.0	08/01	ND	08/04	
				NO3	37.7	03/00	36.5	08/04	
				CLO4	8.0	12/97	ND	08/04	
B11B	8000108	MUNICIPAL	ACTIVE	TCE	20.0	02/97	5.3	02/11	VULNERABLE (NO3 AND CLO4) (1)
				PCE	34.5	06/92	6.7	02/11	
				1,1-DCE	36.0	12/10	10.0	02/11	
				1,1-DCA	2.6	12/88	0.6	02/11	
				1,1,1-TCA	2.9	10/88	ND	12/10	
				C-1,2-DCE	3.6	03/05	0.9	02/11	
				NO3	35.9	02/97	19.0	02/11	
				CLO4	7.0	06/00	ND	08/10	
B7B	1901440	MUNICIPAL	DESTROYED	TCE	2.4	03/85	2.4	03/85	
				PCE	1.4	03/85	1.2	03/85	
				NO3	12.4	08/87	12.4	08/87	
				CLO4	NA	NA	NA	NA	
B7C	8000068	MUNICIPAL	ACTIVE	TCE	15.0	11/10	2.1	02/11	VULNERABLE (NO3) (1)
				PCE	35.0	03/03	6.3	02/11	
				1,1-DCE	6.7	12/89	1.3	02/11	
				C-1,2-DCE	4.7	12/93	0.5	02/11	
				CTC	0.6	02/89	ND	08/10	
				NO3	28.4	08/92	12.0	08/10	
				CLO4	ND	06/97	ND	08/10	
B7D	8000094	MUNICIPAL	INACTIVE	PCE	5.3	07/87	3.5	09/87	VULNERABLE (VOCS)
				TCE	3.9	07/87	3.3	09/87	
				1,1-DCE	5.3	05/87	5.0	09/87	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
B7E	8000122	MUNICIPAL	ACTIVE	VOCS	ND	08/90	ND	08/10	
				NO3	16.0	11/08	2.9	05/09	
				CLO4	ND	06/97	ND	08/10	
B8	1901436	MUNICIPAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
B9	1901437	MUNICIPAL	INACTIVE	TCE	37.0	02/85	34.7	01/87	
				PCE	4.9	01/87	4.9	01/87	
				CTC	8.3	01/87	8.3	01/87	
				NO3	84.7	02/86	68.1	02/87	
				CLO4	NA	NA	NA	NA	
B9B	8000099	MUNICIPAL	ACTIVE	VOCS	ND	06/87	ND	08/10	
				NO3	4.5	06/87	3.5	08/10	
				CLO4	1.2	03/08	ND	08/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
G4A	1900725	MUNICIPAL	ACTIVE	PCE	6.6	08/08	2.7	02/11	VULNERABLE (VOCS AND NO3) (1)
				TCE	1.3	11/97	ND	02/11	
				NO3	24.9	02/08	20.0	02/11	
				CLO4	1.0	03/08	ND	08/10	
B24A	8000203	MUNICIPAL	ACTIVE	VOCS	ND	01/07	ND	02/11	
				NO3	2.5	02/11	2.5	02/11	
				CLO4	ND	01/07	ND	08/10	
B24B	8000204	MUNICIPAL	ACTIVE	PCE	2.1	05/07	ND	02/11	
				TCE	0.7	05/07	ND	02/11	
				NO3	13.0	02/11	13.0	02/11	
				CLO4	ND	01/07	ND	08/10	
B25A (SA3-1S)	8000187	MUNICIPAL	ACTIVE	TCE	60.3	02/08	43.0	04/11	(1,4)
				PCE	28.0	05/08	21.0	04/11	
				CTC	5.9	10/07	2.3	04/11	
				1,2-DCA	1.4	10/07	0.9	04/11	
				1,1-DCE	6.6	02/08	4.2	04/11	
				C-1,2-DCE	6.3	08/07	3.8	04/11	
				CF	1.7	10/07	1.3	04/11	
				NO3	78.0	05/09	56.0	04/11	
				CLO4	40.0	11/10	31.0	04/11	
B25B (SA3-1D)	8000188	MUNICIPAL	ACTIVE	TCE	21.0	03/09	14.0	04/11	VULNERABLE (NO3) (1,4)
				PCE	7.6	03/09	5.2	04/11	
				CTC	10.0	09/04	4.9	04/11	
				1,1-DCA	1.2	10/07	ND	04/11	
				1,1-DCE	2.6	03/09	1.6	04/11	
				C-1,2-DCE	2.4	04/10	1.5	04/11	
				NO3	27.0	05/09	8.8	04/11	
				CLO4	9.9	11/09	6.8	04/11	
B26A (SA3-2S)	8000189	MUNICIPAL	ACTIVE	TCE	57.0	05/09	48.0	05/11	(1,4)
				PCE	6.8	12/10	4.8	05/11	
				CTC	5.4	12/10	2.1	05/11	
				1,1-DCA	0.8	05/09	0.6	05/11	
				1,2-DCA	4.3	11/04	3.0	05/11	
				1,1-DCE	2.0	12/10	1.1	05/11	
				C-1,2-DCE	3.3	05/06	2.7	05/11	
				CF	3.1	07/06	2.5	05/11	
				NO3	61.0	11/09	53.0	05/11	
				CLO4	87.0	07/06	61.0	05/11	
B26B (SA3-2D)	8000190	MUNICIPAL	ACTIVE	TCE	39.0	11/10	42.0	05/11	(1,4)
				PCE	1.4	12/10	1.3	05/11	
				CTC	16.6	02/09	11.0	05/11	
				1,2-DCA	1.4	03/11	1.4	05/11	
				CF	1.4	03/11	1.0	05/11	
				NO3	14.0	12/10	13.0	05/11	
				CLO4	40.0	12/10	34.0	05/11	
SIERRA LA VERNE COUNTRY CLUB									
01	8000124	IRRIGATION	ACTIVE	VOCS	ND	08/96	ND	10/07	
				NO3	10.5	05/99	ND	10/07	
				CLO4	ND	03/98	ND	03/98	
02	8000125	IRRIGATION	INACTIVE	MC	0.5	10/08	ND	10/10	VULNERABLE (CLO4)
				NO3	17.4	08/96	ND	10/10	
				CLO4	28.0	03/98	ND	04/98	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L) CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	REMARKS
SLOAN RANCHES									
01	1901198	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
02	8000045	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
SONOCO PRODUCTS COMPANY									
01	1912786	INDUSTRIAL	ACTIVE	TCE	28.6	12/99	0.6	12/05	VULNERABLE (VOCS)
				PCE	8.5	12/99	ND	12/05	
				1,1-DCE	113.0	12/99	1.0	12/05	
				1,1,1-TCA	71.8	12/99	ND	12/05	
				CTC	1.2	07/96	ND	12/05	
				CF	1.4	07/04	0.6	12/05	
				NO3	72.8	12/05	72.8	12/05	
				CLO4	ND	06/98	ND	07/04	
02	1902971	INDUSTRIAL	ACTIVE	CTC	0.9	11/87	ND	12/05	VULNERABLE (VOCS AND CLO4)
				1,1,1-TCA	2.0	11/87	ND	12/05	
				1,1-DCE	5.9	02/98	1.0	12/05	
				PCE	1.8	10/03	0.6	12/05	
				TCE	16.0	10/03	1.0	12/05	
				CF	1.4	09/02	1.2	12/05	
				NO3	74.5	12/05	74.5	12/05	
				CLO4	10.0	02/98	ND	07/04	
SOUTH COVINA WATER SERVICE									
102W-1	1901606	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
SOUTHERN CALIFORNIA EDISON COMPANY									
110RH	8000046	NON-POTABLE	INACTIVE	VOCS	ND	08/89	ND	02/07	
				NO3	8.9	02/07	8.9	02/07	
				CLO4	ND	11/97	ND	11/97	
1EB86	1900342	NON-POTABLE	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
2EB76	1900343	IRRIGATION	INACTIVE	PCE	4.3	09/04	4.1	02/07	VULNERABLE (VOCS AND NO3)
				TCE	1.3	09/04	0.7	02/07	
				NO3	51.4	09/98	26.5	02/07	
				CLO4	2.0	11/97	2.0	11/97	
38EIS	1900344	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
38W	1900344	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
MURAT	8000047	IRRIGATION	INACTIVE	PCE	4.1	09/02	0.6	10/08	VULNERABLE (VOCS AND NO3)
				TCE	0.9	09/02	ND	10/08	
				NO3	26.9	09/04	14.0	10/08	
				CLO4	ND	04/98	ND	04/98	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
SOUTH PASADENA, CITY OF									
GRAV 2	1901679	MUNICIPAL	ACTIVE	PCE	16.0	07/08	5.2	02/11	VULNERABLE (CLO4)
				CTC	0.9	07/08	ND	02/11	
				NO3	58.2	04/87	49.0	02/11	
				CLO4	6.9	02/03	4.1	02/11	
WIL 2	1901681	MUNICIPAL	INACTIVE	PCE	23.0	01/88	9.1	03/01	VULNERABLE (CLO4)
				TCE	4.6	03/00	4.6	03/01	
				NO3	86.8	03/00	77.9	02/01	
				CLO4	5.0	07/97	ND	12/99	
WIL 3	1901682	MUNICIPAL	ACTIVE	PCE	9.5	08/94	2.0	02/11	VULNERABLE (VOCS AND NO3)
				TCE	1.6	02/10	1.0	02/11	
				NO3	66.0	01/83	20.0	02/11	
				CLO4	ND	07/97	ND	08/10	
WIL 4	1903086	MUNICIPAL	ACTIVE	PCE	8.1	06/00	2.5	02/11	VULNERABLE (VOCS AND NO3)
				TCE	2.1	05/07	1.2	02/11	
				NO3	30.0	02/03	19.0	02/11	
				CLO4	ND	07/97	ND	08/10	
SPEEDWAY 605 INC.									
NA	1902968	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
STERLING MUTUAL WATER COMPANY									
NEW SO.	8000132	MUNICIPAL	ACTIVE	VOCS	ND	06/91	ND	08/10	VULNERABLE (NO3)
				NO3	35.0	02/10	15.0	02/11	
				CLO4	ND	10/97	ND	08/09	
NORTH	1902096	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	08/10	VULNERABLE (NO3)
				NO3	43.4	02/07	24.0	02/11	
				CLO4	ND	09/97	ND	08/09	
SOUTH	1902085	MUNICIPAL	DESTROYED	VOCS	ND	01/85	ND	06/91	
				NO3	16.2	03/91	16.2	03/91	
				CLO4	NA	NA	NA	NA	
SUBURBAN WATER SYSTEMS									
101W-1	41901605	MUNICIPAL	DESTROYED	TCE	1.5	07/87	ND	08/89	
				NO3	54.2	08/89	54.2	08/89	
				CLO4	NA	NA	NA	NA	
102W-1	1901605	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
102W-2	1901606	MUNICIPAL	DESTROYED	TCE	2.0	01/80	ND	06/85	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
103W-1	1901607	MUNICIPAL	DESTROYED	TCE	2.5	06/80	ND	07/82	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
105W-1	1901608	MUNICIPAL	DESTROYED	PCE	1.4	01/96	1.4	01/96	
				NO3	46.2	04/95	46.2	04/95	
				CLO4	NA	NA	NA	NA	
106W-1	1901609	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
111W-1	1901610	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	82.5	03/73	82.5	03/73	
				CLO4	NA	NA	NA	NA	
112W-1	1901611	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	99.2	07/69	99.2	07/69	
				CLO4	NA	NA	NA	NA	
113W-1	1901612	MUNICIPAL	DESTROYED	TCE	0.7	02/80	0.5	03/85	
				NO3	85.0	10/85	67.8	02/88	
				CLO4	NA	NA	NA	NA	
114W-1	1901613	MUNICIPAL	INACTIVE	TCE	2.9	01/80	ND	07/95	VULNERABLE (VOCS AND NO3)
				PCE	0.5	12/93	ND	07/95	
				NO3	46.7	08/91	39.8	04/95	
				CLO4	NA	NA	NA	NA	
117W-1	1901614	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
120W-1	1901615	MUNICIPAL	DESTROYED	TCE	0.3	07/82	ND	08/96	
				NO3	66.0	07/88	60.5	08/96	
				CLO4	NA	NA	NA	NA	
121W-1	8000181	MUNICIPAL	ACTIVE	VOCS	ND	10/02	ND	05/11	VULNERABLE (CLO4)
				NO3	18.0	03/10	12.0	05/11	
				CLO4	4.7	11/08	3.4	05/11	
122W-1	1901616	MUNICIPAL	DESTROYED	TCE	2.6	08/96	2.6	08/96	
				NO3	90.0	05/86	60.7	08/96	
				CLO4	NA	NA	NA	NA	
123W-1	1901617	MUNICIPAL	DESTROYED	TCE	26.8	04/81	ND	08/96	
				PCE	33.0	04/81	ND	08/96	
				NO3	47.0	05/76	4.0	08/96	
				CLO4	NA	NA	NA	NA	
124W-1	1901618	MUNICIPAL	DESTROYED	TCE	0.5	06/83	ND	08/89	
				NO3	60.0	09/84	53.6	08/89	
				CLO4	NA	NA	NA	NA	
125W-1	1901619	MUNICIPAL	DESTROYED	VOCS	ND	01/80	ND	09/81	
				NO3	30.0	05/76	21.0	05/79	
				CLO4	NA	NA	NA	NA	
125W-2	8000087	MUNICIPAL	INACTIVE	VOCS	ND	03/83	ND	07/95	VULNERABLE (NO3)
				NO3	50.0	08/87	40.6	03/95	
				CLO4	NA	NA	NA	NA	
126W-1	1901620	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	18.0	05/75	18.0	05/75	
				CLO4	NA	NA	NA	NA	

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WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
126W-2	8000092	MUNICIPAL	INACTIVE	VOCS	ND	03/85	ND	08/00	VULNERABLE (NO3 AND CLO4)
				NO3	38.8	07/91	34.9	03/01	
				CLO4	4.8	07/97	ND	01/98	
131W-1	1901621	MUNICIPAL	DESTROYED	TCE	56.0	10/93	56.0	10/93	
				PCE	227.0	04/80	52.0	10/93	
				CTC	2.7	10/93	2.7	10/93	
				1,1-DCE	40.0	10/93	40.0	10/93	
				1,1,1-TCA	5.3	10/93	5.3	10/93	
				NO3	62.0	09/81	55.3	10/93	
				CLO4	NA	NA	NA	NA	
133W-1	1901622	MUNICIPAL	DESTROYED	TCE	0.5	07/87	ND	08/89	
				CTC	0.5	08/89	0.5	08/89	
				NO3	49.1	08/89	47.8	09/89	
				CLO4	NA	NA	NA	NA	
134W-1	1901623	MUNICIPAL	DESTROYED	TCE	56.0	10/93	56.0	10/93	
				PCE	0.1	12/80	ND	10/93	
				1,1-DCE	8.6	10/93	8.6	10/93	
				1,1,1-TCA	13.2	03/83	ND	10/93	
				NO3	43.0	06/87	40.9	10/93	
				CLO4	NA	NA	NA	NA	
135W-1	1901624	MUNICIPAL	DESTROYED	TCE	0.8	03/85	0.3	05/85	
				NO3	59.0	02/86	47.5	09/86	
				CLO4	NA	NA	NA	NA	
136W-1	1901625	MUNICIPAL	DESTROYED	PCE	335.0	03/80	66.0	10/93	
				TCE	53.0	03/80	9.1	10/93	
				CTC	2.4	10/93	2.4	10/93	
				1,1-DCE	15.0	10/93	15.0	10/93	
				NO3	48.0	01/77	37.6	10/93	
				CLO4	NA	NA	NA	NA	
139W-1	1901598	MUNICIPAL	DESTROYED	TCE	34.8	06/81	ND	01/97	
				PCE	5.0	02/88	ND	01/97	
				CTC	0.8	09/80	ND	07/96	
				NO3	99.2	05/94	92.9	07/96	
				CLO4	NA	NA	NA	NA	
139W-2	1901599	MUNICIPAL	INACTIVE	TCE	18.7	09/80	ND	05/10	VULNERABLE (VOCS)
				PCE	12.1	03/80	ND	05/10	
				CTC	0.8	09/80	ND	05/10	
				CF	0.6	10/08	ND	05/10	
				NO3	103.5	10/08	58.5	05/10	
				CLO4	34.0	10/08	15.0	15/10	
139W-4	8000069	MUNICIPAL	INACTIVE	TCE	4.7	04/97	ND	12/09	VULNERABLE (VOCS)
				MC	0.7	09/07	ND	12/09	
				NO3	49.0	03/11	49.0	03/11	
				CLO4	12.0	12/03	9.2	12/09	
139W-5	8000095	MUNICIPAL	INACTIVE	TCE	19.0	08/01	19.0	08/01	VULNERABLE (NO3)
				PCE	10.8	05/99	0.7	08/01	
				CTC	1.0	08/01	1.0	08/01	
				1,2-DCA	1.0	02/00	ND	08/01	
				MC	2.4	09/97	ND	08/01	
				NO3	36.5	06/01	36.5	10/09	
				CLO4	12.0	09/97	12.0	10/09	

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WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
139W-6	8000152	MUNICIPAL	INACTIVE	TCE	51.2	02/01	ND	05/10	VULNERABLE (VOCS, NO3, AND CLO4)
				PCE	2.8	02/01	ND	05/10	
				CTC	1.9	02/01	ND	05/10	
				1,2-DCA	1.6	02/01	ND	05/10	
				NO3	42.8	10/08	36.5	05/10	
				CLO4	35.4	11/00	2.0	05/10	
140W-1	1901602	MUNICIPAL	DESTROYED	TCE	1.0	01/80	1.0	01/80	
				NO3	86.9	04/73	68.0	05/75	
				CLO4	NA	NA	NA	NA	
140W-3	1903067	MUNICIPAL	ACTIVE	TCE	13.6	03/80	3.2	12/09	VULNERABLE (VOCS, NO3, AND CLO4)
				PCE	1.0	06/88	ND	12/09	
				CTC	1.0	09/81	ND	12/09	
				1,1-DCE	1.1	10/09	1.1	12/09	
				NO3	78.0	03/85	45.0	12/09	
				CLO4	16.0	12/05	5.6	12/09	
140W-4	8000093	MUNICIPAL	INACTIVE	TCE	7.0	01/96	1.5	11/06	VULNERABLE (VOCS AND NO3)
				NO3	36.4	10/03	36.3	12/04	
				CLO4	12.6	10/03	11.6	12/04	
140W-5	8000145	MUNICIPAL	ACTIVE	TCE	21.0	02/91	4.5	05/11	VULNERABLE (VOCs AND NO3)
				PCE	1.0	06/07	ND	05/11	
				NO3	30.0	03/09	16.0	05/11	
				CLO4	10.0	06/11	8.4	06/11	
142W-1	1901597	MUNICIPAL	DESTROYED	VOCS	ND	02/80	ND	07/82	
				NO3	74.0	06/81	74.0	06/81	
				CLO4	NA	NA	NA	NA	
142W-2	8000183	MUNICIPAL	ACTIVE	VOCS	ND	03/04	ND	05/11	
				NO3	10.0	05/10	10.0	05/11	
				CLO4	3.6	10/09	ND	05/11	
147W-1	1901596	MUNICIPAL	DESTROYED	TCE	23.0	03/85	23.0	03/85	
				PCE	1.2	03/85	1.2	03/85	
				NO3	100.0	03/85	100.0	03/85	
				CLO4	NA	NA	NA	NA	
147W-2	1902760	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	54.0	09/74	54.0	09/74	
				CLO4	NA	NA	NA	NA	
147W-3	8000077	MUNICIPAL	ACTIVE	TCE	4.1	01/92	2.1	05/11	VULNERABLE (VOCS)
				PCE	4.4	04/89	1.3	05/11	
				1,1-DCE	8.9	01/89	2.1	05/11	
				1,1-DCA	4.8	05/89	ND	05/11	
				NO3	19.8	09/88	8.4	05/11	
				CLO4	3.0	04/10	ND	05/11	
148W-1	1901604	MUNICIPAL	DESTROYED	TCE	0.8	06/80	ND	04/97	
				NO3	47.0	02/76	34.8	04/97	
				CLO4	NA	NA	NA	NA	
149W-1	1902119	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
150W-1	1902519	MUNICIPAL	DESTROYED	TCE	6.0	09/81	ND	08/93	
				NO3	53.0	03/86	13.4	08/94	
				CLO4	NA	NA	NA	NA	

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WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
151W-1	1902518	MUNICIPAL	DESTROYED	VOCS	ND	01/80	ND	03/98	
				NO3	116.0	03/98	116.0	03/98	
				CLO4	21.6	03/98	21.6	03/98	
151W-2	8000207	MUNICIPAL	ACTIVE	VOCS	ND	05/09	ND	05/11	
				NO3	6.0	05/11	6.0	05/11	
				CLO4	ND	04/09	ND	05/11	
152W-1	1900337	MUNICIPAL	DESTROYED	TCE	12.8	11/82	8.0	03/85	
				PCE	0.8	11/82	0.3	03/85	
				NO3	43.4	05/86	43.4	05/86	
				CLO4	NA	NA	NA	NA	
153W-1	1902761	MUNICIPAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
154W-1	1902762	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	81.0	05/79	81.0	05/79	
				CLO4	NA	NA	NA	NA	
155W-1	1902819	MUNICIPAL	INACTIVE	PCE	190.0	11/80	90.0	11/98	VULNERABLE (CLO4)
				TCE	50.0	07/81	24.0	11/98	
				CTC	19.0	02/82	ND	11/98	
				1,1-DCE	16.0	03/85	13.0	11/98	
				NO3	60.0	11/80	49.8	11/98	
				CLO4	5.4	11/98	5.4	11/98	
155W-2	1902820	MUNICIPAL	DESTROYED	PCE	190.0	09/93	76.0	11/98	
				TCE	39.0	04/80	22.0	11/98	
				1,1-DCE	21.0	09/93	11.0	11/98	
				1,1-DCA	3.0	09/93	1.4	11/98	
				C-1,2-DCE	16.0	03/85	1.8	11/98	
				NO3	49.0	11/98	49.0	11/98	
				CLO4	4.3	11/98	ND	11/98	
157W-1	1902763	MUNICIPAL	DESTROYED	TCE	12.2	02/80	ND	03/85	
				NO3	58.0	02/86	58.0	02/86	
				CLO4	NA	NA	NA	NA	
201W-1	1901429	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
201W-2	1901430	MUNICIPAL	DESTROYED	TCE	6.8	04/89	1.7	08/06	
				PCE	3.9	09/88	1.4	08/06	
				1,1-DCE	3.2	08/89	ND	08/06	
				C-1,2-DCE	6.1	02/91	4.3	08/06	
				NO3	6.8	08/94	6.3	08/06	
				CLO4	ND	08/97	ND	09/03	
201W-3	1901431	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
201W-4	1901433	MUNICIPAL	ACTIVE	TCE	6.4	09/89	ND	02/09	VULNERABLE (VOCS)
				PCE	4.1	09/88	ND	02/09	
				1,1-DCE	2.0	07/88	ND	02/09	
				C-1,2-DCE	5.2	05/97	ND	02/09	
				BF	4.7	11/07	2.2	02/09	
				DBCM	1.9	11/07	1.0	02/09	
				NO3	18.0	08/10	18.0	08/10	
				CLO4	ND	06/97	ND	08/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
201W-5	1901432	MUNICIPAL	INACTIVE	TCE	6.4	09/89	ND	03/08	VULNERABLE (VOCS)
				PCE	3.8	09/89	ND	03/08	
				1,1-DCE	2.9	09/88	ND	03/08	
				C-1,2-DCE	4.9	08/88	ND	03/08	
				BDCM	1.7	11/07	ND	03/08	
				BF	6.4	11/07	0.6	03/08	
				DBCM	4.6	11/07	ND	03/08	
				NO3	12.0	08/94	12.0	08/07	
				CLO4	ND	06/97	ND	06/03	
201W-6	1901434	MUNICIPAL	DESTROYED	TCE	3.9	05/88	ND	09/05	
				PCE	3.3	05/88	ND	09/05	
				1,1-DCE	3.2	09/88	ND	09/05	
				C-1,2-DCE	8.7	05/88	ND	09/05	
				NO3	20.0	06/85	7.7	05/05	
				CLO4	ND	06/97	ND	06/03	
201W-7	8000195	MUNICIPAL	ACTIVE	PCE	0.6	08/08	0.6	08/10	
				C-1,2-DCE	0.9	08/08	ND	08/10	
				NO3	14.0	08/09	13.0	08/10	
				CLO4	ND	08/08	ND	08/10	
201W-8	8000198	MUNICIPAL	ACTIVE	TCE	0.5	05/07	ND	08/10	
				C-1,2-DCE	1.1	05/07	ND	08/10	
				EBZ	0.8	07/06	ND	08/10	
				NO3	10.0	08/10	10.0	08/10	
				CLO4	2.1	07/06	ND	08/10	
201W-9	8000208	MUNICIPAL	ACTIVE	VOCS	ND	11/08	ND	08/09	
				NO3	14.0	02/10	14.0	02/11	
				CLO4	ND	03/08	ND	09/10	
201W-10	8000210	MUNICIPAL	ACTIVE	TCE	1.4	09/07	ND	02/10	
				PCE	1.3	09/07	ND	02/10	
				C-1,2-DCE	3.0	09/07	ND	02/10	
				NO3	3.8	09/07	2.8	05/09	
				CLO4	ND	09/07	ND	05/09	
202W-1	1901627	MUNICIPAL	DESTROYED	TCE	4.3	09/81	ND	01/89	
				PCE	15.0	10/88	12.1	01/89	
				NO3	24.0	07/87	23.0	10/88	
				CLO4	NA	NA	NA	NA	
SUNNY SLOPE WATER COMPANY									
08	1900026	MUNICIPAL	ACTIVE	VOCS	ND	01/87	ND	09/10	VULNERABLE (NO3)
				NO3	24.0	09/94	2.7	03/11	
				CLO4	ND	07/97	ND	09/10	
09	1902792	MUNICIPAL	ACTIVE	VOCS	ND	01/85	ND	03/11	VULNERABLE (NO3)
				NO3	36.0	06/03	11.0	03/11	
				CLO4	ND	07/97	ND	09/10	
10	8000048	MUNICIPAL	INACTIVE	VOCS	ND	01/85	ND	08/96	
				NO3	63.6	12/94	50.9	08/96	
				CLO4	NA	NA	NA	NA	
13	8000157	MUNICIPAL	ACTIVE	VOCS	ND	08/96	ND	09/10	
				NO3	7.2	09/09	6.9	09/10	
				CLO4	ND	07/97	ND	09/10	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
TAYLOR HERB GARDEN									
NA	1902964	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
TEXACO INC.									
14	1900001	INDUSTRIAL	DESTROYED	PCE	40.0	07/01	2.8	09/03	
				TCE	5.0	05/85	ND	09/03	
				1,2-DCA	0.6	01/96	ND	09/03	
				MC	4.6	04/87	ND	09/03	
				NO3	33.0	07/01	6.4	09/03	
				CLO4	ND	09/97	ND	09/97	
THOMPSON, EARL W.									
01	1900680	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
TOMOVICH (NICK) & SON									
NA	8000037	DOMESTIC	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
TYLER NURSERY									
NA	8000049	IRRIGATION	INACTIVE	TCE	12.9	12/99	1.2	09/04	VULNERABLE (VOCS AND NO3)
				PCE	44.6	12/99	1.2	09/04	
				1,1-DCE	0.6	09/02	ND	09/04	
				1,1-DCA	0.9	09/02	ND	09/04	
				C-1,2-DCE	8.7	09/02	ND	09/04	
				NO3	31.0	09/02	ND	09/04	
				CLO4	NA	NA	NA	NA	
UNITED CONCRETE PIPE CORPORATION									
NA	8000067	INDUSTRIAL	INACTIVE	VOCS	ND	08/89	ND	10/08	
				NO3	4.3	08/89	4.3	08/89	
				CLO4	NA	NA	NA	NA	
UNITED ROCK PRODUCTS CORPORATION									
IRW-1	1900106	INDUSTRIAL	ACTIVE	VOCS	ND	08/89	ND	10/09	
				NO3	6.4	07/96	2.5	10/09	
				CLO4	ND	02/98	ND	02/98	
IRW-2	1903062	INDUSTRIAL	ACTIVE	VOCS	ND	07/96	ND	11/05	
				NO3	4.5	10/04	2.6	11/05	
				CLO4	ND	02/98	ND	02/98	
SIERRA	1902532	INDUSTRIAL	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
VALENCIA HEIGHTS WATER COMPANY									
01	8000051	MUNICIPAL	ACTIVE	MC	0.7	06/89	ND	07/09	VULNERABLE (NO3 AND CLO4)
				NO3	46.5	04/99	32.6	07/07	
				CLO4	8.5	08/00	ND	07/09	
02	8000052	MUNICIPAL	ACTIVE	TCE	0.2	01/80	ND	07/08	VULNERABLE (NO3 AND CLO4)
				NO3	53.7	07/97	27.0	07/06	
				CLO4	8.0	10/98	4.2	07/08	
03A	8000055	MUNICIPAL	DESTROYED	VOCS	ND	03/85	ND	03/92	
				NO3	34.8	09/89	12.1	08/92	
				CLO4	NA	NA	NA	NA	
04	8000054	MUNICIPAL	INACTIVE	PCE	1.0	09/99	ND	09/01	
				NO3	90.0	11/97	78.0	03/02	
				CLO4	32.6	11/00	28.0	03/02	
05	8000120	MUNICIPAL	ACTIVE	VOCS	ND	06/90	ND	07/10	VULNERABLE (NO3 AND CLO4)
				NO3	36.0	07/10	36.0	07/10	
				CLO4	7.2	11/00	ND	04/11	
06	8000180	MUNICIPAL	ACTIVE	CF	13.0	12/02	ND	07/10	VULNERABLE (CLO4)
				NO3	49.3	06/04	48.0	08/09	
				CLO4	8.9	01/07	ND	04/11	
07	8000211	MUNICIPAL	INACTIVE	VOCS	ND	05/08	ND	09/10	VULNERABLE (NO3)
				NO3	29.0	12/09	25.0	12/10	
				CLO4	ND	05/08	ND	04/11	
VALLEY COUNTY WATER DISTRICT									
ARROW	1900034	MUNICIPAL	INACTIVE	TCE	700.0	07/82	600.0	12/96	VULNERABLE (NO3)
				PCE	980.0	12/96	980.0	12/96	
				1,1-DCE	64.0	12/96	64.0	12/96	
				C-1,2-DCE	59.0	12/96	59.0	12/96	
				CTC	14.5	09/92	8.0	12/96	
				1,2-DCA	9.0	02/92	7.3	12/96	
				1,1,1-TCA	45.0	12/96	45.0	12/96	
				1,1-DCA	2.9	02/95	2.7	12/96	
				NO3	26.4	08/96	26.4	08/96	
				CLO4	NA	NA	NA	NA	
B DALTON	1900035	MUNICIPAL	INACTIVE	TCE	137.0	04/85	ND	05/11	VULNERABLE (VOCS)
				PCE	8.0	04/85	ND	05/11	
				1,1-DCA	0.9	05/96	ND	05/11	
				C-1,2-DCE	2.0	11/95	ND	05/11	
				CTC	9.9	04/85	ND	05/11	
				1,2-DCA	11.0	12/98	ND	05/11	
				NO3	72.0	10/09	72.0	05/11	
				CLO4	99.1	12/98	11.0	05/11	
E NIXON (E JOAN)	1900032	MUNICIPAL	ACTIVE	TCE	7.0	11/08	ND	02/11	VULNERABLE (VOCS) (1)
				PCE	11.0	10/04	ND	02/11	
				1,1-DCE	1.3	10/04	ND	02/11	
				C-1,2-DCE	1.7	10/04	ND	02/11	
				NO3	13.6	02/05	6.1	02/11	
				CLO4	ND	05/97	ND	02/11	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
E MAINE	1900027	MUNICIPAL	ACTIVE	TCE	36.0	10/04	ND	05/11	VULNERABLE (VOCs AND CLO4) (1)
				PCE	110.0	10/04	ND	05/11	
				1,1-DCE	10.1	02/91	ND	05/11	
				1,2-DCA	1.4	10/04	ND	05/11	
				1,1,1-TCA	9.1	02/91	ND	05/11	
				C-1,2-DCE	13.0	06/03	ND	05/11	
				CF	1.1	10/04	ND	05/11	
				NO3	21.0	02/11	15.3	05/11	
				CLO4	7.8	10/04	ND	05/11	
LANTE (SA1-3)	8000060	MUNICIPAL	ACTIVE	TCE	1315.0	04/98	150.0	05/11	VULNERABLE (NO3) (1,4)
				PCE	1200.0	11/96	510.0	05/11	
				1,1-DCE	110.0	11/96	8.0	05/11	
				C-1,2-DCE	90.0	11/96	15.0	05/11	
				T-1,2-DCE	110.0	04/85	ND	05/11	
				1,1-DCA	18.0	08/04	ND	05/11	
				1,2-DCA	12.5	01/92	0.6	05/11	
				CTC	17.6	01/92	1.2	05/11	
				1,1,1-TCA	170.0	04/85	ND	05/11	
				MC	24.4	05/87	ND	05/11	
				CF	3.2	05/06	0.9	05/11	
				o-DCB	0.6	08/04	ND	05/11	
				p-DCB	3.1	08/04	ND	05/11	
				NO3	43.0	05/05	37.0	05/11	
				CLO4	94.0	04/98	17.0	05/11	
MORADA	1900029	MUNICIPAL	INACTIVE	TCE	770.0	03/80	ND	05/11	VULNERABLE (VOCS)
				PCE	100.0	02/85	2.2	05/11	
				CTC	29.0	04/84	ND	05/11	
				1,1-DCE	2.5	04/88	ND	05/11	
				1,1-DCA	8.5	02/85	ND	05/11	
				1,2-DCA	0.7	04/88	ND	05/11	
				C-1,2-DCE	8.1	08/95	ND	05/11	
				CF	1.7	10/08	ND	05/11	
				NO3	110.8	11/90	85.5	05/11	
				CLO4	21.0	02/04	11.0	05/11	
PADDY LN	1900031	MUNICIPAL	INACTIVE	TCE	166.0	04/94	29.0	05/11	VULNERABLE (NO3)
				PCE	42.0	11/93	3.5	05/11	
				CF	4.9	05/10	1.8	05/11	
				CTC	15.0	12/87	1.0	05/11	
				1,1-DCE	17.2	11/93	1.6	05/11	
				C-1,2-DCE	23.8	11/93	1.9	05/11	
				1,2-DCA	6.6	02/04	2.6	05/11	
				NO3	63.0	05/10	39.6	05/11	
				CLO4	154.0	02/98	38.0	05/11	
PALM	8000039	MUNICIPAL	INACTIVE	CTC	48.0	07/82	0.8	02/04	VULNERABLE (CLO4)
				TCE	56.0	02/04	56.0	02/04	
				PCE	51.0	02/04	51.0	02/04	
				CF	0.7	02/04	0.7	02/04	
				C-1,2-DCE	7.1	02/04	7.1	02/04	
				1,1,1-TCA	1.8	02/04	1.8	02/04	
				NO3	11.0	12/94	10.0	02/04	
				CLO4	5.6	02/04	5.6	02/04	
W NIXON (W JOAN)	1902356	MUNICIPAL	ACTIVE	TCE	4.0	11/04	ND	03/11	VULNERABLE (VOCS) (1)
				PCE	8.0	11/04	ND	03/11	
				MC	1.6	05/89	ND	10/09	
				NO3	8.5	02/05	6.1	03/11	
				CLO4	ND	05/97	ND	08/10	

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HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
W MAINE	1900028	MUNICIPAL	ACTIVE	TCE	47.3	02/91	ND	05/11	VULNERABLE (VOCS AND CLO4) (1)
				PCE	70.0	02/03	ND	05/11	
				1,1-DCE	14.2	02/91	ND	05/11	
				1,2-DCA	0.8	08/04	ND	05/11	
				1,1,1-TCA	10.6	02/91	ND	05/11	
				C-1,2-DCE	9.0	02/03	ND	05/11	
				NO3	20.8	05/90	9.0	05/11	
				CLO4	6.3	10/04	ND	05/11	
SA1-1	8000185	MUNICIPAL	ACTIVE	TCE	34.0	07/05	4.2	05/11	(1,4)
				PCE	47.0	04/07	7.4	05/11	
				1,1-DCA	11.0	07/05	ND	05/11	
				1,1-DCE	110.0	07/05	6.5	05/11	
				1,2-DCA	1.0	07/05	ND	05/11	
				C-1,2-DCE	4.1	07/05	ND	05/11	
				1,1,1-TCA	6.0	05/06	ND	05/11	
				CF	1.6	12/04	ND	05/11	
				MC	2.2	04/07	ND	05/11	
				FREON 11	1.9	04/11	2.3	05/11	
				NO3	87.0	01/05	71.0	05/11	
				CLO4	17.0	01/05	7.1	05/11	
SA1-2	8000186	MUNICIPAL	ACTIVE	TCE	25.0	04/06	2.0	12/09	VULNERABLE (VOCS) (1,4)
				PCE	37.0	05/06	4.8	12/09	
				1,1-DCA	8.7	07/05	ND	12/09	
				1,1-DCE	62.0	04/06	1.2	12/09	
				1,2-DCA	1.0	07/05	ND	12/09	
				C-1,2-DCE	6.2	07/05	ND	12/09	
				1,1,1-TCA	2.2	05/06	ND	12/09	
				CF	1.3	05/06	ND	12/09	
				NO3	72.0	03/05	59.0	12/09	
				CLO4	15.0	03/05	11.0	12/09	
VALLEY VIEW MUTUAL WATER COMPANY									
01	1900363	MUNICIPAL	ACTIVE	VOCS	ND	06/89	ND	09/10	
				NO3	6.4	09/09	5.7	09/10	
				CLO4	ND	08/97	ND	09/10	
02	1900364	MUNICIPAL	ACTIVE	VOCS	ND	06/88	ND	12/10	
				NO3	7.7	09/09	5.4	12/10	
				CLO4	ND	08/97	ND	12/10	
03	1900365	MUNICIPAL	INACTIVE	TCE	1.3	01/80	ND	03/98	VULNERABLE (NO3)
				NO3	26.9	03/98	26.9	03/98	
				CLO4	18.6	03/98	18.6	03/98	
VIA TRUST									
01	1903012	NON-POTABLE	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

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WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L) CONTAMINANT OF CONCERN	HISTORIC HIGH VALUE	HISTORIC HIGH DATE	MOST RECENT VALUE	MOST RECENT DATE	REMARKS
VULCAN MATERIALS COMPANY (CALMAT COMPANY)									
DUR E	1902920	INDUSTRIAL	ACTIVE	TCE	32.0	11/04	ND	10/10	VULNERABLE (VOCS)
				PCE	27.0	11/04	0.9	10/10	
				1,1-DCE	5.3	11/04	ND	10/10	
				C-1,2-DCE	2.8	11/04	ND	10/10	
				1,1,1-TCA	0.7	11/04	ND	10/10	
				CF	0.7	11/04	ND	10/10	
				MC	1.1	10/06	ND	10/10	
				NO3	16.2	10/04	7.2	10/10	
				CLO4	ND	04/98	ND	10/08	
DUR W	8000063	INDUSTRIAL	ACTIVE	PCE	0.8	02/07	ND	10/09	VULNERABLE (CLO4)
				NO3	16.0	07/01	14.0	10/09	
				CLO4	4.0	05/98	4.0	05/98	
REL 1	1903088	INDUSTRIAL	ACTIVE	VOCS	ND	05/94	ND	10/10	
				NO3	6.5	09/02	ND	10/10	
				CLO4	ND	05/98	ND	05/98	
WADE, RICHARD I.									
NA	8000056	DOMESTIC	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
WEST COVINA VENTURE LIMITED									
NA	1902970	NA	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
WILMOTT, ERMA M.									
01	8000006	DOMESTIC	ACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
WOODLAND, RICHARD									
01	1902949	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
02	1902950	NON-POTABLE	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	
ROSE HILLS MEMORIAL PARK (WORKMAN MILL INVESTMENT COMPANY)									
04	1902790	IRRIGATION	ACTIVE	PCE	5.3	08/87	ND	10/09	VULNERABLE (VOCS AND NO3)
				TCE	11.0	04/85	ND	10/09	
				1,1-DCE	14.0	04/85	ND	10/09	
				1,1,1-TCA	3.3	04/85	ND	10/09	
				NO3	52.8	02/07	43.0	10/10	
				CLO4	ND	06/98	ND	06/98	
01	1900132	IRRIGATION	INACTIVE	VOCS	NA	NA	NA	NA	
				NO3	NA	NA	NA	NA	
				CLO4	NA	NA	NA	NA	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
02	1900095	IRRIGATION	INACTIVE	PCE	8.6	04/85	ND	10/04	VULNERABLE (VOCS)
				TCE	11.0	04/85	ND	10/04	
				NO3	91.4	10/04	91.4	10/04	
				CLO4	ND	06/98	ND	06/98	
01	1900094	IRRIGATION	ACTIVE	TCE	6.1	04/87	ND	10/10	VULNERABLE (VOCS AND NO3)
				PCE	6.4	11/87	1.1	10/10	
				1,2-DCA	0.8	01/96	ND	10/10	
				1,1-DCE	1.0	04/87	ND	10/10	
				C-1,2-DCE	2.6	05/85	ND	10/10	
				NO3	45.2	02/98	31.0	10/10	
				CLO4	ND	02/98	ND	02/98	
03	1900052	IRRIGATION	ACTIVE	TCE	21.0	05/85	ND	09/05	VULNERABLE (VOCS AND NO3)
				PCE	7.4	05/85	ND	09/05	
				1,1-DCE	2.7	05/85	ND	09/05	
				C-1,2-DCE	28.0	05/85	ND	09/05	
				1,1-DCA	1.1	05/85	ND	09/05	
				1,1,1-TCA	7.5	05/85	ND	09/05	
				NO3	46.4	08/00	25.7	09/05	
				CLO4	ND	02/98	ND	02/98	
WHITTIER, CITY OF									
09	1901745	MUNICIPAL	DESTROYED	TCE	1.4	04/85	ND	08/89	
				PCE	1.9	10/88	0.6	08/89	
				NO3	8.8	08/89	8.8	08/89	
				CLO4	NA	NA	NA	NA	
10	1901746	MUNICIPAL	DESTROYED	VOCS	NA	NA	NA	NA	
				NO3	6.6	01/74	6.6	01/74	
				CLO4	NA	NA	NA	NA	
11	1901747	MUNICIPAL	DESTROYED	VOCS	ND	06/87	ND	11/90	
				NO3	10.1	01/90	10.1	01/90	
				CLO4	NA	NA	NA	NA	
12	1901748	MUNICIPAL	DESTROYED	TCE	1.5	07/88	1.5	07/88	
				PCE	0.7	07/88	0.7	07/88	
				NO3	10.0	12/84	8.5	12/85	
				CLO4	NA	NA	NA	NA	
13	1901749	MUNICIPAL	ACTIVE	PCE	4.9	11/87	ND	03/11	VULNERABLE (VOCS) (3)
				TCE	1.1	06/87	ND	03/11	
				MTBE	6.4	03/02	ND	03/11	
				NO3	17.0	03/11	17.0	03/11	
				CLO4	ND	08/97	ND	09/10	
15	8000071	MUNICIPAL	ACTIVE	PCE	9.4	03/03	ND	03/11	VULNERABLE (VOCS) (3)
				TCE	0.7	09/04	ND	03/11	
				C-1,2-DCE	2.5	12/93	ND	12/10	
				NO3	13.0	08/89	7.0	09/10	
				CLO4	ND	08/97	ND	09/10	
16	8000110	MUNICIPAL	ACTIVE	PCE	3.4	12/02	0.6	03/11	VULNERABLE (VOCS) (3)
				TCE	1.4	01/97	ND	03/11	
				C-1,2-DCE	2.5	10/96	ND	03/11	
				NO3	11.0	03/11	11.0	03/11	
				CLO4	ND	08/97	ND	12/10	

APPENDIX C

HIGHLIGHTS OF VOLATILE ORGANIC COMPOUNDS, NITRATE, AND PERCHLORATE CONCENTRATIONS AND WELLS VULNERABLE TO CONTAMINATION (AS OF JUNE 30, 2011)

WELL NAME	RECORDATION NUMBER	USAGE	STATUS	CONCENTRATION (NO3 IN MG/L, OTHERS IN UG/L)					REMARKS
				CONTAMINANT OF CONCERN	HISTORIC HIGH		MOST RECENT		
					VALUE	DATE	VALUE	DATE	
17	8000135	MUNICIPAL	INACTIVE	PCE	12.0	12/02	3.3	09/08	VULNERABLE (VOCS) (3)
				TCE	2.2	05/92	0.5	09/08	
				C-1,2-DCE	1.2	04/95	ND	09/08	
				NO3	13.0	03/03	9.1	03/08	
				CLO4	ND	08/97	ND	09/08	
18	8000136	MUNICIPAL	INACTIVE	PCE	9.2	09/08	4.0	03/11	VULNERABLE (VOCS) (3)
				TCE	2.4	11/95	0.8	03/11	
				C-1,2-DCE	0.7	10/96	ND	03/11	
				NO3	14.7	03/05	14.0	03/11	
				CLO4	ND	08/97	ND	12/10	
EW4-5	8000200	MUNICIPAL	ACTIVE	PCE	29.0	10/06	14.0	12/09	(1)
				TCE	4.1	10/06	1.4	12/09	
				NO3	16.0	12/05	12.0	09/09	
				CLO4	ND	12/05	ND	09/09	
EW4-6	8000201	MUNICIPAL	ACTIVE	PCE	8.1	06/06	ND	12/09	VULNERABLE (VOCS) (1)
				TCE	1.1	10/06	ND	12/09	
				NO3	15.0	11/06	12.0	09/09	
				CLO4	ND	05/06	ND	09/09	
EW4-7	8000202	MUNICIPAL	ACTIVE	PCE	8.2	01/06	3.1	12/09	VULNERABLE (VOCS) (1)
				TCE	1.8	02/06	ND	12/09	
				NO3	18.0	01/06	11.0	09/09	
				CLO4	ND	12/05	ND	09/09	

NOTES

ABBREVIATION	CONTAMINANT	MAXIMUM CONTAMINANT LEVEL	METHOD DETECTION LIMIT
1,1-DCA	1,1-Dichloroethane	5 micrograms per liter (ug/L)	0.5 ug/L
1,1-DCE	1,1-Dichloroethylene	6 ug/L	0.5 ug/L
1,1,1-TCA	1,1,1-Trichloroethane	200 ug/L	0.5 ug/L
1,1,2,2-PCA	1,1,2,2-Tetrachloroethane	1 ug/L	0.5 ug/L
1,2-DCA	1,2-Dichloroethane	0.5 ug/L	0.5 ug/L
BDCM	Bromodichloromethane	80 ug/L	0.5 ug/L
BF	Bromoform	80 ug/L	0.5 ug/L
CF	Chloroform	80 ug/L	0.5 ug/L
CLO4	Perchlorate	6 ug/L	4.0 ug/L
CTC	Carbon Tetrachloride	0.5 ug/L	0.5 ug/L
C-1,2-DCE	Cis-1,2-Dichloroethylene	6 ug/L	0.5 ug/L
DBCM	Dibromochloromethane	80 ug/L	0.5 ug/L
EBZ	Ethylbenzene	300 ug/L	0.5 ug/L
FREON 11	Trichlorofluoromethane	150 ug/L	5.0 ug/L
FREON 113	Trichlorotrifluoroethane	1200 ug/L	10.0 ug/L
MC	Methylene Chloride	5 ug/L	0.5 ug/L
MTBE	Methyl Tert-Butyl Ether	13 ug/L	1.0 ug/L
NO3	Nitrate as Nitrate	45 milligrams per liter (mg/L)	2.0 mg/L
o-DCB	1,2-Dichlorobenzene	600 ug/L	0.5 ug/L
p-DCB	1,4-Dichlorobenzene	5 ug/L	0.5 ug/L
PCE	Tetrachloroethylene	5 ug/L	0.5 ug/L
TCE	Trichloroethylene	5 ug/L	0.5 ug/L
T-1,2-DCE	Trans-1,2-Dichloroethylene	10 ug/L	0.5 ug/L
VC	Vinyl Chloride	0.5 ug/L	0.5 ug/L

REMARKS	
(1)	Existing VOC treatment
(2)	VOC treatment under construction
(3)	VOC treatment proposed
(4)	Existing CLO4 treatment
(5)	CLO4 treatment proposed
NA	Not Available
ND	Not Detected
NL	Notification Level
VOCS	Volatile Organic Compounds

APPENDIX D.

POTENTIAL SITES FOR AQUIFER PERFORMANCE TESTS

APPENDIX D

POTENTIAL SITES FOR AQUIFER PERFORMANCE TESTS

NAME	RECORD.	USAGE	STATUS	PERFO. (1)	FUNCTION	REMARKS
ALHAMBRA, CITY OF						
LON 1	1902789	MUNICIPAL	ACTIVE	411-800	MONITORING	
LON 2	1900017	MUNICIPAL	ACTIVE	296-563	PUMPING	
AZUSA, CITY OF						
NO. 11	8000178	MUNICIPAL	ACTIVE	200-320	PUMPING	
NO. 12	8000179	MUNICIPAL	ACTIVE	206-311	MONITORING	
CALIFORNIA DOMESTIC WATER COMPANY						
05A	8000100	MUNICIPAL	ACTIVE	?-920	PUMPING	
06	1902967	MUNICIPAL	ACTIVE	200-800	MONITORING	
CHAMPION MUTUAL WATER COMPANY						
01	1900908	MUNICIPAL	INACTIVE	100-130	MONITORING	
02	1902816	MUNICIPAL	ACTIVE	152-265	PUMPING	
03	8000121	MUNICIPAL	ACTIVE	107-299	MONITORING	
VULCAN MATERIALS COMPANY (CALMAT COMPANY						
DUR E	1902920	INDUSTRIAL	ACTIVE	238-484	PUMPING	
DUR W	8000063	INDUSTRIAL	ACTIVE	?-525	MONITORING	
GLENDORA, CITY OF						
05-E	8000149	MUNICIPAL	ACTIVE	150-400	PUMPING	
NA	1903119	INDUSTRIAL	ACTIVE	?-220	MONITORING	OWL ROCK PRODUCTS WELL
MONTEREY PARK, CITY OF						
15	8000196	MUNICIPAL	ACTIVE	200-425	PUMPING	
04	1902664	IRRIGATION	ACTIVE	260-752	MONITORING	LAC DEPARTMENT OF PUBLIC WORKS
06	1902666	IRRIGATION	ACTIVE	226-475	MONITORING	LAC DEPARTMENT OF PUBLIC WORKS
WORKMAN MILL INVESTMENT COMPANY (ROSE HILLS MEMORIAL PARK)						
01	1900094	IRRIGATION	ACTIVE	137-264	PUMPING	
ROSE HILLS	8000004	MUNICIPAL	INACTIVE	?-200	MONITORING	BEVERLY ACRES MWC
RURBAN HOMES MUTUAL WATER COMPANY						
NORTH 1	1900120	MUNICIPAL	ACTIVE	140-190	MONITORING	
SOUTH 2	1900121	MUNICIPAL	ACTIVE	125-165	PUMPING	
SAN GABRIEL COUNTY WATER DISTRICT						
05 BRA	1901669	MUNICIPAL	ACTIVE	450-800	MONITORING	
11	8000067	MUNICIPAL	ACTIVE	350-800	PUMPING	
12	8000123	MUNICIPAL	ACTIVE	470-1320	MONITORING	
SAN GABRIEL VALLEY WATER COMPANY						
B24A	8000203	MUNICIPAL	ACTIVE	600-1150	PUMPING	
B24B	8000204	MUNICIPAL	ACTIVE	600-1150	MONITORING	

APPENDIX D

POTENTIAL SITES FOR AQUIFER PERFORMANCE TESTS

NAME	RECORD.	USAGE	STATUS	PERFO. (1)	FUNCTION	REMARKS
GOLDEN STATE WATER COMPANY (SOUTHERN CALIFORNIA WATER COMPANY)/SAN GABRIEL VALLEY DISTRIC						
FAR 1	1902034	MUNICIPAL	ACTIVE	274-455	PUMPING	
FAR 2	1902948	MUNICIPAL	ACTIVE	229-600	MONITORING	
GAR 1	1900513	MUNICIPAL	ACTIVE	?-424	MONITORING	ALTERNATE FOR MONTEREY PARK SITE
GAR 2	1900512	MUNICIPAL	ACTIVE	377-404	PUMPING	
GRA 1	1902030	MUNICIPAL	STANDBY	NA	PUMPING	
GRA 2	1902461	MUNICIPAL	STANDBY	400-475	MONITORING	
SG 1	1900510	MUNICIPAL	ACTIVE	190-411	MONITORING	
SG 2	1900511	MUNICIPAL	ACTIVE	209-393	PUMPING	
GOLDEN STATE WATER COMPANY (SOUTHERN CALIFORNIA WATER COMPANY)/SAN DIMAS DISTRIC						
COL-4	1902268	MUNICIPAL	ACTIVE	122-190	PUMPING	
COL-6	1902270	MUNICIPAL	ACTIVE	?-414	MONITORING	
SUBURBAN WATER SYSTEMS						
201W-9	8000208	MUNICIPAL	ACTIVE	260-650	PUMPING	
201W-7	8000195	MUNICIPAL	ACTIVE	200-650	MONITORING	
201W-8	8000198	MUNICIPAL	ACTIVE	200-650	MONITORING	
201W-10	8000210	MUNICIPAL	NA	NA	MONITORING	
VALENCIA HEIGHTS WATER COMPANY						
05	8000120	MUNICIPAL	ACTIVE	230-720	PUMPING	
07	8000211	MUNICIPAL	ACTIVE	244-724	MONITORING	
VALLEY COUNTY WATER DISTRICT						
E NIXON (JOANBRIDGE)	1900032	MUNICIPAL	ACTIVE	300-586	MONITORING	ALTERNATE FOR MAINE SITE
W NIXON (JOANBRIDGE)	1902356	MUNICIPAL	ACTIVE	300-584	PUMPING	
E MAINE	1900027	MUNICIPAL	ACTIVE	250-580	PUMPING	ALTERNATE FOR NIXON SITE
W MAINE	1900028	MUNICIPAL	ACTIVE	250-580	MONITORING	
VALLEY VIEW MUTUAL WATER COMPANY						
01	1900363	MUNICIPAL	ACTIVE	300-585	MONITORING	
02	1900364	MUNICIPAL	ACTIVE	300-535	PUMPING	
03	1900365	MUNICIPAL	INACTIVE	100-200	MONITORING	

NOTES

NA NOT AVAILABLE
(1) TOP OF THE TOP INTERVAL - BOTTOM OF THE BOTTOM INTERVAL (DEPTH BELOW GROUND SURFACE IN FEET)

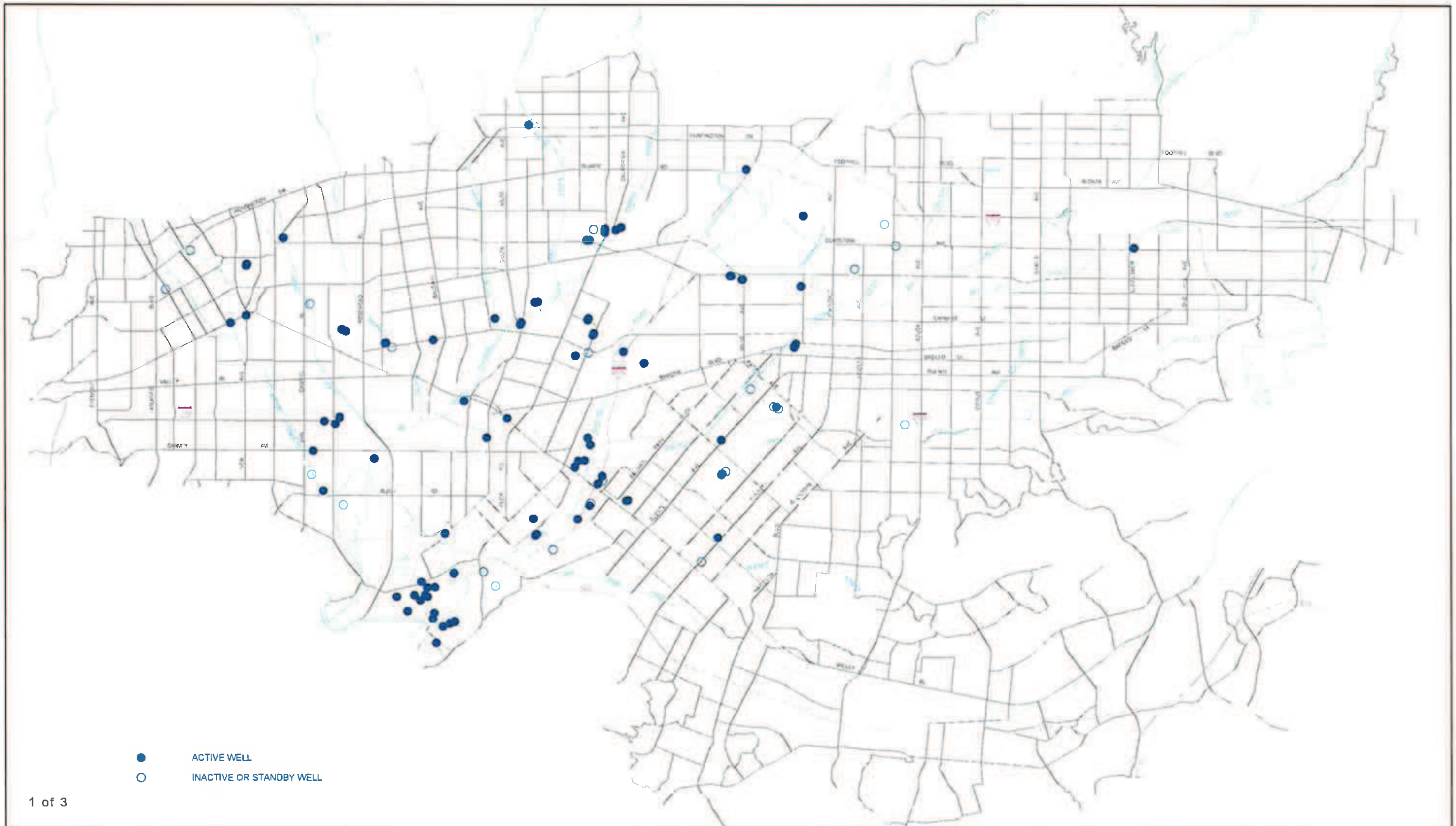
APPENDIX E.

SUMMARY OF TREATMENT FACILITY ACTIVITY IN THE MAIN SAN GABRIEL BASIN

SUMMARY OF TREATMENT FACILITY ACTIVITY
IN THE MAIN SAN GABRIEL BASIN
AS OF JUNE 30, 2011

Operable Unit	Treatment Facility Owner	Treatment Facility(s)	Start Date 1/	Total Water Treated: Fiscal Year 2010-11 (Acre-feet)	Total Water Treated: Accum. Total (Acre-feet)	Total Contaminants Removed: Fiscal Year 2010-11 (Pounds)	Total Contaminants Removed: Accum. Total (Pounds)
AREA 3							
	ALHAMBRA, CITY OF	Well No. 7	July 2001	—	7,582.35	—	130.1
		Well No. 7, 8, 11 & 12	April 2009	3,853.00	8,157.00	84.1	235.7
BPOU							
	LA PUENTE VALLEY COUNTY WATER DISTRICT	Well No. 2, 3 & 4	August 1992	—	11,493.13	—	826.9
		Well No. 2 & 3 (BPOU)	January 2000	3,643.60	34,888.69	716.9	8,304.5
	SAN GABRIEL VALLEY WATER COMPANY	Well B6C	April 1994	—	5,194.17	—	856.2
		Well B6D	April 1994	—	14,526.27	—	421.7
		Plant B5 (BPOU)	January 2007	11,175.63	40,713.00	445.3	1,187.7
		Plant B6 (BPOU)	September 2004	7,730.74	55,620.57	1,961.5	11,582.2
	VALLEY COUNTY WATER DISTRICT	Lante	June 1984	—	7,719.61	—	10,356.7
		Lante, SA1-1 & SA1-2 (BPOU)	December 2004	6,658.87	40,261.64	6,659.5	29,667.2
EMOU							
	ADAMS RANCH MUTUAL WATER COMPANY	Well No. 3	November 2003	65.94	585.81	2.4	20.9
	GOLDEN STATE WATER COMPANY (SGV)	Encinita No. 1, 2 & 3	April 1998	1,748.66	15,979.97	38.3	380.4
PVOU							
	BDP - CARRIER	Carrier	April 1988	117.43	6,232.91	12.0	2,797.0
SEMOU							
	MONTEREY PARK, CITY OF	Well No. 5	September 1999	1,172.48	12,261.90	91.5	879.9
		Well No. 9 & 12, 15	April 2002	5,482.10	38,464.23	843.3	5,350.2
	SAN GABRIEL VALLEY WATER COMPANY	Well 8B, 8C, 8D & 8E	August 2002	2,391.89	26,574.94	402.2	2,653.7
	GOLDEN STATE WATER COMPANY (SGV)	San Gabriel No.1 & 2	November 2001	1,049.20	9,022.09	26.9	337.8
WNOU							
	EPA	WNOU (Shallow Zone)	December 1999	2,640.33	27,319.53	4.8	1,615.8
	WHITTIER, CITY OF	WNOU (Intermediate Zone)	December 2005	6,117.44	29,023.61	208.1	1,091.9
PRODUCER FACILITY							
	ARCADIA, CITY OF	Longden 1 & 2	January 1985	1,355.77	65,066.12	16.4	716.8
	BOZUNG	Well B36, F38, F39 & BC34 2/	October 1994	—	233.00	—	131.3
	CALIFORNIA DOMESTIC WATER COMPANY	Well No. 3, Well No. 5A, Well No. 6 & Well No. 14	September 1993 April 1997	14,746.65	254,731.83	946.2	8,518.8
	EL MONTE, CITY OF	Well No. 12	February 1997	662.42	13,893.79	101.7	852.5
		Well No. 10	May 2004	733.56	4,897.01	5.3	39.1
		Well No. 2A	July 1999	395.64	5,837.07	4.4	100.4
	EPA	Richwood (North Well) 3/	April 1990	—	451.98	—	5.8
		Richwood (South Well) 3/	April 1990				
	GOLDEN STATE WATER COMPANY (SD)	Art 2 & 3, Base 3 & 4, Hwy 1	May 2005	2,297.50	10,838.35	40.5	130.1
	HEMLOCK MUTUAL WATER COMPANY	Hemlock (North Well) 4/	April 1986	—	2,553.65	—	44.6
		Hemlock (South Well) 4/	April 1986				
	MONROVIA, CITY OF	Wells No. 2 & 6	March 1996	2,402.37	33,287.22	36.1	559.1
		Wells No. 3, 4 & 5	October 2007	2,238.33	5,900.13	6.4	39.7
	MONTEREY PARK, CITY OF	Well No. 1, 3, 10 & Fern	June 2004	1,659.10	16,720.86	69.3	1,309.0
	SAN GABRIEL VALLEY WATER COMPANY	Well 11B	March 1991	646.50	38,735.26	1.1	302.1
		Well B11B	March 1993	1,439.74	37,919.91	120.5	2,772.0
		Well B7C	March 1993	1,197.24	42,090.66	81.8	1,620.0
		Well B4B & B4C	January 1999	—	24,093.04	—	1,233.5
		Well G4A	December 2005	148.26	3,075.94	1.5	49.6
	SUBURBAN WATER SYSTEMS	Well No. 140W-4 4/	May 2001	—	2,247.59	—	16.2
	VALLEY COUNTY WATER DISTRICT	Maine East & West	June 1990	3,582.47	34,560.86	13.2	1,702.1
		Nixon East & West 4/	January 2004	4,249.68	18,991.78	13.7	161.0
	WATER QUALITY AUTHORITY	Arrow (Project No. 1) 4/	February 1992	—	7,250.41	—	17,423.0
		Big Dalton (Project No. 2)	March 1997	—	1,229.02	—	82.5
		Whitmore Street	January 2008	38.65	136.37	24.0	95.2
		SEMOU	July 1999	—	3,885.19	—	1,558.5
			TOTAL	91,641.19	1,020,248.46	12,978.9	118,159.5

Footnotes:
1/ From date of beginning of operation.
2/ Treatment facility has been permanently dismantled.
3/ Wells destroyed in June 1999.
4/ Wellfield no longer pumps to treatment facility.



STETSON ENGINEERS INC.

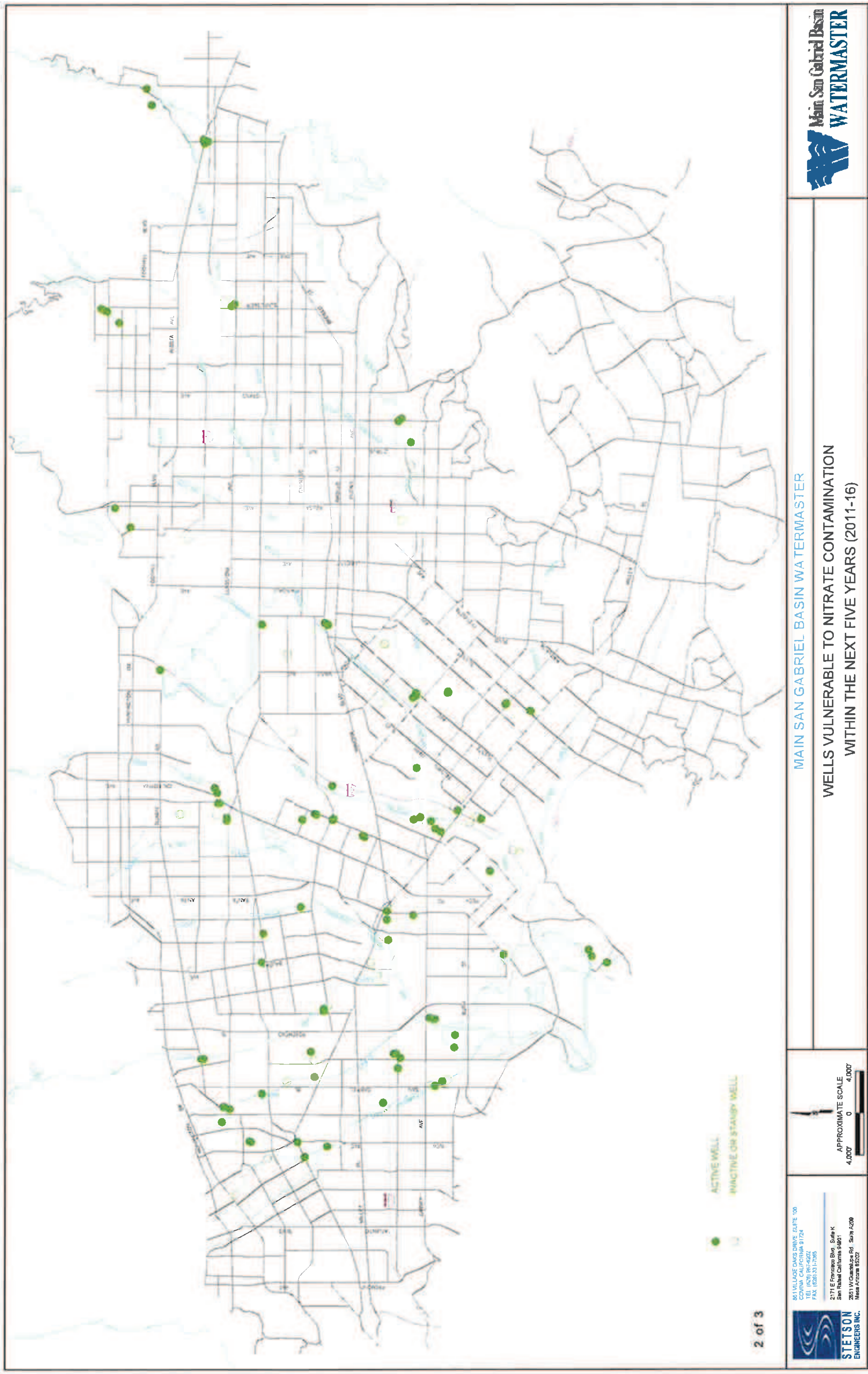
APPROXIMATE SCALE
4,000' 0 4,000'

MAIN SAN GABRIEL BASIN WATERMASTER

WELLS VULNERABLE TO VOLATILE ORGANIC COMPOUNDS CONTAMINATION
WITHIN THE NEXT FIVE YEARS (2011-16)

Main San Gabriel Basin WATERMASTER

Figure 11(b)


MAIN SAN GABRIEL BASIN WATERMASTER
WELLS VULNERABLE TO NITRATE CONTAMINATION
WITHIN THE NEXT FIVE YEARS (2011-16)
Main San Gabriel Basin
WATERMASTER
ACTIVE WELL
INACTIVE OR STANDBY WELL
APPROXIMATE SCALE
4,000' 0 4,000'
2 of 3
STETSON ENGINEERS INC.

STETSON ENGINEERS INC

MAIN SAN GABRIEL BASIN WATERMASTER

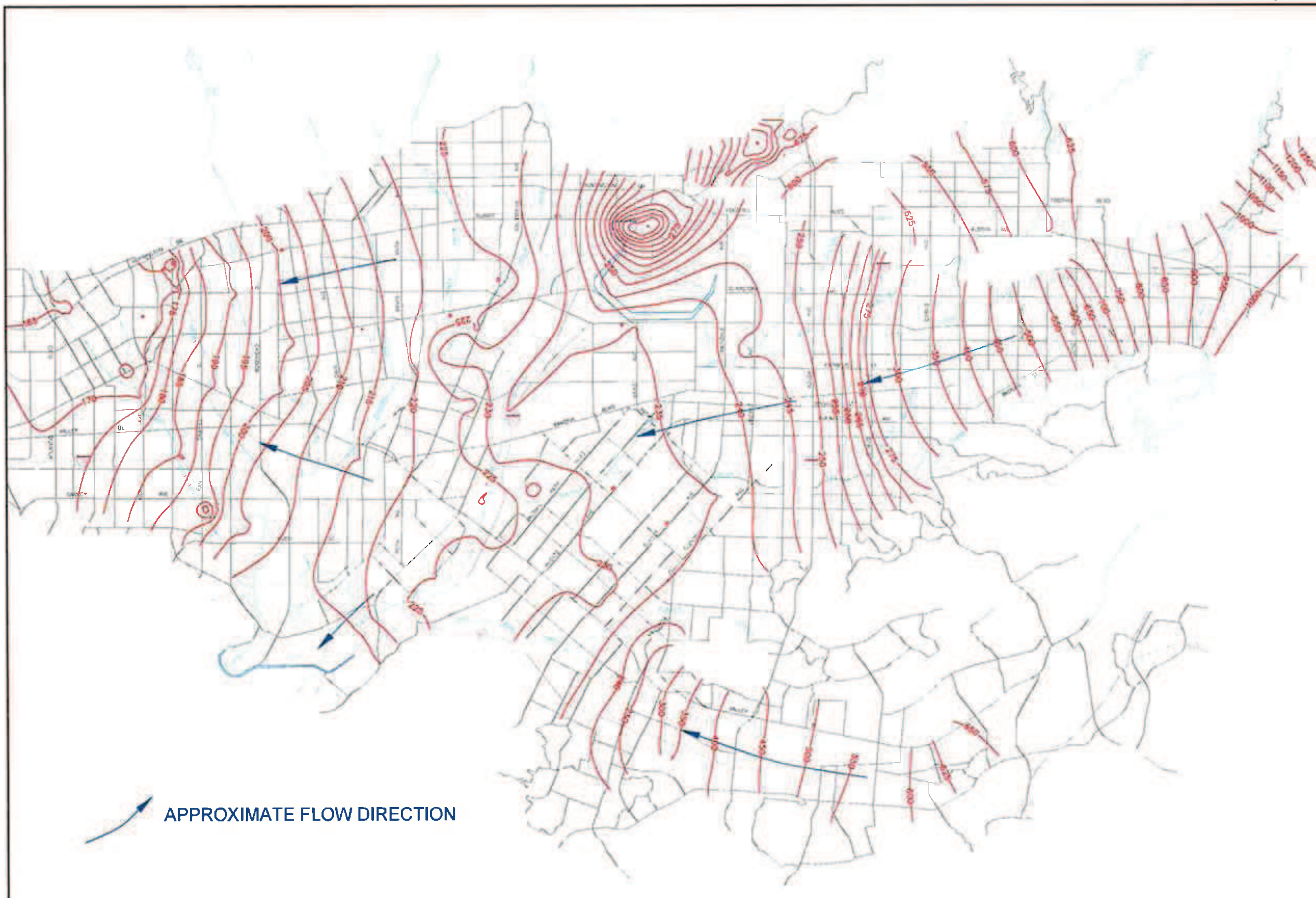
WELLS VULNERABLE TO PERCHLORATE CONTAMINATION
WITHIN THE NEXT FIVE YEARS (2011-16)

Main San Gabriel Basin WATERMASTER

APPENDIX G.

Simulated Basin Groundwater Contours 2010-11 and 2015-16 (Figures 12 and 13)

Figure 12



651 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL (626) 967-6202
FAX (626) 331-7065

2171 E Francisco Blvd Suite K
San Rafael California 94901

2651 W Guadalupe Rd Suite A209
Mesa Arizona 85202

STETSON ENGINEERS INC.

APPROXIMATE SCALE

6,000 0 6,000

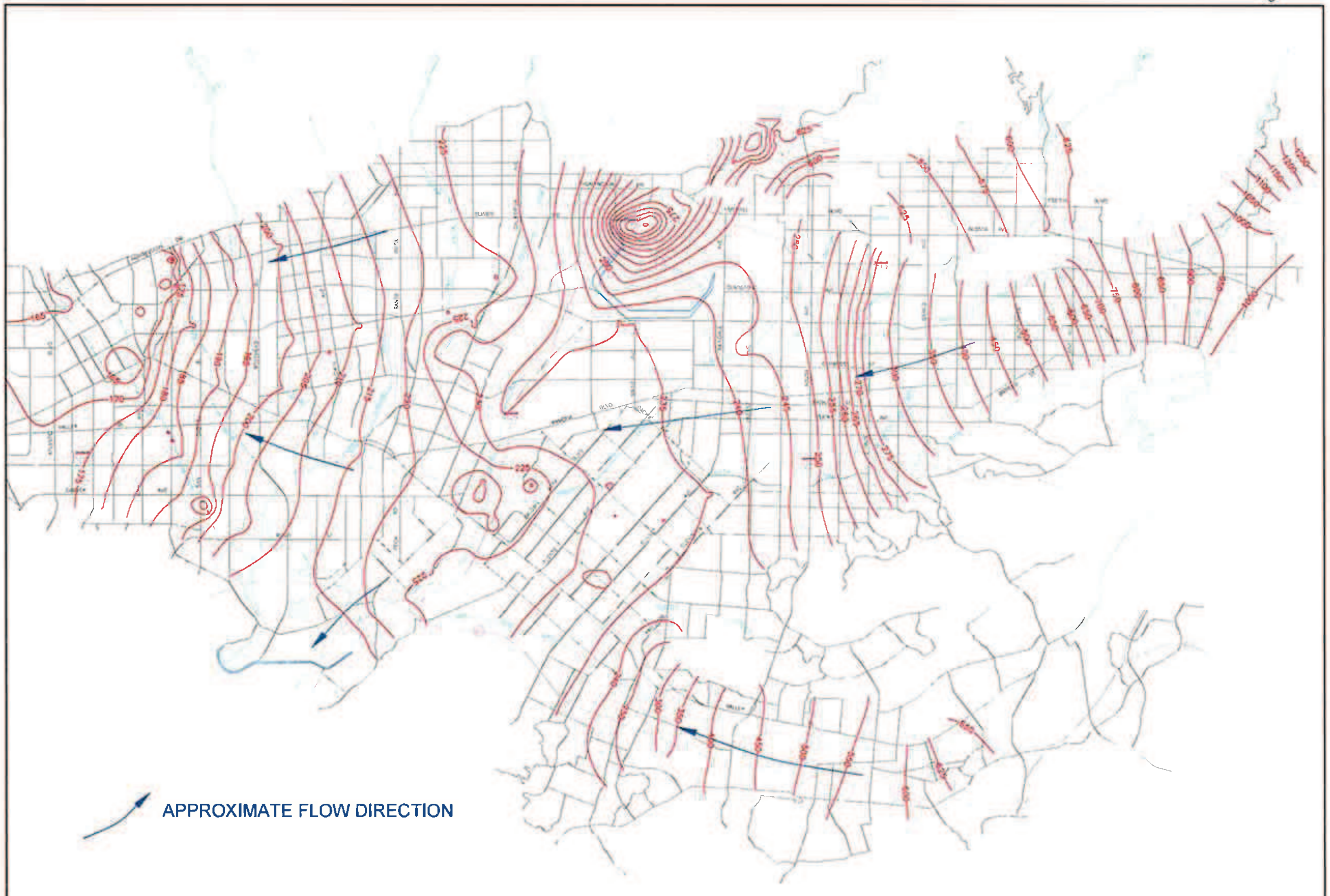
MAIN SAN GABRIEL BASIN WATERMASTER

SIMULATED 2010-11 BASIN GROUNDWATER CONTOURS

MainSanGabrielBasin WATERMASTER

E:\JOBS\1205\1205-61\1112PLAN\FIGURES\FIGURE_12.DWG
E:\JOBS\1205-61(04-05).CTB

Figure 13



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Mesa Arizona 85202

APPROXIMATE SCALE

MAIN SAN GABRIEL BASIN WATERMASTER

SIMULATED 2015-16 BASIN GROUNDWATER CONTOURS

MainSanGabrielBasin WATERMASTER

E:\JOBS\1205\1205-61\1112PLAN\FIGURES\FIGURE_13.DWG
E:\JOBS\1205-61(04-05).CTB

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SAN GABRIEL VALLEY GROUNDWATER BASIN SALT AND NUTRIENT MANAGEMENT PLAN

Main San Gabriel Basin
WATERMASTER

FINAL REPORT
MAY 2016
REVISED NOVEMBER 2016

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22-398

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LIST OF ACRONYMS

AC	Assimilative Capacity
AF	Acre-feet
Af/yr	Acre-feet Per Year
AGR	Agricultural Supply
AQUA	Aquaculture Supply
APT	Aqua Performance Test
Area 3OU	Area 3 Operable Unit
bgs	below ground surface
BGWEMP	Basinwide Groundwater Elevation Monitoring Program
BGWQMP	Basinwide Groundwater Quality Monitoring Program
BMPs	Best Management Practices
BPO	Basin Plan Objective
BPOU	Baldwin Park Operable Unit
ClO_4	Perchlorate
CAWC	California American Water Company
CCR	California Code of Regulations
CDPH	California Department of Public Health (now the SWRCB Division of Drinking Water)
CDWC	California Domestic Water Company
CEQA	California Environmental Quality Act
CECs	Constituents of Emerging Concern
CDWR	California Department of Water Resources
CPUC	California Public Utilities Commission
CTC	Carbon Tetrachloride
DDW	Division of Drinking Water
EDT	Electronic Data Transfer
GM	General Mineral
GP	General Physical
IND	Industrial Service Supply

IRRP	Indirect Reuse Replenishment Project
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LACSD	Sanitation Districts of Los Angeles County
LARWQCB	Los Angeles Regional Water Quality Control Board
lbs	pounds
MCL	Maximum Containment Level
mg/l	milligrams per liter
msl	mean sea level
MUN	Municipal and Domestic Supply
MWD	Metropolitan Water District of Southern California
ND	Not Detected
NO_3	Nitrate
PCE	Tetrachloroethylene
PM2.5	Particulate Matter 10 micrometers or less in diameter
PM10	Particulate Matter 2.5 micrometers or less in diameter
PROC	Industrial Process Supply
PWRP	Pomona Wastewater Reclamation Plant
RWQCB	Regional Water Quality Control Board
SJCWRP	San Jose Creek Wastewater Reclamation Plant
SFSG	Santa Fe Spreading Grounds
SGVWC	San Gabriel Valley Water Company
SNMP	Salt Nutrient Management Plan
SOC	Synthetic Organic Chemicals
SVOC	Semi-Volatile Organic Chemicals
SWP	State Water Project
SWRCB	State Water Resources Control Board
TCE	Trichloroethylene
TDS	Total Dissolved Solids
ug/l	micrograms per liter
USCOE	United Sates Army Corps of Engineers

USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Chemicals
WDR	Waste Discharge Requirements

EXECUTIVE SUMMARY

The State Water Resources Control Board approved Resolution No. 2009-0011 to adopt the Recycled Water Policy in February 2009. Included in that resolution is a requirement for a Salt and Nutrient Management Plan (SNMP) to be prepared for all groundwater basins. The Main San Gabriel Basin Watermaster is the lead agency for the preparation of the San Gabriel Basin SNMP. The primary stakeholders include Upper San Gabriel Valley Municipal Water District, San Gabriel Valley Municipal Water District, Three Valleys Municipal Water District, the Metropolitan Water District of Southern California, the Los Angeles County Sanitation Districts, and the Los Angeles County Department of Public Works.

The SNMP reviewed the geology, hydrology and hydrogeology of the San Gabriel Basin (also herein "Basin"), along with the institutional and management structure for the San Gabriel Basin. TDS, Nitrate, Sulfate, and Chloride were identified as the primary salts and nutrients of concern. Sources of loading (precipitation, subsurface inflow, infiltration of applied water, storm runoff and untreated imported water replenishment) and unloading (groundwater pumping and subsurface outflow) were included in a spreadsheet computer model, along with average water quality data for TDS, Nitrate, Sulfate, and Chloride, on an annual basis. Watermaster developed this spreadsheet model as a tool to calculate the impacts of loading and unloading from numerous water supply components.

The SNMP determined the assimilative capacity of the primary constituents of concern and evaluated potential and hypothetical groundwater replenishment projects in order to determine the loadings and impacts resulting from the projects. In an effort to provide an extremely conservative approach to the calculation of assimilative capacity of the San Gabriel Basin, it was assumed 1) the volume of the San Gabriel Basin available for mixing was about 6,000,000 acre-feet (75 percent of the total volume of about 8,000,000 acre-feet); and 2) only the water quality objectives for the westerly portion of the San Gabriel Basin (450 mg/l) would be used in the calculation, but recognizing the water quality objective for the easterly portion of the San Gabriel Basin is 600 mg/l.

The Recycled Water Policy sets an interim goal that no single project is to use more than 10 percent of the available assimilative capacity, or combination of projects to use more than 20 percent of the available assimilative capacity. Consequently, as part of this SNMP, the antidegradation analysis calculated the collective amount of water from potential future projects using a particular water quality that could be replenished in the San Gabriel Basin without exceeding the very conservative value of 10 percent of the available assimilative capacity. The water quality selected for analysis in the hypothetical scenarios is representative of water quality from likely replenishment water sources under extreme quality conditions. Historical supply sources for replenishment water have been primarily stormwater runoff and SWP, with Colorado River water and recycled water contributing to groundwater replenishment to a lesser extent.

The Upper San Gabriel Valley Municipal Water District's proposed Indirect Reuse Replenishment Project (IRRP), consisting of 10,000 acre-feet of recycled water recharge, was evaluated to determine the cumulative percentage of the assimilative capacity utilized before equilibrium is reached. The IRRP is not anticipated to exceed 10 percent of the available AC of the San Gabriel Basin, although such a limitation is not mandated. TDS would be the controlling and limiting constituent for the IRRP. Long term recharge operations would result in equilibrium reached at approximately 7.2 percent utilization of the TDS assimilative capacity. Nitrate, Sulfate and Chloride would each have less impact on their respective available assimilative capacities.

The San Gabriel Basin has been managed for many decades by the Watermaster, in conjunction with other stakeholders, in order to control salt and nutrient loading to preserve the high quality groundwater supplies. The SNMP acknowledges the historical practice of replenishing the San Gabriel Basin with significant amounts of stormwater runoff and supplemented with untreated imported water from the SWP, both of which have high quality water, particularly regarding TDS.

The San Gabriel Valley has experienced unprecedented drought conditions since calendar year 2006. As a result, the groundwater elevation at Baldwin Park Key Well has decreased from about 250 feet msl during the Spring of 2005 to about 189 feet msl as of December 2009. Since 1972, when the Basin was adjudicated, to present, the Basin Watermaster has actively managed water quality through existing implementation measures. Nonetheless, water quality generally improves (i.e. water quality concentrations decrease) coincident with significant rainfall events/recharge of stormwater runoff and the water quality tends to degrade during drought periods. Consequently, despite the long-term implementation measures the Basin Watermaster has in place, recent drought conditions have had a greater influence on water quality trends over the past 10 years and may give the appearance of an increasing trend in salt and nutrient conditions.

The SNMP identifies a variety of existing and potential activities including continued basin management practices, pursuit of potential new replenishment sites, water quality monitoring, and coordination between agencies which will help manage salts and nutrients in the San Gabriel Basin. The SNMP is a tool by which salts and nutrients can continue to be managed into the future.

The implementation of the SNMP will satisfy the requirements of the Recycled Water Policy by providing a framework for the long-term management of salts and nutrients in the San Gabriel Basin, while encouraging and allowing for increased use of recycled water areas.

CHAPTER I

INTRODUCTION

In February 2009, the State Water Resources Control Board of the State of California (State Water Board or SWRCB) approved the Resolution No. 2009-0011 to adopt the Recycled Water Policy (Policy) to encourage the use of recycled water from municipal wastewater sources as a safe alternative source of water supply while complying with the Resolution No. 68-16 to *"achieve highest water quality consistent with maximum benefit to the people of the State."* The goal of this Policy is to increase the use of recycled water over 2002 levels by at least one million acre-feet per year (af/yr) by 2020 and at least two million af/yr by 2030. Recognizing that some groundwater basins in the state contain salt and nutrients that exceed or threaten to exceed water quality objectives established in the Water Quality Control Plans (Basin Plans), and that not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt and nutrients, the State Water Board determined the appropriate way to address salt and nutrient issues is through the development of regional or sub-regional salt and nutrient management plans (SNMPs) rather than through imposing requirements solely on individual recycled water projects. The SNMP development process should include applicable compliance with the California Environmental Quality Act (CEQA) and participation by Regional Water Board's staff, and the Plans should be submitted to the appropriate Regional Water Board within five years from the effective date of the Policy, i.e. May 14, 2014. Watermaster has received an extension from the RWQCB to submit the San Gabriel SNMP by May, 2016. The Policy requires Regional Water Boards to review the plans and consider each for adoption as basin plan amendments within one year of submittal.

In accordance with the Policy, a science advisory panel (Panel) was convened to provide guidance on future actions related to monitoring constituents of emerging concerns (CECs) in recycled water. The Panel in its report entitled *"Monitoring Strategies for Chemicals of Emerging Concern in Recycled Water – Recommendations of a Scientific Advisory Panel"* and dated June 25, 2010, provided recommendations for monitoring specific CECs in recycled water used for groundwater recharge reuse. The State Water Board incorporated the Panel's recommendations into a proposed revision of the Policy dated September 14, 2012 (Revised Policy). Copies of the Resolution No.

2009-011, the Resolution No 68-16, the Policy, and the Revised Policy are included as Appendix A.

Section 6.b(1)(a) of the Recycled Water Policy (see Appendix A) states in part "…the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans…" In compliance with the Policy, the Regional Water Boards act as an overseer and facilitator of the SNMP development process. In the Los Angeles Region, Board staff has attended stakeholder meetings for various groundwater basin/subbasin groups to provide support and information. In the San Gabriel Valley Groundwater Basin (Basin), the Main San Gabriel Basin Watermaster (Watermaster) is the lead agency for the development of the SNMP for the Basin (San Gabriel SNMP). In the Basin, the sources of salt/nutrient loading are recharge of stormwater runoff; recharge of imported water from the State Water Project (SWP) and from the Colorado River water; and recycled water discharges to the San Gabriel River and the Rio Hondo in the southerly most portion of the Basin. Consequently, the "local salt/nutrient contributing stakeholders" have been identified as the Upper San Gabriel Valley Municipal Water District (Upper District), San Gabriel Valley Municipal Water District (San Gabriel District), Three Valley's Municipal Water District (Three Valley's District), the County of Los Angeles Department of Public Works (LACDPW) which is responsible for stormwater recharge; and Metropolitan Water District of Southern California (MWD) which collectively are responsible for the delivery and recharge of imported water in the Basin; and the Sanitation Districts of Los Angeles County (LACSD) which is responsible for the release of recycled water in the Basin.

Watermaster has held numerous meetings with the "local salt/nutrient contributing stakeholders" including meetings held on November 12, 2012; May 1, 2013; October 8, 2013; October 24, 2013; November 19, 2013; December 18, 2013; and November 19, 2014. The primary source of salt and nutrient unloading is through groundwater extraction by Basin groundwater producers. Watermaster staff regularly informed the Basin producers during the Basin Water Management Committee meetings. Discussion of activities from Basin Water Management Committee meetings are included in Watermaster's Board meeting minutes which are available on Watermaster's website. Watermaster staff has coordinated closely with the Regional Water Board/Los Angeles Region (LARWQCB) staff on the development progress and the contents of the San Gabriel SNMP. Following the annual stakeholder workshop on November 15, 2011, LARWQCB staff authorized Watermaster to proceed with the development of the San Gabriel SNMP. In the letter dated October 4, 2012 Watermaster described its assimilative capacity approach to LARWQCB staff. Subsequently, in a letter dated December 21, 2012, LARWQCB staff provided a response approving the proposed assimilative capacity approach. Furthermore, Watermaster staff participated in LARWQCB SNMP workshops held on November 15, 2010; November 15, 2011; November 15, 2012; November 14, 2013; and December 4, 2014.

The development of the San Gabriel SNMP considers the document entitled *"Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region"* (Guidance). The final Guidance, which was dated June 28, 2012, is included as Appendix B. The purpose of the Guidance is to provide information and guidance to assist on certain aspects of the SNMP development identified by stakeholder groups to ensure the final product is compliant with the specific requirements of the Policy and state and federal water quality laws, but the *"stakeholders have the flexibility to apply any scientifically defensible methodology to make these determinations,"* i.e. estimates of basin/subbasin assimilative capacities and mass loadings. Watermaster staff organized the San Gabriel SNMP and developed an approach for determining the Basin salt/nutrients loadings and assimilative capacities.

The San Gabriel SNMP has been developed for San Gabriel Valley Groundwater Basin as identified in the Main San Gabriel Basin Judgment. To that end, the Puente Basin and the Six Basins are the subject of separate court adjudications and consequently are <u>excluded</u> from this San Gabriel SNMP. Likewise, Spadra sub-basin in not included in the Main San Gabriel Basin Judgment and is excluded from this SNMP.

Watermaster developed a spreadsheet model as a tool to calculate the impacts of loading and unloading from numerous water supply components. Loading components consist of precipitation on the valley floor, percolation of water applied for irrigation (groundwater, local surface water, treated imported water, and recycled water), percolation of local stormwater and untreated imported water, percolation of recycled water discharged from LACSD water reclamation plants to unlined portions of the San Gabriel River, San Jose Creek and Rio Hondo, and subsurface inflow. Unloading components consist of groundwater production and subsurface outflow. Water quality concentrations were applied to the various loading/unloading components to the extent data was available. The rise and fall of the groundwater table through soils in the vadose zone may impact groundwater quality beyond the water quality of the water being percolated. In addition, the groundwater basin contains approximately 8,000,000 acre-feet of fresh water at all times while annual loading/unloading is about 250,000 acre-feet per year. The San Gabriel Basin contains high quality water and is over 30 times the volume of the annual loading and unloading. As a result, there are only very gradual changes in water quality as the result of the annual loading/unloading process.

The spreadsheet model used in this San Gabriel SNMP is a tool to calculate how existing water management practices and potential future projects may impact salts and nutrients in the San Gabriel Basin. The majority of the loading is the result of percolation of very high quality water from precipitation, stormwater run-off and untreated imported water. Unloading is primarily from production of groundwater. The components of loading (Total Dissolved Solids, Nitrate, Chloride and Sulfate) have lower concentrations than the groundwater being unloaded (there is a persistent net unloading on a year to year basis) and consequently overall Basin water quality changes very little.

The Upper District is developing its Indirect Reuse Replenishment Project (IRRP) which is the only planned recycled water recharge project within the San Gabriel Basin. Potential projects to be developed in the future may include, but not are limited to, construction of new facilities that may increase the amount of high quality stormwater runoff that can be captured and percolated, changes to untreated imported water quality (including the source of imported water quality supply), and development of recycled water projects for direct replenishment.

The San Gabriel SNMP was prepared to fulfill the Policy specific requirements. Chapter II describes the Policy's mandate for the use of recycled water. Chapter III describes the San Gabriel SNMP including its goal and objectives, characterization of the Basin, sources of salt and nutrients including their fate and transport, methodology for determining salt/nutrient loadings and assimilative capacities, estimates for salt/nutrient loadings and assimilative capacities, and implementation measures for recycled water, stormwater recharge, and others. Chapter IV provides an antidegradation analysis. Chapter V describes the basinwide salt/nutrient monitoring plan including a description of the monitoring network, monitoring schedule and frequency, and responsible stakeholders. A summary and recommendations for future activities are provided in Chapter VI.

CHAPTER II

MANDATE FOR THE USE OF RECYCLED WATER

II.1. BACKGROUND

On February 9, 2009, the State Water Board adopted Resolution 2009-0011 that created the "Recycled Water Policy". The Recycled Water Policy recognized that "…collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River, and failing levees in the Delta, to create a new reality that challenges California's ability to provide the clean water need for a healthy environment, a healthy population and a healthy economy, both now and in the future." The Recycled Water Policy encourages appropriate water recycling, water conservation and use of stormwater to increase water supplies within California. The mandates contained within the Recycled Water Policy are briefly addressed below.

II.2. SUMMARY OF MANDATES

Section 4 of the Recycled Water Policy provides the "Mandate for the Use of Recycled Water" and is summarized below.

"*a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.*

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy [acre-feet per year] by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 et seq., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 et seq. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California." [1]

As a result of these mandates and coordination with LARWQCB staff, Watermaster has taken the role of lead agency to develop the SNMP for the San Gabriel Valley groundwater basin. The SNMP, and the spreadsheets models which have been developed, will be used as a tool to evaluate the impacts of future projects on the existing water quality of the groundwater basin.

CHAPTER III

SALT AND NUTRIENT MANAGEMENT PLAN

III.1. GOAL AND OBJECTIVES

The primary goal of the San Gabriel SNMP is to assist Watermaster and participating/potential stakeholders to comply with the Policy regarding the use of the recycled water from municipal wastewater treatment facilities as a safe source of water supply, while maintaining the water quality objectives for salt and nutrients in the Basin Plan established by the LARWQCB.

The primary objective of the San Gabriel SNMP is to comply with the specific requirements described in the Policy. They include (1) characterization of the Basin, (2) identification of sources of salt, nutrients, and constituents of emerging concern (CECs) (when deemed necessary by the Recycled Water Policy) and their fate and transport, (3) estimation of salt, nutrients, and CECs (if necessary) loadings and assimilative capacities, (4) identification of water recycling and stormwater recharge/use goals and objectives, (5) verification of compliance with Resolution No. 68-16 through antidegradation analyses, and (6) development of a monitoring plan to verify compliance with the Basin water quality objectives.

III.2. BASIN PLAN WATER QUALITY OBJECTIVES

The Basin is one of 24 groundwater basins located within the Los Angeles Region under jurisdiction of the LARWQCB, extending from Rincon Point (on the coast of western Ventura County) to the eastern Los Angeles County line, as shown on Plate III.1. The LARWQCB adopts and implements the Basin Plan that serves as a basis for its regulatory program. The current Basin Plan, adopted in 1994 and as amended through 2011 [2], combines and replaces the earlier plans: the *Water Quality Control Plan: Santa Clara River Basin* [3] *and* the *Water Quality Control Plan: Los Angeles River Basin* [4].

The Basin Plan establishes water quality standards for the surface and ground waters of the Los Angeles Region based upon designated beneficial uses of water and numerical water quality objectives that must be maintained or attained to protect those uses. Beneficial uses for regional groundwater basins generally include:

- Municipal and Domestic Supply (MUN) for community, military, or individual water supply systems including, but not limited to, drinking water supply;
- Industrial Service Supply (IND) for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization;
- Industrial Process Supply (PROC) for industrial activities that depend primarily on water quality;
- Agricultural Supply (AGR) for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, and support of vegetation for grazing livestock; and
- Aquaculture Supply (AQUA) for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, and harvesting of aquatic plants and animals for human consumption or bait purposes.

The Basin designated beneficial uses, as listed in Table 2-2 of the Basin Plan [2], include MUN, IND, PROC, and AGR. The Basin groundwater is subjected to the following objectives:

Bacteria, Coliform

In ground waters designated as MUN, the concentration of coliform organisms over any seven-day period shall be less than 1.1/100 milliliters.

Chemical Constituents and Radioactivity

Ground waters designated as MUN shall not contain concentrations of chemical constituents and radionuclides in excess of the limits specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into this plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of

Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), and Table 4 of Section 64443 (Radioactivity). This incorporation by reference is prospective including future changes to the incorporated provisions as the changes take effect. (See Tables 3-5, 3-6, 3-7, and 3-9.)

Ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial uses.

Mineral Quality

Numerical mineral quality objectives for individual groundwater basins are contained in Table 3-10.

Nitrogen (Nitrate, Nitrite)

Ground waters shall not exceed 10 mg/L nitrate-nitrogen (nitrogen in the form of nitrate, NO_3-N) or nitrate-nitrogen plus nitrite-nitrogen (NO_3-N + NO_2-N), 45 mg/L as nitrate (NO_3), or 1 mg/l as nitrite-nitrogen (NO_2-N).

Taste and Odor

Ground waters shall not contain taste and odor or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses.

The numerical water quality objectives for the Basin groundwater, which are based on the June 21, 2012 update of Title 22 of the California Code of Regulations (CCRs) [5], are summarized in Table III.1. Neither the Basin Plan nor Title 22 of the CCRs has established the numerical water quality objectives for taste and odor.

The LARWQCB also implements State and federal antidegradation policies to maintain high quality of both surface and ground waters in California (Resolution No. 68-16 [31] and 40 CFR 131.12 [6]). Under the State Nondegradation Objective, whenever the existing quality of water is better than that needed to protect all existing and probable future beneficial uses, the existing high quality shall be maintained until or unless it has been demonstrated to the State that any change in water quality will be consistent with the maximum benefit of the people of the State, and will not unreasonably affect present and probable future beneficial uses of such water. Therefore, unless conditions are met, background water quality concentrations (the concentrations of substances in natural waters which are unaffected by waste management practices or contamination incidents) are appropriate water quality goals to be maintained. If it is determined that some degradation is in the best interest of the people of California, some increase in pollutant level may be appropriate. However, in no case may such increases cause adverse impacts to existing or probable future beneficial uses of waters of the State.

III.3. SAN GABRIEL VALLEY GROUNDWATER BASIN

The San Gabriel Valley was characterized in Appendix A of Bulletin No. 104-2, which contains engineering details on a program for effective utilization of the groundwater resources of the valley initiated in the 1960s by the California Department of Water Resources (CDWR) [7]. Since then, additional data and information on geology, hydrology, hydrogeology, water quality, and groundwater management have become available and provide a better understanding of its characteristics and responses to groundwater management measures. For the purposes of this SNMP, CDWR Bulletin No. 104-2 was used as the basis for the Basin characterization; however, its engineering details may be updated using available data and information, if appropriate, to reflect the existing conditions of the Basin.

The San Gabriel SNMP includes only the portion of the San Gabriel Valley Basin included in the Basin Judgment. The Puente Basin and the Six Basins are subject of separate court adjudications and are not included as part of the San Gabriel SNMP; the Spadra sub-basin is currently not adjudicated, and likewise, not included in this SNMP.

III.3.1. Geography

The Basin underlies the San Gabriel Valley located in southeastern Los Angeles County, and is identified by the CDWR as Groundwater Basin Number 4-13, as shown on Plate III.2. The Basin is bounded by the line of contact between alluvium and the crystalline and metamorphic rocks of the San Gabriel Mountains on the north, by the Raymond fault on the northeast, by the line of contact between the sedimentary rocks of a system of low rolling hills (Repetto, Merced, Puente, and San Jose Hills) on the west and south, and by the bedrock high between San Dimas and La Verne on the east. The Whittier Narrows, a 1.5-mile gap between the Merced and Puente Hills, forms the only exit for the Basin surface water and groundwater, as shown on Plate III.3. The Basin ground surface slopes downward from approximately 1,200 feet above mean sea level (msl) in the San Dimas area, 850 feet msl in the Pomona area on the east, and 600 feet msl in the Alhambra area on the west to approximately 200 feet msl in the Whittier Narrows area on the southwest. According to the CDWR, the Basin surface area is approximately 167 square miles (mi^2) or 106,880 acres [7].

III.3.2. Land Uses

In the 20th century, the San Gabriel Valley *"has undergone a cultural change, progressing from a predominantly rural and agricultural community to a residential and commercial urban complex. Agricultural lands increased from 6,300 acres [about 6 percent of the Basin] in 1880 to 60,300 acres [about 56 percent] in 1924, then decreased steadily to 15,300 acres [about 14 percent] in 1960; urbanization, on the other hand, increased constantly – from 1,700 acres [about 2 percent] in 1904 to 74,500 [about 70 percent] in 1960"* [7]. A recent study conducted by USGS indicates that land use in the Basin is approximately 84 percent urban, 16 percent natural, and 1 percent agricultural [14]. Generalized land use in the San Gabriel Valley is shown on Plate III.4.

III.3.3. Geology

According to the CDWR, the Basin is a structural basin filled with permeable alluvial deposits (water-bearing formations) and underlain and surrounded by relatively impermeable rocks (nonwater-bearing formations) [7]. The Basin also contains many geological features and faults that may influence groundwater movement into, through, or within the Basin. The general geology of the San Gabriel Valley is shown on Plate III.5.

III.3.3.1 Nonwater-Bearing Formations

The nonwater-bearing formations include the igneous and metamorphic rocks (the basement complex rocks and the Glendora Volcanics) and most of the sedimentary Tertiary formations, as shown on Plate III.5. Although these formations are considered nonwater-bearing, wells drilled into them may intersect fractures containing water and can produce up to 15 gallons per minute (gpm) [7]. These formations are assumed as the boundaries of the San Gabriel Valley groundwater basin.

The basement complex rocks (Bc) comprise the main mass of the San Gabriel Mountains. The Glendora Volcanics (Mv) are found in the foothills of the San Gabriel Mountains near Glendora, in the South Hills, and in the northeast end of San Jose Hills. The Tertiary sedimentary rocks, ranging in age from Miocene to Pliocene, consist of the Punchbowl (Ms), Topanga (Ms), Puente (Ms), Repetto (Pr), and Pico (Pp) Formations. These sedimentary formations are found underlying and flanking the unconsolidated alluvial sediments in the east and south of the Basin, as shown on Plate III.5.

III.3.3.2 Water-Bearing Formations

The principal water-bearing formations of the Basin are unconsolidated and semiconsolidated nonmarine sediments of Recent and Pleistocene age varying from boulders and coarse gravel, in areas near the mountain front, to medium- and fine-sand containing a larger amount of silt and clay, in areas away from the mountains. Materials comprising the formations were derived chiefly from the San Gabriel Mountains and extend to a maximum depth of more than 4,000 feet [7]. Primarily, these materials consist of the older alluvium, which constitutes the main valley fill material and is exposed around the margins of the entire Basin, the recent alluvium, which blankets the center of the valley floor, and the transition zone deposits, which lie along San Dimas Wash in the eastern part of the Basin, as shown on Plate III.5.

The older alluvium (Qoal) deposits consist of unsorted yellowish to reddish-brown, angular to subrounded continental debris, derived from the surrounding mountains. These deposits vary from silt to boulders more than two feet in diameter. The thickness of the older alluvium deposits ranges from approximately 300 feet in the northern part of the Basin in the vicinity of the mouth of the San Gabriel River to approximately 4,100 feet in the vicinity of Whittier Narrows. Clay is also present in the older alluvium, probably due to the weathering process after the sediments were deposited [7]. Results from groundwater contamination cleanup activities conducted by the United States Environmental Protection Agency (USEPA) within the Basin [8-13] indicate that clay layers of various thicknesses are embedded within the old alluvium at varying depths. These clay layers act as aquitards, i.e. semi-confining or confining layers, stratifying the water-bearing formations, i.e. aquifers, and restricting hydraulic communication between these aquifers. The cross-section locations are shown on Plate III.6a. The presence and significance of these clay layers are dominant in the southern and western portions of the Basin, especially in the Alhambra area, as shown on the East-West cross-section on Plate III.6b and the North-South cross-section on Plate III.6c.

The transition zone (Qat) deposits are limited in a zone of approximately 2 two miles wide along San Dimas Wash from San Dimas to Baldwin Park, as shown on Plate III.5. These deposits contain gravels found in both the older and Recent alluvium. These deposits are thin (less than 30 feet thick) and lie above the water table [7].

The Recent (Qal) alluvium deposits overlie the older alluvium along the front of the San Gabriel Mountains and in the central part of the Basin. These deposits consist of predominantly coarse boulders, gravels, and sands, ranging in thickness from a few inches to roughly 100 feet in Whittier Narrows [7]. The thickest portions are found along the San Gabriel River channel and its adjacent floodplains.

III.3.3.3 Geological Features and Faults

Numerous geological features and faults have been delineated in the Basin, as shown on Plate III.5; however, only a few of these faults influence groundwater movement in the Basin [7]. According to the CDWR, these faults may be formed by impervious rock brought into contact with water-bearing material, by an offsetting aquifer, by impervious gouge formed in bedrock or alluvium as a result of movement along a fault plane, by fractures in bedrock sealed by impervious deposits, and by permeable or open areas along the line of faulting that act as a conduit carrying water laterally along the fault line. The faults that affect groundwater movement in the Basin are the Raymond fault and the Duarte fault.

The Raymond fault forms the boundary between the Basin and the Raymond Basin from the City of South Pasadena on the west to the City of Monrovia on the east. It is likely a thin and impervious gouge formed in alluvium because it creates a significant difference in water level elevation through a relatively short distance of approximately 2,700 feet between Del Mar Well of California American Water Company (CAWC) and Well No. 3 of San Gabriel County Water District, as shown on Plate III.7. In addition to the difference in water level elevation, the barrier effect of the Raymond fault also is shown by the presence of artesian conditions during periods of high water level, and by the creation of ponds and swampy areas north of the fault line [7]. Based on semi-annual groundwater contour maps generated by Watermaster, the Raymond fault appears to impede groundwater movement southward from the Raymond Basin into the Basin. The groundwater mound in the vicinity of the City of Monrovia, as shown on Plate III.7, appears to be caused by recharge water from the Sawpit Canyon fault.

The Duarte fault crosses the upper portion of the alluvial fan at the mouth of San Gabriel Canyon, passes under the City of Azusa, and continues to the east possibly as far as South Hills, as shown on Plate III.5. This fault, like the Raymond fault, appears to be a thin and impervious gouge formed in alluvium because of a significant difference in water level elevation in a short distance between CAWC Las Lomas Well No. 2 and Crown Haven Well, approximately 2,350 feet across the fault line, as shown on Plate III.8. Based on the highest water level elevations at CAWC Las Lomas Well No. 2 and Encanto Well, the elevation of the top of the Duarte fault at the mouth of San Gabriel Canyon is estimated at approximately 400 feet msl. As a result, groundwater from the San Gabriel Canyon is able to cascade across the fault into the Basin and occasionally create a groundwater mound in the vicinity of CAWC Crown Haven Well, as shown on Plate III.8.

Based on data and information obtained from remedial investigation for the Area 3 Operable Unit (Area 3 OU), USEPA suggests “the presence of a structural bedrock discontinuity that bisects the western and eastern portions of Area 3” [11], as shown on Plates III.9a and III.9b. Further review of the drillers logs in that area indicates that only clay is present below the depth of 275 feet at Well MW1-1 while pervious layers are found to the depth of 460 feet at Well MW1-2AB. This suggests the presence of a vertical aquifer offset along Atlantic Boulevard that creates a difference in water level elevation in the western portion of the Area 3 OU, as shown on Plate III.9b.

III.3.4. Hydrology

III.3.4.1 Surface Water System

The Basin is located within the San Gabriel River and Rio Hondo watershed. The area of this watershed at Whittier Narrows is estimated at approximately 313,600 acres or 490 mi^2. The Basin surface water system consists of two major streams, i.e. the San Gabriel River and the Rio Hondo. The San Gabriel River and its tributaries (Fish Canyon, Rogers Canyon, Big Dalton, Little Dalton, San Dimas, Walnut, and San Jose Creeks) drain the Eastern portion of the San Gabriel River watershed, and the Rio Hondo (which is a distributary of the San Gabriel River) and its tributaries (Alhambra, Rubio, Eaton, Arcadia, Santa Anita, and Sawpit Washes) drain the western portion of the San Gabriel River watershed. Surface water in the San Gabriel River and Rio Hondo exits the Basin at Whittier Narrows, a narrow gap between the Merced and Puente Hills, as shown on Plate III.10.

Historically, surface water flowed freely in the San Gabriel River and the Rio Hondo with improvement no more than a trash dike by farmers [7]. During the summer months, most streams were dry except at Whittier Narrows where perennial flow existed due to rising water. Since 1960, surface water has been significantly modified by flood control reservoirs, dams, and channels constructed by the Los Angeles County Department of Public Works (LACDPW) and the United States Army Corps of Engineers (USCOE). Major flood control reservoirs include Cogswell, San Gabriel, Morris, Big Dalton, Eaton, and Puddingstone Reservoirs. Major flood control dams include Santa Fe Dam and Whittier Narrows Dam. All stream channels have been improved. Most stream channel improvements consist of concrete-lined bottom and sides. The San Gabriel River between Santa Fe Dam and Whittier Narrows Dam and the San Jose Creek west of Elsah Avenue, however, have a pervious bottom allowing surface water percolation for groundwater recharge.

III.3.4.2 Precipitation

The San Gabriel River and Rio Hondo watershed is located within a region of both semiarid and Mediterranean climate, consisting of intermittent rain during the winter months and no rain during the summer months. The majority of the annual rainfall occurs between December and March. Precipitation in the San Gabriel River and Rio Hondo watershed has been monitored by a network of precipitation stations operated by LACDPW. For the purposes of this SNMP, only stations with the longest continuous records were selected, as shown on Plate III.10 and Table III.2. The annual precipitations at the selected stations were obtained from LACDPW and are included in Appendix C. They were used to calculate the annual average precipitations for the mountains watershed (including Station Nos. 63, 68, 89, 144, 223, 235, 334, 338, 390, 425, and 683), the valley floor (including Station Nos. 95, 108, 167, 387, 610, 742, 1037, 1041, and 1140), and the southern low hills watershed (including Station Nos. 96, 201, 356, 1114, and 1260). During the period from water year 1924-25 through 2010-11, the average precipitation ranged from 9.77 to 67.41, averaging 27.28 inches per year (in/yr) for the mountains watershed, from 5.72 to 45.42, averaging 18.57 in/yr for the valley floor, and from 5.06 to 38.91, averaging 16.88 in/yr for the southern low hills watershed, as shown on Plate III.11a and Table III.2. The runoff coefficient was determined using the total volume of inflow at designated streamflow gauges as shown in Appendix D as a percentage of the total volume of precipitation as shown in Table III.2.

A cumulative departure from average precipitation curve has been used to evaluate wet-dry cycles for a hydrologic period. This curve is a time-series plot of the summation of the differences between the annual and average precipitation (departures) from the beginning of the hydrologic period. Upward sloping trends on the curve correspond to wet cycles, and downward sloping trends correspond to dry cycles. The cumulative departure curves for the San Gabriel River and Rio Hondo watershed for the period from 1926-27 to 2010-11 indicate that the watershed has experienced numerous wet-dry cycles in the past, as shown on Plate III.11b. The most prolonged dry cycle occurred between 1944-45 and 1964-65 following the most prolonged wet cycle from 1933-34 to 1943-44.

III.3.4.3 Streamflow

Streamflow in the San Gabriel River, the Rio Hondo, and their tributaries has been monitored at stream gaging stations established by various agencies including LACDPW, CDWR, USCOE, USGS, MWD, and the San Gabriel River Water Committee, as described in Attachment No. 4 of the CDWR's Bulletin No. 104-2 [7]. For the purposes of this SNMP, only stream gaging stations located at critical locations were selected for calculating surface water inflow and outflow of the San Gabriel Basin. They include the LACDPW gaging stations below Morris Dam and Whittier Narrows Dam and the LACDPW gaging stations at the mouth of the San Gabriel River and Rio Hondo tributaries, as shown on Plate III.10. The annual flows at these gaging stations were obtained from LACDPW and are included in Appendix D.

The annual surface water inflow of the San Gabriel Basin or runoff of the San Gabriel River and Rio Hondo watershed at Whittier Narrows was calculated as the sum of the annual streamflow at the LACDPW gaging stations below Morris Dam and at the mouth of the San Gabriel River and Rio Hondo tributaries. During the period 1949-50 through 2010-11, inflow varied from approximately 5,140 to 852,940 af/yr, averaging 188,050 af/yr, as shown on Plate III.12 and Appendix D. The annual streamflow at the LACDPW gaging station below Whittier Narrows Dam, was assumed as the annual surface water outflow of the San Gabriel Basin, and varied from approximately 560 to 274,240 af/yr, averaging 58,230 af/yr, as shown in Appendix D. This outflow, however, includes recycled water released by the San Jose Creek Wastewater Reclamation Plant (SJCWRP) to San Jose Creek since 1972-73. The annual surface water inflow and outflow of the San Gabriel Basin from 1949-50 through 2010-11 are shown on Plate III.12.

Using the annual average precipitation for the mountains watershed, the valley floor, and the southern low hills watershed since 1973-74, as shown in Appendix C, and the areas of the mountains watershed, the valley floor, and the southern low hills watershed, the annual volume of precipitation in the San Gabriel River and Rio Hondo watershed was calculated to vary from approximately 149,100 to 1,472,800 af/yr, averaging approximately 592,700 af/yr, as shown on Table III.2. As a result, runoff coefficient of the San Gabriel River and Rio Hondo watershed was estimated to vary from 6% to 62%, averaging 33%.

III.3.5. Hydrogeology

The Basin is a structural basin filled with permeable alluvial deposits, which is underlain and surrounded by relatively impermeable rock. It forms an aquifer, i.e. *"a geologic unit that can store and transmit water at rates fast enough to supply reasonable amounts to wells"* [15]. The Basin aquifer is stratified in some areas by confining or semi-confining layers consisting of impermeable or less-permeable materials such as clay or silt. In these areas, the Basin aquifer is an aquifer system that may include an unconfined or water-table aquifer overlying individual confined or artesian aquifers separated by semi-confining or confining layers. Groundwater in the confined aquifers is normally under pressure; therefore, water will rise in a well drilled to these aquifers to a level above their overlying confining layer, which is called the potentiometric surface [15]. In general, the Basin aquifer is considered unconfined because the semi-confining or confining layers are not continuous across the Basin, as shown on Plates III.6b and III.6c.

III.3.5.1 Aquifer Characteristics

Performance of an aquifer depends on two characteristics or parameters: transmissivity (T) and storage coefficient or coefficient storage or storativity (S). The transmissivity of an aquifer is defined as *"the amount of water that can be transmitted horizontally by the full saturated thickness of the aquifer under a hydraulic gradient [or slope] of 1"* [15]. It is the product of the hydraulic conductivity or permeability (K) and the saturated thickness of the aquifer (b), T = bK. Common units are gallons per day per square foot (gpd/ft^2) or feet per day (ft/d) for K and gallons per day per foot (gpd/ft) or square feet per day (ft^2/d) for T. The storage coefficient or storativity of an aquifer is defined as *"the volume of water that a permeable unit will absorb or expel from storage per unit surface area per unit change in head"* [15]. It is a dimensionless quantity and representative of the aquifer condition. It is usually less than 0.005 for confined aquifers and ranges from 0.02 to 0.30 for unconfined aquifers.

The aquifer characteristics or parameters may be determined by different methods, but the aquifer performance test (APT) method appears to be most accurate [16]. During the APT, a production well would be pumped at a constant-rate for an adequate time period while monitoring the water level in one or more observation wells located close to the pumping well and having similar well construction design.

As part of its investigation of the Basin in the 1960s, CDWR conducted 22 APTs on wells distributed throughout the Basin to determine the characteristics of the Basin aquifer. The locations of the APTs conducted by CDWR are shown on Plate III.13. The Basin aquifer characteristics estimated by CDWR, as shown in Table III.3, range from 33,000 to 875,000 gpd/ft (or 4,412 to 116,979 ft^2/d) for transmissivity, from 512 to 4,900 gpd/ft^2 (or 68 to 655 ft/d) for hydraulic conductivity, and from 0.00006 to 0.018 for coefficient of storage.

Since 1991, as part of its groundwater resources management activities, Watermaster has conducted 33 APTs primarily to obtain field data for calibration of its two-dimensional finite-difference San Gabriel Basin Groundwater Flow Model. The locations of the APTs conducted by Watermaster are shown on Plate III.13. The Basin aquifer characteristics estimated from these APTs, as shown in Table III.4, range from 13,400 to 1,167,300 gpd/ft (or 1,791 to 156,056 ft^2/d) for transmissivity, from 91 to 3,400 gpd/ft^2 (or 12 to 455 ft/d) for hydraulic conductivity, and from 0.000073 to 0.36 for coefficient of storage. Most of the Basin aquifer acts as a semi-confined aquifer, but in some areas, it acts as a confined or unconfined aquifer.

III.3.5.2 Groundwater Level and Movement

Groundwater levels in production or monitoring wells throughout the Basin have been measured by various agencies such as the well owners, LACDPW, CDWR, USGS, USEPA, San Gabriel Valley Protective Association, and Watermaster since the beginning of the 20^{th} century; however, LACDPW and Watermaster appear to hold most complete water level measurement records, prior to 1993 for LACDPW and thereafter for Watermaster. The water table or potentiometric surface of the Basin aquifer can be found at or near ground surface in the Whittier Narrows area or at depths exceeding 300 feet bgs along the Raymond and Duarte faults, as shown on Plates III.6.b and III.6.c.

A well located in the City of Baldwin Park has been designated by Watermaster as the key well, i.e. the Baldwin Park Key Well (Key Well), whose water levels are used to represent the Basin hydrogeologic conditions. The Key Well location is shown on Plate III.14. Historic water levels in the Key Well indicate that the water table or potentiometric surface of the Basin appears to respond to hydrologic conditions, i.e. wet-dry cycles, as shown on Plate III.15; however, responses at individual wells across the Basin are different. Historic data from the Watermaster Basinwide Groundwater Elevation Monitoring Program (BGWEMP), as shown on Plate III.16, indicate that Groundwater levels in the wells located east of Rio Hondo (such as Well No. 1 of the City of Covina and CAWC Santa Fe Well and Blue Ribbon Well No. 1) appear more sensitive to the hydrologic conditions than those located west of Rio Hondo (such as Well No. 10 of San Gabriel County Water District and Garfield Well of the City of Alhambra) and along the Basin perimeter (such as LACDPW Well 2947F and Well 155W-2 of Suburban Water Systems (SWS)). The water level spikes observed at CAWC Santa Fe Well (Recordation Number 1900354), as shown on Plate III.16, are immediate responses to surface water spreading at the LACDPW Santa Fe Spreading Grounds (SFSG). The SFSG is located adjacent to CAWC Santa Fe Well, as shown on Plate III.14.

The direction of groundwater movement in some areas of the Basin such as the area north of the Duarte fault, the eastern portion east of Azusa Avenue, and the Puente valley remains the same as that during earlier periods. In other portions of the Basin, the direction of groundwater movement is affected naturally by hydrologic conditions and geological features and artificially by groundwater resources management measures such as extraction and/or groundwater recharge.

Prior to development, "*the general direction of ground water movement across all of the San Gabriel Valley was from the perimeter of the valley toward Whittier Narrows, the only area where subsurface outflow from the San Gabriel Valley is known to take place*" [7]. The direction of groundwater movement is perpendicular to the water level contours, as shown on Plate III.17a. Due to groundwater extraction for early development, a groundwater low was formed in the vicinity of the City of Alhambra, causing groundwater in the northwestern portion of the valley to flow towards this groundwater low (also known as the Alhambra pumping hole) rather than towards Whittier Narrows, as shown on Plate III.17b.

Since July 1996, as part of its BGWEMP, Watermaster has generated groundwater contour maps for the entire Basin using the water levels at approximately 130 primary wells and 40 secondary wells measured in January and July to represent the wet and dry periods for each year. The groundwater contours were generated manually on an USGS-Quad map using the measurements at the primary wells as primary data points and those at the secondary wells as supplemental data points. Physical boundaries such as hills and faults, especially the Duarte and Raymond faults, were taken into consideration when preparing the groundwater contours.

The Watermaster semi-annual groundwater contour maps indicate that groundwater movement in the Basin may be affected locally by groundwater extraction and recharge. In the vicinity of major pumping centers, groundwater may flow towards cones of depression caused by large extraction from production wells, as shown on Plate III.17c. Groundwater movement in the Basin portion bounded by the Duarte fault on the north, the San Gabriel River on the west, the Walnut Creek on the south, and Azusa Avenue on the east is highly affected by groundwater recharge activities at the SFSG, as shown on Plate III.17d, or by groundwater cascading across the Duarte fault at the mouth of the San Gabriel Canyon, as shown on Plate III.17e. The groundwater mound created by groundwater recharge at the SFSG or by groundwater cascading from the San Gabriel Canyon reverses the "normal" east-west direction of groundwater movement in the area just south of the Duarte fault and east of the San Gabriel River. This reversed groundwater commingles with that from the east and then flows in a northeast-southwest direction towards Whittier Narrows, as shown on Plates III.17d and III.17e.

III.3.5.3 Subsurface Inflow

According to CDWR, *"ground water moves into the San Gabriel Valley from the Raymond Ground Water Basin across the Raymond fault on the northwest,… Some subsurface inflow also takes place from the San Gabriel Mountains on the north, as a result of stored water moving out of fractures in the Basement Complex into the alluvial fill, and a negligible quantity of water may be enter the valley from the hills on the south… The seasonal subsurface inflow varied from a minimum of 14,400 acre-feet in 1950-51 to a maximum of 21,700 acre-feet in 1943-44...*

The groundwater contours prepared by LACDPW, as shown on Plates III.18a and III.18b, and by the Chino Basin Watermaster, as shown on Plate III.18c do not indicate groundwater movement from the Chino Basin to the San Gabriel Valley since 1957. Based on these groundwater contours, the Chino Basin appears separated from the San Gabriel Basin by a groundwater divide in the La Verne area and from the Puente Basin by a groundwater divide at its northeast end. As a result, there is no subsurface flow from the Chino basin to the San Gabriel and Puente Basins.

"Underflow into San Gabriel Valley across the Raymond fault varied from 2,000 to 12,000 acre-feet per year during the base period [from 1943-44 to 1959-60]. This subsurface flow did not occur at the same rate along the length of the fault, but varied from west to east. The lowest rates occurred near the western edge of the basin where the Raymond fault constitutes a nearly impervious barrier to ground water movement, and the highest rates occurred near Santa Anita where the barrier effect is negligible. Estimates of underflow across the Raymond fault were based on values of ground water gradients between water levels north of the fault" [7].

The groundwater contours prepared by LACDPW, as shown on Plates III.18a and III.18b, and by the Raymond Basin Management Board, as shown on Plates III.18d and III.18e, do not indicate north-south groundwater gradients between water levels north of the fault since 1957. Groundwater in the Raymond Basin appears to flow southeasterly along the Raymond fault towards cones of depression created by production wells. Since October 2007, groundwater in the easterly portion of the Raymond Basin between Eaton Wash and Santa Anita Wash appears to flow northerly away from the Raymond fault, as shown on Plates III.18d and III.18e. As a result, there should be no subsurface flow from the Raymond Basin to the San Gabriel Basin because north-south groundwater gradients between water levels north of the fault have not been observed, at least since 1957.

Subsurface inflow occurs from the Puente Basin into the Main Basin. Groundwater measurements are made semi-annually and subsurface inflow is calculated annually pursuant to the Puente Narrows Agreement. Subsurface inflow has ranged from 658 acre-feet per year to 985 acre-feet per year, while the long-term average has been 857 acre-feet per year, as shown on Table III.6. The seasonal amounts of subsurface inflow calculated by the CDWR and River Watermaster are included in Appendix E.

III.3.5.4 Subsurface Outflow

Subsurface outflow through Whittier Narrows was calculated using Darcy's equation by the CDWR (from 1933-34 to 1959-60) and by the San Gabriel River Watermaster (River Watermaster) (since 1964-65). During the period from 1933-34 to 1959-60, *"subsurface outflow varied from a low of 21,800 acre-feet in 1941-42 to a high of 34,000 acre-feet in 1949-50"* [7] averaging 28,400 af/yr. Since 1964-65, subsurface outflow varied from 15,000 af/yr in 1965-66 to 38,200 af/yr in 2007-08, averaging 26,488 af/yr [20]. As a result, the average subsurface outflow through Whittier Narrows for the period from 1933-34 through 2010-11 is approximately 27,200 af/yr. The seasonal amounts of subsurface outflow calculated by the CDWR and River Watermaster are included in Appendix E.

The calculated subsurface outflow does not appear to follow the Basin hydrologic conditions. For example, during the wet period from 1935-36 to 1941-42, the CDWR subsurface outflow decreased significantly from approximately 33,500 af/yr to approximately 21,800 af/yr. Similarly, during the dry period from 1973-74 to 1976-77, the River Watermaster subsurface outflow increased significantly from approximately 23,300 af/yr to approximately 37,500 af/yr.

III.3.6. Groundwater Storage Capacity and Groundwater in Storage

The groundwater storage capacity of an individual basin is determined by the CDWR as the product of the total volume of that basin (from ground surface to the base) and its average specific yield. The storage capacity is constant and is dependent on the geometry and hydrogeologic characteristics of the aquifer(s) [17]. As a result, the storage capacity defined by the CDWR is the amount of groundwater that can be drained by gravity from the completely saturated basin, i.e. the amount of groundwater that can be extracted from the basin. The CDWR groundwater storage capacity does not include the amount of groundwater that is retained in small pore spaces due to surface retention; therefore, it is less than the total volume of groundwater that can be stored in the basin, which is the sum of these two amounts or the product of the total volume of the basin and its effective porosity, which is the specific yield plus the specific retention.

Groundwater in storage, according to the CDWR, is the amount of groundwater that can be drained (or extracted) from a basin between the water table and its base. Like the groundwater storage capacity, groundwater in storage defined by the CDWR is less than the amount of groundwater stored in the basin between the water table and its base.

The groundwater storage capacity of the San Gabriel Valley (from ground surface to the base of fresh water) was estimated by the CDWR to be 9,500,000 af in 1966 [7], 10,438,000 af in 1975 [18], and 10,740,000 af in 2004 [19].

The amount of groundwater in storage was estimated to be 9,700,000 af in 1960 [7]. Watermaster has been using the groundwater in storage estimated by the CDWR in 1960, i.e. 9,700,000 af, and its rule of thumb for changes in groundwater in storage, i.e. 8,000 af for each linear foot of change in groundwater elevation at the Key Well, to evaluate the Basin groundwater storage. During the period from 1933 to 2012, groundwater in storage in the Basin varied from approximately 7,510,000 af in 2009 to approximately 8,470,000 af in 1944 averaging approximately 7,860,000 af, as shown on Plate III.19. The estimated volume of groundwater in storage for this SNMP is shown in Table III.6. As an extremely conservative approach, this SNMP assumes that only 75 percent of the Basin volume, or about 6,000,000 acre-feet is included in mixing calculations. Extraction wells in the Main Basin typically are about 500 feet to 1,000 feet deep and are screened over large (several hundred feet) intervals, facilitating vertical mixing. Likewise, mixing also occurs as the groundwater flows in the general direction from east to west. Consequently, assimilative capacity calculations in Section III.4.3 use a value of 6,000,000 acre-feet for Basin volume and consider the 25 percent reduction from 8,000,000 acre-feet as a margin of safety.

III.3.7. Water Production

The Basin water production comes from groundwater extracted from the Basin, surface water diversion from the San Gabriel River, groundwater imported from the Raymond Basin, and surface water imported from the State Water Project. A portion of the Basin water production, however, has been exported by producers to serve their service areas in the Central Basin.

III.3.7.1 Basin Groundwater Extraction and Surface Water Diversion

The Basin seasonal groundwater extraction during the period from 1933-34 to 1959-60 was reported in the CDWR Bulletin No. 140-2 [7]. During the period from 1933-34 to 1954-55, it was estimated by the CDWR to vary from 119,800 af/yr in 1934-35 to 177,800 af/yr in 1950-51. During the period from 1955-56 to 1959-60, it was recorded to vary from 164,700 af/yr in 1956-57 to 199,000 af/yr in 1958-59, as shown on Plate III.20.

Since 1973-74, annual groundwater extraction and surface water diversion have been reported in the Watermaster Annual Reports [21]. Approximately 500 groundwater production wells were drilled in the Basin, but only 229 wells are currently active or standby. The locations of the active or standby wells are shown on Plate III.14. The annual groundwater extraction and surface water diversion from 1973-74 to 2010-11 are included in Appendix F. During this period, groundwater extraction varied from 181,240 to 270,380 af/yr, averaging 228,040 af/yr. Surface water diversion varied from 4,690 to 22,820 af/yr, averaging 15,870 af/yr, as shown on Plate III.20. Table III.6 shows the total water production from the San Gabriel Basin.

III.3.7.2 Imported Water

Annual imported water for direct municipal water use and groundwater recharge from 1963-64 through 2010-11 was obtained from the Watermaster annual reports [21] and Raymond Basin Management Board (Raymond Board) annual reports [22], as shown in Appendix G. Water for direct municipal water use is either treated imported water or groundwater imported from water producers in the Raymond Basin. Treated surface water imported from Upper District and Three Valleys Municipal Water District (Three Valleys District) for municipal uses varied from 250 to 50,760 af/yr, averaging 16,030 af/yr. Groundwater imported from the Raymond Basin for municipal uses varied from 520 to 6,200 af/yr, averaging 3,310 af/yr. Surface water from the State Water Project is imported for groundwater recharge by the Upper District, the San Gabriel Valley Municipal Water District (San Gabriel District), and Three Valleys. During this period, surface water imported from State Water Project varied from 0 to 79,040 af/yr, averaging 31,320af/yr. The total imported water varied from 5,240 to 119,630 af/yr, averaging 50,670 af/yr. The annual imported water is included in Appendix G and Table III.6.

III.3.7.3 Exported Water

California Domestic Water Company (CDWC), San Gabriel Valley Water Company (SGVWC), SWS, and the City of Whittier have delivered water from their wells in the Basin to their service areas in the Central Basin. Annual groundwater exported from the Basin, as shown in Appendix H and Table III.6), was reported in the River Watermaster's annual reports [20]. During the period from 1955-56 through 2010-11, groundwater exported from the Basin varied from 25,500 to 44,200 af/yr at an average of 35,700 af/yr. Annual groundwater exported from the Basin by these producers is shown on Plate III.21.

III.3.8. Groundwater Balance Model and Safe Yields

According to the CDWR, deep percolation, i.e. groundwater recharge to the Basin, includes artificial recharge, streambed percolation, percolation of delivered water, and percolation of precipitation. The amount of deep percolation of each component was determined as the "residual" of the amounts of surface water supply, use, and disposal [7]. During the period from 1933-34 to 1959-60, deep percolation varied from a minimum of 92,700 af/yr in 1950-51 to a maximum of 459,500 af/yr in 1940-41.

For the purposes of this San Gabriel SNMP, groundwater recharge to the Basin consists of natural recharge and artificial recharge. The input and output parameters of recharge and discharge were formulated into a groundwater balance model. Furthermore, the Basin natural safe yield is defined as the difference between the natural groundwater recharge and subsurface outflow through Whittier Narrows (no subsurface inflow), and the sum of the natural safe yield and artificial recharge is considered as the Basin managed safe yield.

III.3.8.1 Groundwater Balance Model

The annual groundwater recharge since 1973-74 was estimated using a spreadsheet groundwater balance model that includes components for recharge and discharge within the Basin. Recharge components consist of natural recharge (percolation of precipitation on the valley floor, percolation of runoff from surrounding watersheds, and subsurface inflow from adjacent basins) and artificial recharge (direct spreading of local runoff or imported water, incidental percolation of water discharged into unlined portions of the San Gabriel River, and return flow from water usage within the Basin). Discharge components consist of groundwater extraction and subsurface outflow to the Central Basin through Whittier Narrows.

Recharge Components

The natural recharge components, consisting of percolation of precipitation, percolation of runoff, and subsurface inflow from the Puente Basin, have previously been discussed in Sections III.3.4.2, III.3.4.3, and III.3.5.3, respectively.

Artificial recharge through direct spreading of local and imported water at the spreading grounds within the Basin from 1930-31 through 2010-11 were obtained from the LACDPW annual hydrologic reports [23]. The locations of the spreading grounds are shown on Plate III.14. The annual surface water spreading at the spreading grounds are included as Appendix I and Table III.6. During this period, surface water spreading within the Basin varied from 0 to 427,790 af/yr at an average of 74,020 af/yr, as shown on Plate III.22.

Artificial recharge through return flow includes municipal and recycled water percolated to the Basin from surface uses, such as irrigation. Artificial recharge through incidental percolation of water discharged into the unlined portions of the San Gabriel River and San Jose Creek includes recycled water from the SJCWRP and PWRP that comingles with local stormwater in the River. Annual incidental percolation was estimated as the difference between the annual recycled water released into San Jose Creek from the SJCWRP and the annual streamflow at Station F-263. Percolation is assumed to not occur if the annual streamflow at F-263 is greater than the annual release of recycled water. During the period from 1949-50 to 2010-11, annual incidental percolation of recycled water released into San Jose Creek and San Gabriel River was estimated to vary from 0 to 31,040 af/yr, averaging approximately 8,770 af/yr, as shown in Appendix J, Table III.6 and Plate III.23.

Discharge Components

The discharge components, consisting of groundwater extraction and subsurface outflow, have previously been discussed in Sections III.3.7 and III.3.5, respectively.

Calibration

The groundwater elevation at the Key Well, as shown in Plate III.24, was used to calibrate the components of the Basin spreadsheet groundwater balance model, shown on Plate III.25 and Table III.6.

For the groundwater balance model, percolation of runoff from surrounding watersheds was included under the category of percolation of precipitation. Initial coefficients for recharge from precipitation in the valley floor and watersheds were originally set to 0.25. Assumptions in adjusting the coefficients included: essentially no recharge would occur when the annual precipitation was 0.33 to 0.5 times the average precipitation; recharge would increase as precipitation increased to the average; then increase more as precipitation approached the mean of the average and maximum precipitation, and then for annual precipitation exceeding the mean of the average and maximum precipitation. This results in four coefficients each for the valley floor and watersheds for each time period. The coefficients were adjusted until the predicted groundwater level approximated the groundwater elevation at the Key Well. It is assumed the recharge coefficients differ by region due to differences in watershed area, slope, and area of recharge zones.

Initially, a recharge coefficient of 0.09 was used for return flow from water usage on the valley floor and for return flow from direct use of recycled water to represent the fraction of the water that reaches the groundwater table. The coefficient for direct spreading was assumed to be 1.

First, the groundwater balance model was calibrated for the period from 1973-74 to 1993-94. This calibration adjusted the recharge coefficients from precipitation until the simulated water level matched the measured water level at the Key Well. These coefficients, however, were too high for the years following 1981-82; therefore, they were adjusted further for the period from 1981-82 to 1996-97 and from 1997-98 to 2010-11. The decreasing recharge coefficients from precipitation, as shown in Table III.5, appeared to reflect urban development that increased the impervious areas in the Basin during these periods.

The calibrated recharge coefficients for percolation of precipitation were then kept constant while adjusting the recharge coefficient for return flow in an attempt to improve the match, but the match between simulated and observed water levels at the Key Well was no better. Therefore, the initial recharge coefficient for return flow of 0.09 was used for the best calibration. The best match between simulated and observed groundwater elevations at the Key Well are shown on Plate III.24.

The calibrated Basin spreadsheet groundwater balance model, as shown in Table III.6, indicates that, during the period from 1973-74 through 2010-11, the groundwater recharge to the Basin varied from approximately 104,220 to 613,590 af/yr, averaging approximately 251,540 af/yr. Since 2001-02, there have been two drought years, and thereby receiving about 40% less recharge from precipitation, though direct spreading has averaged about 41,500 af/yr more than the long-term average, as shown in Plate III.25. During the period from 1973-74 through 2010-11, the groundwater discharge through extraction and subsurface outflow varied from approximately 208,290 to 296,480 af/yr, averaging approximately 255,500 af/yr.

III.3.8.2 Natural Safe Yield and Managed Safe Yield

Table III.6 also indicates during the period from 1973-74 to 2010-11 the annual natural safe yield, i.e., the difference between the natural groundwater recharge and the subsurface flow to the Central Basin, varied annually from approximately -26,760 to 315,400 af/yr, averaging approximately 53,640 af/yr. The managed safe yield, i.e., the sum of the natural safe yield and the artificial groundwater recharge, varied from approximately 78,120 to 589,490 af/yr, averaging approximately 224,090 af/yr. CDWR deep percolation to the Basin from 1933-34 to 1959-60 is equivalent to the managed safe yield for that period, which averaged approximately 205,100 af/yr [7].

III.3.9. Groundwater Quality

The quality of groundwater extracted in the San Gabriel Basin has been continuously monitored since the early 1900s. Groundwater quality testing has been performed to meet specific requirements such as the SWRCB Division of Drinking Water (DDW)[1] Title 22. In the 1970s, LACDPW initiated a groundwater quality program to sample groundwater production wells, under selected scheduling, in coordination with CDWR. The samples collected under this program are analyzed for major minerals, total dissolved solids (TDS), electrical conductivity, pH, and, in certain cases, phosphate, iron, manganese, fluoride, and boron [24].

Following its creation in 1973, Watermaster assumed responsibility for the DDW-mandated water quality sampling of groundwater production wells in the Basin. DDW Title 22 sampling requires all wells used for potable water supplies to be sampled at least once every three years for chloride (Cl), sulfate (SO4), and TDS, and at least annually for nitrate (NO3). In addition, all wells are sampled for General Mineral, General Physical, Inorganics, Radioactivity, VOC, plus various emerging contaminants on a regular and continuous basis. All data is provided to DDW electronically and maintained on the Watermaster database. Since the late 1970s and early 1980s, groundwater quality monitoring activities have been expanded to include volatile organic compounds (VOCs), and as a result, significant groundwater contamination was discovered in the Basin.

Since fiscal year 1994-95, Watermaster has also implemented its Basinwide Groundwater Quality Monitoring Program (BGWQMP) to sample all production wells (both potable and non-potable) in the Basin at least once a year for VOCs, TDS, and nitrate (NO_3), and once every three years for chloride and sulfate, in addition to the LARWQCB and USEPA monitoring programs [25]. These groundwater quality monitoring programs have resulted in a large volume of water quality records that are currently stored in the databases managed by Watermaster, LARWQCB, USEPA, and DDW. In addition to nitrate, chloride, sulfate, and TDS, other constituents such as tetrachloroethylene (PCE), trichloroethylene (TCE), carbon tetrachloride (CTC), and perchlorate (CLO_4) are considered as CECs for this SNMP. The Basin Plan Objectives for water quality

[1] The Division of Drinking Water was formally under the California Department of Public Health.

defines the objectives for each nutrient/salt constituent: 45 mg/L NO3, 100 mg/L Cl, 100 mg/L SO4, 450 mg/L TDS (Appendix B, Table III.1). Title 22 of the California Code of Regulations defines the maximum contaminant level (MCL) for NO3 as 45 mg/L and the Upper Limits for Cl, SO4, and TDS as 500 mg/L, 500 mg/L, and 1,000 mg/L, respectively. The maximum recommended levels for CL, SO4, and TDS are 250 mg/L, 250 mg/L, and 500 mg/L, respectively. Further, the MCL identified in the Basin Plan Objectives for PCE and TCE have been set to 5 µg/L, CTC to 0.5 µg/L, and ClO_4 to 6 µg/L (Table III.1).

The water quality data presented in this SNMP is the annual average of all production well quality data as sampled in the above mentioned water quality monitoring programs. The LARWQCB has a "political" boundary separating the Main Basin into the East and West Areas; however, there is no geological/hydrogeological distinction between the two Areas established by LARWQCB and this distinction is not recognized by the CDWR. As shown on Plate III.26, the vast majority of all production wells overly the West Area. Because of the geographical location of the production wells as well as the natural movement of groundwater from the northeast towards the west/southwest, natural comingling and mixing occurs between the two Areas. The depths of the production wells in the Basin, along with the geology of the Basin, facilitate vertical mixing of the groundwater. Consequently, the water quality averages are presented as basin-wide averages.

The USEPA has listed four areas of groundwater contamination in the San Gabriel Valley that have been listed on the USEPA's National Priorities List: San Gabriel Valley Area 1, San Gabriel Valley Area 2, San Gabriel Valley Area 3, and San Gabriel Valley Area 4. These areas impact all or portions of the cities of Alhambra, Arcadia, Azusa, Baldwin Park, Industry, Irwindale, El Monte, La Puente, Monrovia, Rosemead, South El Monte, and West Covina. VOCs including PCE, TCE, and CTC were first detected in groundwater in these areas in 1979. Since then, other contaminants including the VOC 1,4-dioxane, the semi-volatile organic compound N-Nitrosodimethylamine (NDMA), and the inorganic chemical perchlorate have been detected. Since 1979, the USEPA has installed cleanup projects, called Operable Units, in each contaminated area. Treated contaminated water to be used for potable purposes is also regulated by DDW. The contamination level (concentration) and distribution of NO3, Cl, SO4, TDS, and the CECs identified for this SNMP are discussed below.

III.3.9.1 Nitrate, NO_3

The NO_3 concentration data is from the Main San Gabriel Watermaster database, as shown in Appendix K. From 1973-74 to 2011-12, the annual average NO_3 concentration of the Basin, i.e. the average concentration of groundwater extracted from the Basin, ranged from 19.0 mg/L in 2011-12 to 34.7 mg/L in 1975-76, averaging 24.2 mg/L, as shown in Appendix K and Plate III.27a. The average nitrate concentration for the most recent 5-year period is 23.3 mg/L.

Elevated NO_3 concentrations were generally found in shallow wells, while low concentrations were found in wells adjacent to streams or spreading grounds. The NO_3 concentrations exceeding 45 mg/L were generally found in the western portion of the Basin west of Alhambra Wash, in the eastern portion of the Basin east of Little Dalton Wash, and in the vicinity of the mouth of the Puente Valley, as shown on Plate III.27b. The annual average nitrate concentration was calculated as the arithmetic average concentration of all available water quality data at the production wells within the Basin. Analysis of the data in Appendix K revealed that NO_3 concentrations generally decreased each decade since the 1970s. The average concentration of all wells sampled in a decade, and the number of wells testing greater than 45 mg/L, both decreased, from an average of 64 mg/L in the 1970s to 31 mg/L or less since 2000-01, as shown in Table III.7. In the 1970s, 78% of the wells tested exceeded the Basin Plan Objective, while 21% or fewer exceeded 45 mg/L since 2000-01. The NO_3 concentrations in some wells in the southeastern portion of the Basin remain above 45 mg/l, as shown on Plate III.27c. The historical high nitrate concentrations by producer are provided in Appendix Q.

III.3.9.2 Chloride

The chloride concentration data was derived from approximately 3,900 observations from production wells across the Basin. The annual average chloride concentration was calculated as the arithmetic average concentration of all available water quality data at the production wells within the Basin. From 1973-74 to 2011-12, the annual average chloride concentration of the Basin, i.e. the average concentration of groundwater extracted from the Basin, ranged from 21 mg/L in 1998-99 to 37 mg/L in 1982-83, averaging 28 mg/L, as shown in Appendix K and Plate III.28. The average chloride concentration for the most recent 5-year period is 31 mg/L.

Elevated chloride concentrations were generally found in shallow wells, while low concentrations were found in wells adjacent to streams or spreading grounds. The chloride concentrations exceeding 100 mg/L were generally found in the western portion of the Basin west of Alhambra Wash, in the eastern portion of the Basin east of Little Dalton Wash, and in the vicinity of the mouth of the Puente Valley. Though some individual wells exceeded the Basin Plan Objective, the average chloride concentration has been below 100 mg/L, as shown in Plate III.28. There have been minor changes in chloride concentrations in each decade since the 1970s, as shown in Table III.7.

III.3.9.3 Sulfate

The sulfate concentration data was derived from approximately 3,900 observations from production wells across the Basin. The annual average sulfate concentration was calculated as the arithmetic average concentration of all available water quality data at the production wells within the Basin. From 1973-74 to 2011-12, the annual sulfate concentration of the Basin, i.e. the average concentration of groundwater extracted from the Basin, ranged from 38 mg/L in 1998-99 to 70 mg/L in 2009-10, averaging 49 mg/l, as shown in Appendix K and Plate III.29. The average sulfate concentration for the most recent 5-year period is 52 mg/L.

Elevated sulfate concentrations were generally found in shallow wells, while low concentrations were found in wells adjacent to streams or spreading grounds. The sulfate concentrations exceeding 100 mg/L were generally found in the western portion of the Basin west of Alhambra Wash, in the eastern portion of the Basin east of Little Dalton Wash, and in the vicinity of the mouth of the Puente Valley. Though several individual wells exceeded the Basin Plan Objective, the average sulfate concentration has been well below 100 mg/L, as shown in Plate III.29. There have been minor changes in sulfate concentrations in each decade since the 1970s,,as shown in Table III.7.

III.3.9.4 TDS

The TDS concentration data is the Main San Gabriel Watermaster database, as shown in Appendix K. From 1973-74 to 2011-12, the annual average TDS concentration of the Basin, i.e. the average concentration of groundwater extracted from the Basin, ranged from 198 mg/L in 1998-99 to 385 mg/L in 2009-10, averaging 338 mg/L, as shown in Appendix K and Plate III.30a. The exceptionally low concentration in 1998-99 is almost certainly a sampling artifact, as it is more than 90 mg/L less than any other observation in the observation period. The average TDS concentration for the most recent 5-year period is 349 mg/L.

The TDS concentrations exceeding 1,000 mg/l were found in the vicinity of the mouth of the Puente Valley, and the TDS concentrations exceeding 500 mg/l were generally found in the eastern portion of the Basin, east of Big Dalton Wash and also in the vicinity of Whittier Narrows, as shown on Plate III.30b. The 2011-12 TDS concentrations in the eastern portion of the Basin and in the vicinity of Whittier Narrows remain above 500 mg/l, as shown on Plate III.30c. The historical high TDS concentrations by producer are provided in Appendix Q, as a composite representative of all salts.

There is an inverse relation between the volume of groundwater in storage and TDS concentration, as shown in Plate III.30d. The mechanism of this interaction is not clear, but when the volume of groundwater in storage decreases, it appears the salts in the water become more concentrated, resulting in increasing TDS concentrations. The volume of groundwater in storage has been decreasing since about 2001, as shown in Plate III.19. This decrease in groundwater volume is reflected in the increase in groundwater TDS concentrations observed in Plate III.30a.

III.3.9.5 Others

PCE, Tetrachloroethylene or Perchloroethylene

Historically maximum PCE concentrations in the production wells across the Basin varied from less than its method detection limit (ND) to 1,200 micrograms per liter (µg/L), averaging 35 µg/L, as shown in Appendix Q. The PCE concentrations exceeding 5 µg/L, which is the MCL, were generally found in areas in the Cities of Azusa, Baldwin Park, La Puente, Industry, Whittier, Monrovia, El Monte, South El Monte, Rosemead, and Monterey Park, as shown on Plate III.31a. When sampled again, a few months to twenty-nine years later, the PCE concentrations in the production wells meeting the water quality objective increased from 59% to 89%, the maximum observed concentration decreased to 980 µg/L, and the average decreased to 22 µg/L, as shown in Appendix Q. The PCE concentrations in some production wells in the Cities of Azusa, Baldwin Park, La Puente, Industry, El Monte, South El Monte, Rosemead, and Monterey Park remain above 5 µg/L, as shown on Plate III.31b.

TCE, Trichloroethylene

Historically, maximum TCE concentrations in the production wells across the Basin varied from ND to 1,315 µg/L, averaging 44 µg/L, as shown in Appendix Q. The TCE concentrations exceeding 5 µg/L, which is the MCL, were generally found in the same areas as PCE, in the Cities of Azusa, Baldwin Park, La Puente, Industry, Whittier, Monrovia, El Monte, South El Monte, Rosemead, Alhambra, and Monterey Park, as shown on Plate III.32a. When sampled again, a few months to thirty-four years later, the TCE concentrations in the production wells meeting the water quality objective increased from 43% to 82%, the maximum observed concentration decreased to 600 µg/L, and the average decreased to 21 µg/L, as shown in Appendix Q. The TCE concentrations in some production wells in the Cities of Azusa, Baldwin Park, Industry, El Monte, Rosemead, and Alhambra remain above 5 µg/L, as shown on Plate III.32b.

CTC, Carbon tetrachloride

Historically, maximum CTC concentrations in the production wells across the Basin varied from ND to 48 µg/L, averaging 6 µg/L, as shown in Appendix Q. The CTC concentrations exceeding 0.5 µg/L, which is the MCL, were generally found in areas in the Cities of Azusa, Baldwin Park, La Puente, Industry, Whittier, Monrovia, and El Monte, as shown on Plate III.33a. When sampled again, a few months to thirty-two years later, the CTC concentrations in the production wells meeting the water quality objective increased from 2% to 61%, the maximum observed concentration decreased to 14 µg/L, and the average decreased to 4 µg/L, as shown in Appendix

Q. The CTC concentrations in some production wells in the Cities of Baldwin Park and Industry remain above 0.5 µg/L, as shown on Plate III.33b.

ClO_4, Perchlorate

Historically, maximum ClO_4 concentrations in the production wells across the Basin varied from ND to 390 µg/L, averaging 28 µg/L, as shown in Appendix Q. The ClO_4 concentrations exceeding 6 µg/L, which is the MCL, were generally found in areas in the Cities of Azusa, Baldwin Park, La Puente, Industry, Whittier, Monrovia, and El Monte, as shown on Plate III.34a. When sampled again, a few months to sixteen years later, the CLO_4 concentrations in the production wells meeting the water quality objective increased from 77% to 88%, the maximum observed concentration decreased to 100 µg/L, and the average decreased to 17 µg/L, as shown in Appendix Q. The ClO_4 concentrations in some production wells in the Cities of Baldwin Park and Industry remain above 6.0 µg/L, as shown on Plate III.34b.

III.4. SALT/NUTRIENT SOURCES

III.4.1. Source Identification

III.4.1.1. Salt

Salts in the environment and hydrologic systems have natural and anthropogenic sources. Salts are soluble compounds of anions (negatively-charged particles) and cations (positively-charged particles) that are attracted to each other electrically, as the opposing poles of a magnet attract. Chemically, salts are composed of an acid and a base, though these acid-base mixtures vary greatly in strength of bonding, solubility, and activity in the solution. The solubility of salts in natural systems varies considerably, e.g. the solubility of salts based on the anion is, in decreasing order, nitrates, chlorides, sulfates, bicarbonate, and carbonate. The mobility of salts corresponds to their solubility.

Water moving through soil and the vadose zone always has dissolved salts in it. The concentration of these salts depends upon the concentration in the water and in the mineral solids through which the water travels. Everything in nature seeks an equilibrium. If the concentration of salts is greater in the mineral solids than in the water, salts will dissolve and increase the salt concentration in the water. If the concentration in the water is greater than in the surrounding solids, salts will precipitate from the water into the solid phase, decreasing the concentration of salts in the water.

Natural Sources

The Basin is situated on alluvial fans, terraces, and flood plains comprised of alluvium (river-deposited sediments) weathered from rocks and minerals from several sources: sedimentary, granitic, andesitic, volcanic, and mixed rocks. The associated watersheds in the mountains flow across weathering sediments of andesite, breccia, schist, and metamorphosed volcanic, basic igneous, granitic and metamorphic rocks. These weathering minerals are a primary source of salts in the basin, though the solubility may vary, and the dominant salts found vary from one part of the watershed or basin to another, depending upon the specific mineralogy present.

Soils and geologic materials in the vadose (unsaturated zone above an aquifer) contain minerals of varying solubility that may dissolve in water. The most common salts in the Basin's soils include chlorides, sulfates, and carbonates of calcium, magnesium, potassium, and sodium. The weathered sedimentary materials have the greatest natural salinity of the rocks found in the Basin and associated watersheds.

Once dissolved, salts move with the water. If water flowing through soil and the vadose zone enters a river or stream, the salts enter surface water. If water percolates to the groundwater, the salts leach with it and enter the aquifer. If water is insufficient to leach the salts to the groundwater, the salts will accumulate at characteristic depths in the soil or vadose zone, as determined by their solubility. The solubility and mobility of salts in the soil and vadose zone from least to greatest is carbonates, sulfates, and chlorides. Due to its mobility, chloride is often used as an environmental tracer.

If atmospheric demand for water through evaporation and transpiration exceed precipitation and irrigation (or water spreading), salts will tend to accumulate at the surface. This process is accelerated in the case of shallow water tables that allow salts to wick upward with water through capillary action.

Atmospheric deposition is a minor source of salts, including nitrates, sulfates, chlorides, and fossil fuel combustion products.

Anthropogenic Sources

Many human activities may contribute salts to the environment. These include household sources such as detergents, water softeners, swimming pool treatment chemicals, runoff from washing cars, use of treated municipal drinking water or gray-water reuse in residential irrigation systems, and on-site wastewater treatment facilities, as well as centralized wastewater treatment facilities, and many industrial processes. Return-flow from water used for surface or subsurface irrigation of agricultural crops, golf courses, parks, sports fields and lawns contribute salt, especially when water is added in excess of the amount required to meet the combined evaporation and transpiration needs of a crop. This may be intentional in an effort to manage the salinity in the root zone to meet crop requirements, or unintentional due to inefficient or unmanaged irrigation systems. Salts from some sources may enter storm drains or surface water systems with no treatment. Others are directly applied to, or disposed in, the soil-vadose zone as a treatment media. These non-point sources salt sources are the most difficult to monitor. The most obvious salt contributors are the point-sources originating from industrial or municipal centralized waste treatment facilities.

TDS is a measure of the salts dissolved in a water system. Because TDS is a measure of all dissolved solids, including nitrates, chlorides, sulfates, and their companion cations, the TDS increases with the concentration of these constituents. Although the TDS water quality objective for the eastern portion of the Basin is 600 mg/l (MCL, Table III.1), the objective for the majority of the Basin is 450 mg/l. The more conservative value (450 mg/l) will be used in determining the assimilative capacity and in completing the antidegradation analysis.

The Basin water rights were adjudicated in 1972 and the quantity and the quality of the Basin water supplies have been managed by the Watermaster since 1972. The primary sources of salt loading are from stormwater recharge, untreated imported water replenished in the Basin in response to annual production which may exceed water rights, and incidental recharge of recycled water which is discharged into the San Gabriel River, Rio Hondo, and San Jose Creek by the LACSD. (The discharge of recycled water by LACSD has been approved by LARWQCB through Water Discharge Requirements (WRDs)). Watermaster Resolution 4-96-138 (see Appendix R) was developed to provide criteria for the delivery of supplemental water (untreated imported water). The Watermaster Judgment and Rules and Regulations directs Watermaster to purchase the highest (best) quality of untreated imported water available. Since the criteria for the delivery of supplemental water was adopted in 1996, Colorado River water has not been used for groundwater replenishment. In the event the highest quality water is not available, the criteria provide a decision tree regarding the delivery and recharge of untreated imported water. To the extent possible, Watermaster's goal is to purchase untreated imported water with TDS concentration no greater than 450 mg/l, chloride concentrations no greater than 100 mg/l and sulfate concentrations no greater than 100 mg/l.

Watermaster historically delivered only SWP water for groundwater recharge purposes. The TDS concentration has ranged from 157 mg/l to376 mg/l and averaged 249 mg/l over the past 39 years. During drought periods the SWP water is more susceptible to sea water influences which may increase TDS and chloride concentrations in the SWP water. However, the TDS concentration of the SWP water is consistent with the historical TDS concentrations throughout the Basin. Stormwater runoff TDS concentrations have ranged from 160 mg/l to 390 mg/l and averaged 232 mg/l over the past 39 years. Historically, Watermaster has had very little Colorado River water delivered to the Basin and has never ordered recycled water for groundwater replenishment purposes.

Watermaster's policy to consistently order and deliver the highest quality of untreated imported water and its support of stormwater recharge has helped to maintain the high quality of groundwater regarding TDS.

Similarly, the chloride and sulfate concentrations in SWP water and stormwater are also below the LARWQCB BPO. This has enabled the chloride and sulfate concentrations to consistently maintain a high quality.

III.4.1.2. Nutrients

At least 18 minerals are recognized as essential for plants, and at least 24 for animals, including humans. In surface water systems, the primary nutrients of concern are nitrogen as nitrate (NO_3^-) or nitrite (NO_2^-), and phosphorus as particulates in runoff water, or dissolved in water as orthophosphates (HPO_4^{2-}, $H_2PO_4^-$). Historically, nitrate has been the primary concern for groundwater quality, but recently more recently, it has been realized that phosphorus may become mobile in the soil and vadose zone, and therefore may be found in groundwater and aquifers [26].

The nutrients for which Basin water quality objectives (BPO) exist are nitrate (as NO_3^-, 45 mg/l), nitrogen (nitrate + nitrite, 10 mg/l), sulfate (SO_4^{2-}, 100 mg/l), chloride (Cl^-, 100 mg/l), and boron (B, 0.5 mg/l) (Table III.1).

Nutrient additions include atmospheric deposition with precipitation of nitrogen as ammonium and nitrate, sulfur, and chloride. Some of these are by-products of fossil fuel combustion, while others are the result of natural phenomena, such as lightning converting atmospheric nitrogen into nitrate, or denitrification in wetlands which releases nitrogen into the atmosphere. Wildfires release nutrients into the atmosphere which may return to the surface through precipitation. Other nutrients remain on the surface after fires, and will enter surface waters during precipitation events that generate runoff. Other natural nutrient additions occur through natural biogeochemical nutrient cycles through microbial decomposition of plant and animal residues in the soil. Nutrients are released into the soil as minerals during decomposition of organic structures by soil microbes. Nutrient cycling is accelerated when lawns and turf areas are irrigated during the dry season. Boron, sulfates, and chlorides are constituents of naturally-occurring minerals, and that are released into the environment as the minerals weather. These naturally-occurring minerals are readily found in the vadose zone at a characteristic depth associated with their solubility. As the irrigation of agricultural or municipal lands increases the volume of water moving through the vadose zone, these minerals leach with the water, and may reach the groundwater.

Anthropogenic sources likely provide the greatest nutrient additions in the Basin. Municipalities, academic institutions, industrial parks, and homeowners maintain turf and lawns with fertilizer. The primary ingredient in most fertilizers is nitrogen, either as urea, ammonium or nitrate. Once in the soil, though, microbes generally convert other nitrogen forms into nitrate. Commercial fertilizers are soluble salts that dissolve in water. Chloride is a common component in many fertilizers due to its high solubility, especially those containing potassium. Sulfates and chlorides are common ingredients in fertilizers and soil amendments. Fertilizer nutrients may enter surface waters through runoff if high-intensity precipitation events occur soon after spreading. Nitrates and chlorides will leach readily if irrigation and/or precipitation exceed the combined atmospheric demand of water from evaporation and transpiration. Nutrients that leach from the plant root zone have the potential to reach the groundwater in irrigation return flows when a sufficient water head exists to move the water and leached nutrients through the vadose zone.

On-site wastewater treatment systems return nutrients to the soil throughout the Basin in areas not associated with a centralized treatment facility. Centralized municipal wastewater treatment systems and some industrial wastewater treatment systems release nutrients into the environment, particularly nitrates, sulfates, and chlorides. The majority of these nutrients are returned in treated wastewater to surface water sources or to the soil, though some may be released into the air, particularly if a portion of the wastewater treatment system occurs under anaerobic conditions. Reduced forms of nitrogen and sulfur may be released into the atmosphere under anaerobic conditions. These gases may be returned to the soil surface with precipitation.

Though agriculture is widely recognized as a contributor of nutrients to surface and groundwater, it is currently a minor contributor in the Basin, as agriculture occupies only about 1 percent of the land area, while about 84 percent is urban and 16 percent is in natural ecosystems. Between about 1950 and 1973, nitrogen fertilizer was inexpensive, and often applied in greater quantities than required. The concurrence of the energy crisis, which drove up commercial nitrogen fertilizer prices, and the Clean Water Act, likely combined to decrease nitrate additions to the groundwater.

Portions of the Basin, particularly those areas easterly of Big Dalton Wash historically have experienced nitrate concentrations above the BPO (and DDW Drinking Water limit) of 45 mg/l. The specific course(s) of the elevated nitrate concentrations have not been thoroughly investigated, but likely influenced by extensive historical agricultural activity and use of septic systems in the area. The area is now highly urbanized and the agricultural activities no longer exist and the residences are all on municipal sewer systems, although the historical sources of nitrate are still in the vadose zone. There are relatively few production wells in the easterly portion of the Basin. Producers manage nitrate concentrations through blend plans approved by DDW. Nitrate, for the most part, has been detected below 5 mg/l in stormwater runoff and SWP water, which is significantly lower than the long-term background water concentrations, as measured by a long-term average groundwater extraction concentration of 24 mg/l.

III.4.1.3. Others

The contaminants of emerging concern, PCE, TCE, CTC, have historically been widely used as solvents and for other purposes. Perchlorate (ClO_4) is a naturally-occurring and synthesized compound used in flares, explosives and rocket fuel. These contaminants enter the environment when released into the air during use, spilled onto soil, disposed in old landfills, and from cleaning facilities that use or manufacture these compounds. Once in the air, they can return to the surface with precipitation. Most are highly water soluble and readily leach through the soil and vadose zone. These contaminants have been addressed by the USEPA through Operable Unit cleanup plans and are being removed for the San Gabriel Basin. Information for these contaminants is provided below, but they are not included in this SNMP.

PCE, Tetrachloroethylene or Perchloroethylene [27]

Tetrachloroethylene is a colorless organic liquid used for aerosol dry-cleaning products and textile processing, as a chemical intermediate, and for vapor-degreasing in metal-cleaning operations. The basin water quality objective is 5 μg/l.

TCE, Trichloroethylene [28]

Trichloroethylene is a chlorinated hydrocarbon used as an industrial solvent to remove grease from fabricated metal parts, as a dry-cleaning agent, as an intermediary in chemical manufacturing, and as a solvent in paint and glues. It was historically used as an anesthetic and analgesic. The basin water quality objective is 5 μg/l.

CTC, Carbon tetrachloride [29]

Carbon tetrachloride is a clear heavy organic liquid used to make refrigerants and propellants for aerosol cans, as a solvent for oils, fats, lacquers, varnishes, rubber waxes, resins, and rubber cement, and as a grain fumigant, insecticide, and a dry-cleaning agent. It was used in early fire extinguishers. The basin water quality objective is 0.5 μg/l.

CLO_4, Perchlorate [30]

Perchlorate is both a naturally-occurring and manmade compound used as an ingredient in solid fuel for rockets and missiles, and in the construction of highway safety flares, fireworks, pyrotechnics, explosives, common batteries, and automobile restraint systems. The basin water quality objective is 6 μg/l.

III.4.2. Fate and Transport

III.4.2.1 Salt

Once salts are in the soil and vadose zone, there are three possible fates: remain where they are, wick upward to the surface with water, leach downward with water. For simplicity in the following discussion, all references to soil apply equally to the vadose zone (unsaturated zone above a permanent groundwater table). On a landscape scale, salts remain in the soil, or they move to surface waters, or to aquifers.

Salts will remain at the same relative depth if the balance of water applied plus precipitation approximately equals atmospheric demand through evaporation from soil surfaces and transpiration from plant leaves.

Salts will move downward if the balance of water applied plus precipitation exceeds atmospheric demand through evaporation from soil surfaces and transpiration from plant leaves.

Salts move little when the balance of water applied plus precipitation is less than atmospheric demand through evaporation from soil surfaces and transpiration from plant leaves. However, in the case of water tables within 4 to 6 feet of the soil surface, depending upon texture of the soils, salts may move upward. Finer-textured soils (silts, loams, and clays) promote upward capillary movement of water in greater quantity, and from greater depths, resulting in greater salt accumulation at the surface than occurs on coarse-textured soils (sands and sandy loams).

Salts move with water, in the same direction, and generally at the same rate. The exception occurs when the soil chemistry alters the form and solubility of the salt. This may occur through several possible chemical reactions, including salts precipitating out of the water as a solid.

Most clay minerals in the soil are negatively charged, and may adsorb some cations (positively-charged ions), e.g., calcium, magnesium, potassium, and sodium to the mineral surfaces. Anions (negatively-charged ions) move through the soil more readily, though some will be attracted to the cations on soil surfaces. The result is preferential movement of anions, such as chloride sulfates, and nitrates through the soil.

The soils in the basin are typical of semiarid and arid region soils that typically have high concentrations of calcium, often in the form of calcium carbonate (often seen as caliche) and gypsum (calcium sulfate). These salts dissociate weakly in the soil solution, allowing the components to move with water, and to participate in chemical reactions. The most common salt reaction in the soil is precipitation. Some anions, such as chloride, moving through the soil solution may precipitate with cations, such as calcium, to form a salt, such as calcium chloride. Once precipitated, the salt does not move until it dissolves and the individual components enter the soil solution again.

All soils have a limit to the cations and anions they can adsorb. Precipitation of salts in the solid phase is controlled by the concentration of salts in the water, and the availability of minerals in the soil to react with the salts in the water. Salts always precipitate when the amount of water is insufficient to continue leaching them. When sufficient water is available, some salts will be dissolved in the water and leach as the water percolates.

If conditions in the soil become anaerobic, due to saturation and lack of free oxygen, some soil bacteria have the ability to “breathe” minerals such as nitrogen, iron and manganese. When this occurs, iron and manganese become more soluble, and also may participate in precipitation reactions in the soil. Precipitation removes ions from the soil solution. However, anaerobic conditions are associated with greater leaching, since these conditions occur with saturation.

Water moves from areas of high potential energy to areas of low potential energy, on a landscape, or in the soil or vadose zone. This is commonly stated as water flows downhill. Though gravity pulls water downward, there are other forces in soil that can pull water upward. A wet soil generally has higher potential energy than a dry soil, and so water typically moves toward drier soil. This is the reason that water moves upward from a water table through the capillary fringe. If the soil surface is within the capillary fringe, water will move to the surface. Salts move with water, so if the water goes to the surface, so do the salts. Once at the surface, the water evaporates, and the salts precipitate on the soil surface. This accumulation of salts is common in arid and semiarid regions with shallow water tables, or in areas where irrigation management does not incorporate necessary leaching fractions to leach the salts out of the root zone. When irrigation results in artificially high water tables, a drainage system must be installed to remove the water from the soil profile and root zone. The salts move with the water through the drainage system, typically into surface water, such as rivers.

The salts will move as far downward in the soil as does the water. In semiarid and arid regions, the long-term historic depth of water penetration from natural precipitation is identified by the presence of a zone of increased chloride concentration, often called chloride bulge. This is the reason chloride is used as a tracer; it is the most soluble, and moves the furthest with water. Other salts of lower solubility, such gypsum, precipitate above the chloride bulge, while calcium carbonate precipitates above the gypsum.

If sufficient water is added to the surface (precipitation and/or irrigation and/or water spreading) to move water through the soil to the groundwater table and aquifer, the salts reach the groundwater and aquifer, as well. Once in the aquifer, the salts remain there unless removed from the aquifer through groundwater pumping or outflow from one basin to another, if a hydraulic connection between aquifers exists.

III.4.2.2 Nutrients

Nutrients in the soil have been classified historically as mobile or immobile, referring to their solubility and tendency to move within the soil. Mobile nutrients have long been recognized as those with the potential to leach below the root zone. However, even “immobile” nutrients may be leached from the soil if sufficient water moves through the soil. Though initially high in calcium and other cations, soils in humid regions often have little calcium remaining because centuries of leaching have washed it out of the soil. More recently, ideas about other immobile nutrients, such as phosphorus, are being revisited as more is learned about the fixation (holding) capacity of soils for a given nutrient. Once the fixation capacity is reached, the nutrient becomes mobile and may leach into groundwater.

Nitrogen is involved in a complex, natural biochemical nutrient cycle, passing through inorganic solid and gas phases, and solid organic compounds through living organisms and decomposition products of dead organisms and waste products. There are no naturally-occurring soil minerals that contain nitrogen. Nitrogen in the soil is most commonly found in organic compounds, and as ammonium, and nitrate. Nitrite is seldom present in large concentrations in soil, except in anaerobic conditions. Naturally-occurring soil organisms readily convert ammonium to nitrite, and nitrite to nitrate, a process called nitrification. Other organisms decompose proteins in organic materials to release ammonium, which then undergoes nitrification. The abundance of these organisms decreases with soil depth, and so does the conversion of nitrogen from one form to another.

Once in the soil, nitrate may be taken up by plants, used by soil organisms, leached, or reduced. The same processes occur when nitrate is added directly to a soil as fertilizer or as a constituent of recycled water. Nitrate reduction occurs under anaerobic conditions when biological oxygen demand is great. Once all the oxygen is consumed by aerobic organisms during the decomposition of organic compounds, decomposition continues by organisms that “breathe” nitrate instead of oxygen. In these circumstances, nitrate is converted to nitrite. However, nitrite may be further converted to gaseous nitric or nitrous oxides, or dinitrogen gas. Depending upon the depth at which this conversion occurs, these gases may be released into the atmosphere, or may remain dissolved in water. Once in these gas forms, they are unusable to plants or animals, and to most soil organisms.

Nitrate and nitrate have the same solubility characteristics as chloride, and so all previous discussion about chloride transport applies equally to nitrate and nitrite.

Sulfur undergoes similar biological reactions in the soil as nitrogen, but also exists in chemical equilibria with sulfur-containing soil minerals. Sulfates are soluble, but not quite as mobile as nitrate or chloride. Sulfates may be taken up by plants, used by soil microorganisms, leached, or reduced under anaerobic conditions with high biological oxygen demand. Reduced sulfur compounds are odorous gasses that are released into the atmosphere or remain dissolved in water.

Boron is present in soils as boric acid, which is highly soluble, and prone to leach in sandy soils. In fine-textured soils, boron leaching is less likely until the fixation capacity is reached.

III.4.2.3 Others

PCE, Tetrachloroethylene or Perchloroethylene [27]

Tetrachloroethylene is more dense than water, therefore tends to sink in a pool of water. It slowly degrades in water into trichloroacetic and hydrochloric acids. There are aerobic and anaerobic soil bacteria that biodegrade PCE. Depending upon the mode of water spreading, much of the PCE in water likely volatilizes into the atmosphere where it will photo-degrade or return to the surface with precipitation. PCE does not bind to the soil, and may leach.

TCE, Trichloroethylene [28]

Trichloroethylene volatilizes from surface water into the atmosphere where it may return to the surface with precipitation. In soil, there is less volatilization because TCE binds to the soil particles. It is slightly soluble in water and persists for long time periods. It is not known to degrade in soil, water, or the atmosphere.

CTC, Carbon tetrachloride [29]

Carbon tetrachloride volatilizes readily from surface water into the atmosphere, where it is very stable, though it may return to the surface with precipitation. CTC does not bind to soil particles, and either volatilizes or leaches. It will biodegrade in soil and water.

CLO4, Perchlorate [30]

Perchlorate is soluble in water and does not bind to soil, so will readily leach. It is not known to degrade in soil or water, and so persists in the environment.

III.5. LOADING ESTIMATES AND ASSIMILATIVE CAPACITY

In compliance with Section 9(c)(1) of the Policy, which states "*the available assimilative capacity of a basin/subbasin shall be calculated by comparing the mineral water quality objective [Basin Plan objective] with the average concentration of the basin/sub-basin [background basin water quality conditions], either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer*."

The annual average nitrate, chloride, sulfate, and TDS concentrations of the Basin were calculated as the arithmetic average concentration of all available water quality data at the production wells within the Basin. The assimilative capacity was determined as the difference in the potential nutrient or salt load, determined by the groundwater volume and the Basin Plan Water Quality Objective, and the current nutrient or salt load in the groundwater. As a result, the assimilative capacity, as specified in Section 9(c)(1), can be calculated for any time period.

III.5.1. Loading Estimates

For the San Gabriel SNMP characterization, loading is defined as the amount of a component entering the groundwater already in storage via groundwater replenishment. Loading estimates were tabulated using components of the groundwater balance model (Table III.6) and existing water quality data for those components (Appendix K). The inputs from the groundwater balance model include: precipitation on the valley floor and runoff from the surrounding watershed, incidental percolation of water discharged into the San Gabriel River, direct spreading of local runoff and imported water replenishment, return flow from direct usage, subsurface flow into and out of the basin, groundwater extraction, water quality data, and exported water (Table III.6). The total amount of groundwater in Basin storage is about 8,000,000 acre-feet. For this characterization, it is assumed that approximately 75 percent of the groundwater in Basin storage (about 6,000,000 acre-feet) is subject to mixing.

III.5.1.1 Loading/Unloading Estimation Models

The quantity of groundwater in storage (ac-ft) and existing water quality data from wells (concentrations of TDS, nitrate, chloride, and sulfate) were used to determine the quantity, expressed in pounds, of each component stored in the groundwater. The quantity of each component of the groundwater balance model (ac-ft/yr) and the concentration of the constituent salts (mg/L) for that component were used to estimate the amount of the constituent salt that was added to, or removed from, the groundwater in storage. A separate loading/unloading spreadsheet model was prepared for each of the nutrients and salts, as summarized in Tables III.9, III.10, III.11, and III.13. The full calculation process for each loading/unloading estimate using the volume of each groundwater balance component and the water quality for each constituent salt in that component is documented in Appendices M, N, O, and P. The discussion below explains how the loading/unloading estimation models were calibrated.

The loading of a nutrient/salt constituent is particularly sensitive to precipitation and runoff from watersheds, which also affects the loading from direct spreading of local runoff. For these reasons, it is important to consider that of the last thirteen years, nine have had below average precipitation in the valley floor, including five of the driest years among 87 years of records; seven have had below average precipitation in the San Gabriel Mountains watershed, including five of the driest years among 85 years of records; and nine have had below average precipitation in the southern low hills watershed, including three of the driest years among 87 years of records. These below average precipitation years resulted in lower than average estimated nutrient/salt loading to the groundwater stored in the Basin. Groundwater extraction has been relatively consistent in the last 15 years, while recharge has varied considerably, as previously seen in Plate III.19. This plate also suggests a three to five-year lag in recharge trends before observing a similar trend in groundwater in storage.

It is not possible to accurately predict the concentration of any constituent salts in any particular year. Therefore, long-term trends in the groundwater concentration of each constituent nutrient/salt were used to calibrate the specific spreadsheet model. The following general assumptions were used to calibrate the spreadsheet model for each constituent nutrient/salt.

III.5.1.2 General Assumptions

- All water, regardless of source, flowing through the vadose zone is subject to chemical equilibria among the minerals in the water, the soil, and the vadose zone. The concentration of nutrients/salts in the water when it reaches the groundwater often is much different than the water quality at the soil surface. In these models, water released into San Jose Creek or used in direct spreading is assumed to bypass the vadose zone.
- The current groundwater concentration for the constituent nutrients/salt represents the historical (geologic time frame) equilibrium for the amount of salt that dissolves or precipitates as water moves through the vadose zone from natural recharge processes (precipitation, percolation from the watershed and surface waters, subsurface inflow and outflow from the Basin). The current groundwater quality also integrates recent changes to the equilibrium as a result of human activities in the past century.
- The mean groundwater concentration was used as the absolute minimum concentration of a groundwater balance component recharging the aquifer. Any groundwater balance component recharging the aquifer passed through the soil and vadose zone. During this process, it gained or lost nutrients/salt according to the governing chemical equilibria. It

was not possible to calibrate the spreadsheet models when values less than the long-term groundwater mean were used for a recharge component such as precipitation and runoff, without violating chemical equilibria constraints on other recharge components such as return flow. The volume of precipitation and runoff was about 4 times that of return flow.

- Precipitation or return flow: When the concentration of the constituent nutrient/salt for components of the groundwater balance model was less than the current groundwater concentration for that constituent, it generally was assumed the concentration of that constituent increased as it moved through the vadose zone.
- Precipitation or return flow: When the concentration of the constituent nutrient/salt for components of the groundwater balance model was greater than the current groundwater concentration for that constituent, it generally was assumed the concentration of that constituent decreased as it moved through the vadose zone so that the concentration matched the groundwater concentration upon recharging the aquifer.
- Direct spreading and incidental percolation of water discharged into the river channels: Generally, the concentration of constituent nutrients/salts in water was assumed not to change as it passed through the vadose zone into the aquifer (the concentration stayed the same).
- The trend in groundwater quality (1973-74 to 2010-2011) for each constituent nutrient/salt was determined using 75 percent of the groundwater in storage volume to estimate the quantity of loading/unloading (lbs/yr).
- The quality of the groundwater in storage is calculated using a mass balance approach to determine the constituent stored in groundwater.
- Concentrations or coefficients (multipliers) for each of the groundwater balance components were adjusted to match the long-term trend identified. These values are reported for nitrate, chloride, and sulfate in Table III.8, and for TDS in Table III.12, and will be discussed in greater detail in the appropriate section.

The loading/unloading model for each constituent salt will be discussed separately.

III.5.1.3 Limitations

All nutrient/salt quantities are rounded to the nearest 1,000 pounds (lbs). The following limitations on this estimate should encourage using these values with caution.

- The groundwater quality varies spatially and with depth. The current groundwater data limit the ability to accurately determine the quantity of each constituent nutrient/salt present.
- The actual quantity of some components in the groundwater model are estimated, but not precisely measured.
- Constituent nutrient/salt data are unavailable at various depths through the vadose zone to the groundwater.
- The concentration of the constituent nutrient/salt in the recharge component when it reaches the aquifer/groundwater is estimated.
- The residence time of the constituent nutrient/salt as it moves through the vadose zone is not known, and varies spatially across the basin. Water from the spreading grounds moves rather quickly to the groundwater, while the time required for return flow to reach the groundwater level is not known. There is no correlation between the constituent nutrient/salt concentrations added to the surface and changes in the groundwater concentration in periods less than 10 to 15 years, depending upon the constituent nutrient/salt. Since only about 40 years of data exist, it is not possible to identify whether a stronger correlation exists on a longer time span.
- The actual groundwater quantity and quality of inflow from Puente Basin and outflow to Central Basin is estimated.
- The aquifer exhibits some degree of concentration/dilution effects. In years when the aquifer level declines, the concentration of the constituent nutrient/salt tends to increase (but not always). Conversely, in years when the aquifer levels rise due to increased recharge, the concentration of the constituent nutrient/salt tends to decrease.
- Water quality for each constituent nutrient/salt is not available for each groundwater balance component for each year. In this case, "means" of data from adjacent years was used. When data were insufficient for that, the mean for the period of observation was used.

The result of these limitations is an inability to accurately predict the concentration of groundwater constituent nutrient/salt on a year-to-year basis. However, the prediction should improve with time as additional data is gathered on a more frequent basis.

III.5.1.4 Calibration

The calibrations for nitrate, chloride, and sulfate were initiated using the assumptions identified above. Then they were adjusted in order to match the long-term trends in groundwater nutrient/salt concentration. The calibration coefficients for these models are presented in Table III.8.

The calibration for TDS required adjustments for groundwater volume and the increasing concentration through the observation period. A similar feature as the groundwater balance model was incorporated to scale the contribution of different volumes of precipitation and runoff, return flow, and surface spreading. The calibration coefficients are presented in Table III.12.

Nitrate Calibration

The coefficients and concentrations used for the nitrate balance model are shown in Table III.8. For many of these water sources, the nitrate concentration of the water source was less than 5 mg/L. It was assumed the groundwater accumulated nitrate as it passed through the vadose zone. Using the actual concentration did not result in an acceptable model, as it would predict that substantially more nitrates were being removed from the system than replaced. The mean groundwater nitrate concentration in the last 20 years varied from about 20 mg/L to 27 mg/L. The water quality assumptions for the groundwater balance model component contributions to the groundwater in storage used a nitrate concentration of 19 mg/L as a minimum concentration returned to the groundwater. This is less than the long-term mean groundwater nitrate concentration (24 mg/L). Since the nitrate concentration in the groundwater has been decreasing throughout the reporting period, this value was chosen to represent improving groundwater quality. This minimum concentration is used for water sources which had a nitrate concentration less than the mean groundwater quality, and it was assumed that the water accumulated nitrate as it passed through the vadose zone. A nitrate concentration of 19 mg/L was used for precipitation and watershed runoff, return flow of treated imported water, and direct spreading of local runoff and untreated imported water.

The actual annual water quality of subsurface flow was used unchanged, as this flow does not pass through the vadose zone. The actual annual water quality of recycled water was used unchanged for the incidental percolation of water discharged into river channels of the Basin, as it was assumed this passed through an abbreviated portion of the vadose zone, or passed through via preferential flow, and therefore did not have time for chemical activity to occur in transit. A 1.5 loading factor was applied to the nitrate concentrations of return flow from direct uses of waters from San Gabriel Basin production, and surface water imported Raymond Basin water. The loading factor suggests the nitrate concentration of these water sources increased as it moved through the vadose zone. This is possible due to the potential for over-application of nitrate-containing fertilizers and other materials often applied to urban landscapes, and to pet manure sources. Sometimes the nitrate concentration of the return flow from direct uses of surface water and imported water was less than the groundwater minimum concentration after applying the 1.5 multiplier; in these cases, 19 mg/L was used. Using these coefficients, the nitrate balance model that matched the long-term concentration trends, as shown in Table III.9.

There was little variation in nitrate extraction and outflow in the past thirteen years. However, due to the recent drought discussed previously, the model predicted below average nitrate loading from precipitation and runoff from watersheds in twelve of those thirteen years, and below average nitrate loading from direct spreading in nine years, primarily due to the decrease in local runoff. The result is the model predicted nitrate unloading in ten of the last thirteen years, with a net unloading of almost 20 million lbs. Plate III.35a demonstrates that unloading trends generally follow the same trends in the nitrate concentration from extraction wells. The inverse relationship between key well groundwater elevations and basinwide nitrate concentrations is shown in Plate III.35b. Table III.9 will be discussed in greater detail in the following section.

Chloride Calibration

The coefficients and concentrations used for the chloride balance model are shown in Table III.8. In the chloride balance, precipitation from the valley floor, runoff from the watershed, San Gabriel Basin production water, surface water, and imported Raymond Basin water typically had chloride concentrations less than 28 mg/L, which is the long-term average groundwater chloride concentration. For these water sources, it was assumed that chloride would dissolve into water as it passed through the soil and vadose zone, resulting in that water having approximately the average groundwater chloride concentration when it reached the groundwater, so 28 mg/L was used for the model. Semiarid and arid region soils commonly have soil and vadose zone strata that are enriched in chlorides. The chloride concentration of all other water sources exceeded the long-term average groundwater concentration. For these sources, the actual annual chloride concentration of the water source was used for the chloride balance model. These included return flow from direct uses of recycled water and imported water, direct spreading of imported water from the State Water Project, incidental recharge of water discharged into river channels of the Basin, and subsurface inflow. Using these coefficients, the chloride balance model matched the long-term concentration trends, as shown in Table III.10.

There was little variation in chloride extraction and outflow in the past thirteen years. However, due to the recent drought discussed previously, the model predicted below average chloride loading from precipitation and runoff from watersheds in twelve of those thirteen years, and below average chloride loading from direct spreading in six years, primarily due to the decrease in local runoff. The result is the model predicted chloride unloading in six of the last thirteen years, with a net unloading of more than 10 million lbs. Plate III.36a demonstrates that unloading trends generally follow the same trends in the chloride concentration from extraction wells. The inverse relationship between key well groundwater elevations and basinwide chloride concentrations is shown in Plate III.36b. Table III.10 will be discussed in greater detail in the following section.

Sulfate Calibration

The coefficients and concentrations used for the sulfate balance model are shown in Table III.8. Using the actual concentration did not result in an acceptable model, as it would predict that substantially more sulfates were being removed from the system than replaced. The mean groundwater sulfate concentration in the last 20 years varied from about 40 mg/L to 70 mg/L. The water quality assumptions for the groundwater balance model component contributions to the groundwater in storage used a sulfate concentration of 49 mg/L as a minimum concentration returned to the groundwater. This minimum concentration is used for water sources which had a sulfate concentration less than the mean groundwater quality, and it was assumed that the water accumulated sulfate as it passed through the vadose zone. Semiarid and arid region soils commonly have soil and vadose zone strata that are enriched in sulfates. Additionally, sulfates are common fossil-fuel combustion by-products, partially responsible for smog in urban regions. These compounds return to the soil surface with precipitation, and are then available to move through the soil and vadose zone into the groundwater. For precipitation and watershed runoff, 49 mg/L was used. The actual annual water quality of subsurface flow was used unchanged, as this flow does not pass through the vadose zone. The actual sulfate concentration was also used unchanged for incidental percolation of water discharged into river channels of the Basin. A 1.5 loading factor was used for return flow from direct uses of San Gabriel Basin production, surface water, imported Raymond Basin water, treated imported water, and recycled water. The sulfate concentration of the return flow from direct uses of surface water was less than the groundwater minimum concentration after applying the 1.5 multiplier; in these cases, 49 mg/L was used. When the sulfate concentration exceeded the groundwater mean, the actual concentration was used for direct spreading of local runoff; when the sulfate concentration was less than the groundwater mean, 49 mg/L was used. A concentration of 49 mg/L was used for return flow from untreated imported water Using these coefficients and concentrations, it was possible to have a sulfate balance model that matched the long-term concentration trends, as shown in Table III.11.

There was little variation in sulfate extraction and outflow in the past thirteen years. However, due to the recent drought discussed previously, the model predicted below average sulfate loading from precipitation and runoff from watersheds in twelve of those thirteen years, and below average sulfate loading from direct spreading in nine years, primarily due to the decrease in local runoff.

The result is the model predicted sulfate unloading in eleven of the last thirteen years, with a net unloading of almost 90 million lbs. Plate III.37a demonstrates that unloading trends generally follow the same trends in the sulfate concentration from extraction wells. The inverse relationship between key well groundwater elevations and basinwide sulfate concentrations is shown in Plate III.37b. Table III.11 will be discussed in greater detail in the following section.

Total Dissolved Solids, TDS Calibration

The TDS balance model is more challenging, as the TDS chemistry is the summation of all the individual component nutrient/salts, including nitrate, chloride, sulfate, phosphate, calcium, magnesium, potassium, and sodium, among others. Several iterations were required to obtain a model that matched the long-term trends in groundwater TDS concentration. The actual annual water quality was used in the model for subsurface inflow, recycled water in its various uses, and for treated, imported water. Multi-year TDS concentration cycles are apparent in Plates III.30a and III.30b. Due to these cycles, average groundwater concentration was calculated by decades, as shown in Table III.12. It can be seen that the average groundwater TDS concentration decreased from 1973 through the 1990s, then increased dramatically since 2000. This change in the trend in groundwater TDS concentration required two stages in the calibration of the model: 1973-74 to 1999-2000, and after 2000-01 to 2010-11. The coefficients were applied only to water sources with water quality that generally had lesser TDS concentrations than the average decadal groundwater TDS concentration. These sources included: return flow from precipitation and watershed runoff, return flow from direct uses of San Gabriel Basin (production) water, imported Raymond Basin water, and surface waters, and direct spreading of local runoff, and untreated imported water from the State Water Project. The coefficient (multiplier) was determined as a function of the volume of annual recharge from precipitation on the valley floor, runoff from the watershed, return flow, or surface spreading, relative to the mean for that recharge component. The coefficients were assigned in three categories: less than 75% of the mean for that recharge component, 75% of the mean to the mean for that component, and greater than the mean of that component. The multiplier increased with volume of recharge, assuming more water moving through the vadose zone has the potential to dissolve more salts along the way. The TDS concentration used in the model was the greater concentration of the source or the product of the multiplier and the decadal mean groundwater TDS concentration, as shown in Table III.12. This model was further adjusted to account for the concentration/dilution factor associated with the volume of groundwater in storage, as seen in Plate III.30d. The TDS balance model is shown in Table III.13. However, it should be noted that, even though the model was able to approximate the TDS concentration, the annual net balance TDS load (loading less unloading) does not track changes in groundwater TDS concentration. The TDS balance model is more reliable for predicting concentrations than for modeling quantity of TDS input/output.

There was little variation in TDS extraction and outflow in the past thirteen years. However, due to the recent drought discussed previously, the model predicted below average TDS loading from precipitation and runoff from watersheds in eleven of those thirteen years, and below average TDS loading from direct spreading in five years, primarily due to the decrease in local runoff. The result is the model predicted TDS unloading in six of the last thirteen years. However, it also predicted the two years with greatest TDS loading, resulting in a net load more than 360 million lbs. Plate III.38a demonstrates that unloading trends generally follow the same trends in the TDS concentration from extraction wells. The inverse relationship between key well groundwater elevations and basinwide TDS concentrations is shown in Plate III.38b. Table III.13 will be discussed in greater detail in the following section.

III.5.2 Allowable Load and Assimilative Capacity

For this characterization, the allowable load is defined as the quantity (in pounds) of a constituent salt that may be present in the groundwater in storage without exceeding the Basin water quality objective. This was determined using 75 percent of the volume of the groundwater in storage and the Basin water quality objective for the constituent nutrient/salt, nitrate (as NO_3^-, 45 mg/l), chloride (Cl-, 100 mg/l), sulfate (as SO_4^{2-}, 100 mg/l), and TDS (450 mg/L).

The assimilative capacity is defined as the difference between the quantity of the constituent nutrient/salt stored in the groundwater, and the allowable load of that constituent. This was determined on an annual basis, and the mean of the last ten years (2001-02 to 2010-2011) is used as the assimilative capacity for that constituent.

It is important to realize the allowable load and the assimilative capacity are both dependent upon the quantity of groundwater in storage. Long-term changes in the quantity of groundwater in storage will have concomitant effects on the assimilative capacity. For the reporting period, the groundwater in storage decreased an average of about 2,700 ac-ft/yr. However, in the last ten years, it has decreased about 4,300 ac-ft/yr, and in the last five, about 31,000 ac-ft/yr (Table III.6). A decrease in the volume of groundwater in storage will result in a decrease in the assimilative capacity.

III.5.2.1 Nitrate

Since 1973-74, the groundwater extraction water quality has varied from approximately 19 to 35 mg/l nitrate (Appendix K), averaging 24 mg/L, resulting in nitrate stored in groundwater varying from about 290 to 320 million lbs, with an average of about 300 million lbs, as shown in Table III.9. The Basin Plan water quality objective (45 mg/l) and 75% of the groundwater volume in storage is used to determine the allowable load and estimate the assimilative capacity.

The means from the annual nitrate loading/unloading balance from 2001-02 to 2010-11 are summarized in Plate III.39a. Of the annual nitrate load (about 15 million lbs), direct spreading accounts for about 62 percent, while precipitation and watershed runoff contribute almost 16 percent. Incidental percolation of water discharged into the river channels in the Basin and return flow from direct uses contribute about equally to make up the balance. Groundwater extraction accounts for about 96 percent of the nitrate unloading, and about 4 percent is outflow to Central Basin. For the reporting period, the nitrate concentration has decreased slightly, resulting in a net unloading of less than 1 million lbs/yr.

The current nitrate load is about 300 million lbs, while the allowable nitrate load is about 710 million lbs. The assimilative capacity is about 410 million lbs, the difference between the allowable load and the current load, which is approximately equivalent to 26 mg/L. More than half the allowable load remains available as the assimilative capacity.

III.5.2.2 Chloride

Since 1973-74, the groundwater extraction water quality has varied from 21 to 37 mg/L chloride (Appendix K), averaging 28 mg/L, resulting in chloride stored in groundwater ranging from about 340 to 620 million lbs, with an average of about 450 million lbs, as shown in Table III.10. The Basin water quality objective (100 mg/l) and 75% of the groundwater volume in storage is used to determine the allowable load and estimate the assimilative capacity.

The means from the annual chloride loading/unloading balance from 2001-02 to 2010-11 are summarized in Plate III.39b. Of the mean annual chloride load (about 26 million lbs), direct spreading accounts for about 63 percent. Precipitation and watershed runoff contribute about 14 percent. Incidental percolation of water discharged into the river channels in the Basin contributes about 12 percent, and return flow from direct uses makes up the balance. Groundwater extraction accounts for almost 81 percent of the chloride unloading, while outflow to Central Basin accounts for the remaining 19 percent. For the reporting period, the chloride concentration has decreased slightly, resulting in a net unloading of about 3 million lbs/yr.

The current chloride load is about 510 million lbs, while the allowable chloride load is about 1,580 million lbs. The assimilative capacity is about 1,070 million lbs, the difference between the allowable load and the current load, which is approximately equivalent to 68 mg/L. Approximately 68 percent of the allowable load remains available as the assimilative capacity.

III.5.2.3 Sulfate

Since 1973-74, the Basin water quality has varied from 38 to 70 mg/l sulfate (Appendix K), averaging about 49 mg/L, resulting in sulfate stored in groundwater ranging from about 750to 890million lbs, with an average of about 835million lbs, as shown in Table III.11. The Basin water quality objective (100 mg/l) and 75% of the groundwater volume in storage is used to determine the allowable load and estimate the assimilative capacity.

The means from the annual sulfate loading/unloading balance from 2001-02 to 2010-11 are summarized in Plate III.39c. Of the mean annual sulfate load (about 40 million lbs), direct spreading accounts for about 60 percent. Precipitation and watershed runoff contribute about 16 percent. Return flow from direct uses contributes about 17 percent, and incidental percolation of water discharged into the river channels in the Basin makes up the balance. Groundwater extraction accounts for almost 81 percent of the sulfate unloading, while outflow to Central Basin accounts for the remaining 19 percent. For the reporting period, the sulfate concentration has decreased slightly, resulting in a net unloading of about 3 million lbs/yr.

The current sulfate load is about 835 million lbs, while the allowable chloride load is about 1,580 million lbs. The assimilative capacity is about 745 million lbs, the difference between the allowable load and the current load, which is approximately equivalent to 47 mg/L. Approximately 47 percent of the allowable load remains available as the assimilative capacity.

III.5.2.4 TDS

Since 1973-74, the Basin water quality varied from about 200 to 390 mg/L TDS (Appendix K), resulting in TDS stored in groundwater ranging from about 5.0 to 5.9 billion lbs, with an average of 5.4 billion lbs, as shown in Table III.13. Though the Basin has different TDS water quality objectives for the eastern (600 mg/L) and western areas (450 mg/L), this characterization uses a conservative approach and applies 450 mg/L to the whole Basin, and only 75% of the groundwater volume in storage, for determination of the allowable load and the assimilative capacity.

The means from the annual TDS loading/unloading balance from 2001-02 to 2010-11 are summarized in Plate III.39d. Of the mean annual TDS load (about 330 million lbs), direct spreading accounts for about 68 percent. Precipitation and watershed runoff contribute about 17 percent. Return flow from direct uses and incidental percolation of water discharged into the river channels in the Basin make up the balance. Groundwater extraction accounts for almost 89 percent of the TDS unloading, while outflow to Central Basin accounts for the remaining 10 percent. For the reporting period, the TDS concentration has increased slightly, resulting in a net loading of about 60 million lbs/yr.

The current TDS load is about 5,500 million lbs, while the allowable TDS load is about 7,100 million lbs. The assimilative capacity is about 1,600 million lbs, the difference between the allowable load and the current load, which is approximately equivalent to 100 mg/L. Approximately 22 percent of the allowable load remains available as the assimilative capacity.

III.5.2.5 Assimilative Capacity and Groundwater Volume in Storage

It was noted earlier that the volume of groundwater in storage fluctuates, as shown on Plates III.19 and III.24. Since the allowable load is a function of the Basin Plan water quality objectives and the volume of groundwater in storage, these fluctuations affect the assimilative capacity . In general, assimilative capacity increases with the volume of groundwater in storage, though this trend can be offset by opposing changes in concentration. The worst case scenario for assimilative capacity is for the volume of groundwater to decrease while the concentration of a nutrient/salt increases.

The volume of groundwater in storage has decreased about 3 percent in the last decade. In the same period, the nitrate assimilative capacity decreased about 3 percent, chloride assimilative capacity decreased about 4 percent, sulfate assimilative capacity decreased about 1 percent, and TDS assimilative capacity decreased about 28 percent, as shown in Plate III.40. The changes in assimilative capacity in the last decade reflect the varying increases in groundwater concentration of the constituent nutrient/salt.

The TDS assimilative capacity has the least percentage of the allowable load available (20 percent), and so is the most vulnerable to changes in groundwater storage volume. The increasing TDS concentration in the groundwater compounds the challenge. For any project considered that would return additional nutrient/salt constituents to the Basin, TDS will be the most limiting factor.

III.5.3 Assimilative Capacity as a Tool to Assess Future Projects

This assimilative capacity model may be used to evaluate the potential effect of releasing water from a recycled water project into the Basin. The baseline period for assimilative capacity is from 2001-02 to 2010-11.

It was previously stated that TDS will be the most limiting factor in evaluating the potential effects of replacing current water use with water from recycled water project. This requires further explanation. The TDS concentration integrates the combinations and concentration of all salts dissolved in the solution, in this case groundwater stored in the aquifer. Salts are composed of negatively-charged ions (anions) and positively-charged ions (cations). The nitrates, chlorides, and sulfates included in this SNMP are elements and compounds that have a negative charge (anions) that contribute to TDS. Other anions that may be dissolved in water include nitrite, sulfite, carbonate, bicarbonate, and borates, among others. As everything in nature seeks an equilibrium, there will be an approximately equal concentration of elements or compounds with a positive charge, cations, to offset the anions in solution. The most common cations found in soil and the vadose zone in semiarid and arid regions include calcium, magnesium, and potassium, though many other alkali earth metals, alkali metals, and metals may be present (elements and compounds from the upper and left sections of the periodic table of the elements). The resultant TDS of a solution is dependent upon which of these salts is present, and the relative concentration and atomic mass of the individual constituents.

In waters analyzed in the Main San Gabriel Basin, nitrate, chloride, sulfate and the associated cations account for 55 to 80 percent of the total TDS. Using these characteristics, Table III.14a identifies a range of TDS values that would be associated with selected concentrations of the constituent nutrient/salt. Nitrate and the associated cations contribute about 20 percent to the total TDS concentration in the ambient groundwater. In water from the State Water Project or imported treated water from the Weymouth Plant, nitrate contributes less than 2 percent of the TDS concentration. The maximum contribution from chloride about 50 percent was found in waters released from the SJCWRP East Plant, 109 mg/L chloride and 622 mg/L TDS, as shown in Appendix K. Sulfate contributed almost 70 percent of TDS in water from the Weymouth Plant, 198 mg/L sulfate and 539 mg/L TDS, as shown in Appendix K. Therefore, it is a chemical and physical impossibility to have chloride or sulfate concentrations of 250 mg/L without having TDS at or above 600 mg/L. In all these cases, TDS is still the limiting factor for assimilative capacity in the Basin.

A proposed groundwater recharge project in the Basin, the Indirect Reuse Replenishment Project, was analyzed to determine the cumulative percentage of assimilative capacity utilized after prolonged groundwater recharge with recycled water. In addition, the three hypothetical scenarios presented in Table III.14a were analyzed to determine the maximum volume of recycled water under hypothetical quality conditions each year that could be recharged while still cumulatively utilizing less than 10 percent of the assimilative capacity. The analyses are presented in the subsections below.

III.5.3.1 Project Evaluation – Indirect Reuse Replenishment Project

The Upper District is developing its IRRP which would provide up to 10,000 ac-ft/yr of recycled water from the San Jose Creek Water Reclamation Plant West Plant for groundwater replenishment in the Main Basin, replacing approximately 10,000 ac-ft/yr of untreated imported water previously used for groundwater replenishment. The quality of the SJCWRP West Plant effluent is distinctive from the SJCWRP East Plant effluent that is discharged into the San Jose Creek and percolates to the Basin. The impacts of the IRRP on the Main Basin were evaluated using the assimilative capacity tool developed as part of this SNMP.

For this evaluation, the assumptions include:

- the volume of groundwater stored in the basin is the mean of the last ten years, and does not change;
- 75% of the total groundwater in storage is the mixing volume, or 5,811,700 af;
- the Basin water quality objectives remain constant;
- assimilative capacity for each individual nutrient/salt constituent does not change;
- withdrawal and replenishment remains constant at 250,000 af/yr;
- 10,000 af/yr of recycled water is substituted for 10,000 af/yr of untreated imported water;

- the recycled water quality remains constant and is the ten-year average (2001-02 to 2010-11) of the San Jose Creek Water Reclamation Plant West effluent: nitrate = 27 mg/L; chloride = 110 mg/L; sulfate = 85 mg/L; and TDS = 530 mg/L;
- the balance of loading from recharge is calculated using 240,000 af/yr;
- unloading is determined using 250,000 af/yr and the ambient groundwater quality;
- the yearly ambient groundwater quality increases over time with continued recycled water recharge

Based on the above mentioned assumptions, the Upper District IRRP project would use about 0.3 percent of the San Gabriel Basin's assimilative capacity for TDS after the first year of recharging 10,000 ac ft of recycled water, as noted in Table III.14b. The remaining constituents analyzed, chloride, sulfate, and nitrate, utilize a lower percentage of the assimilative capacity as compared to TDS. For chloride to be the limiting assimilative capacity factor in the Basin, the chloride concentration of the recycled water would have to exceed 160 mg/L while the TDS concentration was 530 mg/L or less, meaning that essentially all salts were magnesium chloride. The same condition would exist for sulfate. This ignores the presence of other salts in the soil, vadose zone, and water source. With the current ambient groundwater conditions in the Basin, it is chemically and physically infeasible for chloride, sulfate, or nitrate to limit assimilative capacity, as demonstrated in Table III.14a.

The IRRP impacts on the Basin TDS concentrations were analyzed further to determine the potential utilization of the assimilative capacity resulting from long term recharge of recycled water. The constituent concentrations in the groundwater will eventually stabilize and will not increase despite continued recharge of recycled water. The TDS concentration in the groundwater is estimated to reach equilibrium after more than 100 years of recycled water recharge under the same quality assumptions. Once equilibrium is reached, the TDS concentration in the groundwater will be 364 mg/L, an increase of seven (7) mg/L, which represents approximately 7.2 percent utilization of the available AC. The IRRP utilizes a smaller percentage of the available assimilative capacity of the other constituents analyzed once equilibrium is reached: 1.2 percent for nitrate, 4.6 percent for chloride, and 2.7 percent for sulfate.

The increase in TDS concentration falls within the SWRCB's recommendation that a single project utilize less than 10 percent of the assimilative capacity to prevent significant degradation to groundwaters. Although the chloride and TDS concentrations in tertiary treated recycled water exceed the water quality objectives, the assimilative capacity is great enough such that the minor water quality objective exceedances do not substantially degrade the overall quality of the Main Basin. These estimates of the assimilative capacity utilization are also conservative in nature because the SNMP analyzed the IRRP as the single recycled water project in the basin with loading contributions from direct reuse recycled water projects already accounted for in the overall balance models for the basin. However, the SWRCB recommends that multiple recycled water projects combined limit their utilization of the assimilative capacity to 20 percent. Therefore, if all of the recycled water projects were considered concurrently, the IRRP could utilize a larger percentage of the assimilative capacity. The complete analysis for the IRRP is provided in Table III.14b.

III.5.3.2 Hypothetical Scenarios Evaluation

The three hypothetical scenarios presenting varied replenishment water quality for nitrate, chloride, sulfate, and TDS were evaluated to determine the maximum volume of new replenishment water under varied quality conditions that could be recharged annually without cumulatively exceeding the 10 percent of the assimilative capacity. For these evaluations, the assumptions include:

- the volume of groundwater stored in the basin is the mean of the last ten years, and does not change;
- 75% of the total groundwater in storage is the mixing volume, or 5,811,700 af;
- the Basin water quality objectives remain constant;
- assimilative capacity for each individual nutrient/salt constituent does not change;
- withdrawal and replenishment rates are balanced at 250,000 af/yr;
- new replenishment water of particular quality is substituted for recharge of untreated imported water;
- the replenishment water quality remains constant for each of the three scenarios with the constituent concentrations presented in Table III.14a;

- the ambient groundwater quality increases over time with continued replenishment water recharge.

The water quality selected for analysis in the hypothetical scenarios is representative of water quality from likely replenishment water sources. Historical supply sources for replenishment water have been primarily stormwater runoff and SWP, with Colorado River water and recycled water contributing to groundwater replenishment to a lesser extent. Scenario 1 represents the likely water quality of potential replenishment water from the Colorado River with a high sulfate concentration. Scenario 2 represents likely water quality of potential replenishment water from the State Water Project experiencing salt water intrusion with a high chloride concentration. Scenario 3 represents likely water quality of potential replenishment water with a high sulfate concentration along with a lower nitrate concentration. These scenarios only evaluated the impacts resulting from direct spreading of replenishment water (100 percent of replenishment water reaches groundwater); therefore, it should be noted that indirect use of replenishment water (such as would be likely with recycled water irrigation projects) would allow recharge of a significantly greater volume of replenishment water before resulting in an equivalent utilization of the assimilative capacity because it is assumed only nine percent volumetrically of indirect uses reaches the groundwater. Accordingly, it is unlikely that a single indirect replenishment project would utilize 10 percent of the available assimilative capacity due to volumetric and operational constraints.

In Scenario 1, the recharge water quality is as follows: 20 mg NO_3/L, 50 mg Cl/L, 250 mg SO_4/L, and between 605 and 968 mg TDS/L. Using these recharge water quality characteristics for Nitrate, Chloride, and Sulfate, and the average TDS concentration from the TDS range, TDS is the most limiting of the constituents, reaching approximately 10 percent of the assimilative capacity with replenishment and subsequent production of 5,700 acre feet of recycled water annually, as shown on Table III.14c.

In Scenario 2, the recharge water quality is as follows: 1 mg NO_3/L, 250 mg Cl/L, 60 mg SO_4/L, and between 635 and 1,015 mg TDS/L. Using these recharge water quality characteristics for Nitrate, Chloride, and Sulfate, and the average TDS concentration from the TDS range, TDS is the most limiting of the constituents, reaching approximately 10 percent of the assimilative capacity with replenishment and subsequent production of 5,300 acre feet of recycled water annually, as shown on Table III.14d.

In Scenario 3, the recharge water quality is as follows: 1 mg NO_3/L, 60 mg Cl/L, 250 mg SO_4/L, and between 594 and 950 mg TDS/L. Using these recharge water quality characteristics for Nitrate, Chloride, and Sulfate, and the average TDS concentration from the TDS range, TDS is the most limiting of the constituents, reaching approximately 10 percent of the assimilative capacity with replenishment and subsequent production of 5,800 acre feet of water annually, as shown on Table III.14e.

The three hypothetical scenarios evaluated for the AC represent extreme loading characteristics that are not likely to represent the quality of the replenishment water utilized in the San Gabriel Valley. However, in the event that replenishment water (including recycled water) intended for either indirect or direct use within the San Gabriel Valley has a quality falling outside of the ranges evaluated in this SNMP, an evaluation would be conducted to determine the estimated utilization of the assimilative capacity.

III.6. IMPLEMENTATION MEASURES

The Basin has been actively managed for many decades to control salt and nutrient loading to preserve the high quality groundwater supplies. Existing programs include support of stormwater runoff replenishment conducted by LACDPW, use of untreated imported water from the State Water Project (which is the highest quality imported water currently available) to annually replenish the water Basin as a result of prior years' over production, and an extensive water quality monitoring program. Basin management is conducted in coordination between the Watermaster, Upper District, San Gabriel District, Three Valleys District, MWD, LACSD, and LACDPW. Historically, stakeholders have coordinated to replenish the groundwater supplies with the greatest amount of high quality water as possible. As a result, significant replenishment of the groundwater Basin with high quality (low TDS) water (such as fiscal year 1991-92 on Tables III.9, III.10, III.11, III.13) may actually result in an estimated net loading of the Basin. However, the additional groundwater volume from such replenishment dilutes the groundwater TDS concentration in the long-term. Because the volume of water in the Basin is so large in comparison with the loading, the loading is insignificant.

The San Gabriel Valley has experienced unprecedented drought conditions since calendar year 2006. As a result, the groundwater elevation at Baldwin Park Key Well has decreased from about 250 feet msl during the Spring of 2005 to about 189 feet msl as of December 2009, as shown on Plate III.24. Since 1972, when the Basin was adjudicated, to present, the Basin Watermaster has actively managed water quality through existing implementation measures (described in greater detail below). Nonetheless, water quality generally improves (i.e. water quality concentrations decrease) coincident with significant rainfall events/recharge of stormwater runoff and the water quality tends to degrade during drought periods. This general inverse relationship between groundwater levels and water quality concentrations is shown on Plates III.35b, III.36b, III.37b, and III.38b. Consequently, despite the long-term implementation measures the Basin Watermaster has in place, recent drought conditions have had a greater influence on water quality trends over the past 10 years and may give the appearance of an increasing trend in salt and nutrient conditions.

Section 6.b(3)(e) of the Recycled Water Policy states in part that a SNMP shall include "…implementation measures to manage salt and nutrient loading on a sustainable basis…" in the Basin. Implementation measures may have two types of impacts to a groundwater basin. Those impacts consist of 1) loading as the result of additional water replenished in the groundwater basin and 2) change to the <u>concentration</u> of salts and nutrients that are included in the water that is replenished. The following sections address existing and potential implementation measures that may impact salt and nutrient loading. Those implementation measures are summarized on Table III.15 and briefly described below.

III.6.1 Groundwater Replenishment

Maintain Spreading Facilities (Existing) – LACDPW maintains a complex system of dams, retention basins, storm channels and off-stream spreading grounds to control stormwater runoff and to maximize replenishment of the stormwater flow. The existing spreading grounds are conjunctively operated to enable both stormwater run-off and untreated imported water to be replenished into the Basin in an efficient and effective manner. Local stormwater and untreated imported water from the SWP replenished in these facilities typically have the lowest concentrations of TDS, Nitrate, Sulfate, and Chloride of the various sources contributing to loading. As shown on Appendices M, N, O, and P, the concentration of the TDS, chloride, nitrate, and sulfate in local stormwater and SWP water (which historically have been used to replenish the water supplies of the Basin) is lower than the quality of the groundwater extracted. Consequently, the quality of the Basin will be maintained over time assuming replenishment is greater than or equal to extractions. During drought conditions with little stormwater runoff, this may not be the case.

Maintain Unlined Portions of Rivers and Streams (Existing) – The San Gabriel River is unlined from Morris Dam to Whittier Narrows Dam, along with portions of the Rio Hondo, Walnut Creek, and San Jose Creek. Stormwater is released under a controlled manner into these unlined water bodies to augment groundwater replenishment that occurs in off-stream spreading grounds. Replenishment of high quality stormwater contributes to the long-term enhancement of groundwater quality.

Groundwater Replenishment Coordinating Group (Existing) - Representatives from the Watermaster, LACDPW, LACSD, and MWD meet approximately every two months to coordinate the planned replenishment of local and untreated imported water with the availability of the sources of supply and the availability of groundwater replenishment facilities. As the highest quality source of water stormwater run-off is typically given the highest priority for replenishment activities.

Optimize Delivery of SWP Water (Existing) – SWP water typically contains the lowest concentration of TDS. Consequently, the Watermaster and MWD have endeavored to maximize delivery of untreated SWP water to replenish the Basin in conjunction with groundwater basin management practices.

<u>Develop New Spreading Facilities (Potential)</u> – The Watermaster and LACDPW continually investigate opportunities to expand the network of spreading grounds. Potential new sites include sand and gravel pits.

III.6.2 Reduce Stormwater Runoff (Potential)

Cities within the Basin are co-permittees for the new MS4 permit. As such, cities are directed to take proactive steps, both individually and collectively, to implement stormwater Best Management Practices (BMPs) to reduce or eliminate stormwater runoff from facilities and consequently reduce flow in storm channels. These practices may result in increased stormwater replenishment. As noted in Section III.6.1, stormwater runoff typically contains the highest (best) quality of water used to replenish the Basin. Increased replenishment of high quality will tend to improve Basin water quality over time.

III.6.3 Recycled Water

<u>Nitrogen Treatment (Existing) -</u> Although recycled water is not a significant component of loading in the Basin, historical loading occurred from the discharge of recycled water into the San Jose Creek, San Gabriel River, and Rio Hondo, and the subsequent infiltration of a portion of that discharge. The LACSD has taken steps to reduce the nitrate (nitrogen) concentration in the recycled water.

III.6.4 Imported Water

Historically the Basin has used SWP water almost exclusively to replenish the groundwater supplies as the result of groundwater production in excess of water rights. This practice ensures reliable groundwater supplies and that the groundwater levels are operated within a historical range of about 100 feet. MWD has taken proactive steps in conjunction with the California Department of Water Resources (DWR) to ensure the TDS concentrations of the SWP water are maintained.

As noted in Section III.6.1, long-term replenishment of the Basin with high quality water will tend to improve Basin water quality over time.

III.6.5 Institutional

<u>Main San Gabriel Basin Judgment (Existing) –</u> The Basin Watermaster was created by the court in 1973 to manage both the water quantity and quality of the Basin. These activities include the annual establishment of the Operating Safe Yield which limits the amount of groundwater that can be pumped from the groundwater basin without having to purchase untreated imported water from the SWP. Watermaster coordinates with the LACFCD and MWD to ensure available water supplies are replenished in an efficient manner. Watermaster maintains records of all groundwater produced for the Basin, maintains a database of groundwater quality from all municipal water supply wells, and keeps track of all water entering and leaving the Basin. In addition, the Watermaster also adopted the “Criteria for Delivery of Supplemental Water” (Criteria) by Resolution No.4-96-138. The Criteria sets forth procedures the Watermaster follows to ensure the highest quality untreated imported water is replenished in the Basin.

III.6.6 Regulatory

<u>Title 22 Water Quality Monitoring (Existing) -</u> All municipal water suppliers are required to adhere to the provisions of Title 22 regarding water quality monitoring of municipal water supply wells. In general TDS, chloride, and sulfate samples are collected once every three years and nitrate samples are collected annually. Based on water quality results, municipal water suppliers may need to construct groundwater treatment facilities and/or develop water quality blending plans to maintain production from wells. In those situations, DDW may require more frequent water quality monitoring than those noted above. The municipal water supply wells are distributed throughout the Basin as shown on Plate III.26 and water quality data from Title 22 water quality sampling will be incorporated into the Basin-wide Salt and Nutrient Monitoring Program described in Chapter V.

<u>SNMP Monitoring Program (Future) -</u> Watermaster will implement a proposed monitoring plan as required by the Recycled Water Policy (See Section V.2). As required by the Recycled

Water Policy Section 6.b(3)(a)(iii) water quality data will be reported to the LAWRWQCB at least every three years. The sampling frequency for salts and nutrients will be periodically evaluated and adjusted accordingly as necessary.

CHAPTER IV

ANTIDEGRADATION ANALYSIS

IV.1. REGULATORY BACKGROUND

In 1968, the SWRCB adopted Resolution No. 68-16 (Resolution) as the State's Anti-Degradation Policy. Resolution No. 68-16 states in part:

1. *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*
2. *Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) o pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.* [31]

The Policy acknowledges that groundwater recharge with recycled water benefits the public; however, the SWRCB finds that groundwater recharge with recycled water has the potential to degrade water quality in groundwater basins. Therefore, the Policy requires that an antidegradation analysis be included in each salt and nutrient management plan to demonstrate the projects included within the plan will, collectively, satisfy the requirements of the Resolution. The Policy states in part with regards to the Resolution:

- *The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:*

  (1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall calculate the impacts of the project or projects over at least a ten year time frame.

  (2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

- *Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.*

  (1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

  (2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin). [Appendix A]

IV.2. PROJECT EVALUATION

To demonstrate compliance with the Resolution pursuant to the guidelines provided in the Policy, an antidegradation analysis was completed to determine the percent utilization of the available assimilative capacity. The baseline period for assimilative capacity is from 2001-02 to 2010-11.

For this antidegradation analysis, mass-balance calculations were performed using the Basin annual groundwater in storage estimated by the spreadsheet groundwater balance model (Table III.6), and the annual water quality data for all water used within the Basin (Appendix K). These mass-balance spreadsheets for nitrate, sulfate, chloride, and TDS are summarized in Tables III.9, III.10, III.11, and III.13.

Section III.5 of this SNMP identified the quantity of new water that could be introduced annually to the Basin before 10 percent of the available assimilative capacity for TDS would be used. The Nitrate, Chloride, and/or Sulfate concentrations in replenishment water are not sufficient for these compounds to become limiting to assimilative capacity before TDS. The antidegradation analysis consists of separate calculations for Nitrate, Chloride, Sulfate, and TDS showing the percentage utilization of each respective assimilative capacity after 1 year, 5 years, 10 years, 20 years, and when equilibrium is reached, as shown in Tables III.14b, III.14c, III.14d, and III.14e. The Recycled Water Policy sets an interim goal that no single project is to use more than 10 percent of the available assimilative capacity, or combination of projects to use more than 20 percent of the available assimilative capacity. Consequently, as part of this SNMP, the antidegradation analysis calculated the collective amount of water from potential future projects that could be replenished in the Basin without exceeding the very conservative value of 10 percent of the available assimilative capacity.

The antidegradation analysis (See Section III.5) considered Upper District's IRRP and three hypothetical scenarios representing varied water quality characteristics of potential replenishment sources. In all cases the 75 percent of the Basin value (about 6,000,000 acre-feet) was used. The resultant calculated value represents the point of equilibrium in the future at such point the continuous annual loading from the new water supply changes the background water quality throughout the Basin by a maximum of 10 percent.

IRRP: The water quality of new water supplies is assumed to be 530 mg/l for TDS, 6 mg/l for nitrate, 110 mg/l for chloride and 85 mg/l for sulfate. Table III .14(b) shows the summary of the calculations and indicates TDS is the central constituent and will use 7.2 percent of the assimilative capacity through annual replenishment of about 10,000 acre-feet of recycled water when equilibrium is reached. Because it has been determined that the IRRP utilizes less than 10 percent of the available assimilative capacity, additional antidegradation analyses are not necessary and the IRRP is fully compliant with the Resolution and with the Policy with regards to groundwater replenishment projects. Additionally, the IRRP will not alter the planned beneficial uses of the Basin.

Scenario 1: The water quality of new water supplies is assumed to be 787 mg/l for TDS, 20 mg/l for nitrate, 50 mg/l for chloride and 250 mg/l for sulfate, indicative of potential water quality of Colorado River water. Table III .14(c) shows the summary of the calculations and indicates TDS is the central constituent and will use 10 percent of the assimilative capacity through annual replenishment of about 5,700 acre-feet when equilibrium is reached.

Scenario 2: The water quality of new water supplies is assumed to be 825 mg/l for TDS, 1 mg/l for Nitrate, 250 mg/l for Chloride and 60 mg/l for Sulfate, indicative of potential water quality of State Water Project water with salt water intrusion. Table III.14(d) shows the summary of the calculations and indicates TDS is the critical constituent and will use 10 percent of the assimilative capacity through annual replenishment of about 5,300 acre-feet when equilibrium is reached.

Scenario 3: The water quality of new water supplies is assumed to be 772 mg/l for TDS, 1 mg/l for Nitrate, 60 mg/l for Chloride, and 250 mg/l for Sulfate. Table III.14(e) shows the summary of the calculations and indicates TDS is the critical constituent and will use 10 percent of the assimilative capacity through annual replenishment of about 5,800 acre-feet when equilibrium is reached.

The antidegradation analysis is extremely conservative, as it assumes no additional constituent removal beyond historical amounts, and does not consider the TDS water quality objective for the eastern portion of the Basin is 600 mg/l. Additionally, the IRRP and the hypothetical scenarios only consider direct spreading where 100 percent of the water is assumed to reach the groundwater. A recycled water project utilizing direct use would only result in a fraction of the recharge water reaching the groundwater; therefore, a significantly greater volume of replenishment water could be used before utilizing 10 percent of the assimilative capacity. In the event that replenishment water (including recycled water) intended for either indirect or direct use within the San Gabriel Valley has a quality falling outside of the ranges evaluated in this SNMP, an evaluation would be conducted to determine the estimated utilization of the assimilative capacity.

IV.3. PREDICTIVE TRENDS

The general water quality trends for chloride, sulfate, and TDS are increasing, excluding the impacts of potential future water projects; the general water quality trend for nitrate is decreasing. Therefore, an evaluation of the compiled historical water data for the period 1973-74 to 2010-11 was conducted to project future groundwater quality assuming no hypothetical scenarios or additional recycled water projects are implemented. First, the linear interpolation of the annual mean extraction well quality was determined for each subarea over the long term time period (1973-74 through 2010-11) to determine the historical trend. Next, the linear interpolation was extrapolated from 2011-12 to 2030-31 to plot the future predictive trends without taking into consideration any additional projects, future implementation measures, or changes in hydrology. Along with the long term trend of the constituent concentration, lines representing 10 percent and 20 percent of the baseline average assimilative capacity and the IRRP trend line were plotted to compare the constituent concentration trends to the recommended acceptable usage of the available assimilative capacity for a single project (10 percent) and multiple projects (20 percent). The baseline period is from 2001-02 to 2010-11.

The results of the trend analyses indicate that nitrate concentration trends are gradually decreasing. Chloride, sulfate, and TDS concentrations are gradually increasing and are anticipated to remain significantly below the water quality objectives through the year 2030. The plots of the extrapolated trends for nitrate, chloride, sulfate, and TDS concentrations are shown on Plates IV.1a, IV.1b, IV.1c, and IV.1d, respectively.

As discussed in Section III.3.9, there is a considerable of degree of annual variation of water quality for each constituent. Salt concentrations vary with several different factors including the volume of groundwater in storage. Constituent concentrations are inversely related to volume of groundwater in storage; therefore, the volume of groundwater in storage has the potential to greatly impact constituent concentration trends. The frequency of sampling impacts at certain impaired wells also affects the mean of the constituent concentration data set.

These predictive trends have limitations and are broad generalizations of the available data. Consequently, Watermaster will periodically update the data sets and trends for continued evaluation. As discussed in III.3.6, Watermaster is managing current implementation measures and has proposed potential implementation measures with the aim of continuing to manage and maintain the water quality in the San Gabriel Basin.

CHAPTER V

BASIN-WIDE SALT AND NUTRIENT MONITORING PLAN

V.1 BACKGROUND

Section 6.b.(3)(a) of the Recycled Water Policy states in past "Each salt and nutrient management plan shall include the following components:

a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

    i. The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
    ii. The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.
    iii. The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years."

The Main San Gabriel Basin is a large groundwater aquifer with a surface area of approximately 167 square miles. The Basin contains approximately 8 million acre-feet of fresh water on average and supports annual groundwater production of about 240,000 acre-feet. Municipal water supply companies (purveyors) collectively have about 200 active, producing wells. The wells are required to be sampled on a regular basis pursuant to Title 22, Chapter 15 “Domestic Water Quality and Monitoring” (Title 22). As described in the section below, Watermaster staff have been given the responsibility to collect water quality samples to satisfy Title 22 requirements.

The Watermaster will be the primary stakeholder responsible for “…conducting, complying and reporting the monitoring data…” pursuit to Section 6.b(3)(a) of the Recycled Water Policy. Watermaster has implemented a program in conjunction with water purveyors in the Basin, to collect TDS and Nitrate samples from all active potable water supply wells every year. In addition, chloride and sulfate samples will be collected from all active potable water supply wells at least once every three years. This program ensures there is a complete annual record of “salts” and “nutrient” data so that a long-term trend can be established. As noted in Section III.3.9 the average concentrations for the most recent 10-year period are about 357 mg/l TDS, 22 mg/l Nitrate, 31 mg/L Chloride, and 53 mg/L Sulfate. Watermaster prepares a “Five-year Water Quality and Supply Plan” pursuant to Section 28 of Watermaster’s Rules and Regulations. The Five-year Plan identifies existing and planned activities to enhance water quality through the Basin, including a summary of cleanup programs to remove contaminants from the Basin. Although these cleanup programs do not contribute or remove salts and nutrients, they are included as added information in the SNMP. Each of these existing programs will be incorporated in the Basin-wide Salt and Nutrient Management Plan, as described in this Chapter.

Watermaster also adopted the “Criteria for Delivery of Supplemental Water” (Criteria) by Resolution No.4-96-138 on April 3, 1996 (see Appendix R). The Criteria sets forth procedures the Watermaster follows to ensure the highest quality untreated imported water is replenished in the Basin. At any time, the highest quality of water is not available, the Criteria has established steps Watermaster follows to determine the impacts of delivering lesser quality water, including a potential option of not delivering untreated imported water until a time when the water quality improves and/or a different source becomes available.

This SNMP proposes to use Watermaster’s existing Title 22 water quality monitoring program for groundwater and San Gabriel River water, with increased frequencies of monitoring for TDS and nitrate, to satisfy the monitoring plan requirement of the SNMP. Recycled water is monitored by

LACSD and is subject to permit requirements established by the RWQCB. Imported water is monitored by MWD.

V.1.1 Title 22 Water Quality Monitoring Program

There are approximately 200 active and standby potable water supply wells and 50 active irrigation and industrial water wells in the Basin. The location of these wells is shown on Plate III.26. The most productive water supply area is around the central portion of the Basin, near the San Gabriel River. Water quality conditions vary throughout the Basin due to natural and human influences.

Watermaster coordinates the well water sampling program on behalf of all drinking water purveyors in the Basin. Watermaster samples their potable supply wells for the following chemical groups regulated by the California Safe Drinking Water Act (California Health and Safety Code) under the specific drinking water standards contained in the California Code of Regulations: radioactivity, VOCs, Synthetic Organic Chemicals (SOCs are primarily pesticides and herbicides) and inorganics.

Water samples are collected from potable supply wells and then analyzed for a variety of constituents by a State-certified testing laboratory to demonstrate compliance with the requirements of the California Code of Regulations, Title 22, Chapter 15, "Domestic Water Quality and Monitoring" (Title 22). The Title 22 water quality test results summarized in this report have been submitted to the DDW, as required by the following sections of Title 22:

- Sections 64431-64432, Primary Standards -Inorganic Chemicals;
- Section 64449, Secondary Drinking Water Standards;
- Section 64442, MCL and Monitoring-Gross Alpha Particle Activity, Radium-226, Radium-228 and Uranium;
- Sections 64444 to 64445 Organic Chemicals (SVOCs only); and
- Sections 64530 to 64537 Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors.

A State-certified laboratory, under contract to Watermaster, analyzes the samples and submits results to DDW and Watermaster electronically. Title 22 establishes testing requirements and the format for reporting laboratory results of public water systems' water quality analyses. The regulations require all certified drinking water analytical laboratories to submit water quality data directly to DDW in digital, electronic form. This submittal is referred to as Electronic Data Transfer (EDT). The laboratory provides Watermaster with the EDT electronic files, which are uploaded to Watermaster's water quality database. Watermaster coordinates with Producers to obtain general mineral and general physical water quality results.

Watermaster's Title 22 basin-wide monitoring program provides much of the source water data used to develop the Basin SNMP and is incorporated into a database maintained by Watermaster.

V.1.1.1 Participating Purveyors

Purveyors participating in the Title 22 water quality monitoring program are categorized according to the total number of service connections.

<u>Purveyors with 10,000 or More Service Connections:</u>

1. Alhambra, City of
2. Arcadia, City of
3. Azusa Light and Water
4. California American Water-San Marino
5. Glendora, City of
6. Golden State Water Company-San Dimas
7. Monterey Park, City of
8. San Gabriel Valley Water Company
9. Suburban Water Systems-San Jose
10. Suburban Water Systems-Whittier/La Mirada
11. Valley County Water District

12. Whittier, City of

Purveyors with 200 to 10,000 Service Connections:

1. Amarillo Mutual Water Company
2. California-American Water-Duarte
3. Covina, City of
4. East Pasadena Water Company
5. El Monte, City of
6. Golden State Water Company-South San Gabriel
7. Golden State Water Company -South Arcadia
8. Industry Public Utilities
9. La Puente Valley County Water District
10. Monrovia, City of
11. Rurban Homes Mutual Water Company
12. San Gabriel County Water District
13. South Pasadena, City of
14. Sunny Slope Water Company
15. Valencia Heights Water Company
16. Valley View Mutual Water Company

Purveyors with Less Than 200 Service Connections:

1. Adams Ranch Mutual Water Company
2. Champion Mutual Water Company
3. Del Rio Mutual Water Company
4. Hemlock Mutual Water Company
5. Sterling Mutual Water Company

Wholesalers:

1. California Domestic Water Company
2. Covina Irrigating Company

V.1.1.2 Title 22 Sampling Schedules

Title 22 source water monitoring frequencies are specified by DDW in "Vulnerability Assessment and Monitoring Frequency Guidelines", issued to Basin purveyors every three years. Watermaster develops schedules for source water sample collection according to the monitoring frequencies specified in the "Vulnerability Assessment and Monitoring Frequency Guidelines" and incorporates more frequent monitoring into the schedules when required by Title 22 drinking water regulations.

General Mineral (GM) and General Physical (GP) – Basin purveyors are responsible for source water compliance monitoring of GM/GP constituents, including TDS, chloride, sulfate and nitrate. Appendix S presents typical sampling schedules for each purveyor and each sampling location. The sampling schedule shows: 1) the type of analysis to be performed, 2) the current required frequency of sampling, 3) the date of the last test and 4) date of the next test.

Groundwater sources are required to be sampled at least once every three years for GM/GP constituents. Standby groundwater sources are sampled at least once every nine years. In accordance with DDW regulations, a standby source shall be used only for short-term emergencies of five consecutive days or less, and for less than a total of fifteen days a year.

TDS is one of the parameters included in general mineral analyses. Because approximately one-third of the Basin's active potable supply wells are required to be sampled each year for GM/GP constituents, it would take up to three years to gather TDS data for all of the wells. Since fiscal year 1997-98, Watermaster has conducted annual TDS sampling of all active potable supply wells and selected active non-potable wells in the Basin. In addition, sulfate and chloride sample results are collected every three years.

Producers sample their wells based on requirements and frequencies prescribed in Title 22 and enforced by DDW. Based on the water quality concentration, DDW may require additional sampling. In the event a constituent in a well exceeds an MCL, DDW may require treatment, a blend plan, or that the well ceases production.

Historically, there have been no issues throughout the Basin with chloride and sulfate concentrations in production wells whereby DDW has required increased monitoring beyond once every three years. Any production well which has a nitrate concentration between 50 percent and 100 percent of the MCL (or pumps to a liquid-phase granular activated carbon treatment facility) must be sampled on a quantity basis. DDW has also approved numerous nitrate treatment facilities and blend plans to mainstream production from wells with nitrate at or above the MCL of 45 mg/l. TDS is required by DDW to be sampled at least once every three years and Watermaster has implemented a program to collect samples at all wells every year. Similar to nitrate, DDW staff review water quality results and may require additional sampling based on the TDS concentrations. Historically production wells in the Main Basin have not required blending or treatment for TDS.

Inorganics - Groundwater sources are required to be sampled at least every three years for inorganic chemicals, except for nitrate, which is sampled at least annually. Approximately one-third of the groundwater sources are monitored for inorganic chemicals each year on a rotating basis. Standby groundwater sources are monitored at least once every nine years.

DDW requires quarterly or more frequent nitrate testing of operating wells when 1) a well is being treated or blended to reduce the nitrate level below the MCL, 2) the nitrate concentration in a well exceeds one-half the MCL, or 3) a well which supplies water to a Granular Activated Carbon treatment system. Watermaster schedules and collects quarterly nitrate samples at approximately 90 active wells in the Basin and annual nitrate samples at approximately another 110 active and standby wells. Annual samples are collected at all operating wells which do not meet the quarterly monitoring criteria. In an average quarter, approximately 120 nitrate samples in the Basin are collected by Watermaster.

Radioactivity - On December 7, 2000, USEPA promulgated the final revised drinking water standards for radionuclides, which became effective on December 8, 2003. The DDW adopted the federal standards. The radionuclide rule requires all community water systems to monitor gross alpha. Monitoring frequencies have been determined based on the results of the initial round of quarterly samples.

V.1.2 Criteria for Delivery of Supplemental Water

By Resolution No. 4-96-136 Watermaster adopted the "Criteria for Delivery of Supplemental Water" on April 3, 1996. A copy of the Criteria is included in Appendix R. Pursuant to provisions of the Main Basin Judgment, production in excess of Basin water rights must be replaced through the delivery of untreated imported water, which is referred to as Supplemental Water. The Supplemental Water Criteria provides a background of regulatory and institutional requirements which, must be considered when delivering Supplemental Water, with an emphasis on delivery of the highest quality water at all times.

V.1.3 Five-year Water Quality and Supply Plan

Watermaster prepares and annually updates this Five-Year Water Quality and Supply Plan (Five-Year Plan) in accordance with the requirements of Section 28 of its Rules and Regulations. The objective is to coordinate groundwater related activities so that both water supply and water quality in the Basin are protected and improved. Many important issues are detailed in the Five-Year Plan, including how Watermaster plans to:

1. Monitor groundwater supply and quality;
2. Develop projections of future groundwater supply and quality;
3. Ensure adequate supplemental water is available for groundwater replenishment;
4. Review and cooperate on cleanup projects, and provide technical assistance to other agencies;
5. Assure that pumping does not lead to future degradation of water quality in the Basin;
6. Address emerging contaminants in the Basin;
7. Develop a cleanup and water supply program consistent with the U.S. Environmental Protection Agency (USEPA) plans for its San Gabriel Basin Superfund sites; and

8. Continue to perform responsibilities under the Baldwin Park Operable Unit (BPOU) Project Agreement relating to project administration and performance evaluation.

The Los Angeles County Superior Court created the Main San Gabriel Basin Watermaster in 1973 to resolve water issues that had arisen among water users in the San Gabriel Valley. Watermaster's mission was to generally manage the water supply of the Main San Gabriel Groundwater Basin.

During the late 1970s and early 1980s, significant groundwater contamination was discovered in the Basin. The contamination was caused in part by past practices of local industries that had inappropriately disposed of industrial solvents, as well as by infiltration of nitrates from an earlier agricultural period. Cleanup efforts for industrial contamination were undertaken at the local, state, and federal levels.

By 1989, local water agencies adopted a joint resolution regarding water quality issues that stated that Watermaster should coordinate local activities aimed at preserving and restoring the quality of groundwater in the Basin. The joint resolution also called for a cleanup plan.

In 1991, the Los Angeles County Superior Court granted Watermaster the authority to control pumping for water quality purposes. Accordingly, Watermaster added Section 28 to its Rules and Regulations regarding water quality management. The new responsibilities included: developing the Five-Year Water Quality and Supply Plan, updating it annually, and submitting it to the LARWQCB, and making it available for public review by November 1 of each year. A copy of the Five-Year Water Quality and Supply Plan is included in Appendix T.

The Five-year Water Quality and Supply Plan includes projections of future groundwater production from each well in the Basin along with a tabular summary of VOC, Nitrate, and Perchlorate data. This information is included in the appendices to the Five-year water Quality and Supply Plan.

V.1.4 Basin-wide Water Quality Monitoring Program (BGWQMP)

The BGWQMP was developed in fiscal year 1994-95 by the Watermaster to gather supplemental water quality information in addition to data collected under the DDW Title 22 program. The BGWQMP includes annual water quality sampling for TDS for all potable supply wells in the Basin (DDW requires sampling once every three years). In addition, water quality data for TDS, Nitrate, and VOCs are collected from production wells that are not used for potable water supply. All water quality data is included in the Watermaster database.

V.2 Proposed Monitoring Plan

The Recycled Water Policy, Section 6.b(3)(a) requires a water quality monitoring plan to be developed. Specifically, section 6.b(3)(a)(ii) states "…the preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located approximately to determine water quality throughout the most critical areas of the basin…"

The Watermaster is the Court appointed agency which manages both the quality and quantity of water supplies in the Main Basin. The Watermaster also coordinates the existing Title 22 Water validity Monitoring Program described in Section V1.1 of this SNMP. Consequently, Watermaster will serve as the responsible agency to oversee collection of water quality data. The location of production wells subject to Title 22 sampling is shown on Plate III.26. Water quality data will be submitted to DDW pursuant to Title 22 requirements and incorporated into Watermaster's database. As required by the Recycled Water Policy Section 6.b(3)(a)(iii) water quality data will be reported to the LAWRWQCB at least every three years.

Water quality sampling for TDS and nitrate will be conducted annually at all production wells, and at least once every three years at all production wells for sulfate and chloride. An example of the sampling schedule is shown in Appendix S. The sampling schedule is update on a regular basis as data is received by Watermaster.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

VI.1 SUMMARY

The SWRCB approved Resolution No. 2009-0011 to adopt the Recycled Water Policy in February 2009. Included in that resolution is a requirement for a SNMP to be prepared for all groundwater basins. The Main San Gabriel Basin Watermaster is the lead agency for the preparation of the San Gabriel Basin SNMP. The primary stakeholders include Upper District, San Gabriel District, Three Valleys District, MWD, LACSD, and LACDPW.

The SNMP reviewed the geology, hydrology and hydrogeology of the San Gabriel Basin, along with the institutional and management structure for the San Gabriel Basin. TDS, Nitrate, Sulfate, and Chloride were identified as the primary constituents of concern. Sources of loading (precipitation, subsurface inflow, infiltration of applied water, storm runoff and untreated imported water replenishment) and unloading (groundwater pumping and subsurface outflow) were included in a spreadsheet computer model, along with average water quality data for TDS, Nitrate, Sulfate, and Chloride, on an annual basis.

In an effort to provide a conservative approach to the calculation of AC of the San Gabriel Basin and the impacts of a potential project, it was assumed 1) the volume of the San Gabriel Basin available for mixing was about 6,000,000 acre-feet (75 percent of the total volume of about 8,000,000 acre-feet); and 2) only the water quality objectives for the westerly portion of the San Gabriel Basin (450 mg/l) would be used in the calculation, but recognizing the water quality objective for the easterly portion of the San Gabriel Basin is 600 mg/l. The Upper District's proposed IRRP project, consisting of 10,000 acre-feet of recycled water recharge, was evaluated to determine the cumulative percentage of the assimilative capacity utilized before equilibrium is reached. The project is not anticipated to exceed 10 percent of the available AC of the San Gabriel Basin, although such a limitation is not mandated. After one year of recharge, the IRRP project would use about 0.3 percent of the assimilative capacity for TDS (as shown on the last column of Table III. 14.b), which would be the controlling constituent, and would reach equilibrium at approximately 7.2 percent assimilative capacity utilization for TDS. Nitrate, Sulfate and Chloride would each have less impact on their respective available assimilative capacities.

The SNMP acknowledges the historical practice of replenishing the San Gabriel Basin with significant amounts of stormwater runoff and supplemented with untreated imported water from the SWP, both of which have high quality water, particularly regarding TDS. The SNMP identifies a variety of existing and potential activities including continued basin management practices, pursuit of potential new replenishment sites, water quality monitoring, and coordination between agencies which will help manage salts and nutrients in the San Gabriel Basin.

VI.2 RECOMMENDATIONS

The Main San Gabriel Watermaster manages the San Gabriel Basin, in cooperation with other stakeholders, and has successfully managed the salt and nutrient loading over the past 40 years. The Watermaster recognizes the SNMP is a tool by which salts and nutrients can continue to be managed into the future.

On-Going Activities

The following are recommendations for on-going salt and nutrient management in the San Gabriel Basin.

- Regularly update the SNMP spreadsheet data so that impacts of potential future projects on salt and nutrient loading may be evaluated.
- Continue to collect water quality data throughout the San Gabriel Basin.
- Continue to meet with stakeholders on a regular basis to coordinate San Gabriel Basin management activities with an emphasis on stormwater runoff replenishment and continued use of SWP water for groundwater replenishment

Potential Activities

The following are recommendations for potential activities for salt and nutrient management in the San Gabriel Basin.

- Develop new/expand existing groundwater replenishment facilities to increase stormwater replenishment capabilities.
- Encourage local planning efforts which result in reduced stormwater runoff and enhanced stormwater capture.

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SAN GABRIEL VALLEY BASIN SNMP PLATES

SOURCE : Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region. June 28, 2012.

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MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER BASINS WITHIN THE LOS ANGELES REGION

PLATE III.1

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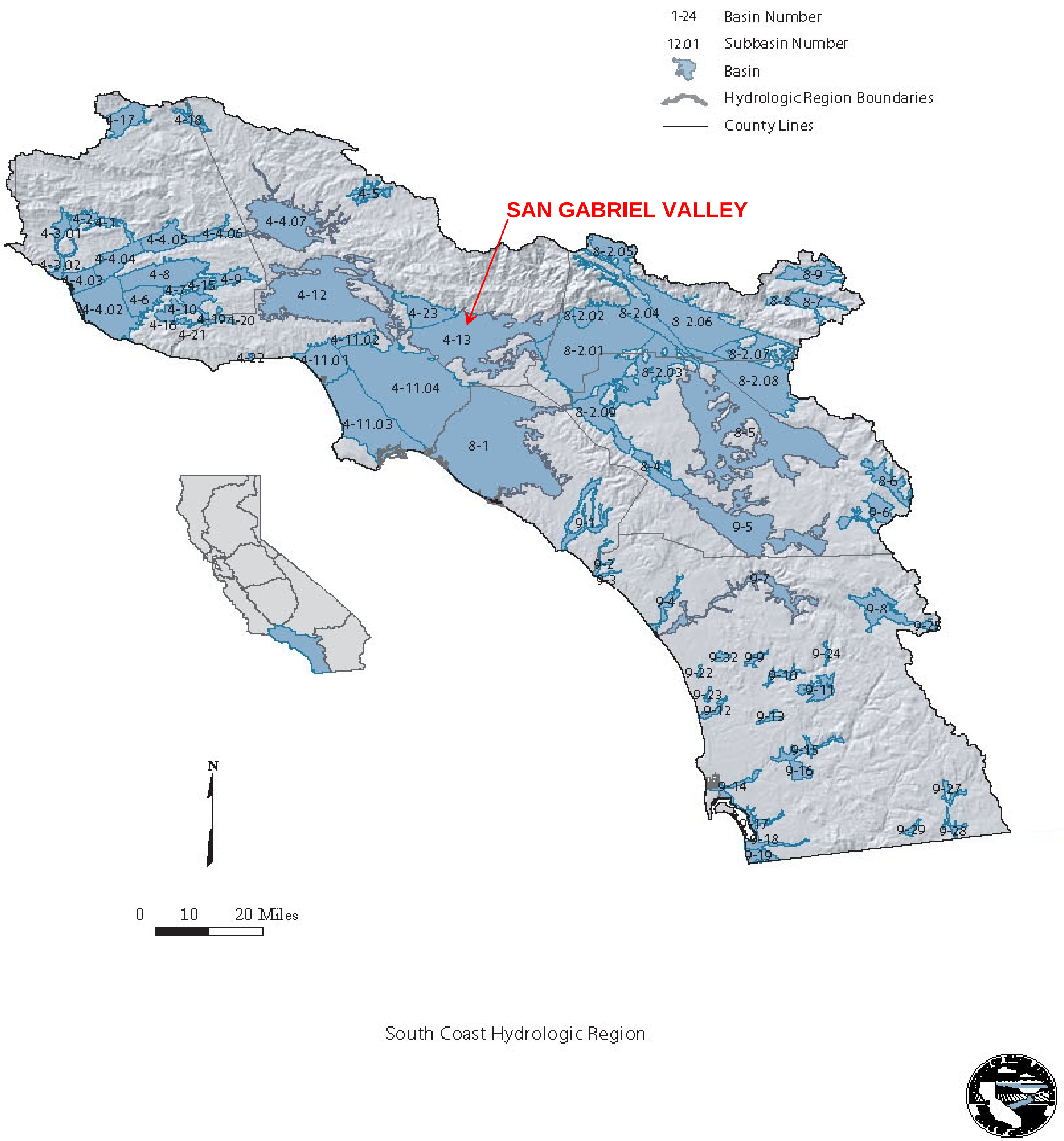

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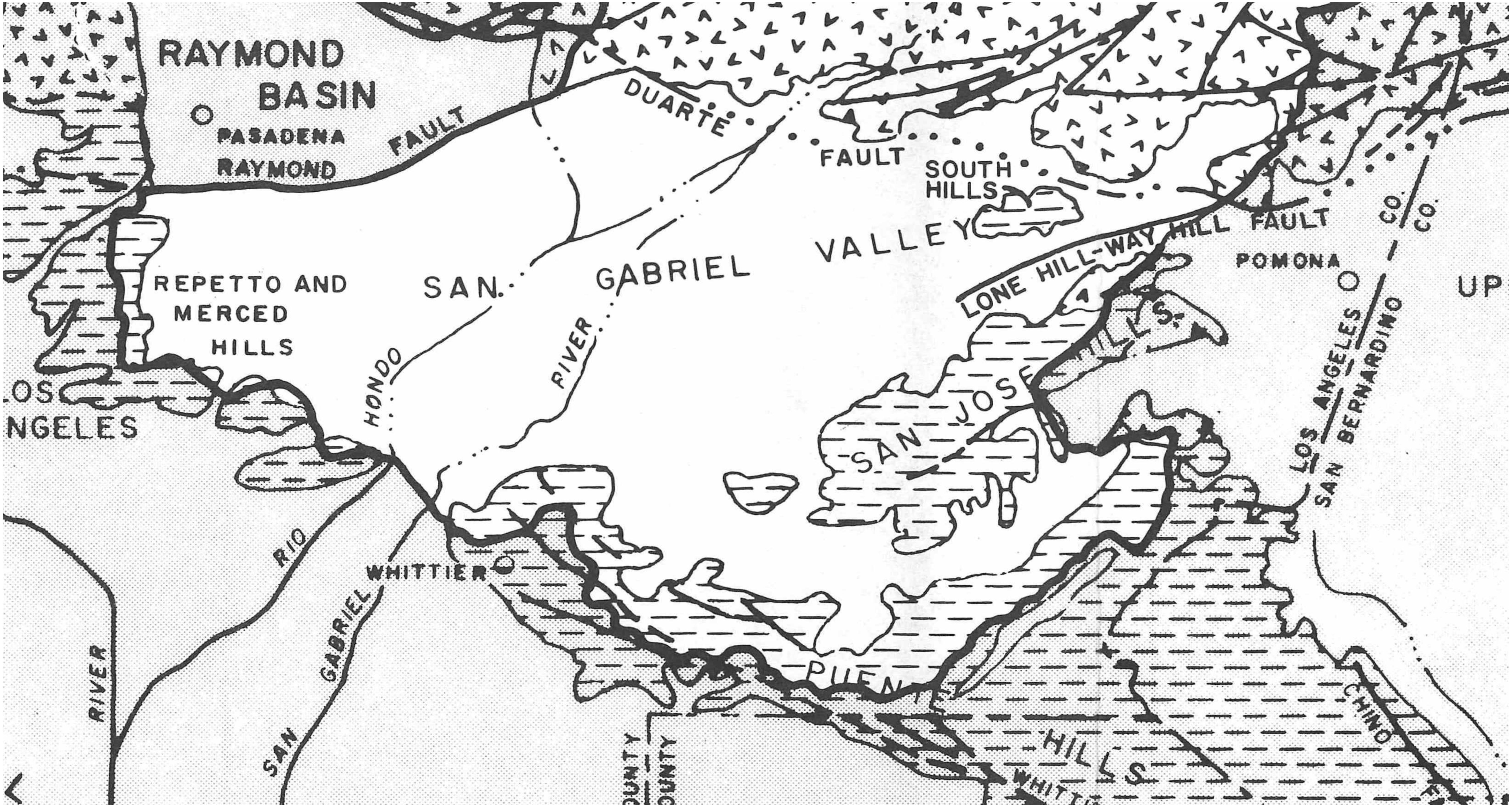
MAIN SAN GABRIEL BASIN WATERMASTER

SAN GABRIEL VALLEY IDENTIFIED BY THE DEPARTMENT OF WATER RESOURCES

10/3/2012



Source: Plate 1 - Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geohydrology. Bulletin No. 104-2. California Department of Water Resources. March 1966.

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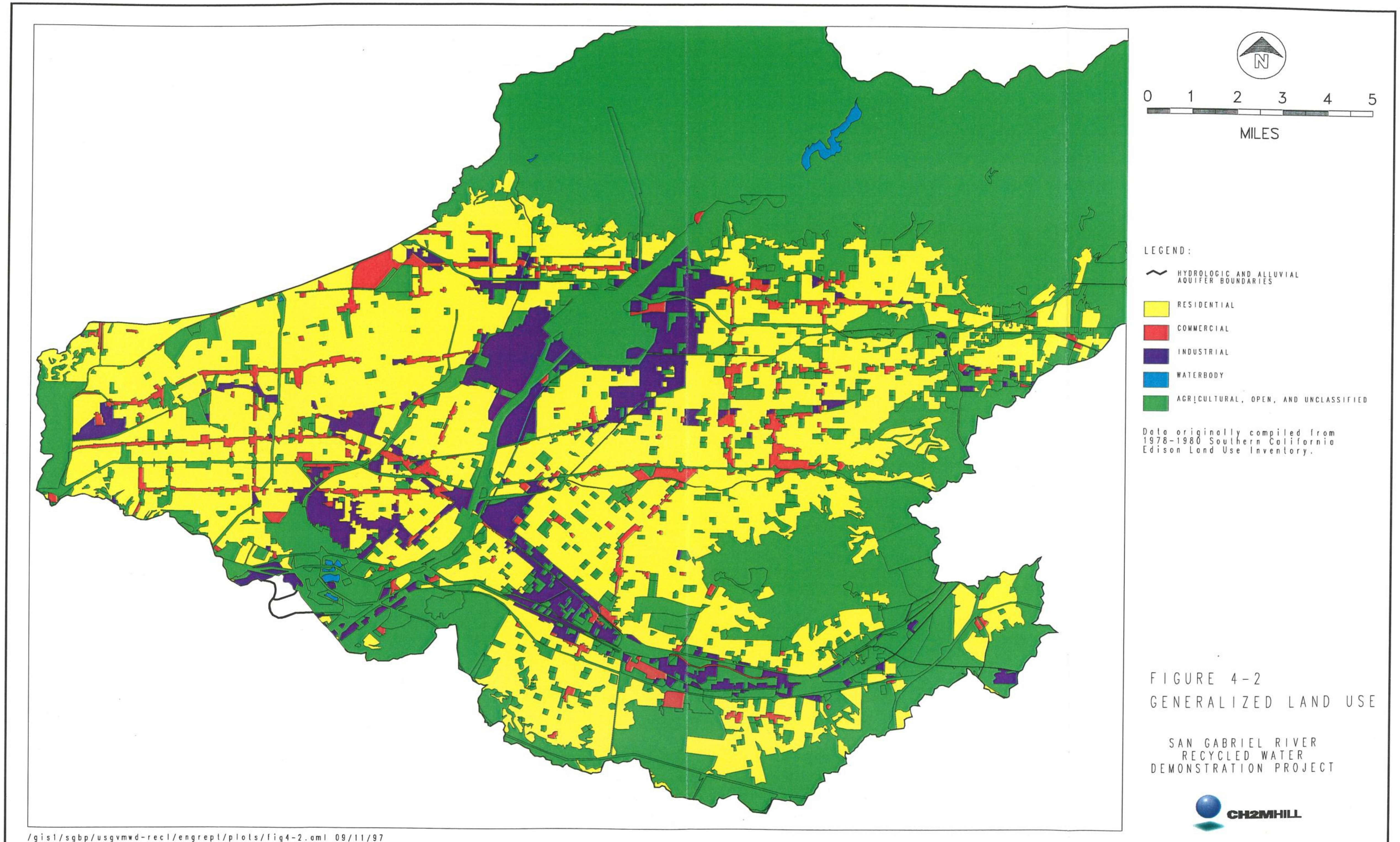
MAIN SAN GABRIEL BASIN WATERMASTER

SAN GABRIEL VALLEY GROUNDWATER BASIN

10/3/2012



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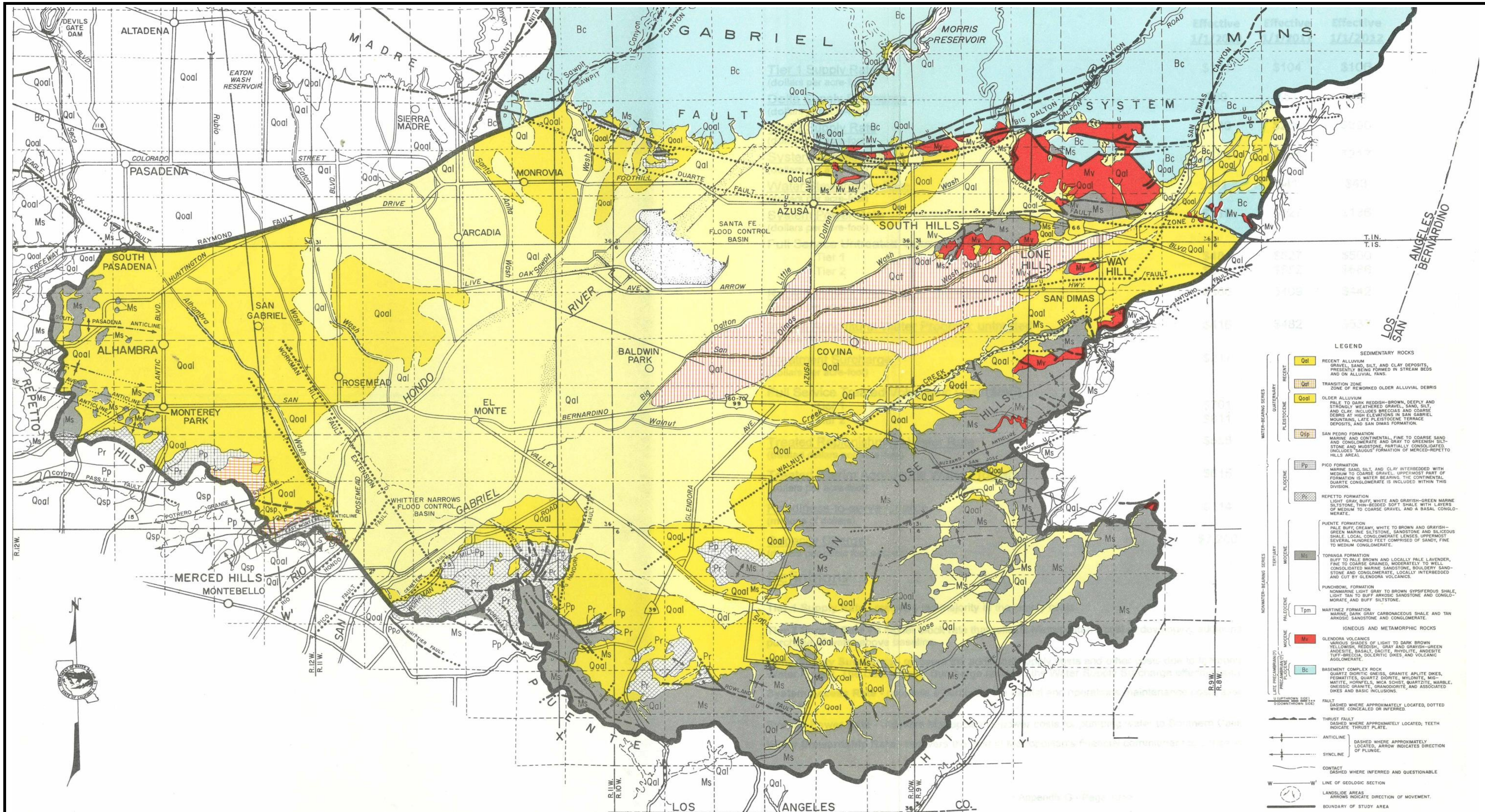
MAIN SAN GABRIEL BASIN WATERMASTER

GENERALIZED LAND USE IN THE SAN GABRIEL VALLEY

2/25/2016



Source: Plate 9A - Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geohydrology. Bulletin No. 104-2. California Department of Water Resources. March 1966.

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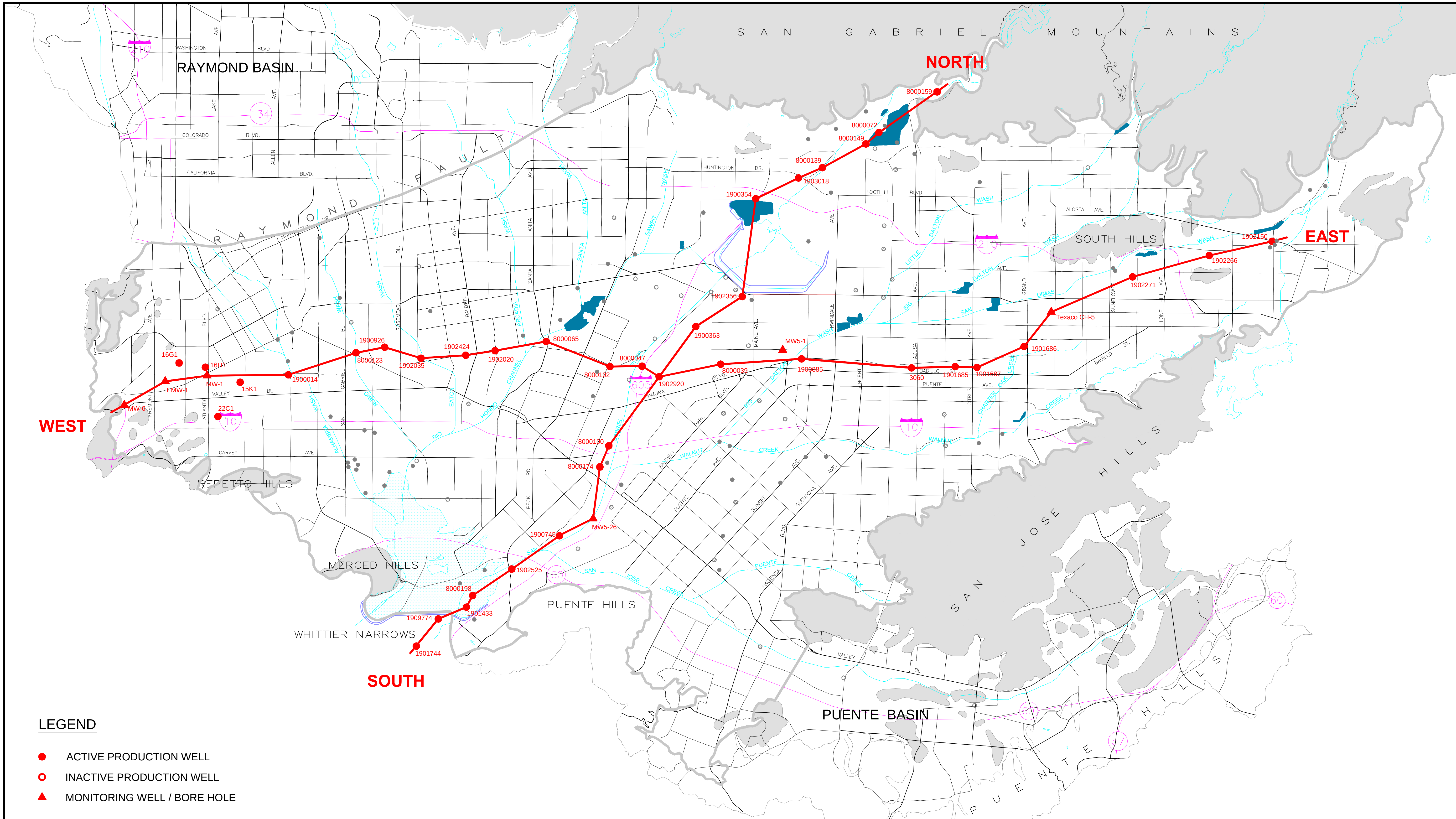
MAIN SAN GABRIEL BASIN WATERMASTER

GENERAL GEOLOGY OF THE SAN GABRIEL VALLEY

11/7/2014



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APPROXIMATE SCALE:
4,500' 0 4,500'

MAIN SAN GABRIEL BASIN WATERMASTER

LOCATION OF CROSS SECTIONS

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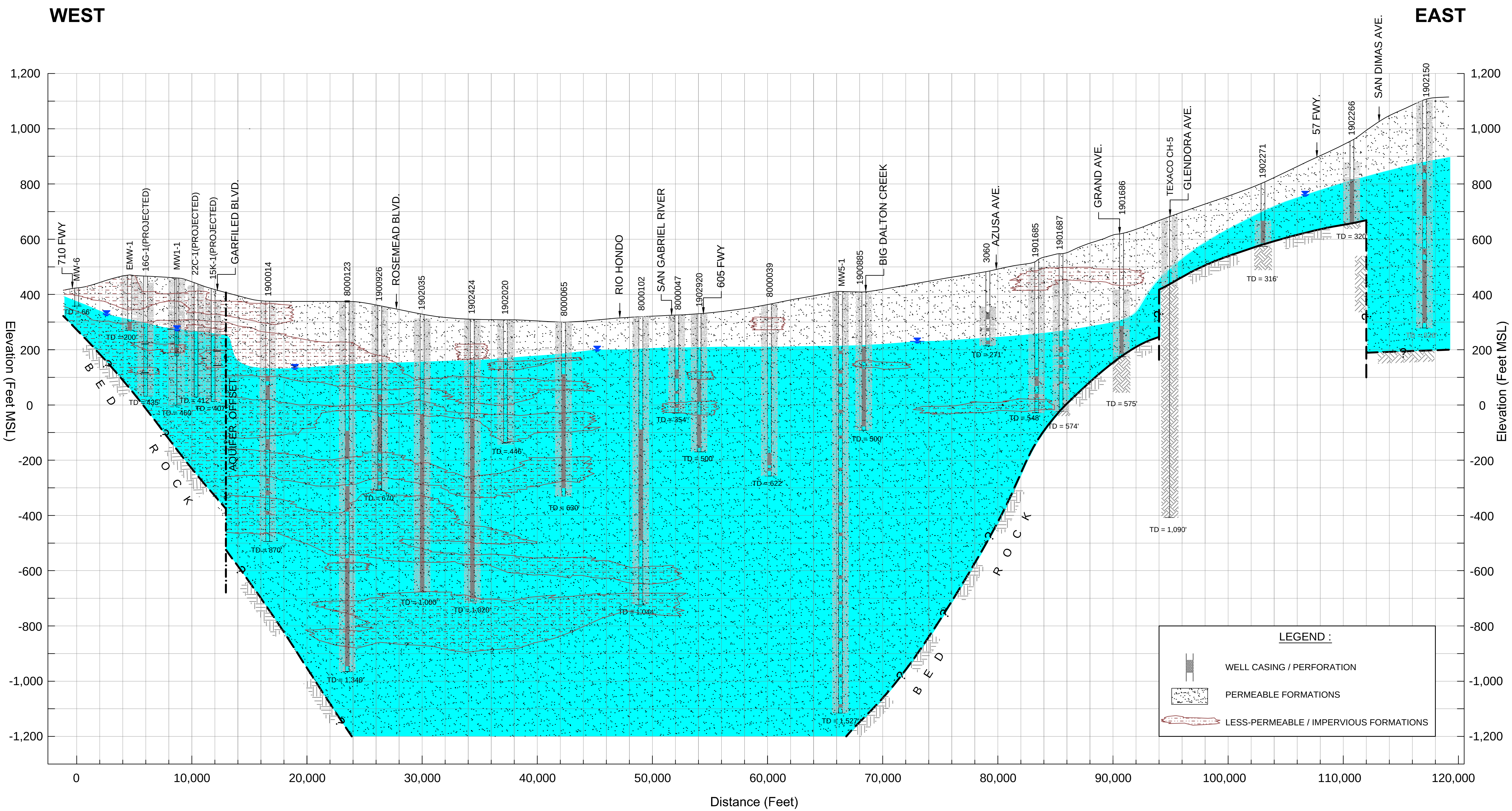

NOTE : SEE PLATE III.6a FOR CROSS SECTION LOCATION

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MAIN SAN GABRIEL BASIN WATERMASTER

SAN GABRIEL GROUNDWATER BASIN - EAST WEST CROSS SECTION

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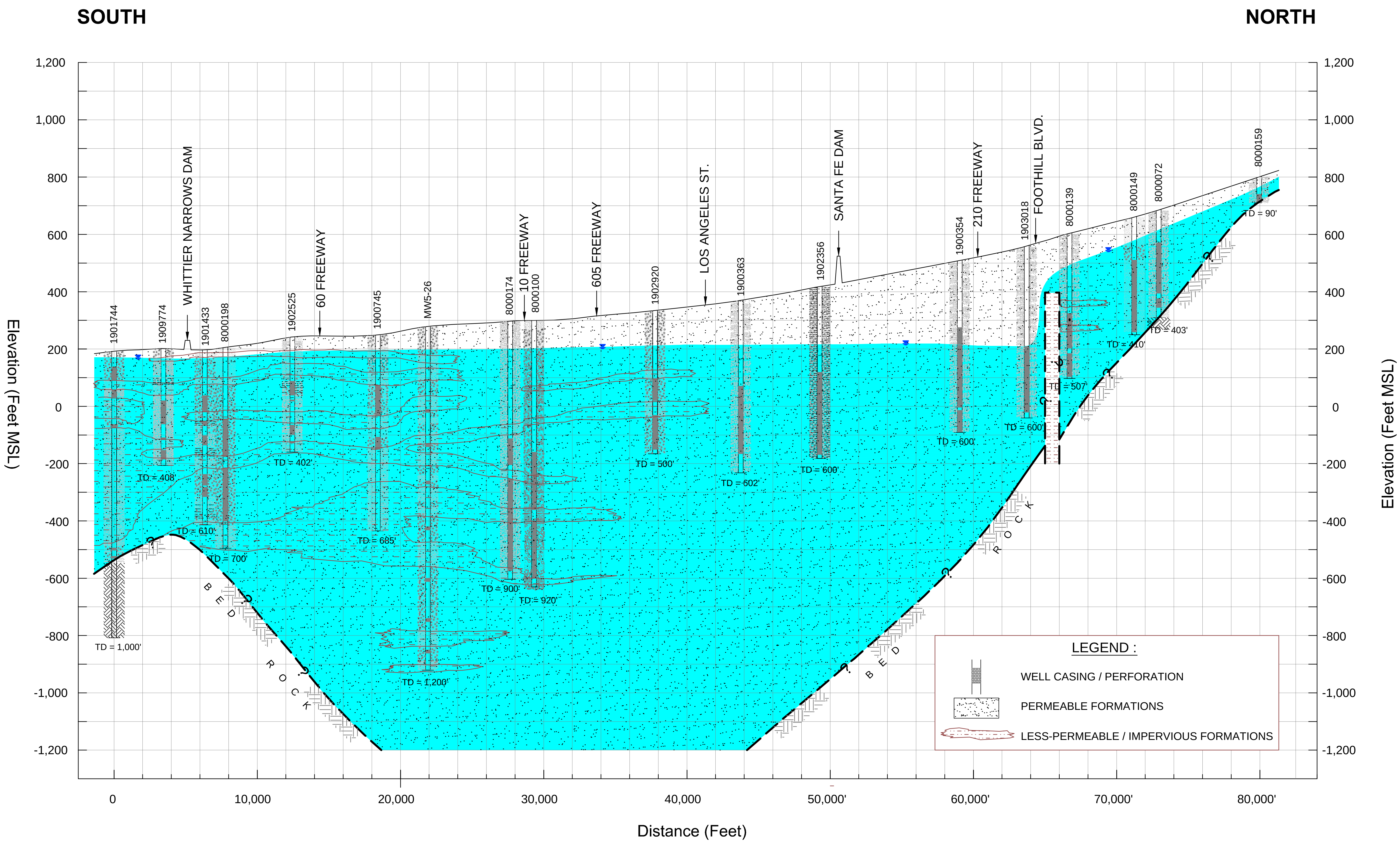

NOTE : SEE PLATE III.6a FOR CROSS SECTION LOCATION

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MAIN SAN GABRIEL BASIN WATERMASTER

SAN GABRIEL GROUNDWATER BASIN - NORTH SOUTH CROSS SECTION

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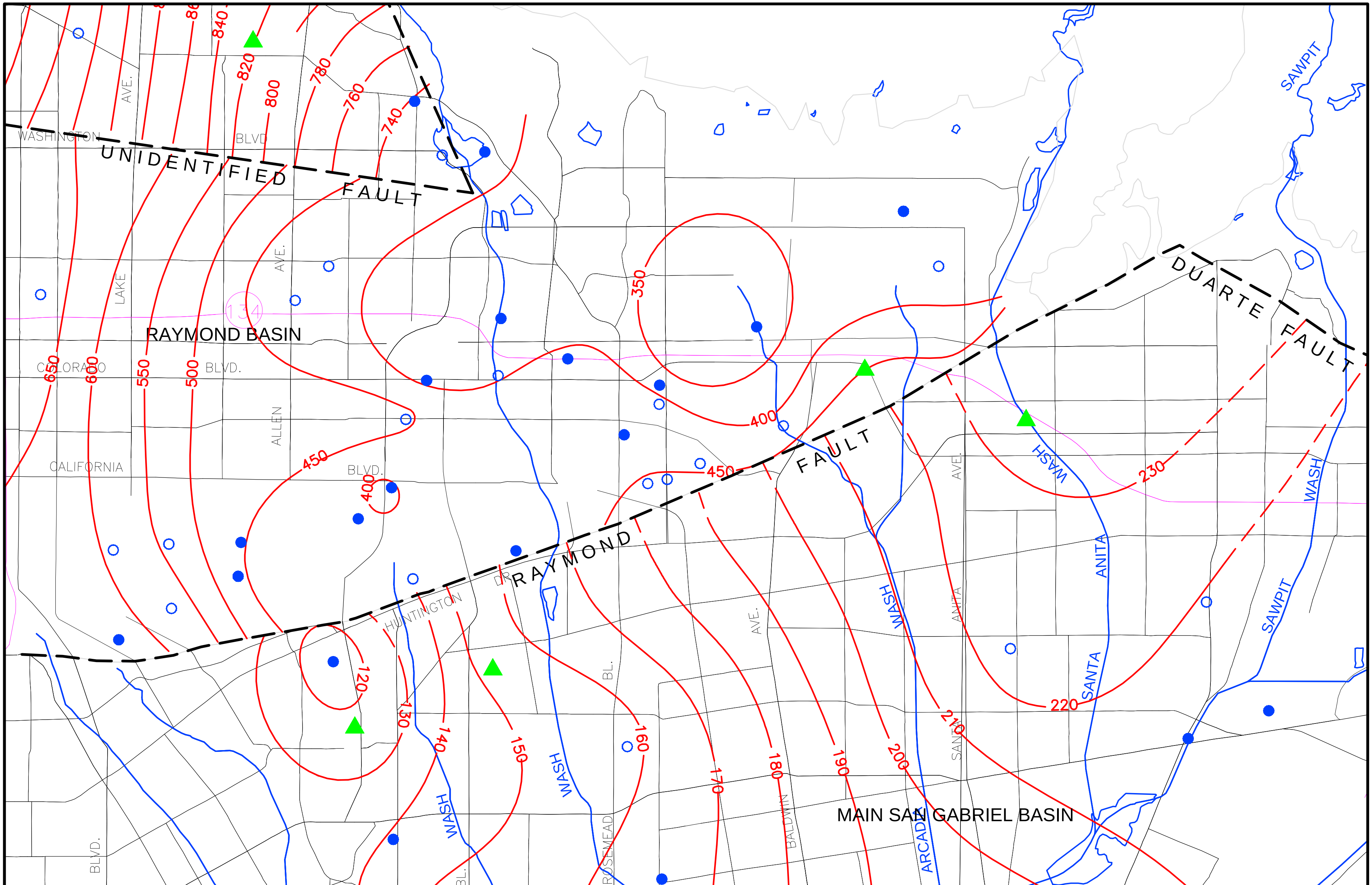

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FAX: (626) 331-7065

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2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

STETSON ENGINEERS INC.

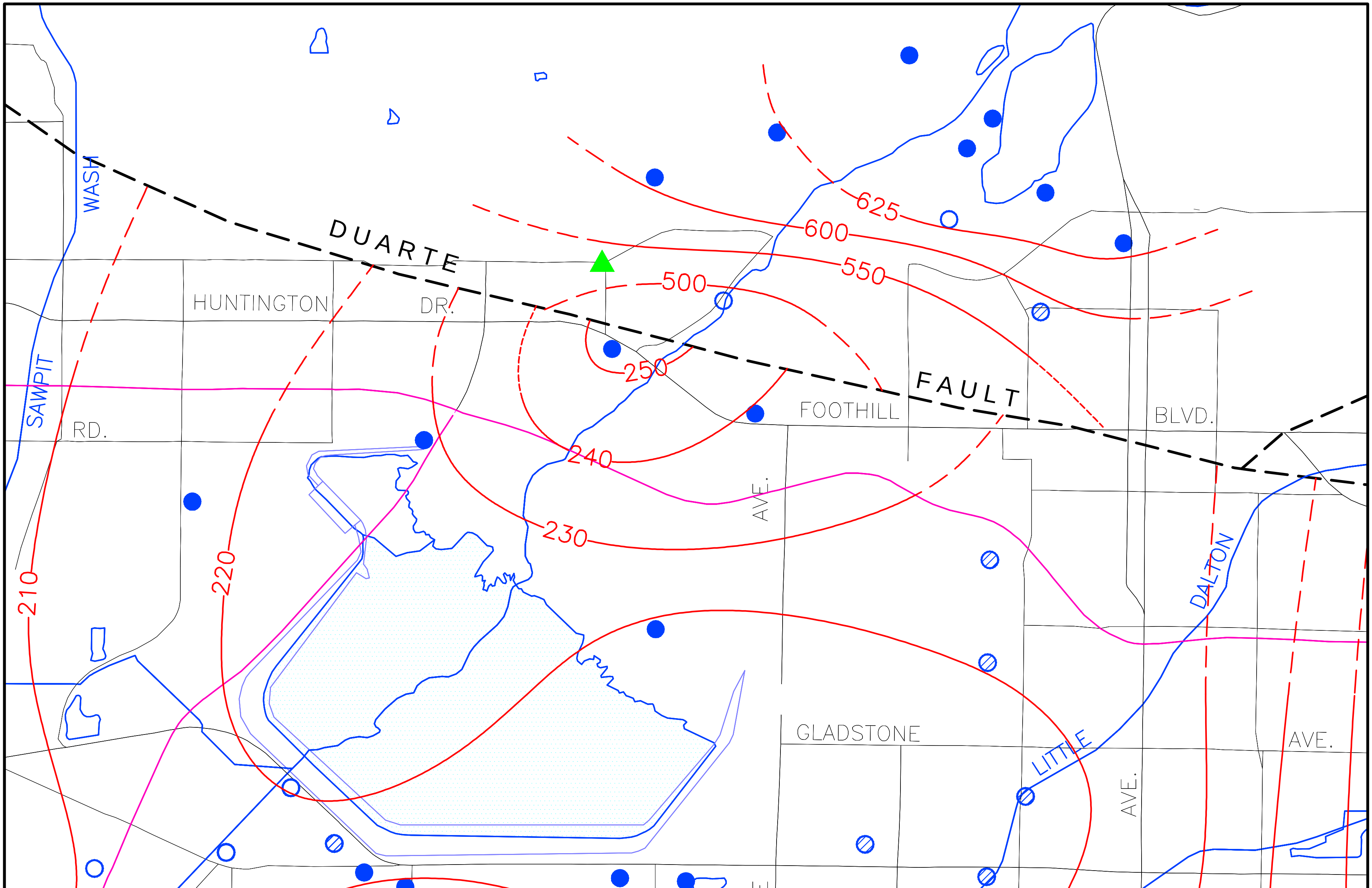
APPROXIMATE SCALE:
2,500' 0 2,500'

MAIN SAN GABRIEL BASIN WATERMASTER

DIFFERENCES IN WATER LEVEL ELEVATIONS ACROSS RAYMOND FAULT (OCTOBER 2007)

PLATE III.7

F:\JOBS\1205\1205-16\13-Salt..\SanGabrielISMNMP\Plates\PLATE III.7.DWG
F:\JOBS\1205-01(2010).CTB



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Mesa Arizona 85202

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APPROXIMATE SCALE

2,000' 0 2,000'

MAIN SAN GABRIEL BASIN WATERMASTER

DIFFERENCES IN WATER LEVEL ELEVATIONS ACROSS DUARTE FAULT (JULY 2010)

PLATE III.8

F:\JOBS\1205\1205-16\13-Salt..\SanGabrielISMNMP\Plates\PLATE III.8.DWG
F:\JOBS\1205-67'.CTB

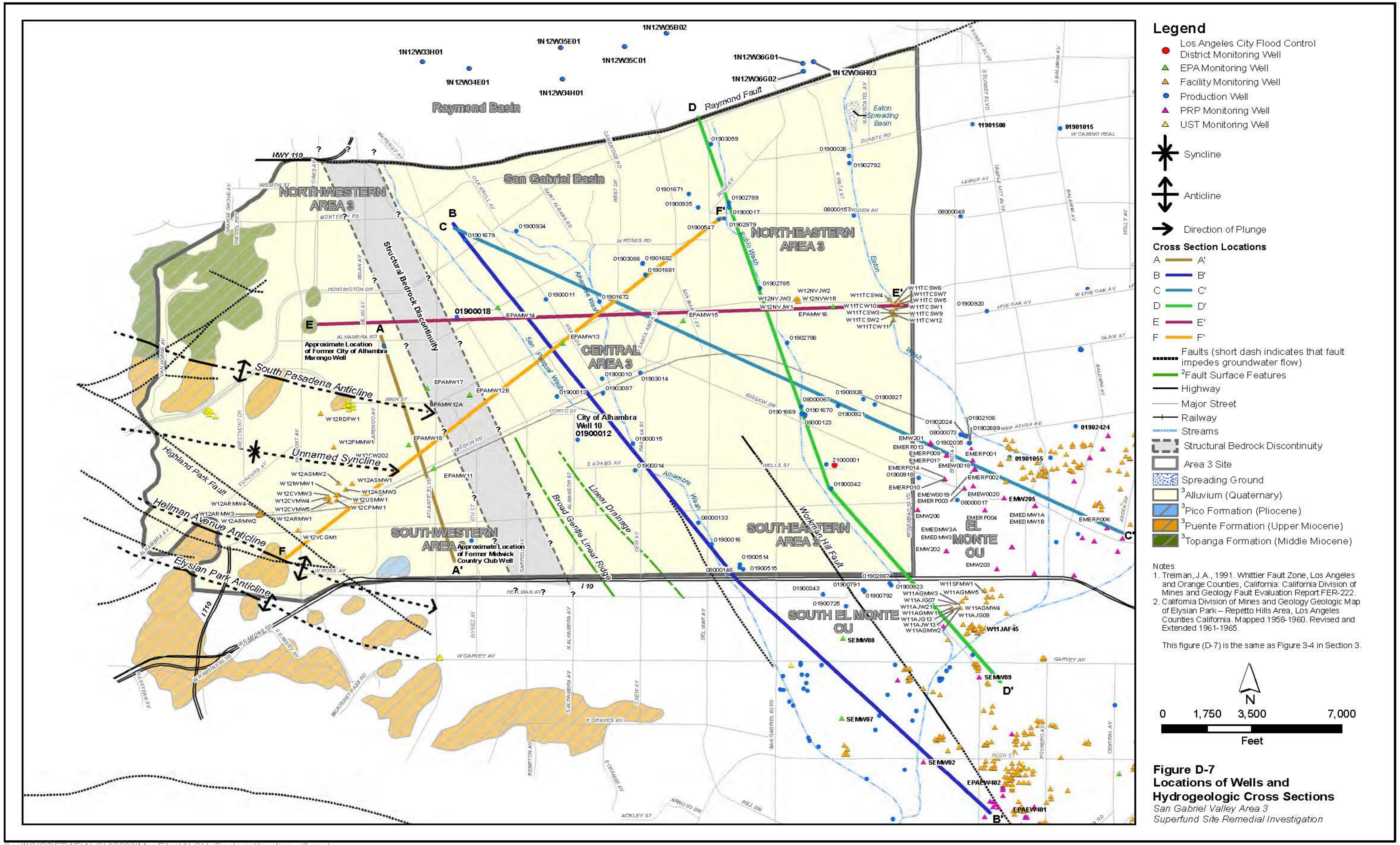

Figure D-7
Locations of Wells and Hydrogeologic Cross Sections
San Gabriel Valley Area 3
Superfund Site Remedial Investigation

\\galt\GIS2\EPA\FALOU\2008\MapFiles\ALOU_GeologicXsection_v3.mxd

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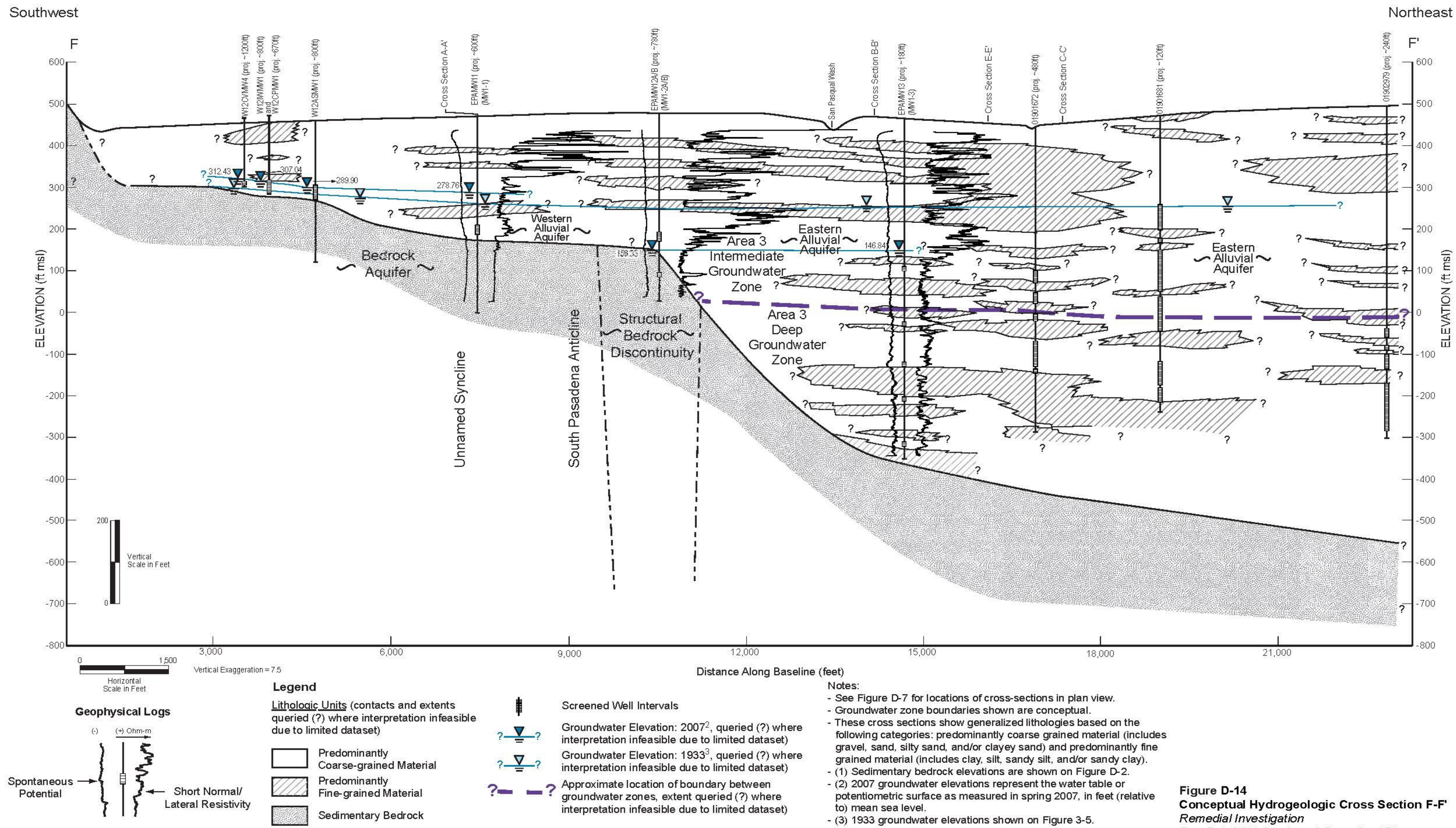
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

STRUCTURAL BEDROCK DISCONTINUITY INTERPRETED BY U.S. ENVIRONMENTAL PROTECTION AGENCY

11/7/2014



Legend

Lithologic Units (contacts and extents queried (?) where interpretation infeasible due to limited dataset)

- Predominantly Coarse-grained Material
- Predominantly Fine-grained Material
- Sedimentary Bedrock

Screened Well Intervals

Groundwater Elevation: 2007[2], queried (?) where interpretation infeasible due to limited dataset)

Groundwater Elevation: 1933[3], queried (?) where interpretation infeasible due to limited dataset)

Approximate location of boundary between groundwater zones, extent queried (?) where interpretation infeasible due to limited dataset)

Notes:
- See Figure D-7 for locations of cross-sections in plan view.
- Groundwater zone boundaries shown are conceptual.
- These cross sections show generalized lithologies based on the following categories: predominantly coarse grained material (includes gravel, sand, silty sand, and/or clayey sand) and predominantly fine grained material (includes clay, silt, sandy silt, and/or sandy clay).
- (1) Sedimentary bedrock elevations are shown on Figure D-2.
- (2) 2007 groundwater elevations represent the water table or potentiometric surface as measured in spring 2007, in feet (relative to) mean sea level.
- (3) 1933 groundwater elevations shown on Figure 3-5.
- (4) This Figure (D-14) is the same as Figure 3-15 in Section 3.

Figure D-14
Conceptual Hydrogeologic Cross Section F-F'
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

SCO385133.RR.01 SGV_CrossFF 4.ai 5/09

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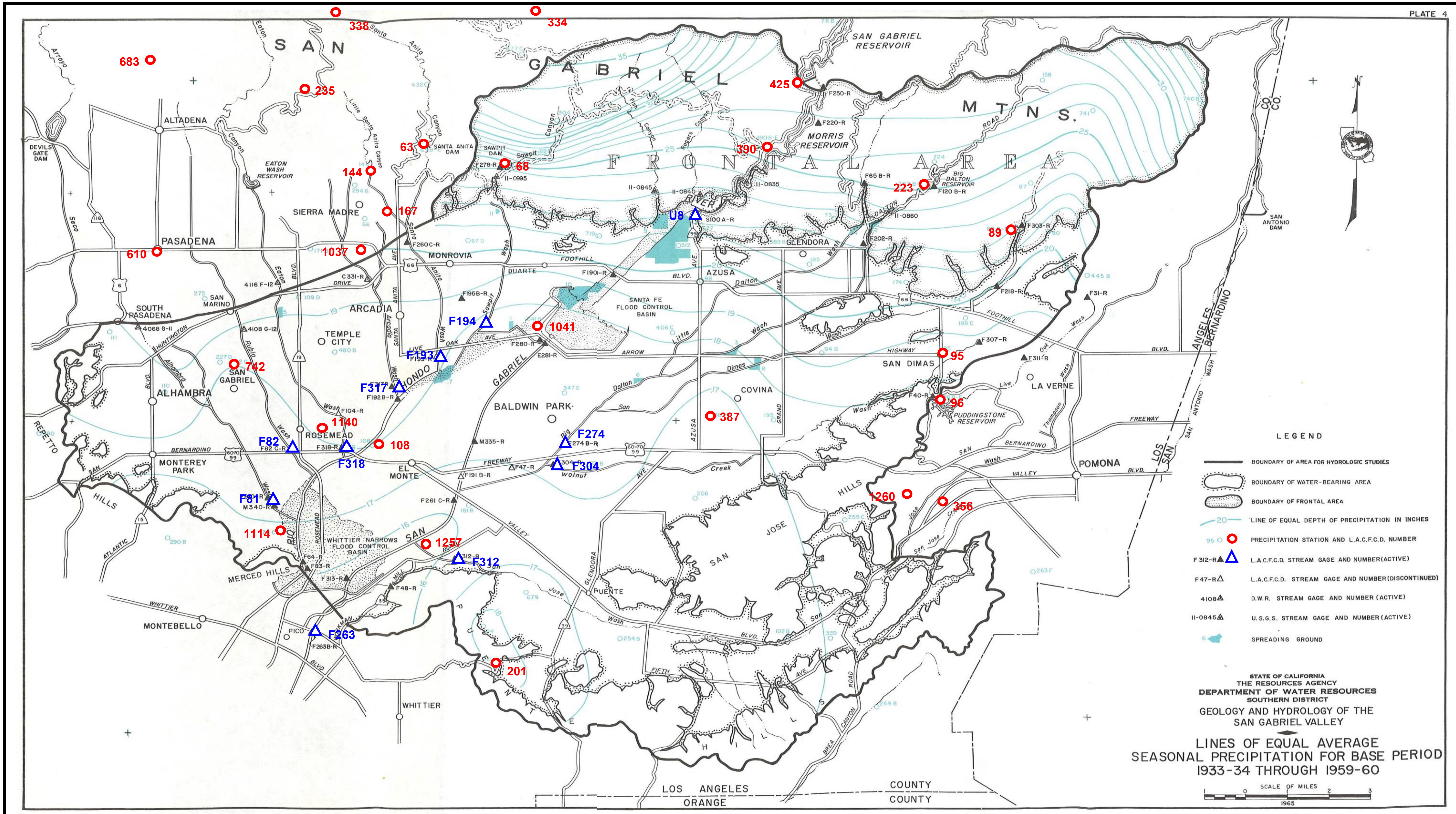
MAIN SAN GABRIEL BASIN WATERMASTER

STRUCTURAL BEDROCK DISCONTINUITY INTERPRETED BY U.S. ENVIRONMENTAL PROTECTION AGENCY

11/7/2014



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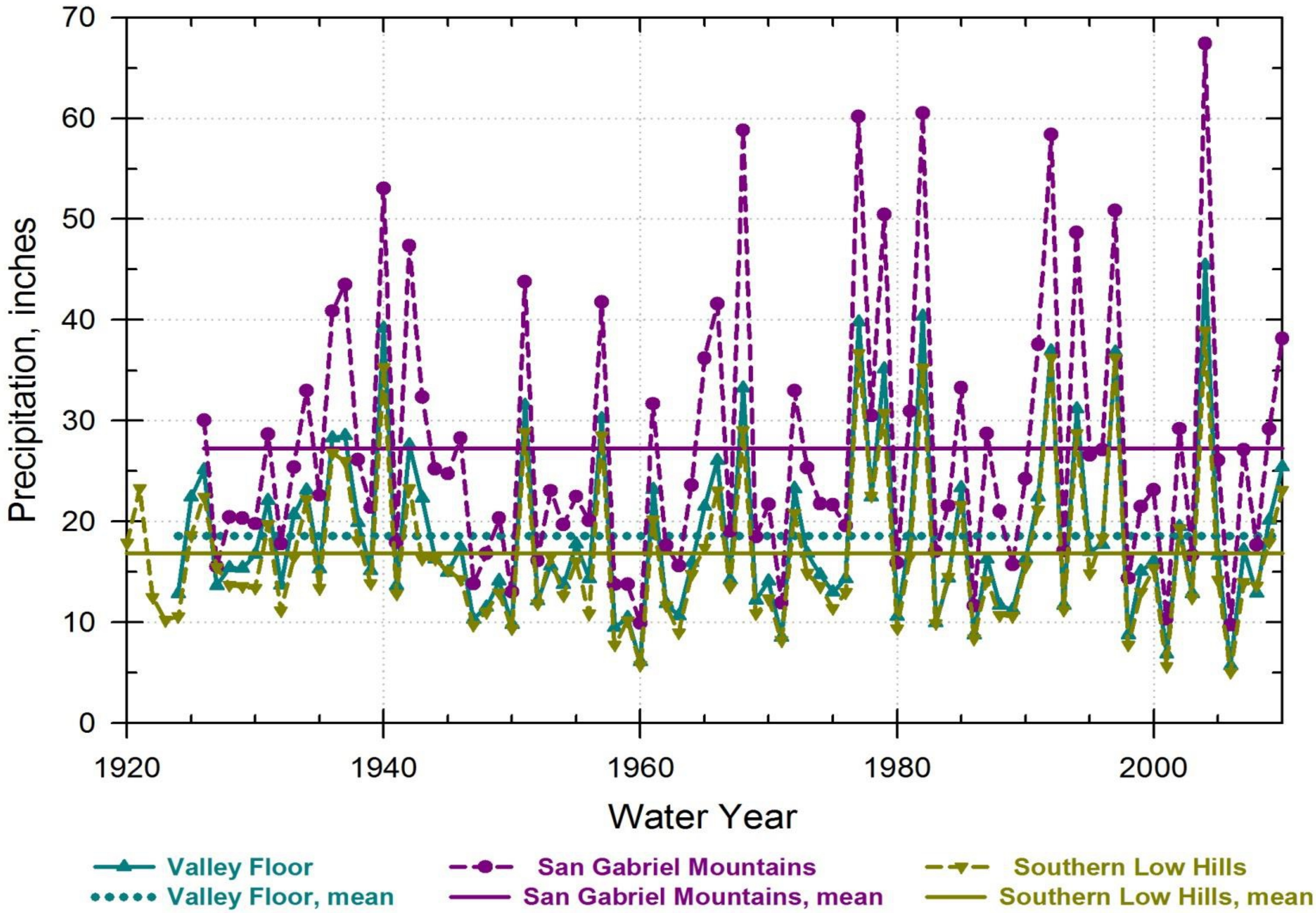
MAIN SAN GABRIEL BASIN WATERMASTER

HYDROLOGY OF THE SAN GABRIEL BASIN WATERSHED

11/7/2014



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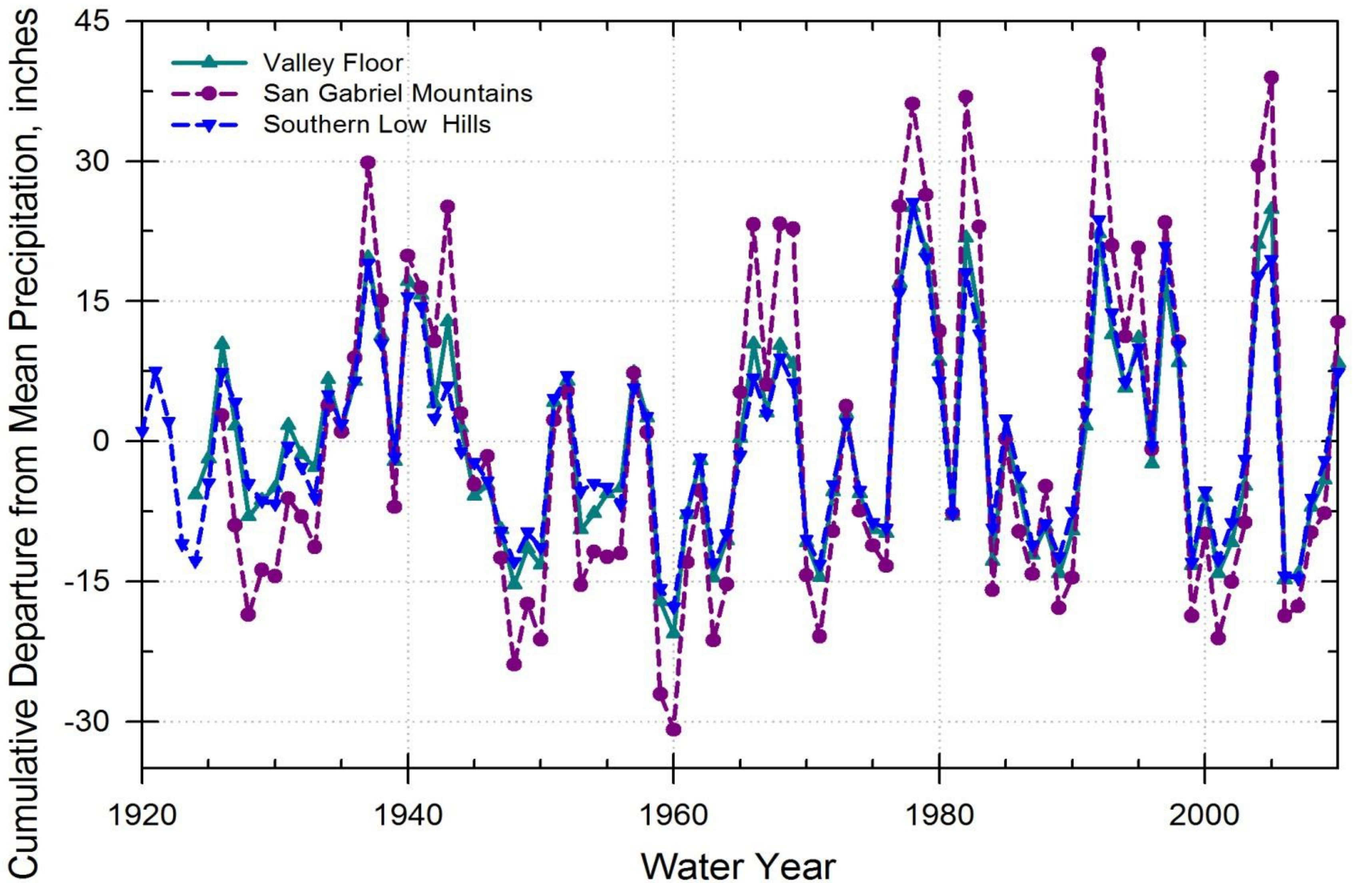
MAIN SAN GABRIEL BASIN WATERMASTER

PRECIPITATION IN THE SAN GABRIEL RIVER AND RIO HONDO WATERSHED

PLATE III.11a

11/7/2014



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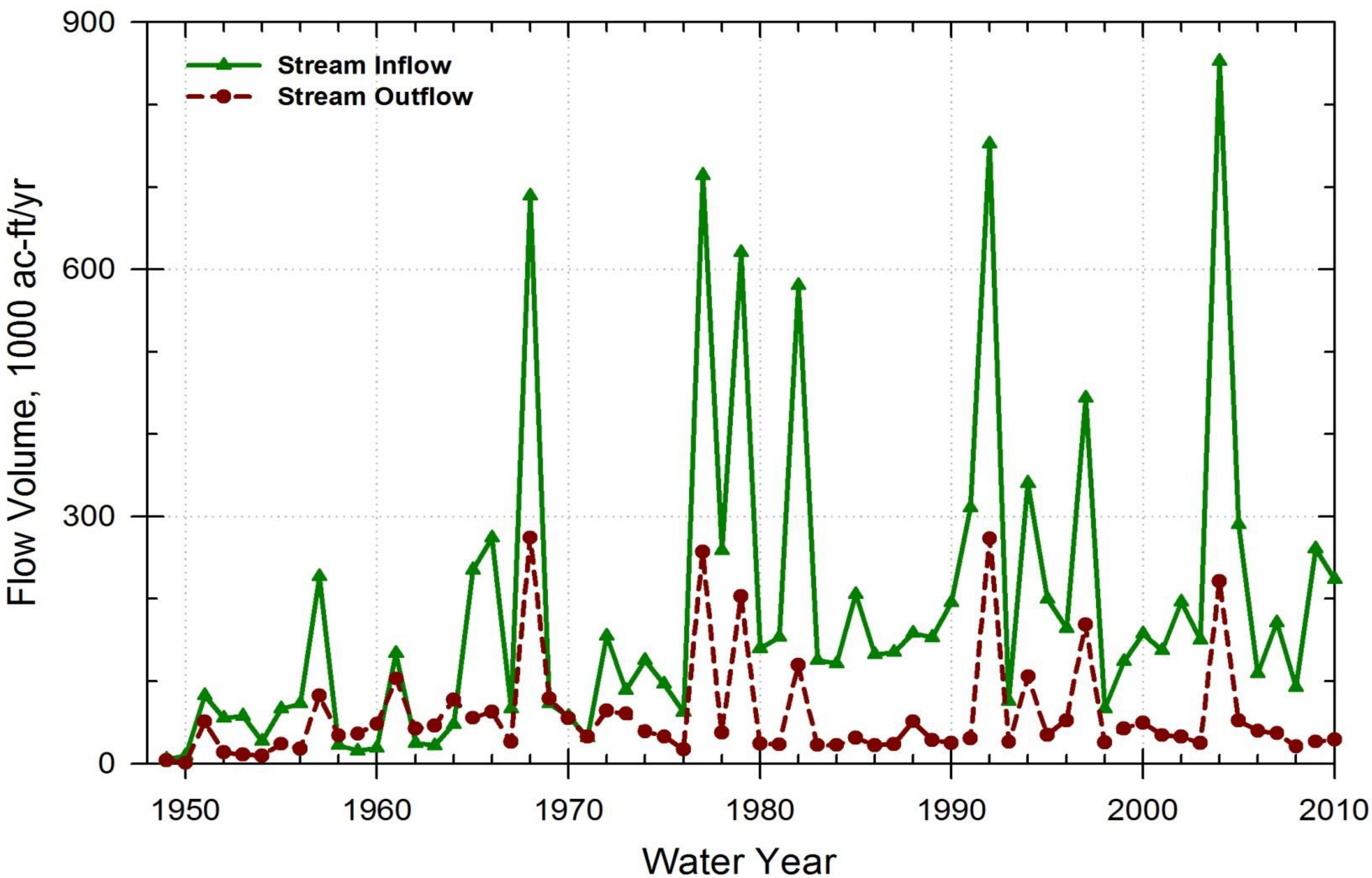
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

CUMULATIVE DEPARTURE OF PRECIPITATION IN THE SAN GABRIEL RIVER AND RIO HONDO WATERSHED

PLATE III.11b

11/7/2014



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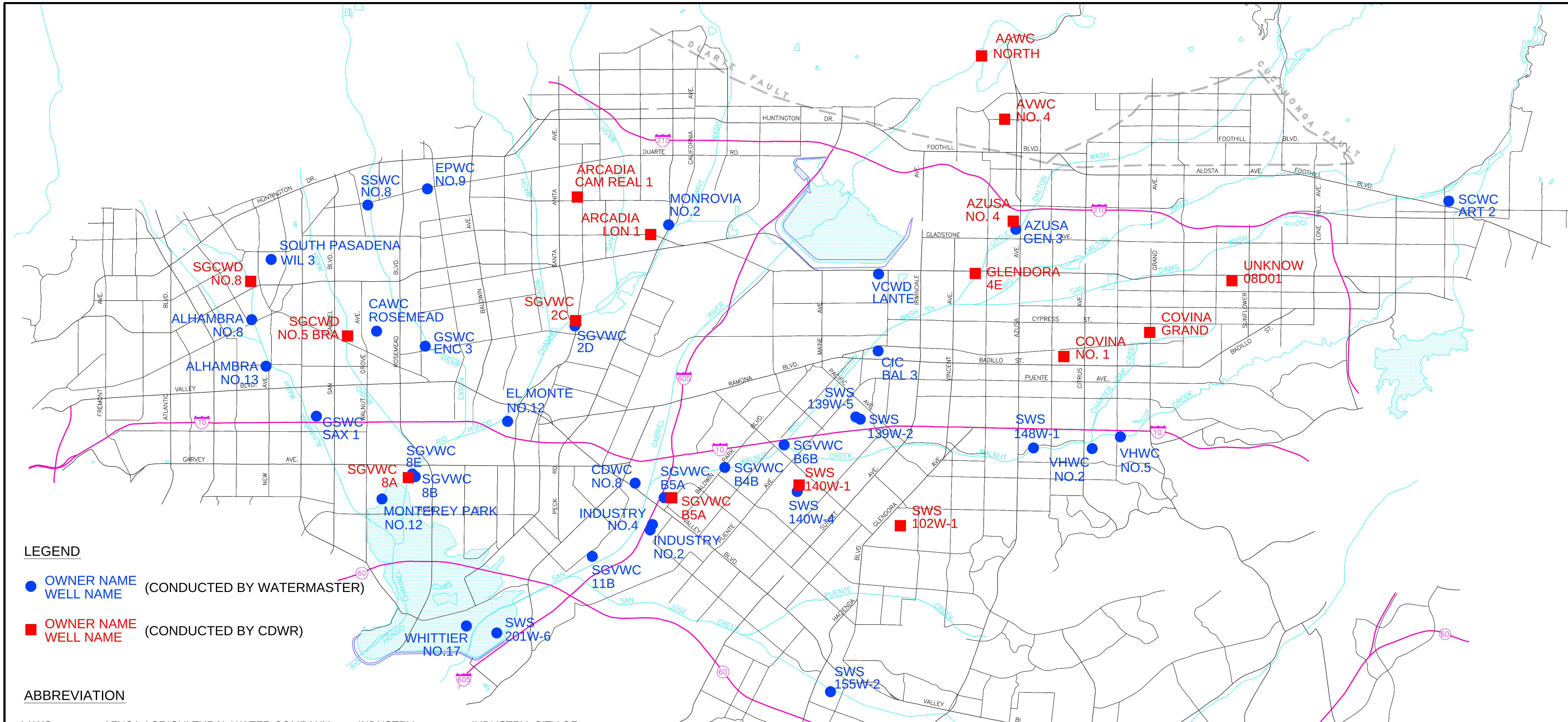
MAIN SAN GABRIEL BASIN WATERMASTER

SAN GABRIEL BASIN STREAM INFLOW AND OUTFLOW

PLATE III.12

11/7/2014



LEGEND

● OWNER NAME WELL NAME (CONDUCTED BY WATERMASTER)

■ OWNER NAME WELL NAME (CONDUCTED BY CDWR)

ABBREVIATION

AAWC	AZUSA AGRICULTURAL WATER COMPANY	INDUSTRY	INDUSTRY, CITY OF
ALHAMBRA	ALHAMBRA, CITY OF	MONROVIA	MONROVIA, CITY OF
ARCADIA	ARCADIA, CITY OF	MONTEREY PARK	MONTEREY PARK, CITY OF
AVWC	AZUSA VALLEY WATER COMPANY	GSWC	GOLDEN STATE WATER COMPANY
AZUSA	AZUSA, CITY OF	SGCWD	SAN GABRIEL COUNTY WATER DISTRICT
CAWC	CALIFORNIA AMERICAN WATER COMPANY	SGVWC	SAN GABRIEL VALLEY WATER COMPANY
CDWC	CALIFORNIA DOMESTIC WATER COMPANY	SOUTH PASADENA	SOUTH PASADENA, CITY OF
CIC	COVINA IRRIGATING COMPANY	SSWC	SUNNY SLOPE WATER COMPANY
COVINA	COVINA, CITY OF	SWS	SUBURBAN WATER SYSTEMS
EL MONTE	EL MONTE, CITY OF	VCWD	VALLEY COUNTY WATER DISTRICT
EPWC	EAST PASADENA WATER COMPANY	VHWC	VALENCIA HEIGHTS WATER COMPANY
GLENDORA	GLENDORA, CITY OF	WHITTIER	WHITTIER, CITY OF

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Mesa Arizona 85202

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APPROXIMATE SCALE
4,000' 0 4,000'

MAIN SAN GABRIEL BASIN WATERMASTER

LOCATIONS OF AQUIFER PERFORMANCE TESTS

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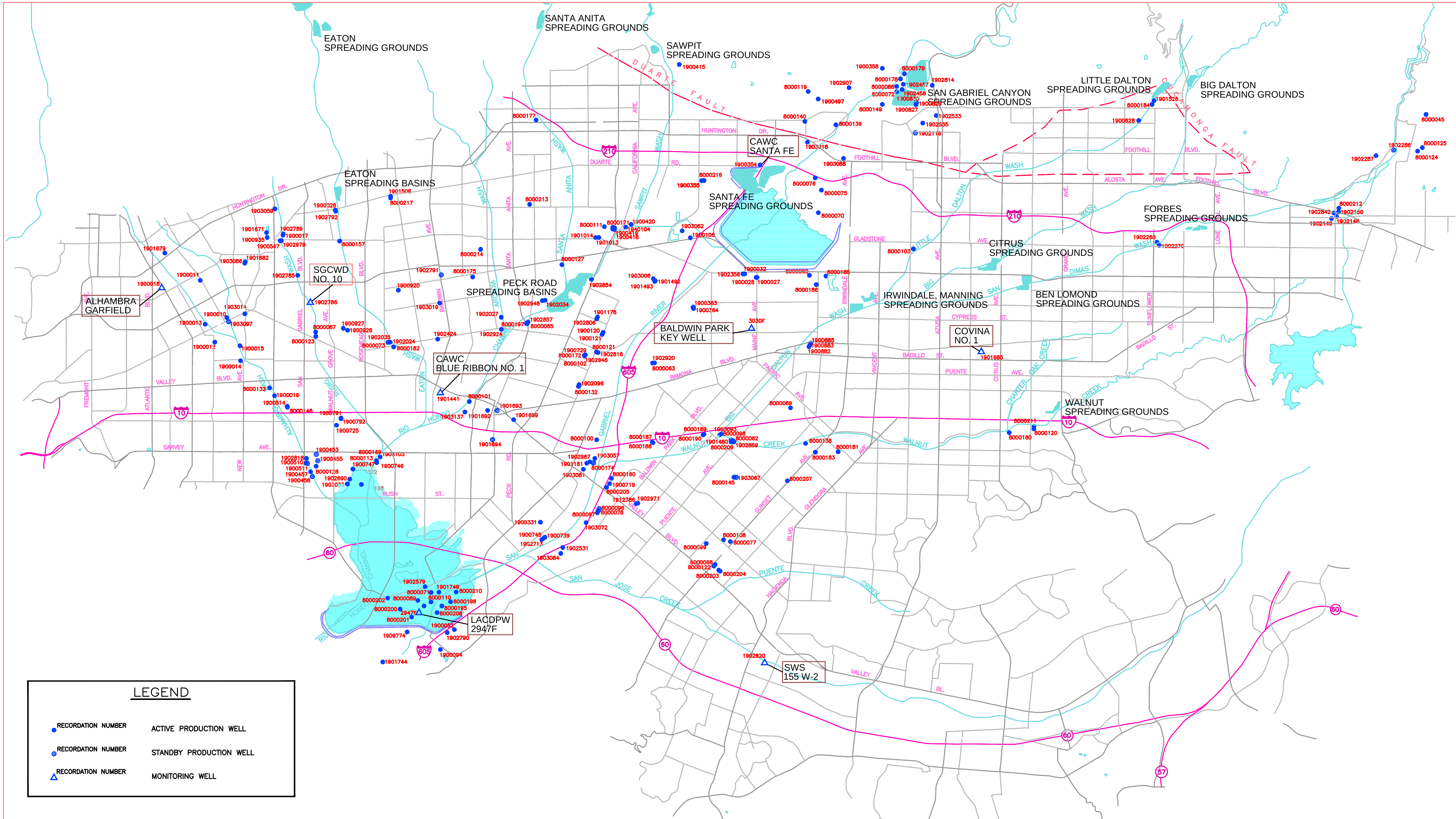

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APPROXIMATE SCALE
4,000' 0 4,000'

MAIN SAN GABRIEL BASIN WATERMASTER

LOCATION OF WELLS AND SPREADING GROUNDS / BASINS

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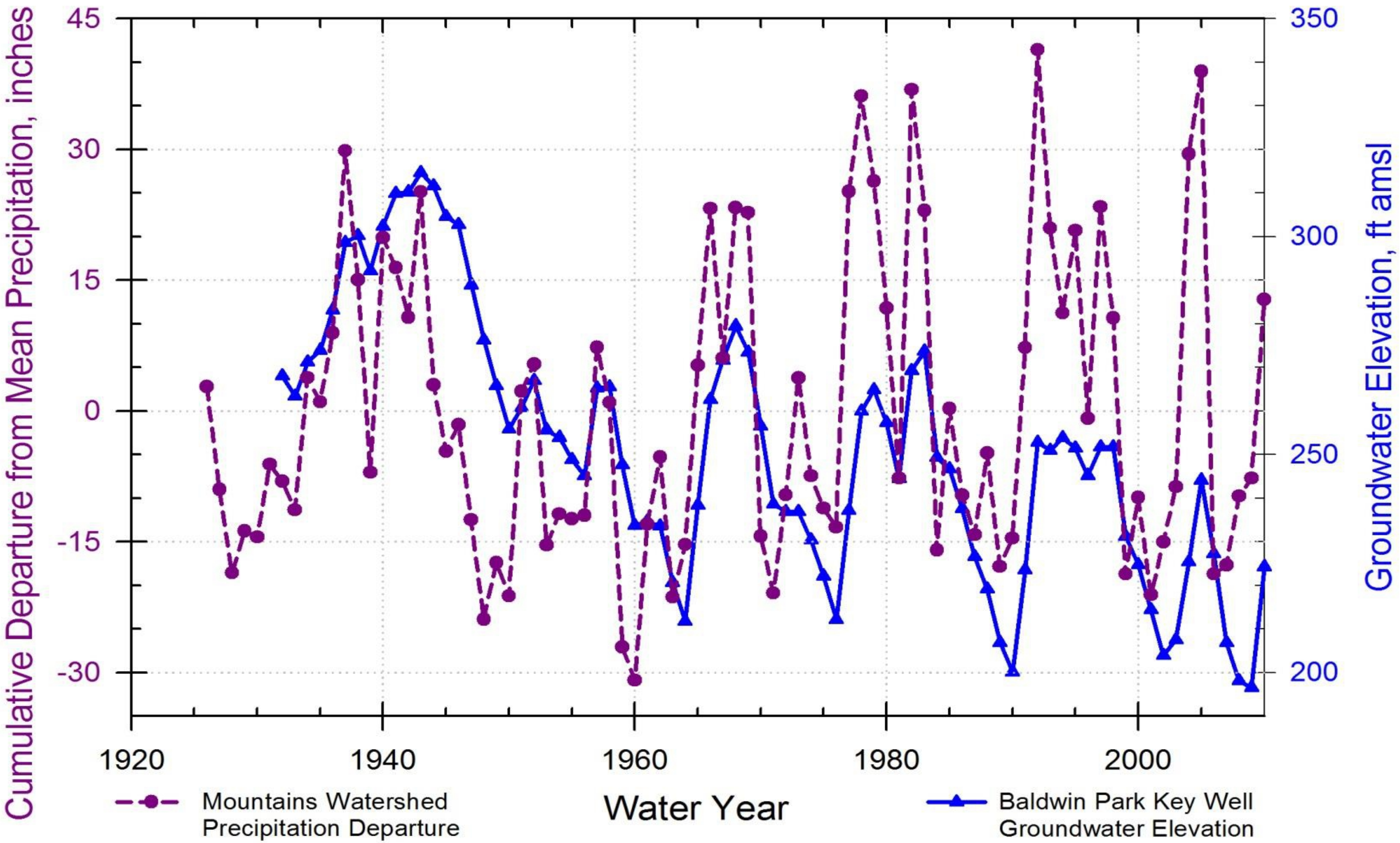
F:\JOBS\1205-67'.CTB



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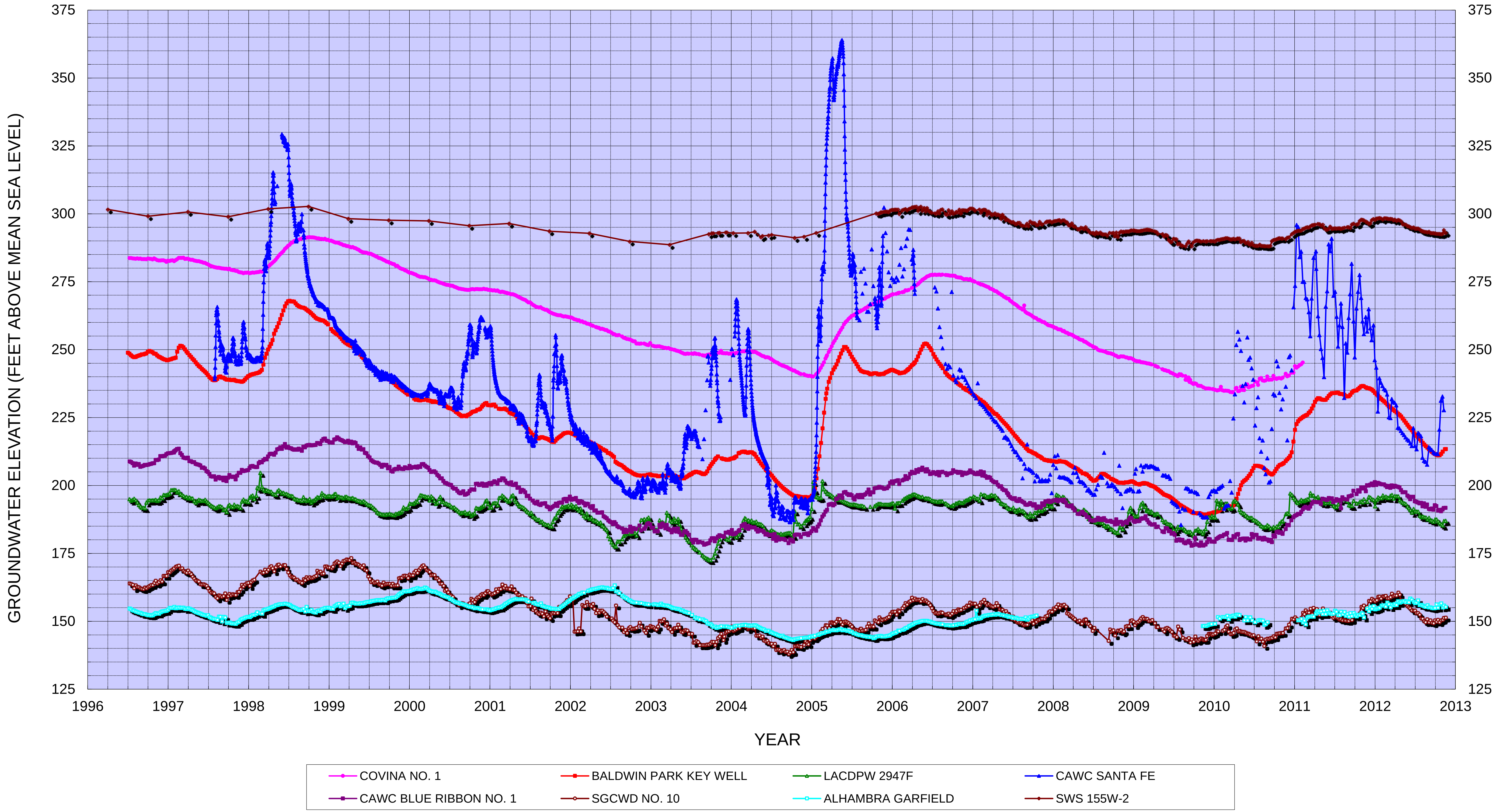
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER ELEVATION AT BALDWIN PARK KEY WELL AND CUMULATIVE DEPARTURE FROM MEAN PRECIPITATION (MOUNTAINS WATERSHED)

11/7/2014



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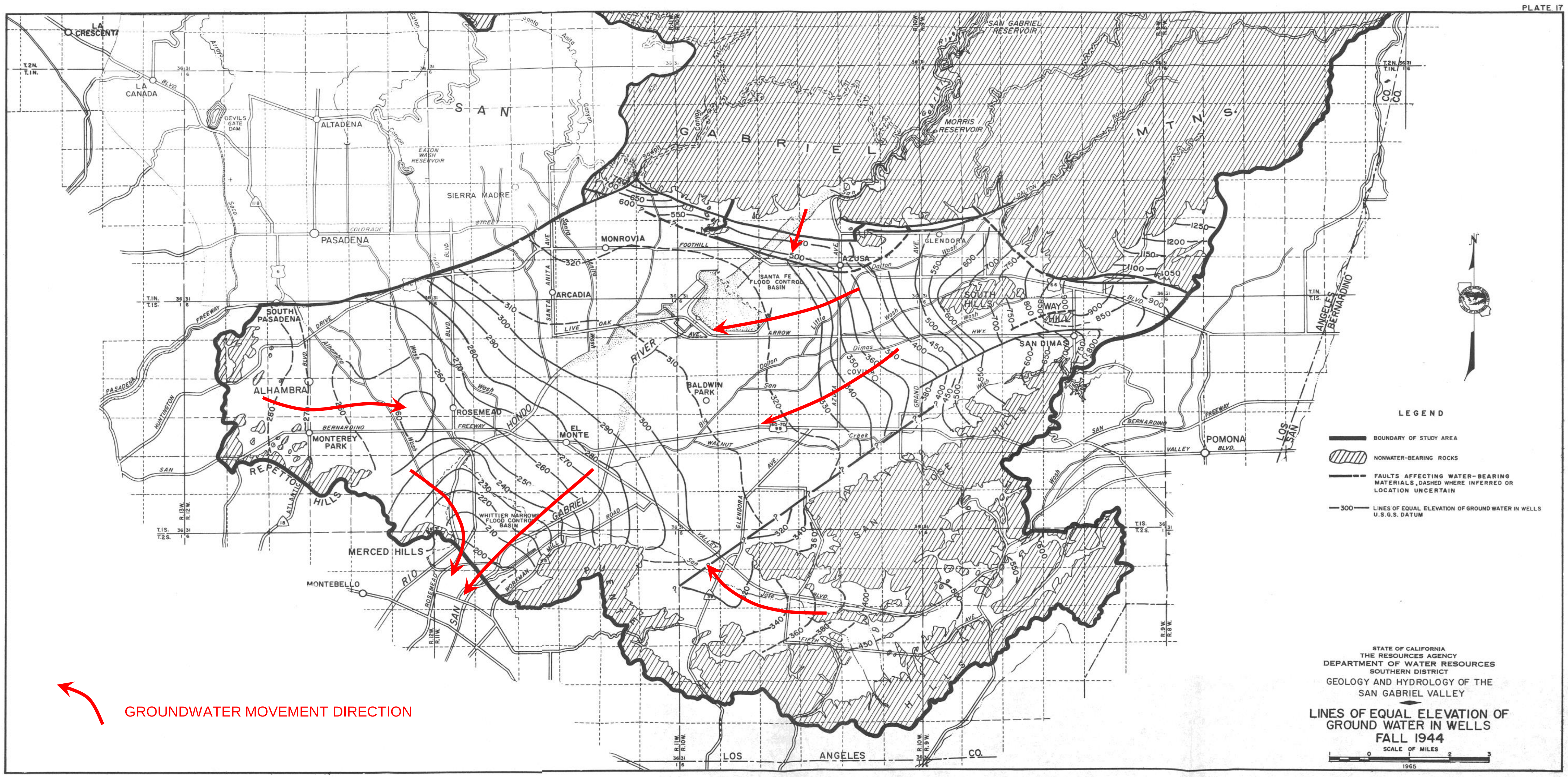
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

HYDROGRAPH OF GROUNDWATER ELEVATION AT WELLS IN THE MAIN SAN GABRIEL BASIN

11/7/2014



Source: Plate 17 - Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geohydrology. Bulletin No. 104-2. California Department of Water Resources. March 1966.

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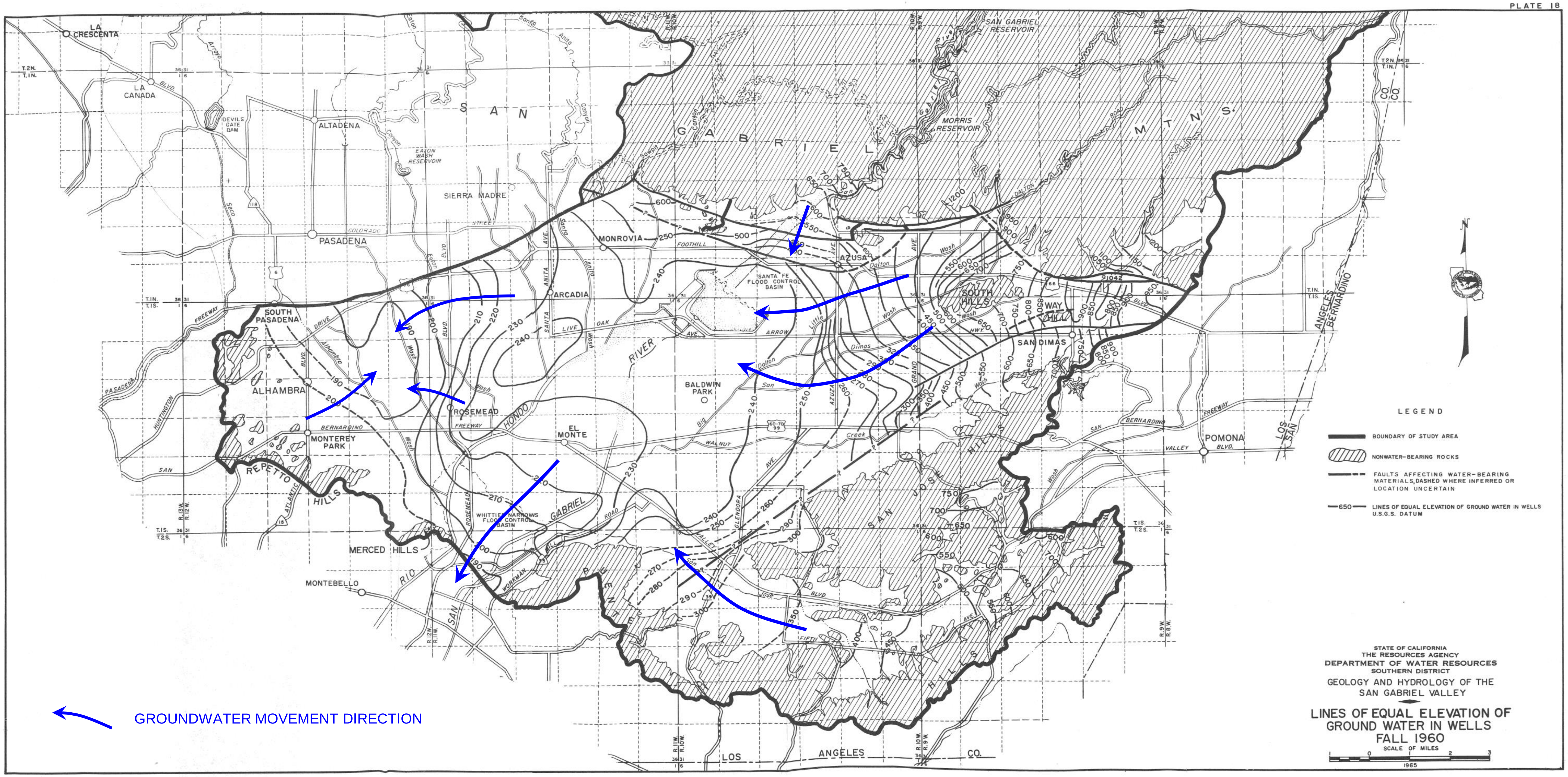
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER MOVEMENT PRIOR TO DEVELOPMENT

11/7/2014



Source: Plate 18 - Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geohydrology. Bulletin No. 104-2. California Department of Water Resources. March 1966.

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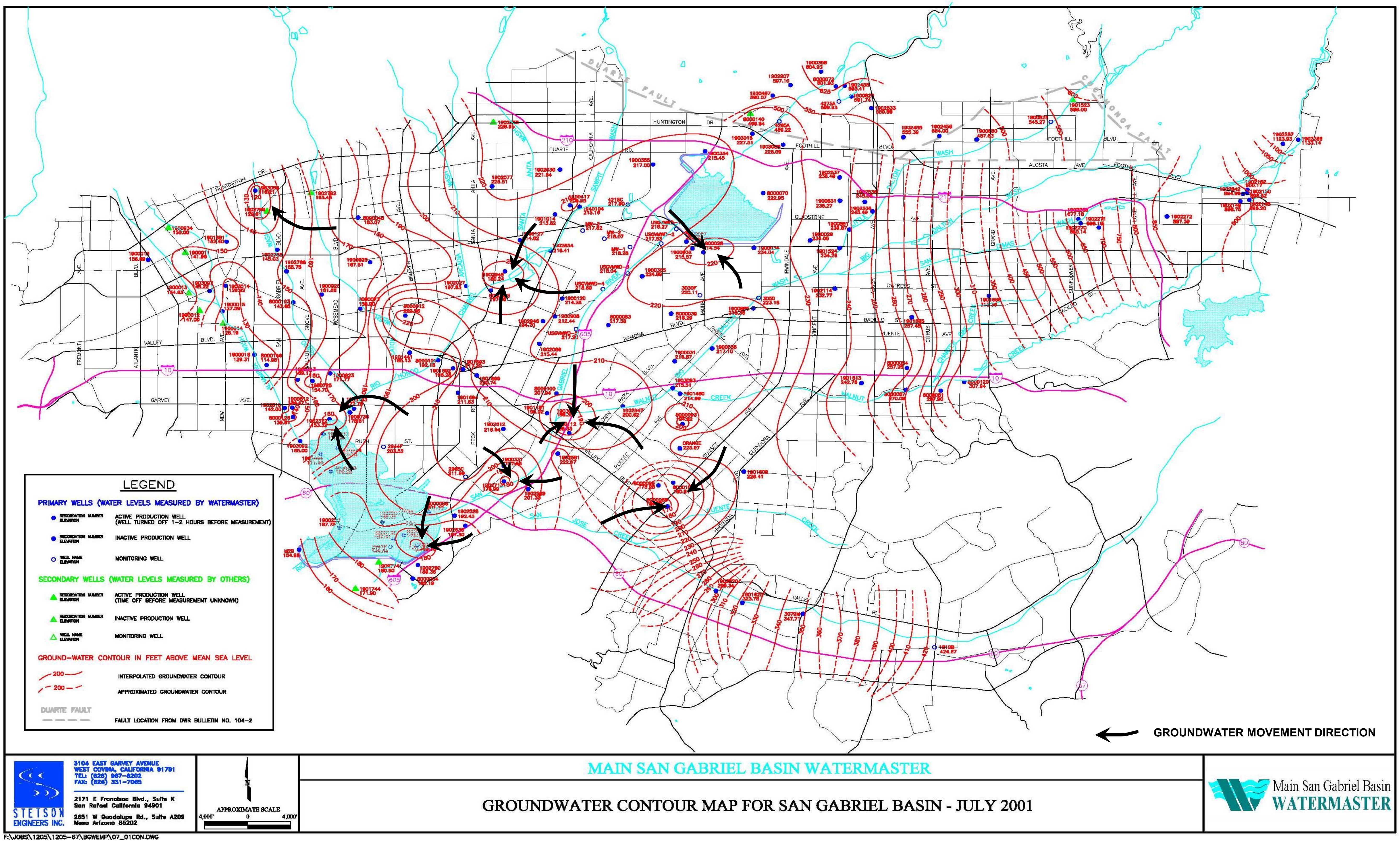
	GROUNDWATER MOVEMENT DURING EARLY DEVELOPMENT

11/7/2014



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West Covina San Rafael Mesa, Arizona
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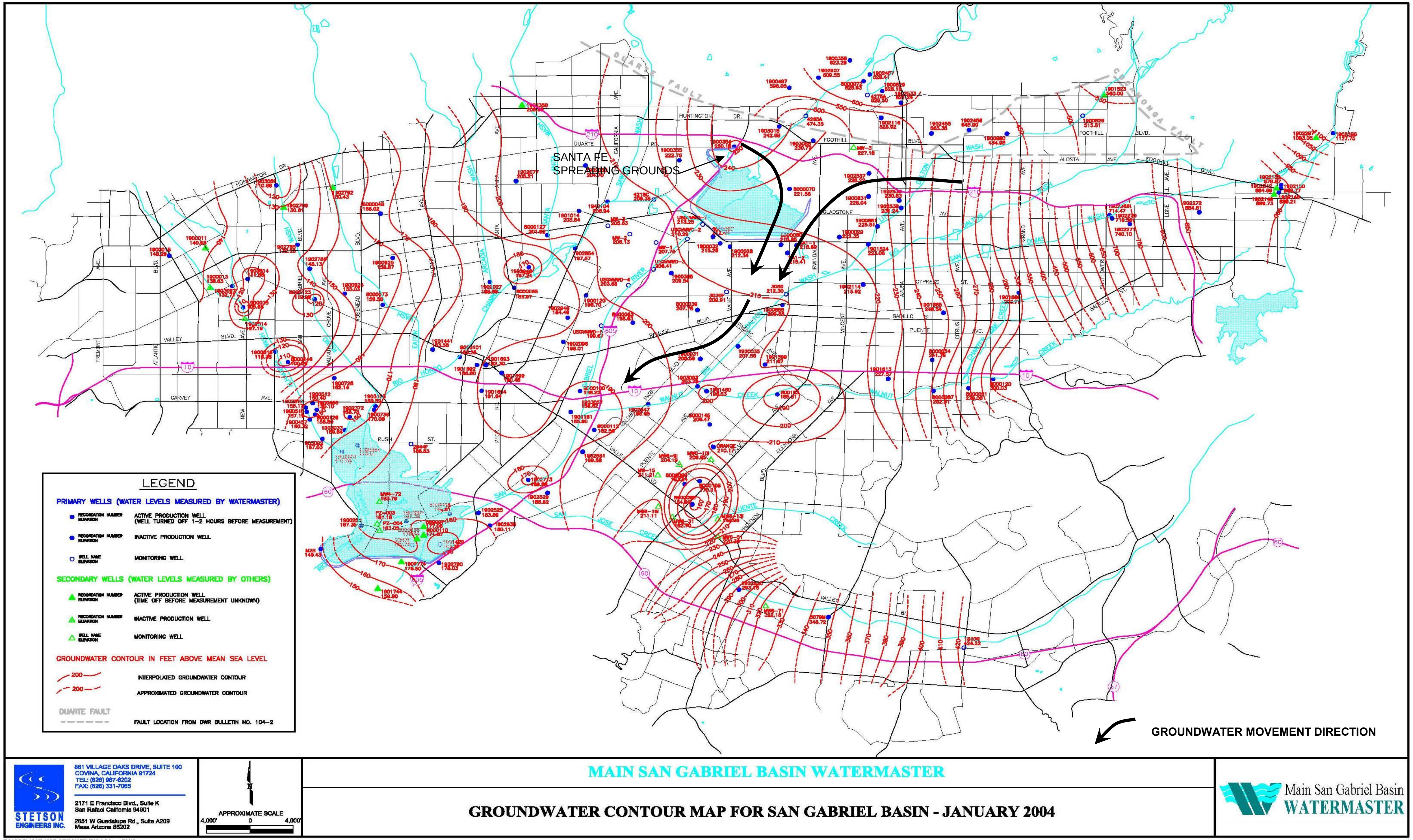
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER MOVEMENT AFFECTED BY GROUNDWATER EXTRACTION



STETSON ENGINEERS INC.

West Covina San Rafael Mesa, Arizona

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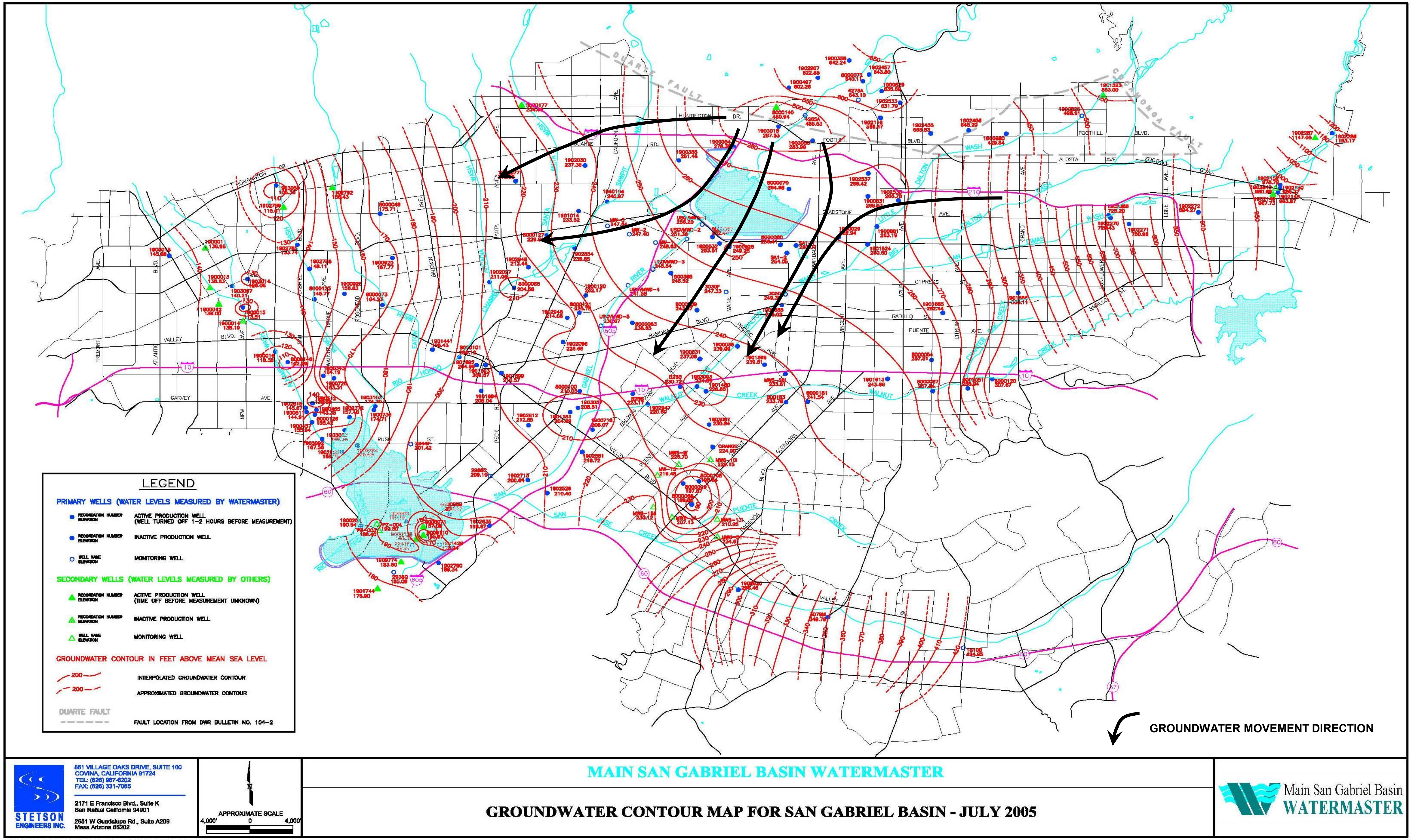
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER MOVEMENT AFFECTED BY GROUNDWATER RECHARGE AT SANTA FE SPREADING GROUNDS

11/7/2014



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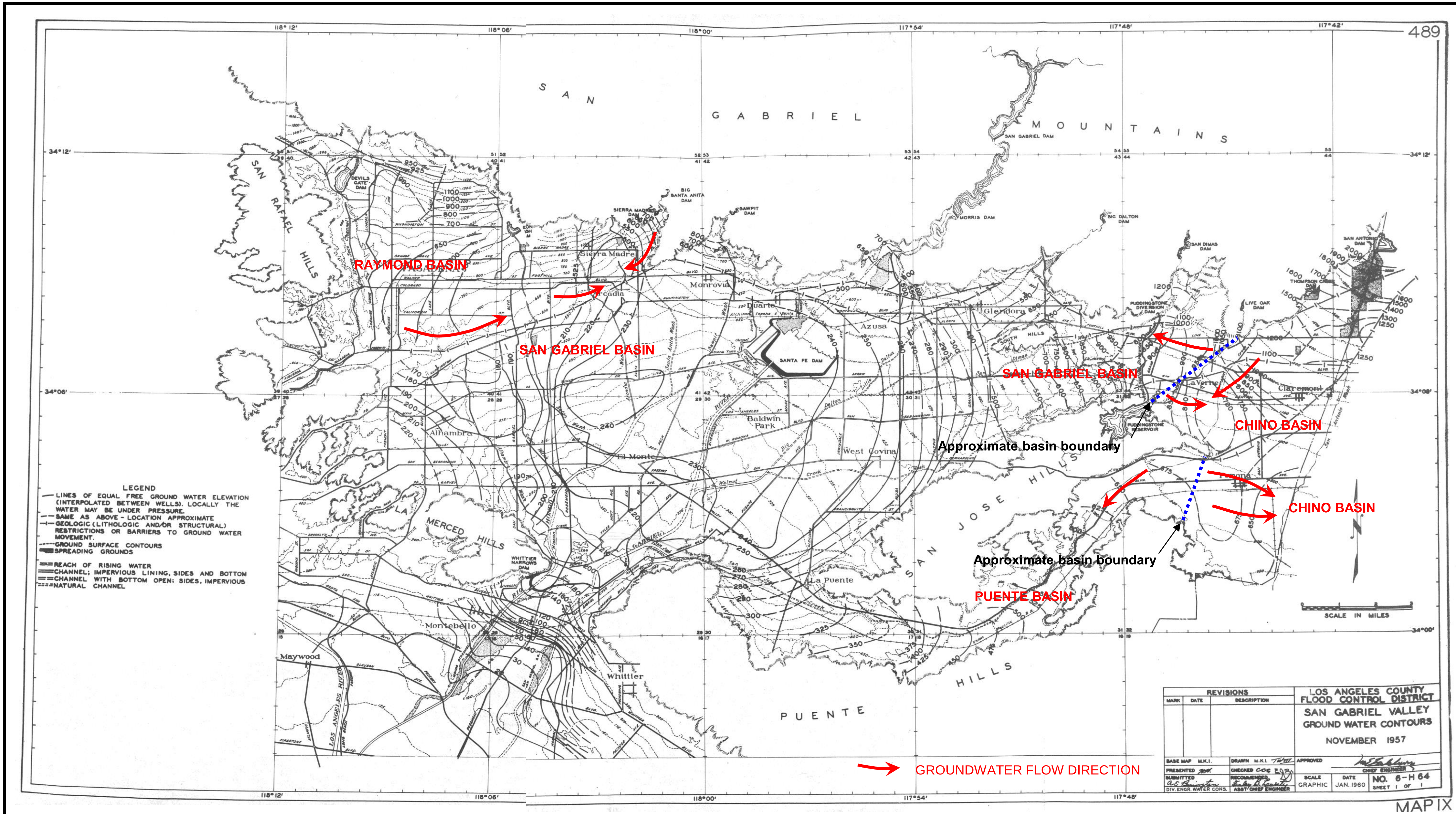
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER MOVEMENT AFFECTED BY GROUNDWATER CASCADING ACROSS DUARTE FAULT

11/7/2014



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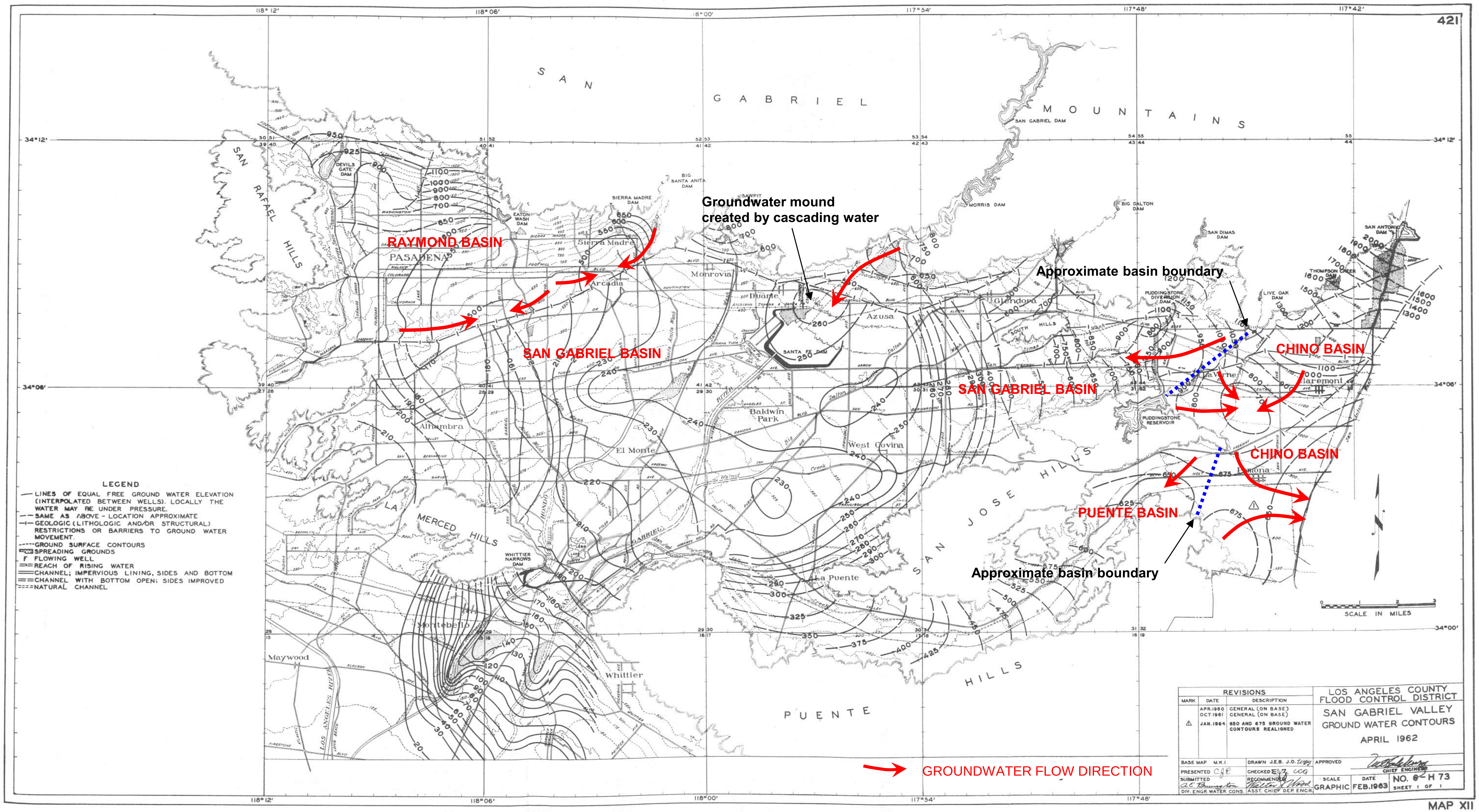
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER CONTOURS FOR NOVEMBER 1957 PREPARED BY LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

11/7/2014



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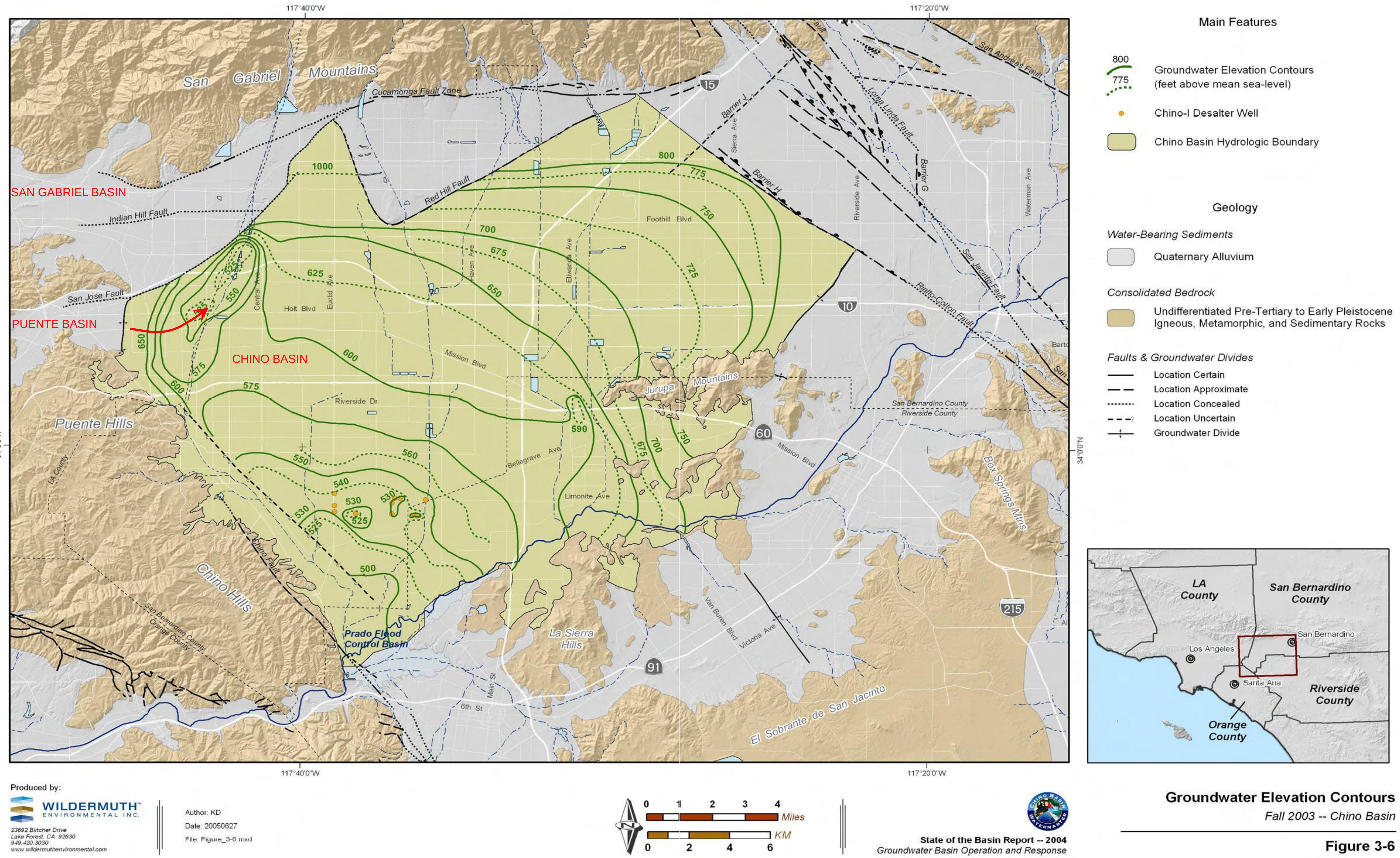
GROUNDWATER CONTOURS FOR APRIL 1962 PREPARED BY LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS



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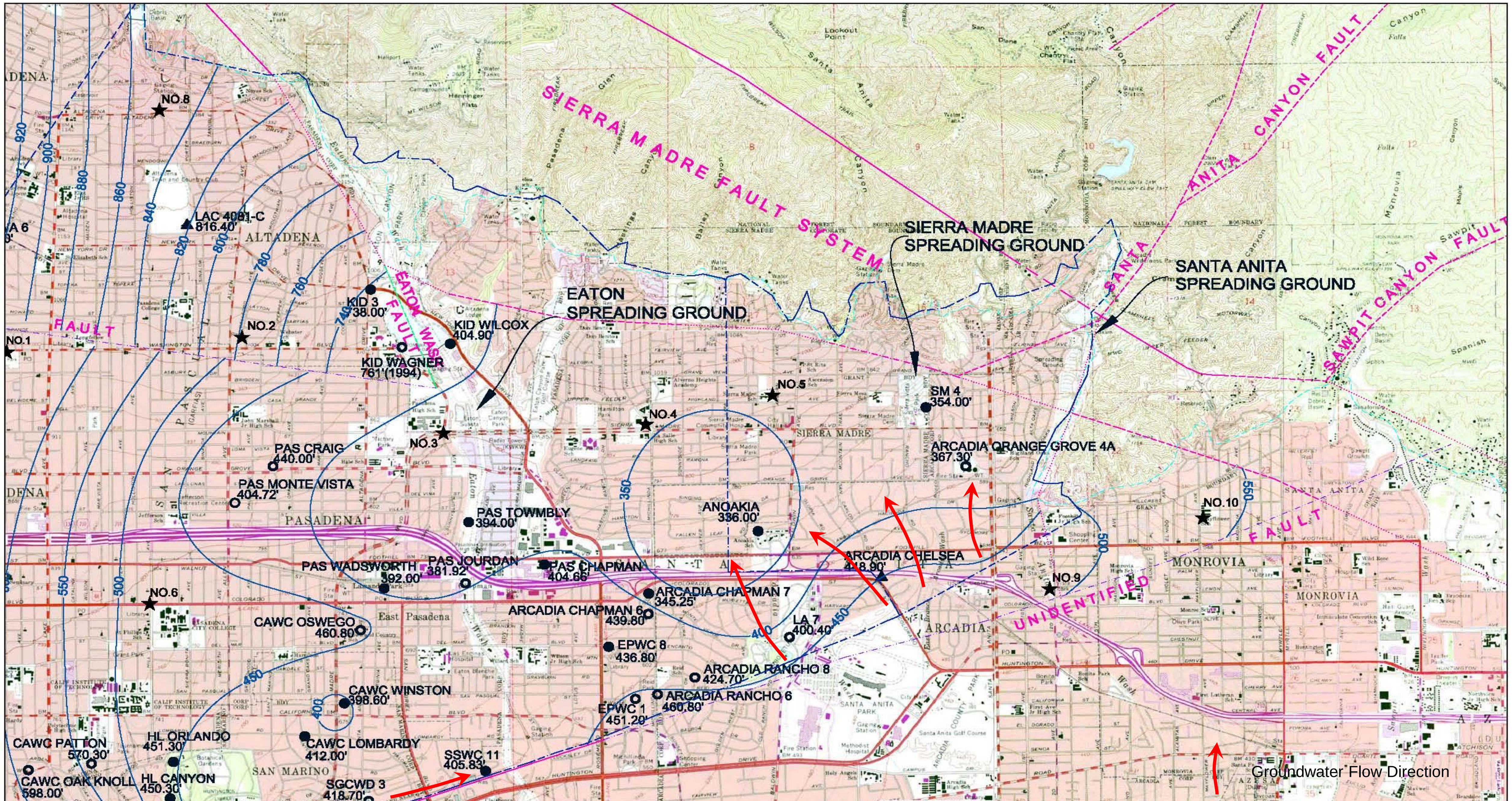
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER CONTOURS FOR CHINO BASIN - FALL 2003

11/7/2014



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San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

STETSON ENGINEERS INC.

APPROXIMATE SCALE 0 1,500' 3,000'

RAYMOND BASIN MANAGEMENT BOARD

GROUNDWATER MONITORING AND MANAGEMENT PLAN - PHASE I
OCTOBER 2007 GROUNDWATER CONTOUR SNAP-SHOT
PRELIMINARY GROUNDWATER ELEVATION MONITORING NETWORK

PLATE 2

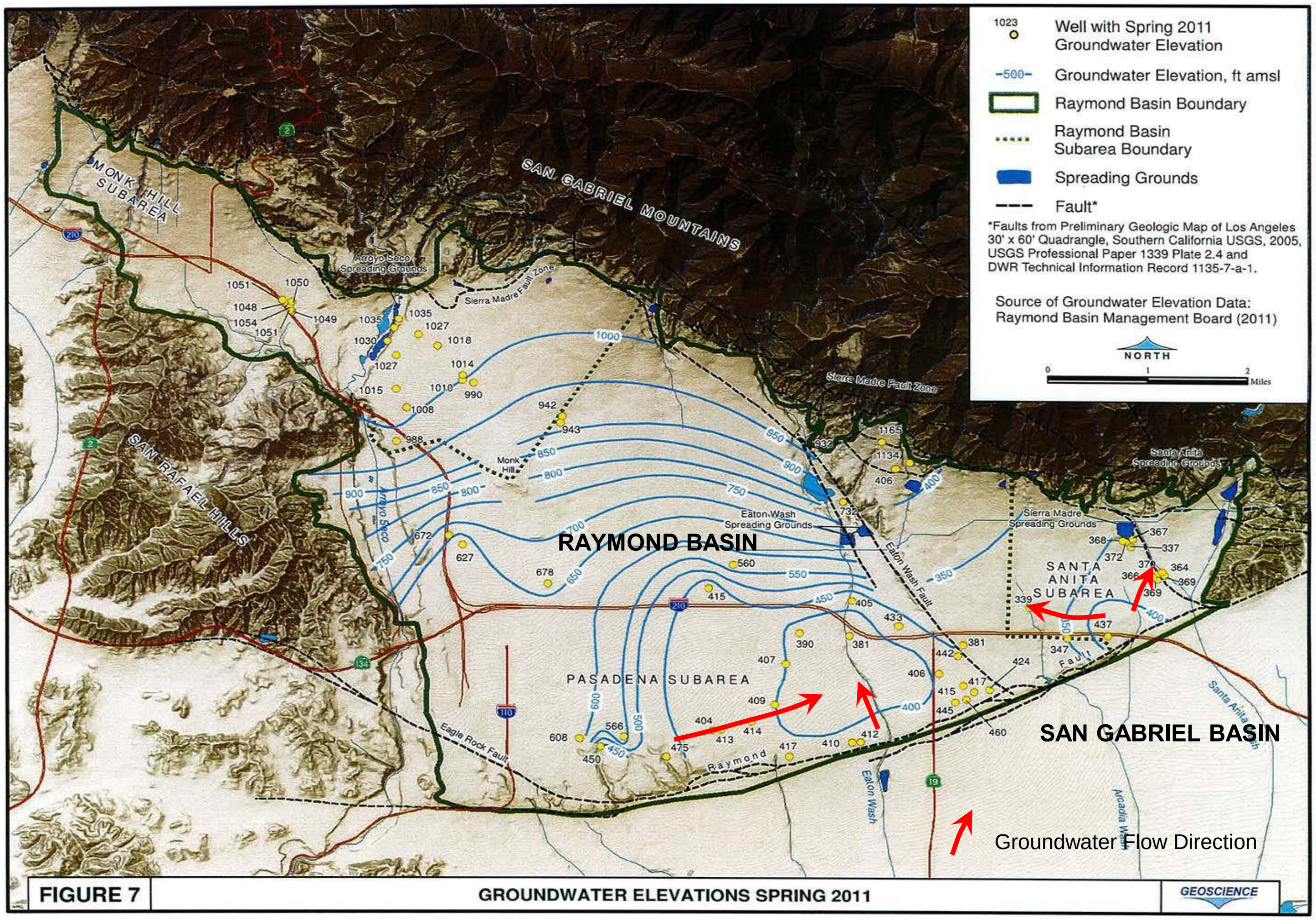
JOBS\1627\05\Monitoring network\MonitoringNetwork\PLATE_2(1.21.08).DWG
JOBS\1627-05(p23).CTB

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER CONTOURS FOR RAYMOND BASIN - OCTOBER 2007

11/7/2014



Source: Annual Report July 1, 2010 - June 30, 2011. Raymond Basin Management Board. September 2011.

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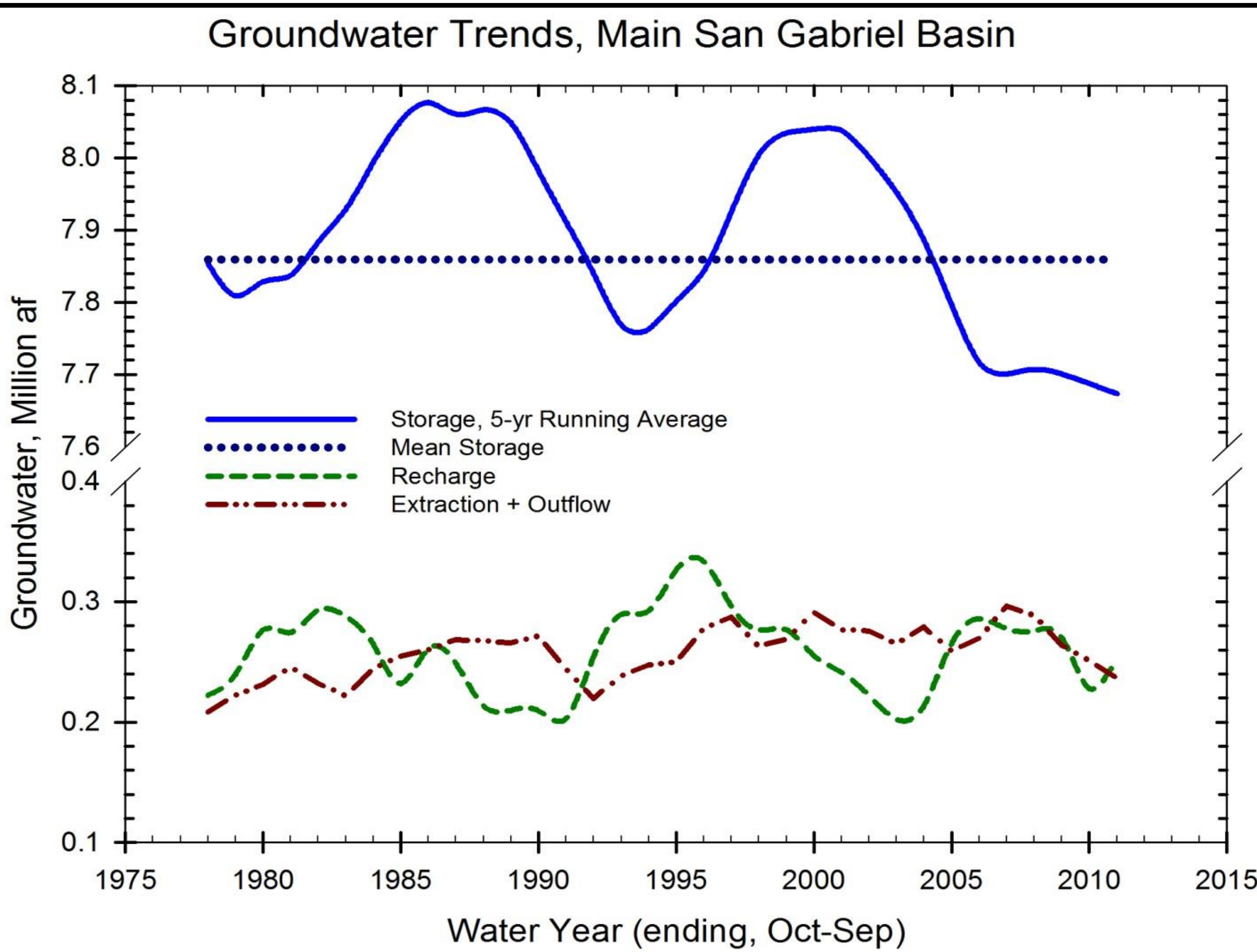
MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER CONTOURS FOR RAYMOND BASIN - SPRING 2011

PLATE III.18e

11/7/2014



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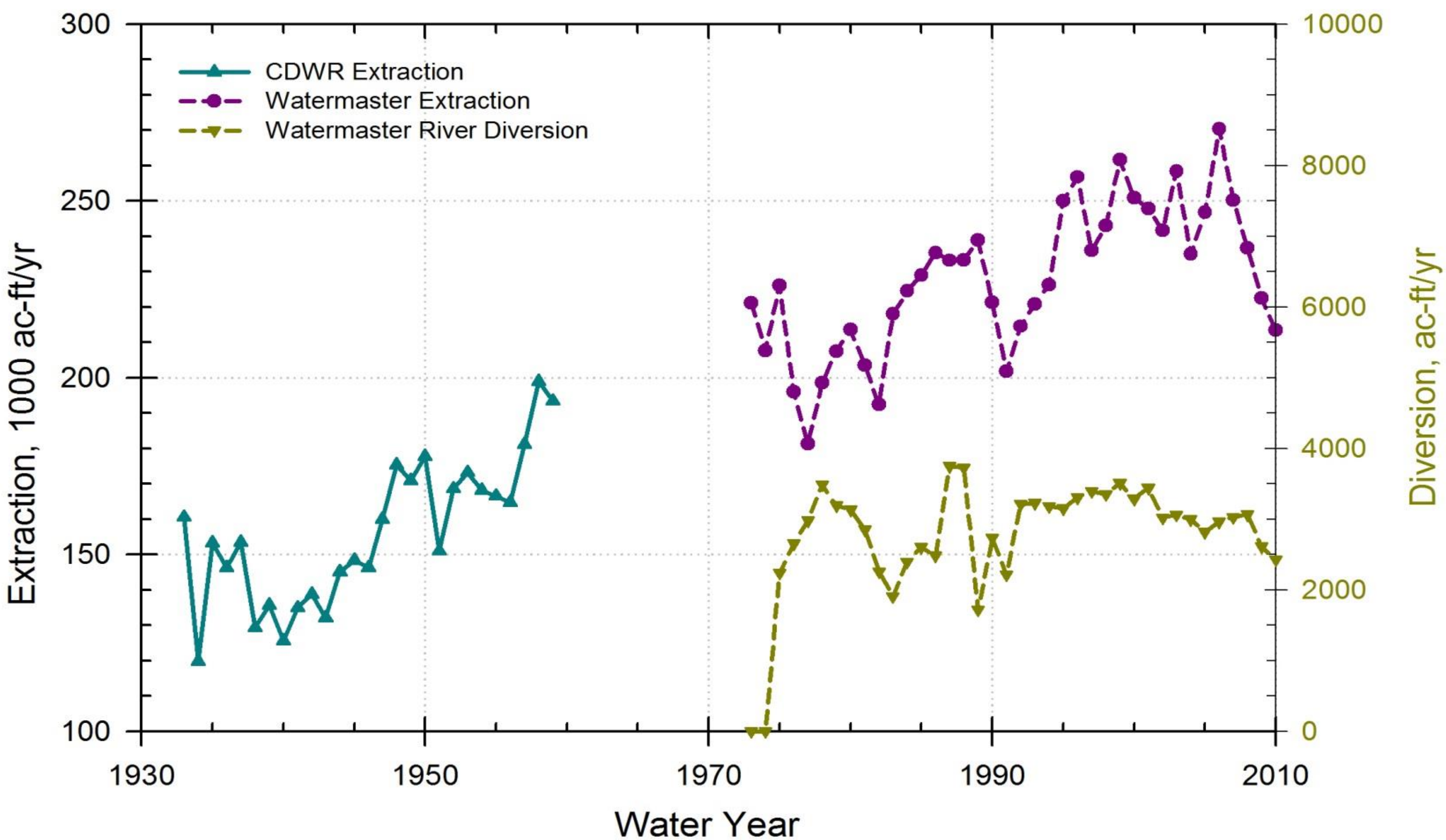
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

HISTORIC GROUNDWATER IN STORAGE IN THE SAN GABRIEL VALLEY ESTIMATED BY WATERMASTER

PLATE III.19

11/7/2014



STETSON ENGINEERS INC.

West Covina San Rafael Mesa, Arizona

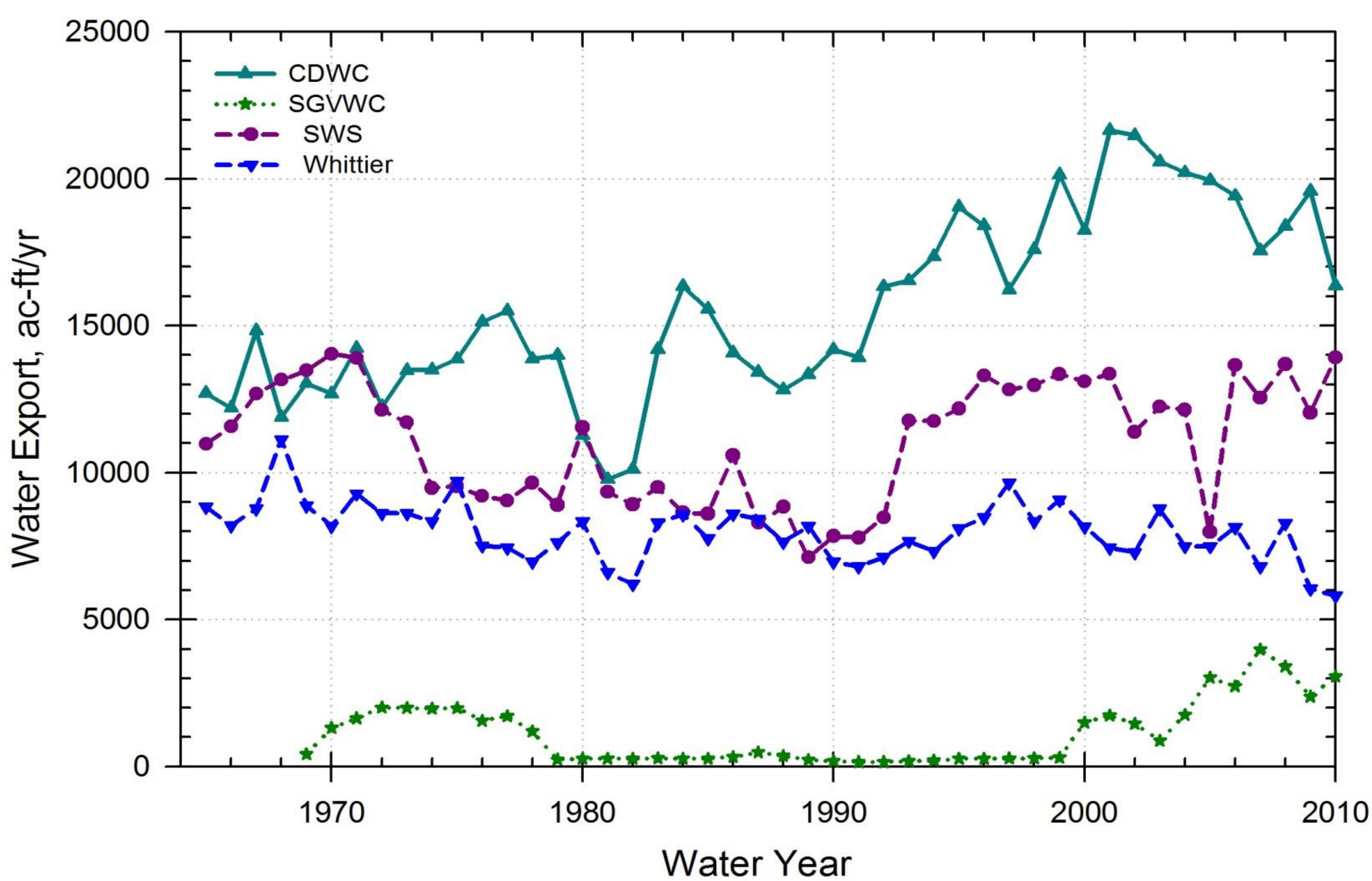
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

GROUNDWATER EXTRACTION AND SURFACE WATER DIVERSION IN THE SAN GABRIEL BASIN

PLATE III.20

11/7/2014



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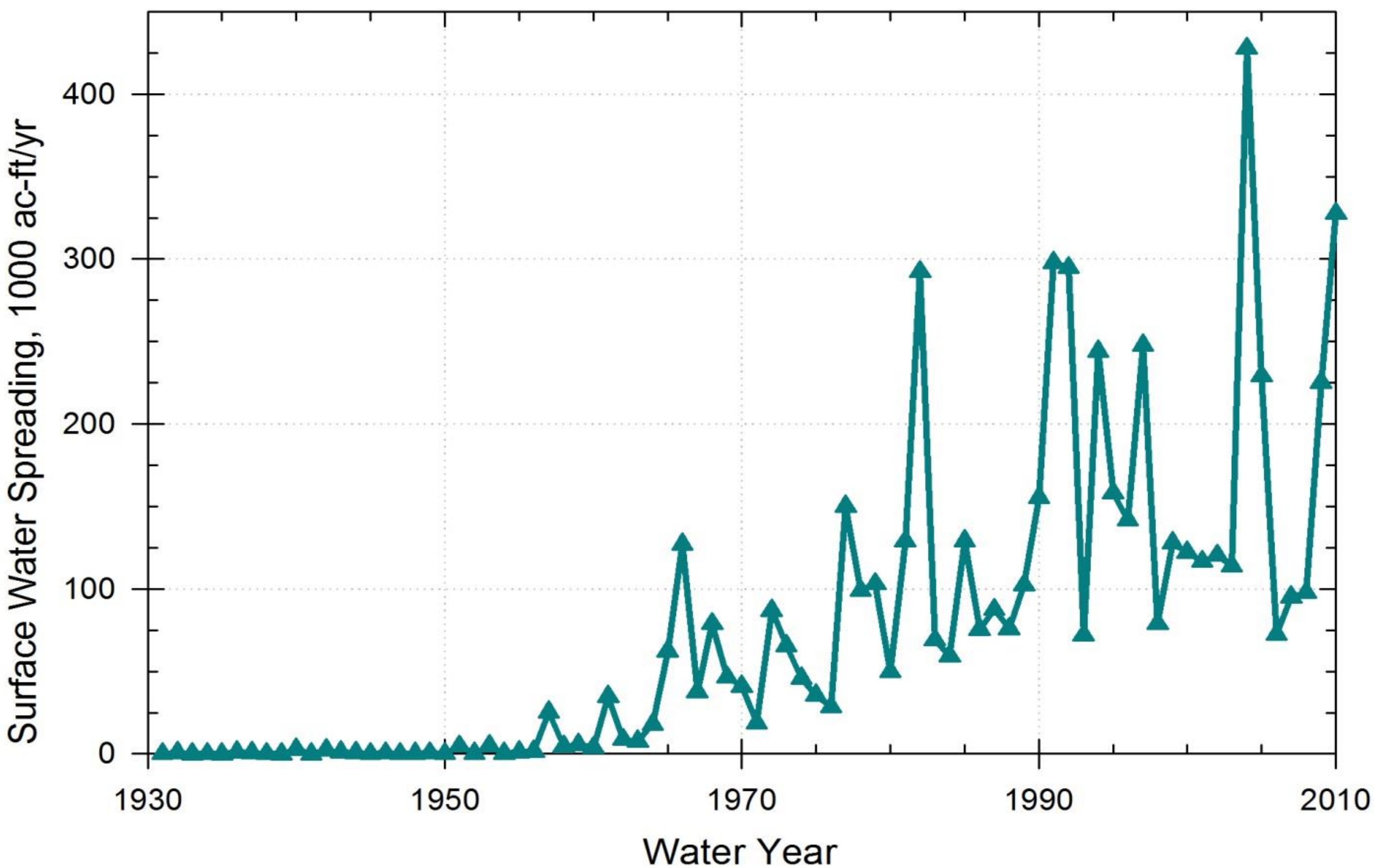
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

EXPORTED GROUNDWATER FROM THE SAN GABRIEL BASIN

PLATE III.21

11/7/2014



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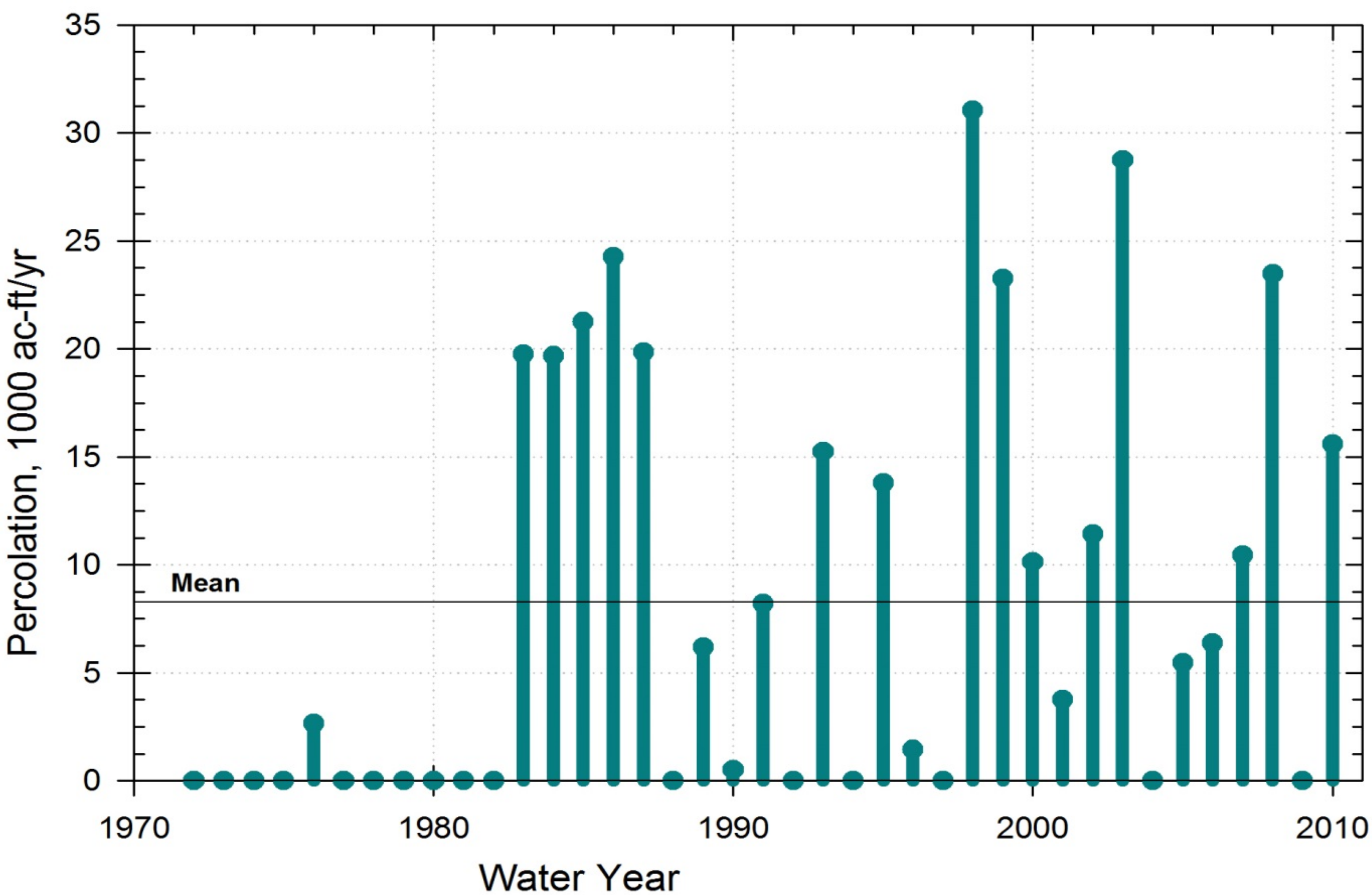
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

SURFACE WATER SPREADING IN THE SAN GABRIEL BASIN

PLATE III.22

11/7/2014



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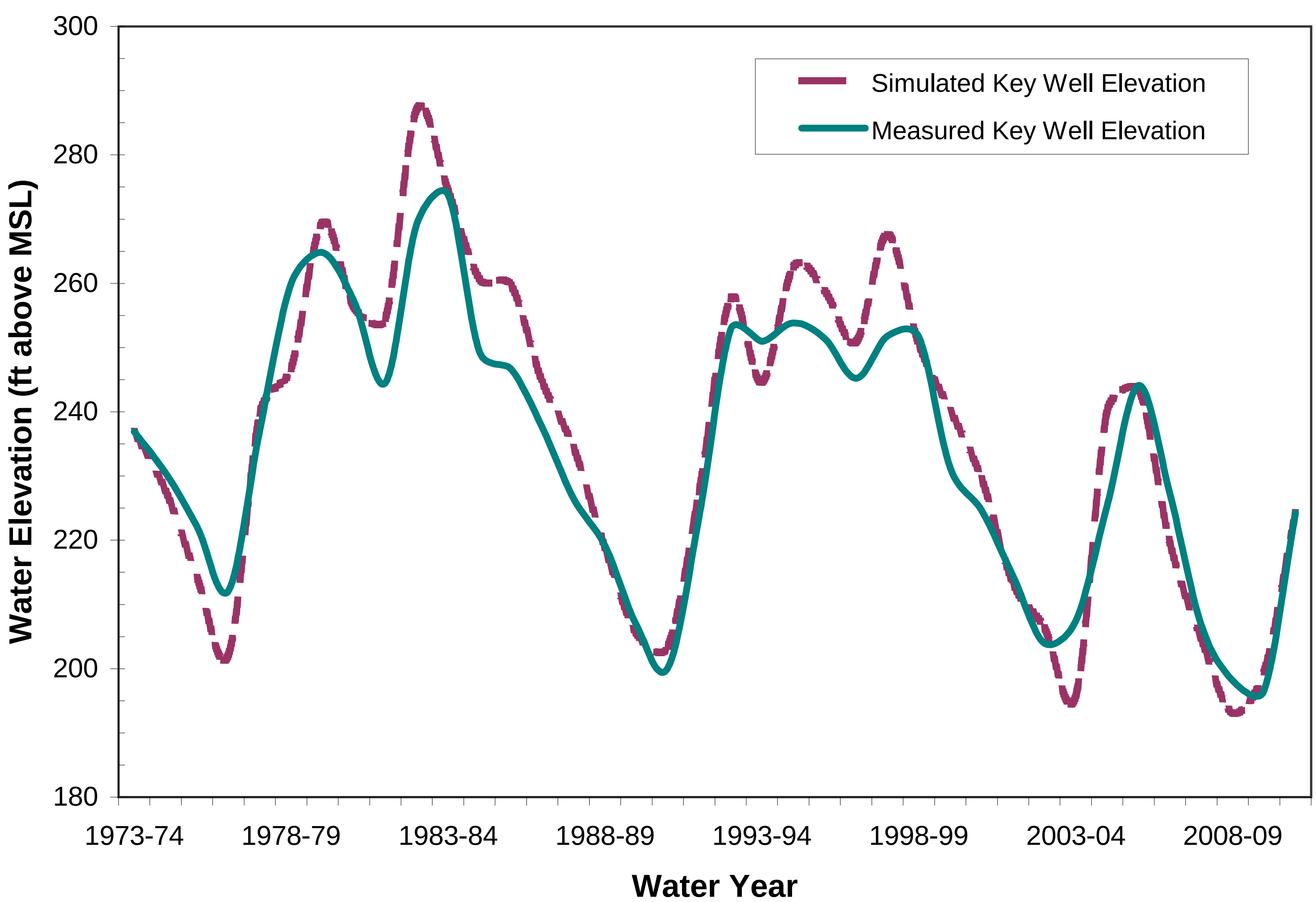
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

INCIDENTAL PERCOLATION IN SAN GABRIEL RIVER AND SAN JOSE CREEK

PLATE III.23

5/27/2016



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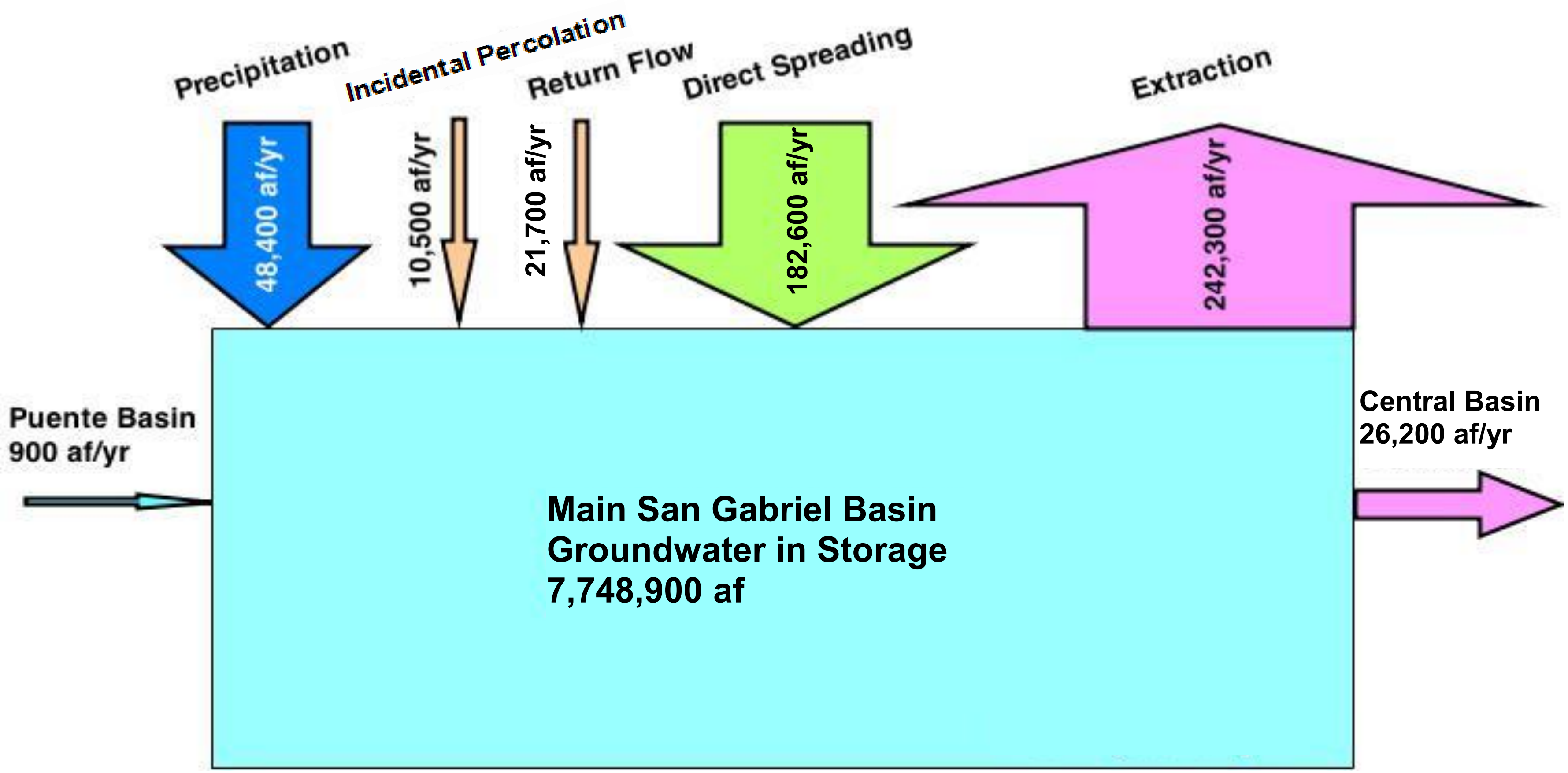
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

OBSERVED AND SIMULATED
GROUNDWATER ELEVATIONS AT KEY WELL

PLATE III.24

10/28/2015



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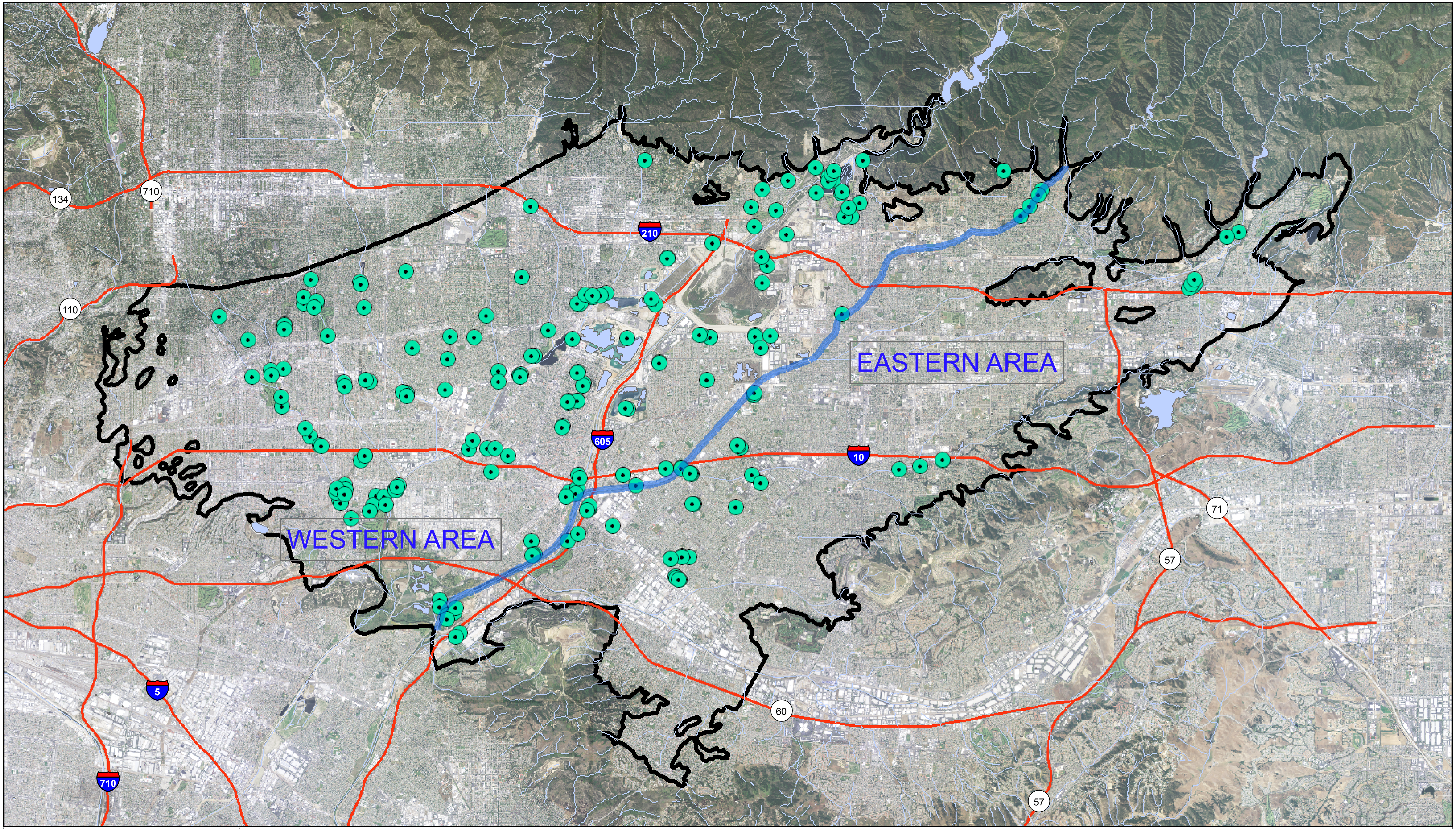
MAIN SAN GABRIEL BASIN WATERMASTER

COMPONENTS OF THE BASIN SPREADSHEET GROUNDWATER BALANCE MODEL, 2001-02 to 2010-11

PLATE III.25

11/2/2015

PLATE III.26



MAIN SAN GABRIEL BASIN WATERMASTER

PRODUCTION WELLS IN THE MAIN SAN GABRIEL BASIN
(EASTERN AND WESTERN AREAS)

22-550

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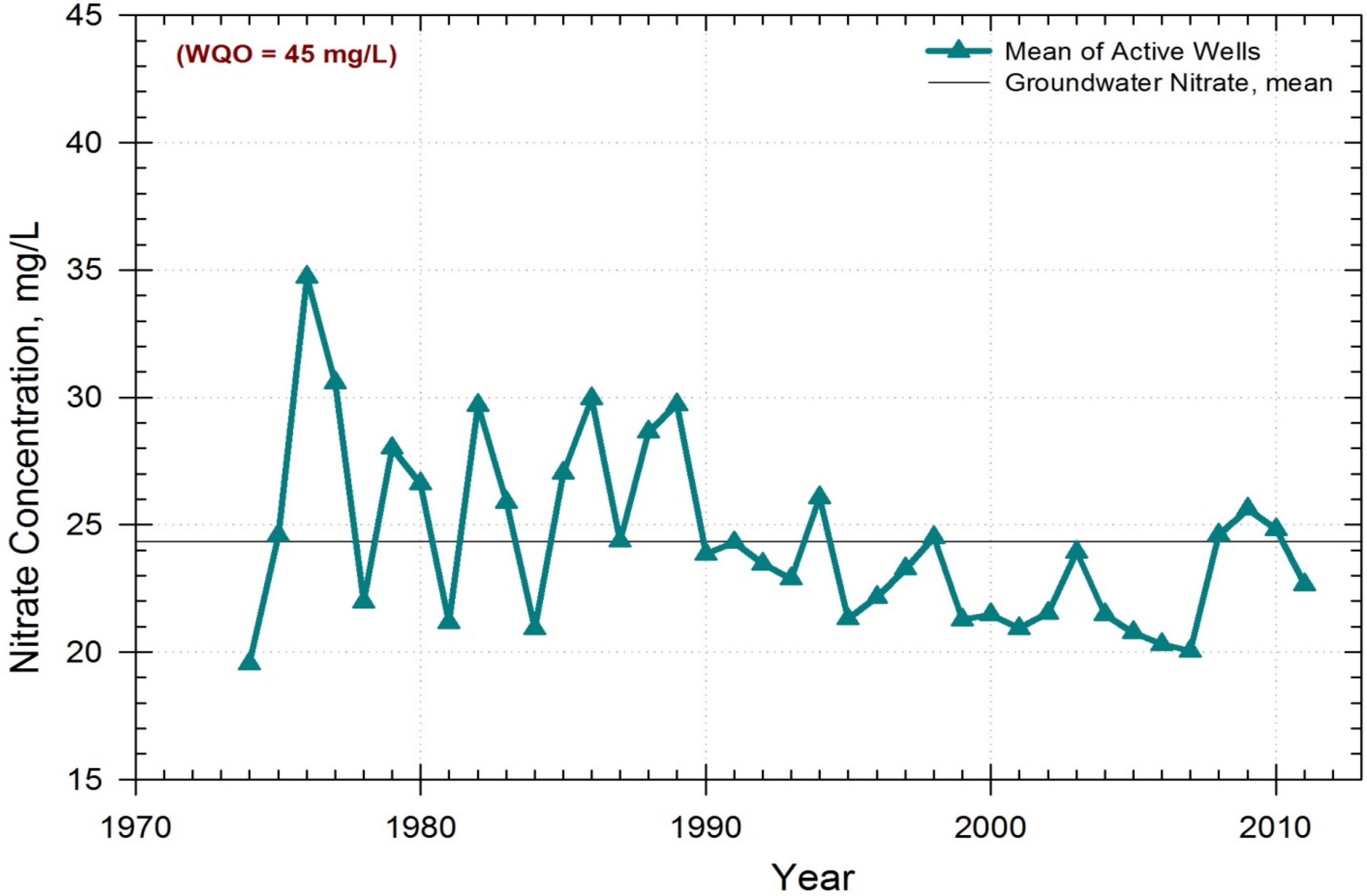

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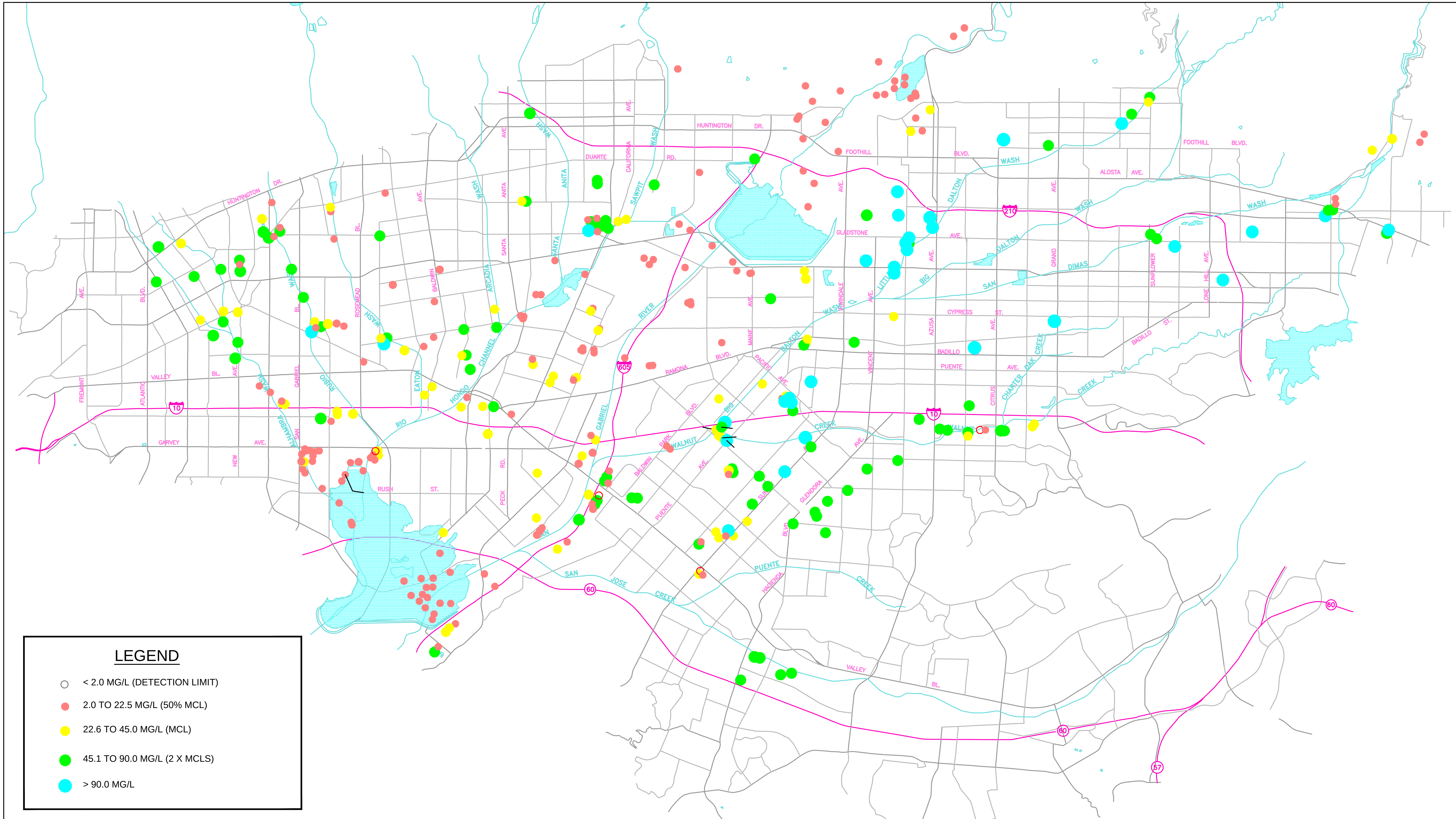
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

AVERAGE NITRATE CONCENTRATION OF SAN GABRIEL BASIN ACTIVE WELLS, (FROM APPENDIX K)

PLATE III.27a

5/27/2016



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San Rafael California 94901

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Mesa Arizona 85202

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APPROXIMATE SCALE
4,000' 0 4,000'

MAIN SAN GABRIEL BASIN WATERMASTER

NITRATE CONCENTRATION IN PRODUCTION WELLS - HISTORICAL HIGH

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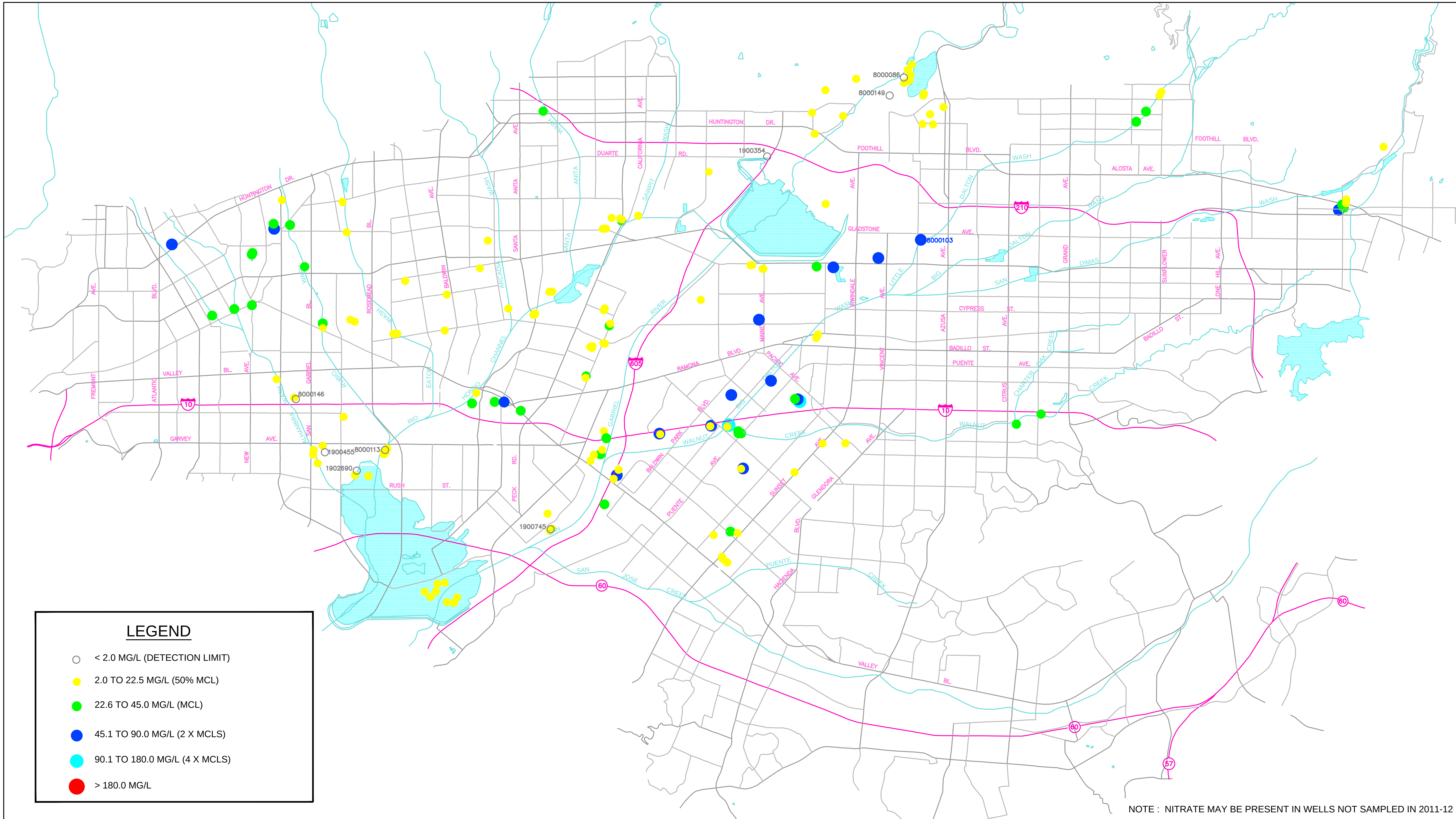

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APPROXIMATE SCALE
4,000' 0 4,000'

MAIN SAN GABRIEL BASIN WATERMASTER

NITRATE DETECTED IN PRODUCTION WELLS - FISCAL YEAR 2011-12

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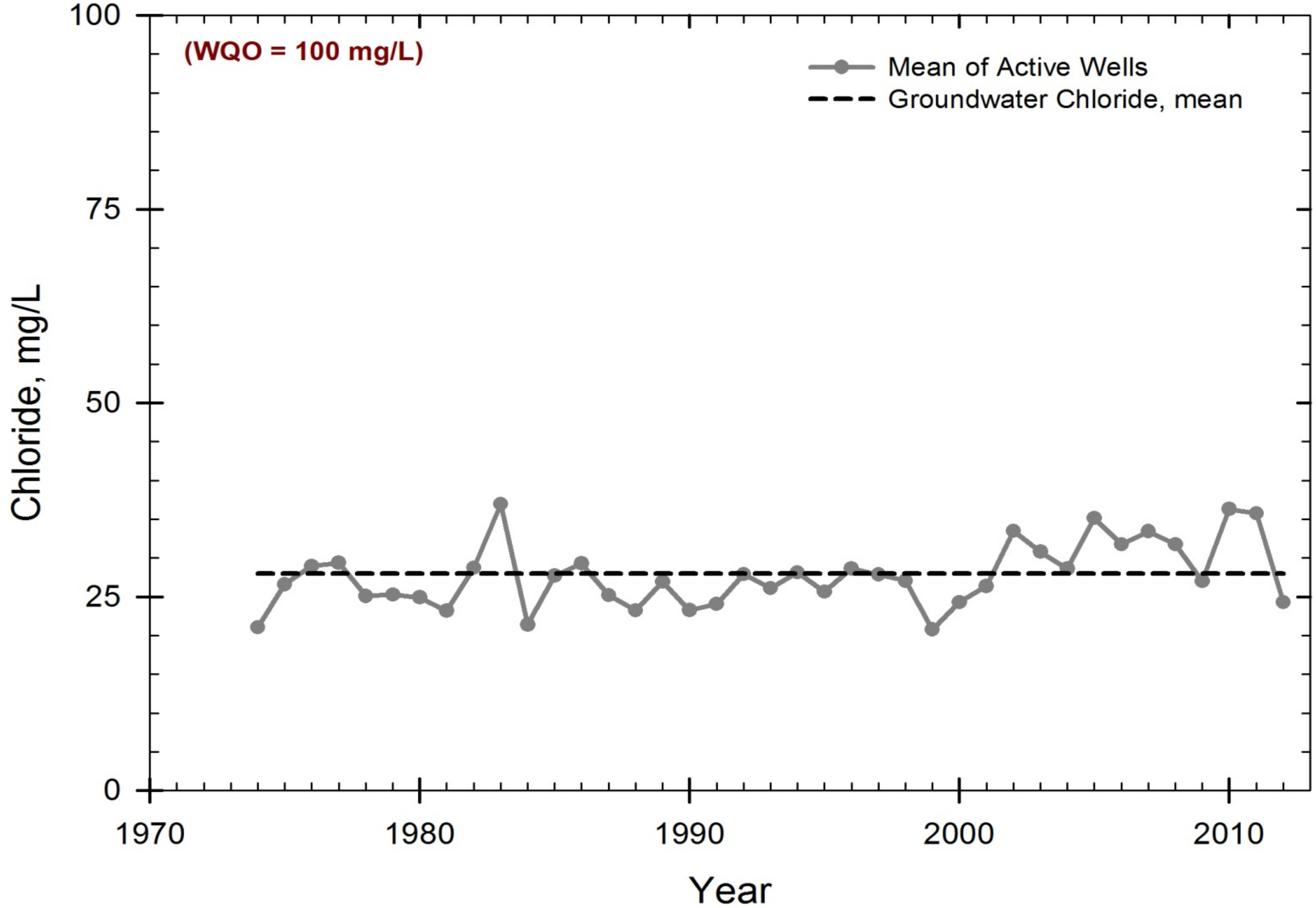

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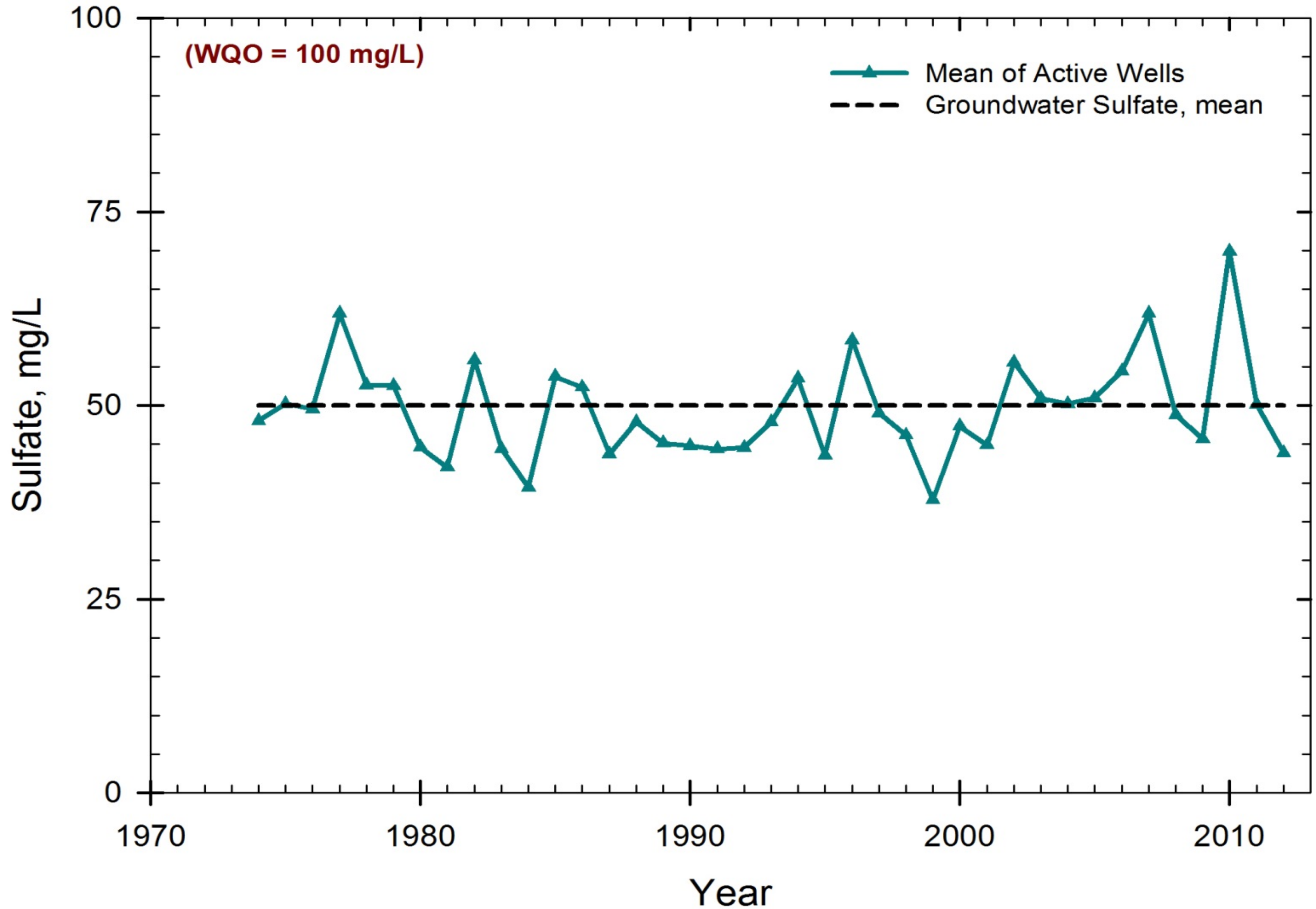
MAIN SAN GABRIEL BASIN WATERMASTER

AVERAGE CHLORIDE CONCENTRATION OF SAN GABRIEL BASIN ACTIVE WELLS

PLATE III.28

5/27/2016



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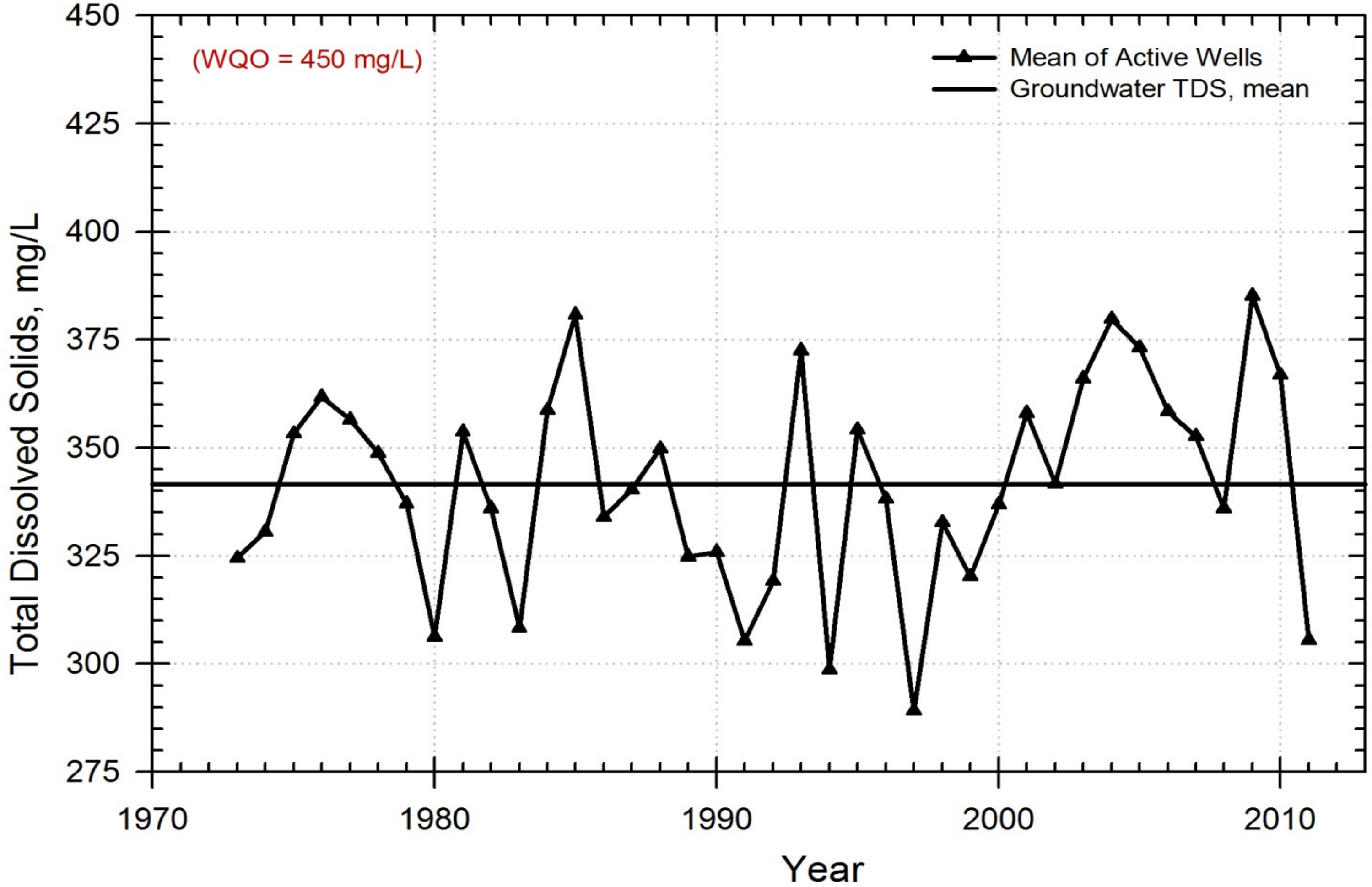
WATER RESOURCE ENGINEERS

MAIN SAN GABRIEL BASIN WATERMASTER

AVERAGE SULFATE CONCENTRATION OF SAN GABRIEL BASIN ACTIVE WELLS

PLATE III.29

5/27/2016



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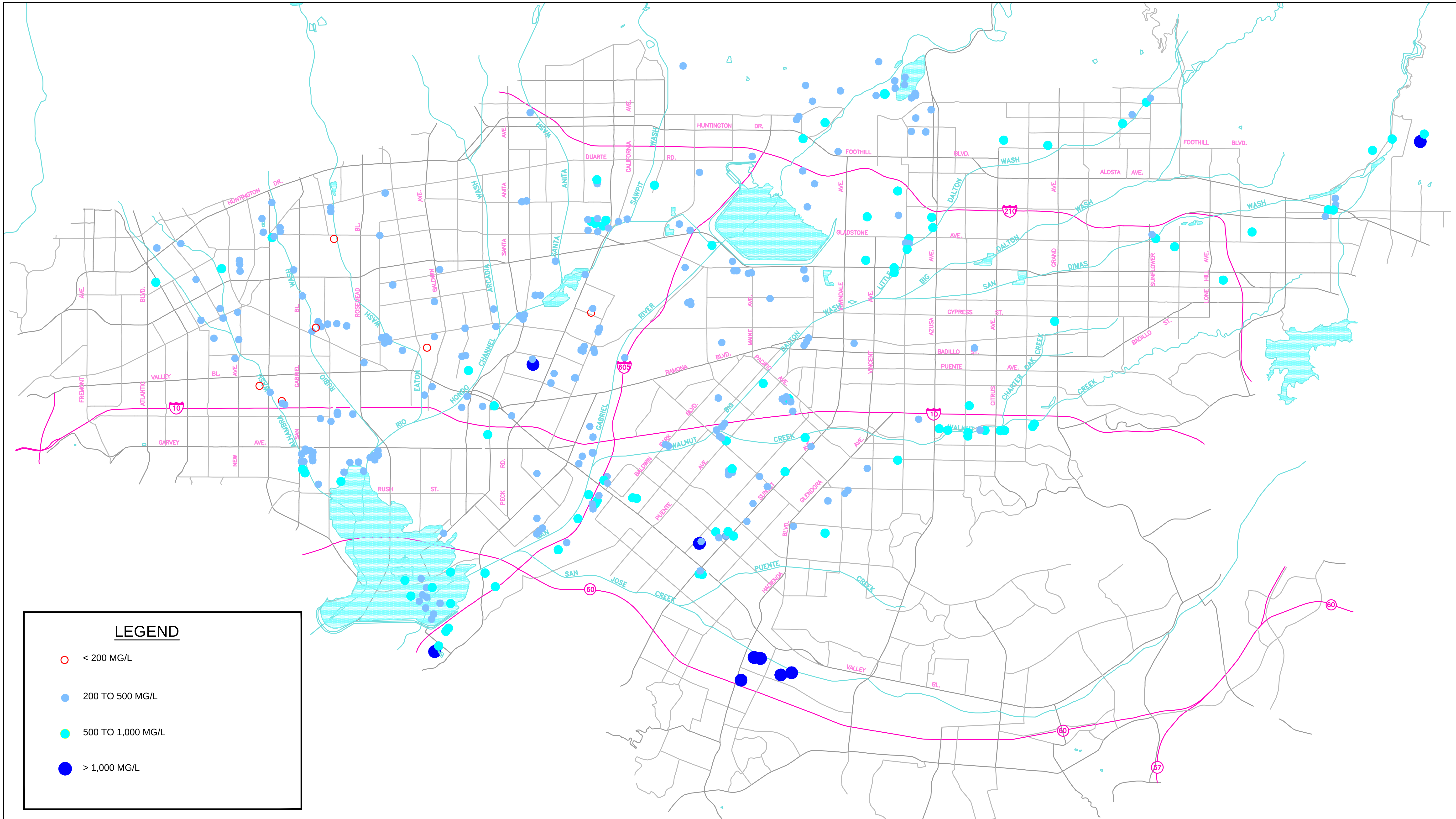
MAIN SAN GABRIEL BASIN WATERMASTER

AVERAGE TOTAL DISSOLVED SOLIDS CONCENTRATION OF SAN GABRIEL BASIN ACTIVE WELLS

PLATE III.30a

5/27/2016



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APPROXIMATE SCALE
4,000' 0 4,000'

MAIN SAN GABRIEL BASIN WATERMASTER

TOTAL DISSOLVED SOLIDS CONCENTRATION IN PRODUCTION WELLS - HISTORICAL HIGH

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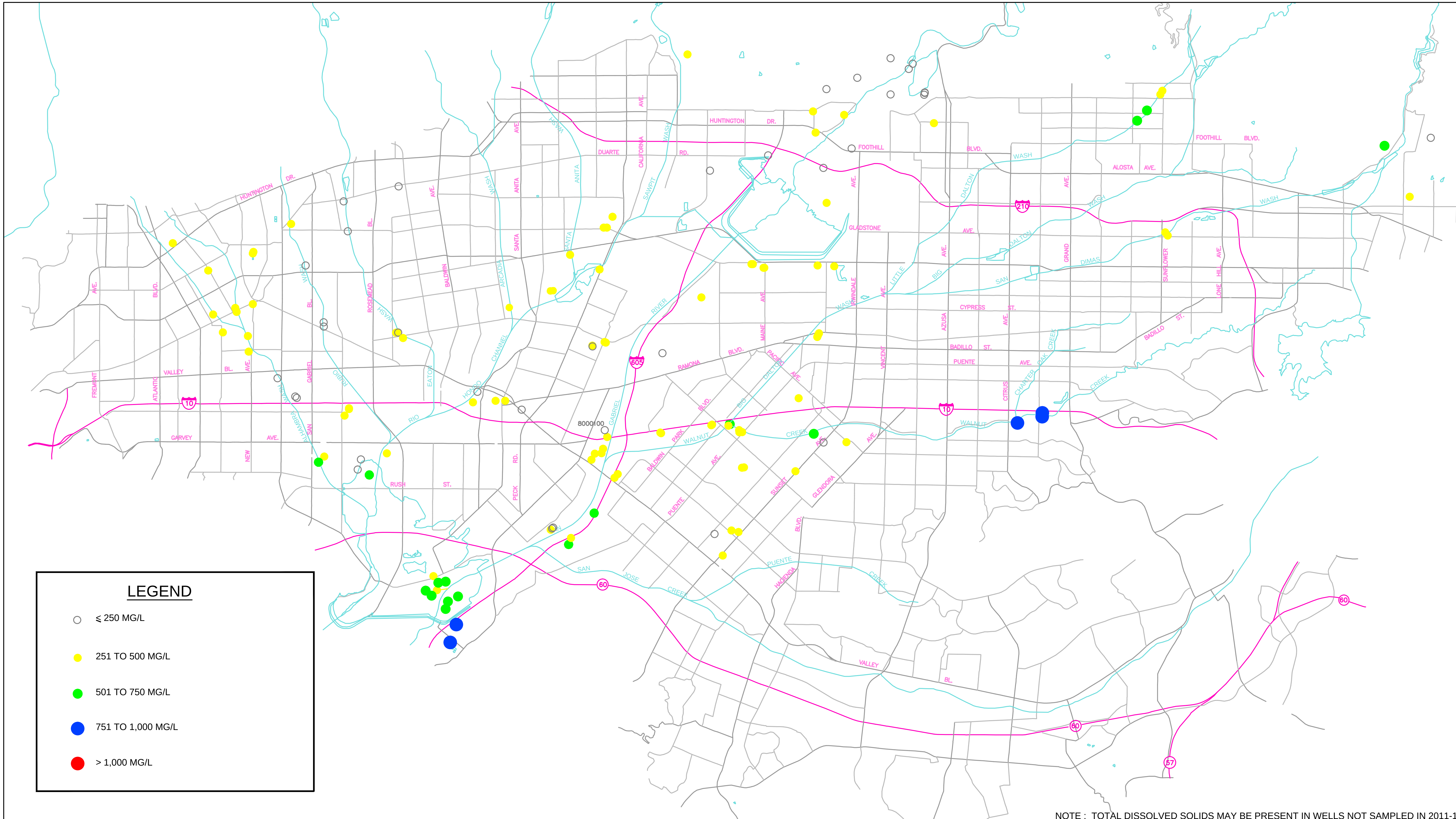

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MAIN SAN GABRIEL BASIN WATERMASTER

TOTAL DISSOLVED SOLIDS CONCENTRATION IN PRODUCTION WELLS - FISCAL YEAR 2011-12

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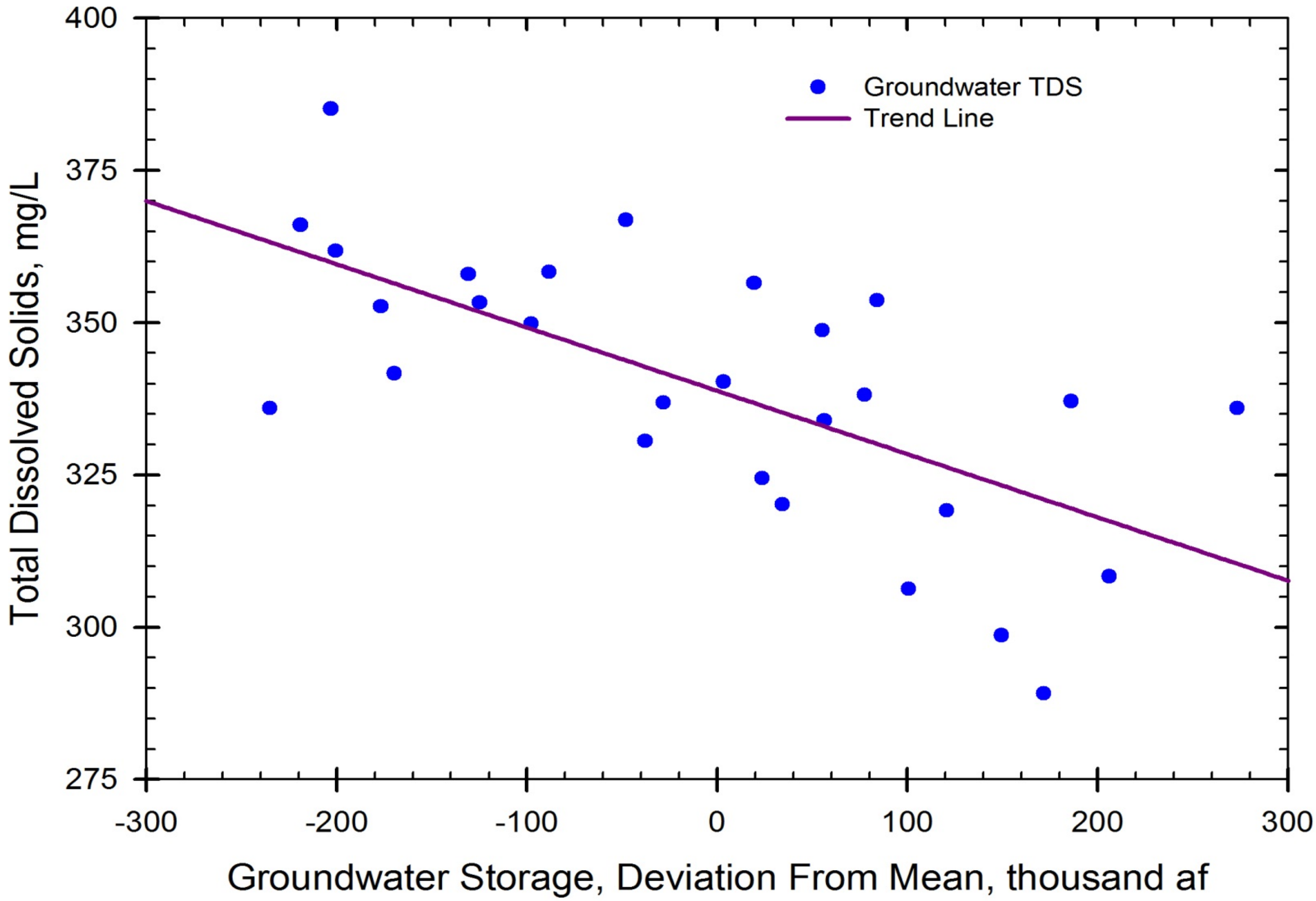

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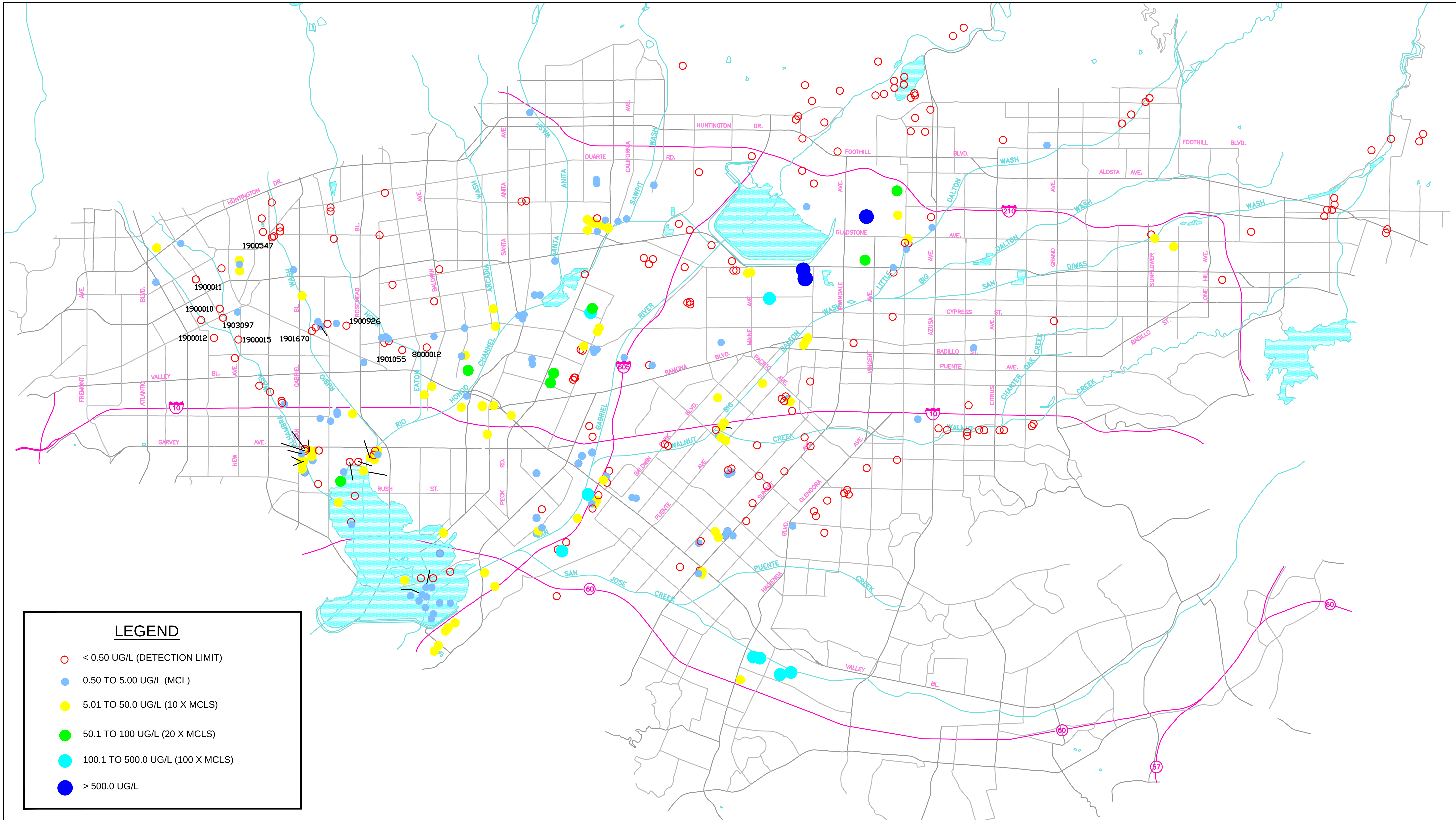
MAIN SAN GABRIEL BASIN WATERMASTER

TOTAL DISSOLVED SOLIDS CONCENTRATION IN GROUNDWATER AND GROUNDWATER STORAGE DEVIATION IN SAN GABRIEL BASIN, 1973-74 to 2010-2011

PLATE III.30d

5/27/2016



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TETRACHLOROETHYLENE CONCENTRATION IN PRODUCTION WELLS - HISTORICAL HIGH

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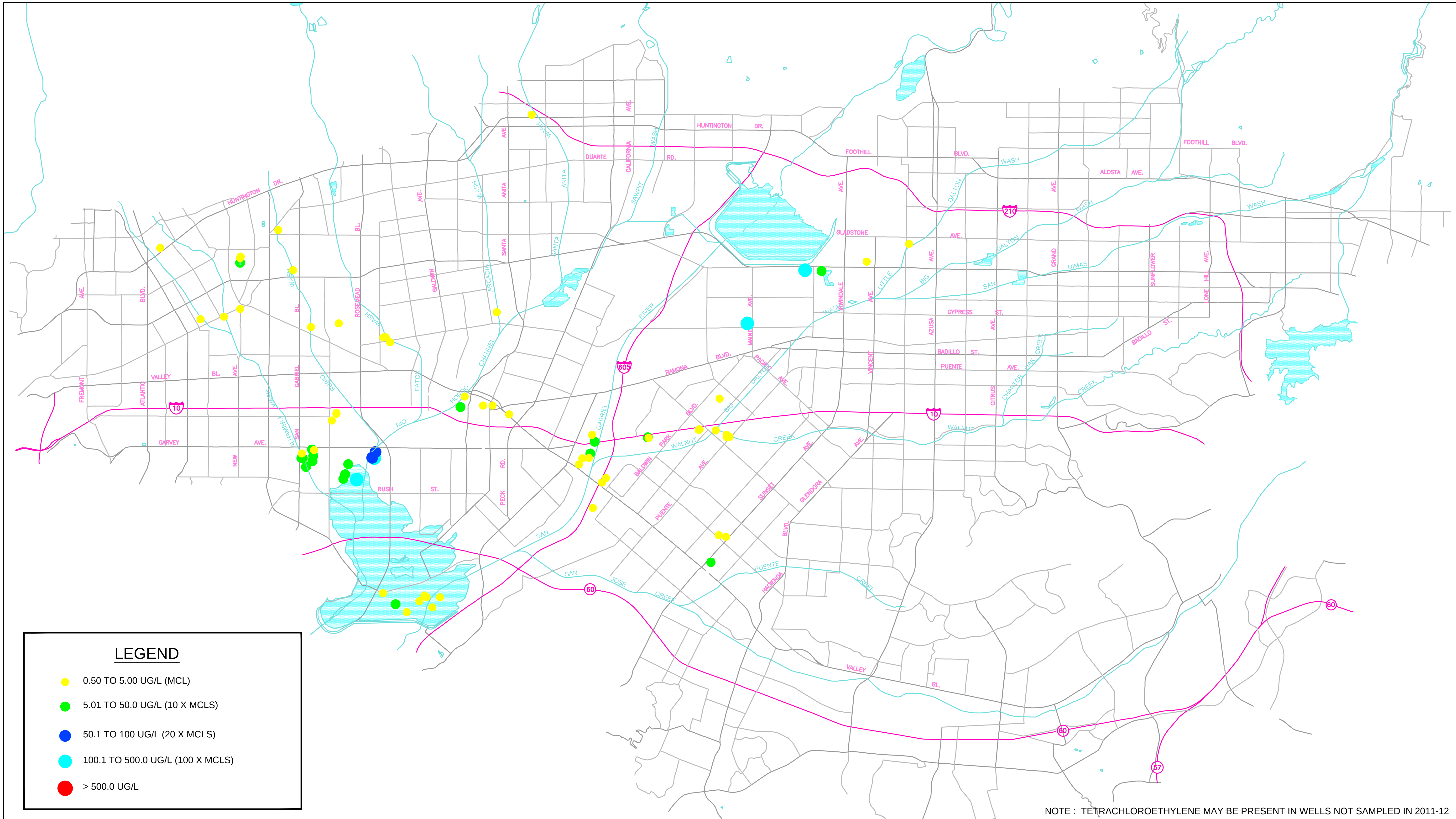

LEGEND

- 0.50 TO 5.00 UG/L (MCL)
- 5.01 TO 50.0 UG/L (10 X MCLS)
- 50.1 TO 100 UG/L (20 X MCLS)
- 100.1 TO 500.0 UG/L (100 X MCLS)
- > 500.0 UG/L

NOTE : TETRACHLOROETHYLENE MAY BE PRESENT IN WELLS NOT SAMPLED IN 2011-12

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MAIN SAN GABRIEL BASIN WATERMASTER

TETRACHLOROETHYLENE DETECTED IN PRODUCTION WELLS - FISCAL YEAR 2011-12

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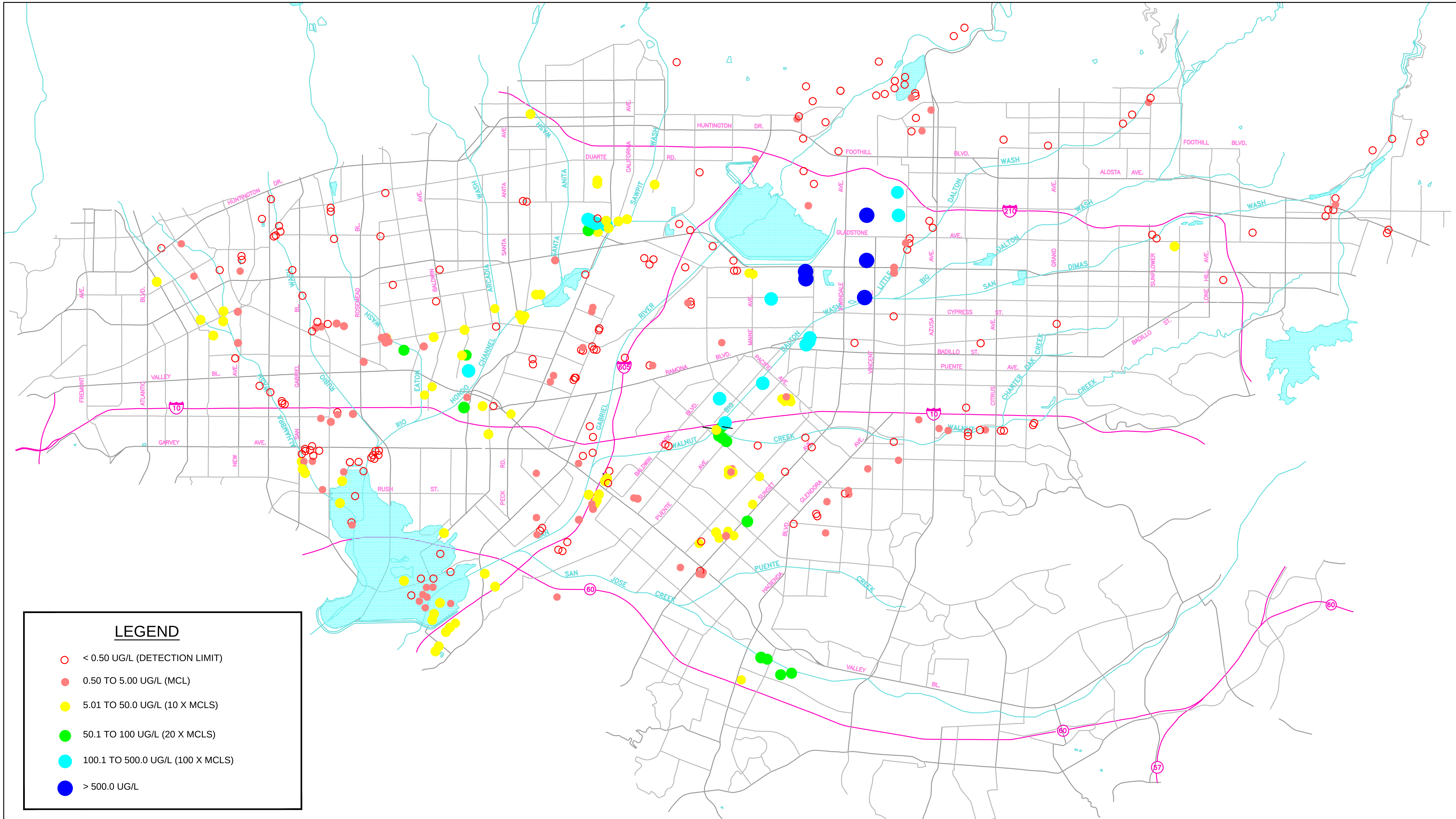

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TRICHLOROETHYLENE CONCENTRATION IN PRODUCTION WELLS - HISTORICAL HIGH

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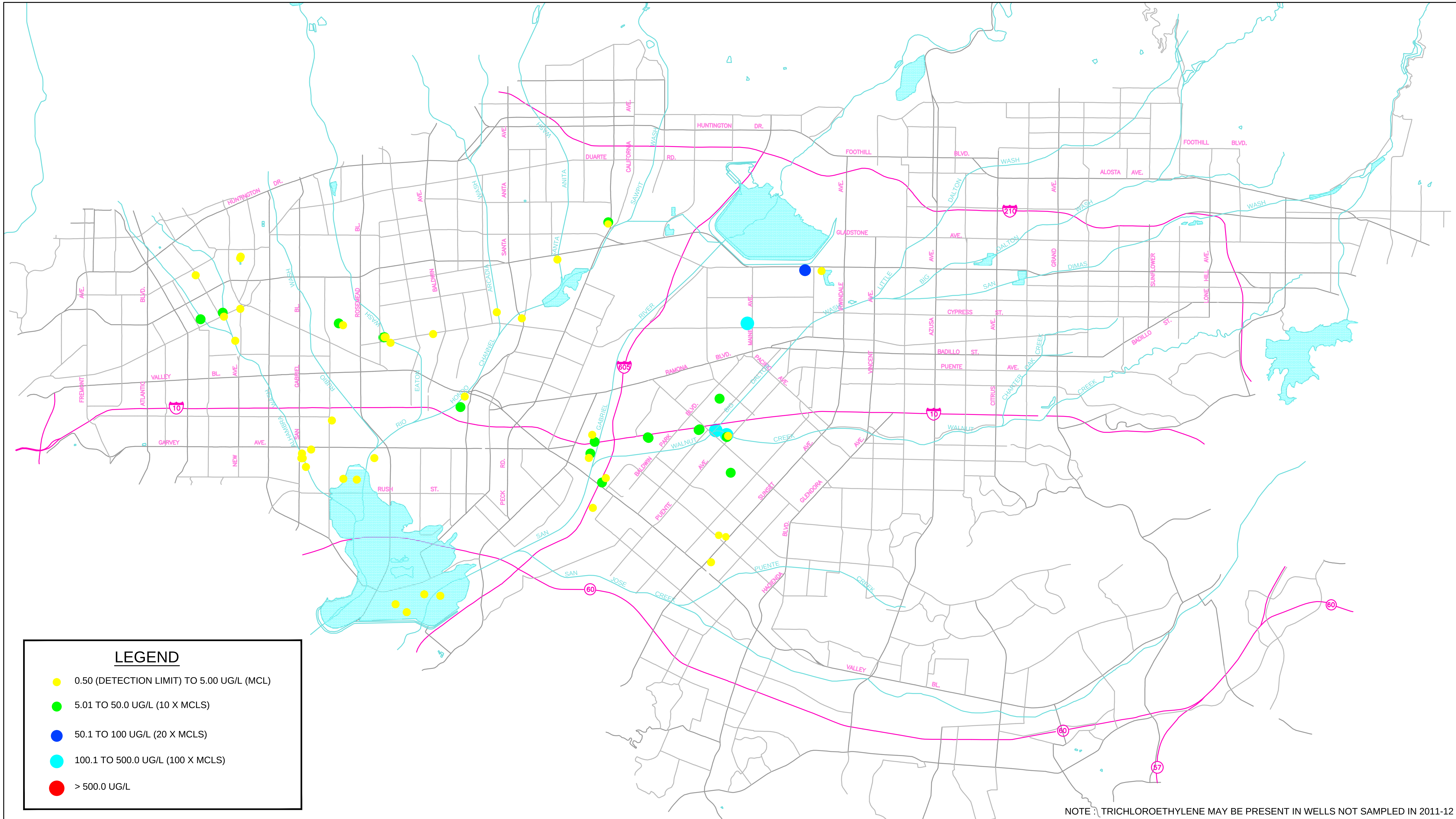

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TRICHLOROETHYLENE DETECTED IN PRODUCTION WELLS - FISCAL YEAR 2011-12

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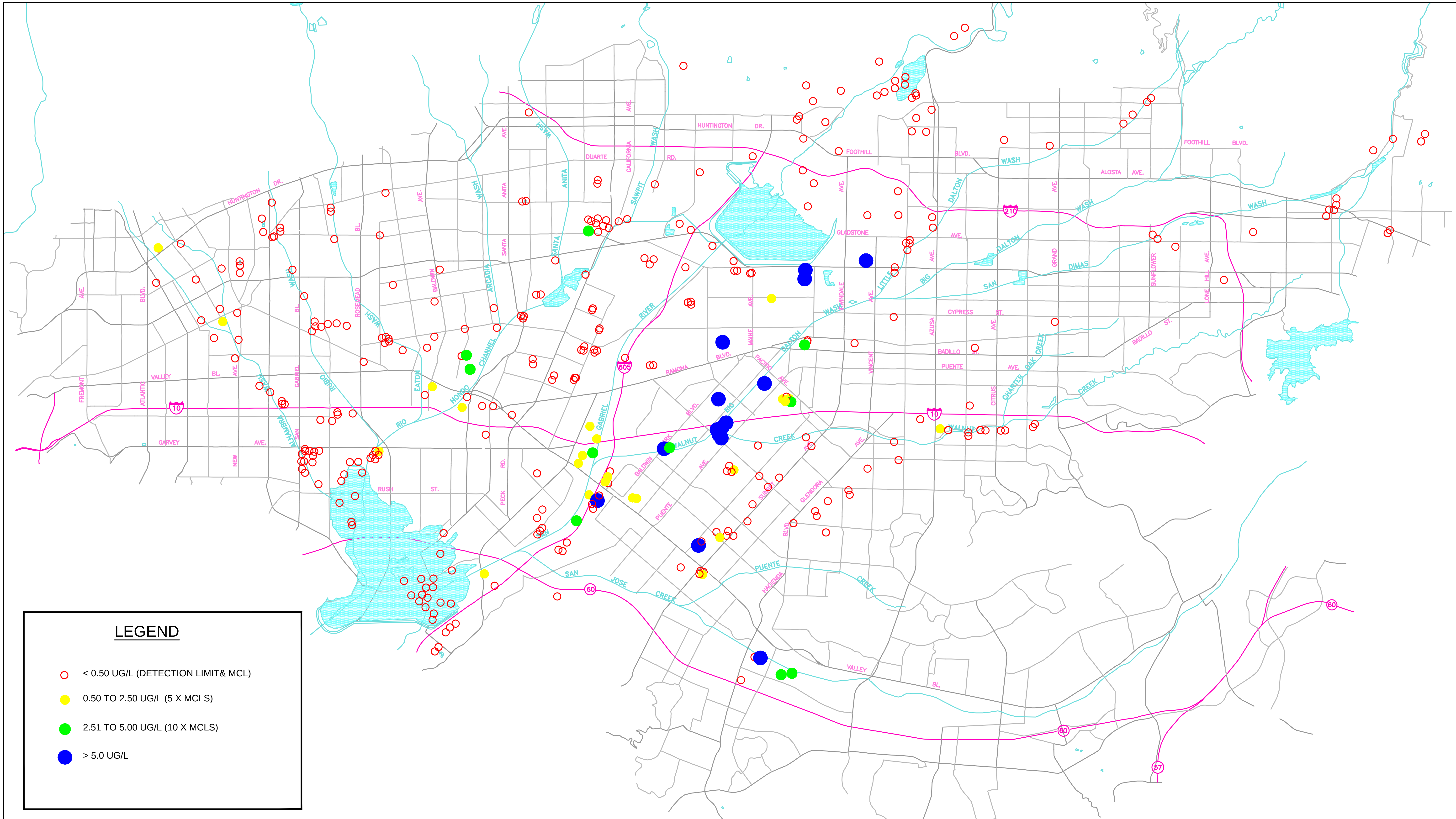

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MAIN SAN GABRIEL BASIN WATERMASTER

CARBON TETRACHLORIDE CONCENTRATION IN PRODUCTION WELLS - HISTORICAL HIGH

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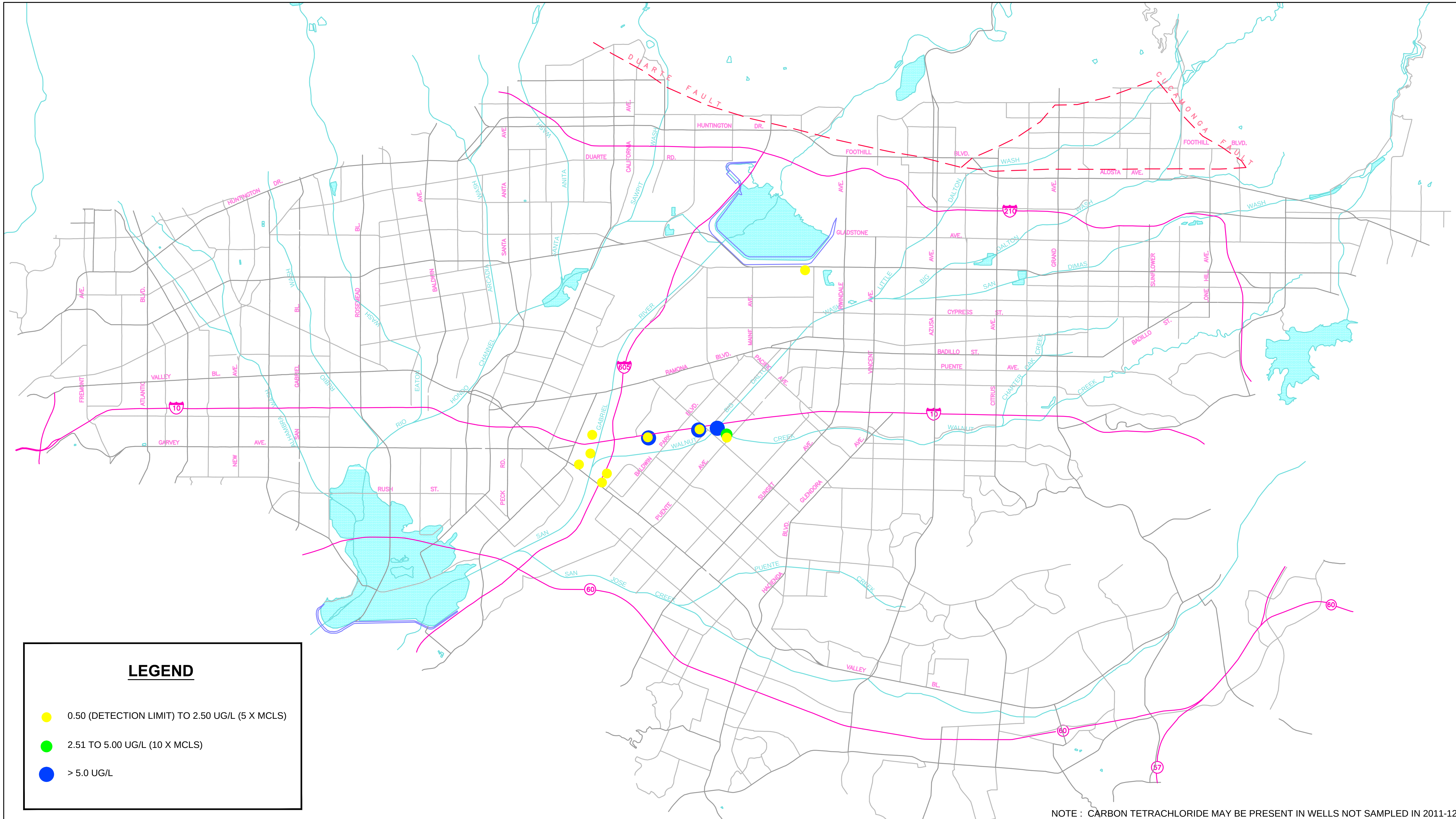

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CARBON TETRACHLORIDE DETECTED IN PRODUCTION WELLS - FISCAL YEAR 2011-12

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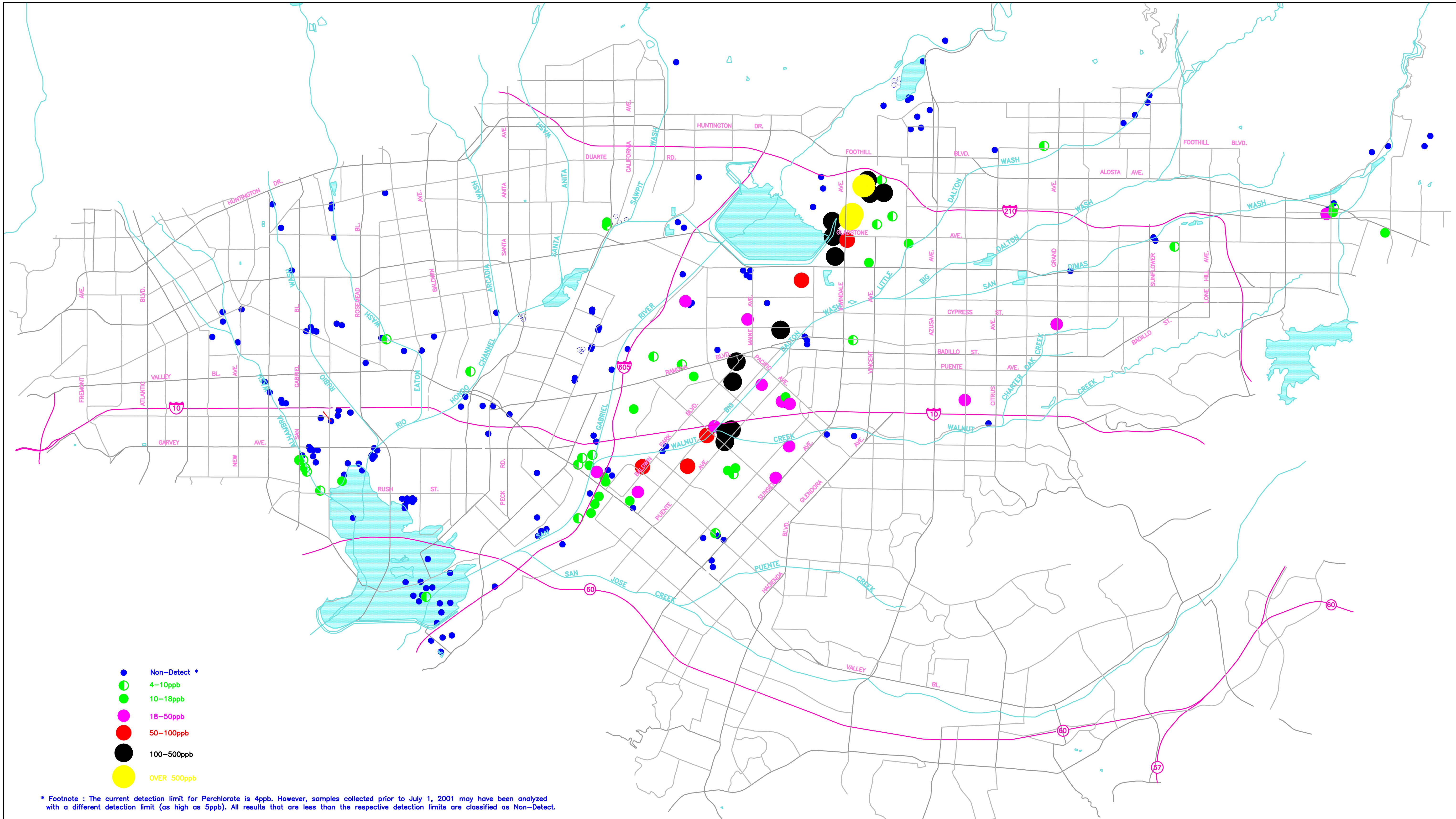

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MAIN SAN GABRIEL BASIN WATERMASTER

PERCHLORATE CONCENTRATION IN PRODUCTION WELLS - HISTORICAL HIGH

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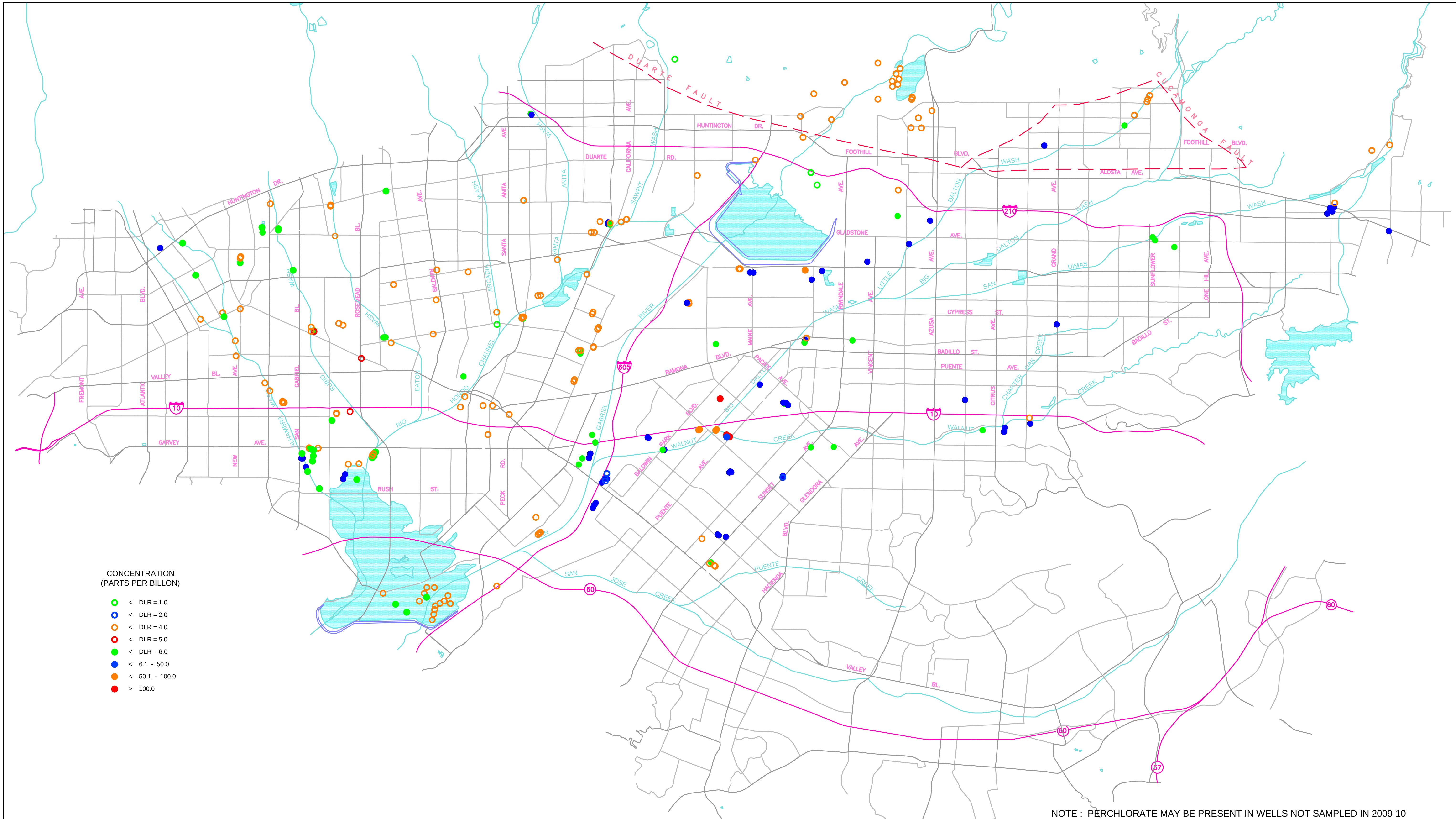

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MAIN SAN GABRIEL BASIN WATERMASTER

PERCHLORATE DETECTED IN PRODUCTION WELLS - FISCAL YEAR 2009-10

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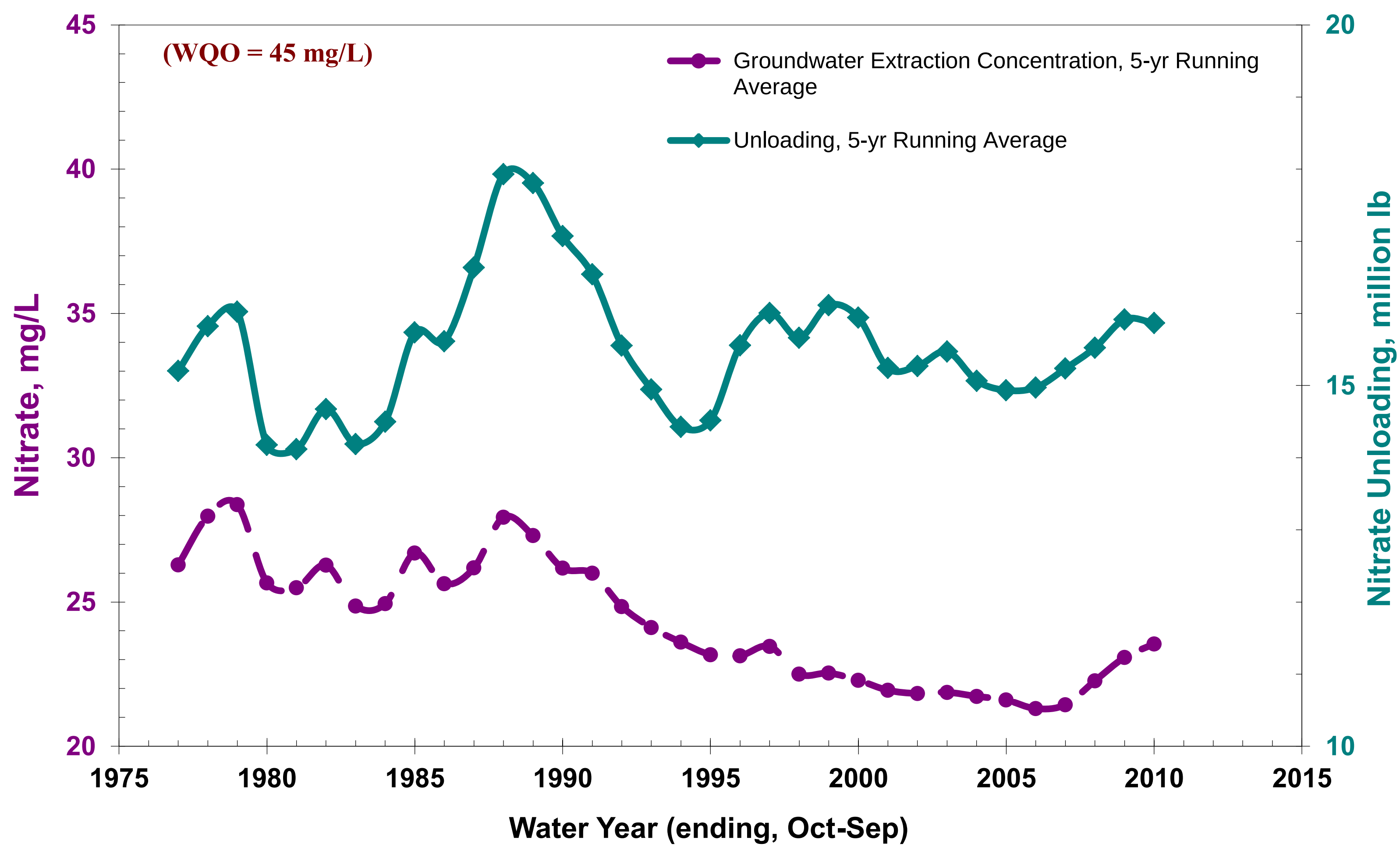

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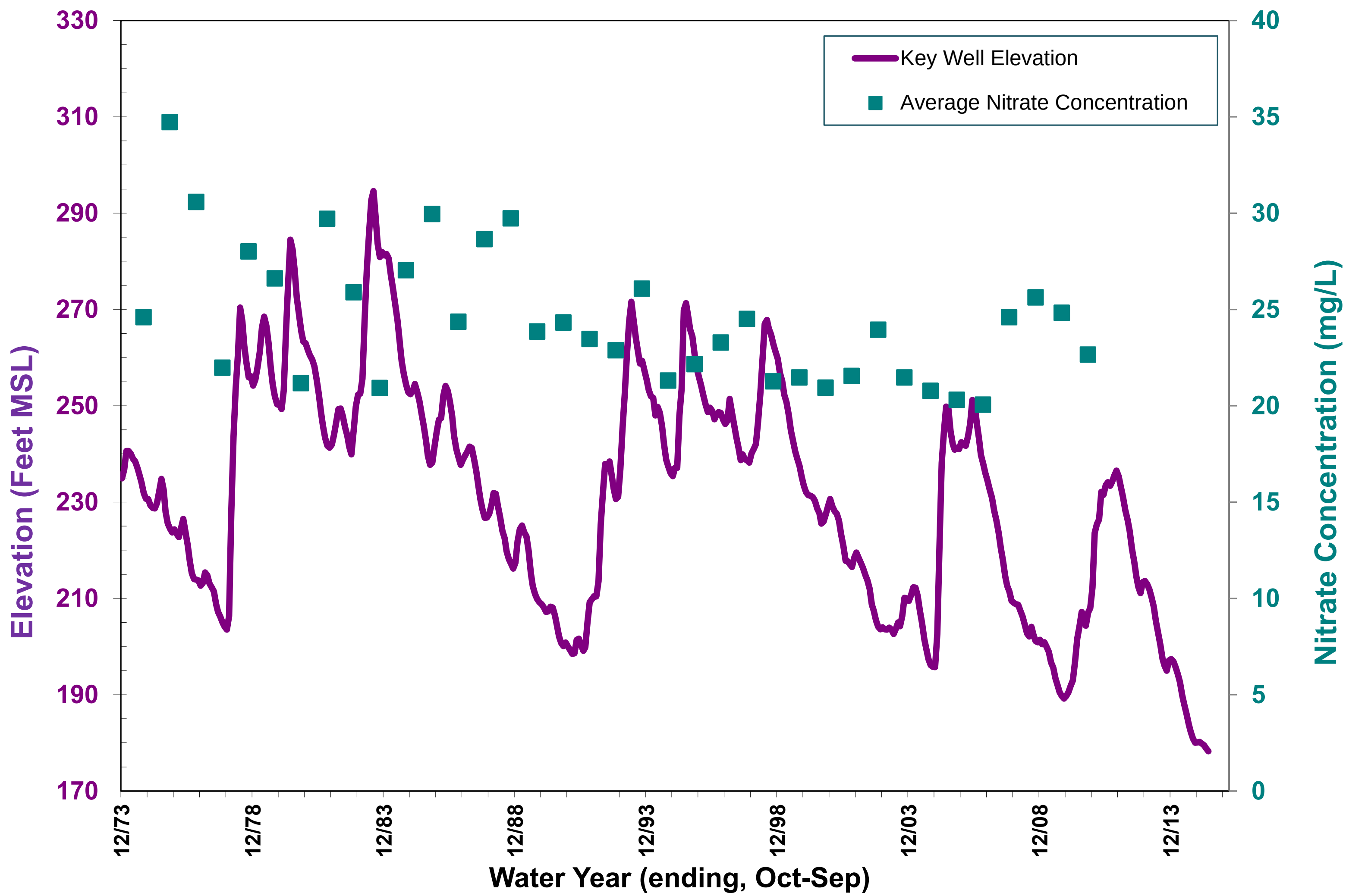
MAIN SAN GABRIEL BASIN WATERMASTER

NITRATE CONCENTRATION AND UNLOADING TRENDS IN SAN GABRIEL BASIN, 1973-74 to 2010-2011

PLATE III.35a

2/26/2016



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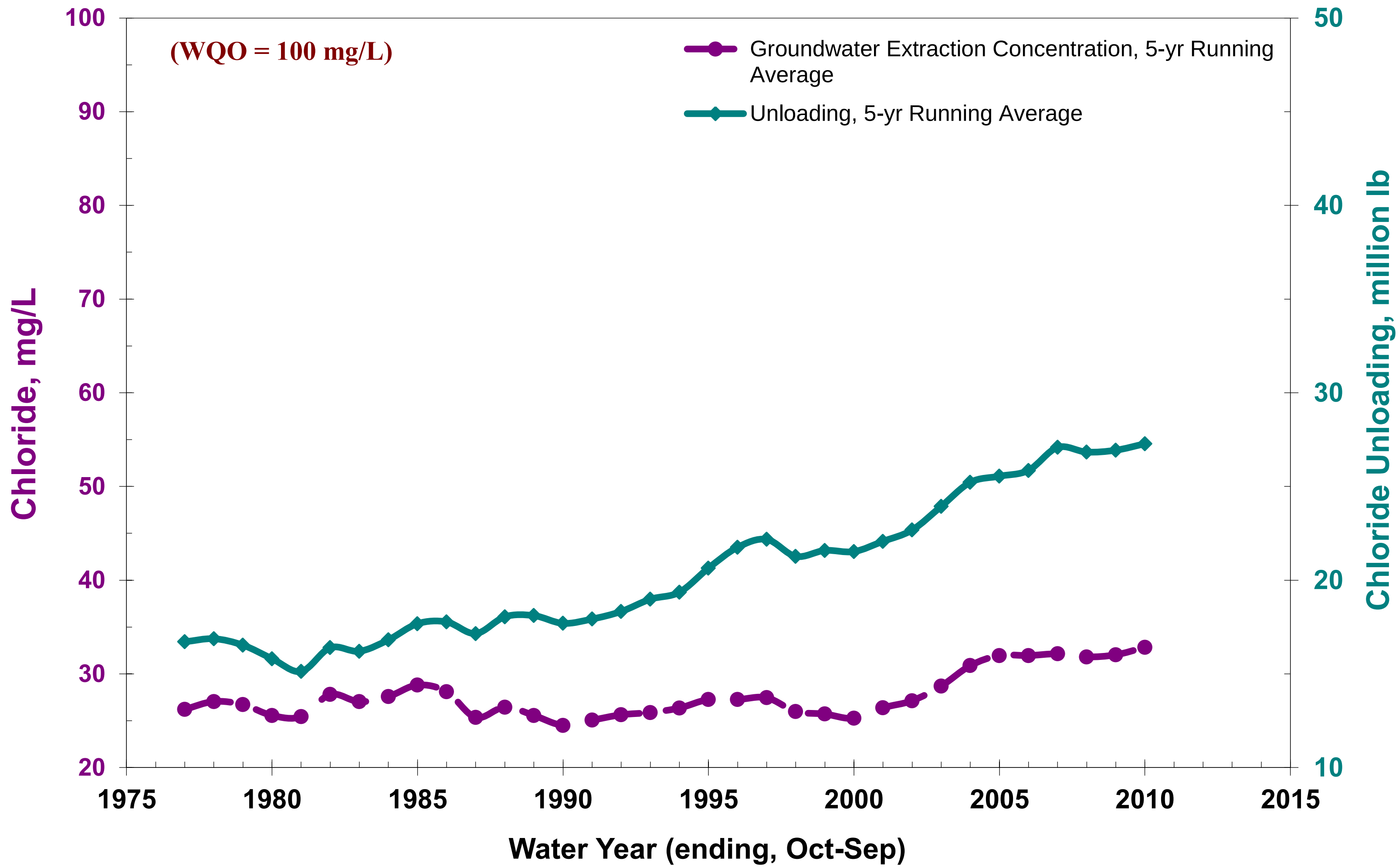
MAIN SAN GABRIEL BASIN WATERMASTER

WATER LEVEL AT BALDWIN PARK KEY WELL COMPARED TO NITRATE CONCENTRATIONS

PLATE III.35b

2/25/2016



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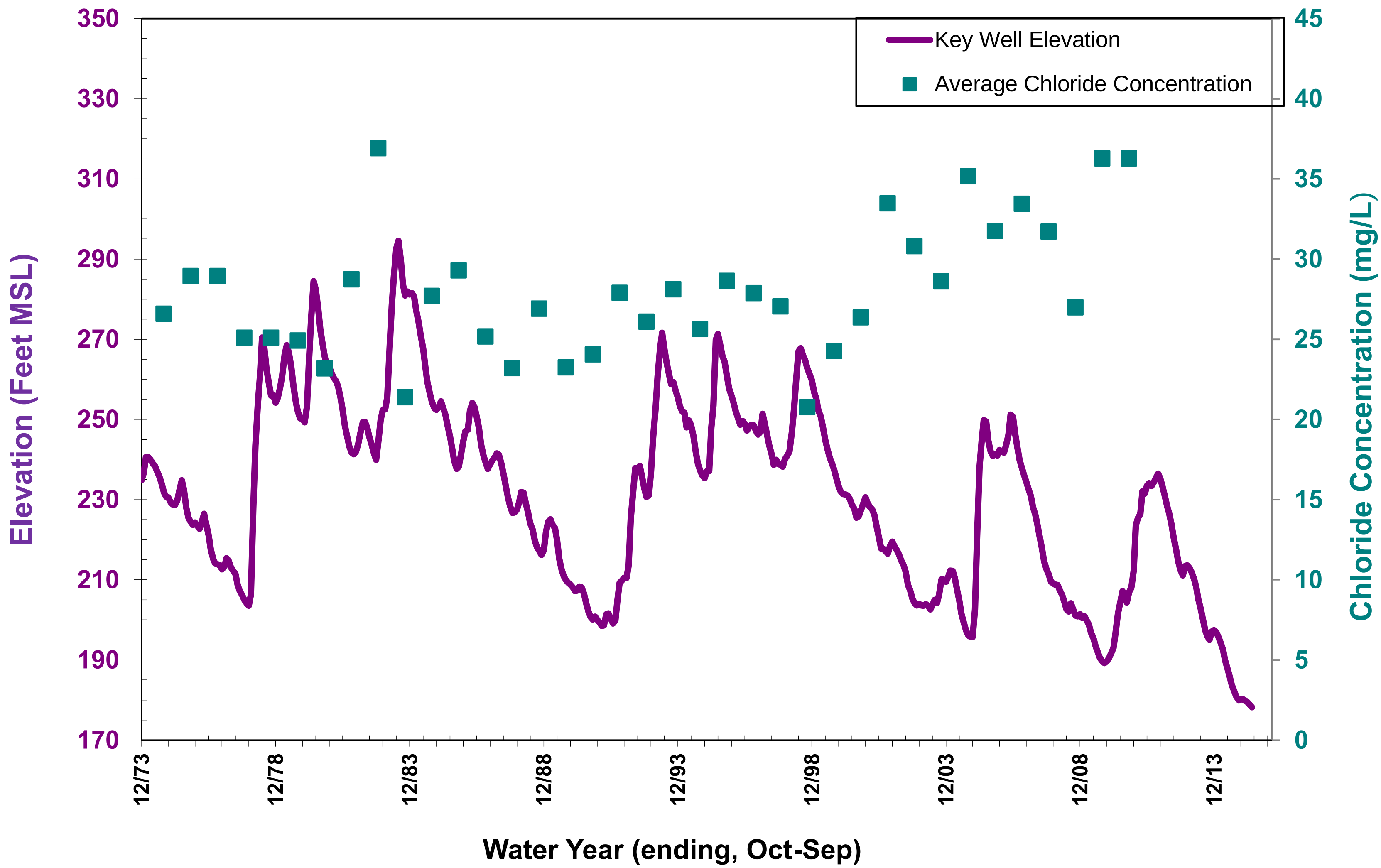
MAIN SAN GABRIEL BASIN WATERMASTER

CHLORIDE CONCENTRATION AND UNLOADING TRENDS IN SAN GABRIEL BASIN, 1973-74 to 2010-2011

PLATE III.36a

2/25/2016



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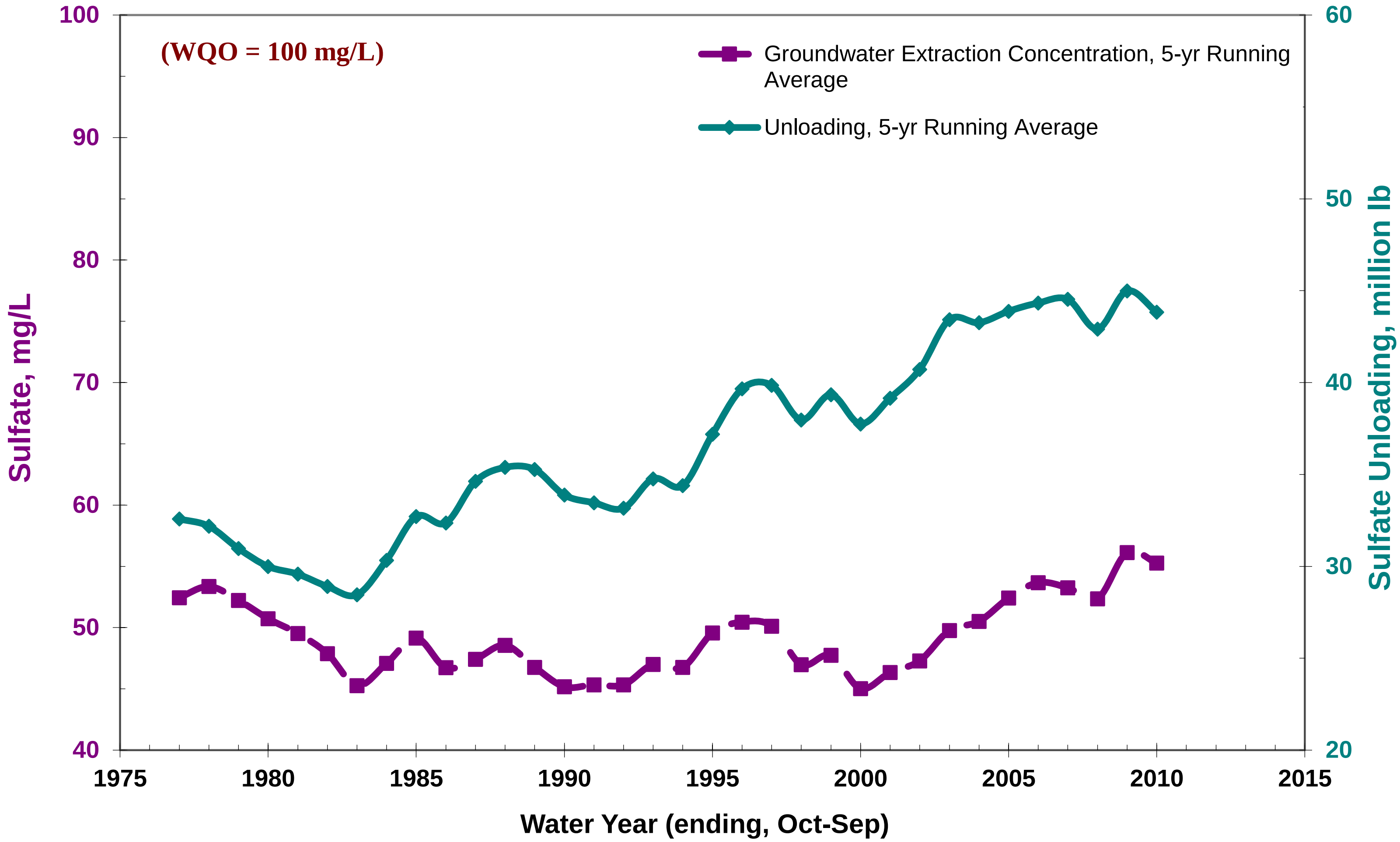
MAIN SAN GABRIEL BASIN WATERMASTER

WATER LEVEL AT BALDWIN PARK KEY WELL COMPARED TO CHLORIDE CONCENTRATIONS

PLATE III.36b

2/25/2016



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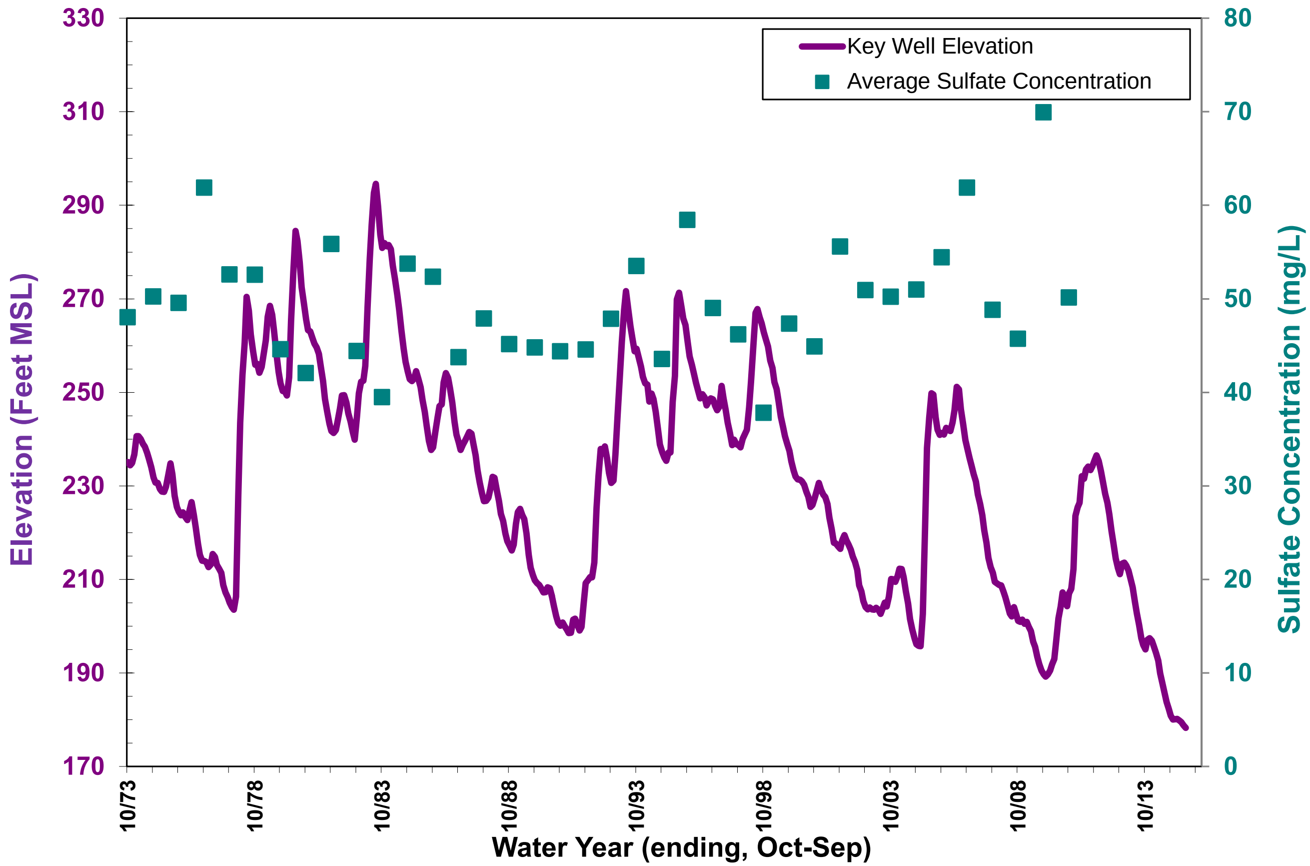
MAIN SAN GABRIEL BASIN WATERMASTER

SULFATE CONCENTRATION AND UNLOADING TRENDS IN SAN GABRIEL BASIN, 1973-74 to 2010-2011

PLATE III.37a

5/27/2016



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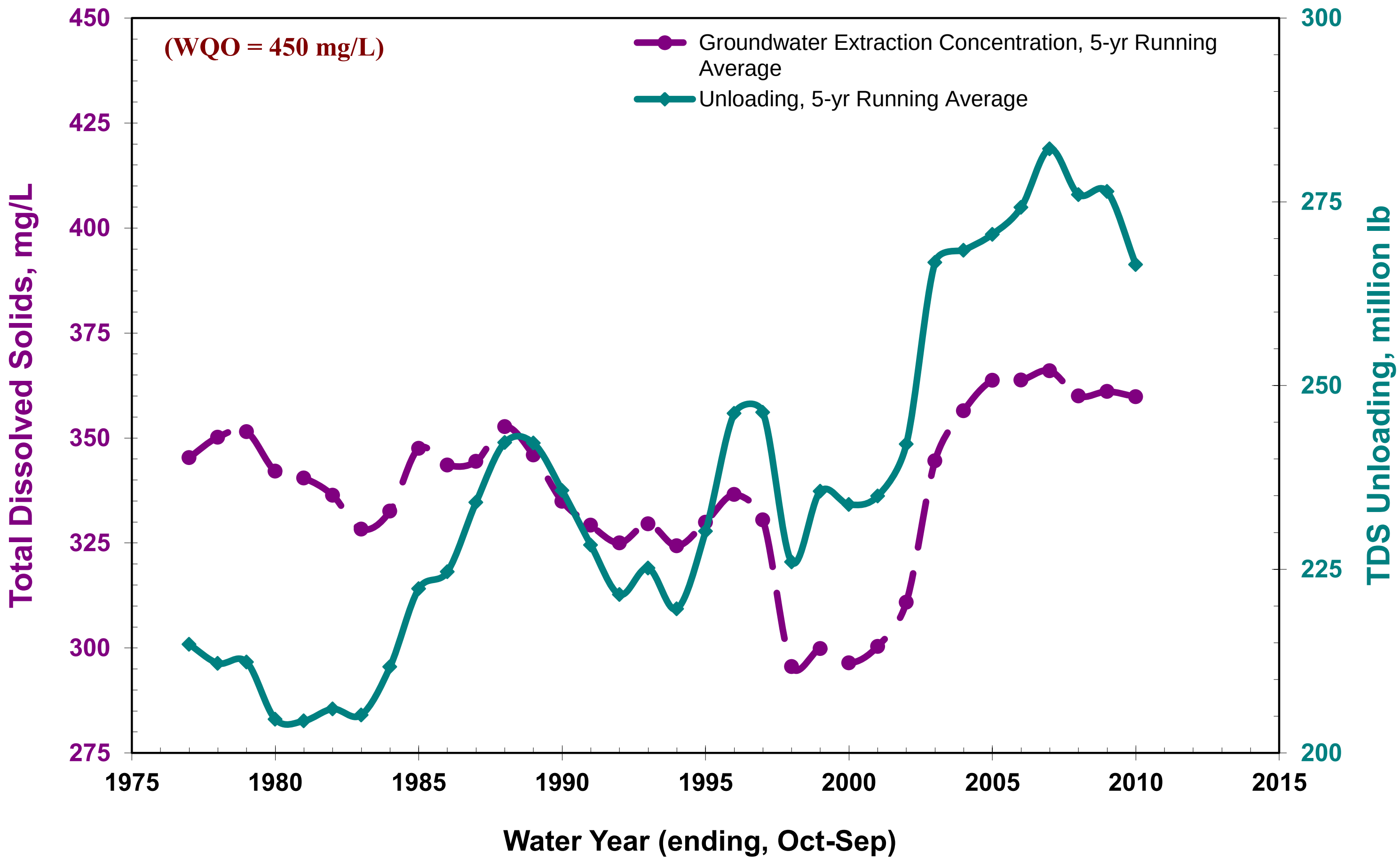
MAIN SAN GABRIEL BASIN WATERMASTER

WATER LEVEL AT BALDWIN PARK KEY WELL COMPARED TO SULFATE CONCENTRATIONS

PLATE III.37b

2/25/2016



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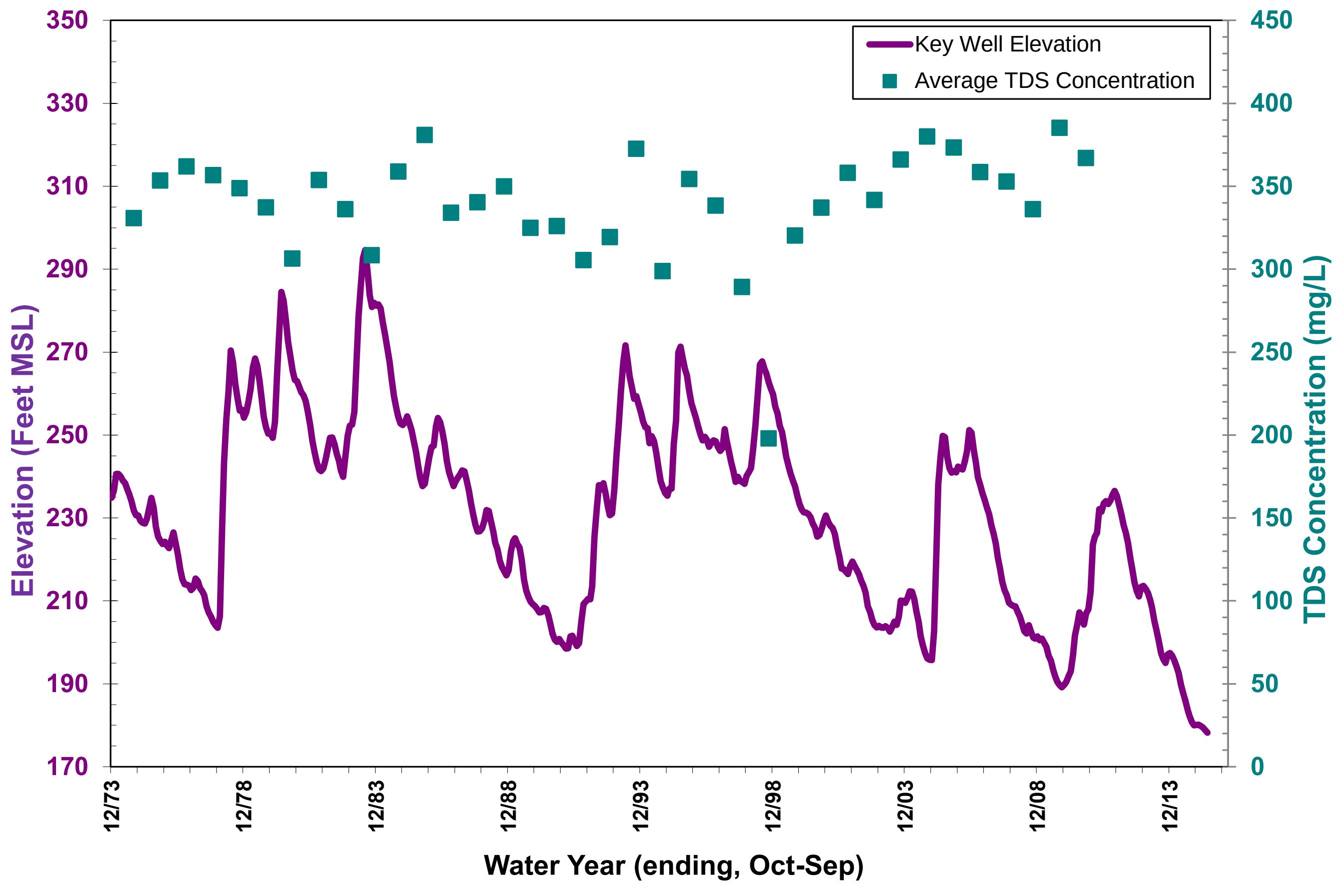
MAIN SAN GABRIEL BASIN WATERMASTER

TOTAL DISSOLVED SOLIDS CONCENTRATION AND UNLOADING TRENDS IN SAN GABRIEL BASIN, 1973-74 to 2010-2011

PLATE III.38a

2/25/2016



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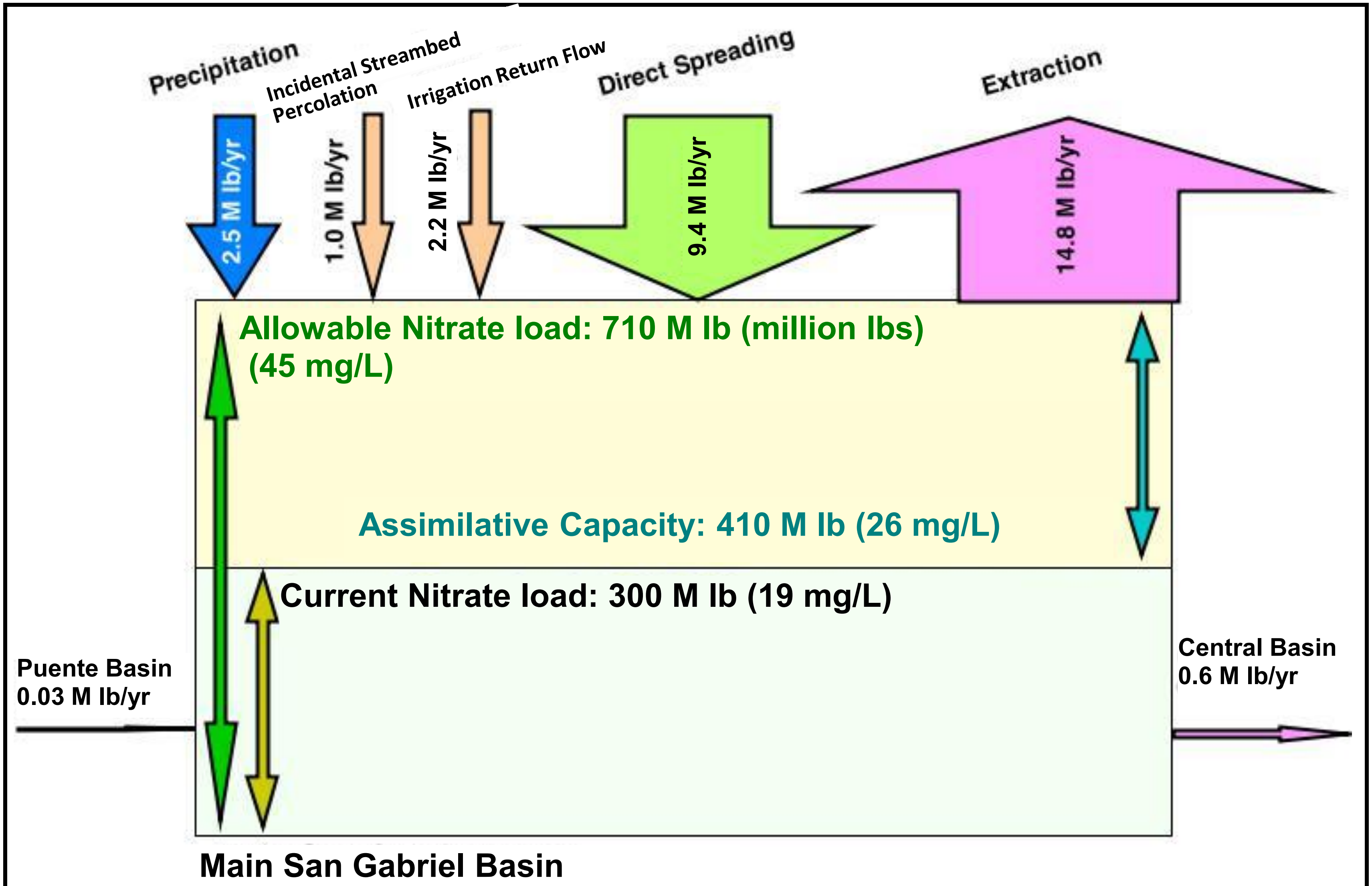
MAIN SAN GABRIEL BASIN WATERMASTER

WATER LEVEL AT BALDWIN PARK KEY WELL COMPARED TO TOTAL DISSOLVED SOLIDS (TDS) CONCENTRATIONS

PLATE III.38b

2/26/2016



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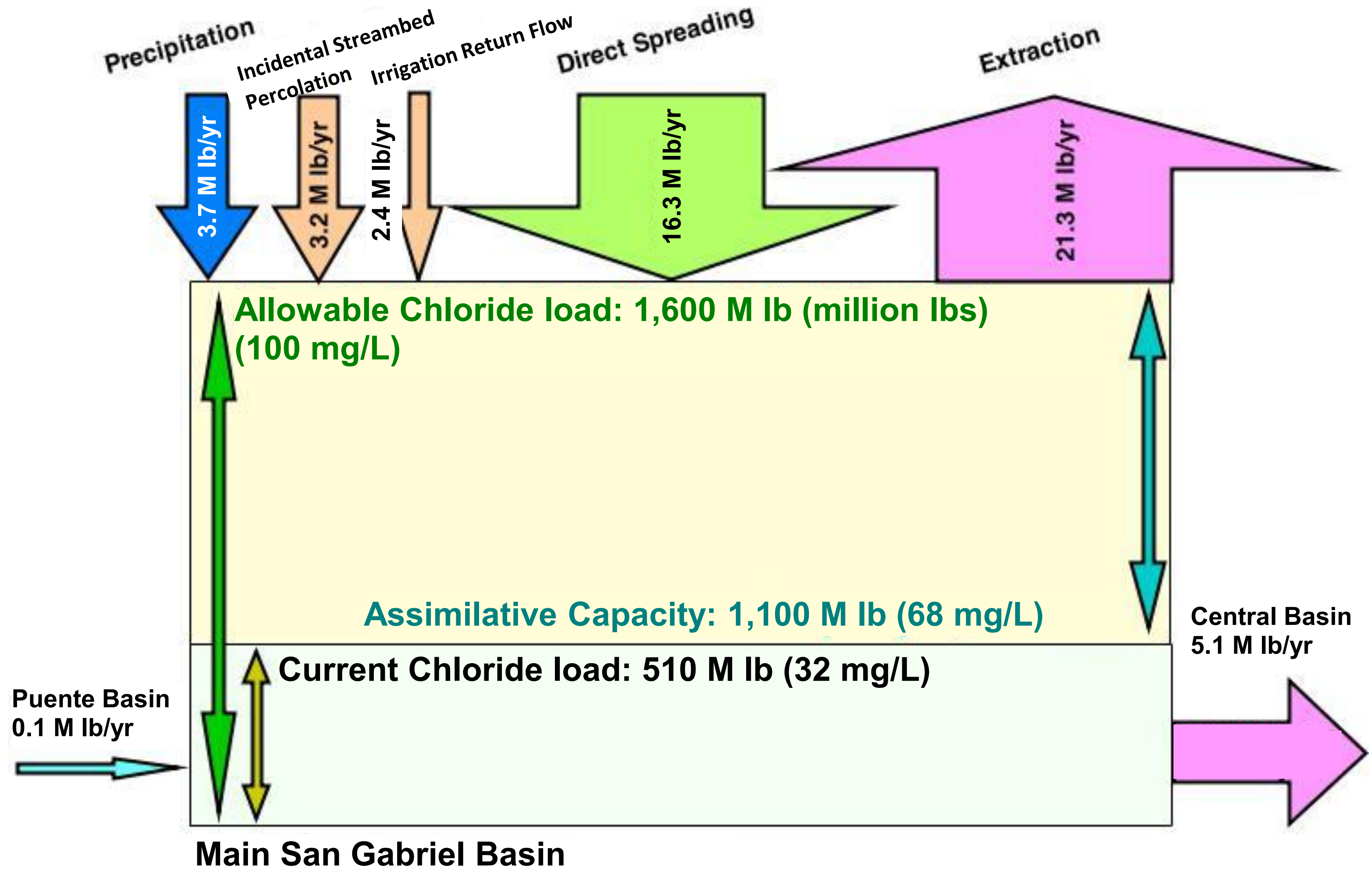
MAIN SAN GABRIEL BASIN WATERMASTER

NITRATE BALANCE COMPONENTS IN SAN GABRIEL BASIN, 2001-02 to 2010-11

PLATE III.39a

2/26/2016



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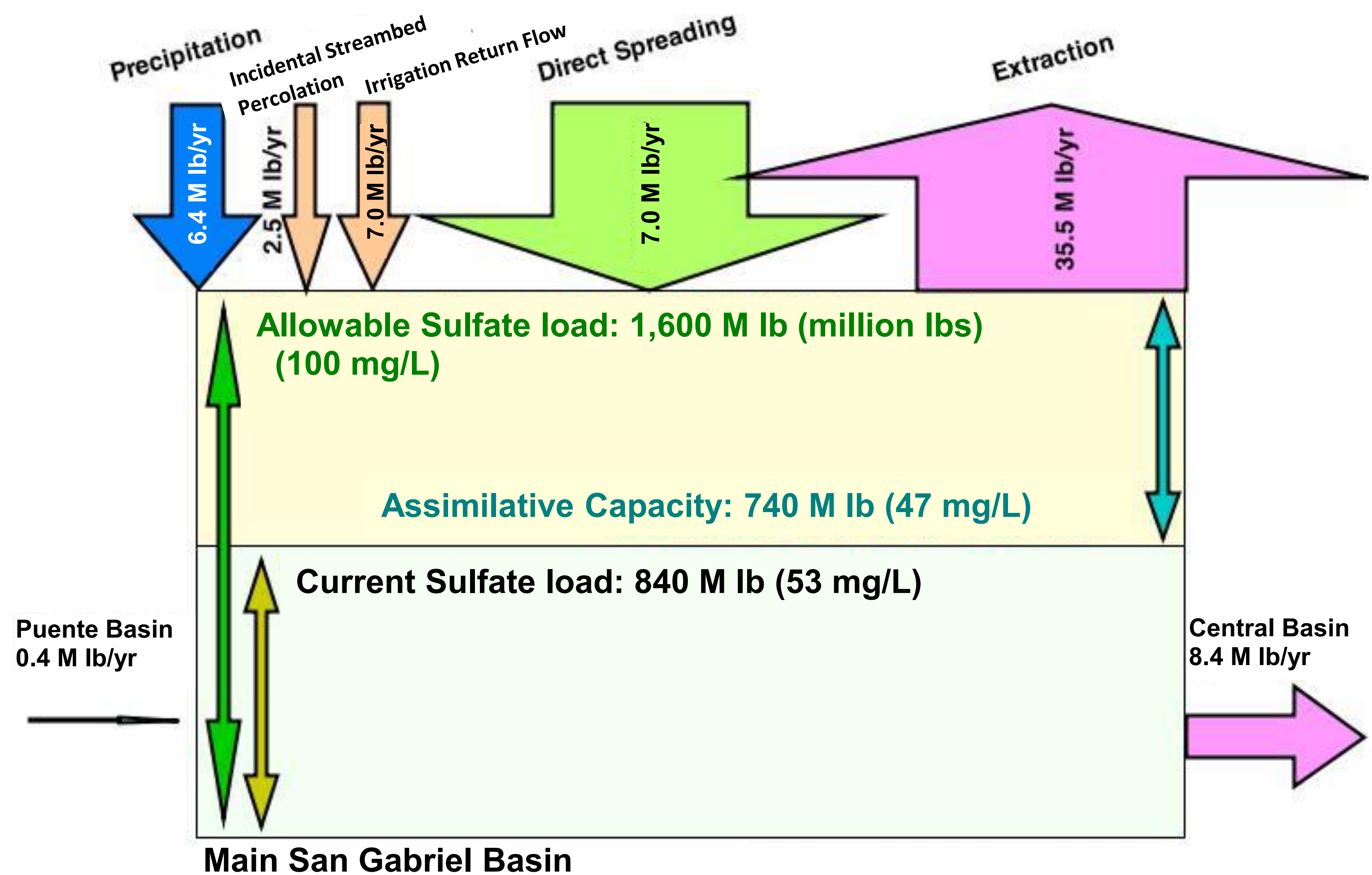
MAIN SAN GABRIEL BASIN WATERMASTER

CHLORIDE BALANCE COMPONENTS IN SAN GABRIEL BASIN, 2001-02 to 2010-11

PLATE III.39b

2/26/2016



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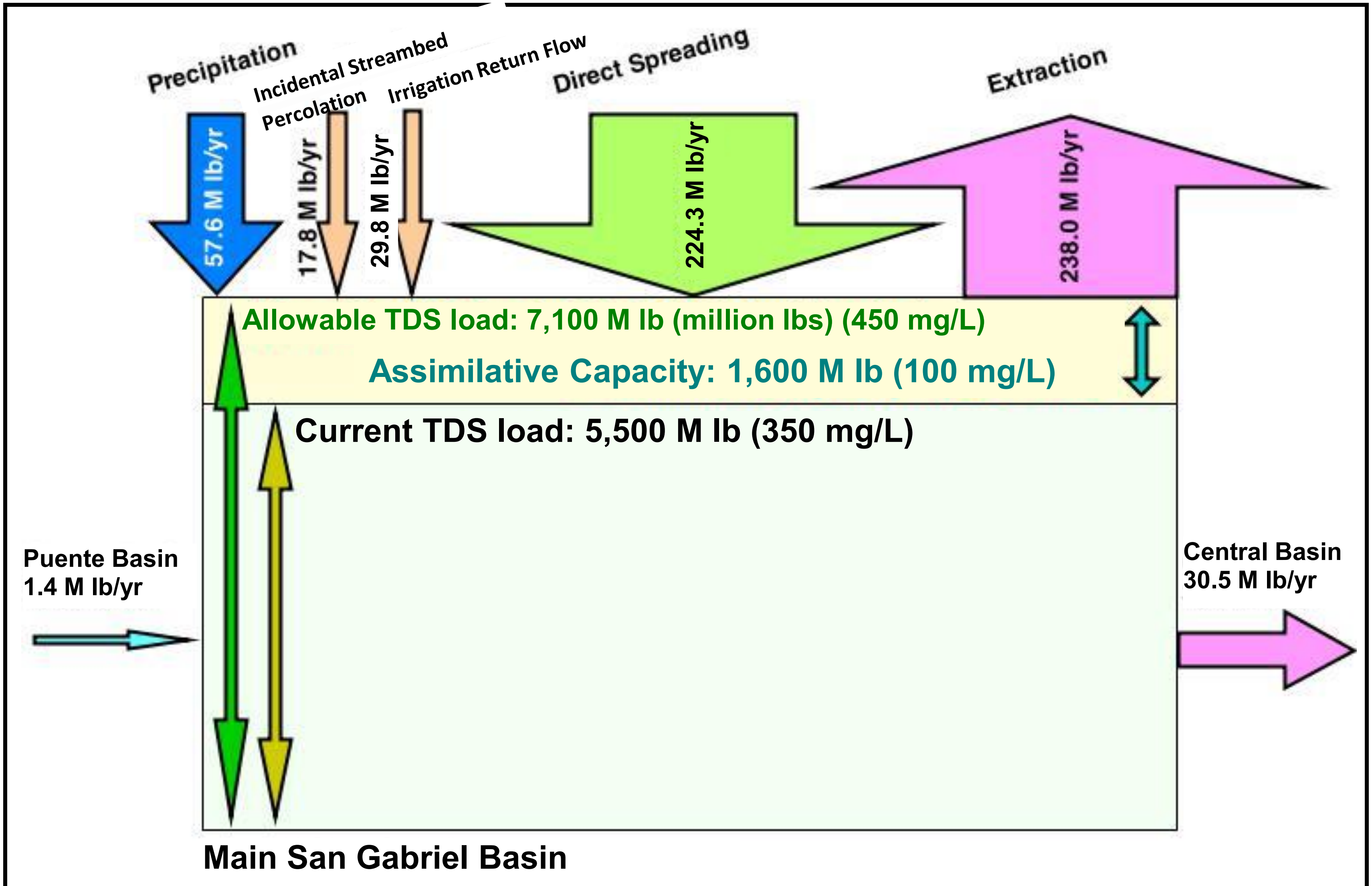
MAIN SAN GABRIEL BASIN WATERMASTER

SULFATE BALANCE COMPONENTS IN SAN GABRIEL BASIN, 2001-02 to 2010-11

PLATE III.39c

2/26/2016



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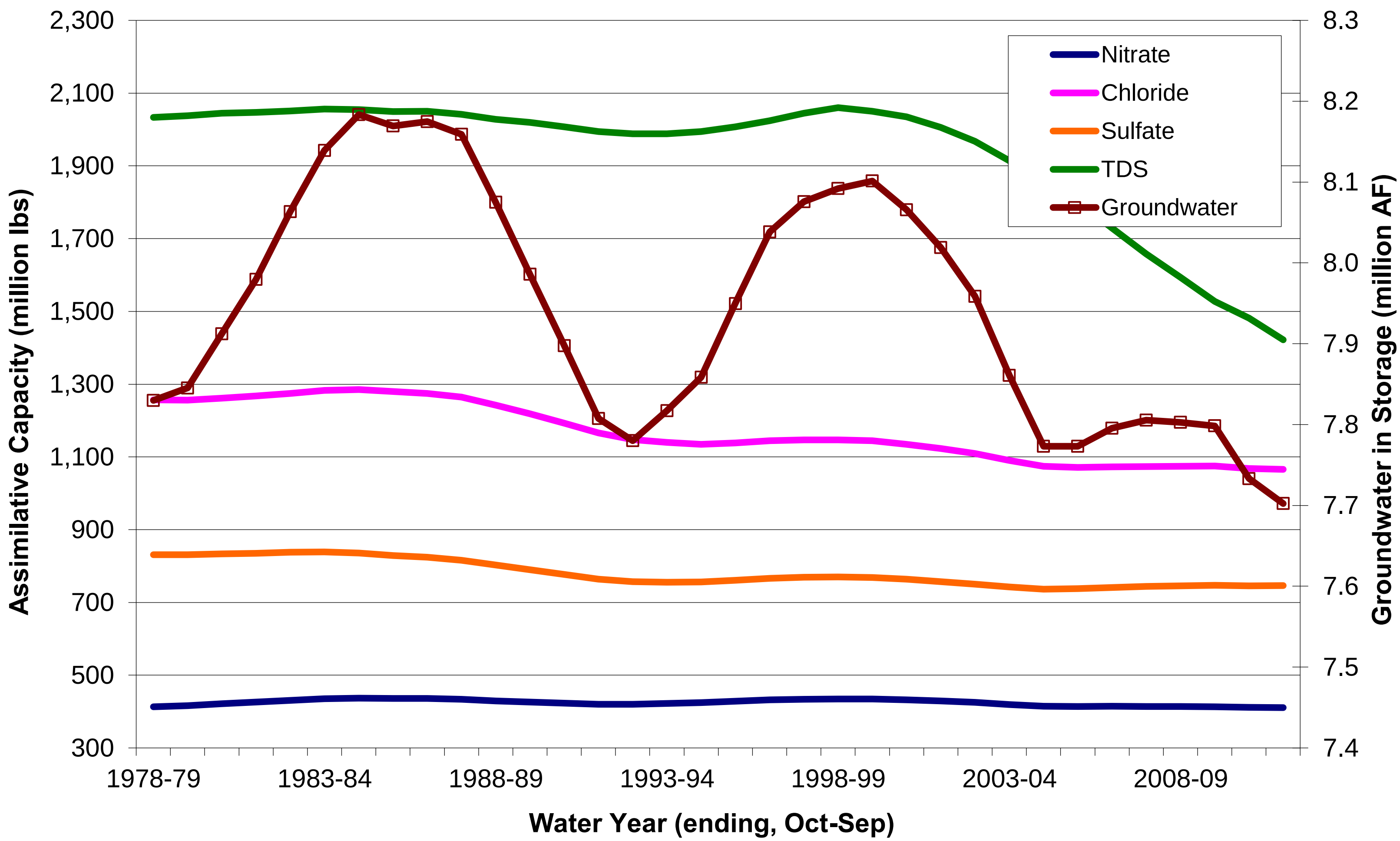
MAIN SAN GABRIEL BASIN WATERMASTER

TOTAL DISSOLVED SOLIDS BALANCE COMPONENTS IN SAN GABRIEL BASIN, 2001-02 to 2010-11

PLATE III.39d

2/26/2016



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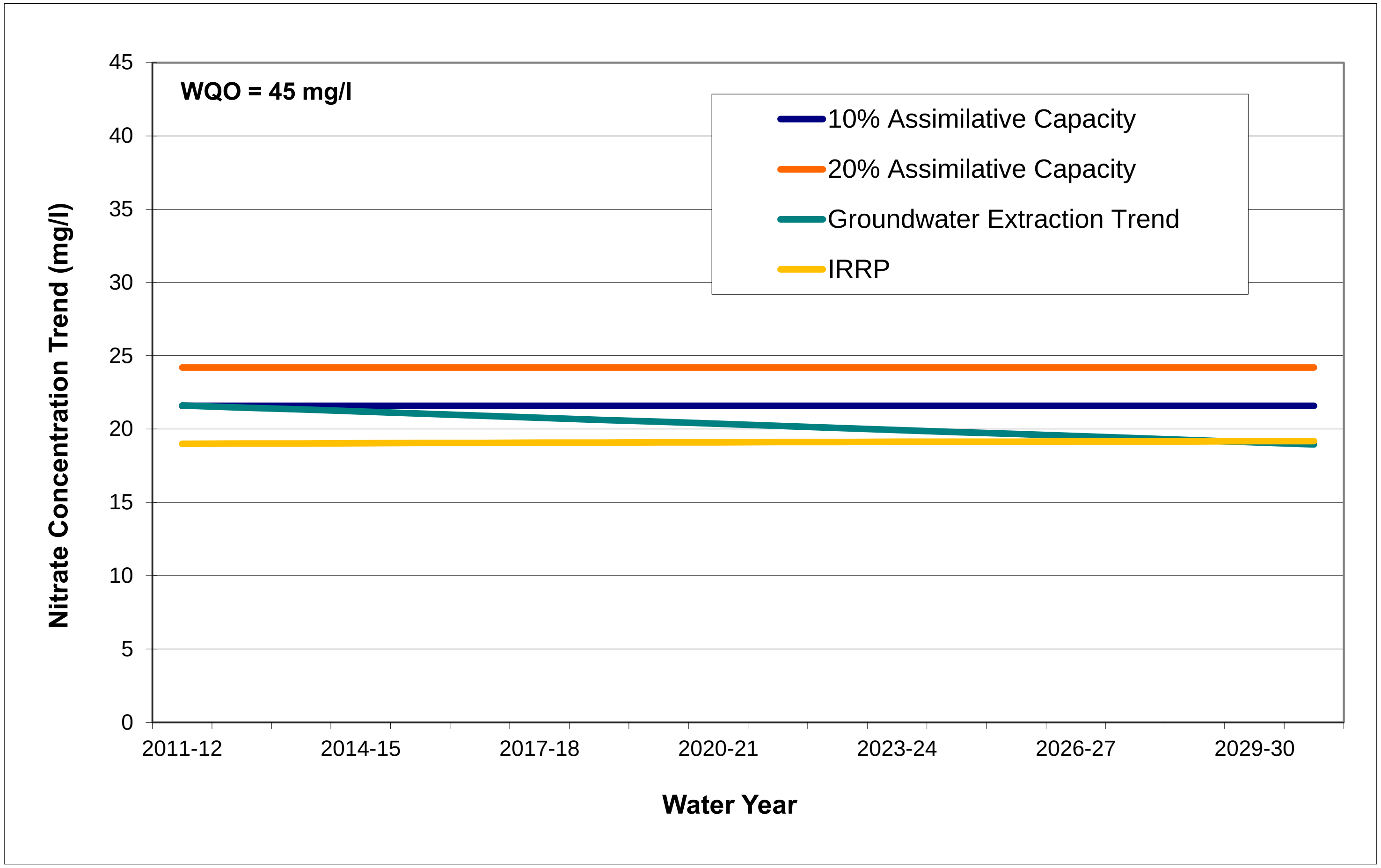
MAIN SAN GABRIEL BASIN WATERMASTER

CHANGES IN ASSIMILATIVE CAPACITY AFFECTED BY GROUNDWATER IN STORAGE (5-YR RUNNING AVERAGE) THROUGH TIME

PLATE III.40

2/26/2016



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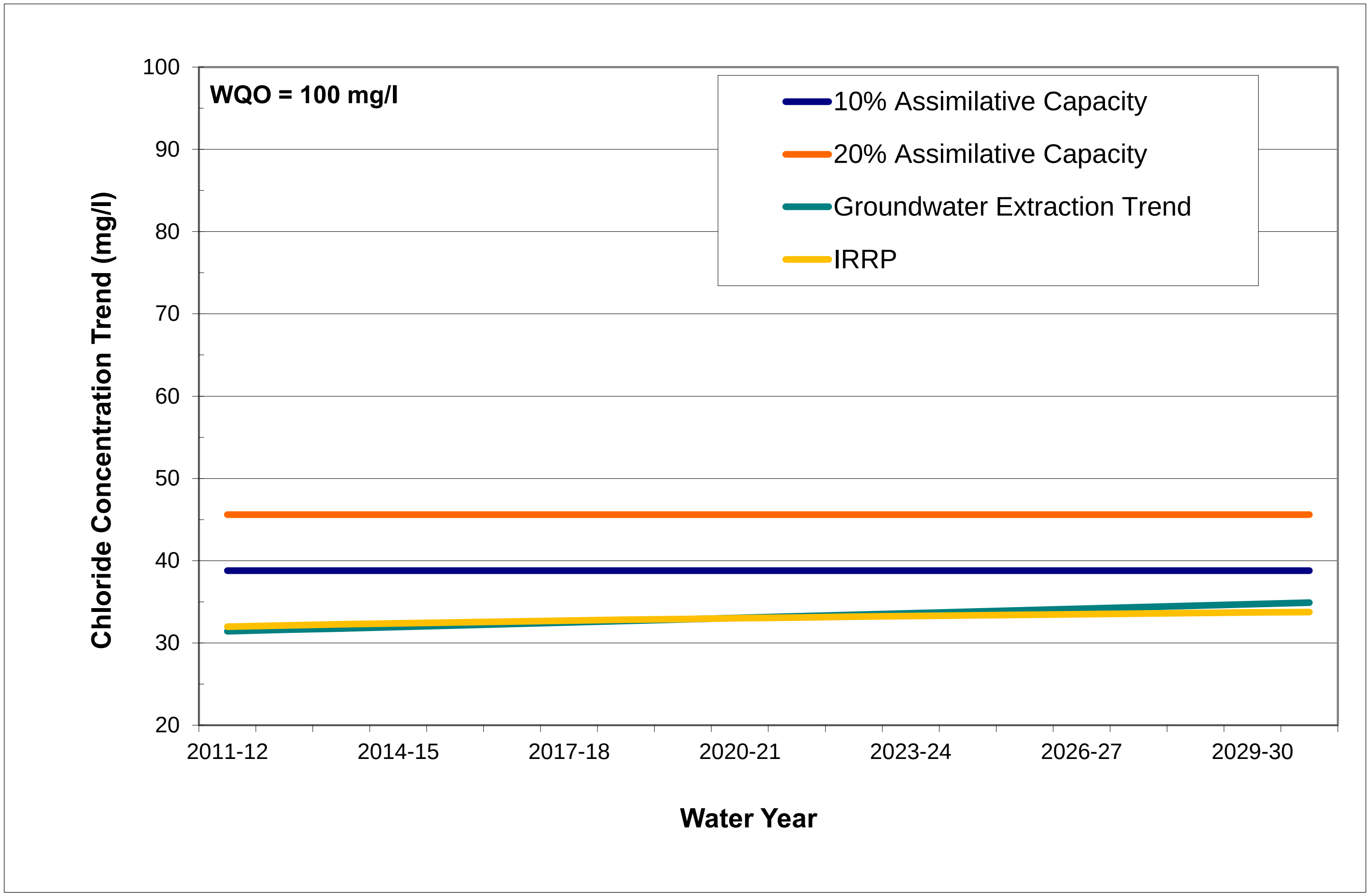
MAIN SAN GABRIEL BASIN WATERMASTER

Nitrate Groundwater Concentration Trends

PLATE IV.1a

2/26/2016



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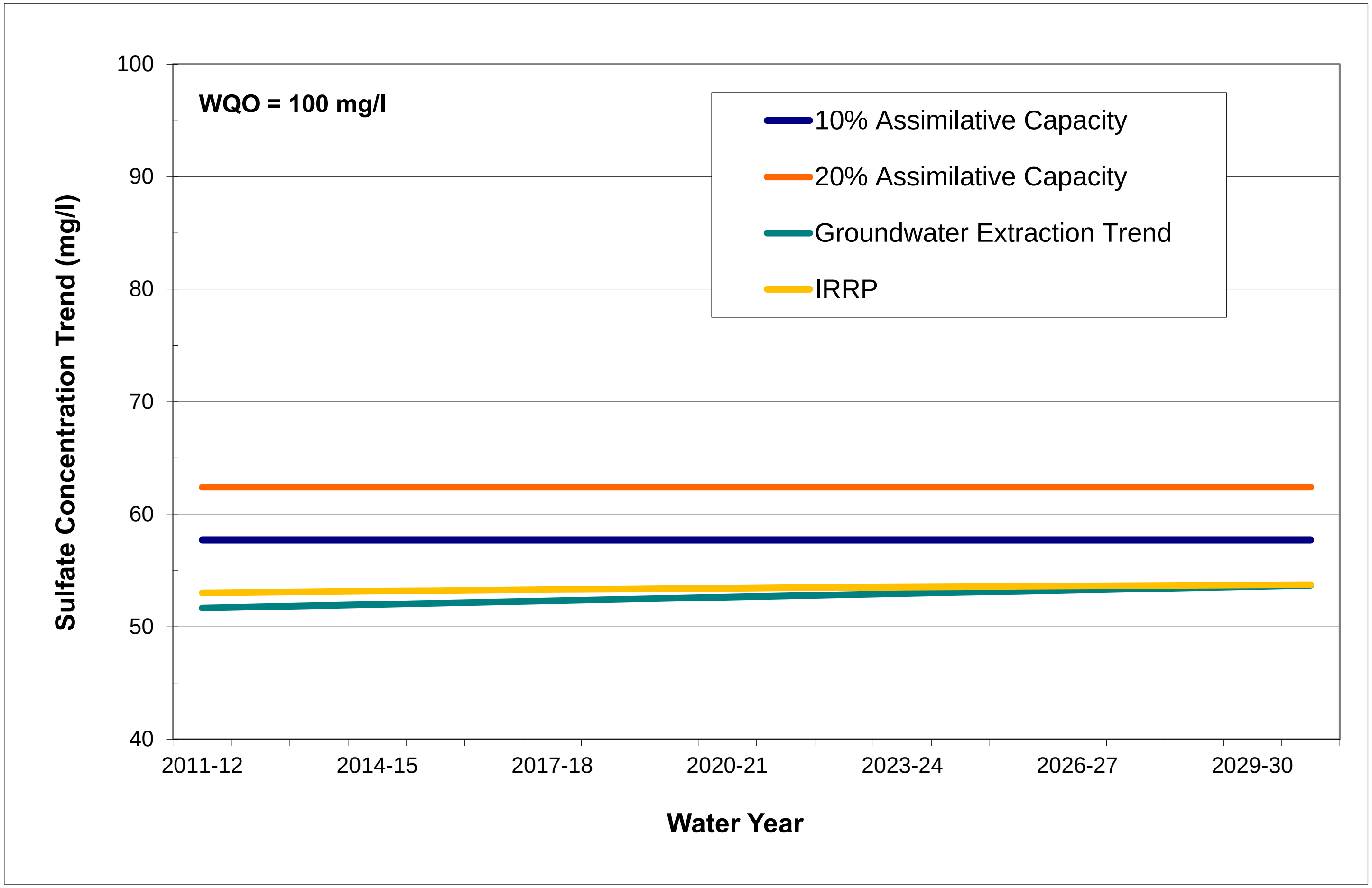
MAIN SAN GABRIEL BASIN WATERMASTER

Chloride Groundwater Concentration Trends

PLATE IV.1b

2/26/2016



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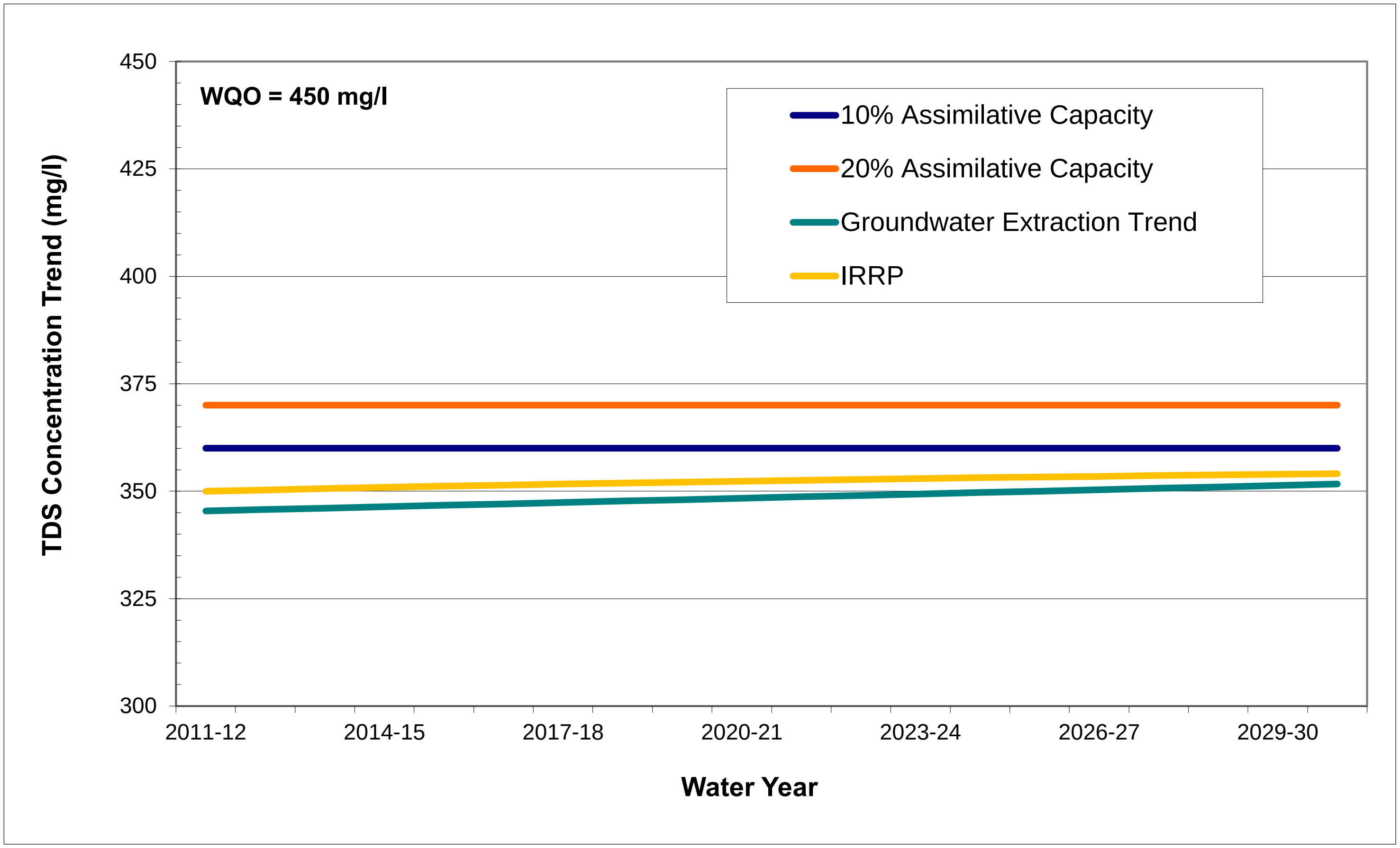
MAIN SAN GABRIEL BASIN WATERMASTER

Sulfate Groundwater Concentration Trends

PLATE IV.1c

2/26/2016



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MAIN SAN GABRIEL BASIN WATERMASTER

TDS Groundwater Concentration Trends

PLATE IV.1d

2/26/2016

SAN GABRIEL VALLEY BASIN SNMP TABLES

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE MAIN SAN GABRIEL BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES

BACTERIA (Objective in coliforms per 100 mL)

COLIFORM	1.1

INORGANIC CHEMICALS (MCLs in mg/L) (TABLE 64431-A) [1]

ALUMINUM	1
ANTIMONY	0.006
ARSENIC	0.01
ASBESTOS [2] (in MFL)	7
BARIUM	1
BERYLLIUM	0.004
CADMIUM	0.005
CHROMIUM	0.05
CYANIDE	0.15
FLUORIDE	2
MERCURY	0.002
NICKEL	0.1
NITRATE (as NO_3)	45
NITRATE + NITRITE (as N)	10
NITRITE (as N)	1
PERCHLORATE	0.006
SELENIUM	0.05
THALLIUM	0.002

RADIOACTIVITY (MCLs in pCi/L) (TABLES 64442 AND 64443) [1]

RADIUM 226 + RADIUM 228	5
GROSS ALPHA	15
URANIUM	20
BETA/PHOTON EMITTERS (in millirem/year)	4
STRONTIUM 90	8
TRITIUM	20,000

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE MAIN SAN GABRIEL BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES

ORGANIC CHEMICALS (MCLs in mg/L)

VOLATILE ORGANIC CHEMICALS (TABLE 64444-A) [1]

BENZENE	0.001
CARBON TETRACHLORIDE	0.0005
1,2-DICHLOROBENZENE	0.6
1,4-DICHLOROBENZENE	0.005
1,1-DICHLOROETHANE	0.005
1,2-DICHLOROETHANE	0.0005
1,1-DICHLOROETHYLENE	0.006
cis-1,2-DICHLOROETHYLENE	0.006
trans-1,2-DICHLOROETHYLENE	0.01
DICHLOROMETHANE	0.005
1,2-DICHLOROPROPANE	0.005
1,3-DICHLOROPROPENE	0.0005
ETHYLBENZENE	0.3
METHYL-TERT-BUTYL ETHER (MTBE)	0.013
MONOCHLOROBENZENE	0.07
STYRENE	0.1
1,1,2,2-TETRACHLOROETHANE	0.001
TETRACHLOROETHYLENE	0.005
TOLUENE	0.15
1,2,4-TRICHLOROBENZENE	0.005
1,1,1-TRICHLOROETHANE	0.2
1,1,2-TRICHLOROETHANE	0.005
TRICHLOROETHYLENE	0.005
TRICHLOROFLUOROMETHANE	0.15
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	1.2
VINYL CHLORIDE	0.0005
XYLENES	1.75 [3]

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE MAIN SAN GABRIEL BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES

NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (TABLE 64444-A) [1]

ALACHLOR	0.002
ATRAZINE	0.001
BENTAZON	0.018
BENZO (A) PYRENE	0.0002
CARBOFURAN	0.018
CHLORDANE	0.0001
2,4-D	0.07
DALAPON	0.2
DIBROMOCHLOROPROPANE	0.0002
DI (2-ETHYLHEXYL) ADIPATE	0.4
DI (2-ETHYLHEXYL) PHTHALATE	0.004
DINOSEB	0.007
DIQUAT	0.02
ENDOTHALL	0.1
ENDRIN	0.002
ETHYLENE DIBROMIDE (EDB)	0.00005
GLYPHOSATE	0.7
HEPTACHLOR	0.00001
HEPTACHLOR EPOXIDE	0.00001
HEXACHLOROBENZENE	0.001
HEXACHLOROCYCLOPENTADIENE	0.05
LINDANE	0.0002
METHOXYCHLOR	0.03
MOLINATE	0.02
OXAMYL	0.05
PENTACHLOROPHENOL	0.001
PICLORAM	0.5
POLYCHLORINATED BIPHENOLS (Total PCBs)	0.0005
SIMAZINE	0.004
THIOBENCARB	0.07
TOXAPHENE	0.003
2,3,7,8-TCDD (DIOXIN)	3×10^{-8}
2,4,5-TP (SILVEX)	0.05

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE MAIN SAN GABRIEL BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES
MINERALS (Objectives in mg/L)	
TOTAL DISSOLVED SOLIDS [4]	450/600
SULFATE	100
CHLORIDE	100
BORON	0.5

NOTES :

[1] Title 22, Division 4, Chapter 15 - California Code of Regulations - Updated June 21, 2012

[2] For fibers exceeding 10 micrometers in length

[3] MCL for either a single isomer or the sum of isomers

[4] 450 mg/L for Western Area west of Walnut Creek, Big Dalton Wash, and Little Dalton Wash
600 mg/L for Eastern Area east of Walnut Creek, Big Dalton Wash, and Little Dalton Wash

MCL : Maximum contaminant level

mL : Milliliter

MFL : Million fibers per liter

pCi/L : Picocuries per liter

mg/L : Milligrams per liter

TABLE III.2
PRECIPITATION AND RUNOFF IN THE SAN GABRIEL RIVER AND RIO HONDO WATERSHEDS

column (1)	(2)	(3)	(4) = (2) * (3) / 12	(5)	(6)	(7) = (5) * (6) / 12	(8)	(9)	(10) = (8) * (9) /12	(11) = (4) + (7) + (10)	(12)	(13) = (12) / (11)
	Precipitation volume										Runoff	Runoff
Water Year	Valley Floor			San Gabriel Mountains Watershed			Southern Low Hills Watershed				Volume	Coefficient†
(Oct-Sept)	in/yr	acres	af/yr	in/yr	acres	af/yr	in/yr	acres	af/yr	total	af/yr	%
1924/25	12.85	106,880	114,500		167,584		10.61	39,136	34,600	149,100	n	
1925/26	22.42	106,880	199,700		167,584		18.61	39,136	60,700	260,400	n	
1926/27	25.13	106,880	223,800	30.04	167,584	419,500	22.43	39,136	73,200	716,500	n	
1927/28	13.66	106,880	121,700	15.52	167,584	216,700	15.44	39,136	50,400	388,800	n	
1928/29	15.43	106,880	137,400	20.46	167,584	285,700	13.70	39,136	44,700	467,800	n	
1929/30	15.39	106,880	137,000	20.33	167,584	283,900	13.57	39,136	44,300	465,200	n	
1930/31	16.75	106,880	149,200	19.77	167,584	276,100	13.39	39,136	43,700	469,000	n	
1931/32	22.10	106,880	196,800	28.66	167,584	400,300	19.72	39,136	64,300	661,400	n	
1932/33	13.68	106,880	121,800	17.81	167,584	248,800	11.17	39,136	36,400	407,000	n	
1933/34	20.68	106,880	184,200	25.40	167,584	354,700	16.47	39,136	53,700	592,600	n	
1934/35	23.12	106,880	205,900	32.97	167,584	460,500	22.19	39,136	72,400	738,800	n	
1935/36	15.28	106,880	136,100	22.61	167,584	315,700	13.37	39,136	43,600	495,400	n	
1936/37	28.31	106,880	252,200	40.89	167,584	571,100	26.77	39,136	87,300	910,600	n	
1937/38	28.53	106,880	254,100	43.49	167,584	607,300	25.99	39,136	84,800	946,200	n	
1938/39	19.91	106,880	177,300	26.11	167,584	364,700	18.11	39,136	59,100	601,100	n	
1939/40	15.12	106,880	134,700	21.39	167,584	298,700	13.86	39,136	45,200	478,600	n	
1940/41	39.18	106,880	349,000	53.05	167,584	740,800	35.29	39,136	115,100	1,204,900	n	
1941/42	13.62	106,880	121,300	17.93	167,584	250,400	12.83	39,136	41,800	413,500	n	
1942/43	27.60	106,880	245,800	47.34	167,584	661,200	23.29	39,136	75,900	982,900	n	
1943/44	22.34	106,880	199,000	32.33	167,584	451,500	16.29	39,136	53,100	703,600	n	
1944/45	16.27	106,880	144,900	25.21	167,584	352,100	16.28	39,136	53,100	550,100	n	
1945/46	14.99	106,880	133,500	24.72	167,584	345,300	15.17	39,136	49,500	528,300	n	
1946/47	17.43	106,880	155,200	28.24	167,584	394,400	14.27	39,136	46,600	596,200	n	
1947/48	10.32	106,880	91,900	13.82	167,584	193,000	9.74	39,136	31,800	316,700	n	
1948/49	11.51	106,880	102,500	16.82	167,584	234,900	11.02	39,136	36,000	373,400	n	
1949/50	14.12	106,880	125,800	20.32	167,584	283,800	12.93	39,136	42,200	451,800	n	
1950/51	9.79	106,880	87,200	13.02	167,584	181,800	9.39	39,136	30,600	299,600	n	
1951/52	31.51	106,880	280,700	43.80	167,584	611,600	28.88	39,136	94,200	986,500	n	
1952/53	12.12	106,880	107,900	16.11	167,584	225,000	11.84	39,136	38,600	371,500	n	
1953/54	15.62	106,880	139,100	23.05	167,584	321,900	16.50	39,136	53,800	514,800	n	
1954/55	13.79	106,880	122,800	19.68	167,584	274,900	12.66	39,136	41,300	439,000	n	
1955/56	17.79	106,880	158,500	22.49	167,584	314,000	16.06	39,136	52,400	524,900	n	
1956/57	14.36	106,880	127,900	20.08	167,584	280,400	10.85	39,136	35,400	443,700	n	
1957/58	30.19	106,880	268,900	41.77	167,584	583,400	28.54	39,136	93,100	945,400	n	
1958/59	9.51	106,880	84,700	13.74	167,584	191,900	7.78	39,136	25,400	302,000	n	
1959/60	10.47	106,880	93,200	13.75	167,584	192,000	10.16	39,136	33,100	318,300	n	
1960/61	6.11	106,880	54,400	9.91	167,584	138,400	5.75	39,136	18,800	211,600	18,750	8.9%
1961/62	23.20	106,880	206,600	31.68	167,584	442,400	20.17	39,136	65,800	714,800	133,660	18.7%
1962/63	11.88	106,880	105,800	17.60	167,584	245,800	11.68	39,136	38,100	389,700	24,740	6.3%
1963/64	10.63	106,880	94,600	15.61	167,584	218,000	8.98	39,136	29,300	341,900	21,910	6.4%
1964/65	15.93	106,880	141,900	23.61	167,584	329,800	14.81	39,136	48,300	520,000	47,810	9.2%
1965/66	21.53	106,880	191,700	36.18	167,584	505,300	17.39	39,136	56,700	753,700	235,210	31.2%
1966/67	26.04	106,880	231,900	41.59	167,584	580,800	23.09	39,136	75,300	888,000	274,260	30.9%
1967/68	14.19	106,880	126,400	19.03	167,584	265,800	13.51	39,136	44,100	436,300	n	
1968/69	33.22	106,880	295,900	58.82	167,584	821,500	29.06	39,136	94,800	1,212,200	n	
1969/70	12.23	106,880	108,900	18.49	167,584	258,300	10.88	39,136	35,500	402,700	n	
1970/71	14.07	106,880	125,300	21.71	167,584	303,200	12.34	39,136	40,300	468,800	n	
1971/72	8.53	106,880	76,000	11.94	167,584	166,800	8.22	39,136	26,800	269,600	n	
1972/73	23.26	106,880	207,200	32.97	167,584	460,500	20.81	39,136	67,900	735,600	n	
1973/74	16.84	106,880	150,000	25.34	167,584	353,800	14.88	39,136	48,500	552,300	n	
1974/75	14.73	106,880	131,200	21.76	167,584	303,900	13.56	39,136	44,200	479,300	125,360	26.2%
1975/76	12.98	106,880	115,600	21.64	167,584	302,300	11.39	39,136	37,200	455,100	96,570	21.2%
1976/77	14.35	106,880	127,800	19.57	167,584	273,300	12.97	39,136	42,300	443,400	62,360	14.1%
1977/78	39.78	106,880	354,300	60.18	167,584	840,400	36.68	39,136	119,600	1,314,300	714,220	54.3%
1978/79	22.42	106,880	199,700	30.50	167,584	426,000	22.57	39,136	73,600	699,300	258,610	37.0%
1979/80	35.12	106,880	312,800	50.43	167,584	704,300	30.76	39,136	100,300	1,117,400	620,480	55.5%
1980/81	10.61	106,880	94,500	15.91	167,584	222,200	9.38	39,136	30,600	347,300	139,830	40.3%
1981/82	18.58	106,880	165,500	30.93	167,584	431,900	16.51	39,136	53,800	651,200	153,430	23.6%
1982/83	40.35	106,880	359,400	60.50	167,584	844,900	35.26	39,136	115,000	1,319,300	580,390	44.0%
1983/84	9.94	106,880	88,500	17.03	167,584	237,900	9.89	39,136	32,200	358,600	125,300	34.9%
1984/85	14.38	106,880	128,100	21.57	167,584	301,300	14.48	39,136	47,200	476,600	121,420	25.5%
1985/86	23.37	106,880	208,100	33.26	167,584	464,600	21.61	39,136	70,500	743,200	205,610	27.7%
1986/87	8.72	106,880	77,700	11.62	167,584	162,300	8.38	39,136	27,300	267,300	132,170	49.4%
1987/88	16.27	106,880	144,900	28.72	167,584	401,100	14.17	39,136	46,200	592,200	135,020	22.8%
1988/89	11.71	106,880	104,300	21.00	167,584	293,300	10.69	39,136	34,900	432,500	158,490	36.6%
1989/90	11.25	106,880	100,200	15.72	167,584	219,500	10.63	39,136	34,700	354,400	153,030	43.2%
1990/91	16.33	106,880	145,400	24.23	167,584	338,400	15.54	39,136	50,700	534,500	195,490	36.6%
1991/92	22.47	106,880	200,100	37.58	167,584	524,800	21.16	39,136	69,000	793,900	310,420	39.1%
1992/93	36.92	106,880	328,800	58.40	167,584	815,500	36.20	39,136	118,100	1,262,400	752,490	59.6%
1993/94	11.66	106,880	103,900	17.12	167,584	239,100	11.23	39,136	36,600	379,600	76,080	20.0%
1994/95	31.19	106,880	277,800	48.67	167,584	679,600	28.77	39,136	93,800	1,051,200	340,500	32.4%
1995/96	17.02	106,880	151,600	26.59	167,584	371,300	14.86	39,136	48,500	571,400	199,600	34.9%
1996/97	17.72	106,880	157,800	27.13	167,584	378,900	18.34	39,136	59,800	596,500	164,510	27.6%
1997/98	36.81	106,880	327,900	50.84	167,584	710,000	36.24	39,136	118,200	1,156,100	444,060	38.4%
1998/99	8.77	106,880	78,100	14.37	167,584	200,700	7.76	39,136	25,300	304,100	66,940	22.0%
1999/00	15.06	106,880	134,100	21.49	167,584	300,100	12.99	39,136	42,400	476,600	n	
2000/01	16.12	106,880	143,500	23.15	167,584	323,300	15.35	39,136	50,100	516,900	157,540	30.5%
2001/02	6.85	106,880	61,000	10.31	167,584	143,900	5.66	39,136	18,400	223,300	137,430	61.5%
2002/03	19.49	106,880	173,600	29.22	167,584	408,000	19.32	39,136	63,000	644,600	196,230	30.4%
2003/04	12.86	106,880	114,500	16.64	167,584	232,400	12.43	39,136	40,500	387,400	150,380	38.8%
2004/05	45.42	106,880	404,500	67.41	167,584	941,400	38.91	39,136	126,900	1,472,800	852,940	57.9%
2005/06	16.61	106,880	147,900	26.07	167,584	364,100	14.20	39,136	46,300	558,300	290,230	52.0%
2006/07	5.72	106,880	51,000	9.77	167,584	136,500	5.06	39,136	16,500	204,000	109,290	53.6%
2007/08	17.20	106,880	153,200	27.10	167,584	378,500	13.95	39,136	45,500	577,200	171,320	29.7%
2008/09	12.90	106,880	114,900	17.68	167,584	246,900	13.64	39,136	44,500	406,300	92,750	22.8%
2009/10	20.13	106,880	179,300	29.16	167,584	407,300	17.97	39,136	58,600	645,200	260,560	40.4%
2010/11	25.40	106,880	226,200	38.16	167,584	532,900	23.12	39,136	75,400	834,500	223,450	26.8%
max	45.42		404,500	67.41		941,400	38.91		126,900	1,472,800	852,900	61.5%
min	5.72		51,000	9.77		136,500	5.06		16,500	149,100	18,800	6.3%
mean	18.57		165,400	27.28		381,000	16.88		55,000	592,700	226,300	33.1%
2006-2011	16.27		144,900	24.37		340,400	14.75		48,100	533,400	171,500	34.6%
2001-2011	18.26		162,600	27.15		379,200	16.43		53,600	595,400	248,500	41.4%

Data Source App.C (10) App.C (22) App.C (28) App D (12)

† The runoff coefficient indicates the long-term effects of development in impervious surfaces, limiting infiltration and increasing runoff.

TABLE III.3
SUMMARY OF AQUIFER PERFORMANCE TESTS CONDUCTED BY CALIFORNIA DEPARTMENT OF WATER RESOURCES

PRODUCER NAME	AQUIFER PERFORMANCE TEST SETTING				ESTIMATED AQUIFER CHARACTERISTICS				
					TRANSMISSIVITY		HYDRAULIC CONDUCTIVITY		STORAGE COEFFICIENT
	PUMPING WELL	MONITORING WELL	TEST TYPE	TESTING DATE	(GPD/FT)	(FT^2/D)	(GPD/FT^2)	(FT/D)	
AZUSA AGRICULTURAL WATER COMPANY	01N/10W-22P01 (NO. 1)	01N/10W-22P02 (NO. 2)	DRAWDOWN	12/22/1960	124,000	16,578	NA	NA	0.00006
AZUSA VALLEY WATER COMPANY	01N/10W-27K02 (NO. 4)	01N/10W-27K01 (NO. 5)	DRAWDOWN	12/19/1960	595,000	79,545	4,900	655	0.018
ARCADIA, CITY OF	01N/11W-34N03 (C. REAL 1)	01N/11W-34N05 (C. REAL 2)	DRAWDOWN	12/7/1960	377,000	50,401	696	93	0.0036
UNKNOW	01S/09W-08D01	NONE	RECOVERY	12/16/1961	49,000	6,551	NA	NA	NA
AZUSA, CITY OF	01S/10W-03A01 (NO. 4)	01S/10W-03H01 (NO. 6)	DRAWDOWN	12/16/1960	875,000	116,979	2,182	292	0.00028
GLENDORA, CITY OF	01S/10W-10C01 (4-E)	01S/10W-10C02 (3-G)	DRAWDOWN	12/21/1960	263,000	35,160	954	128	0.011
COVINA, CITY OF	01S/10W-12R01 (GRAND)	NONE	RECOVERY	11/6/1961	203,000	27,139	NA	NA	NA
COVINA, CITY OF	01S/10W-14B01 (NO. 1)	NONE	RECOVERY	11/7/1960	42,000	5,615	NA	NA	NA
SUBURBAN WATER SYSTEMS	01S/10W-28K03 (102W-1)	01S/10W-28K04 (102W-2)	DRAWDOWN	11/16/1960	83,000	11,096	512	68	0.00022
SUBURBAN WATER SYSTEMS	01S/10W-30G01 (140W-1)	01S/10W-30G03 (140W-2)	DRAWDOWN	11/30/1960	559,000	74,733	NA	NA	0.0025
ARCADIA, CITY OF	01S/11W-02F01 (LON 1)	01S/11W-02F02 (LON 2)	DRAWDOWN	12/8/1960	750,000	100,267	1,769	236	0.00029
SAN GABRIEL VALLEY WATER COMPANY	01S/11W-10N06 (2C)	NONE	RECOVERY	11/14/1961	260,000	34,759	NA	NA	NA
SAN GABRIEL VALLEY WATER COMPANY	01S/11W-26K01 (B5A)	01S/11W-26G01 (B5B)	DRAWDOWN	11/14/1961	477,000	63,770	NA	NA	0.0006
SAN GABRIEL VALLEY WATER COMPANY	01S/11W-30B01 (8A)	NONE	RECOVERY	11/15/1960	110,000	14,706	NA	NA	NA
SAN GABRIEL COUNTY WATER DISTRICT	01S/12W-11D01 (NO. 8)	NONE	RECOVERY	11/17/1961	134,000	17,914	NA	NA	NA
SAN GABRIEL COUNTY WATER DISTRICT	01S/12W-13B01 (NO. 5 BRA)	01S/12W-13B02 (NO. 6 BRA)	DRAWDOWN	11/16/1961	33,000	4,412	NA	NA	NA

Notes

Data from Table 9-2, Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geohydrology. Bulletin No. 104-2. CDWR. March 1966.
GPD/FT: Gallons per day per foot
FT^2/D: Square feet per day
GPD/FT^2: Gallons per day per square foot
FT/D: Feet per day
NA: Not available

TABLE III.4
SUMMARY OF AQUIFER PERFORMANCE TESTS CONDUCTED BY MAIN SAN GABRIEL BASIN WATERMASTER

PRODUCER NAME	AQUIFER PERFORMANCE TEST SETTING			ESTIMATED AQUIFER CHARACTERISTICS					
				TRANSMISSIVITY		HYDRAULIC CONDUCTIVITY		STORAGE COEFFICIENT	AQUIFER TYPE
	PUMPING WELL	MONITORING WELL(S)	TESTING DATE(S)	(GPD/FT)	(FT^2/D)	(GPD/FT^2)	(FT/D)		
SOUTHERN CALIFORNIA WATER COMPANY	SAX 1	SAX 3	12/13/1991	119,000	15,909	330	44	0.0008	Semi-Confined
MONROVIA, CITY OF	No. 2	No. 1 and 3	04/15-16/1992	625,000	83,556	2,080	278	0.0026	Semi-Confined
CALIFORNIA AMERICAN WATER COMPANY	ROSEMEAD	GRAND	07/16-17/1992	539,000	72,059	2,840	380	0.0013	Semi-Confined
COVINA IRRIGATING COMPANY	3 BAL	1 BAL	07/27-28/1992	1,100,000	147,059	3,100	414	0.0026	Semi-Confined
ALHAMBRA, CITY OF	No. 8	No. 7 and 12	08/13-14/1992	429,000	57,353	2,600	348	0.0035	Semi-Confined
SAN GABRIEL VALLEY WATER COMPANY	B6B	B6C	09/24/1992	529,000	70,722	1,970	263	0.000082	Semi-Confined
INDUSTRY, CITY OF	No. 2	No. 1	10/01/1992	412,000	55,080	1,650	221	0.0073	Semi-Confined
SUBURBAN WATER SYSTEMS	140W-4	140W-5 and W-3	06/03/1993	573,000	76,604	1,110	148	0.0037	Semi-Confined
SOUTHERN CALIFORNIA WATER COMPANY	2 GID	1 GID	09/13/1993	93,000	12,433	1,760	235	0.00103	Confined
SUBURBAN WATER SYSTEMS	155W-2	155W-1	09/28/1993	39,000	5,214	1,020	136	0.000574	Confined
SAN GABRIEL VALLEY WATER COMPANY	11B	11C	05/05/1994	93,000	12,433	540	72	0.00069	Semi-Confined
MONTEREY PARK, CITY OF	No. 12	No. 9	07/20/1995	282,000	37,701	600	80	0.0015	Semi-Confined
SUBURBAN WATER SYSTEMS	139W-2	139W-1	11/02/1995	752,000	100,535	3,200	428	0.0013	Semi-Confined
SUNNY SLOPE WATER COMPANY	No. 8	No. 9	11/15/1995	236,000	31,551	670	90	0.00087	Semi-Confined
CALIFORNIA DOMESTIC WATER COMPANY	No. 8	No. 2	12/27/1995	271,000	36,230	1,100	147	0.0002	Semi-Confined
SAN GABRIEL VALLEY WATER COMPANY	B5A	B5B	05/03/1996	226,000	30,214	1,510	202	0.00019	Semi-Confined
SAN GABRIEL VALLEY WATER COMPANY	B4B	B4C	7/24/1996	583,600	78,021	2,690	360	0.000025	Confined
SUBURBAN WATER SYSTEMS	201W6	201W-1 and W-2	12/19/1996	505,000	67,513	2,940	393	0.00051	Confined
AZUSA LIGHT AND WATER	GEN 3	GEN 1	3/20/1997	539,600	72,139	2,202	294	0.00058	Semi-Confined
SUBURBAN WATER SYSTEMS	148W-1	133W-1	4/4/1997	94,460	12,628	3,150	421	0.00039	Confined
EL MONTE, CITY OF	No. 12	No. 13	4/9/1997	358,900	47,981	1,100	147	0.00089	Semi-Confined
SOUTHERN CALIFORNIA WATER COMPANY	ENC 3	ENC 1 and ENC 2	11/20/1997	272,000	36,364	1,127	151	0.00021	Confined
SAN GABRIEL VALLEY WATER COMPANY	8E	8D	04/17/1998	1,167,300	156,056	2,245	300	0.0042	Confined
WHITTIER, CITY OF *	No. 17	No. 18	04/28-29/1998	803,007	107,354	1,123	150	0.00164	Semi-Confined
SAN GABRIEL VALLEY WATER COMPANY	8B	8A	05/07/1998	140,100	18,730	2,800	374	0.000073	Semi-Confined
VALENCIA HEIGHT WATER COMPANY	No. 2	No. 1	9/29/1998	60,900	8,142	858	115	0.0006	Semi-Confined
SUBURBAN WATER SYSTEMS	139W-5	139W-6	03/23/1999	545,000	72,861	3,400	455	0.0001	Semi-Confined
SOUTHERN CALIFORNIA WATER COMPANY	ART 2	BAS 3	1/29/2004	13,400	1,791	91	12	0.00056	Semi-Confined
SAN GABRIEL VALLEY WATER COMPANY	2D	2E	7/30/2004	380,000	50,802	930	124	0.00043	Semi-Confined
SOUTH PASADENA, CITY OF	WIL 3	WIL 2	1/19/2005	347,000	46,390	960	128	0.012	Unconfined
VALLEY COUNTY WATER DISTRICT	LANTE	ARROW	3/28-31/2005	649,400	86,818	1,746	233	0.36	Unconfined
ALHAMBRA, CITY OF	No. 13	No. 14	3/8/2006	82,200	10,989	375	50	0.00015	Semi-Confined
INDUSTRY, CITY OF	No. 5	No. 4	6/26-7/2/2007	506,000	67,647	1,270	170	0.00047	Confined
VALENCIA HEIGHT WATER COMPANY	No. 5	No. 7	5/22/2008	28,650	3,830	251	34	0.00025	Confined
EAST PASADENA WATER COMPANY	No. 9	No. 11	12/3/2011	136,590	18,261	1,200	160	0.00031	Semi-Confined

Notes

average S 0.021271

GPD/FT: Gallons per day per foot
FT^2/D: Square feet per day
GPD/FT^2: Gallons per day per square foot
FT/D: Feet per day
* Analyzed from pump test data provided by EPA

TABLE III.5

CALIBRATED COEFFICIENTS FOR RECHARGE FROM PRECIPITATION, CATEGORIZED BY PRECIPITATION QUANTITY CLASSES

PRECIPITATION QUANTITY CLASSES	Precipitation	VALLEY FLOOR RECHARGE COEFFICIENTS			Precipitation	MOUNTAIN WATERSHEDS RECHARGE COEFFICIENTS			Precipitation	LOW HILLS WATERSHEDS RECHARGE COEFFICIENTS		
	- in -	PRIOR TO 1981-82	1981-82 TO 1996-97	SINCE 1997-98	- in -	PRIOR TO 1981-82	1981-82 TO 1996-97	SINCE 1997-98	- in -	PRIOR TO 1981-82	1981-82 TO 1996-97	SINCE 1997-98
<Average/2 or <Average/3		0	0	0		0	0	0		0	0	0
Average/3 to Average	6.44		0.08		9.71		0.1		5.93		0.08	
Average/2 to average	9.66	0.2		0.05	14.56	0.2		0.08	8.90	0.2		0.06
Average to (Average+Maximum)/2	19.32	0.23	0.08	0.06	29.13	0.23	0.12	0.1	17.80	0.22	0.1	0.08
>(Average+Maximum)/2	32.37	0.26	0.11	0.07	48.27	0.26	0.14	0.13	28.36	0.26	0.11	0.1

TABLE III.6

SAN GABRIEL GROUNDWATER BASIN MODEL

WATER YEAR (1)	GROUNDWATER RECHARGE – PERCOLATION OF PRECIPITATION – FROM VALLEY FLOOR: PRECIP. INCHES (2)	AREA ACRES (3)	COEFF. (4)	VOLUME ACRE-FEET (5) = (2)*(3)*(4)/12	FROM WATERSHED – SAN GABRIEL MOUNTAINS: PRECIP. INCHES (6)	AREA ACRES (7)	COEFF. (8)	VOLUME ACRE-FEET (9) = (6)*(7)*(8) /12	SOUTHERN LOW HILLS: PRECIP. INCHES (10)	AREA ACRES (11)	COEFFI. (12)	VOLUME ACRE-FEET (13) = (10)*(11)* (12) /12	TOTAL FROM WATERSHED ACRE-FEET (14) = (9)+(13)	TOTAL PERCOLATION OF PRECIPITATION ACRE-FEET (15) = (5)+(14)	SUBSURFACE FLOW FROM PUENTE BASIN ACRE-FEET (16)	INCIDENTAL PERCOLATION IN SAN GABRIEL RIVER AND SAN JOSE CREEK ACRE-FEET (17)	PERCOLATION OF RETURN FLOW FROM WATER USAGE – MUNICIPAL WATER – Net Water USE: SAN GABRIEL PRODUCT. ACRE-FEET (18)	IMPORT WATER ACRE-FEET (19)	EXPORT WATER ACRE-FEET (20)	ACRE-FEET (21) = (18)+(19)-(20)	COEFF. (22)	RETURN FLOW ACRE-FEET (23) = (21)*(22)	RECYCLED WATER: DIRECT USE ACRE-FEET (24)	COEFF. (25)	RETURN FLOW ACRE-FEET (26) = (24)*(25)	TOTAL PERCOLATION OF RETURN FLOW ACRE-FEET (27) = (23)+(26)	DIRECT SPREADING: LOCAL RUNOFF ACRE-FEET (28)	IMPORT WATER ACRE-FEET (29)	TOTAL RECHARGE FROM SPREADING ACRE-FEET (31) = (28)+(29)+(30)	TOTAL RECHARGE TO MAIN BASIN ACRE-FEET (32) = (15)+(16)+(17)+(27)+(31)	GROUNDWATER BALANCE – Removal/Outflow: GROUND WATER EXTRACTION ACRE-FEET (33)	SUBSURFACE FLOW TO CENTRAL BASIN ACRE-FEET (34)	ANNUAL CHANGE ACRE-FEET (35) = (32)-(33)-(34)	GROUNDWATER IN STORAGE ACRE-FEET (36) = (36)i + (35)i+1	CALIBRATION – WATER LEVEL ELEVATION – BALDWIN PARK KEY WELL: SIMULATED FEET MSL (37) = (37)i + ((35)i+1)/8000	MEASURED FEET MSL (38)	BASIN SAFE YIELD: NATURAL ACRE-FEET (39) = (15)+(16) - (34)	MANAGED ACRE-FEET (40) = (32)-(34)
1973-74	16.84	106,880	0.20	30,000	25.34	167,584	0.20	70,760	14.88	39,136	0.20	9,700	80,460	110,460	796		235,440	5,280	35,800	204,920	0.09	18,440	0	0.09	0	18,440	56,830	8,840	65,670	195,370	221,090	23,400	-49,120	7,932,100	236.9	236.9	87,860	171,970
1974-75	14.73	106,880	0.20	26,240	21.76	167,584	0.20	60,780	13.56	39,136	0.20	8,840	69,620	95,860	710		223,130	6,960	33,280	196,810	0.09	17,710	0	0.09	0	17,710	11,000	34,800	45,800	160,080	207,650	26,600	-74,170	7,857,930	227.7	230.4	69,970	133,480
1975-76	12.98	106,880	0.20	23,120	21.64	167,584	0.20	60,450	11.39	39,136	0.20	7,430	67,880	91,000	732		240,010	7,800	35,090	212,720	0.09	19,140	0	0.09	0	19,140	6,570	29,060	35,630	146,500	226,020	28,050	-107,570	7,750,360	214.2	222.2	63,680	118,450
1976-77	14.35	106,880	0.20	25,560	19.57	167,584	0.20	54,650	12.97	39,136	0.20	8,460	63,110	88,670	658	2,660	210,230	12,550	33,390	189,390	0.09	17,050	0	0.09	0	17,050	10,020	18,340	28,360	137,400	196,030	37,600	-96,230	7,654,130	202.2	212.1	51,730	99,800
1977-78	39.78	106,880	0.26	92,110	60.18	167,584	0.26	218,510	36.68	39,136	0.26	31,100	249,610	341,720	730	0	195,410	16,400	33,710	178,100	0.09	16,030	0	0.09	0	16,030	129,630	20,550	150,180	508,660	181,240	27,050	300,370	7,954,500	239.7	237.1	315,400	481,610
1978-79	22.42	106,880	0.23	45,940	30.50	167,584	0.23	97,970	22.57	39,136	0.22	16,190	114,160	160,100	850	0	214,970	16,390	31,680	199,680	0.09	17,970	0	0.09	0	17,970	68,060	30,970	99,030	277,950	198,530	23,850	55,570	8,010,070	246.7	260.0	137,100	254,100
1979-80	35.12	106,880	0.26	81,340	50.43	167,584	0.26	183,110	30.76	39,136	0.26	26,080	209,190	290,530	930	0	222,920	18,060	30,740	210,240	0.09	18,920	0	0.09	0	18,920	97,430	5,800	103,230	413,610	207,490	23,750	182,370	8,192,440	269.5	264.8	267,710	389,860
1980-81	10.61	106,880	0.20	18,900	15.91	167,584	0.20	44,440	9.38	39,136	0.20	6,120	50,560	69,460	820	0	230,840	21,900	31,390	221,350	0.09	19,920	0	0.09	0	19,920	49,690	0	49,690	139,890	213,550	31,950	-105,610	8,086,830	256.3	257.3	38,330	107,940
1981-82	18.58	106,880	0.08	13,240	30.93	167,584	0.12	51,830	16.51	39,136	0.08	4,310	56,140	69,380	845	0	219,540	19,710	25,970	213,280	0.09	19,200	0	0.09	0	19,200	86,280	42,620	128,900	218,330	203,540	28,850	-14,060	8,072,770	254.5	244.5	41,380	189,480
1982-83	40.35	106,880	0.11	39,540	60.50	167,584	0.14	118,280	35.26	39,136	0.11	12,650	130,930	170,470	850	0	209,950	19,410	25,510	203,850	0.09	18,350	0	0.09	0	18,350	263,900	28,340	292,240	481,910	192,390	29,250	260,270	8,333,040	287.0	269.2	142,070	452,660
1983-84	9.94	106,880	0.08	7,080	17.03	167,584	0.10	23,790	9.89	39,136	0.08	2,580	26,370	33,450	798	19,750	236,750	24,000	32,260	228,490	0.09	20,560	0	0.09	0	20,560	65,710	3,330	69,040	143,600	218,030	26,750	-101,180	8,231,860	274.4	273.8	7,500	116,850
1984-85	14.38	106,880	0.08	10,250	21.57	167,584	0.10	30,130	14.48	39,136	0.08	3,780	33,910	44,160	820	19,680	242,290	27,690	33,830	236,150	0.09	21,250	0	0.09	0	21,250	59,330	70	59,400	145,310	224,500	30,300	-109,490	8,122,370	260.7	249.3	14,680	115,010
1985-86	23.37	106,880	0.08	16,650	33.26	167,584	0.12	55,750	21.61	39,136	0.10	7,050	62,800	79,450	840	21,250	246,200	25,810	32,180	239,830	0.09	21,580	0	0.09	0	21,580	73,310	55,860	129,170	252,290	229,080	30,950	-7,740	8,114,630	259.7	246.7	49,340	221,340
1986-87	8.72	106,880	0.08	6,220	11.62	167,584	0.10	16,230	8.38	39,136	0.08	2,190	18,420	24,640	850	24,270	253,660	27,870	33,580	247,950	0.09	22,320	0	0.09	0	22,320	19,520	55,940	75,460	147,540	235,370	33,100	-120,930	7,993,700	244.6	237.6	-7,610	114,440
1987-88	16.27	106,880	0.08	11,590	28.72	167,584	0.10	40,110	14.17	39,136	0.08	3,700	43,810	55,400	880	19,840	248,100	31,820	30,610	249,310	0.09	22,440	0	0.09	0	22,440	43,470	43,990	87,460	186,020	233,170	34,150	-81,300	7,912,400	234.5	226.5	22,130	151,870
1988-89	11.71	106,880	0.08	8,340	21.00	167,584	0.10	29,330	10.69	39,136	0.08	2,790	32,120	40,460	890	0	252,940	31,020	29,650	254,310	0.09	22,890	0	0.09	0	22,890	29,980	45,920	75,900	140,140	233,250	32,500	-125,610	7,786,790	218.8	219.1	8,850	107,640
1989-90	11.25	106,880	0.08	8,020	15.72	167,584	0.10	21,950	10.63	39,136	0.08	2,770	24,720	32,740	910	6,200	252,260	35,030	28,840	258,450	0.09	23,260	0	0.09	0	23,260	54,790	47,500	102,290	165,400	238,900	32,600	-106,100	7,680,690	205.5	206.8	1,050	132,800
1990-91	16.33	106,880	0.08	11,640	24.23	167,584	0.10	33,840	15.54	39,136	0.08	4,060	37,900	49,540	905	500	232,070	31,590	29,170	234,490	0.09	21,100	0	0.09	0	21,100	101,270	54,150	155,420	227,470	221,270	22,750	-16,550	7,664,140	203.4	200.1	27,700	204,720
1991-92	22.47	106,880	0.08	16,010	37.58	167,584	0.12	62,970	21.16	39,136	0.10	6,900	69,870	85,880	925	8,200	221,480	19,900	28,660	212,720	0.09	19,140	0	0.09	0	19,140	229,600	68,300	297,900	412,050	201,750	17,800	192,500	7,856,640	227.5	223.6	69,010	394,250
1992-93	36.92	106,880	0.11	36,170	58.40	167,584	0.14	114,180	36.20	39,136	0.11	12,990	127,170	163,340	890	0	236,140	20,640	32,070	224,710	0.09	20,220	0	0.09	0	20,220	232,240	62,630	294,870	479,320	214,540	23,950	240,830	8,097,470	257.6	252.8	140,280	455,370
1993-94	11.66	106,880	0.08	8,310	17.12	167,584	0.10	23,910	11.23	39,136	0.08	2,930	26,840	35,150	845	15,230	243,610	20,510	36,140	227,980	0.09	20,520	0	0.09	0	20,520	33,540	38,300	71,840	143,590	220,790	26,700	-103,900	7,993,570	244.6	250.9	9,300	116,890
1994-95	31.19	106,880	0.08	22,220	48.67	167,584	0.14	95,150	28.77	39,136	0.11	10,320	105,470	127,690	860	0	243,480	20,870	36,620	227,730	0.09	20,500	0	0.09	0	20,500	221,840	22,350	244,190	393,240	226,250	23,500	143,490	8,137,060	262.5	253.9	105,050	369,740
1995-96	17.02	106,880	0.08	12,130	26.59	167,584	0.10	37,130	14.86	39,136	0.08	3,880	41,010	53,140	810	13,790	268,950	18,480	39,570	247,860	0.09	22,310	0	0.09	0	22,310	125,600	32,480	158,080	248,130	250,010	27,850	-29,730	8,107,330	258.8	251.4	26,100	220,280
1996-97	17.72	106,880	0.08	12,630	27.13	167,584	0.10	37,890	18.34	39,136	0.10	5,980	43,870	56,500	820	1,440	279,480	18,700	40,440	257,740	0.09	23,200	0	0.09	0	23,200	86,780	55,080	141,860	223,820	256,790	30,400	-63,370	8,043,960	250.9	245.2	26,920	193,420
1997-98	36.81	106,880	0.07	22,950	50.84	167,584	0.13	92,310	36.24	39,136	0.10	11,820	104,130	127,080	840	0	254,040	15,650	38,970	230,720	0.09	20,760	0	0.09	0	20,760	184,830	62,890	247,720	396,400	235,990	26,650	133,760	8,177,720	267.6	251.8	101,270	369,750
1998-99	8.77	106,880	0.00	0	14.37	167,584	0.00	0	7.76	39,136	0.00	0	0	0	750	31,040	265,150	14,940	39,170	240,920	0.09	21,680	0	0.09	0	21,680	65,510	13,350	78,860	132,330	242,940	26,200	-136,810	8,040,910	250.5	251.7	-25,450	106,130
1999-00	15.06	106,880	0.05	6,710	21.49	167,584	0.08	24,010	12.99	39,136	0.06	2,540	26,550	33,260	760	23,250	278,690	23,050	42,860	258,880	0.09	23,300	0	0.09	0	23,300	66,270	61,680	127,950	208,520	261,680	29,300	-82,460	7,958,450	240.2	231.3	4,720	179,220
2000-01	16.12	106,880	0.05	7,180	23.15	167,584	0.08	25,860	15.35	39,136	0.06	3,000	28,860	36,040	860	10,130	270,920	21,630	41,000	251,550	0.09	22,640	1,268	0.09	110	22,750	79,310	42,990	122,300	192,080	250,890	25,900	-84,710	7,873,740	229.6	224.7	11,000	166,180
2001-02	6.85	106,880	0.00	0	10.31	167,584	0.00	0	5.66	39,136	0.00	0	0	0	890	3,760	263,690	36,180	44,160	255,710	0.09	23,010	1,463	0.09	130	23,140	70,580	46,080	116,660	144,450	247,880	27,650	-131,080	7,742,660	213.2	214.4	-26,760	116,800
2002-03	19.49	106,880	0.06	10,410	29.22	167,584	0.10	40,800	19.32	39,136	0.08	5,040	45,840	56,250	940	11,410	237,490	41,500	41,590	237,400	0.09	21,370	1,329	0.09	120	21,490	63,870	56,440	120,310	210,400	241,680	23,400	-54,680	7,687,980	206.4	204.0	33,790	187,000
2003-04	12.86	106,880	0.05	5,730	16.64	167,584	0.08	18,590	12.43	39,136	0.06	2,430	21,020	26,750	960	28,740	252,850	51,310	42,470	261,690	0.09	23,550	1,557	0.09	140	23,690	45,710	68,320	114,030	194,170	258,380	20,500	-84,710	7,603,270	195.8	207.5	7,210	173,670
2004-05	45.42	106,880	0.07	28,320	67.41	167,584	0.13	122,380	38.91	39,136	0.10	12,690	135,070	163,390	960	0	247,270	31,270	41,580	236,960	0.09	21,330	1,300	0.09	120	21,450	406,070	21,720	427,790	613,590	234,980	24,100	354,510	7,957,780	240.1	225.4	140,250	589,490
2005-06	16.61	106,880	0.05	7,390	26.07	167,584	0.08	29,130	14.20	39,136	0.06	2,780	31,910	39,300	860	5,450	259,940	24,620	38,440	246,120	0.09	22,150	1,159	0.09	100	22,250	150,120	79,040	229,160	297,020	246,690	22,800	27,530	7,985,310	243.6	244.1	17,360	274,220
2006-07	5.72	106,880	0.00	0	9.77	167,584	0.00	0	5.06	39,136	0.00	0	0	0	950	6,380	284,330	27,040	43,920	267,450	0.09	24,070	2,285	0.09	210	24,280	47,830	24,780	72,610	104,220	270,380	26,100	-192,260	7,793,050	219.5	227.2	-25,150	78,120
2007-08	17.20	106,880	0.05	7,660	27.10	167,584	0.08	30,280	13.95	39,136	0.06	2,730	33,010	40,670	940	10,440	258,170	31,290	40,860	248,600	0.09	22,370	2,587	0.09	230	22,600	87,240	7,730	94,970	169,620	250,240	38,200	-118,820	7,674,230	204.7	206.8	3,410	131,420
2008-09	12.90	106,880	0.05	5,740	17.68	167,584	0.08	19,750	13.64	39,136	0.06	2,670	22,420	28,160	960	23,480	250,550	22,830	43,750	229,630	0.09	20,670	2,316	0.09	210	20,880	91,160	6,610	97,770	171,250	236,720	27,300	-92,770	7,581,460	193.1	198.1	1,820	143,950
2009-10	20.13	106,880	0.06	10,760	29.16	167,584	0.10	40,730	17.97	39,136	0.08	4,690	45,420	56,180	945	0	237,120	17,010	40,040	214,090	0.09	19,270	2,354	0.09	210	19,480	192,440	32,710	225,150	301,760	222,450	28,400	50,910	7,632,370	199.5	196.6	28,730	273,360
2010-11	25.40	106,880	0.06	13,570	38.16	167,584	0.10	53,290	23.12	39,136	0.08	6,030	59,320	72,890	985	15,590	226,940	11,070	39,140	198,870	0.09	17,900	2,314	0.09	210	18,110	259,210	68,420	327,630	435,210	213,400	23,200	198,610	7,830,980	224.3	224.3	50,680	412,010
STATISTICAL ANALYSIS																																						
Maximum	45.42			92,110	67.41			218,510	38.91			31,100	249,610	341,720	985	31,040				267,450		24,070			230	24,280			427,790	613,590	270,380	38,200	354,510	8,333,040			315,400	589,490
Minimum	5.72			0	9.77			0	5.06			0	0	0	658	0				178,100		16,030			0	16,030			28,360	104,220	181,240	17,800	-192,260	7,581,460			-26,760	78,120
1973-74 to 2010-11 Ave.	19.32			18,680	29.13			54,740	17.80			6,820	61,570	80,240	857	9,210				230,440		20,740			47	20,790			141,170	251,540	228,040	27,460	-3,950	7,924,390			53,640	224,090
Last 5 years Ave.	16.27			7,550	24.37			28,810	14.75			3,220	32,030	39,580	956	11,180				231,730		20,860			214	21,070			163,630	236,410	238,640	28,640	-30,870	7,702,420			11,900	207,770
Last 10 years Ave.	18.26			8,960	27.15			35,500	16.43			3,910	39,400	48,360	939	10,530				239,650		21,570			168	21,740			182,610	264,170	242,280	26,170	-4,280	7,748,910			23,130	238,000
Data Source	Table III.2				Table III.2				Table III.2						App E	App J	App F	App G	App H				App L				App I (27)-	App G	App I		App F	App E						
column	(2)				(5)				(8)						(5)	(18)	(5)	(16)	(5)				(12)				App G (4)	(4)	(27)		(3)	(4)						

TABLE III.7

TOTAL DISSOLVED SOLIDS, NITRATE, CHLORIDE, AND SULFATE WELL TEST DATA HISTORIC TRENDS

		Nitrate, mg/L (from Appendix S.1)			
Decade	No. wells	<45	>45		mean
		------- % of wells tested -------			- mg/L -
1970s	40	23%	78%		64
1980s	109	48%	52%		48
1990s	178	63%	37%		40
2000s	219	79%	21%		31
2010s	248	90%	10%		20
total	796				

		Chloride, mg/L			
Decade	No. wells	<75	75-99	> 100	mean
		------- % of wells tested -------			- mg/L -
1970s	715	96.8%	1.5%	1.7%	26.2
1980s	1126	97.3%	1.5%	1.2%	26.2
1990s	1019	96.2%	2.3%	1.6%	25.6
2000s	902	93.2%	4.0%	2.8%	30.4
2010s	130	91.5%	3.8%	4.6%	30.3
total	3903				

		Sulfate, mg/L			
Decade	No. wells	<75	75-99	> 100	mean
		------- % of wells tested -------			- mg/L -
1970s	715	81.1%	7.1%	11.7%	51.3
1980s	1126	85.9%	6.7%	7.5%	46.5
1990s	1019	87.7%	6.2%	6.1%	46.1
2000s	902	86.4%	3.4%	10.2%	51.6
2010s	130	81.5%	7.7%	10.8%	52.7
	3903				

		TDS, mg/L (from Appendix S.2)			
Decade	No. wells	<450	451 to 600	>600	mean
		------- % of wells tested -------			- mg/L -
1970s	62	63%	34%	3%	361
1980s	105	53%	31%	15%	350
1990s	159	58%	24%	18%	337
2000s	280	62%	22%	16%	318
2010s	180	75%	18%	7%	290
total	786				

*(Percent of wells tested in the decade within the defined concentration limits.)

TABLE III.8
CALIBRATION COEFFICIENTS OR CONCENTRATION FOR NITRATE, CHLORIDE AND SULFATE BALANCE MODELS

Source	Unit	Concentration or Coefficient		
		Nitrate	Chloride	Sulfate
Mean Groundwater Quality, 1973-74 to 2010-2011	mg/L	24	28	49
Precipation and Watershed (Mountains, Southern Low Hills)	mg/L	19	28	49
Subsurface flow from Puente Basin	Factor	1	1	1
Incidental Recharge from water released to San Gabriel River	Factor	1	1	1
Loading from returned flow (Direct uses)				
San Gabriel Basin, Surface water, Raymond Basin imported	Factor	1.5†		1.5‡
	mg/L		28	
Recycled water				
Whttier Narrows, San Jose Creek WRPs	Factor	1†	1	1.5
Treated imported water, Weymouth	Factor		1	1.5
	mg/L	19		
Loading from Direct spreading				
Local Runoff (Azusa)	Factor			1‡
	mg/L	19	28	
Untreated imported water (State Water Project)	Factor		1	
	mg/L	19		49

† Minimum concentration = 19 mg/L, chosen to represent improving water quality in the Basin.

‡ Minimum concentration = 49 mg/L.

TABLE III.9
LOADING AND ASSIMILATIVE CAPACITY OF NITRATE IN SAN GABRIEL BASIN

Water Year	Nitrate loading: Precipitation /Watershed Runoff LBS	Nitrate loading: Puente Basin Subsurface Inflow LBS	Nitrate loading: Incidental Percolation in River LBS	Nitrate loading: Returned flow Total LBS	Nitrate loading: Direct Spreading LBS	Nitrate loading: Total LBS	Nitrate unloading: Groundwater extraction unloading LBS	Nitrate unloading: Subsurface outflow unloading LBS	Nitrate unloading: Total LBS	Nitrate balance LBS	Nitrate in Groundwater (mixing, 75% of volume) LBS	Allowable loading 45 mg/l * mixing volume LBS	Assimilative capacity 75% basin + inflow/outflow LBS	Assimilative capacity 75% basin + inflow/outflow mg/L
column(1)	(2)	(3)	(4)	(5)	(6)	(7)=(2)+(3)+(4)+(5)+(6)	(8)	(9)	(10)=(8)+(9)	(11)=(7)-(10)	(12)	(13)	(14)=(13)-(12)	(15)
1973-74	5,704,000	25,000	0	1,706,000	3,392,000	10,827,000	11,754,000	318,000	12,072,000	-1,245,000	316,277,000	727,631,000	411,354,000	25
1974-75	4,950,000	22,000	0	2,014,000	2,366,000	9,352,000	13,884,000	354,000	14,238,000	-4,886,000	311,391,000	720,828,000	409,437,000	26
1975-76	4,699,000	23,000	0	3,005,000	1,840,000	9,567,000	21,329,000	510,000	21,839,000	-12,272,000	299,119,000	710,960,000	411,841,000	26
1976-77	4,579,000	21,000	459,000	2,341,000	1,464,000	8,864,000	16,288,000	684,000	16,972,000	-8,108,000	291,011,000	702,132,000	411,121,000	26
1977-78	17,647,000	23,000	0	1,632,000	7,755,000	27,057,000	10,823,000	74,000	10,897,000	16,160,000	307,171,000	729,686,000	422,515,000	26
1978-79	8,267,000	27,000	0	2,219,000	5,114,000	15,627,000	15,114,000	58,000	15,172,000	455,000	307,626,000	734,784,000	427,158,000	26
1979-80	15,004,000	29,000	0	2,212,000	5,331,000	22,576,000	15,007,000	241,000	15,248,000	7,328,000	314,954,000	751,513,000	436,559,000	26
1980-81	3,587,000	26,000	0	1,871,000	2,566,000	8,050,000	12,288,000	305,000	12,593,000	-4,543,000	310,411,000	741,825,000	431,414,000	26
1981-82	3,583,000	27,000	0	2,397,000	6,657,000	12,664,000	16,431,000	247,000	16,678,000	-4,014,000	306,397,000	740,535,000	434,138,000	26
1982-83	8,803,000	27,000	0	2,031,000	15,092,000	25,953,000	13,538,000	133,000	13,671,000	12,282,000	318,679,000	764,411,000	445,732,000	26
1983-84	1,728,000	25,000	4,928,000	1,906,000	3,565,000	12,152,000	12,397,000	360,000	12,757,000	-605,000	318,074,000	755,129,000	437,055,000	26
1984-85	2,280,000	40,000	4,405,000	2,474,000	3,068,000	12,267,000	16,493,000	293,000	16,786,000	-4,519,000	313,555,000	745,085,000	431,530,000	26
1985-86	4,103,000	36,000	4,366,000	2,746,000	6,671,000	17,922,000	18,648,000	148,000	18,796,000	-874,000	312,681,000	744,375,000	431,694,000	26
1986-87	1,272,000	29,000	4,898,000	2,350,000	3,897,000	12,446,000	15,584,000	477,000	16,061,000	-3,615,000	309,066,000	733,282,000	424,216,000	26
1987-88	2,861,000	27,000	3,783,000	2,681,000	4,517,000	13,869,000	18,151,000	627,000	18,778,000	-4,909,000	304,157,000	725,824,000	421,667,000	26
1988-89	2,090,000	31,000	0	2,803,000	3,919,000	8,843,000	18,842,000	398,000	19,240,000	-10,397,000	293,760,000	714,302,000	420,542,000	26
1989-90	1,691,000	30,000	1,418,000	2,329,000	5,282,000	10,750,000	15,487,000	678,000	16,165,000	-5,415,000	288,345,000	704,569,000	416,224,000	27
1990-91	2,558,000	23,000	115,000	2,182,000	8,026,000	12,904,000	14,620,000	501,000	15,121,000	-2,217,000	286,128,000	703,051,000	416,923,000	27
1991-92	4,435,000	72,000	1,715,000	1,932,000	15,383,000	23,537,000	12,864,000	544,000	13,408,000	10,129,000	296,257,000	720,709,000	424,452,000	27
1992-93	8,435,000	26,000	0	2,007,000	15,227,000	25,695,000	13,342,000	498,000	13,840,000	11,855,000	308,112,000	742,801,000	434,689,000	26
1993-94	1,815,000	24,000	2,552,000	2,322,000	3,711,000	10,424,000	15,645,000	559,000	16,204,000	-5,780,000	302,332,000	733,270,000	430,938,000	26
1994-95	6,594,000	27,000	0	1,957,000	12,610,000	21,188,000	13,105,000	463,000	13,568,000	7,620,000	309,952,000	746,433,000	436,481,000	26
1995-96	2,744,000	17,000	2,665,000	2,220,000	8,163,000	15,809,000	15,058,000	507,000	15,565,000	244,000	310,196,000	743,706,000	433,510,000	26
1996-97	2,918,000	19,000	232,000	2,397,000	7,326,000	12,892,000	16,241,000	2,380,000	18,621,000	-5,729,000	304,467,000	737,893,000	433,426,000	26
1997-98	6,562,000	22,000	0	2,289,000	12,793,000	21,666,000	15,715,000	359,000	16,074,000	5,592,000	310,059,000	750,163,000	440,104,000	26
1998-99	0	19,000	5,723,000	2,076,000	4,073,000	11,891,000	14,045,000	449,000	14,494,000	-2,603,000	307,456,000	737,613,000	430,157,000	26
1999-00	1,718,000	18,000	4,063,000	2,261,000	6,607,000	14,667,000	15,270,000	541,000	15,811,000	-1,144,000	306,312,000	730,049,000	423,737,000	26
2000-01	1,861,000	20,000	1,603,000	2,159,093	6,316,000	11,959,093	14,273,000	443,000	14,716,000	-2,756,907	303,555,093	722,278,000	418,722,907	26
2001-02	0	24,000	584,000	2,237,668	6,025,000	8,870,668	14,512,000	609,000	15,121,000	-6,250,332	297,304,761	710,254,000	412,949,239	26
2002-03	2,905,000	26,000	1,435,000	2,363,559	6,214,000	12,943,559	15,726,000	487,000	16,213,000	-3,269,441	294,035,320	705,238,000	411,202,680	26
2003-04	1,382,000	30,000	2,551,000	2,329,659	5,889,000	12,181,659	15,078,000	426,000	15,504,000	-3,322,341	290,712,979	697,467,000	406,754,021	26
2004-05	8,438,000	24,000	0	2,010,847	22,092,000	32,564,847	13,265,000	516,000	13,781,000	18,783,847	309,496,826	729,987,000	420,490,174	26
2005-06	2,030,000	22,000	369,000	2,031,565	11,834,000	16,286,565	13,611,000	446,000	14,057,000	2,229,565	311,726,391	732,512,000	420,785,609	26
2006-07	0	31,000	498,000	2,206,442	3,750,000	6,485,442	14,735,000	575,000	15,310,000	-8,824,558	302,901,833	714,876,000	411,974,167	26
2007-08	2,101,000	26,000	810,000	2,470,346	4,904,000	10,311,346	16,732,000	794,000	17,526,000	-7,214,654	295,687,178	703,976,000	408,288,822	26
2008-09	1,454,000	26,000	1,991,000	2,424,752	5,049,000	10,944,752	16,484,000	467,000	16,951,000	-6,006,248	289,680,931	695,466,000	405,785,069	26
2009-10	2,902,000	31,000	0	2,200,299	11,627,000	16,760,299	15,007,000	733,000	15,740,000	1,020,299	290,701,230	700,136,000	409,434,770	26
2010-11	3,764,000	38,000	1,528,000	1,920,451	16,919,000	24,169,451	13,137,000	681,000	13,818,000	10,351,451	301,052,681	718,355,000	417,302,319	26
Max	17,647,000	72,000	5,723,000	3,005,000	22,092,000	32,564,800	21,329,000	2,380,000	21,839,000	18,783,800	318,679,000	764,411,000	445,732,000	27
Min	0	17,000	0	1,632,000	1,464,000	6,485,400	10,823,000	58,000	10,897,000	-12,272,000	286,128,000	695,466,000	405,785,100	25
1973-74 to	4,143,800	27,200	1,386,600	2,229,300	7,290,400	15,077,300	15,013,800	496,900	15,510,700	-433,400	303,968,400	726,923,800	422,955,400	26
Last 5 yrs n	2,044,200	30,400	965,400	2,244,500	8,449,800	13,734,300	15,219,000	650,000	15,869,000	-2,134,700	296,004,800	706,561,800	410,557,000	26
Last 10 yrs	2,497,600	27,800	976,600	2,219,600	9,430,300	15,151,900	14,828,700	573,400	15,402,100	-250,200	298,330,000	710,826,700	412,496,700	26

*(condensed from Appendix M)

TABLE III.10
LOADING AND ASSIMILATIVE CAPACITY OF CHLORIDE IN SAN GABRIEL BASIN

	Chloride loading						Chloride unloading						Assimilative capacity	
Water Year	Precipitation /Watershed Runoff LBS	Puente Basin Subsurface Inflow LBS	Incidental Percolation in River LBS	Returned flow Total LBS	Direct Spreading LBS	Total LBS	Groundwater extraction unloading LBS	Subsurface outflow unloading LBS	Total LBS	Chloride balance LBS	Chloride in Groundwater (mixing, 75% of volume) LBS	Allowable loading 100 mg/l * mixing volume LBS	75% basin + inflow/outflow LBS	mg/L
column(1)	(2)	(3)	(4)	(5)	(6)	(7)=(2)+(3)+(4)+(5)+(6)	(8)	(9)	(10)=(8)+(9)	(11)=(7)-(10)	(12)	(13)	(14)=(13)-(12)	(15)
1973-74	8,393,000	114,000	0	1,657,000	5,737,000	15,901,000	12,651,000	1,399,000	14,050,000	1,851,000	340,406,000	1,616,959,000	1,276,553,000	79
1974-75	7,283,000	101,000	0	1,591,000	6,229,000	15,204,000	15,010,000	1,721,000	16,731,000	-1,527,000	338,879,000	1,601,839,000	1,262,960,000	79
1975-76	6,915,000	104,000	0	1,747,000	4,528,000	13,294,000	17,784,000	762,000	18,546,000	-5,252,000	333,627,000	1,579,911,000	1,246,284,000	79
1976-77	6,737,000	94,000	976,000	1,658,000	5,449,000	14,914,000	15,646,000	4,905,000	20,551,000	-5,637,000	327,990,000	1,560,294,000	1,232,304,000	79
1977-78	25,965,000	104,000	0	1,610,000	12,155,000	39,834,000	12,363,000	1,323,000	13,686,000	26,148,000	354,138,000	1,621,525,000	1,267,387,000	78
1978-79	12,164,000	121,000	0	1,749,000	8,379,000	22,413,000	13,628,000	1,232,000	14,860,000	7,553,000	361,691,000	1,632,853,000	1,271,162,000	78
1979-80	22,074,000	133,000	0	1,832,000	7,682,000	31,721,000	14,056,000	968,000	15,024,000	16,697,000	378,388,000	1,670,029,000	1,291,641,000	77
1980-81	5,278,000	117,000	0	1,965,000	3,782,000	11,142,000	13,455,000	1,476,000	14,931,000	-3,789,000	374,599,000	1,648,500,000	1,273,901,000	77
1981-82	5,274,000	121,000	0	1,882,000	11,200,000	18,477,000	15,896,000	1,255,000	17,151,000	1,326,000	375,925,000	1,645,634,000	1,269,709,000	77
1982-83	12,955,000	121,000	0	1,769,000	20,468,000	35,313,000	19,308,000	716,000	20,024,000	15,289,000	391,214,000	1,698,690,000	1,307,476,000	77
1983-84	2,543,000	114,000	7,837,000	2,040,000	5,245,000	17,779,000	12,675,000	1,236,000	13,911,000	3,868,000	395,082,000	1,678,065,000	1,282,983,000	76
1984-85	3,356,000	117,000	4,761,000	2,152,000	4,521,000	14,907,000	16,907,000	1,153,000	18,060,000	-3,153,000	391,929,000	1,655,745,000	1,263,816,000	76
1985-86	6,039,000	132,000	6,353,000	2,154,000	17,725,000	32,403,000	18,241,000	1,009,000	19,250,000	13,153,000	405,082,000	1,654,167,000	1,249,085,000	76
1986-87	1,873,000	127,000	7,916,000	2,242,000	9,088,000	21,246,000	16,099,000	1,529,000	17,628,000	3,618,000	408,700,000	1,629,516,000	1,220,816,000	75
1987-88	4,211,000	124,000	4,799,000	2,189,000	15,025,000	26,348,000	14,705,000	2,209,000	16,914,000	9,434,000	418,134,000	1,612,943,000	1,194,809,000	74
1988-89	3,075,000	116,000	0	2,255,000	18,881,000	24,327,000	17,060,000	1,325,000	18,385,000	5,942,000	424,076,000	1,587,337,000	1,163,261,000	73
1989-90	2,488,000	133,000	2,174,000	2,391,000	16,564,000	23,750,000	15,098,000	3,278,000	18,376,000	5,374,000	429,450,000	1,565,709,000	1,136,259,000	73
1990-91	3,765,000	130,000	207,000	2,282,000	27,576,000	33,960,000	14,466,000	2,721,000	17,187,000	16,773,000	446,223,000	1,562,335,000	1,116,112,000	71
1991-92	6,528,000	133,000	3,321,000	1,927,000	33,438,000	45,347,000	15,296,000	3,483,000	18,779,000	26,568,000	472,791,000	1,601,576,000	1,128,785,000	70
1992-93	12,414,000	179,000	0	2,055,000	27,377,000	42,025,000	15,212,000	3,710,000	18,922,000	23,103,000	495,894,000	1,650,669,000	1,154,775,000	70
1993-94	2,672,000	121,000	5,464,000	2,092,000	8,070,000	18,419,000	16,871,000	4,790,000	21,661,000	-3,242,000	492,652,000	1,629,489,000	1,136,837,000	70
1994-95	9,708,000	123,000	0	2,135,000	20,405,000	32,371,000	15,760,000	4,471,000	20,231,000	12,140,000	504,792,000	1,658,740,000	1,153,948,000	70
1995-96	4,039,000	99,000	4,123,000	2,230,000	13,443,000	23,934,000	19,460,000	4,163,000	23,623,000	311,000	505,103,000	1,652,679,000	1,147,576,000	69
1996-97	4,295,000	117,000	446,000	2,294,000	11,396,000	18,548,000	19,457,000	4,875,000	24,332,000	-5,784,000	499,319,000	1,639,761,000	1,140,442,000	70
1997-98	9,661,000	120,000	0	2,028,000	23,296,000	35,105,000	17,346,000	3,694,000	21,040,000	14,065,000	513,384,000	1,667,028,000	1,153,644,000	69
1998-99	0	97,000	8,943,000	2,112,000	6,183,000	17,335,000	13,716,000	3,418,000	17,134,000	201,000	513,585,000	1,639,140,000	1,125,555,000	69
1999-00	2,529,000	108,000	6,509,000	2,361,000	12,252,000	23,759,000	17,257,000	4,547,000	21,804,000	1,955,000	515,540,000	1,622,330,000	1,106,790,000	68
2000-01	2,739,000	123,000	3,029,000	2,315,120	15,734,000	23,940,120	17,978,000	5,350,000	23,328,000	612,120	516,152,120	1,605,062,000	1,088,909,880	68
2001-02	0	123,000	1,155,000	2,584,440	14,639,000	18,501,440	22,560,000	4,509,000	27,069,000	-8,567,560	507,584,560	1,578,341,000	1,070,756,440	68
2002-03	4,277,000	134,000	3,504,000	2,579,736	12,225,000	22,719,736	20,235,000	3,816,000	24,051,000	-1,331,264	506,253,296	1,567,195,000	1,060,941,704	68
2003-04	2,034,000	137,000	8,280,000	2,918,373	12,021,000	25,390,373	20,096,000	3,343,000	23,439,000	1,951,373	508,204,669	1,549,927,000	1,041,722,331	67
2004-05	12,422,000	128,000	0	2,364,107	34,210,000	49,124,107	22,456,000	5,777,000	28,233,000	20,891,107	529,095,776	1,622,193,000	1,093,097,224	67
2005-06	2,987,000	123,000	1,555,000	2,301,791	19,374,000	26,340,791	21,293,000	3,656,000	24,949,000	1,391,791	530,487,567	1,627,805,000	1,097,317,433	67
2006-07	0	136,000	1,803,000	2,451,948	8,355,000	12,745,948	24,577,000	4,044,000	28,621,000	-15,875,052	514,612,514	1,588,613,000	1,074,000,486	68
2007-08	3,092,000	115,000	3,178,000	2,518,342	8,068,000	16,971,342	21,575,000	8,618,000	30,193,000	-13,221,658	501,390,857	1,564,392,000	1,063,001,143	68
2008-09	2,140,000	137,000	7,403,000	2,308,856	8,232,000	20,220,856	17,365,000	4,823,000	22,188,000	-1,967,144	499,423,712	1,545,481,000	1,046,057,288	68
2009-10	4,271,000	136,000	0	2,052,095	19,871,000	26,330,095	21,936,000	6,793,000	28,729,000	-2,398,905	497,024,807	1,555,859,000	1,058,834,193	68
2010-11	5,541,000	141,000	5,000,000	1,828,091	25,678,000	38,188,091	20,741,000	5,927,000	26,668,000	11,520,091	508,544,899	1,596,345,000	1,087,800,101	68
Max	25,965,000	179,000	8,943,000	2,918,400	34,210,000	49,124,100	24,577,000	8,618,000	30,193,000	26,568,000	530,487,600	1,698,690,000	1,307,476,000	79
Min	0	94,000	0	1,591,000	3,782,000	11,142,000	12,363,000	716,000	13,686,000	-15,875,100	327,990,000	1,545,481,000	1,041,722,300	67
1973-74 to	6,098,300	122,400	2,598,300	2,121,600	14,065,800	25,006,500	17,269,300	3,263,800	20,533,100	4,473,400	448,088,600	1,615,386,200	1,167,297,600	72
Last 5 yrs n	3,008,800	133,000	3,476,800	2,231,900	14,040,800	22,891,300	21,238,800	6,041,000	27,279,800	-4,388,500	504,199,400	1,570,138,000	1,065,938,600	68
Last 10 yrs	3,676,400	131,000	3,187,800	2,390,800	16,267,300	25,653,300	21,283,400	5,130,600	26,414,000	-760,700	510,262,300	1,579,615,100	1,069,352,800	68

* (condensed from Appendix N)

TABLE III.11
LOADING AND ASSIMILATIVE CAPACITY OF SULFATE IN SAN GABRIEL BASIN

	Sulfate loading						Sulfate unloading						Assimilative capacity	
Water Year	Precipitation /Watershed Runoff LBS	Puente Basin Subsurface Inflow LBS	Incidental Percolation in River LBS	Returned flow Total LBS	Direct Spreading (3) LBS	Total LBS	Groundwater extraction unloading LBS	Subsurface outflow unloading LBS	Total LBS	Sulfate balance LBS	Sulfate in Groundwater (mixing, 75% of volume) LBS	Allowable loading 100 mg/l * mixing volume LBS	75% basin + inflow/outflow LBS	mg/L
column(1)	(2)	(3)	(4)	(5)	(6)	(7)=(2)+(3)+(4)+(5)+(6)	(8)	(9)	(10)=(8)+(9)	(11)=(7)-(10)	(12)	(13)	(14)=(13)-(12)	(15
1973-74	14,711,000	342,000	0	4,188,000	8,746,000	27,987,000	28,854,000	3,625,000	32,479,000	-4,492,000	776,406,000	1,616,959,000	840,553,000	52
1974-75	12,767,000	304,000	0	4,184,000	6,101,000	23,356,000	28,346,000	5,140,000	33,486,000	-10,130,000	766,276,000	1,601,839,000	835,563,000	52
1975-76	12,119,000	313,000	0	4,610,000	4,745,000	21,787,000	30,443,000	2,135,000	32,578,000	-10,791,000	755,485,000	1,579,911,000	824,426,000	52
1976-77	11,809,000	283,000	680,000	5,375,000	3,777,000	21,924,000	32,961,000	3,066,000	36,027,000	-14,103,000	741,382,000	1,560,294,000	818,912,000	52
1977-78	45,511,000	313,000	0	4,598,000	20,001,000	70,423,000	25,906,000	2,426,000	28,332,000	42,091,000	783,473,000	1,621,525,000	838,052,000	52
1978-79	21,322,000	364,000	0	4,974,000	13,189,000	39,849,000	28,364,000	2,139,000	30,503,000	9,346,000	792,819,000	1,632,853,000	840,034,000	51
1979-80	38,693,000	398,000	0	4,632,000	13,747,000	57,470,000	25,148,000	2,259,000	27,407,000	30,063,000	822,882,000	1,670,029,000	847,147,000	51
1980-81	9,251,000	351,000	0	4,834,000	6,618,000	21,054,000	24,401,000	3,300,000	27,701,000	-6,647,000	816,235,000	1,648,500,000	832,265,000	50
1981-82	9,240,000	364,000	0	5,697,000	17,167,000	32,468,000	30,900,000	3,058,000	33,958,000	-1,490,000	814,745,000	1,645,634,000	830,889,000	50
1982-83	22,704,000	364,000	0	4,484,000	38,919,000	66,471,000	23,211,000	1,749,000	24,960,000	41,511,000	856,256,000	1,698,690,000	842,434,000	50
1983-84	4,455,000	342,000	5,959,000	4,834,000	9,194,000	24,784,000	23,382,000	4,871,000	28,253,000	-3,469,000	852,787,000	1,678,065,000	825,278,000	49
1984-85	5,881,000	351,000	5,777,000	6,349,000	7,911,000	26,269,000	32,781,000	4,035,000	36,816,000	-10,547,000	842,240,000	1,655,745,000	813,505,000	49
1985-86	10,581,000	386,000	8,664,000	6,239,000	17,204,000	43,074,000	32,594,000	6,982,000	39,576,000	3,498,000	845,738,000	1,654,167,000	808,429,000	49
1986-87	3,281,000	358,000	7,256,000	5,763,000	10,050,000	26,708,000	27,981,000	4,228,000	32,209,000	-5,501,000	840,237,000	1,629,516,000	789,279,000	48
1987-88	7,379,000	366,000	6,902,000	6,326,000	11,648,000	32,621,000	30,336,000	5,950,000	36,286,000	-3,665,000	836,572,000	1,612,943,000	776,371,000	48
1988-89	5,389,000	373,000	0	5,923,000	10,107,000	21,792,000	28,607,000	3,445,000	32,052,000	-10,260,000	826,312,000	1,587,337,000	761,025,000	48
1989-90	4,360,000	377,000	2,056,000	6,209,000	13,623,000	26,625,000	29,077,000	7,177,000	36,254,000	-9,629,000	816,683,000	1,565,709,000	749,026,000	48
1990-91	6,598,000	390,000	258,000	5,899,000	20,699,000	33,844,000	26,686,000	5,936,000	32,622,000	1,222,000	817,905,000	1,562,335,000	744,430,000	48
1991-92	11,437,000	398,000	3,276,000	5,229,000	39,673,000	60,013,000	24,437,000	5,661,000	30,098,000	29,915,000	847,820,000	1,601,576,000	753,756,000	47
1992-93	21,754,000	420,000	0	5,701,000	39,271,000	67,146,000	27,900,000	6,900,000	34,800,000	32,346,000	880,166,000	1,650,669,000	770,503,000	47
1993-94	4,682,000	364,000	5,174,000	6,329,000	9,569,000	26,118,000	32,094,000	7,983,000	40,077,000	-13,959,000	866,207,000	1,629,489,000	763,282,000	47
1994-95	17,006,000	368,000	0	5,727,000	32,521,000	55,622,000	26,782,000	7,601,000	34,383,000	21,239,000	887,446,000	1,658,740,000	771,294,000	46
1995-96	7,077,000	358,000	3,823,000	7,140,000	21,054,000	39,452,000	39,704,000	6,888,000	46,592,000	-7,140,000	880,306,000	1,652,679,000	772,373,000	47
1996-97	7,525,000	351,000	474,000	6,413,000	18,895,000	33,658,000	34,188,000	8,263,000	42,451,000	-8,793,000	871,513,000	1,639,761,000	768,248,000	47
1997-98	16,925,000	360,000	0	5,365,000	32,992,000	55,642,000	29,612,000	6,157,000	35,769,000	19,873,000	891,386,000	1,667,028,000	775,642,000	47
1998-99	0	312,000	7,424,000	4,685,000	10,504,000	22,925,000	24,962,000	5,697,000	30,659,000	-7,734,000	883,652,000	1,639,140,000	755,488,000	46
1999-00	4,430,000	325,000	4,929,000	6,348,000	17,040,000	33,072,000	33,654,000	7,597,000	41,251,000	-8,179,000	875,473,000	1,622,330,000	746,857,000	46
2000-01	4,800,000	368,000	2,671,000	5,933,131	16,288,000	30,060,131	30,612,000	8,025,000	38,637,000	-8,576,869	866,896,131	1,605,062,000	738,165,869	46
2001-02	0	387,000	1,032,000	7,935,219	15,537,000	24,891,219	37,440,000	12,024,000	49,464,000	-24,572,781	842,323,350	1,578,341,000	736,017,650	47
2002-03	7,491,000	402,000	2,605,000	7,674,963	16,025,000	34,197,963	33,438,000	10,176,000	43,614,000	-9,416,037	832,907,312	1,567,195,000	734,287,688	47
2003-04	3,562,000	411,000	6,796,000	8,688,704	15,187,000	34,644,704	35,256,000	8,915,000	44,171,000	-9,526,296	823,381,016	1,549,927,000	726,545,984	47
2004-05	21,761,000	417,000	0	6,863,146	56,974,000	86,015,146	32,552,000	7,860,000	40,412,000	45,603,146	868,984,163	1,622,193,000	753,208,837	46
2005-06	5,234,000	368,000	1,167,000	6,866,568	30,520,000	44,155,568	36,492,000	5,267,000	41,759,000	2,396,568	871,380,730	1,627,805,000	756,424,270	46
2006-07	0	407,000	1,280,000	7,504,425	9,670,000	18,861,425	45,466,000	6,243,000	51,709,000	-32,847,575	838,533,155	1,588,613,000	750,079,845	47
2007-08	5,416,000	358,000	2,296,000	6,514,492	12,648,000	27,232,492	33,187,000	11,421,000	44,608,000	-17,375,508	821,157,647	1,564,392,000	743,234,353	48
2008-09	3,750,000	411,000	6,248,000	6,142,465	13,021,000	29,572,465	29,415,000	6,678,000	36,093,000	-6,520,535	814,637,112	1,545,481,000	730,843,888	47
2009-10	7,482,000	407,000	0	7,220,806	29,986,000	45,095,806	42,267,000	8,491,000	50,758,000	-5,662,194	808,974,918	1,555,859,000	746,884,082	48
2010-11	9,707,000	424,000	3,284,000	4,760,451	43,634,000	61,809,451	29,068,000	6,936,000	36,004,000	25,805,451	834,780,369	1,596,345,000	761,564,631	48
Max	45,511,000	424,000	8,664,000	8,688,700	56,974,000	86,015,100	45,466,000	12,024,000	51,709,000	45,603,100	891,386,000	1,698,690,000	847,147,000	52
Min	0	283,000	0	4,184,000	3,777,000	18,861,400	23,211,000	1,749,000	24,960,000	-32,847,600	741,382,000	1,545,481,000	726,546,000	46
1973-74 to	10,686,600	367,200	2,369,200	5,898,900	18,801,400	38,123,400	30,750,100	5,955,400	36,705,500	1,418,000	834,535,700	1,615,386,200	780,850,500	48
Last 5 yrs	5,271,000	401,400	2,621,600	6,428,500	21,791,800	36,514,300	35,880,600	7,953,800	43,834,400	-7,320,100	823,616,600	1,570,138,000	746,521,400	48
Last 10 yrs	6,440,300	399,200	2,470,800	7,017,100	24,320,200	40,647,600	35,458,100	8,401,100	43,859,200	-3,211,600	835,706,000	1,579,615,100	743,909,100	47

* (condensed from Appendix O)

TABLE III.12

CALIBRATION COEFFICIENTS OR CONCENTRATION FOR TOTAL DISSOLVED SOLIDS (TDS) BALANCE MODEL

Loading/Unloading		
Decadal Mean Groundwater TDS Concentration (GW)		mg/L
1973-74 to 1979-80		345
1980-81 to 1989-90		335
1990-91 to 1999-2000		326
2000-01 to 2010-11		362
Volume of annual recharge from precipitation or returned flow or surface spreading to mean volume	Coefficient, c (multiplier)	
	1973-74 to 1999-2000	2000-01 to 2010-11
Greater than mean	0.94	1.25
75% to mean	0.90	1.10
Less than 75% of mean	0.90	1.00
Source	Concentration or Coefficient	
Subsurface inflow from Puente Basin	Use annual water quality.	Use annual water quality.
Treated, Imported Water (Blend of Weymouth)	Use annual water quality.	Use annual water quality.
Incidental Recharge	Use annual San Jose Creek water quality.	Use annual San Jose Creek water quality.
Recycled Water:		
For Irrigation (Whittier Narrows, San Jose Creek WRPs)	Use annual water quality.	Use annual water quality.
Direct Spreading	Use annual water quality.	Use annual water quality.
	Multiply appropriate annual coefficient (c) by decadal mean TDS concentration (GW). Use greater of source TDS or product (c*GW)	
Precipitation (Valley Floor, Watershed)	c*GW	c*GW
Loading from returned flow (Direct uses)		
San Gabriel Basin, Raymond Basin, and Surface Waters	c*GW	c*GW
Loading from Direct Spreading (Local Runoff, State Water Project)	c*GW	c*GW

Concentration

The loading/unloading balance was used to estimate the annual mass of TDS stored in groundwater.

The annual mass of TDS stored was used to estimate the TDS concentration (annual TDS estimate).

annual TDS estimate = annual mass of TDS storage / annual GW storage volume / 2.718

The groundwater TDS concentration in the model was further adjusted for volume of groundwater in storage.

annual TDS adjusted = annual TDS estimate + (annual GW storage volume - mean GW storage volume) * -0.0001

TABLE III.13
LOADING AND ASSIMILATIVE CAPACITY OF TDS IN SAN GABRIEL BASIN

Water Year	TDS loading						TDS unloading			Balance	TDS in	Allowable	Assimilative capacity 75% basin + inflow/outflow	
	Precipitation /Watershed Runoff LBS	Puente Basin Subsurface Inflow LBS	Incidental Percolation in River LBS	Returned flow Total LBS	Direct Spreading LBS	Total LBS	Groundwater extraction unloading LBS	Subsurface outflow unloading LBS	Total LBS	TDS balance LBS	Groundwater (mixing, 75% of volume) LBS	loading 450 mg/l * mixing volume LBS	LBS	mg/L
column(1)	(2)	(3)	(4)	(5)	(6)	(7)=(2)+(3)+(4)+(5)+(6)	(8)	(9)	(10)=(8)+(9)	(11)=(7)-(10)	(12)	(13)	(14)=(13)-(12)	(15)
1973-74	97,275,000	1,197,000	0	19,110,000	57,831,000	175,413,000	194,981,000	21,434,000	216,415,000	-41,002,000	5,246,546,000	7,276,314,000	2,029,768,000	126
1974-75	84,418,000	1,063,000	0	18,335,000	40,342,000	144,158,000	186,577,000	20,967,000	207,544,000	-63,386,000	5,183,160,000	7,208,276,000	2,025,116,000	126
1975-76	80,137,000	1,093,000	0	21,346,000	31,377,000	133,953,000	217,046,000	22,033,000	239,079,000	-105,126,000	5,078,034,000	7,109,599,000	2,031,565,000	129
1976-77	78,086,000	988,000	4,685,000	19,993,000	24,975,000	128,727,000	192,781,000	25,447,000	218,228,000	-89,501,000	4,988,533,000	7,021,325,000	2,032,792,000	130
1977-78	300,930,000	1,093,000	0	19,049,000	132,253,000	453,325,000	175,616,000	17,057,000	192,673,000	260,652,000	5,249,185,000	7,296,862,000	2,047,677,000	126
1978-79	140,989,000	1,272,000	0	20,044,000	87,209,000	249,514,000	188,198,000	15,299,000	203,497,000	46,017,000	5,295,202,000	7,347,837,000	2,052,635,000	126
1979-80	255,850,000	1,392,000	0	19,667,000	90,899,000	367,808,000	190,105,000	18,333,000	208,438,000	159,370,000	5,454,572,000	7,515,130,000	2,060,558,000	123
1980-81	59,470,000	1,227,000	0	20,095,000	42,543,000	123,335,000	177,780,000	22,405,000	200,185,000	-76,850,000	5,377,722,000	7,418,251,000	2,040,529,000	124
1981-82	59,401,000	1,272,000	0	21,123,000	110,360,000	192,156,000	195,675,000	21,329,000	217,004,000	-24,848,000	5,352,874,000	7,405,354,000	2,052,480,000	125
1982-83	145,951,000	1,272,000	0	19,034,000	250,199,000	416,456,000	175,695,000	25,122,000	200,817,000	215,639,000	5,568,513,000	7,644,106,000	2,075,593,000	122
1983-84	27,366,000	1,197,000	30,329,000	21,403,000	59,110,000	139,405,000	182,718,000	16,722,000	199,440,000	-60,035,000	5,508,478,000	7,551,291,000	2,042,813,000	122
1984-85	37,809,000	1,227,000	33,378,000	24,381,000	50,857,000	147,652,000	218,882,000	22,236,000	241,118,000	-93,466,000	5,415,012,000	7,450,853,000	2,035,841,000	123
1985-86	68,022,000	1,365,000	34,366,000	25,562,000	110,592,000	239,907,000	237,114,000	16,236,000	253,350,000	-13,443,000	5,401,569,000	7,443,753,000	2,042,184,000	123
1986-87	20,159,000	1,354,000	38,326,000	22,512,000	64,606,000	146,957,000	213,640,000	14,844,000	228,484,000	-81,527,000	5,320,042,000	7,332,821,000	2,012,779,000	124
1987-88	47,432,000	1,234,000	32,557,000	24,315,000	74,881,000	180,419,000	215,655,000	32,487,000	248,142,000	-67,723,000	5,252,319,000	7,258,242,000	2,005,923,000	124
1988-89	34,640,000	1,202,000	0	25,083,000	68,344,000	129,269,000	221,770,000	18,285,000	240,055,000	-110,786,000	5,141,533,000	7,143,017,000	2,001,484,000	126
1989-90	34,705,000	1,291,000	10,426,000	23,891,000	98,746,000	169,059,000	210,915,000	29,860,000	240,775,000	-71,716,000	5,069,817,000	7,045,689,000	1,975,872,000	126
1990-91	41,203,000	1,362,000	866,000	21,517,000	139,567,000	204,515,000	196,000,000	25,167,000	221,167,000	-16,652,000	5,053,165,000	7,030,507,000	1,977,342,000	127
1991-92	71,427,000	1,392,000	14,409,000	19,512,000	259,082,000	365,822,000	167,413,000	23,997,000	191,410,000	174,412,000	5,227,577,000	7,207,092,000	1,979,515,000	124
1992-93	135,851,000	1,579,000	0	20,626,000	249,161,000	407,217,000	186,114,000	28,252,000	214,366,000	192,851,000	5,420,428,000	7,428,012,000	2,007,584,000	122
1993-94	28,286,000	1,272,000	26,679,000	24,853,000	59,758,000	140,848,000	223,552,000	34,471,000	258,023,000	-117,175,000	5,303,253,000	7,332,702,000	2,029,449,000	125
1994-95	106,201,000	1,287,000	0	21,426,000	203,087,000	332,001,000	183,666,000	29,382,000	213,048,000	118,953,000	5,422,206,000	7,464,329,000	2,042,123,000	123
1995-96	44,197,000	1,134,000	24,243,000	25,719,000	131,477,000	226,770,000	240,675,000	33,306,000	273,981,000	-47,211,000	5,374,995,000	7,437,056,000	2,062,061,000	125
1996-97	46,991,000	1,227,000	2,450,000	25,579,000	117,994,000	194,241,000	236,014,000	35,530,000	271,544,000	-77,303,000	5,297,692,000	7,378,926,000	2,081,234,000	127
1997-98	105,694,000	1,187,000	0	21,076,000	206,031,000	333,988,000	185,454,000	29,698,000	215,152,000	118,836,000	5,416,528,000	7,501,627,000	2,085,099,000	125
1998-99	0	1,089,000	49,171,000	21,736,000	65,597,000	137,593,000	130,590,000	25,636,000	156,226,000	-18,633,000	5,397,895,000	7,376,128,000	1,978,233,000	121
1999-00	26,488,000	1,130,000	36,736,000	23,773,000	106,409,000	194,536,000	227,734,000	33,448,000	261,182,000	-66,646,000	5,331,249,000	7,300,485,000	1,969,236,000	121
2000-01	38,987,000	1,276,000	16,327,000	32,926,936	150,250,000	239,766,936	229,739,000	35,198,000	264,937,000	-25,170,064	5,306,078,936	7,222,779,000	1,916,700,064	119
2001-02	0	1,258,000	6,397,000	34,077,004	143,321,000	185,053,004	241,198,000	36,073,000	277,271,000	-92,217,996	5,213,860,939	7,102,536,000	1,888,675,061	120
2002-03	69,105,000	1,407,000	19,584,000	32,846,301	147,818,000	270,760,301	224,438,000	26,076,000	250,514,000	20,246,301	5,234,107,240	7,052,376,000	1,818,268,760	116
2003-04	26,881,000	1,487,000	47,839,000	30,842,254	140,090,000	247,139,254	257,061,000	22,845,000	279,906,000	-32,766,746	5,201,340,494	6,974,670,000	1,773,329,506	114
2004-05	200,730,000	1,461,000	0	27,461,579	525,556,000	755,208,579	242,582,000	26,857,000	269,439,000	485,769,579	5,687,110,073	7,299,871,000	1,612,760,927	99
2005-06	42,513,000	1,356,000	9,014,000	27,306,310	281,531,000	361,720,310	250,225,000	25,532,000	275,757,000	85,963,310	5,773,073,384	7,325,124,000	1,552,050,616	95
2006-07	0	1,575,000	10,942,000	34,251,177	89,204,000	135,972,177	263,364,000	32,207,000	295,571,000	-159,598,823	5,613,474,560	7,148,760,000	1,535,285,440	97
2007-08	49,965,000	1,482,000	18,402,000	32,653,382	116,674,000	219,176,382	239,849,000	50,460,000	290,309,000	-71,132,618	5,542,341,942	7,039,763,000	1,497,421,058	96
2008-09	28,268,000	1,252,000	41,897,000	31,461,743	120,114,000	222,992,743	216,184,000	32,649,000	248,833,000	-25,840,257	5,516,501,685	6,954,663,000	1,438,161,315	93
2009-10	69,019,000	1,369,000	0	25,242,664	276,604,000	372,234,664	232,869,000	38,596,000	271,465,000	100,769,664	5,617,271,350	7,001,364,000	1,384,092,650	89
2010-11	89,548,000	1,482,000	23,729,000	22,200,529	402,505,000	539,464,529	212,792,000	13,242,000	226,034,000	313,430,529	5,930,701,879	7,183,554,000	1,252,852,121	78
Max	300,930,000	1,579,000	49,171,000	34,251,200	525,556,000	755,208,600	263,364,000	50,460,000	295,571,000	485,769,600	5,930,701,900	7,644,106,000	2,085,099,000	130
Min	0	988,000	0	18,335,000	24,975,000	123,335,000	130,590,000	13,242,000	156,226,000	-159,598,800	4,988,533,000	6,954,663,000	1,252,852,100	78
1973-74 to 2010-2011 mean	73,526,200	1,284,300	14,019,800	24,263,900	140,183,000	253,277,200	210,070,000	26,282,100	236,352,100	16,925,100	5,362,735,800	7,269,238,000	1,906,502,200	118
Last 5 yrs	47,360,000	1,432,000	18,994,000	29,161,900	201,020,200	297,968,100	233,011,600	33,430,800	266,442,400	31,525,700	5,644,058,300	7,065,620,800	1,421,562,500	91
Last 10 yrs	57,602,900	1,412,900	17,780,400	29,834,300	224,341,700	330,972,200	238,056,200	30,453,700	268,509,900	62,462,300	5,532,978,400	7,108,268,100	1,575,289,700	100

* (condensed from Appendix P)

TABLE III.14a

ASSIMILATIVE CAPACITY ANALYSIS: SALTS IN SOLUTION POSSIBILITIES HYPOTHETICAL SCENARIOS FOR RECHARGE WATER QUALITY CHARACTERISTICS

Scenario	NO_3	Cl	SO_4	TDS†	
				Minimum‡	Maximum‡
	---------- mg/L ----------				
Scenario 1	20	50	250	605	968
Scenario 2	1	250	60	635	1,015
Scenario 3	1	60	250	594	950

† TDS is estimated using the equivalent weight of nitrate, chloride, and sulfate, and the equivalent weight of the most common companion cations: calcium, magnesium, and potassium.
‡ The minimum and maximum are estimated using the ratios identified in the analysis of waters in the Main San Gabriel Basin, in which nitrate, chloride, and sulfate contributed 55 to 80 percent of the total TDS concentration.

TABLE III.14b

ASSIMILATIVE CAPACITY ANALYSIS: GROUND WATER RECHARGE WITH RECYCLED WATER

INDIRECT REUSE REPLENISHMENT PROJECT

Water Quantity Assumptions, 2001-02 to 2010-11				
	ac-ft			
Mixing model, 75% of groundwater in storage	5,811,700	5,811,700	5,811,700	5,811,700
	ac-ft/yr			
Groundwater Recharge/Removal	250,000	250,000	250,000	250,000
Recycled Water Replacement	10,000	10,000	10,000	10,000
Balance of Recharge	240,000	240,000	240,000	240,000
Water Quality Characteristics, 2001-02 to 2010-11				
	Nitrate	Chloride	Sulfate	TDS
	mg/L			
Groundwater	19	32	53	350
Basin Water Quality Objectives	45	100	100	450
San Jose Creek Water Reclamation Plant - West	27	110	85	530
Loading Characteristics, 2001-02 to 2010-11				
	lbs			
Allowable loading	710,826,700	1,579,615,100	1,579,615,100	7,108,268,100
Current load	298,330,000	510,262,300	835,706,000	5,532,978,400
Assimilative Capacity (AC)	412,496,700	1,069,352,800	743,909,100	1,575,289,700
10% AC	41,249,670	106,935,280	74,390,910	157,528,970
IRRP Project Evaluation				
	lbs/yr			
Recycled Water Project loading	734,000	2,989,000	2,310,000	14,403,000
Balance of Recharge loading	12,392,000	21,068,000	34,503,000	228,278,000
Total loading	13,126,000	24,057,000	36,813,000	242,681,000
Groundwater removal unloading	12,909,000	21,946,000	35,941,000	237,790,000
Net load	217,000	2,111,000	872,000	4,891,000
	percent			
Percent AC used with 10,000 AF after 1 year	0.1	0.2	0.1	0.3
Percent AC used with 10,000 AF after 5 years	0.2	0.9	0.5	1.4
Percent AC used with 10,000 AF after 10 years	0.4	1.6	1.0	2.6
Percent AC used with 10,000 AF after 20 years	0.7	2.7	1.6	4.2
Percent AC used after Equilibrium Reached	1.2	4.6	2.7	7.2

TABLE III.14c

ASSIMILATIVE CAPACITY ANALYSIS: GROUND WATER RECHARGE WITH RECYCLED WATER

SCENARIO 1

Water Quantity Assumptions, 2001-02 to 2010-11				
	--------acre ft--------			
Mixing model, 75% of groundwater in storage	5,811,700	5,811,700	5,811,700	5,811,700
	-------- ac-ft/yr --------			
Groundwater Recharge/Removal	250,000	250,000	250,000	250,000
Replenishent Water	5,700	5,700	5,700	5,700
Balance of Recharge	244,300	244,300	244,300	244,300

Water Quality Characteristics, 2001-02 to 2010-11	Nitrate	Chloride	Sulfate	TDS
	-------- mg/L --------			
Groundwater	19	32	53	350
Basin Water Quality Objectives	45	100	100	450
Replenishment Water - Scenario 1	20	50	250	787

Loading Characteristics, 2001-02 to 2010-11				
	-------- lbs --------			
Allowable loading	710,826,700	1,579,615,100	1,579,615,100	7,108,268,100
Current load	298,330,000	510,262,300	835,706,000	5,532,978,400
Assimilative Capacity (AC)	412,496,700	1,069,352,800	743,909,100	1,575,289,700
10% AC	41,249,670	106,935,280	74,390,910	157,528,970

Scenario 1 Evaluation				
	-------- lbs/yr --------			
Recycled Water Project loading	310,000	775,000	3,873,000	12,191,000
Balance of Recharge loading	12,614,000	21,445,000	35,122,000	232,368,000
Total loading	12,924,000	22,220,000	38,995,000	244,559,000
Groundwater removal unloading	12,909,000	21,946,000	35,941,000	237,790,000
Net load	15,000	274,000	3,054,000	6,769,000
	-------- percent --------			
Percent AC used with 5,700 AFY after 1 year	0.0	0.0	0.4	0.4
Percent AC used with 5,700 AFY after 5 years	0.0	0.1	1.9	2.0
Percent AC used with 5,700 AFY after 10 years	0.0	0.2	3.4	3.5
Percent AC used with 5,700 AFY after 20 years	0.1	0.4	5.6	5.8
Percent AC used after Equilibrium Reached	0.1	0.6	9.6	10.0

TABLE III.14.d

ASSIMILATIVE CAPACITY ANALYSIS: GROUND WATER RECHARGE WITH RECYCLED WATER

SCENARIO 2

Water Quantity Assumptions, 2001-02 to 2010-11				
	ac-ft			
Mixing model, 75% of groundwater in storage	5,811,700	5,811,700	5,811,700	5,811,700
	ac-ft/yr			
Groundwater Recharge/Removal	250,000	250,000	250,000	250,000
Replenishment Water	5,300	5,300	5,300	5,300
Balance of Recharge	244,700	244,700	244,700	244,700
Water Quality Characteristics, 2001-02 to 2010-11				
	Nitrate	Chloride	Sulfate	TDS
	mg/L			
Groundwater	19	32	53	350
Basin Water Quality Objectives	45	100	100	450
Replenishment Water - Scenario 2	1	250	60	825
Loading Characteristics, 2001-02 to 2010-11				
	lbs			
Allowable loading	710,826,700	1,579,615,100	1,579,615,100	7,108,268,100
Current load	298,330,000	510,262,300	835,706,000	5,532,978,400
Assimilative Capacity (AC)	412,496,700	1,069,352,800	743,909,100	1,575,289,700
10% AC	41,249,670	106,935,280	74,390,910	157,528,970
Scenario 2 Evaluation				
	lbs/yr			
Recycled Water Project loading	14,000	3,601,000	864,000	11,883,000
Balance of Recharge loading	12,635,000	21,481,000	35,179,000	232,749,000
Total loading	12,649,000	25,082,000	36,043,000	244,632,000
Groundwater removal unloading	12,909,000	21,946,000	35,941,000	237,790,000
Net load	-260,000	3,136,000	102,000	6,842,000
	percent			
Percent AC used with 5,300 AFY after 1 year	-0.1	0.3	0.0	0.4
Percent AC used with 5,300 AFY after 5 years	-0.3	1.3	0.1	2.0
Percent AC used with 5,300 AFY after 10 years	-0.5	2.4	0.1	3.5
Percent AC used with 5,300 AFY after 20 years	-0.9	4.0	0.2	5.8
Percent AC used after Equilibrium Reached	-1.5	6.8	0.3	10.1

TABLE III.14.e

ASSIMILATIVE CAPACITY ANALYSIS: GROUND WATER RECHARGE WITH RECYCLED WATER

SCENARIO 3

Water Quantity Assumptions, 2001-02 to 2010-11				
	ac-ft			
Mixing model, 75% of groundwater in storage	5,811,700	5,811,700	5,811,700	5,811,700
	ac-ft/yr			
Groundwater Recharge/Removal	250,000	250,000	250,000	250,000
Replenishment Water	5,800	5,800	5,800	5,800
Balance of Recharge	244,200	244,200	244,200	244,200
Water Quality Characteristics, 2001-02 to 2010-11				
	Nitrate	Chloride	Sulfate	TDS
	mg/L			
Groundwater	19	32	53	350
Basin Water Quality Objectives	45	100	100	450
Replenishment Water - Scenario 3	1	60	250	772
Loading Characteristics, 2001-02 to 2010-11				
	lbs			
Allowable loading	710,826,700	1,579,615,100	1,579,615,100	7,108,268,100
Current load	298,330,000	510,262,300	835,706,000	5,532,978,400
Assimilative Capacity (AC)	412,496,700	1,069,352,800	743,909,100	1,575,289,700
10% AC	41,249,670	106,935,280	74,390,910	157,528,970
Scenario 3 Evaluation				
	lbs/yr			
Recycled Water Project loading	16,000	946,000	3,941,000	12,168,000
Balance of Recharge loading	12,609,000	21,437,000	35,107,000	232,273,000
Total loading	12,625,000	22,383,000	39,048,000	244,441,000
Groundwater removal unloading	12,909,000	21,946,000	35,941,000	237,790,000
Net load	-284,000	437,000	3,107,000	6,651,000
	percent			
Percent AC used with 5,800 AFY after 1 year	-0.1	0.0	0.4	0.4
Percent AC used with 5,800 AFY after 5 years	-0.3	0.2	1.9	2.0
Percent AC used with 5,800 AFY after 10 years	-0.6	0.4	3.5	3.6
Percent AC used with 5,800 AFY after 20 years	-0.9	0.6	5.7	5.9
Percent AC used after Equilibrium Reached	-1.5	1.0	9.8	10.1

Table III.15

Existing and Potential Implementation Measures

Activity	Timeframe	Type of Implementation Measure	Loading Impact	Concentration Impact
Groundwater Replenishment	Existing	• Spreading Grounds • Replenishment in unlined portions of streams • Replenishment Coordinating Groups • Optimize delivery of SWP water	Increase	Decrease
	Potential	• New replenishment facilities	Increase	Decrease
Reduce Stormwater Runoff	Potential	• Stormwater to BMPs to reduce runoff	Increase	No Change
Recycled Water	Existing	• Nitrogen Treatment	Decrease	Decrease
Imported Water TDS Management	Existing	• MWD Salinity Source Water Control Program	No Change	Decrease
Institutional	Existing	• Basin Adjunction/Watermaster • Establishment of Safe Yield • Supplemental Water Criteria	None	None
Regulatory	Existing	• Title 22 Water Quality Monitoring	None	None
	Future	• SNMP Monitoring Program	None	None

Existing – Implementation measures or projects/programs that are currently in place

Potential – Implementation measures that are anticipated to be in operation before 2025 notwithstanding exigencies that are outside in the control of the project sponsors

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