



City of
Santa Monica



Supplemental Engineering Report for Dry-Weather Runoff, Reclamation, Storage, Pumping, Distribution, and Nonpotable Water Use Area Facilities



August 2000

BOYLE ENGINEERING CORPORATION

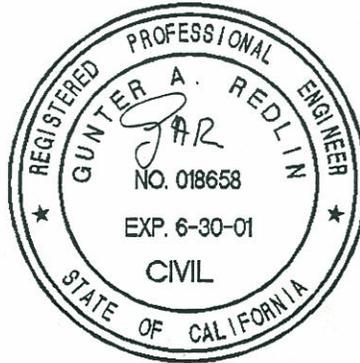
Supplemental Engineering Report for Dry-Weather Runoff, Reclamation, Storage, Pumping, Distribution, and Nonpotable Water Use Area Facilities

City of Santa Monica

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BOYLE

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Section 1

Background

1.1 Introduction

During September 1999, the City of Santa Monica completed a report entitled, *Engineering Report for Dry-Weather Runoff, Reclamation, Storage, Pumping, Distribution, and Nonpotable Water Use Area Facilities*. This report was prepared to fulfill regulatory requirements of the California Department of Health Services (DHS) and the Los Angeles Regional Water Quality Control Board (RWQCB). The report described and documented a project which is now under construction. The project will treat dry-weather runoff with the treated water to be used mainly for urban landscape irrigation purposes.

The September 1999 engineering report described the following project features in detail:

- Dry-weather runoff water sources
 - Pico-Kenter stormwater pumping plant
 - Pier storm drain pumping station
- Raw water pipe conveyances to the dry-weather runoff treatment plant
- Dry-weather runoff treatment plant
- Plant effluent storage reservoir and effluent pumping station
- Recycled water distribution piping system
- Recycled water use areas
 - Portions of Palisades Park
 - Memorial Park
 - Woodlawn Cemetery (City-owned)
 - City Hall/Civic Center
 - Olympic Boulevard medians (10th Street to 20th Street)
 - Santa Monica Freeway right-of-ways (Caltrans)

The draft engineering report was submitted to DHS for their review and comment. The report was then finalized, and copies were sent to both DHS and the RWQCB.

1.2 Regulatory Compliance Status of Project

The City of Santa Monica is in the process of applying for Reclamation Requirements from the RWQCB to permit the above-outlined "Recycled Water Use Areas." This will be done by preparing a Report of Waste Discharge and supplying the RWQCB with a final copy of the September 1999 Engineering Report (already supplied), a copy of this supplemental report when completed, and a water quality

monitoring plan (WQMP) for the treatment plant. A proposed WQMP has been prepared by City staff and is currently under review by the RWQCB.

1.3 Purpose of Supplemental Engineering Report

The purpose of this supplemental engineering report is to document the following additions to the project:

- Additional recycled water use areas
 - Existing Water Garden Phase I development (for landscape irrigation and makeup water for on-site ornamental lake)
 - Water Garden Phase II development under construction (for landscape irrigation and the flushing of toilets and urinals)
 - Three additional center medians in Olympic Boulevard between 20th Street and Stuart (for landscape irrigation)
- Additional recycled water distribution lines in Olympic Boulevard to serve the Water Garden Phase I and Phase II use areas and additional medians in Olympic Boulevard. This additional line will extend from 17th Street to 26th Street. The portion between 17th and 19th Streets is an 8-inch line that will replace an originally designed 1.5-inch line that was earlier sized to irrigate only the Olympic Boulevard median between 17th Street and 20th Street in the September 1999 report (see Figure 5-1 in the September 1999 report).

Each of the above project additions will be described in this report.

1.4 Recycled Water Uses

All recycled water uses described in the September 1999 engineering report involved urban landscape irrigation. The proposed reuses described in this supplemental report are as follows:

- Olympic Boulevard Medians – urban landscape irrigation
- Water Garden Phase I¹ – scenic lake makeup² and urban landscape irrigation
- Water Garden Phase II - scenic lake makeup², urban landscape irrigation, and the flushing of toilets and urinals

¹Both project phases consist of two six-story office buildings each.

²Shared single lake in the middle of the four office buildings.

Section 2

Extension of Recycled Water Distribution System

2.1 Extension to Recycled Water Distribution System

Figure 2-1 shows the additional recycled water use areas described in Section 3 of this report. The Olympic Boulevard median between 17th Street and 20th Street is not an additional use area. It was included in the September 1999 report. Figure 2-2 shows the proposed recycled waterline in Olympic Boulevard between 17th Street and 26th Street. In the September 1999 report, the line was to have ended at 19th Street as a 1.5-inch-diameter pipe to supply water for the irrigation of the Olympic median between 17th Street and 20th Street. This line segment will now be upsized to an 8-inch line to be installed between 17th Street and 26th Street to serve the following new use areas:

- Three Olympic Boulevard medians between 20th Street and Stuart
- Water Garden Phase II development
- Water Garden Phase I development

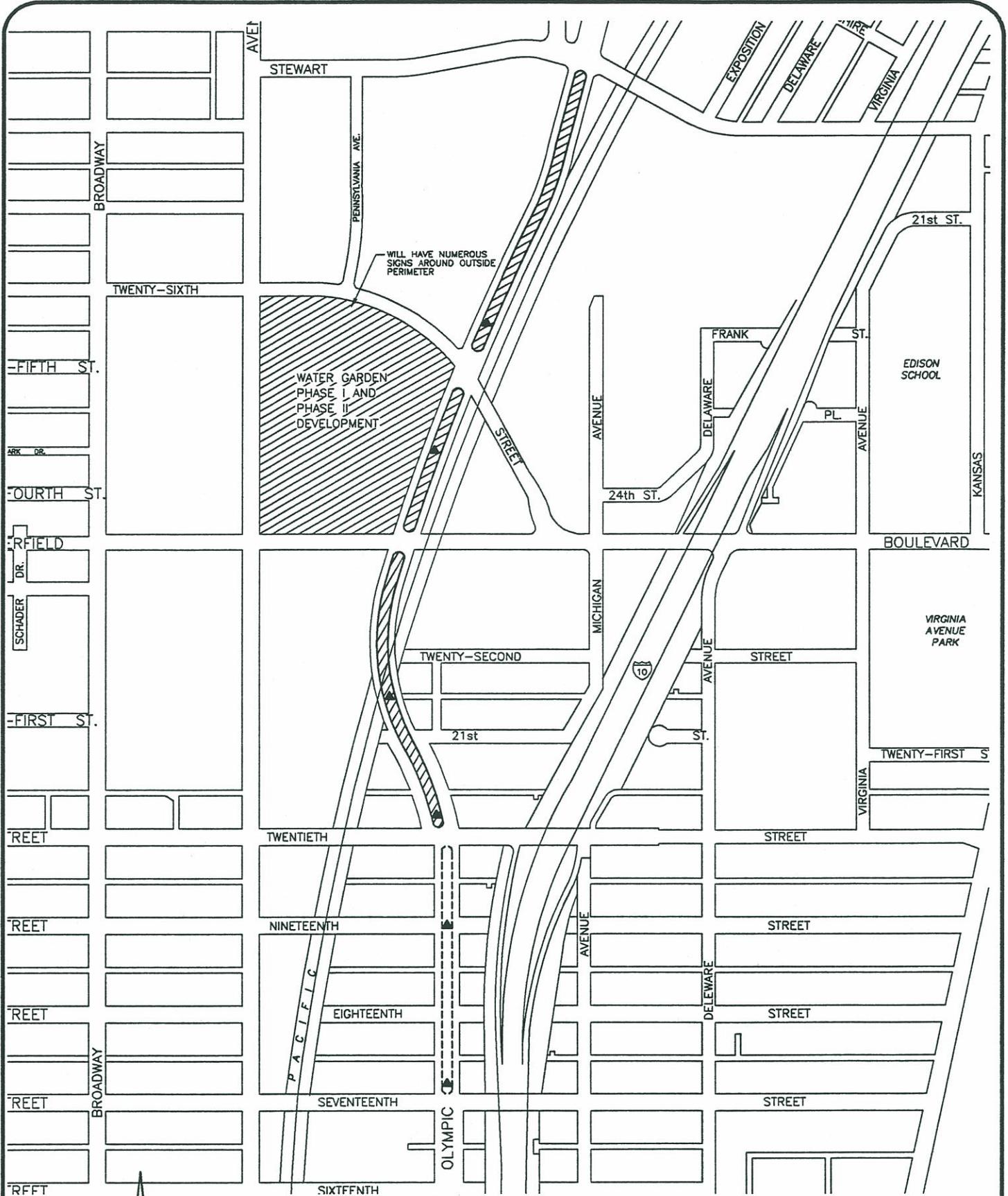
Each of the above five new use areas will have one recycled water connection and meter and as shown on Figure 2-2. Figure 2-1 also shows the approximate locations of the warning signs in the Olympic Boulevard medians.

2.2 New Recycled Water Main Construction Features

The new 8-inch recycled waterline between 17th Street and Stuart will be of ductile iron construction. The top of the installed pipeline segment will be equipped with purple plastic warning tape embossed with the words, "Caution – Reclaimed Water – Do Not Drink." This tape will be 3 inches wide and will be fastened to the pipe every 10 feet. The 8-inch pipeline is about 3,562 feet long. The pipeline has the following appurtenances:

Appurtenance	Station No.
Air vacuum release valve	79+20
Gate valve	79+84
Service lateral to median between 17 th St. and 20 th St.	86+70
Service lateral to median between 20 th St. and Cloverfield	95+75
Air vacuum release valve	104+39
Water Garden Phase II service lateral	106+03
Service lateral to median between Cloverfield and 26 th St.	106+15
Service lateral to median between 26 th St. and Stuart	113+15
Water Garden Phase I – end of 8-inch pipeline	114+82

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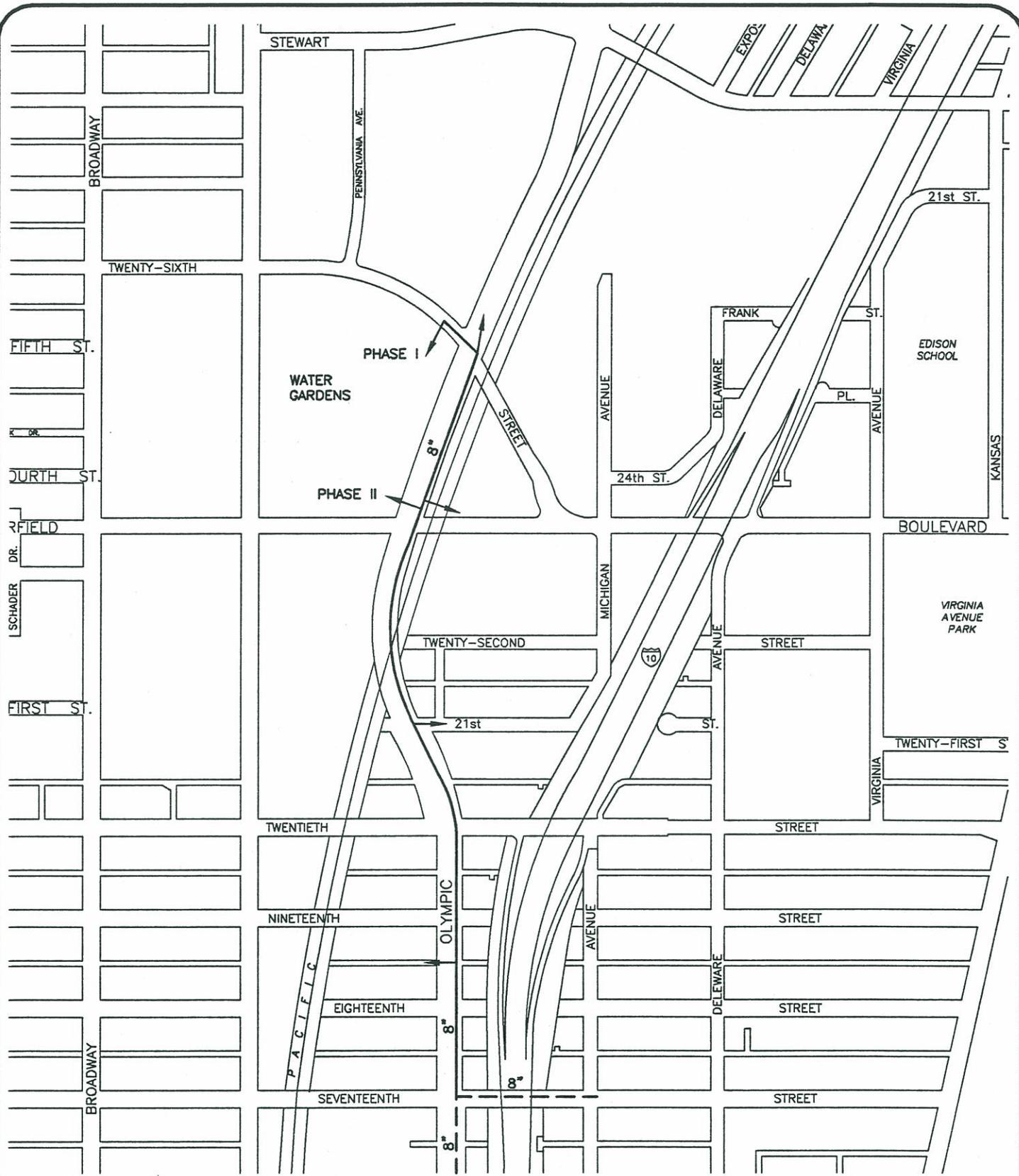


CITY OF SANTA MONICA
 ADDITIONAL RECYCLED WATER USE AREAS

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FIGURE 2-1

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PHASE I PIPELINE - - - - -
PHASE II PIPELINE ————



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RECYCLED WATER DISTRIBUTION SYSTEM
AND NEW USER CONNECTIONS

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FIGURE 2-2

2.3 New Recycled Water Main Proximity to Sanitary Sewers and Water Mains

Recycled water mains should be located 10 feet away from sanitary sewers and domestic waterlines where in parallel construction and should cross over sanitary sewers and domestic waterlines where in perpendicular construction.

The following table summarizes where the proposed design is not in compliance with the recommended pipe separation requirements.

Condition	Approximate Pipeline Location
New recycled waterline crosses over domestic waterline in perpendicular construction	Condition does not occur
New recycled waterline parallels a domestic waterline at a distance of less than 10 feet	Station 105+40 to Station 106+00 This domestic water pipeline will become redundant and will therefore be abandoned and severed
New recycled waterline crosses under a sanitary sewer line in perpendicular construction	Station 81+90 (8") Station 81+95 (8" abandoned) Station 85+80 (8" abandoned) The recycled waterline is of ductile iron construction with compression joints
New recycled waterline parallels a sanitary sewer at a distance of less than 10 feet	Condition does not occur

The distribution system expansion segments is well designed and meets almost all of the recommended separation requirements.

2.4 Water Quality Monitoring in Nonpotable Water Distribution System

The sampling program recommended in the September 1999 engineering report is also recommended for each of the four new recycled water use areas. The following table summarizes the recommended recycled water sampling program for each of the four new use areas.

Constituent	Sampling Frequency
Total/Fecal Coliform Bacteria	Monthly
Color	Monthly
Odor/Turbidity	Monthly
Specific Conductance	Monthly
Chlorine Residual ¹	Monthly

¹If and when the City initiates chlorination at the DWRRF for quality control in the distribution system.

The purpose of including specific conductance to this list is for demonstration of Basin Plan compliance and to verify that blending (when necessary) at the DWRRF is adequate.

With time, this generated water quality data will indicate the need (or lack thereof) at the DWRRF to operate the installed sodium hypochlorite treatment facilities for the prevention of bacteria growths and/or the prevention of odor and pipeline slime problems by maintaining some minimum chlorine residual at the delivery points to all nonpotable water use areas.

The monthly samples at each use area will be collected from an internal hose bib connected to a quick-disconnect coupler. One such sampling facility will be provided in each use area. The hose bib should be allowed to run for at least 5 minutes before the sample is collected.

2.5 Pumping and Distribution System Surge Analyses

2.5.1 Current Pumping System

The current system includes two pumps located at the City of Santa Monica Urban Runoff Recycling Facility (SMURRF) treatment plant. Each pump is sized to handle a 550-gallon-per-minute (gpm) flow. A space has also been provided to add a third pump at some future date if needed to serve future system users.

2.5.2 Model Results for Current System

The recycled water delivery system was modeled with the initial users including Palisades Park (Pier to Arizona), Memorial Park and five irrigation meters in the Olympic Boulevard medians. The total peak hour demand of these initial users is estimated to be 282 gpm.

Results. No surge control equipment is required for this scenario. Surge conditions were modeled based on peak hour demands appropriately distributed between nighttime irrigation users (assumed to occur between 12 a.m. and 6 a.m.) and daytime users (Water Garden Phase II).

2.5.3 Model Results for Current System Expanded to Incorporate Additional Users

The system was also modeled to incorporate additional users. This includes three additional nighttime irrigation users (three Caltrans irrigation meters, Woodlawn Cemetery, and three additional irrigation meters along Olympic Boulevard medians) and one additional daytime and nighttime user (Water Garden). These additional nighttime irrigation users, combined with the three initial system users, will create a total estimated peak hour demand of approximately 400 gpm. The daytime Water Garden Phase II dual plumbing demand is estimated at a total peak hourly flow rate of about 312 gpm. It should also be noted that the peak hour irrigation demand for Water Garden will be met from an on-site storage reservoir and pumping system. The 70,000-gallon reservoir can be filled during the day, and the irrigation demand can be pumped from it during the night, thus not peaking off of or otherwise impacting the SMURRF system.

Results. No surge control equipment is required for the expanded recycled water system. However, to provide appropriate protection at the far ends of the piping system, the SMURRF expanded design will include at least two air/vacuum release valves in lieu of standard air release valves. This same finding is also applicable for peak hour flow demands up to the full capacity of the pump, i.e., 550 gpm.

2.5.4 Ultimate System

The ultimate system cannot be accurately modeled at this time without first completing a system demand study. The results of such a study will be used to determine the need for a future third pump and any appropriate surge equipment at the treatment plant. Additional future daytime and dual plumbing users, such as the City's proposed Civic Center Safety Facility and the Rand Corporation buildings, should not have any significant effect on the surge analysis as long as the total daytime demands remain below those which can be supported by a single pump. However, adding more nighttime irrigation users (e.g., a future extension to serve all of Palisades Park) could impact the system, requiring the addition of both a third pump and a surge tank.

2.5.5 Recommendations

The surge analyses included the following recommendations, which will now be implemented:

1. There is no need to install any surge equipment at this time at the treatment plant pump station. None is required for the current or proposed system expansion.
2. Incorporate air/vacuum release valves at the far ends of the SMURRF recycled water distribution system in lieu of standard air release valves.
3. Schedule the irrigation of City-owned facilities to be evenly distributed between the hours of 12 a.m. and 6 a.m. to minimize peak system demands and thereby obviate the need for surge equipment (which might otherwise be required if all irrigation were to occur during a more condensed time period, e.g., 12 a.m. to 3 a.m.).
4. Prepare a recycled water demand study to identify any proposed future system demands (e.g., City Safety Facility and other Civic Center users, Rand Corporation, Palisades Park extension,

etc.) and determine the possible need for the addition of a third pump at the treatment plant and any associated surge equipment.

5. Conduct additional surge analyses based on the results of the recycled water demand study.
6. Install surge equipment, but only if needed to mitigate surge conditions created by future system demands.

Section 3

Additional Nonpotable Water Use Areas

3.1 General

The following additional areas will be retrofitted for receiving recycled water:

- Three Olympic Boulevard medians between 20th Street and Stuart
- Water Garden Phase I development (existing)
- Water Garden Phase II development (under construction and to be occupied in the fall of 2000)

The additional Olympic Boulevard median use areas are currently using potable water for the landscape irrigation purposes. The Water Garden Phase I development used potable water for on-site landscape irrigation and scenic lake makeup water for several years, then recycled domestic wastewater, and then potable water again (since December 28, 1999).

The Water Garden Phase II development is currently under construction. When completed (estimated completion is July/August 2000) the facility will use potable water for landscape irrigation, scenic lake water makeup, and for the flushing of toilets and urinals. As soon as the recycled water becomes available from the City of Santa Monica, both Water Garden developments will switch over from potable to recycled water for landscape irrigation, lake makeup water, and the flushing of toilets and urinals in Phase II.

3.2 On-Site Reviews

Each new targeted recycled water use area was visited. Limited testing was conducted at each site by turning off the water meters (domestic and irrigation) to determine which water meter supplied what on-site water outlets. This was done to determine if irrigation water meters also served internal domestic water outlets and if domestic water meters served internal irrigation water outlets. The work was done with the cooperation of City Water Department and Parks Department staff and representatives from the Water Garden Phase I and Phase II developments.

3.3 Olympic Medians Between 20th Street and Stuart

3.3.1 Location and Current Water Uses

There is one long, continuous median strip in Olympic Boulevard between 20th Street and Cloverfield Boulevard. This first median begins at 20th Street and then extends northeasterly past 20th Court, 21st Street, 21st Court, the extension of 22nd Street, and ends at Cloverfield Boulevard. The second Olympic Boulevard median extends from Cloverfield Boulevard to 26th Street. The third Olympic Boulevard median to be added extends northeasterly from 26th Street to Stuart. The only water uses on these three median areas is for landscape irrigation purposes.

3.3.2 Current Irrigation Water Service and Site Retrofit Requirements

The current potable water service to the first median is located on 21st Street (Point A) as shown on Figure 3-1. The 2-inch connection off an 8-inch cast-iron line is metered and equipped with an RPP backflow prevention device. The median strip is wide, covered with grass, and planted with large shade trees. During periods of nice weather, this median is used for sunbathing, picnicking, and other outdoor recreational activities by the nearby residents. The on-site irrigation piping system is free of hose bibs. Median irrigation is controlled from an on-site computerized irrigation control box. Irrigation is performed between midnight and 4 a.m. When active, the sprinklers were not observed to overspray into adjacent traffic lanes. The average amount of water used for irrigating this island is about 6,000 gpd.

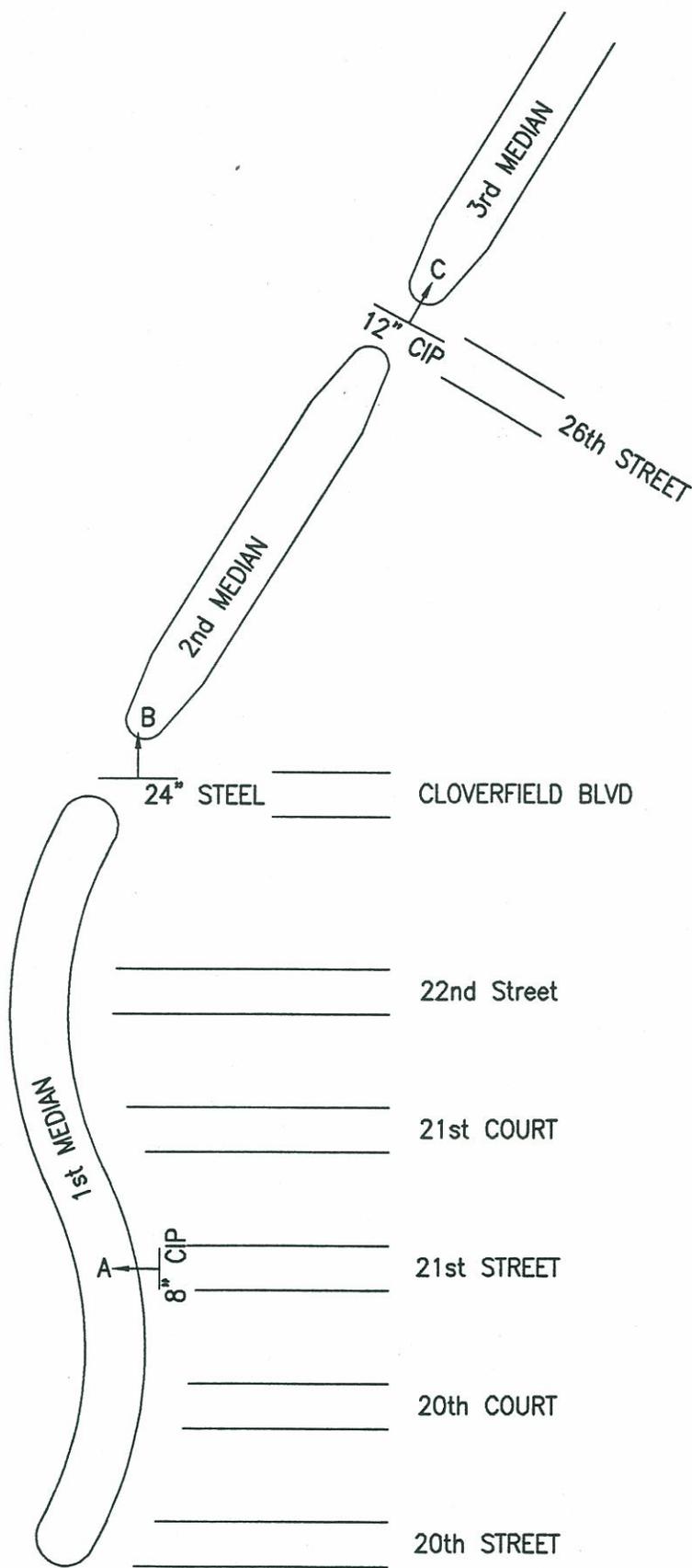
The current water service to the second median is located on Cloverfield Boulevard (Point 3) as shown on Figure 3-1. The 2-inch connection off a 24-inch steel waterline is metered and equipped with an RPP backflow prevention device. The median site characteristics and its method of irrigation are very similar to that of the first median. The average amount of water for irrigating this median is about 4,000 gpd.

The current water service to the third median is located on 26th Street (Point C) as shown on Figure 3-1. The 2-inch connection off a 12-inch cast-iron waterline is metered and equipped with an RPP backflow prevention device. The median site characteristics and its method of irrigation are very similar to that of the second median. The average amount of water for irrigating this median is about 4,000 gpd. The approximate locations for the recycled water system connections are shown on Figure 2-2.

3.3.3 Site Retrofit Needs and Recommendations

The retrofits for these median islands will be as follows:

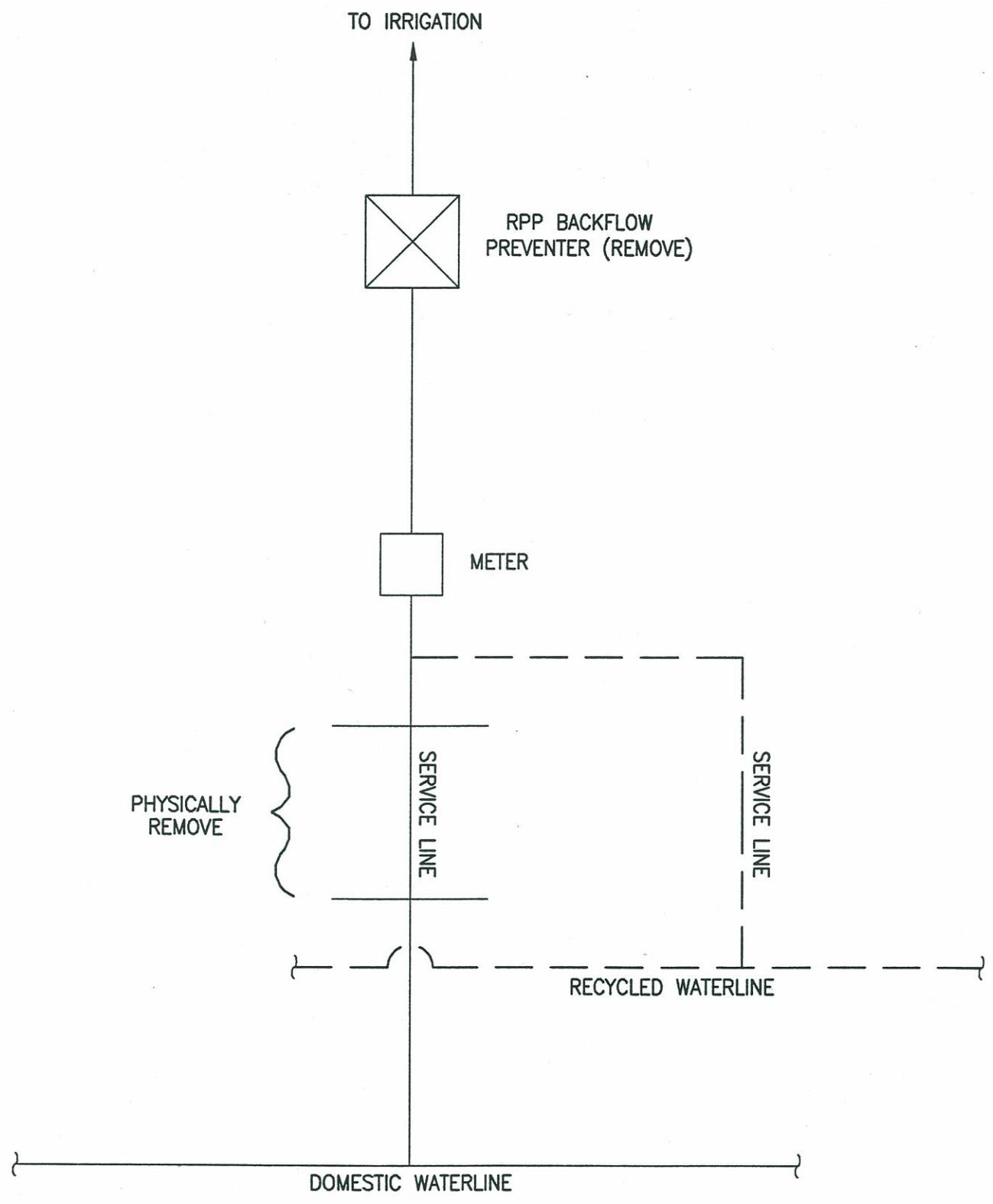
- The existing domestic water service lines to the medians will each be physically severed upstream of the water meters and backflow prevention devices (see Figure 3-2).
- The backflow prevention devices, becoming redundant, will then be removed to also eliminate an unnecessary pressure losses (see Figure 3-2).
- A nonpotable water service line will be connected to each of the three irrigation water service connections with the continued use of the existing water meter (see Figure 3-2).
- No on-site hose bibs will be allowed; none currently exist. If water outlets other than sprinkler heads are needed, only quick-disconnect couplers will be allowed. The top of the existing irrigation meter boxes will be painted purple, and a plastic purple warning tag will be installed inside each of the meter boxes. This warning tag will state that reclaimed water is being used on-site for irrigation and to not drink the water coming out of the sprinklers.
- The on-site irrigation water controller boxes will also be painted purple and equipped with similar plastic warning tags.
- At least one durable metal warning sign will be installed on each of the island medians, notifying the public that recycled water is being used for irrigation and to not drink the water.



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OLYMPIC MEDIANS
NE OF 20th STREET

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TYPICAL OLYMPIC BLVD
MEDIAN RETROFITS

All new piping used to connect the nonpotable water source into the existing on-site irrigation piping systems will be constructed with purple PVC piping specially manufactured for use in nonpotable water systems.

After the retrofit work is completed, the nonpotable water meter will be turned on to determine that all sprinklers are indeed served by the meter. Once that is determined, the meter will be turned off to confirm that all related sprinklers also turn off. This check will also be used to confirm that no interconnections exist between the median and the other two adjacent medians. City staff and their consultants for this project will witness this piping check.

3.4 Water Garden Phase I Development

3.4.1 Location and Type of Development to be Served

The existing Water Garden development is located on the west side of Olympic Boulevard between Cloverfield Boulevard and 26th Street. The development consists of two six-story office buildings (2425 West Olympic Boulevard and 1620 26th Street). Located between the two buildings is an ornamental man-made lake covering an area of about 1.2 acre, with approximately 3.5 acres of landscaping around the lake, between the two buildings, and along the frontages facing West Olympic Boulevard and 26th Street. These frontage landscaped areas also include several ornamental spray fountains, which are now and will remain on potable water because of aerosol and misting considerations.

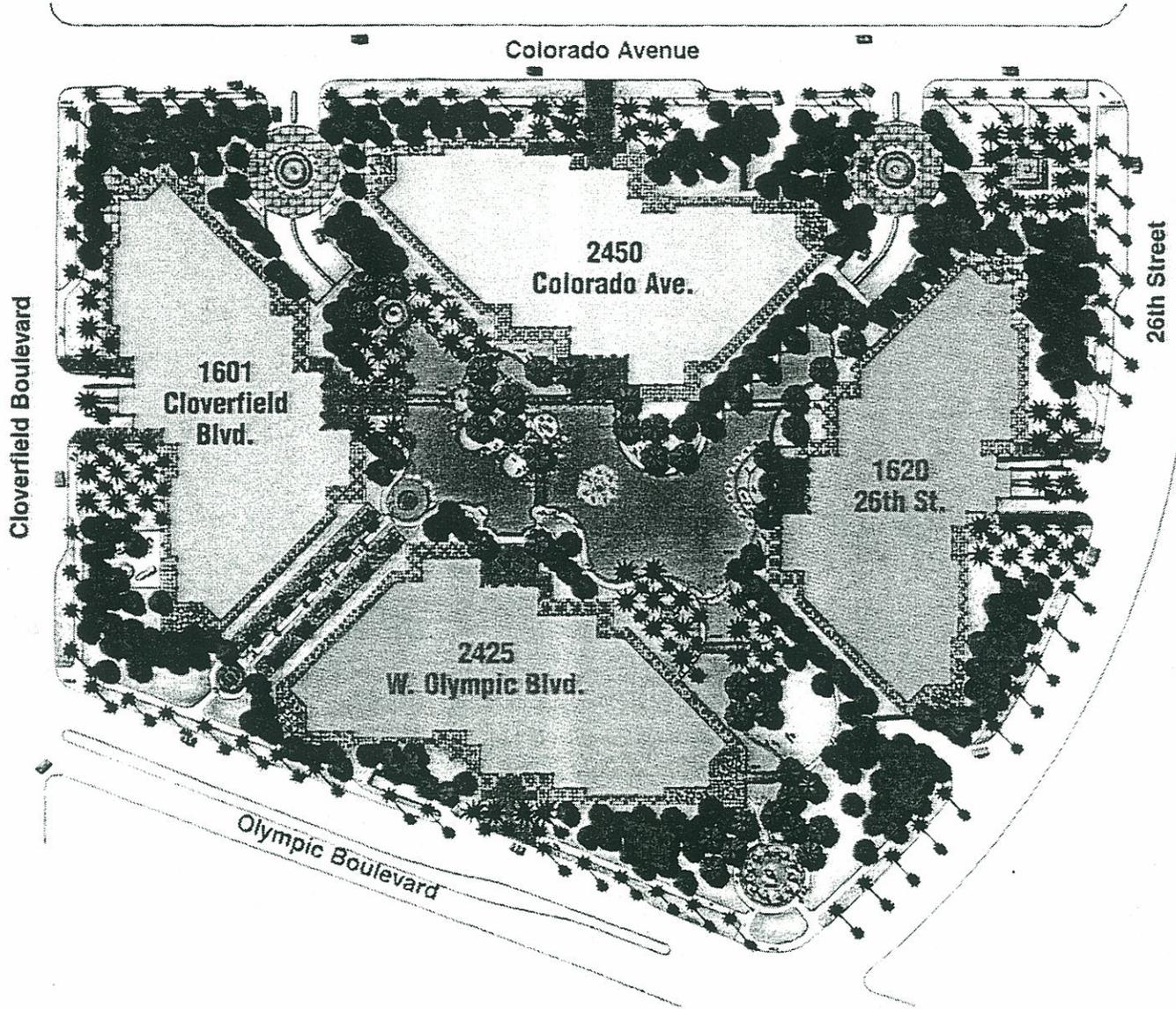
Figure 3-3 shows both the Phase I and Phase II Water Garden developments (two additional office buildings) with the scenic lake in the middle and the landscaped area around the lake and around all four of the office buildings. Section 3.5 of this report will discuss the Water Garden Phase II development, which is currently under construction.

3.4.2 Phase I Site Description

The Water Garden Phase I development (east and south buildings) was opened to the public in 1990/1991. An on-site wastewater treatment plant was completed by the time the first phase of the office complex was completed, but it took until May 9, 1994 to receive Waste Discharge Requirements for the treatment plant from the Los Angeles Regional Water Quality Control Board. The treated wastewater was discharged to the sanitary sewer system from 1991 through 1994, until it was demonstrated that the treatment plant could reliably and consistently meet the tertiary treatment requirements of the California Department of Health Services in terms of turbidity and disinfection so that the plant effluent could be safely used on-site for beneficial uses.

The treatment plant was permanently abandoned on December 28, 1999, due to costly operating expenses, limited treatment capacity, and on-site safety concerns. All on-site generated sewage has been discharged since December 1999 to the local sewer system. When active, the plant discharged into a 70,000-gallon treated water storage reservoir from which the water was pumped into the Phase I landscape irrigation system to the lake. This storage reservoir has an airgapped potable water makeup supply line which is now used to supply the landscape irrigation water system for Phase I and for lake

THE WATER GARDEN



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WATER GARDEN - PHASE I
AND PHASE II DEVELOPMENT

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water makeup. When active, the treatment plant was operated by a contractor. The treated water (now potable water) from the storage reservoir was handled by on-site maintenance staff, which includes an experienced mechanical engineer very knowledgeable about recycled water handling matters.

3.4.3 City Development Agreement (1988)

A development agreement was entered into on March 23, 1988 (copy in Appendix) between the City of Santa Monica and the developer of Water Garden Phase I. This agreement provided for the following water conservation elements:

- All toilets and urinals installed shall use not more than 1.5 gallons of water per flush and not more than 1 gallon per flush for urinals, with exceptions for handicapped persons.
- All on-site generated wastewater, except that from solid food wastes from on-site restaurants, shall be treated in on-site sewage treatment systems having the capacity of treating waste to a standard appropriate for the use of recycled water in toilets and urinals, for use in irrigation of landscaping, and for makeup water in an on-site, artificial, decorative lake.

The above recycled water reuse was required for water conservation purposes and because at the time there were sewage discharge limitations due to a lack of adequate local sewer capacity, the latter of which is no longer a concern.

- The recycled water produced by the on-site treatment plant shall be used for toilet and urinal flushing if approved by the Los Angeles County Health Department (it was not for Phase I). Excess recycled water beyond that needed for toilet and urinal flushing shall be used for landscape irrigation and replacement of evaporation of water from the artificial lake. If the use of recycled water is not approved for flushing toilets and urinals, the recycled water shall be used to the maximum extent possible for landscape irrigation and lake makeup water purposes.

The toilet/urinal flushing requirement was later not approved by the Cross-connection Control Section of the Los Angeles County Health Department because of a lack of design and system operating criteria (which now exists).

Due to unforeseen problems in obtaining timely regulatory approvals, it was not possible to begin using the recycled water for several years, but recycled water use plans were finally implemented for landscape irrigation and lake makeup water during 1994 and continued until December 1999.

3.4.4 Amended City Development Agreement (1999)

On December 23, 1999, the 1988 development agreement was modified and clarified that recycled water will be used as follows:

- Landscape irrigation for Phases I and II
- Lake makeup water for Phases I and II

Toilet and urinal flushing use for the Phase II development will be covered under a separate agreement.

The amended agreement acknowledged the December 2000 abandonment of the on-site package wastewater treatment plant due to cost issues, safety considerations, and the lack of treatment capacity for all required recycled water demands within the complex. The new agreement:

- Voided the 1988 development agreement.
- Permitted connections to the City sewer system and the permanent abandonment of the package domestic wastewater treatment plant.
- Stated that the Phase I/Phase II development will instead obtain its recycled water supply from the SMURRF system, and that recycled water will not be used at the various water spray fountains located in both Phase I and Phase II landscaped areas.
- Stated that until recycled water becomes available (summer/fall 2000), the Phase I and Phase II developments will both use potable water from the date the on-site package wastewater treatment plant was abandoned on December 28, 1999 until recycled water from the City becomes available.

The 1999 amended development agreement is attached in the Appendix.

3.4.5 1988/1989 Engineering Report – Water Garden Project – Wastewater Reclamation Facility

The information provided below is for historical information and background purposes. This report was prepared by Engineering-Science for the J.H. Snyder Company in August 1988 with later revisions in March 1989. The report is summarized below.

Section 1 – Introduction

A two-phase project is described. The four-building development is described as containing office space, retail space, restaurants, child-care facilities, and a health club. It describes the reasons for installing an on-site package sewage treatment plant with on-site reuse of the plant effluent.

Section 2 – Evaluation of Thetford Treatment System

Evaluations are summarized of eight package wastewater treatment plants located throughout the U.S. (Texas, New Jersey, and Virginia) of the type being considered for use in the Water Garden project. None of the eight plants reviewed nationwide were found to practice reclamation reuse. Five plants used leaching disposal facilities, and three used percolation ponds for effluent disposal.

The report states that the Los Angeles County Health Department may require drying any plant effluent to be used for toilet and urinal flushing, but stated that other wastewater reclaimers were working with DHS to have DHS waive such a requirement.

Section 3 – Design Criteria and Treatment Plant Description

A detailed description of the then-proposed package treatment plant train was provided. The plant proposed was of a type that would provide a wastewater quality suitable for unrestricted recreational reuse—the highest degree of treatment outlined in DHS’s Wastewater Reclamation Criteria. In fact, the plant contained additional treatment processes that would result in a higher degree of treatment than required by regulations. One treatment plant was proposed for Phase I, and a separate treatment plant was proposed for Phase II. Each plant was proposed to consist of three treatment modules:

- Biological treatment – anoxic reactor and aerobic sludge digestion
- Ultrafiltration – tubular membranes
- Water polishing – GAC filtration, and UV and chlorine disinfection

Only the first plant for Phase I was later constructed. Some of the plant components were constructed somewhat differently than described in the report. The two treatment plants needed were estimated to need processing capacities of 21,500 and 15,500 gpd, respectively. The two office building construction phases were estimated to accommodate 3,260 and 3,022 persons, respectively. The toilet/urinal flushing for Phase II (being equipped with a dual-plumbed piping system) was estimated to require a flow of about 16,000 gpd.

The treated effluent being used for lake makeup water was to receive additional treatment for phosphorus reduction using alum coagulation followed by sedimentation. This was never implemented.

Section 4 – Summary of Title 22 Requirements

The then-enforced DHS regulations were explained and how these regulations will be complied with, including plant reliability features dealing with multiple turbidity monitoring devices. A treatment plant contingency plan was presented. Alarm systems to be provided were described. Redundancy features in treatment units were described.

Section 5 – Transmission and Distribution Systems

This section of the report stated that the on-site distribution mains for recycled water uses will be designed to comply with the following guidelines and regulations:

- Guidelines for the Distribution of Nonpotable Water, AWWA
- Guidelines for the Use of Reclaimed Water, DHS
- Regulations Relating to Cross-Connection, Title 17, DHS
- Manual of Cross-Connection Control Procedures and Practices, DHS

Reclaimed waterlines and potable waterlines were to be at least 10 feet apart and 1 foot apart in vertical construction locations (potable waterlines *over* reclaimed waterlines).

The report stated that all piping, valves, and outlets handling recycled water will be marked to differentiate them from domestic waterlines. All recycled water controllers, valves, etc., will be affixed with reclaimed water warning signs. There will be no connections between the potable water

supply and reclaimed water piping. Any potable water supplement to the reclaimed water will only be through an airgap separation or RP backflow prevention device, which will be inspected quarterly.

Groundwater extraction wells nearest the Water Garden Project are located near Olympic Boulevard and Stuart Street. These wells were reported to be contaminated and therefore on inactive status.

Section 6 – Use Areas

The use areas were described. The lake is described as covering 1.8 acres (actually 1.2 acres) and the total landscaped areas being about 6.2 acres. Landscape irrigation water demand was estimated to average 19,500 gpd, with maximum demand days being possibly twice as much. Lake makeup water demands were estimated to average 6,430 gpd (actually 4,340 gpd). This assumed an annual evaporation rate of 4 feet.

The report indicated that potable water makeup will at times be required to meet these demands once the Phase II development is completed. The on-site lake has an overflow into the Kenter Canyon storm drain. Runoff from the project site also drains to the same storm drain.

The report section states that the landscape irrigation system will be inspected daily to confirm that the sprinkler system is functioning properly. A contingency plan is described as to what actions will be taken in case inadequately recycled water is delivered to the use areas. Emergency notification procedures were described.

The preparation of an O&M manual was mentioned, and an ongoing on-site employee training program was described. Signage was proposed around the landscaped areas and in each building lobby. Such signs (never installed) were to emphasize the positive benefits of water conservation and wastewater reuse.

The section stated that no hose bibs will be installed on the irrigation system and that RP backflow prevention devices will be installed on all potable water service connections into the project site. All buried reclaimed water irrigation pipe will be marked with a plastic tape indicating "reclaimed waterline." Each potable waterline will be marked "potable waterline."

Within the building and wherever exposed, pipes will be color coded and labeled. Potable waterlines will be painted blue; reclaimed waterlines purple. To the extent possible, different pipe materials will be used for potable and reclaimed waterlines.

The report stated that copies of reclaimed water and potable water piping drawings will be kept in the building engineer's office and the building security office. Copies of these drawings will also be provided to the City of Santa Monica and the Los Angeles County Health Department.

The engineering report contained the following appendices:

Appendix A: Engineering-Science Cycle-Let Treatment Plant Report (their report on the eight treatment plants reviewed nationwide)

Appendix B: City of Santa Monica's 1987 potable water quality data

Appendix C: A Report of Waste Discharge for Waste Discharge Requirements to the RWQCB. The request was for a plant being able to handle 50,000 gpd. (In 1994, a Waste Discharge Requirement was issued, but only for 20,000 gpd.)

3.4.6 Waste Discharge Requirements from the RWQCB (May 1994)

These requirements, issued on May 5, 1994, permitted a plant design capacity of 20,000 gpd for serving up to 3,000 occupants, or about 6.7 gpd/person using low-flow toilets and urinals. The treatment process consisted of flow equalization, primary sedimentation, secondary treatment including anaerobic denitrification and aerobic treatment, ultrafiltration, activated carbon filtration, and UV and chlorine disinfection. Sludges produced were to be discharged to the sanitary sewer. The treated water was stored in a 70,000-gallon storage reservoir from where it was pumped with a single 250-gpm pump into the landscape irrigation system and to an ornamental lake for water makeup purposes.

The plant effluent limitations required by the RWQCB were as follows:

Constituent	Units	Maximum Limitation
pH	units	6.5 to 8.5
TDS	mg/L	1,000
Sulfate	mg/L	250
Chloride	mg/L	250
Boron	mg/L	0.5
Nitrate/nitrite and ammonia (N)	mg/L	10
Oil and grease	mg/L	10
Suspended solids	mg/L	30
TOC	mg/L	20
BOD	mg/L	30

Additional requirements were as follows:

- A seven-day media coliform bacteria MPN of 2.2/100 mL
- A maximum day coliform bacteria MPN of 23/100 mL
- Adding a coagulant to wastewater after secondary treatment and before filtration
- An average daily filtered water turbidity of 2 ntu
- A turbidity of no more than 5 ntu 95 percent of the time during any 24-hour period
- The recycled water shall be applied at such a rate and volume as not to exceed the vegetative demand and soil moisture conditions with no runoff.
- Erection of warning signs stating, "Attention – Reclaimed Wastewater – Avoid Contact – Do Not Drink." (This is not yet been done.)

A copy of the 1994 RWQCB's Waste Discharge Requirements is attached in the Appendix for informational purposes.

3.4.7 Treatment Plant Performance and Recycled Water Demands

The information in this paragraph is provided to compare the original recycled water system with the new system. Summarized on Table 3-1 is 1999 plant flow and performance information for the last year the plant was operated. The plant flow information for the Phase I development shows the following:

- Generated sewage flows were often in excess of the 20,000-gpd treatment plant capacity credited by the RWQCB.
- Peak day flows reached volumes ranging up to 38,000 gpd.
- During some months, some of the treated water flow had to be discharge out of the 70,000-gallon storage reservoir into the sewer system due to lack of sufficient on-site recycled water demands. However, the diverted effluent flows into the sewer system were small.
- The total month reuse column shows the actual recycled water demands for Phase I in terms of landscape irrigation and lake makeup requirements. The lake bottom liner is about to be rebuilt to reduce excessive water losses due to percolation. This problem became evident when it was

noted that lake water makeup requirements were found to significantly exceed the estimated lake evaporation losses tabulated below.

Phase I Estimated Lake Evaporation Losses

Month	Evaporation		Month	Evaporation	
	gal/min	gal/month		gal/min	gal/month
1	0.8	35,712	7	8.9	397,296
2	1.4	56,448	8	8.6	383,904
3	2.5	111,600	9	7.1	306,720
4	3.6	155,520	10	4.8	214,272
5	5.0	223,200	11	2.6	112,320
6	7.1	306,720	12	1.2	53,568
Total (in/yr)	53.6				

How much additional water was actually put into the lake to make up for evaporation and percolation losses could not be determined. If these figures were known, one could subtract these water volumes from the "total month" column on Table 3-1 to determine how much water was used for the Phase I landscape irrigation requirements.

Table 3-1 clearly shows the following in terms of water quality:

- The treatment plant easily met the filtration turbidity requirement of 2.0 ntu.
- Chlorine residuals in the plant effluent fluctuated greatly.

**Table 3-1
Wastewater Treatment Plant Performance Summary
Water Garden Development - Phase I
City of Santa Monica**

Month	Reuse Flow (gal)			Sewer Flow Total Month ² (gal)	Max Turbidity (ntu)	Chlorine Residual (mg/L)		Min pH (units)	Maximum Coliform (MPN/100 mL)
	Max Day	Avg Day	Min Day			Max	Min		
1/99	31,478	23,734	0	735,746	0.4	2.0	0.1	7.4	<2
2/99	35,374	25,728	10,565	56,000	0.3	2.2	0.2	7.1	12
3/99	36,381	26,028	10,485	806,870	0.2	4.6	0.2	7.1	<2
4/99	37,000	25,049	0	751,464	0.2	3.6	0.1	7.0	<2
5/99	37,591	25,333	6,288	785,331	0.2	2.1	0	7.1	<2
6/99	37,794	29,155	94	874,641	0.2	5.0	0	7.0	<2
7/99	37,604	30,339	7,895	940,510	0.3	10.1	0	7.1	<2
8/99	37,797	31,062	11,554	962,907	0.2	4.9	0	7.1	<2
9/99	36,977	25,472	10,061	764,175	0.2	2.1	0.1	7.1	<2
10/99	37,129	24,866	4,998	770,861	0.2	0.4	0.02	7.0	<2
11/99	36,068	22,198	9,326	665,948	0.7	0.0	0.02	7.0	<2
12/99 ¹	29,944	18,778	0	60,056	0.2	0.3	0.02	7.1	<2

¹Stopped using recycled water on 12/28/99. Started to discharge the sewage to the sewer.

²Treated sewage discharged to sewer.

- The pH of the water was usually relatively low (corrosive).
- Disinfection of the wastewater was excellent each day except for a one-day occasion.

Table 3-2 summarizes the chemical quality of the treated water. The plant effluent water quality met the RWQCB discharge requirement. The TDS of the water ranged from 613 to 658 mg/L. The landscaping on the Phase I development tolerated this water quality quite well according to on-site O&M staff.

The future recycled water supply from the City of Santa Monica has the following “finished” water quality goals:

- Oil and grease None detected
- pH 6-9 (noncorrosive)
- Turbidity 2 NTU
- Total suspended solids: <2 mg/L
- TDS 900-1,000 mg/L

More comprehensive sampling will be conducted by the City as soon as the treatment plant becomes operational.

3.4.8 Irrigation Demand Estimates for the Phase I Development

Irrigation demands for Phase I were estimated during 1993 with the following projections:

Month	Planted Area ¹ (ft ²)	ET (inches/year)	Effective Rainfall ² (inches/year)	Estimated Water Use (gallons)
January	152,637	2.2	0	164,221
February	152,637	2.5	0	195,302
March	152,637	3.4	0	308,927
April	152,637	3.8	0	472,905
May	152,637	4.8	0	547,319
June	152,637	5.0	0	529,587
July	152,637	5.3	0	598,193
August	152,637	4.9	0	507,645
September	152,637	4.5	0	403,662
October	152,637	4.5	0	308,927
November	152,637	2.4	0	201,388
December	152,637	2.0	0	146,978
Total	152,637	44.0	0	4,405,564

¹No credit given.

3.4.9 Location of Proposed Recycled Water Service and On-Site Connection

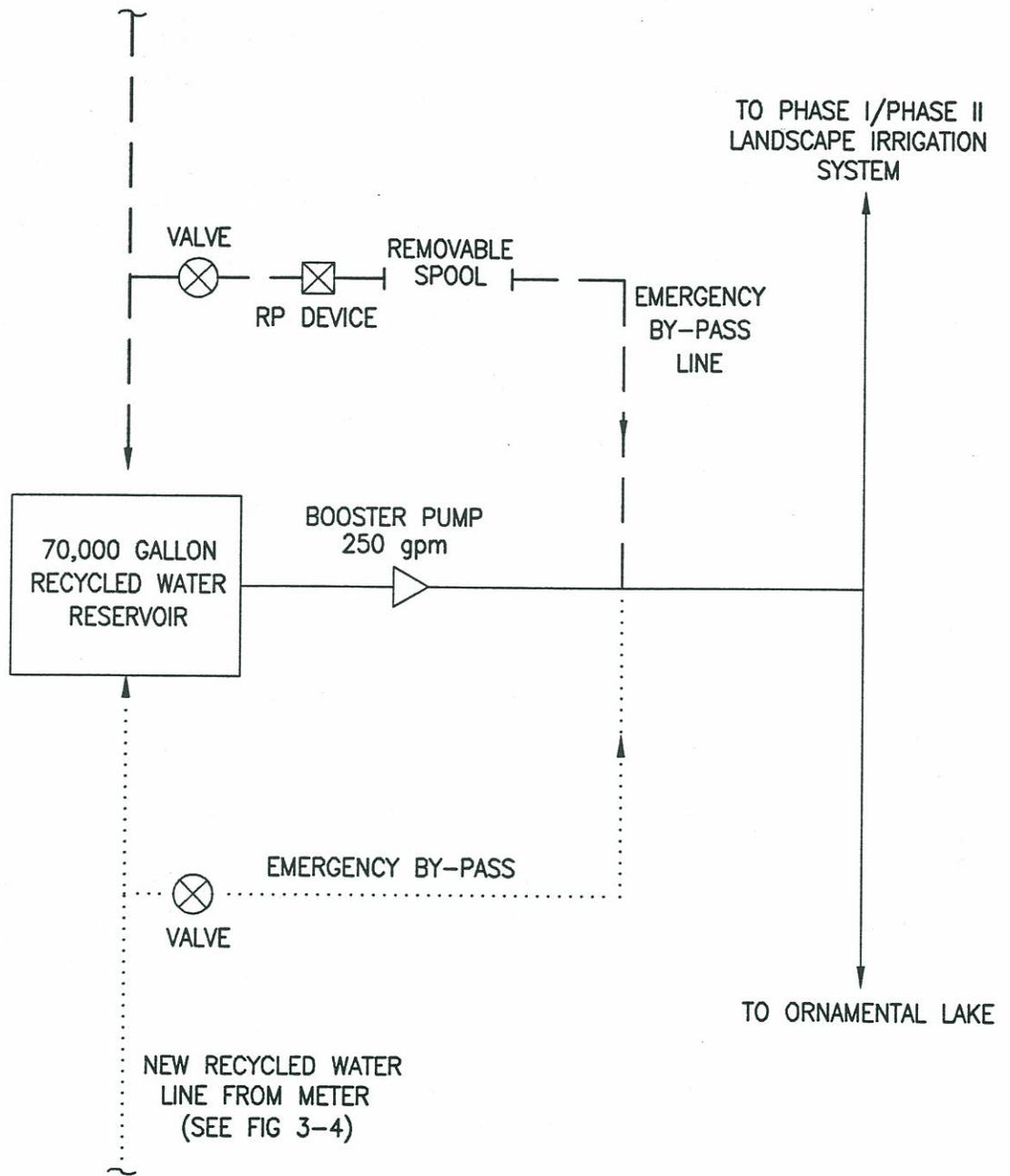
The 8-inch recycled waterline in Olympic Boulevard will terminate at 26th Street, and the new recycled water service connections will be made off the end of the 8-inch line as shown on Figures 2-2 and 3-4.

Table 3-2
Wastewater Treatment Plant Effluent Quality - 1999
Water Gardens Development - Phase I
City of Santa Monica
 (Results in mg/L)

Quarter	NO ₃ (N)	NO ₂ (N)	NH ₃ (N)	TDS	Cl ⁻	SO ₄	TOC	B
1	7.5	0.0	0.0	658	102	178	2.2	0.466
2	3.9	0.0	3.4	613	103	141	9.0	0.440
3	8.2	0.0	0.0	644	140	150	5.4	0.398
4								
Max	8.2	0.0	3.4	658	140	178	9.0	0.466
Avg	6.5	0.0	1.1	638	115	156	5.5	0.435
Min	3.9	0.0	0.0	613	102	141	2.2	0.398

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POTABLE WATER MAKE-UP
LINE THROUGH AIRGAP
SEPARATION



NOTE: THE EMERGENCY BY-PASS LINE INVOLVING THE POTABLE WATER WILL BE PERMANENTLY ABANDONED

CITY OF SANTA MONICA
NEW RECYCLED WATER FEED LINE
INTO 70,000 GALLON RESERVOIR

The recycled water connection will be metered. From the meter, a 4- to 6-inch cast-iron pipe, wrapped with a purple warning tape, will convey the recycled water directly into the 70,000-gallon recycled water storage reservoir. This line will also be connected into the discharge side of the booster pump for use when the reservoir needs to be cleaned or repaired. See Figures 3-4 and 3-5.

3.4.10 Existing Potable Water Services Into Phase I

Phase I has a 6-inch domestic water service on 26th Street which also provides makeup water into the top of the 70,000-gallon tertiary treated wastewater storage tank through an airgap separation. This reservoir has an overflow that discharges into a local storm drain. The same potable water connection can also be used to directly supply the Phase I landscape irrigation piping system through an RPP backflow prevention device and a removable spool pipe (both currently removed). This interconnection into the 250-gpm pump discharge has been activated at times when it was necessary to clean and maintain the 70,000-gallon reservoir. The City of Santa Monica will require Phase I to keep using the reservoir and the potable water makeup airgap as the means to provide on-site water supply reliability in case recycled water is not available. Use of the on-site reservoir will also cause Phase I to peak off its reservoir, not the City system. The water service is equipped with a 6-inch RP backflow prevention device, which is tested yearly.

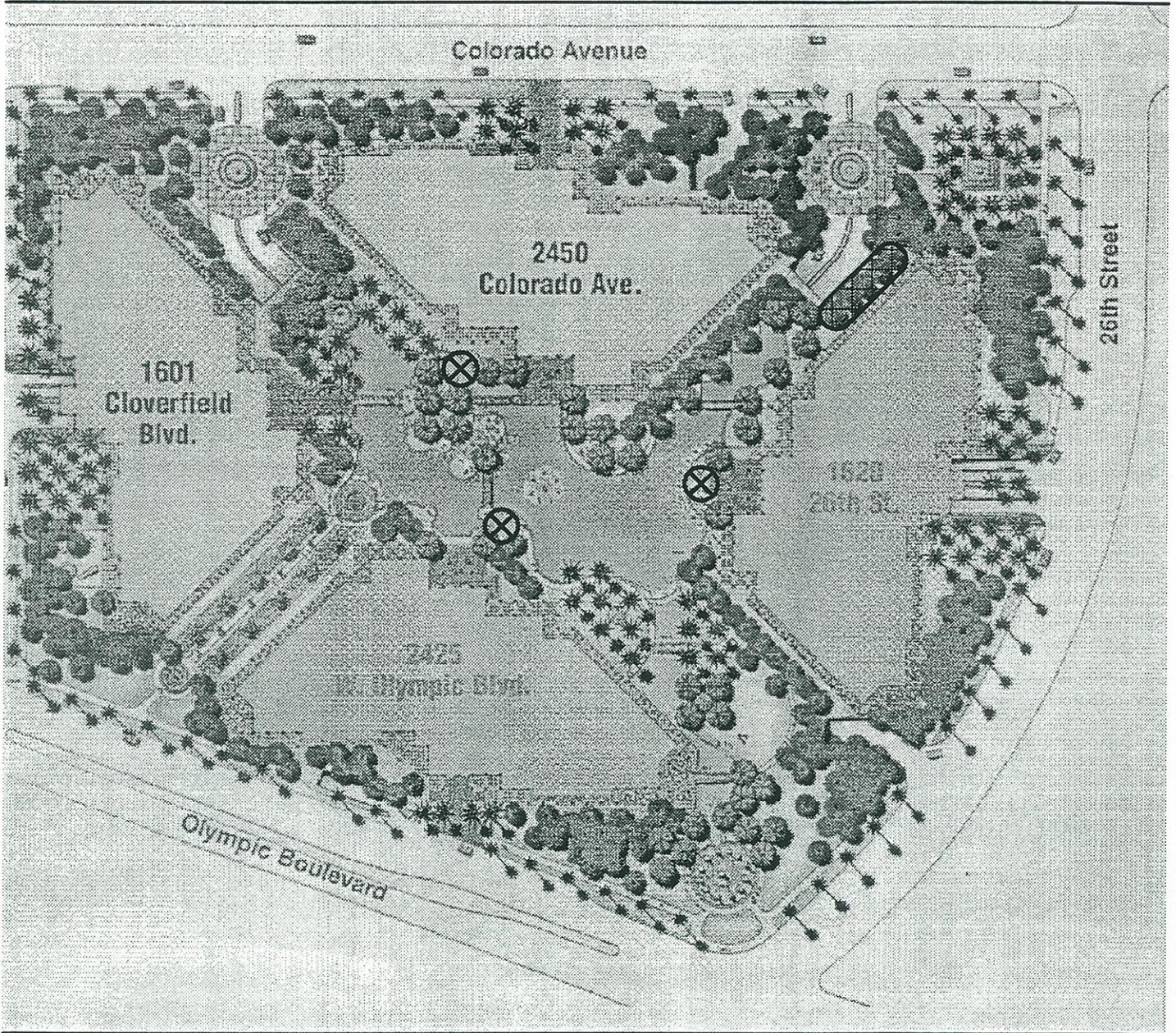
Phase I has a second 6-inch domestic water service on 26th Street that is used to supply water into a 90,000-gallon fire protection storage tank. Fire pumps take water from this tank to provide fire protection. This 6-inch water service has a 6-inch backflow prevention device, which is tested yearly.

3.4.11 Landscape Irrigation System

The existing landscape irrigation piping system was initially installed as a purple PVC piping system designed for the distribution of recycled water. All aboveground features of the irrigation system are colored purple and marked with purple tape. There are no hose bibs on this irrigation water piping system. Some aboveground piping associated with the irrigation system is of copper construction that is spiral wrapped with purple tape to clearly identify that it is a recycled water pipeline.

The irrigation water distribution system is only pressurized while the booster pump off the 70,000-gallon recycled water storage tank is operating. This pump maintains a pressure of 60 psi. Irrigation hours are between midnight and 6 a.m. There is no pressure in the irrigation water piping system the remainder of the time. This mode of operation will be continued in the future and will include the Phase II development. There are several quick-disconnect couplers off the irrigation piping system for washdown and hand watering purposes using portable hoses. The facility has two outdoor eating areas (see Figure 3-6). One of these is surrounded by eight lake spray fountains used for lake aeration. Neither area is near lawn sprinklers. There are currently no general warning signs anywhere in or adjacent to the landscape areas or in any of the buildings that would inform the on-site general public that recycled water is being used. No such signs have been required in the past. There are no outdoor drinking fountains except within a fenced child care playground area. The landscape areas border one location used as a child care facility playground area. This area is fenced (it has no landscaped areas within the fenced playground area). The bushes on the outside of the fence area will continue to be irrigated with potable water. When irrigated with recycled water, the grass and plants have not responded adversely to the water quality used in the past. The existing landscape irrigation

THE WATER GARDEN



OUTDOOR EATING AREA



FENCED CHILD CARE RECREATION AREA



CITY OF SANTA MONICA
 WATER GARDEN - PHASE I
 AND PHASE II DEVELOPMENT

BOYLE ENGINEERING CORPORATION

FIGURE 3-6

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pipng system now serving Phase I will be extended throughout the Phase II landscaped areas instead of building a separate irrigation water piping system. Figure 3-6 shows the location of the three outdoor eating areas and the outdoor fenced childcare playground area.

3.4.12 Ornamental Lake

The existing 1.2-acre lake holds about 396,000 gallons of water. The water depth is 12 inches. As part of the ongoing construction of Phase II, the lake will be increased from about 1.2 to 1.4 surface acres. The lake is aerated 24 hours/day. The lake water is continuously filtered using a biofiltration system. In the past, the water has been dyed blue to enhance the appearance of the water and to discourage anyone from drinking the water. On the day of visiting Water Garden Phase I, the water looked physically very good. At that time, the lake was found to accommodate numerous water birds. As part of the lake enlargement project, it is planned to replace the lake liner to reduce excessive water percolation losses and to rebuild the biofiltration system. The recycled waterline that supplies lake makeup water is a purple PVC line with no hose bibs on the line.

3.4.13 Recommendations for Phase I

The following recommendations are made and will be implemented for Phase I:

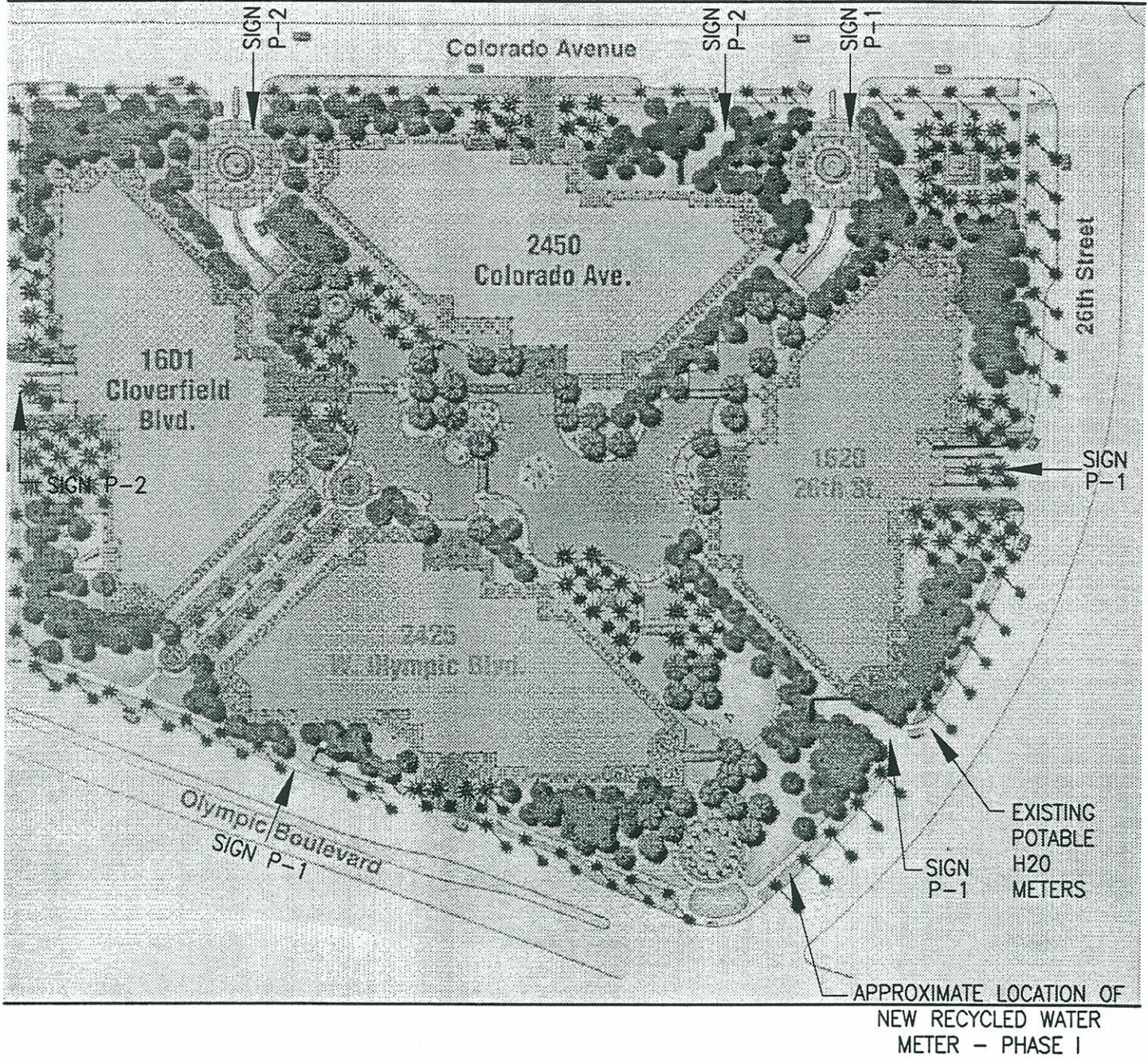
1. Install four warning signs—one at each entrance into the Phase I areas, as shown on Figure 3-7. Each will be a metal sign using white lettering on a green background (the color composition now used on other signs within the office building complex).
2. Each sign will use 1-inch lettering with the following wording: “To Conserve Water, This Facility Uses Recycled Water for Landscape Irrigation and Lake Makeup Water.”
3. The existing 70,000-gallon recycled water storage reservoir will continue to be used, along with the existing 250-gpm pump for landscape irrigation around the Phase I and Phase II developments and for makeup water of the expanded ornamental lake.
4. The potable water makeup line into the 70,000-gallon reservoir will continue to be maintained as an airgapped installation.
5. All new pipelines to convey recycled water from the metered service to the 70,000-gallon reservoir will be clearly identified with purple tape. This will include all appurtenances to that piping.

3.5 Water Garden Phase II Development

3.5.1 Location and Type of Development

This additional development, almost a mirror image of the Phase I development, is located on the west side of Olympic Boulevard between Cloverfield Boulevard and 26th Street. The development consists of a six-story office building and a five-story office building. These buildings will also be known as the

THE WATER GARDEN



SIGN P-1 = FOR PHASE I
 SIGN P-2 = FOR PHASE II



CITY OF SANTA MONICA
 WATER GARDEN - PHASE I
 AND PHASE II DEVELOPMENT

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West and North Buildings. Their addresses are 1601 Cloverfield Boulevard and 2450 Colorado Avenue. Located between these two buildings and the two buildings constituting Phase I are 2.62 acres of landscaping and an existing ornamental lake, which will be expanded in surface area by about 10 percent. The additional buildings also have frontage landscaping that include several spray fountains, which will use potable water only. Figure 3-3 shows the Phase I and Phase II developments with the expanded scenic lake in the middle and the landscaped area around the lake and around all four office buildings. Figure 3-6 shows that Phase II will have one outdoor eating area near the lake. This area is away from lawn sprinklers and lake aeration devices.

3.5.2 Phase II Site Description

Phase II is a virtual copy of the Phase I development. It too will accommodate 2,000 to 3,000 persons. One difference is that one of the two new office buildings is only five stories tall. The facility is scheduled for completion by July/August 2000. The original plan was to expand the 20,000-gpd tertiary domestic wastewater treatment plant and to use the additional plant effluent for the following Phase II water demands:

- Toilet/urinal flushing within the two Phase II office buildings
- Landscape irrigation water obtained through the existing Phase I landscape irrigation piping system
- Ornamental lake water makeup in a slightly enlarged lake using the existing Phase I lake makeup water system

Since this wastewater treatment plant was permanently abandoned, the toilet/urinal flushing in both buildings will now be done from a new recycled water connection from the City of Santa Monica to be located at the intersection of Olympic Boulevard and Cloverfield. Both buildings have been equipped with a dual plumbing system to serve a total of 46 toilet facilities. The Los Angeles County Health Department has reviewed the construction of the Phase II plumbing as the buildings are being completed. This review has been conducted by Mr. Howard Miller using Appendix J of the Uniform Plumbing Code as the design and system testing criteria. Appendix J is attached in the Appendix of this report. Appendix J also includes instructions on how such dual plumbing systems need to be initially tested, maintained, monitored, and again tested for cross-connection every four years.

3.5.3 Irrigation Demand Estimates for Phase II

Irrigation demands for Phase II were determined during 1993 with the following projections:

Month	Planted Area (ft ²)	ET (inches/year)	Effective Rainfall ¹ (inches/year)	Estimated Water Use (gallons)
January	114,343	2.2	0	123,576
February	114,343	2.5	0	146,619
March	114,343	3.4	0	230,280
April	114,343	3.8	0	348,353

Month	Planted Area (ft ²)	ET (inches/year)	Effective Rainfall ¹ (inches/year)	Estimated Water Use (gallons)
May	114,343	4.8	0	404,359
June	114,343	5.0	0	392,311
July	114,343	5.3	0	432,490
August	114,343	4.9	0	376,374
September	114,343	4.5	0	301,067
October	114,343	4.5	0	230,280
November	114,343	2.4	0	150,662
December	114,343	2.0	0	110,690
Year/Total	114,343	44.0	0	3,270,703
Average Day				8,960

¹No credit given.

3.5.4 Location of Proposed Recycled Water Service

Recycled water service for the Water Garden Phase II development will be off the 8-inch recycled water main in Olympic Boulevard near its intersection with Cloverfield Boulevard, as shown on Figures 2-2 and 3-8. The 6-inch-diameter connection will be metered. The supply derived through this connection will only be used for the flushing of toilets and urinals in Phase II. The Phase II recycled water supply for landscape irrigation and lake water makeup will be obtained through the existing Water Garden Phase I recycled water distribution system described in Section 3.4.12.

3.5.5 Proposed Potable Water and Recycled Water Services Into Phase II

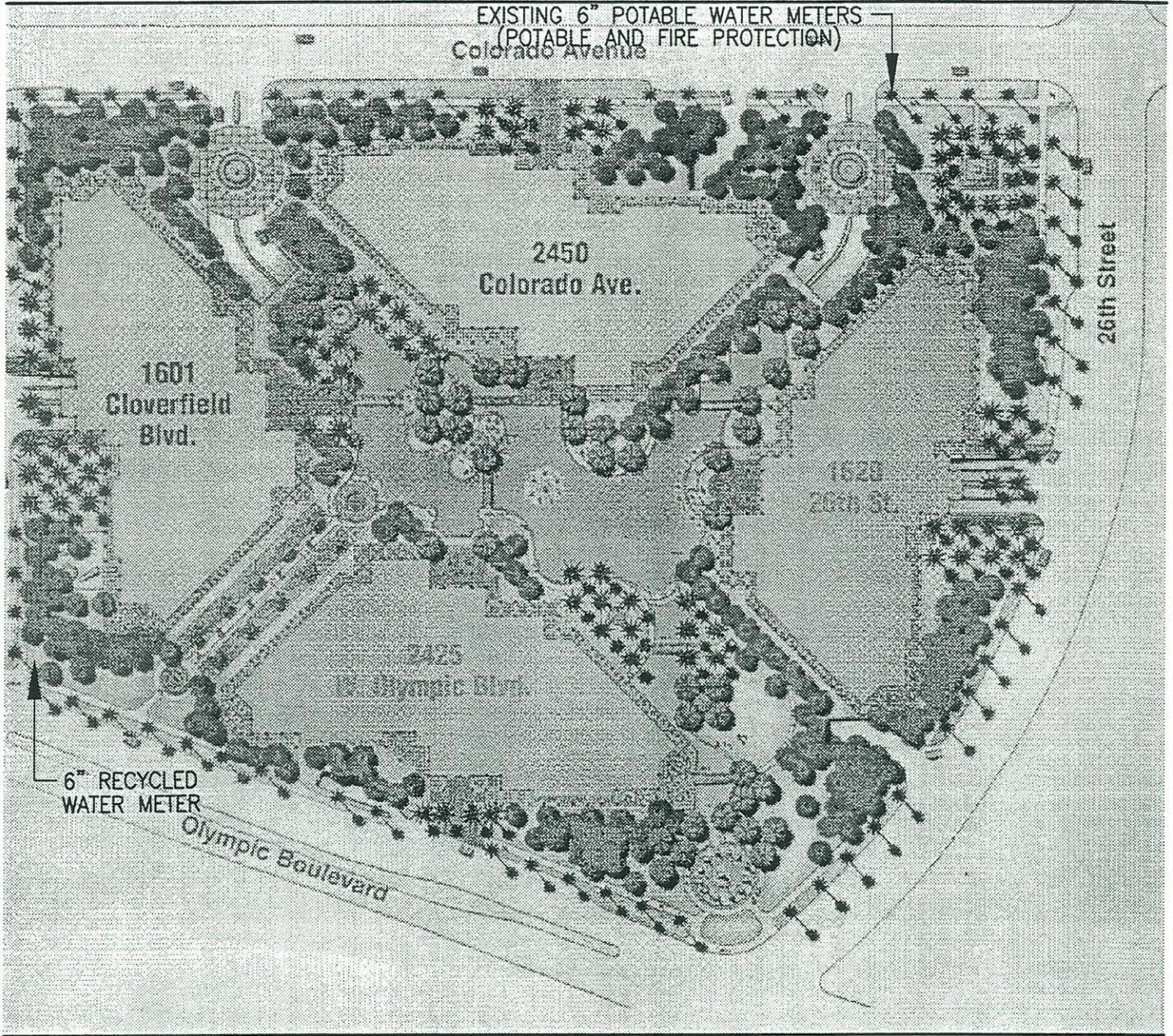
Phase II will have two 6-inch potable water service connections, one of which will be used to service the fire protection system. These connections are located side by side on the Colorado Avenue side of the complex, as shown on Figure 3-8. Both connections are metered and equipped with RPP backflow prevention devices.

The recycled water service for the dual-plumbed water piping system is off the 8-inch City supply line in Olympic Boulevard at the intersection of Olympic Boulevard and Cloverfield Boulevard, as shown on Figure 3-8. A purple pipeline will convey the recycled water supply from the meter to an on-site in-line booster station that will repressurize the recycled water supply to the five- and six-story office buildings. This booster pumping plant is housed in the Phase II building basement facing Colorado Avenue.

3.5.6 Recycled Water Booster Station

Both the potable water source supplying potable water outlets and the recycled water source supplying 46 toilet rooms come together in a basement equipment room that houses two pumping systems, as shown schematically on Figure 3-9. It shows two side-by-side, in-line booster stations, each consisting of three pumps and a pressure tank. Also shown is a temporary intertie because recycled water will not be available initially. This intertie will be physically removed as soon as the recycled water becomes available.

THE WATER GARDEN



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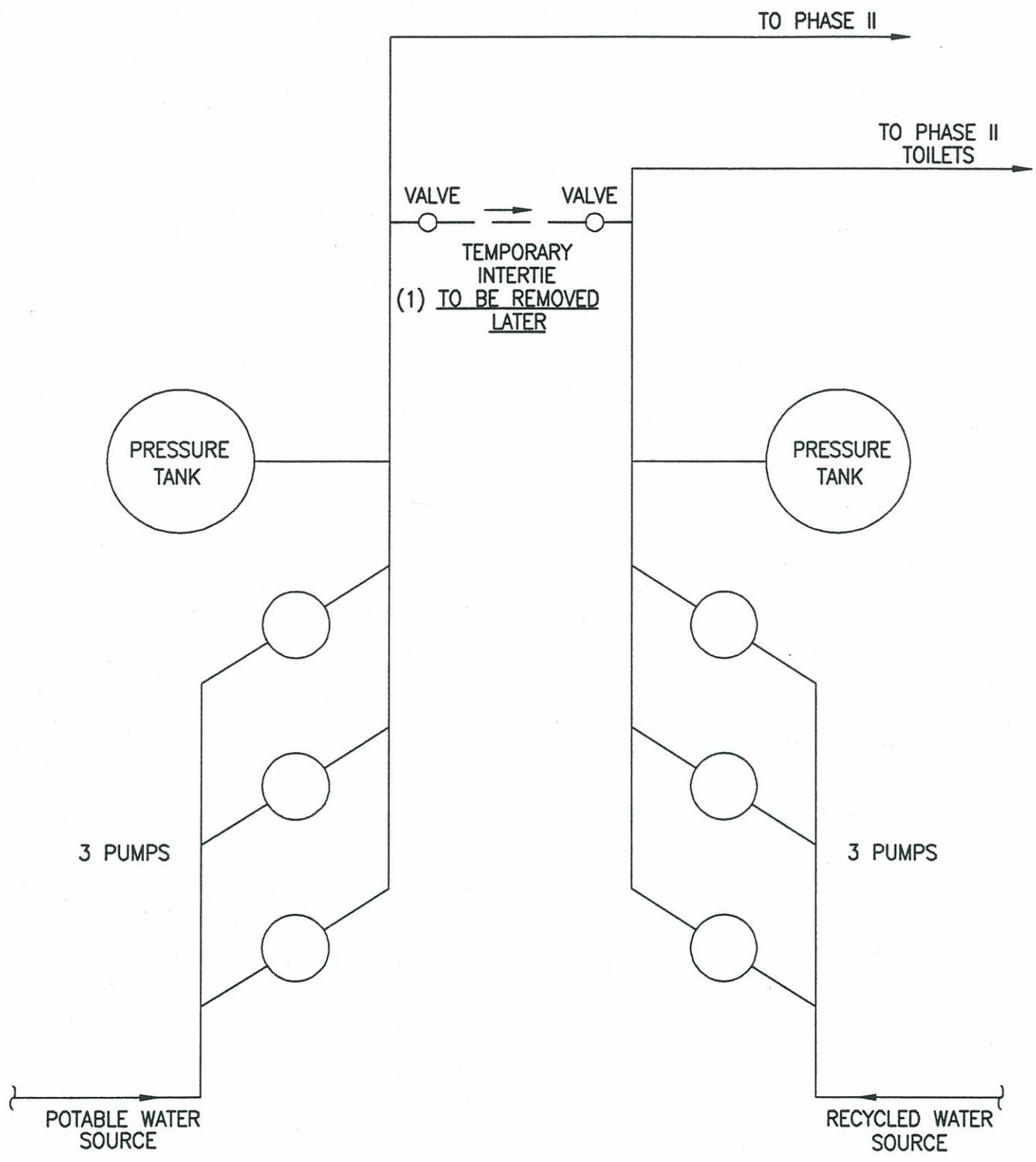


CITY OF SANTA MONICA
WATER GARDEN - PHASE I
AND PHASE II DEVELOPMENT

BOYLE ENGINEERING CORPORATION

FIGURE 3-8

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(1) POTENTIAL FUTURE EXTREME EMERGENCY BACKUP SYSTEM WITH THE USE OF A RPP BACKFLOW PREVENTION DEVICE ONLY WITH PRIOR CITY AUTHORIZATION.

CITY OF SANTA MONICA
PUMPING EQUIPMENT IN
PHASE II WATER GARDEN
EQUIPMENT ROOM

This emergency intertie can be reactivated if necessary in the future, but only with the prior approval from the City of Santa Monica and the incorporation of an approved RPP backflow prevention device. This would only occur in the unlikely event that the City is unable to deliver recycled water. Appendix J of the Uniform Plumbing Code requires that permanent internal backup connections are not allowed.

The room and the equipment have not yet been painted. When completed, all of the recycled water piping and pumping equipment will be painted purple and equipped with approved warning signs and warning tags. The potable water equipment will be painted blue. The equipment room will be equipped with the necessary facilities to prevent draining of both water potable and recycled water piping systems. These facilities to be added will include facilities to dispose of the considerable amounts of water that will result from draining either piping system.

3.5.7 Miscellaneous Site Characteristics

All of the outdoor irrigation piping that is buried will be purple PVC sprinkler piping. All lawn sprinkler appurtenances will be painted purple, and purple warning tape will be used. No hose bibs will be installed on any recycled water piping. Portable outdoor hose usage will only be through quick-disconnect couplers off the irrigation system. Landscape irrigation hours for Phase II will be during the same hours as described for Phase I (midnight through 6 a.m.).

All indoor recycled water piping is of copper construction and spiral wrapped with purple warning tape. Typical pipe sections are shown on photographs in the Appendix. There will be no hose bibs off indoor recycled water piping.

There will be no outdoor drinking fountains. Phase II will have three outdoor spray fountains, which will use potable water only. The locations of the Phase II outside warning signs are shown on Figure 3-7. There will also be warning signs on the inside of each dual-plumbed building at the following locations:

- Inside the entrance of each toilet room
- On the access door to recycled water plumbing components/valves
- On each recycled water valve

3.5.8 Proposed DHS Regulations for Dual-Plumbed Recycled Water System

DHS is currently in the process of revising its currently enforced reclaimed water regulations (Wastewater Reclamation Criteria). The proposed revisions include the use of recycled water for dual-plumbed systems. Dual-plumbed systems are defined in the proposed regulations as follows:

“Dual-plumbed system,” or “dual plumbed” means a system that utilizes separate piping systems for recycled water and potable water within a facility and where the recycled water is used for either of the following purposes:

- a. To serve plumbing outlets used by the public within a building, or*
- b. Landscape irrigation at individual residences*

General requirements for dual plumbed recycled water systems are proposed as follows:

- a. *No person other than a recycled water agency shall deliver recycled water to a dual-plumbed facility. (This will be the case for this project.)*
- b. *No recycled water agency shall deliver recycled water for any internal use to any individually-owned residential units, including free-standing structures, multiplexes, or condominiums. (This will not apply to this project.)*
- c. *No recycled water agency shall deliver recycled water for internal use except for fire suppression systems to any facility that produces or processes food products or beverages. This exclusion does not apply to a cafeteria or snack bar in a facility whose primary function does not involve the production or processing of foods and/or beverages. (This will not apply to this project.)*
- d. *No recycled water agency shall deliver recycled water to a facility using a dual-plumbed system unless the report required pursuant to Section 13522.5 of the Water Code, and which meets the requirements set forth in Section 60314 has been submitted to the regulatory agency (DHS). (This report will fulfill this requirement.)*

For dual-plumbed recycled water systems, the report to be submitted pursuant to Section 13522.3 of the Water Code must contain the following information in addition to the information required by Section 60323:

1. *A detailed description of the intended use area identifying the following:*
 - a. *The number, location, and type of facilities within the use area proposing to use dual plumbed systems*
 - b. *The average number of persons estimated to be served by each facility on a daily basis*
 - c. *The specific boundaries of the proposed use area including a map showing the location of each facility to be served*
 - d. *The person or persons responsible for operation of the dual-plumbed system at each facility, and*
 - e. *The specific use to be made of the recycled water at each facility*
2. *Plans and Specifications describing the following:*
 - a. *Proposed piping system to be used*
 - b. *Pipe locations of both the recycled and potable water piping systems*
 - c. *Type and location of outlets and plumbing fixtures that will be accessible to the public, and*
 - d. *The methods and devices to be used to prevent backflow of recycled water into the public water system*

3. *The methods to be used by the recycled water agency to assure that the installation and operation of the dual-plumbed system will not result in cross-connections between the recycled water piping system and the potable water piping system. This shall include a description of pressure, dye, or other test methods to be used to test the system every four years.*

This report contains the above-outlined information requests. Section 60323 states that all recycled water projects require the preparation of an engineering report with the following instructions:

- a. *No person shall produce or supply reclaimed water for direct reuse from a proposed water reclamation plant unless he files an engineering report. (This is the reason for this supplemental report.)*
- b. *The report shall be prepared by a properly qualified engineer registered in California and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed reclamation system. The report shall clearly indicate the means for compliance with these regulations and any other features specified by the regulatory agency.*
- c. *The report shall contain a contingency plan which will assure that no untreated or inadequately-treated wastewater will be delivered to the use area. (The contingency plan for the City's recycled water treatment plant is contained in the original report for this project.)*

The new proposed regulations contain the following design requirements:

The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed recycled water system unless the connection between the two piping systems is protected by an airgap separation which complies with the requirements of Section 7602(a) and 7603(a) of Title 17, CCR, and the approval of the public water system has been obtained. (No on-site backup system is being prepared, but such a system will exist because the recycled water system will initially be supplied with potable water until the recycled water becomes available.)

The proposed new regulations also include the following operations requirements:

- a. *Prior to the initial operation of the dual-plumbed recycled water system and annually thereafter, the dual-plumbed system within each facility and use area shall be inspected for possible cross-connections with the potable water system. The recycled water system shall also be tested for possible cross-connections at least once every four years. The testing shall be conducted in accordance with the method described in the report submitted to Section 60314. The inspection and testing shall be performed by a cross-connection control specialist certified by the California-Nevada Section of the American Water Works Association. A written report documenting the results of the inspection and testing for the prior year shall be submitted to the Department within 30 days following completion of the testing. (This will be done under the close supervision and inspection by the Los Angeles County Health Department and City of Santa Monica Water Division staff.)*
- b. *The recycled water agency shall notify the Department of any incidence of backflow from the dual-plumbed recycled water system into the potable water system within 24 hours of the*

discovery of the incident. (The City of Santa Monica will provide such notification if and when necessary.)

- c. *Any backflow prevention device installed on the dual-plumbed recycled water system to protect the public water system shall be inspected and maintained in accordance with Section 7605 of Title 17, CCR.* (This will be enforced by the City of Santa Monica.)

Finally, the proposed new regulation states the following specific cross-connection control requirements:

1. *Premises where the public water system is used to supplement the recycled water supply must be protected with an airgap separation.* (Not applicable to this project.)
2. *Premises where recycled water is used and there is no interconnection with the potable water system, the potable water supply lines must be equipped with an RP backflow prevention devices.* (Applicable to this project.)
3. *Residences using recycled water for landscape irrigation as part of an approved dual-plumbed use area established pursuant to Sections 60313 through 60316 unless the recycled water supplier, or the Department if the water supplier is also the supplier of the recycled water, to utilize an alternative backflow protection plan that includes an annual inspection and annual shutdown test of the recycled water and the potable water system to subsection 60316(a). Potable water services to such residences must be equipped with at least approved double check valve assembly backflow prevention devices.* (Not applicable to this project.)
4. *Buildings where the fire system is supplied from the public water system and where recycled water is used in a separate piping system within the same building (or premises) must install at least approved double check valve assembly backflow prevention devices on such fire protection services.* (Not applicable to this project.)

A copy of the DHS "Notice of Proposed Rulemaking" and a copy of the new proposed regulations "Water Recycling Criteria (R-13-95) are attached in the Appendix for informational purposes. Two important considerations must be kept in mind:

- These regulations are intended to be applicable when treated domestic wastewater is to be recycled for beneficial uses. In this project, treated dry-weather runoff (not domestic wastewater) is the source water. These proposed regulations are used by the City of Santa Monica as guidance (not because compliance is required) to adequately protect the public health aspects in this project. Compliance with all of the regulation requirements is voluntary.
- These proposed regulations have not yet been officially adopted because revisions are still being made in response to public comments received after public circulation and review of the draft language.

3.5.9 Los Angeles County Health Department Requirements

Attached in the Appendix is a two-page guidance document used by County staff to evaluate and approve plans and specifications and the actual construction of recycled water facilities. The guidance

criteria provided is primarily for more typical recycled water uses such as landscape irrigation—not specifically for dual-plumbed buildings. The county health department uses Appendix J of the Uniform Plumbing Code for their approval of dual-plumbed systems.

3.5.10 Uniform Plumbing Code, Appendix J

Appendix J was added to the Uniform Plumbing Code in 1991/1992 to provide design, testing, and operational criteria for dual plumbing systems in nonresidential buildings. This section will outline the most salient features of Appendix J.

J-1 General Requirements

- No physical connections are allowed between the recycled water plumbing system and the potable water piping system. The only such connection that now exists to feed potable water into recycled water piping systems will be removed as soon as recycled water becomes available through the recycled water service at Olympic Boulevard and Colorado Avenue.
- All potable water connections into the buildings must have an approved backflow prevention device. Both potable water services (one for potable use and the other for fire protection) have RPP backflow prevention devices.
- No permit for using recycled water can be issued until complete plumbing plans have been submitted and approved to the Administrative Authority. The Administrative Authority for this project is the City of Santa and the Cross-Connection Control Section of the Los Angeles County Health Department. Plumbing plans have been submitted to the City, and periodic plumbing inspections have been conducted by the Administrative Authority as the buildings are being completed.
- Before the buildings can be occupied, the dual plumbing system must be tested for potential cross-connection in the presence of the Administrative Authority. This procedure is called the “initial test.” Plans are now under way to conduct the initial test during July or August, which will involved draining both plumbing systems, one at a time. This test will be closely observed by city/county health department staff.

J-2 Definitions

See Appendix J contained in the Appendix of this report.

J-3 Permit

A permit is required to construct the initial plumbing systems, and additional permits are needed to make subsequent plumbing modifications. A permit to construct the initial plumbing systems is said to have been issued by the City of Santa Monica.

J-4 Drawings and Specifications

- Such documents will need to be detailed. The plumbing drawings for this project are very detailed.
- Recycled water risers in toilet rooms shall be installed in the opposite end of the room with respect to potable water piping. This was done whenever practical for this project.
- The recycled waterlines should not be in the same walls and/or ceilings as potable water piping. This was done where practical for this project. Also, the 10-foot/1-foot pipe separation requirements were used in this project whenever possible.

J-5 Pipe Material

- The piping for recycled water within buildings shall be of potable pipe construction materials.
- This piping shall be continuously wrapped with purple mylar tape.
- This tape must state "Caution: Reclaimed Water – Do Not Drink."
- This paragraph provides detailed information on the required type of warning tape, wrapping procedures, and lettering of the warning language.
- The paragraph states that all mechanical equipment (pumps, tanks, valves, etc., used as appurtenances to the recycled water piping system must be painted purple.

This project will incorporate and comply with all of the above outlined technical requirements.

J-6 Installation

- No hose bibs are allowed off the recycled water piping system. (The project meets this requirement.)
- Both piping systems (potable and recycled) must have the necessary valves to permit each piping system to be deactivated and drained.
 - Air vacuum release valves on top of the piping system
 - Drain valve on the lowest part of the piping system

The project currently does *not* meet this requirement, but such valving will be added to permit execution of the "initial cross-connection test."

- Recycled water piping and potable water piping cannot be placed (where in parallel) in the same trench.
 - The piping systems must be 10 feet apart in horizontal construction.
 - The piping systems must be 1 foot apart in vertical construction (potable *over* the recycled water piping)

The project, where feasible, meets these pipe separation requirements.

J-7 Warning Signs

- Room Entrance Signs. Room entrance signs (toilet rooms) should have at least half-inch letter, must be clearly visible, and sufficiently located. Signs must be approved by the Administrative Authority. Suggested sign language is: "To Conserve Water, This Building Uses Recycled Water to Flush Toilets and Urinals." Each of the 46 toilet rooms will have at least one such sign inside near the entrance door and possibly other locations such as at handwashing/mirror areas. The placement of all signs will be reviewed and approved by the Los Angeles County Health Department.
- Equipment Room Signs. Specific language requirements are stated. One-inch letters need to be used, and the sign location must be clearly visible. This project involves only one equipment room. Signage, as required, will be installed under the supervision of the Los Angeles County Health Department.
- Tank Type Water Closet Signs. Specific language is required. This project will not include any tank type water closets.
- Valve Access Door Signs. Sign makeup requirements are set forth, including placement location. A sign will be placed on the inside and in the center of each access door frame of the project.
- Valve Seals. Each valve must be sealed in a manner approved by the Administrative Authority after the recycled water system has been approved and placed into operation. These seals shall either be a crimped lead wire seal or a plastic breakaway seal which, if broken after system approval, shall be deemed conclusive evidence that the recycled water system has been accessed. Each seal shall be identified with a purple tag with the words "Recycled Water."

J-8 Inspection and Testing

- Recycled water piping shall first be tested as outlined in the Uniform Plumbing Code for testing potable water piping.
- An initial and subsequent cross-connection inspection and test must be performed on both the potable and recycled water piping systems as follows:
 - (1) Visual Dual System Inspection
 - Starting at each potable/recycled water meter, a visual review needs to be made to determine that no visual cross-connections have been created
 - All pumps and other equipment, equipment room signs, and exposed piping in the equipment room shall be checked.
 - All valves shall be checked to ensure that valve seals are still in place and intact. All valve control door signs need to be checked to verify that no signs have been removed.

(2) Cross-Connection Test

The following procedures shall be followed by the owner in the presence of the Administrative Authority:

- The potable water system shall be activated and pressurized. The reclaimed water system shall be shut down and completely drained.
- The potable water system shall remain pressurized for a minimum period of time specified by the Administrative Authority while the reclaimed water system is empty. The minimum period the reclaimed water system is to remain depressurized shall be determined on a case-by-case basis, taking into account the size and complexity of the potable and reclaimed water distribution systems, but in no case shall that period be less than one (1) hour.
- All fixtures, potable and reclaimed, shall be tested and inspected for flow. Flow from any reclaimed water system outlet shall indicate a cross-connection. No flow from a potable water outlet would indicate that it may be connected to the reclaimed water system.
- The drain on the reclaimed water system shall be checked for flow during the test and at the end of the period.
- The potable water system shall then be completely drained.
- The reclaimed water system shall then be activated and pressurized.
- The reclaimed water system shall remain pressurized for a minimum period of time specified by the Administrative Authority while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis, but in no case shall that period be less than one (1) hour.
- All fixtures, potable and reclaimed, shall be tested and inspected for flow. Flow from any potable water system outlet shall indicate a cross-connection. No flow from a reclaimed water outlet would indicate that it may be connected to the potable water system.
- The drain on the potable water system shall be checked for flow during the test and at the end of the period.
- If there is no flow detected in any of the fixtures which would have indicated a cross connection, the potable water system shall be repressurized.

In the event a cross-connection is discovered after the dual plumbing system has been placed into service, the following procedure, in the presence of the Administrative Authority, shall be activated immediately:

- Reclaimed water piping to the building shall be shut down at the meter, and the reclaimed water riser shall be drained.

- Potable water piping to the building shall be shut down at the meter.
- The cross-connection shall be uncovered and disconnected.
- The building shall be retested following procedures listed above.
- The potable water system shall be chlorinated with 50 ppm chlorine for 24 hours.
- The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. If test results are acceptable, the potable water system may be recharged.

Both the visual inspection and the initial cross-connection test will be completed as required, with the Administrative Authority witnessing the tests, before Water Garden Phase II is occupied. An annual visual inspection of both plumbing systems must be made following the outlined procedures in (1) above. A cross-connection test, as outlined in (2) above, must be completed and witnessed by the Administrative Authority at least once every 4 years. Both will be done in the future as required.

J-9 Pipeline Sizing

Recycled water pipe sizing must be done as outlined in the Uniform Plumbing Code for sizing potable water piping.

J-10 Approved Uses of Recycled Water

Recycled water is allowed in all nonresidential buildings to supply fixtures (toilets and urinals) as specified in this document, except where prohibited by statute, regulation, or ordinance.

3.5.11 Recommendations for Phase II

The following recommendations are made and will be implemented for Phase II:

1. Install three warning signs—one at each entrance into the Phase II areas, as shown on Figure 3-7. Each will be a metal sign using white lettering on a green background (the color composition now used on other signs within the Phase II building complex). Each sign will use 1-inch lettering with the following wording: “To Conserve Water, This Facility Uses Recycled Water for Landscape Irrigation and Lake Makeup Water.”
2. Erect a warning sign inside the equipment room and paint all potable water components within this room blue and all recycled water components purple.
3. Erect warning signs inside the entrance of each rest room.
4. Attach warning tags and seals as required on each recycled water valve.

5. Equip the potable water and the recycled water piping system with appropriate valves (at high and low points) to permit each piping system to be totally drained for cross-connection testing purposes.
6. Conduct an initial visual inspection with the Administrative Authority of the piping systems that can be viewed for cross connections with the prior to building occupancy.
7. Conduct an initial cross-connection test with the Administrative Authority of both piping systems following the procedures contained in Appendix J of the Uniform Plumbing Code.
8. Appoint Mr. Travis Addison, mechanical engineer of maintenance in Phase I, as the overall on-site recycled on-site recycled water supervisor for all recycled water uses in the Water Garden Phase I and Phase II development. No on-site piping modifications of any kind should be made in the future without his *written* approval.
9. The next Phase II cross-connection test should be repeated in 2 years and, if satisfactory, every 4 years thereafter.
10. Provide a recycled water supply that is noncorrosive.

Appendix

- 1988 Development Agreement for Water Garden Phase I/Phase II Development
- Amended 1999 Development Agreement for Water Garden Phase I Development
- 1994 RWQCB Waste Discharge Requirements for Package Wastewater Treatment Plant for Water Garden Phase I Development
- Irrigation Water Use Estimates for Water Garden Phase I and Phase II
- Monthly Lake Evaporation Rates for Water Garden Phase I and Phase II
- Probable Water Fountain Evaporation Rates for Water Garden Phase I and Phase II
- Notice of Proposed Rulemaking for Water Recycling Criteria (R-13-95), California Department of Health Services
- Uniform Plumbing Code, Appendix J – Reclaimed Water Systems for Nonresidential Buildings
- Recycled Water Use Criteria – Los Angeles County Health Department
- Project Photographs

*1988 Development Agreement for Water Garden
Phase I/Phase II Development*

1988

SEWAGE AND WATER CONSERVATION

COMPLIANCE AGREEMENT

This Agreement is made and entered into this 23 day of March, 1988, by and between J. H. SNYDER COMPANY II, a California limited partnership ("Developer") and the CITY OF SANTA MONICA, a municipal corporation ("City") with reference to the following facts:

WHEREAS, on February 9, 1988, the City adopted Ordinance No. 1433(CCS) which authorized and directed the City to enter into a Development Agreement between Developer and City (the "Development Agreement") denominated as City Contract No. 5061 relating to the development of a project in the City located on the property bounded by Olympic Boulevard, Twenty-Sixth Street, Colorado Avenue and Cloverfield Boulevard, and commonly known as the Water Garden Project (the "Project"); and

WHEREAS, in adopting Ordinance No. 1433(CCS) the City Council of the City directed the City Manager to return to the City Council within 30 days of February 9, 1988, with a proposed agreement detailing the manner in which the Developer would be required to comply with the water and sewer conservation provisions of the Development Agreement in order to meet the goals for water and sewer conservation set forth in the Development Agreement; and

WHEREAS, the City and the Developer have met and intend by this Agreement to set forth the manner in which the Developer will comply with the water and sewer conservation provisions of the Development Agreement;

NOW, THEREFORE, the parties agree as follows:

1. This Agreement shall constitute the manner in which the Developer shall comply with the water and sewer conservation provisions of the Development Agreement.

2. This Agreement is not intended to modify, amend, repeal, or otherwise change the Development Agreement or any provisions thereof.

3. The Developer shall construct the Project incorporating each of the following design features for the purpose of reducing water use and sewage discharge:

(a) All toilets and urinals installed in the Project shall be of a design approved for use as an ultra low flow toilet or urinal which shall consume not more than 1.5 gallons per flush for toilets and 1.0 gallons per flush for

urinals, except in those circumstances where such fixtures cannot meet the requirements of the applicable code for accessibility to handicapped persons.

(b) All of the plumbing waste from both toilets and urinals (black water) and from all other plumbing fixtures (gray water) (with the exception of solid food waste from restaurants) shall be treated in an onsite treatment system which shall have the capacity of treating plumbing waste to a standard appropriate for the use of reclaimed water in toilets and urinals and for use in irrigation of landscaping and in the artificial, decorative lake.

(c) The reclaimed water discharged from the treatment system required by Section 3(b) above shall, if approved by the Department of Health of the County of Los Angeles, be used for the flushing of toilets and urinals in the Project (other than in restaurants and child care facilities). To the extent that there is any excess reclaimed water, such reclaimed water shall be used for the following uses in the following order or priority: (1) replacement of evaporation of water from the artificial, decorative lake, and (2) irrigation of landscaping.

(d) If the use of reclaimed water for flushing of toilets and urinals is not approved by the Department of Health of the County of Los Angeles as provided in Section 5(a) or 5(b), below, then the reclaimed water shall be used for the following uses in the following order of priority: (1) replacement of evaporation of water from the artificial, decorative lake, and (2) irrigation of landscaping.

(e) Unless non-potable water is unavailable or prohibited from being used, all water utilized for the filling and replenishment of the artificial lake shall come from non-potable sources. Lake water demand not met by the on-site treatment system shall be met by flow from storm drains or another source acceptable to the Department of General Services.

(f) On-site drainage from 80% of the Property not covered by roofs shall be engineered to discharge into the artificial, decorative lake which shall be designed to act as an on-site detention basin which will enable to Project to retain any additional peak flow to area storm drains.

(g) To the extent feasible, landscaping shall consist of drought-resistant plants and the landscaping plans shall be subject to the approval of the Department of General Services as to the water conservation features of such landscaping.

4. The Developer shall employ a qualified sanitation engineer to prepare and file an engineering report on both the technical requirements of the sewage treatment system described in Section 3(b), above, and the discharge systems described in Sections 3(c) and 3(d), above, at least 60 days prior to the submission by the Developer of building plans for a building permit. Such report shall analyze the technical requirements of such systems and the standards for their design, coliform levels, contingency and emergency plans and flood prevention plans. The system design set forth in such report shall meet California Water Reclamation Criteria as well as guidelines set forth in Title 22 of the California Administrative Code. The engineer shall prepare such report in accordance with the State of California Department of Health Services "Guideline for the Preparation of an Engineering Report on the Production, Distribution and Use of Reclaimed Water" and shall consider the State of California Department of Health Services "Guidelines for Use of Reclaimed Water" and "Uniform Guidelines for Wastewater Disinfection".

5. (a) The Developer shall be required to install reclaimed water return lines within Phase I of the Project which will allow for the reuse specified in Section 3(c), above, if, within 90 days after the filing of the engineering report required by Section 4 above, the County of Los Angeles has approved the use of reclaimed water for use in toilets and urinals. If the County of Los Angeles has not approved such use, the Developer shall install the treatment system and reclaimed water lines for lake and landscaping as required by Section 3(d), above.

(b) The Developer shall be required to install reclaimed water return lines within Phase II of the Project which will allow for the reuse specified in Section 3(c), above, if, prior to filing of building plans for Phase II for plan check with the City, the County of Los Angeles has approved the use of reclaimed water for use in toilets and urinals. If the County of Los Angeles has not approved such use, the Developer shall install the treatment system and reclaimed water lines for lake and landscaping as required by Section 3(d), above.

6. No occupancy permit for any building in any Phase of the Project will be approved until the system required by Section 3(b), above, is fully operational and plumbing systems are in place for the uses of treated water described in Sections 3(c) and 3(d), above, as applicable.

7. Any definitions used in this Agreement which are not defined herein shall be defined as set forth in the Development Agreement.

8. This Agreement constitutes the entire agreement between the Developer and the City as to compliance with the water and sewage conservation for the Project and supersedes and prior oral or written understanding other than as set forth in the Development Agreement.

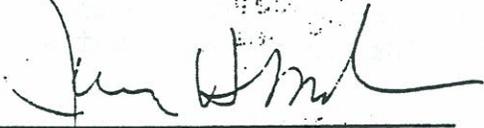
9. This Agreement shall be construed in accordance with the laws of the State of California.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first above written.

J. H. SNYDER COMPANY II,
a California limited
partnership

CITY OF SANTA MONICA,
a municipal corporation

By



JEROME H. SNYDER,
General Partner

By



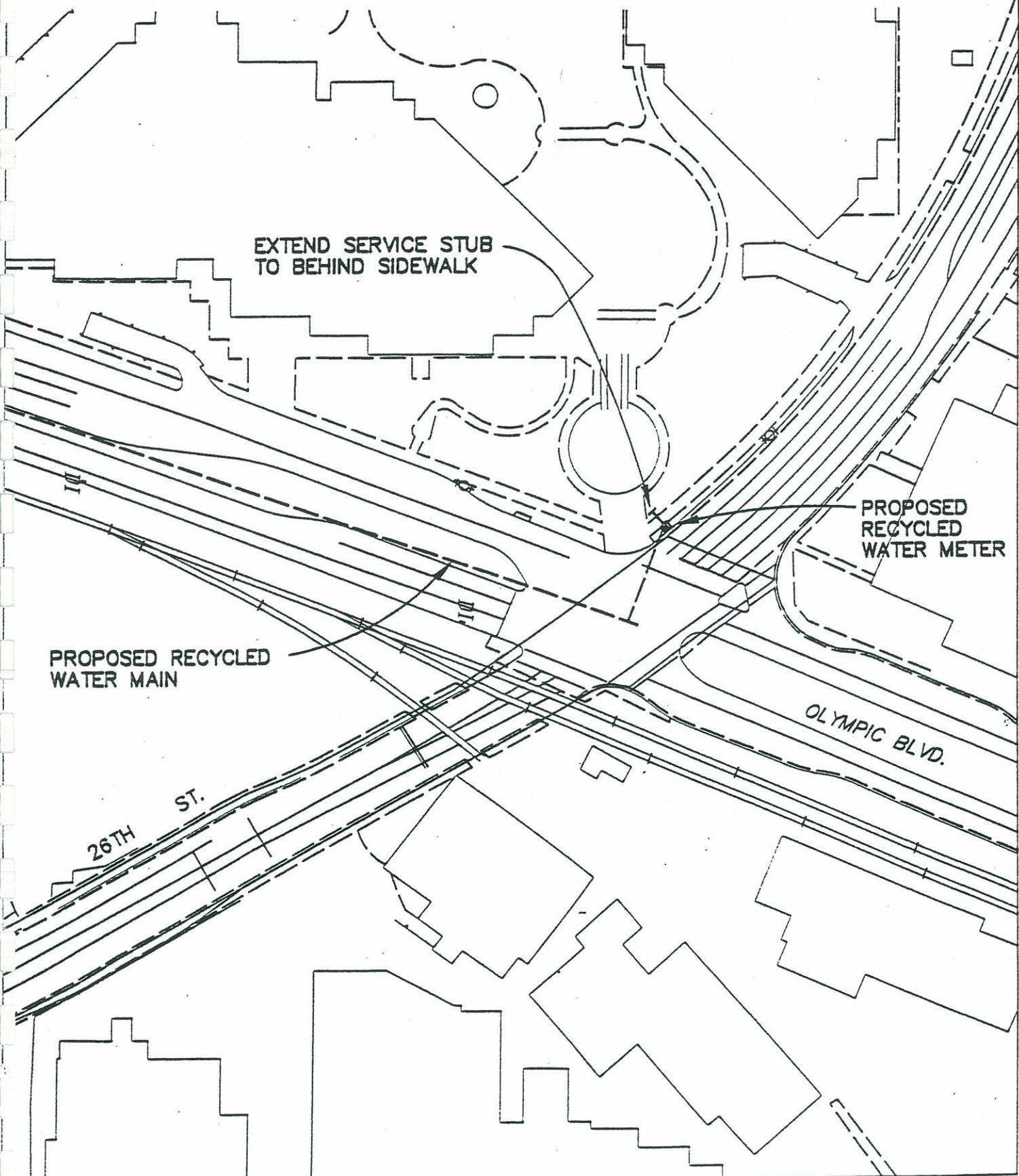
JOHN JALILI,
City Manager

APPROVED AS TO FORM:



Robert M. Myers,
City Attorney

WATER GARDEN PHASE I
RECYCLED WATER
POINT OF CONNECTION



*Amended 1999 Development Agreement for Water Garden
Phase I Development*

1999

AMENDED SEWAGE AND WATER CONSERVATION
COMPLIANCE AGREEMENT

This Amended Sewage and Water Conservation Compliance Agreement ("Agreement") is made and entered into this 23 day of December, 1999, by and between WATER GARDEN COMPANY, L.L.C., a Delaware limited liability company ("Owner") and the CITY OF SANTA MONICA, a municipal corporation ("City") with reference to the following facts:

WHEREAS, on February 9, 1988, City adopted Ordinance No. 1433 (CCS) which authorized and directed City to enter into a Development Agreement between J.H. Snyder Company II ("Snyder"), Owner's predecessor-in-interest, and City denominated as City Contract No. 5061 (the "Development Agreement") relating to the development of a project in the City located on the property bounded by Olympic Boulevard, Twenty-Sixth Street, Colorado Avenue and Cloverfield Boulevard, and commonly known as the Water Garden Project (the "Project"); and

WHEREAS, the Project has been developed in two separate phases. The first phase is commonly known as Water Garden Phase I, which is now owned by Owner and was completed on or about July 1991. The second phase is commonly known as Water Garden Phase II,

which is owned by CST Water Garden II, LLC, as successor-in-interest to Snyder, and is anticipated to be completed in Fall 2000; and

WHEREAS, in adopting Ordinance No. 1433 (CCS), the City Council of City directed the City Manager to return to the City Council with a proposed agreement detailing the manner in which Snyder would be required to comply with the water and sewer conservation provisions of the Development Agreement in order to meet the goals for water and sewer conservation set forth in the Development Agreement; and

WHEREAS, on or about March 23, 1988, City and Snyder entered into a Sewage and Water Conservation Compliance Agreement, a copy of which is attached hereto as Exhibit 1, which among other conditions required that all wastewater generated by the Project (with the exception of water from restaurants) be treated in an on-site treatment system ("On-Site Treatment Plant") and be used for landscape irrigation, replenishment of an on-site artificial lake and other water features, and for toilet and urinal flushing in Phase II of the Project; and

WHEREAS, the treatment capacity of the Project's existing On-Site Treatment Plant has proven insufficient to supply all of the landscape irrigation and lake/water feature replenishment needs

of the Project, cannot be cost-effectively upgraded to meet increased exterior water demand, and presents safety concerns to the occupants of the Project and surrounding areas; and

WHEREAS, City is presently constructing a storm drain water runoff facility located at the Santa Monica Pier, known as the Santa Monica Urban Runoff Recycling Facility (SMURRF), which will produce recycled water that can be used for numerous purposes, including, but not limited to, landscape irrigation, water feature replenishment, building interior non-potable water uses, and street cleaning; and

WHEREAS, allowing Owner to utilize recycled water from SMURRF rather than from its On-Site Treatment Plant will be beneficial to City since it is anticipated to promote an even greater reduction in the amount of potable water used at the site than is possible with the On-Site Treatment Plant and will alleviate the safety concerns created by the On-Site Treatment Plant; and,

WHEREAS, on June 29, 1999, the City Council authorized the City Manager to negotiate and execute a modification to the Sewage and Water Conservation Compliance Agreement with Owner for Water Garden Phase I; and

WHEREAS, City and Owner have met and intend by this Agreement to set forth the manner in which Owner will comply with the water and sewer conservation provisions of the Development Agreement as they relate to Water Garden Phase I;

NOW, THEREFORE, the parties hereby agree as follows:

1. Amended and Restated Agreement. This Agreement establishes the manner in which Owner shall comply with the water and sewer conservation provisions of the Development Agreement for Water Garden Phase I. The original March 23, 1988 Sewage and Water Conservation Compliance Agreement shall have no further force or effect as to Water Garden Phase I or Owner.

2. Connection to City Sewer System. As soon as feasible, Owner shall deactivate its On-Site Treatment Plant. All of the plumbing waste from both toilets and urinals and from all other plumbing fixtures in Water Garden Phase I shall be disposed of through the City's sewer system, using the existing connection between the Project and the City sewer system. Owner shall be responsible for any physical improvements required to tie into the City's sewer system (through the existing connection point) and shall be responsible for all associated costs of installing such

improvements. Owner shall also be responsible for all costs associated with the deactivation and maintenance of the On-Site Treatment Plant. Owner shall have the right to remove the On-Site Treatment Plant in its entirety from the Project, at Owner's sole cost and expense. The City no longer requires Water Garden Phase I to install and operate a sewage treatment system pursuant to Paragraph 20 of Exhibit D to the Development Agreement.

3. Use of Recycled Water from SMURRF. The City will install recycled water lines to a point of connection for Water Garden Phase I as shown on the site plan attached hereto as Exhibit 2. Once SMURRF and the reclaimed water distribution system is operational, Owner shall use recycled urban runoff water supplied by City from SMURRF or other sources for all landscape irrigation water demands and all decorative lake water demands of Water Garden Phase I (except as may be required by state regulations with respect to water fountains). City guarantees to Owner that it will supply sufficient water (either recycled or potable) to meet these water supply demands for the life of the Project and that the SMURRF recycled water will be cleaned to applicable state standards. City shall provide the recycled urban runoff water to Owner at a cost per billing unit no greater than the lesser of (i) the prevailing potable water price per billing unit being paid by

City water customers or (ii) the price per billing unit for the recycled water that is being charged to the owner of Water Garden Phase II or any other real estate project in City at the time that the recycled water is delivered to the Project. Water Garden Phase I acknowledges that it shall be required to comply with the County of Los Angeles Department of Health Services Cross-connection & Water Pollution Control program requirements with respect to the use of the recycled water.

4. Use of Potable Water. Until SMURRF becomes operational, which is anticipated to occur in the Summer/Fall 2000, Owner is authorized to utilize potable water in lieu of recycled water for landscape irrigation and decorative lake/water feature water demands. City shall provide Owner with at least thirty (30) days advance notice when it must switch from potable water to recycled water provided by SMURRF.

5. Payments to City. Prior to January 1, 2000, Owner shall pay to City \$333,333; prior to January 1, 2001, Owner shall pay to City \$333,333; and prior to January 1, 2002, Owner shall pay to City \$333,334, which cumulatively represent the remaining Sewer Facility fees for Water Garden Phase I as well as a contribution to City's Stormwater Management Fund. The foregoing payments (which total in the aggregate \$1 million) are the total amounts of money

required to be paid by Owner to City under this Agreement and in connection with the deactivation of the On-Site Treatment Plant and the connection to City's sewer system, except only for the charges to be paid by Owner for the actual usage of recycled water supplied by the City.

6. Phase I Landscaping. The Development Agreement requires that, to the extent feasible, landscaping for Water Garden Phase I shall consist of drought-resistant plants and the landscaping plans shall be subject to the approval of the Department of General Services as to the water conservation features of such landscaping. City hereby confirms that Owner has complied with the foregoing requirements with respect to the existing landscaping at the Water Garden Phase I portion of the Project. Owner shall continue to comply with the foregoing landscaping requirements with respect to any replacement or additional landscaping at Water Garden Phase I.

7. Definitions. Any definitions used in this Agreement which are not defined herein shall be defined as set forth in the Development Agreement.

8. Entire Agreement. This Agreement constitutes the entire agreement between Owner and City as to compliance with the water and sewage conservation requirements for Phase I of the

Project and supersedes any prior oral or written understanding, other than set forth in the Development Agreement. The original March 23, 1988 Sewage and Water Conservation Agreement remains in full force and effect solely as it pertains to Phase II of the Project.

9. Effect on Development Agreement. This Agreement is not intended to modify, amend, repeal, or otherwise change the Development Agreement or any provisions thereof.

10. Governing Law. This Agreement shall be construed in accordance with the laws of the State of California.

11. Construction of Agreement. Each party hereto acknowledges that all parties participated equally in the drafting of this Agreement, and that, accordingly, no court construing this Agreement should construe it more stringently against one party than the other party.

12. Representation by Counsel. The parties represent and agree that the parties have thoroughly discussed all aspects of this Agreement with their respective attorneys, and that the parties have carefully read and fully understand all of the provisions of this Agreement and that the parties are voluntarily entering into this Agreement.

13. Attorney's Fees. In the event of any controversy, claim or dispute between the parties hereto, arising out of or relating to this Agreement or breach thereof, the prevailing party shall be entitled to recover from the losing party reasonable expenses, attorneys' fees and costs.

14. Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective heirs, devisees, personal representatives, successors and assigns.

15. Amendment of Agreement. No oral modification hereof will be binding upon the parties, and any modification, to be legally enforceable, will be in writing and signed by the parties.

16. Captions. The captions heading the various paragraphs of this Agreement are for convenience only and will not be construed to limit, expand or define the contents hereof.

17. Notices. All notices, instructions, demands and communications pertaining to this Agreement shall be in writing and shall be deemed effective: (1) upon receipt if served by personal service or by facsimile; or (2) three (3) business days after mailing if sent by certified mail, return receipt requested, by postage prepaid, and addressed as follows:

If to Owner: Water Garden Company, L.L.C.
J.P. Morgan Investment Management, Inc.
522 Fifth Avenue
12th Floor
New York, N.Y. 10036
Attention: Mr. David Chen

With a copy to: Tooley & Company,
a Trammell Crow Company
2425 Olympic Boulevard
Suite 520E
Santa Monica, CA 90404
Attention: Building Manager

With a copy to: Ted Bischak
Trammell Crow Company
5 Park Plaza, Suite 100
Irvine, CA 92614
Facsimile: (949) 251-2132

If to City: City of Santa Monica
1685 Main Street
Santa Monica, CA 90401
Attn: Director of Environmental
And Public Works Management
Facsimile: (310) 576-3598
Telephone: (310) 458-8221

With a copy to: City Attorney
1685 Main Street
Santa Monica, CA 90401
Facsimile: (310) 395-6727
Telephone: (310) 458-8336

IN WITNESS WHEREOF, the parties have executed this Agreement
as of the date first above written.

Owner:

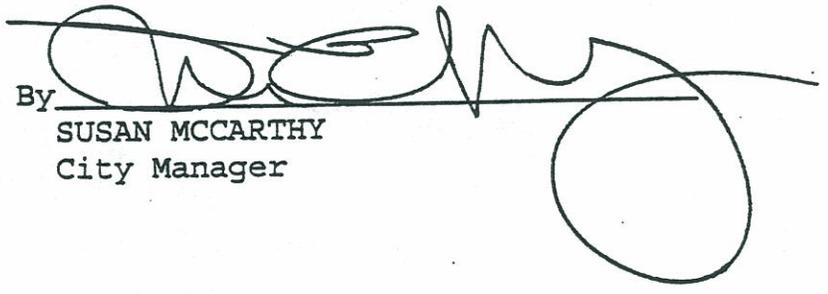
WATER GARDEN COMPANY, L.L.C.
A Delaware limited liability company



By: David Chen
Its: Vice President

City:

CITY OF SANTA MONICA
a municipal corporation

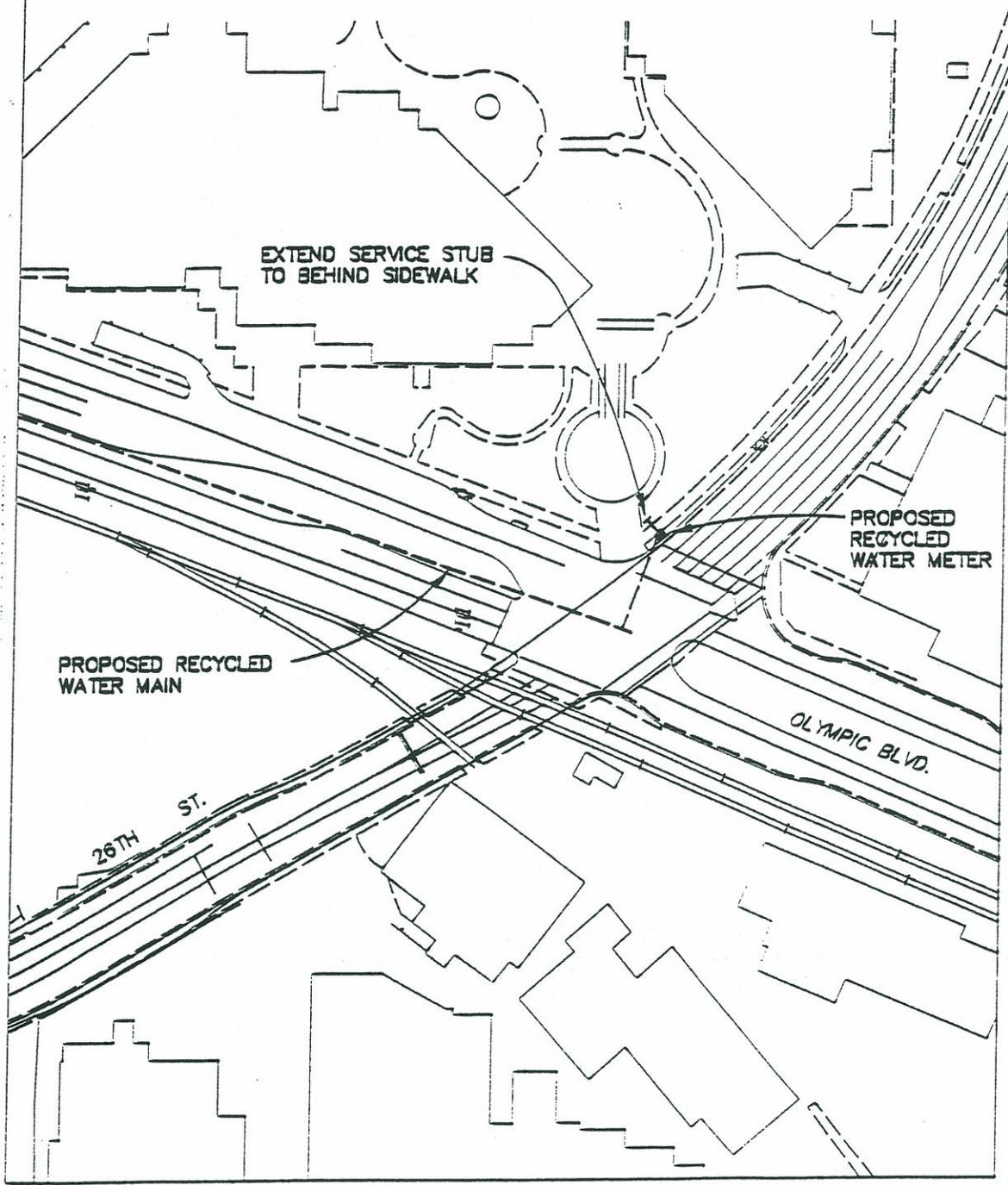


By SUSAN MCCARTHY
City Manager

APPROVED AS TO FORM:

By Marsha Jones Moutrie
Marsha Jones Moutrie,
City Attorney

WATER GARDEN PHASE I
RECYCLED WATER
POINT OF CONNECTION



DWG: v:\c7710004\acad\fig3-a
Time: 04-21-00 1:09:31 PM
User: Ihamburger
XRef Files:
Job #: FRC7710004

*1994 RWQCB Waste Discharge Requirements for
Package WWTP for Water Garden Phase I Development*

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. 94-038

WASTE DISCHARGE REQUIREMENTS
WATER RECLAMATION REQUIREMENTS
FOR
WATER GARDEN ASSOCIATES
(Wastewater Treatment Plant)
(File No. 93-083)

The California Regional Water Quality Control Board, Los Angeles Region finds:

1. Water Garden Associates (hereinafter Reclaimer) has filed a complete Report of Waste Discharge for reclamation of treated commercial wastewater from a currently-operating package tertiary wastewater treatment plant (Plant) at 1620 26th Street, Santa Monica, California (Figure 1).
2. The Reclaimer provides an effluent from the Plant that complies with all Title 22 Water Reclamation Requirements. Tertiary-treated wastewater is currently discharged to the sanitary sewer and flows to the City of Los Angeles Hyperion Treatment Plant.
3. The Reclaimer proposes to reclaim treated commercial wastewater from the Plant for landscape irrigation and to fill a decorative lake.
4. The Plant has a design capacity of 20,000 gallons per day (gpd), and services up to 3,250 occupants in the Water Garden office complex. The Plant does not receive wastes from any restaurants in the Water Garden complex.
5. The treatment process consists of flow equalization, primary sedimentation, secondary treatment for denitrification and aerobic digestion, ultrafiltration, activated carbon filtration, ultraviolet disinfection, and chlorination. Waste sludge is discharged to the sanitary sewer and treated at the City of Los Angeles Hyperion Treatment Plant.
6. In emergencies, untreated wastewater is stored in a 55,000-gallon sump. There is also access for tanker trucks to hook directly into this sump in order to pump out sewage and/or excess waste sludge.

May 9, 1994^{*}

- 70,000
7. Reclaimed water that is not immediately reused will be stored in an epoxy-coated concrete irrigation tank with a capacity of 50,000 gallons.
 8. Domestic water is provided by the City of Santa Monica, and includes imported water from the Metropolitan Water District and local groundwater.
 9. The Plant, decorative lake, and landscape irrigation areas are located at an approximate latitude of 34° 1' 45" and longitude of 118° 28' 15", and overlie the Santa Monica Basin within the Coastal Plain Groundwater Basin of Los Angeles County in the Los Angeles River Basin.
 10. The beneficial uses of groundwater in the Coastal Plain Groundwater Basin of Los Angeles County are municipal and domestic supply, industrial service, process supply, and agricultural supply.
 11. The Regional Board adopted a revised Water Quality Control Plan (Plan) for the Los Angeles River Basin on June 3, 1991. The Plan contains beneficial uses and water quality objectives for the groundwater of the Coastal Plain Groundwater Basin of Los Angeles County. The requirements contained in this Order, as they are met, will be in conformance with the goals and objectives of the Water Quality Control Plan.
 12. The City of Santa Monica (City) has certified a final environmental impact report in accordance with the California Environmental Quality Act (Public Resources Code Section 21000, et seq.). The City has altered the project by (1) requiring an on-site wastewater treatment and reclamation system to treat domestic wastewater produced from the office complex, and (2) requiring on-site reuse of treated wastewater for landscape irrigation and for filling and maintaining a decorative lake. The City's intent in imposing such conditions was to recognize and reverse the trend of overloading existing regional treatment facilities, and to emphasize conservation of water resources. The changes of the project mitigate the adverse environmental impacts of the project on water quality.
 13. Section 13523 of the California Water Code provides that a Regional Board, after consulting with, and receiving the recommendations of the State Department of Health Services, and after any necessary hearing, shall, if it determines such action to be necessary to protect the public health, safety, or

welfare, prescribe Water Reclamation Requirements for water which is used, or proposed to be used, as reclaimed water.

Section 13523 further provides that such requirements shall include, or be in conformance with, the statewide reclamation criteria.

14. The Regional Board has consulted with the State Department of Health Services (DHS) regarding the proposed reclamation of tertiary-treated wastewater, and has incorporated the DHS findings and recommendations.
15. The use of reclaimed water for recreational impoundments or for landscape irrigation could affect the public health, safety, or welfare; requirements for such use are therefore necessary in accordance with Section 13523 of the California Water Code.

The Regional Board has notified the Reclaimer and interested agencies and persons of its intent to issue Waste Discharge Requirements/Water Reclamation Requirements for this discharge, and has provided them with an opportunity to submit their written views and recommendations.

The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and to the updated requirements.

IT IS HEREBY ORDERED that Water Garden Associates shall comply with the following:

A. EFFLUENT LIMITATIONS

1. Wastes discharged shall be limited to treated commercial wastewater only. No restaurant wastes or water softener wastes shall be discharged to the Plant.
2. The pH of reclaimed water shall at all times be within the range 6.5 to 8.5 pH units.
3. Radioactivity shall not exceed the limits specified in the current version of Title 22, California Code of Regulations, Chapter 15, Article 5, Sections 64441 and 64443, or subsequent revisions.
4. Wastes discharged shall not contain constituents in excess of the following limits:

<u>Constituent</u>	<u>Units</u>	<u>Maximum Effluent Limitation</u>
Total dissolved solids	mg/L	1,000
Sulfate	mg/L	250
Chloride	mg/L	250
Boron	mg/L	0.5
Nitrate-N plus nitrite-N plus ammonia-N	mg/L	10
Oil and grease	mg/L	10
Suspended solids	mg/L	30
Total organic carbon	mg/L	20
BOD ₅ 20°C	mg/L	30

B. SPECIFICATIONS FOR USE OF RECLAIMED WATER

1. Reclaimed water used for nonrestricted recreational impoundments and landscape irrigation shall be at all times an adequately coagulated, clarified, oxidized, filtered, disinfected wastewater, or a wastewater treated by a sequence of unit processes that will ensure an equivalent degree of treatment and reliability.

The wastewater shall be considered adequately disinfected if the 7-day median number of coliform organisms in the effluent does not exceed 2 per 100 milliliters, as determined from the bacterial results of the last 7-days for which analyses have been completed, and the number of coliform organisms does not exceed 23 per 100 milliliters in any sample.

An oxidized wastewater means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen. For the purpose of these requirements, an oxidized wastewater shall be equivalent to secondary effluent with the following characteristics:

- (a) a biological oxygen demand, BOD₅ 20°C, value of less than 30 mg/L;
- (b) a suspended solids (SS) content of less than 30 mg/L; and
- (c) total organic carbon (TOC) value of less than 20 mg/L.

A coagulated wastewater means an oxidized wastewater in which the colloidal and finely divided suspended matter have been destabilized and agglomerated by the addition of suitable floc-forming chemicals, or by an equally effective method.

A filtered wastewater means an oxidized, coagulated, clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 turbidity units, and does not exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

2. Reclaimed water shall not be directly used for uses other than those enumerated above until requirements for these uses have been established by this Regional Board in accordance with Section 13523 of the California Water Code, unless the Regional Board waives such requirements, or finds that the above cited standards are applicable to these uses.
3. Reclaimed water uses shall meet the requirements specified in the current "Guidelines for Use of Reclaimed Water" issued by the State Department of Health Services.
4. Reclaimed water used for irrigation shall be retained on the areas of use, and shall not be allowed to escape as surface flow, except as provided for in a National Pollutant Discharge Elimination System (NPDES) Permit.

For the purpose of this requirement, however, minor amounts of irrigation return water from peripheral areas shall not be considered a violation of this Order.

5. Reclaimed water shall be applied at such a rate and volume as not to exceed vegetative demand and soil moisture conditions. Special precautions must be taken to prevent clogging of spray nozzles, to prevent overwatering and to exclude the production of runoff. Pipelines shall be maintained so as to prevent leakage.
6. Reclaimed water used for irrigation shall not be allowed to run off into the decorative lake.

7. Reclaimed water shall not be used for irrigation within 150 feet of any water well or mineral spring.
8. At locations within the facility, along the perimeter, at points of access to the area where reclaimed water is used, signs shall be posted with the following warning: "ATTENTION: RECLAIMED WASTEWATER - AVOID CONTACT - DO NOT DRINK".

C. GENERAL REQUIREMENTS

1. The discharge or use of raw or inadequately treated sewage at any time is prohibited.
2. Reclaimed water shall not be used for irrigation or to fill the decorative lake during periods of extreme rainfall and/or runoff.
3. Standby or emergency power facilities and/or sufficient capacity shall be provided for reclaimed water storage during rainfall or in the event of plant upsets or outages, and at times when spray irrigation cannot be practiced.
4. Reclaimed water use or disposal shall not result in earth movement in geologically unstable areas.
5. Adequate facilities shall be provided to protect the sewage treatment and reclamation facilities from damage by storm flows and runoff.
6. Adequate freeboard shall be maintained in the decorative lake to ensure that direct rainfall will not cause overtopping.
7. Neither treatment of waste nor any reclaimed water use or disposal shall cause pollution or nuisance.
8. Water reclamation and reuse or disposal shall not result in problems due to breeding of mosquitoes, gnats, midges, or other pests.
9. Reclaimed water use or disposal shall not impart tastes, odors, color, foaming, or other objectionable characteristics to receiving groundwaters. Reclaimed water use or disposal shall not impart odors, color, foaming, or other objectionable characteristics to the decorative lake.

10. Reclaimed water use or disposal, which could affect receiving groundwaters, shall not contain any substance in concentrations toxic to human, animal, or plant life.
11. Odors of sewage origin shall not be perceivable beyond the limits of the property owned or controlled by the Reclaimer.
12. At a minimum, a certified Grade III plant operator shall inspect the treatment plant on a weekly basis, to ensure that the treatment processes are working properly, and that the plant effluent wastewater is in compliance with this Order.

D. PROVISIONS

1. A copy of these requirements shall be maintained at the reclamation facility so as to be available at all times to operating personnel.
2. In the event of any change in name, ownership, or control of this wastewater treatment and reclamation facility, the Reclaimer shall notify this Regional Board of such change and shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Board.
3. In accordance with Section 13522.5 of the California Water Code and Section 60323 of the Wastewater Reclamation Criteria, the Reclaimer shall file an Engineering Report, prepared by a properly qualified engineer registered in California, of any material change or proposed change in character, location or volume of the reclaimed water, or its uses, to the Regional Board and to the State Department of Health Services.
4. The Reclaimer shall file with the Regional Board technical reports on self-monitoring work performed according to the detailed specifications contained in the Monitoring and Reporting Program, as directed by the Executive Officer.

The results of any monitoring done more frequently than required at the locations and/or times specified in the Monitoring and Reporting Program shall be reported to the Regional Board.

5. The Reclaimer shall notify this Regional Board, by telephone within 24 hours, of any violations of reclaimed water use conditions or any adverse conditions as a result of the use of reclaimed water from this facility; written confirmation shall follow within one week.
6. The Reclaimer shall notify Regional Board staff, immediately by telephone, of any confirmed coliform counts that could cause a violation of the Water Reclamation Requirements, including the date(s) thereof. This information shall be confirmed in the next monitoring report; in addition, for any actual coliform limit violations that occurred, the report shall also include the reasons for the high coliform results, the steps being taken to correct the problem (including dates thereof), and the steps being taken to prevent a recurrence.
7. These requirements do not exempt the Reclaimer from compliance with any other laws, regulations, or ordinances which may be applicable: they do not legalize this reclamation facility, and they leave unaffected any further constraint on the use of reclaimed water at this site which may be contained in other statutes or required by other agencies.
8. The Reclaimer shall be responsible to ensure that all users of reclaimed water comply with the specifications and requirements for such use.
9. This Order does not alleviate the responsibility of the Reclaimer to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency. Expansion of this facility from its current capacity shall be contingent upon issuance of all necessary permits, including a Conditional Use Permit.
10. For any extension or expansion of the reclaimed water system, the Reclaimer shall submit a report detailing the extension or expansion for the approval of the Executive Officer. Following construction, as-built drawings shall be submitted to the Executive Officer for approval prior to use of reclaimed water.

11. The Reclaimer shall submit to the Regional Board, within 60 days of the adoption of this Order, procedures that will be (or have been) taken to ensure that discharge of untreated sewage from the treatment facility, in the event of equipment failure, will not occur.
12. Raw sewage or partially dried waste sludge shall not be sprayed on ground surface.
13. Any offsite disposal of sewage sludge shall be made only to a legal point of disposal, and in accordance with provisions of Division 7.5 of the California Water Code. For the purpose of these requirements, a legal point of disposal is defined as one for which Waste Discharge Requirements have been established by a California Regional Water Quality Control Board, and is in full compliance therewith.
14. Any discharge of reclaimed water at any point(s) other than specifically described in this Order is prohibited, and constitutes a violation of the Order.
15. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
 - (a) Violation of any term or condition contained in this Order;
 - (b) Obtaining this Order by misrepresentation, or failure to disclose all relevant facts;
 - (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
16. The Reclaimer shall furnish, within a reasonable time, any information the Regional Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The Reclaimer shall also furnish to the Regional Board, upon request, copies of records required to be kept by this Order.

- 17 The Reclaimer shall take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting human health or the environment.
18. Bypass (the intentional diversion of waste streams from any portion of a treatment facility) is prohibited. The Regional Board may take enforcement action against the Reclaimer for bypass unless:
 - (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.);
 - (b) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventive maintenance; and
 - (c) The Reclaimer submitted a notice at least ten days in advance of the need for a bypass to the Regional Board.

The Reclaimer may allow a bypass to occur that does not cause reclaimed water limitations to be exceeded, but only if it is for essential maintenance to assure efficient operation. In such a case, the above bypass conditions are not applicable.

19. This Order includes "Standard Provisions Applicable to Waste Discharge Requirements". If there is any conflict between provisions stated herein and the "Standard Provisions Applicable to Waste Discharge Requirements", these provisions stated herein will prevail.

Water Garden Associates
Wastewater Treatment Plant
Order No. 94-038

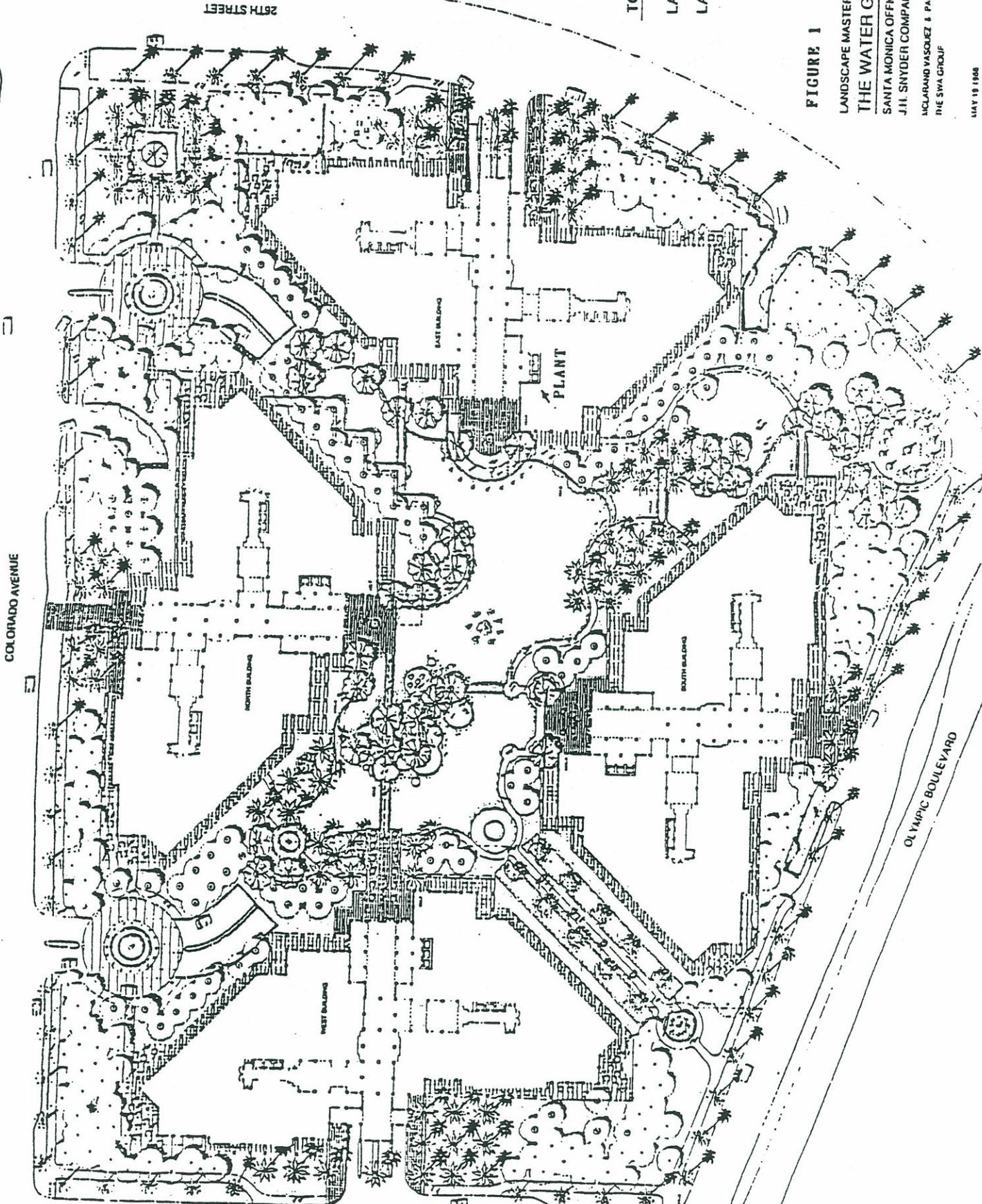
File No. 93-083

I, Robert P. Ghirelli, Executive Officer, do hereby certify that the foregoing is a full true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region on May 9, 1994.



ROBERT P. GHIRELLI, D.Env.
Executive Officer

/WP



NOTE

ALL LANDSCAPED AREAS
WILL BE IRRIGATED WITH
RECLAIMED WATER

TOTAL AREA

LAKE	1.8	ACRES
LANDSCAPING	6.2	ACRES

FIGURE 1

**LANDSCAPE MASTER PLAN
THE WATER GARDEN**

SANTA MONICA OFFICE AND COMMERCE CENTER
J.H. SNYDER COMPANY & CALIFORNIA FEDERAL SAVINGS
MCLARAND VASQUEZ & PARTNERS INC
THE SWA GROUP

*Irrigation Water Use Estimates for Water Garden
Phase I and Phase II*

**IRRIGATION WATER USE ESTIMATE
FOR
THE WATER GARDEN, PHASE 1
SANTA MONICA, CALIFORNIA**

JANUARY

.....
 SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 2.2 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,182	80%	0.310	83%	208	155,430
Turf - Warm-Season	0	80%	0.550	83%	0	0
SubTrop Tree/Shrub	8,328	80%	0.670	83%	10	7,442
Pots	1,147	80%	0.670	83%	2	1,349
Other	0	80%	0.000	83%	0	0
TOTALS	152,637				220	164,221

FEBRUARY

.....
 SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 2.5 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,182	80%	0.840	83%	248	185,312
Turf - Warm-Season	0	80%	0.540	83%	0	0
SubTrop Tree/Shrub	8,328	80%	0.670	83%	11	8,457
Tree/Shrub Evergreen	1,147	80%	0.670	83%	2	1,528
Other	0	80%	0.000	83%	0	0
TOTALS	152,637				261	195,302

MARCH

SITE NAME: THE WATER GARDEN DATE: 03/29/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 3.4 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE	
					(CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.750	83%	395	295,341
Turf - Warm-Season	0	80%	0.780	83%	0	0
SubTrop Tree/Shrub	6,329	80%	0.870	83%	15	11,501
Tree/Shrub Evergreen	1,147	80%	0.870	83%	3	2,085
Other	0	80%	0.000	83%	0	0
TOTALS	152,637				413	308,927

APRIL

SITE NAME: THE WATER GARDEN DATE: 03/29/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 3.8 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE	
					(CCF)	(gallons)
Turf - Cool-Season	145,162	80%	1.040	83%	612	457,720
Turf - Warm-Season	0	80%	0.720	83%	0	0
SubTrop Tree/Shrub	6,329	80%	0.670	83%	17	12,855
Tree/Shrub Evergreen	1,147	80%	0.670	83%	3	2,330
Other	0	80%	0.000	83%	0	0
TOTALS	152,637				632	472,905

MAY

SITE NAME: THE WATER GARDEN DATE: 03/29/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 4.8 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.950	83%	708	523,139
Turf - Warm-Season	0	80%	0.790	83%	0	0
SubTrop Tree/Shrub	8,328	80%	0.670	83%	22	16,237
Tree/Shrub Evergreen	1,147	80%	0.670	83%	4	2,943
Other	0	80%	0.000	83%	0	0
TOTALS	152,637				732	547,319

JUNE

SITE NAME: THE WATER GARDEN DATE: 03/29/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 5.0 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.880	83%	681	509,608
Turf - Warm-Season	0	80%	0.680	83%	0	0
SubTrop Tree/Shrub	8,328	80%	0.670	83%	23	16,914
Tree/Shrub Evergreen	1,147	80%	0.670	83%	4	3,066
Other	0	80%	0.000	83%	0	0
TOTALS	152,637				708	529,587

JULY

.....

SITE NAME:	THE WATER GARDEN	DATE:	03/29/93
SITE LOCATION:	SANTA MONICA, CALIFORNIA	BY:	D. Pagano
PHASE:	ONE		
REFERENCE ET?	5.3 inches/year		
EFFECTIVE RAIN?	0 inches/year		

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,192	80%	0.940	63%	771	577,015
Turf - Warm-Season	0	80%	0.710	63%	0	0
SubTrop Tree/Shrub	6,328	80%	0.670	63%	24	17,929
Tree/Shrub Evergreen	1,147	80%	0.670	63%	4	3,250
Other	0	80%	0.000	63%	0	0
TOTALS	152,637				800	598,193

AUGUST

.....

SITE NAME:	THE WATER GARDEN	DATE:	03/29/93
SITE LOCATION:	SANTA MONICA, CALIFORNIA	BY:	D. Pagano
PHASE:	ONE		
REFERENCE ET?	4.9 inches/year		
EFFECTIVE RAIN?	0 inches/year		

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.960	63%	652	488,065
Turf - Warm-Season	0	80%	0.710	63%	0	0
SubTrop Tree/Shrub	6,328	80%	0.670	63%	22	16,576
Tree/Shrub Evergreen	1,147	80%	0.670	63%	4	3,004
Other	0	80%	0.000	63%	0	0
TOTALS	152,637				679	507,645

SEPTEMBER

SITE NAME: THE WATER GARDEN DATE: 03/29/83
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 4.5 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.740	83%	516	385,680
Turf - Warm-Season	0	80%	0.620	83%	0	0
SubTrop Tree/Shrub	6,328	80%	0.670	83%	20	15,222
Tree/Shrub Evergreen	1,147	80%	0.670	83%	4	2,758
Other	0	80%	0.000	83%	0	0
TOTALS	152,837				540	403,662

OCTOBER

SITE NAME: THE WATER GARDEN DATE: 03/29/83
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 3.4 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,182	80%	0.760	83%	395	295,341
Turf - Warm-Season	0	80%	0.540	83%	0	0
SubTrop Tree/Shrub	6,328	80%	0.670	83%	15	11,501
Tree/Shrub Evergreen	1,147	80%	0.670	83%	3	2,085
Other	0	80%	0.000	83%	0	0
TOTALS	152,837				413	308,927

NOVEMBER

SITE NAME: THE WATER GARDEN DATE: 03/29/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 2.4 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.580	63%	256	191,798
Turf - Warm-Season	0	80%	0.580	63%	0	0
SubTrop Tree/Shrub	6,328	80%	0.670	63%	11	8,119
Tree/Shrub Evergreen	1,147	80%	0.670	63%	2	1,472
Other	0	80%	0.000	63%	0	0
TOTALS	152,637				269	201,388

DECEMBER

SITE NAME: THE WATER GARDEN DATE: 03/29/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 2.0 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.600	63%	126	138,984
Turf - Warm-Season	0	80%	0.550	63%	0	0
SubTrop Tree/Shrub	6,328	80%	0.670	63%	9	6,766
Tree/Shrub Evergreen	1,147	80%	0.670	63%	2	1,226
Other	0	80%	0.000	63%	0	0
TOTALS	152,637				136	146,976

ANNUAL

SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: ONE
 REFERENCE ET? 44.0 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq. Ft.)	ANNUAL			ESTIMATED ANNUAL WATER USE	
		MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	(CCF)	(gallons)
Turf - Cool-Season	145,162	80%	0.830	63%	5,655	4,229,744
Turf - Warm-Season	0	80%	0.830	63%	0	0
SubTrop Tree/Shrub	6,328	80%	0.870	83%	189	148,842
Tree/Shrub Evergreen	1,147	80%	0.870	83%	36	26,979
Other	0	80%	0.000	63%	0	0
TOTALS	152,637				5,890	4,405,564

MARCH

SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: TWO
 REFERENCE ET? 3.4 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.750	83%	281	210,530
Turf - Warm-Season	0	80%	0.780	83%	0	0
SubTrop Tree/Shrub	9,866	80%	0.870	83%	23	17,588
Tree/Shrub Evergreen	1,200	80%	0.670	83%	3	2,191
Other	0	80%	0.000	83%	0	0
TOTALS	114,343				308	230,290

APRIL

SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: TWO
 REFERENCE ET? 3.8 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	103,477	80%	1.040	83%	436	329,280
Turf - Warm-Season	0	80%	0.720	83%	0	0
SubTrop Tree/Shrub	9,866	80%	0.670	83%	26	19,835
Tree/Shrub Evergreen	1,200	80%	0.670	83%	3	2,438
Other	0	80%	0.000	83%	0	0
TOTALS	114,343				466	348,353

MAY

SITE NAME: THE WATER GARDEN
 SITE LOCATION: SANTA MONICA, CALIFORNIA
 PHASE: TWO
 REFERENCE ET? 4.8 inches/year
 EFFECTIVE RAIN? 0 inches/year

DATE: 03/30/89
 BY: D. Pagano

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE	
					(CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.950	63%	503	376,477
Turf - Warm-Season	0	80%	0.790	63%	0	0
SubTrop Tree/Shrub	9,666	80%	0.670	63%	33	24,802
Tree/Shrub Evergreen	1,200	80%	0.670	63%	4	3,079
Other	0	80%	0.000	63%	0	0
TOTALS	114,343				541	404,359

JUNE

SITE NAME: THE WATER GARDEN
 SITE LOCATION: SANTA MONICA, CALIFORNIA
 PHASE: TWO
 REFERENCE ET? 5.0 inches/year
 EFFECTIVE RAIN? 0 inches/year

DATE: 03/30/93
 BY: D. Pagano

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE	
					(CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.880	63%	486	363,268
Turf - Warm-Season	0	80%	0.880	63%	0	0
SubTrop Tree/Shrub	9,666	80%	0.670	63%	35	25,836
Tree/Shrub Evergreen	1,200	80%	0.670	63%	4	3,207
Other	0	80%	0.000	63%	0	0
TOTALS	114,343				524	392,311

JULY

SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: TWO
 REFERENCE ET? 5.3 Inches/year
 EFFECTIVE RAIN? 0 Inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.840	63%	550	411,318
Turf - Warm-Season	0	80%	0.710	63%	0	0
SubTrop Tree/Shrub	8,328	80%	0.670	63%	24	17,929
Tree/Shrub Evergreen	1,147	80%	0.670	63%	4	3,250
Other	0	80%	0.000	63%	0	0
TOTALS	110,952				578	432,497

AUGUST

SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: TWO
 REFERENCE ET? 4.9 Inches/year
 EFFECTIVE RAIN? 0 Inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.860	63%	465	347,911
Turf - Warm-Season	0	80%	0.710	63%	0	0
SubTrop Tree/Shrub	8,888	80%	0.670	63%	34	25,319
Tree/Shrub Evergreen	1,200	80%	0.670	63%	4	3,143
Other	0	80%	0.000	63%	0	0
TOTALS	114,343				503	376,374

NOVEMBER

SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: TWO
 REFERENCE ET? 2.4 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.890	63%	183	138,721
Turf - Warm-Season	0	80%	0.580	63%	0	0
SubTrop Tree/Shrub	9,666	80%	0.670	63%	17	12,401
Tree/Shrub Evergreen	1,200	80%	0.670	63%	2	1,540
Other	0	80%	0.000	63%	0	0
TOTALS	114,343				201	150,662

DECEMBER

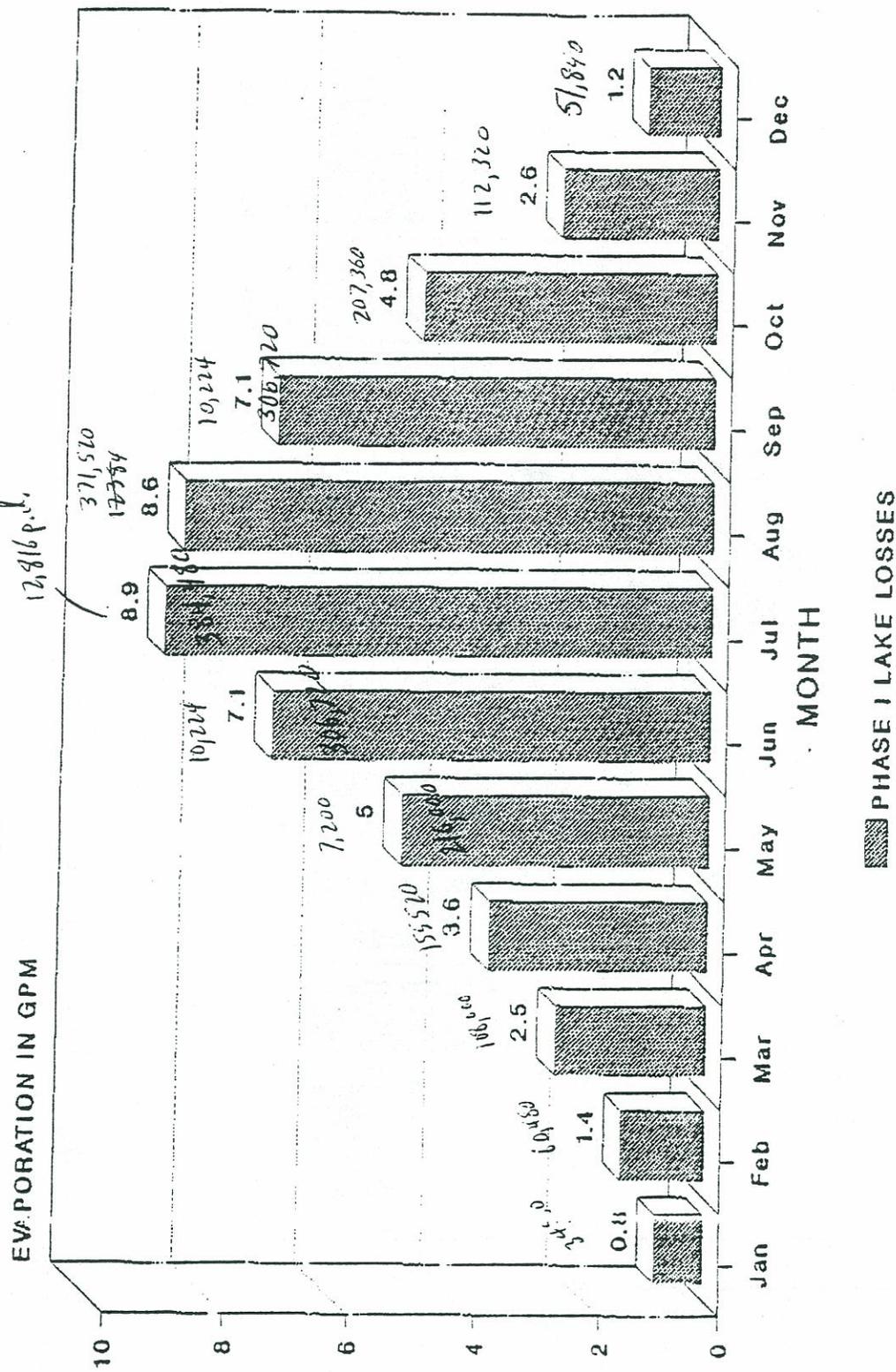
SITE NAME: THE WATER GARDEN DATE: 03/30/93
 SITE LOCATION: SANTA MONICA, CALIFORNIA BY: D. Pagano
 PHASE: TWO
 REFERENCE ET? 2.0 inches/year
 EFFECTIVE RAIN? 0 inches/year

PLANT MATERIAL SITUATION	AREA (Sq.Ft.)	MGMT. STRESS LEVEL	CROP COEFF. Kc	EST. SYS. EFF.	ESTIMATED MONTHLY WATER USE (CCF)	(gallons)
Turf - Cool-Season	103,477	80%	0.800	63%	132	99,073
Turf - Warm-Season	0	80%	0.550	63%	0	0
SubTrop Tree/Shrub	9,666	80%	0.670	63%	14	10,334
Tree/Shrub Evergreen	1,200	80%	0.670	63%	2	1,283
Other	0	80%	0.000	63%	0	0
TOTALS	114,343				148	110,690

*Monthly Lake Evaporation Rates for
Water Garden Phase I and Phase II*

PROBABLE MONTHLY LAKE EVAPORATION RATES

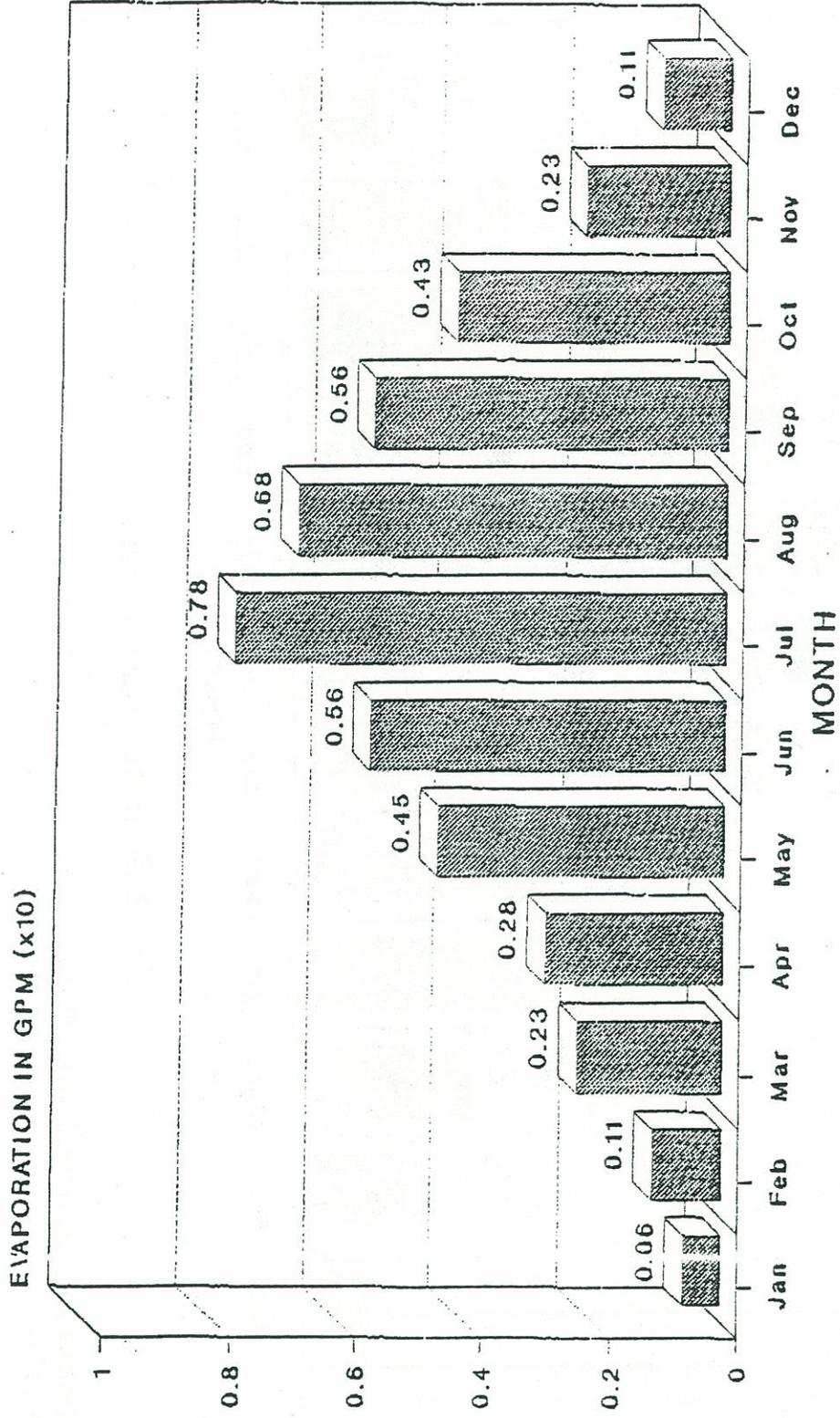
The Water Gardens, Phase I



Probable Average Monthly Rate is 4.51 GPM.

PROBABLE MONTHLY LAKE EVAPORATION RATES

The Water Gardens, Phase II



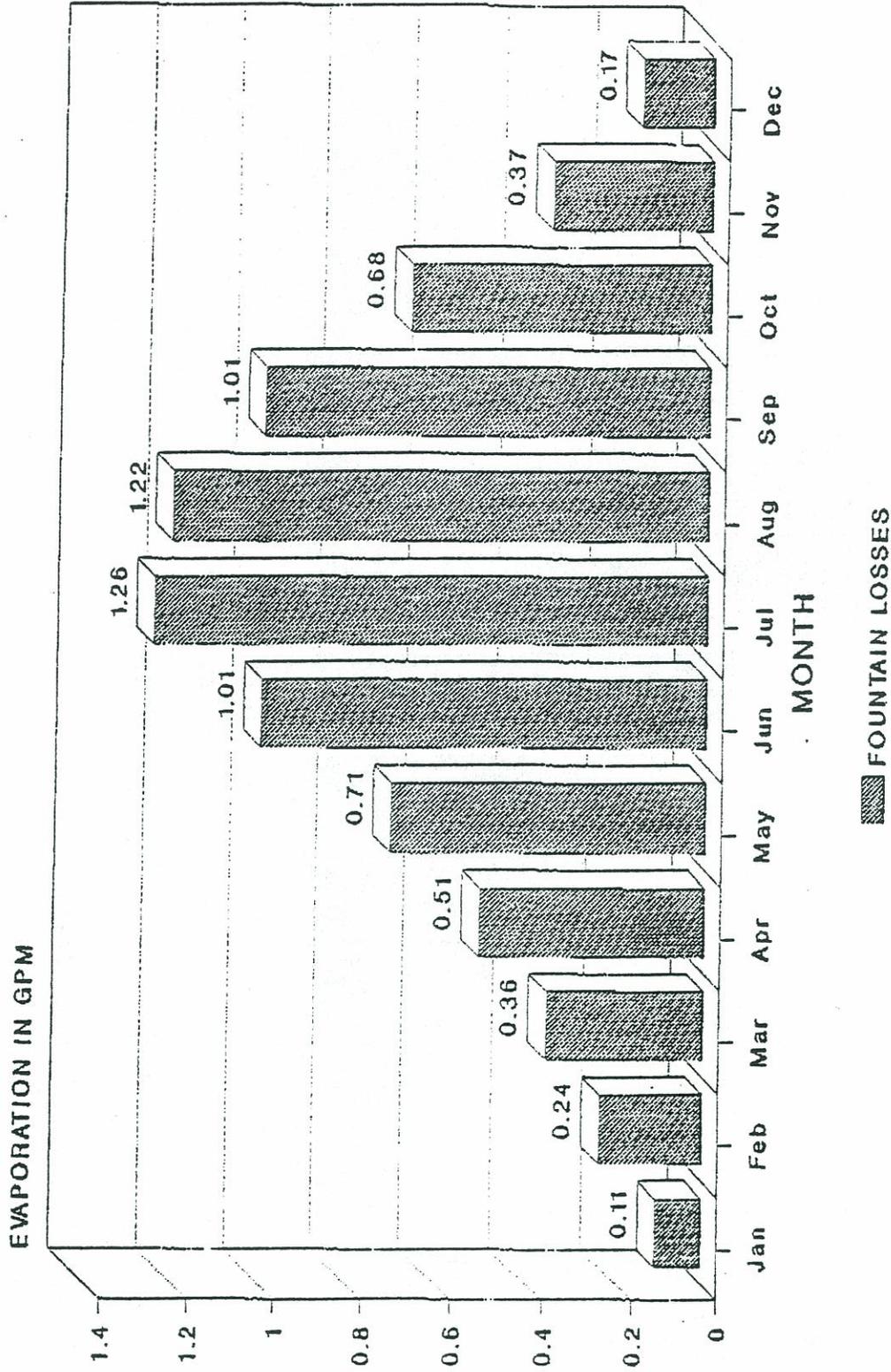
PHASE II LAKE LOSSES

Probable Average Monthly Rate is
.482 GPM

*Probable Water Fountain Evaporation Rates for
Water Garden Phase I and Phase II*

PROBABLE FOUNTAIN EVAPORATION RATES

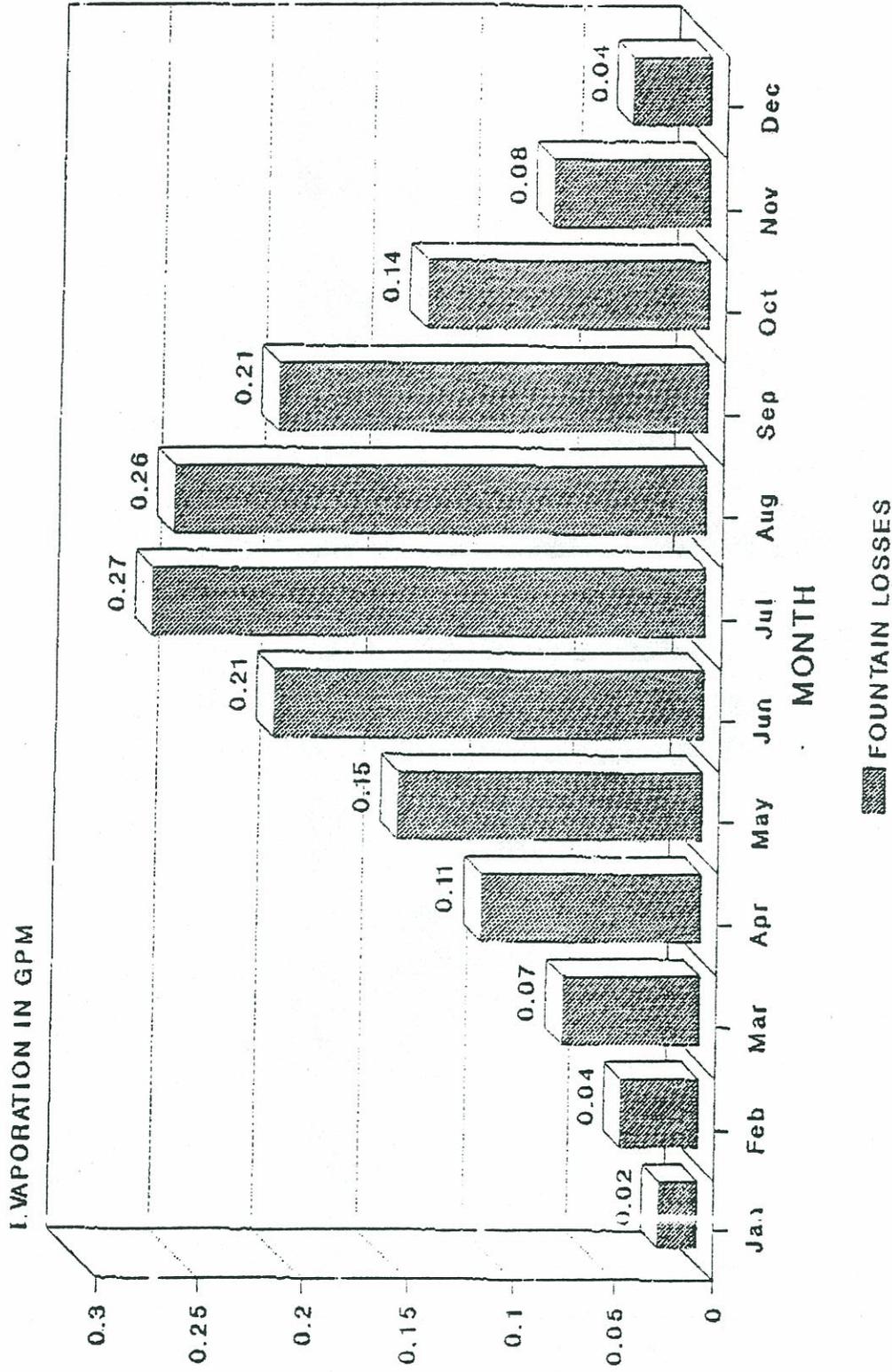
The Water Gardens, Phase I



Probable Average Monthly Rate is .641 GPM.

PROBABLE FOUNTAIN EVAPORATION RATES

The Water Gardens, Phase II



Probable Average Monthly Rate is
.135 GPM.

*Notice of Proposed Rulemaking for Water Recycling Criteria
(R-13-95), California Department of Health Services*

RECEIVED

TITLES 17 and 22 OCT 14 1999 CALIFORNIA DEPARTMENT OF HEALTH SERVICES

BOYLE ENGINEERING
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OCT 11 1999

BOYLE ENGINEERING
O.C.

ACTION: Notice of Proposed Rulemaking

SUBJECT: Water Recycling Criteria (R-13-95)

PUBLIC PROCEEDINGS: Notice is hereby given that the California Department of Health Services will conduct written public proceedings during which time any interested person or such person's duly authorized representative may present statements, arguments or contentions relevant to the action described in this notice. Any written statements, arguments or contentions must be received by the Office of Regulations, Department of Health Services, 714 P Street, Room 1000, P.O. Box 942732, Sacramento, CA 94234-7320, by 5:00 p.m. on November 8, 1999, which is hereby designated as the close of the written comment period. It is requested but not required that written statements, arguments or contentions sent by mail or hand-delivered be submitted in triplicate. *

Comments by FAX (916-657-1459) or email (regulation@dhs.ca.gov) must be received before 5:00 p.m. on the last day of the public comment period. All comments, including email or fax transmissions, should include the author's name and U.S. Postal Service mailing address in order for the Department to provide copies of any notices for proposed changes in the regulation text on which additional comments may be solicited.

CONTACT: Inquiries concerning the action described in this notice may be directed to Charles E. Smith of the Office of Regulations at (916) 657-0730. In any such inquiries, please identify the action by using the Department regulation control number R-13-95.

Persons wishing to use the California Relay Service may do so at no cost. The telephone numbers for accessing this service are: 1-800-735-2929, if you have a TDD; or 1-800-735-2922, if you do not have a TDD.

INFORMATIVE DIGEST: The production and use of recycled water is currently regulated by state law and administrative regulations and requirements. Pursuant to Section 13521 of the California Water Code, the Department of Health Services (Department) is mandated to establish statewide recycling criteria for each varying use of recycled water where such use involves the protection of public health. In addition, the use of the term "recycling" in this section provides the authority for the replacement of the terms "Reclamation" and "reclaimed" by the terms "recycling" and "recycled" in the proposed regulations. The State Regional Water Quality Control Boards prescribe recycling requirements for individual water recycling projects. The requirements issued by the boards must include, or be in conformance with, the recycling criteria adopted by the Department.

The existing recycling criteria were adopted by the Department on October 15, 1977. Since that time, the use of recycled water has expanded significantly. Furthermore, technical and health effects studies have been conducted and advances in treatment technology have been demonstrated. Also during this period, the increasing need for water conservation and the increase in potable water demand have created a greater need for more recycling and reuse of wastewater.

Pursuant to the authority granted by Section 13521 of the Water Code, the Department has developed proposed revisions to the existing recycling regulations. These revisions are intended to expand the range of allowable uses of recycled water, establish criteria for those new uses, and clarify some of the ambiguity contained in the existing regulations.

Specifically, the Department proposes the following changes to Title 22, Division 4 of the California Code of Regulations:

1. Repeal existing Section 60301 and replace with proposed new Sections 60301.100 through 60301.920. The purpose of this change is to reorganize the content of the existing section with new section numbers, repeal obsolete definitions, add new definitions for terms used in the proposed regulations, and reorder the definitions alphabetically.
2. Repeal Sections 60303 through 60319 and replace with proposed Sections 60302 through 60306. These sections reorganize existing uses and requirements, add new allowable uses, and add language relating to the use of recycled water for industrial cooling and establishing specific requirements.
3. Adopt a new Section 60310 establishing requirements for specific areas of use of recycled water.
4. Adopt new Sections 60313, 60314, 60315, and 60316 establishing requirements for use of recycled water in dual plumbing systems.
5. Repeal existing Section 60321 relating to sampling and analysis and replace with proposed Section 60321, which has better clarity.

In addition, the Department proposes to amend Section 7604 of Title 17, California Code of Regulations to modify the type of backflow prevention devices needed in order to be consistent with the dual plumbing requirements proposed in Article 4, Division 4 of Title 22, California Code of Regulations.

Plain English Policy Statement Overview: California does not have as much water as it needs. When sewage is cleaned up enough, it can be used in ways that can save drinking water. By law, the Department has to make rules that say how to figure out if the sewage is clean enough to use and tell people the ways the cleaned sewage can be used. The Department has to make sure that there is no risk to people when cleaned sewage is used in these ways. The Department made rules

on this for people in 1977. Those rules are out of date. These new rules will fix the old rules so they are up to date.

These rules will not cost small businesses in California any money. They will protect the public's health and safety. They will make it possible for California to save some of its drinking water for people to drink. No alternative would be better to carry out the law.

AUTHORITY: Section 116375, Health and Safety Code; and Sections 13521 and 13522.5, Water Code.

REFERENCE: Sections 13520, 13521, 13522.5, 13523.1, 13553 and 13554, Water Code.

FISCAL IMPACT ESTIMATE:

- A. Fiscal Effect on Local Government: There would be indeterminate savings due to reduced use of potable water. There would be an estimated one-time cost of \$200 per reclaimed water site to post appropriate warning signs, for a total of \$35,000 to be absorbed by local agencies.
- B. Fiscal Effect on State Government: There would be an estimated one-time cost of \$200 per reclaimed water site to post appropriate warning signs, for a total of \$21,000 to be absorbed by the Department.
- C. Fiscal Effect on Federal Funding of State Programs: No fiscal impact exists.
- D. Fiscal Effect on Private Persons or Businesses Directly Affected: There would be an estimated one-time cost of \$200 per reclaimed water site to post appropriate warning signs, for a total of \$84,000.

DETERMINATIONS: The Department has determined that the regulations would not impose a mandate on local agencies or school districts, nor are there any costs for which reimbursement is required by Part 7 (commencing with Section 17500) of Division 4 of the Government Code.

The Department has determined that the regulations would not have a significant adverse economic impact on businesses, including the ability of California businesses to compete with businesses in other states.

For communities where development has been constrained by limited water resources, recycled water can provide a new source of water and, as such, may enable businesses or residential areas to develop beyond what might have otherwise been possible. Since the proposed regulations would expand the approved uses for recycled water, recycled water would have a broader range of applications, thus making recycled water a more viable option for a community. In addition, the use of recycled water can potentially free some quantity of potable water for drinking and other

appropriate uses where potable water is the only option. Based on this, the Department has determined that the regulations might affect the following:

1. The creation or elimination of jobs within the State of California. The requirements summarized above may create and/or enable the creation of jobs wherever recycled water is produced and/or used. Utilities choosing to produce recycled water may need additional staff in order to manage and monitor the treatment processes involved. Likewise, users of recycled water may need additional staff to ensure that the water is properly handled. Communities with currently limited water resources that avail themselves of the opportunity to use recycled water, may experience business expansion and development and, thus, an increase in jobs.
2. The expansion of businesses currently doing business within the State of California. Since the proposed regulations would expand the uses for recycled water, the demand for this resource is likely to increase and, therefore, more utilities would probably go into the production of recycled water. Also, utilities already producing recycled water might, if they are able, increase their production. Thus, these utilities would be expanding their services and clientele. For this reason, if no other, there would be some expansion.

Since water is an expensive commodity for businesses that use a significant amount, the use of recycled water, where approvable, would result in a cost savings, enabling possible expansion for such businesses. For communities where water resources have limited development, the availability of recycled water could result in expansion of businesses previously constrained.

3. The creation of new businesses or the elimination of existing businesses within the State of California. Since the proposed regulations would expand the uses for recycled water, the demand for this resource is likely to increase and, therefore, more utilities would probably go into the production of recycled water.

In addition, there may be would-be businesses unable to start up due to lack of available water resources or the cost of potable water, which might be able to establish themselves if they were able to utilize recycled water because of the broader range of uses under the proposed regulations.

The Department has determined that the regulations would affect small business. The Department has also determined that it is not feasible to draft the regulations in plain English due to the technical nature of the regulations; however, a noncontrolling plain English summary of the regulations is available from the Office of Regulations at the address noted above.

AVAILABILITY OF STATEMENT OF REASONS AND TEXT OF REGULATIONS: The Department has prepared and has available for public review an initial statement of reasons for the proposed regulations, all the information upon which the proposed regulations are based, and the text of the proposed regulations. A copy of the initial statement of reasons and a copy of the text

of the proposed regulations are available upon request by writing to the Office of Regulations at the address noted above, which address will also be the location of public records, including reports, documentation, and other material related to the proposed regulations.

AVAILABILITY OF CHANGED OR MODIFIED TEXT: The full text of any regulation which is changed or modified from the express terms of the proposed action will be made available by the Department's Office of Regulations at least 15 days prior to the date on which the Department adopts, amends, or repeals the resulting regulation.

ADDITIONAL STATEMENTS AND COMMENTS: In accordance with Government Code Section 11346.5(a)(12) the Department must determine that no alternative considered by the Department would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action.

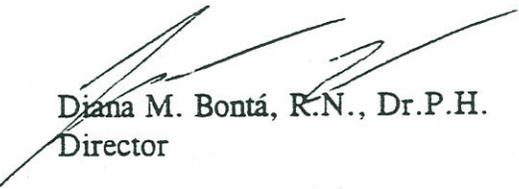
Any interested person or his or her duly authorized representative may request, no later than 15 days prior to the close of the written comment period, a public hearing pursuant to Government Code Section 11346.8.

Reasonable accommodation or sign language interpreting services at a public hearing will be provided upon request. Such request should be made no later than 15 days prior to the close of the written comment period.

DEPARTMENT OF HEALTH SERVICES

R-13-95

Dated: August 30, 1999


Diana M. Bontá, R.N., Dr.P.H.
Director

INITIAL STATEMENT OF REASONS

Water Recycling

Chapter 3. Water Recycling Criteria

Pursuant to section 13521 of the California Water Code, The Department of Health Services (Department) is mandated to establish statewide recycling criteria for each varying use of recycled water where such use involves the protection of public health. In addition, the use of the term "recycling" in this section provides the authority for the proposed substitution of terms in the attached regulations: "Reclamation" and "reclaimed" would be replaced with "recycling" and "recycled".

The existing recycling criteria were adopted by the Department on October 15, 1977. Since that time, the use of recycled water has expanded significantly. Furthermore, technical and health effects studies, have been conducted and advances in treatment technology have been demonstrated. Also during this period, the increasing need for water conservation and the increase in potable water demand have created a greater need for more recycling and reuse of wastewater.

Pursuant to the authority granted by section 13521 of the Water Code, the Department has developed proposed revisions to the existing recycling regulations. These revisions are intended to expand the range of allowable uses of recycled water, establish criteria for these new uses, and clarify some of the ambiguity contained in the existing regulations.

Article 1. DEFINITIONS

Section 60301. Definitions.

Existing section 60301 would be repealed and new sections 60301.100 through 60301.920 would be adopted. The existing section 60301 would be reorganized with new section numbers and the definitions placed into alphabetical order.

The terms in existing subsections (a), (g), (k), (l), (m), (o), (p), (s), (t), (v), (w), (x), (y), (z), (aa), and (bb) are no longer used or necessary or are already defined in law.

Subsection (f) would be amended and redesignated as new section 60301.800. The language would be reworded to clarify that the term "spray irrigation" is limited to crops or vegetation and does not include drip irrigation.

Subsections (h), (i), (j), and (u) would be amended for greater clarity and redesignated as new sections 60301.760, 60301.620, 60301.550 and 60301.830, respectively.

Subsection (q) would be amended and redesignated as new section 60301.160. The wording would be changed to clarify that the coagulation process must take place prior to the filter to assure that particle agglomeration takes place prior to filtration.

Subsection (r) would be redesignated as new section 60301.320. The wording would be changed to remove the clarification unit process requirement from this definition. The existing requirement would be adequately covered by other definitions and is unnecessary. A maximum turbidity limit of 10 NTU would be adopted into the previous definition. The existing definition allows the 2 NTU daily average to be exceeded up to 5 percent of the time. Not specifying an absolute maximum, however, would allow a treatment facility to produce an effluent with unlimited turbidity 5 percent of the time. This could cause the disinfection process to be ineffective for short periods. Imposing a 10 NTU maximum would preclude this possibility while not imposing unreasonable operational restrictions on existing plants. Existing plants that are well operated have demonstrated the capability to meet this requirement consistently. Other minor changes would be made in this section for greater clarity, such as specifying that "of the time" refers to a 24-hour period.

Subsection 60301.320(b) requires the use of filtration technologies with membranes to physically screen particulate matter, including certain pathogens (microfiltration, ultrafiltration,

nanofiltration, and reverse osmosis). Membrane filtration has been demonstrated to achieve virus removal when the turbidity performance objectives in this subsection have been met

Proposed sections 60301.170, 60301.220, 60301.225, 60301.240, 60301.245, 60301.250, 60301.300, 60301.310, 60301.400, 60301.600, 60301.620, 60301.700, 60301.750, 60301.900, and 60301.920 would be adopted to define new general terms used in the proposed regulations.

Proposed section 60301.100 would be adopted to define the term "approved Laboratory" as one which has been certified by the Department. This definition is necessary to assure the validity of the bacteriological results.

Proposed section 60301.230 would be adopted to define a wastewater that has been "adequately disinfected, oxidized, coagulated, clarified, and filtered"; these terms are used in the existing sections 60303 through 60305. This definition contains specific proposed criteria relating to the disinfection process. Existing regulations (sections 60303 through 60317) specify a median concentration of coliform bacteria of 2.2 per 100 milliliters and a maximum of 23 coliform per 100 milliliters which may be exceeded in only one sample within a 30 day period. These bacterial requirements are unchanged in the proposed regulations but are made a part of the definition for greater clarity. The existing regulation does not specify a maximum for the one sample exceedance. The Department believes that this should not be unlimited because it could create a short period of substantial contamination to users. A maximum of 240 MPN has been inserted for the one sample exceedance. This would allow ample operational flexibility without creating an unreasonable risk to the public.

Currently, the term "adequate disinfection" is defined strictly in terms of coliform concentrations. The Department does not believe this provides sufficient reliability for inactivation of viruses. A report on a major study of the effectiveness of wastewater treatment processes in controlling viruses (the Pomona Virus Study) was released in February 1977. That report made specific technical recommendations on minimum disinfection concentration and contact time necessary to control viruses. Since the release of that study the Department has used those recommendations

as the basis for comments to the regional water quality control boards on proposed recycling project requirements, to ensure adequate public health protection when recycled water is used. Proposed section 60301.230, therefore, also adds a requirement for a minimum chlorine concentration versus time (generally referred to as CT values) of 450 based on a minimum 90 minute contact time. These requirements are based on the Department's experience with several demonstration projects (including the 1977 report on the Pomona Virus Study) where these concentrations and detention times were shown to be effective in inactivating viruses and on operational testing data submitted by the Los Angeles County Sanitation Districts. An alternative disinfection method can be used provided that it is demonstrated to be capable of removing or inactivating viruses to a level of 1/100,000 (5 logs) of the initial concentration. The demonstration of a 5 log reduction or use of the specified CT values were determined by the Department to be necessary to assure effective and reliable removal and inactivation of enteric viruses for those uses where the public exposure to the recycled water is exceptionally high.

Sections 60303 through section 60319. These sections would be repealed from title 22, division 4 and new sections 60302 through 60310 would be adopted.

ARTICLE 2. Sources of Recycled Water

Section 60302. Source Specifications

This new section would be adopted to establish that only municipal sewage can be used as a source for recycled water. If this limitation did not exist, any kind of wastewater could be used, including various types of industrial wastewaters; this could result in water quality issues beyond the scope of these regulations.

ARTICLE 3. Use of Recycled Water

Section 60303. Exceptions

This section would be adopted to make it clear that the requirements of this chapter do not apply to onsite use of recycled water at a treatment plant. Many water recycling or wastewater treatment plants utilize treated effluent from the plant for a variety of operational purposes. These operational uses are under the direction of wastewater treatment plant operators who are

knowledgeable and trained in the safe handling of wastewater. Since the primary purpose of these regulations would be to protect the general public who may be unaware of potential hazards, applying them to onsite uses would serve no useful purpose and would unreasonably restrict treatment plant operations.

Section 60304. Use of Recycled Water for Irrigation

(a) This new section would not substantively change the existing requirements set forth in sections 60303 through 60317 for irrigation of food crops, parks, playgrounds, or schoolgrounds which currently require the use of disinfected tertiary effluent. Residential landscaping and unrestricted access golf course uses would be added to the list of acceptable uses of tertiary recycled water because the risk of public exposure for these uses is comparable to the currently allowed uses. This subsection would permit a recycled water to be produced without the use of chemical coagulation for the uses set forth in this section provided certain turbidity levels were not exceeded. The Department has determined from the Castroville demonstration project and other plant experiences that the disinfection process can be effective for irrigation uses without the need for coagulation as long as the turbidities remain below 5 NTU and the filter effluent turbidity does not exceed 2 NTU. This provision would allow some recycling projects to save treatment costs and still provide a recycled water which is safe for the uses stated in this subsection.

(b) Subsection (b) is the same as section 60305 of the current requirements except that the wording would be modified for greater clarity.

(c) This subsection would be essentially the same as existing requirements (sections 60311 through 60313) except that the requirements would be reorganized and the wording modified for greater clarity.

(d) This subsection would be essentially the same as sections 60307 through 60309 of the existing regulations. Several terms would be changed, wording modified, and the section reorganized for greater clarity. Existing section 60309 requires the use of at least primary

treatment effluent for seed, fodder and fiber crops. While public contact with these types of uses are minimal, contact is still possible by workers and others. Therefore, the Department has determined that this type of effluent should receive oxidation in addition to primary treatment to assure an acceptable minimal quality of recycled water and thereby protect public health ("Review of Health Risks Relating to Ingestion and Inhalation of Constituents of Recycled Water." Department of Health Services 1992, section 2). Primary treatment by itself is rarely practiced in California and the Department is not aware of any recycled water facility that uses only primary treatment without at least also having oxidation ponds. Therefore, this change should not affect any existing operations.

In addition, the use of recycled water for Christmas tree farms would be adopted with the provision that no irrigation with recycled water take place for a period of 14 days prior to harvesting or allowing public access. Based on observations of irrigated sites, the Department has determined that the 14 days allows for sufficient absorption and evaporation of irrigation water to ensure that the public would not be at any risk of exposure to the recycled water used for irrigation.

(e) This subsection is proposed to be added to assure that the public is not exposed to an unreasonable risk of infection due to the eating of food that has come into direct contact with inadequately treated recycled water. The Department has determined ("Review of Health Risks Relating to Ingestion and Inhalation of Constituents of Recycled Water." Department of Health Services 1992) that the highest conceivable probability of contracting a viral intestinal infection from one episode (one day) of eating one meal that includes food that was sprayed with disinfected tertiary recycled water during irrigation is 1 in 100,000. As pointed out in the above referenced document, the Department considers this to be an acceptable level of infectious risk. Since a less treated recycled water (i.e., disinfected secondary-2.2) would create a higher and unacceptable risk of infection, the requirement for use of disinfected tertiary recycled water is proposed.

Section 64305. Use of Recycled Water for Impoundments

(a) The purpose of this subsection would be to set forth the requirement for disinfected tertiary treatment, as defined in section 60301.22 and which has been subjected to conventional treatment, for nonrestricted recreational impoundments in order to provide adequate public health protection from enteric viruses and bacteria. Nonrestricted recreational use of recycled water presents one of the most significant public exposures to the possibility of infection from recycled water due to potential ingestion of the recycled water while swimming. Existing section 60315 requires complete conventional treatment for nonrestricted recreational use but does not define this treatment in the same manner as the proposed regulations.

(b) The purpose of this subsection would be to allow the use of disinfected tertiary recycled water for nonrestricted recreational impoundments in certain circumstances. The Department recognizes that disinfected tertiary treated recycled water (which does not include the sedimentation unit process as part of the treatment chain) has been demonstrated to be equivalent to conventional treatment with respect to removal and inactivation of viruses. However, there is some uncertainty that this type of treatment can reliably produce a pathogen free effluent in all cases. The Blue Ribbon Panel on Assessment of Risk recommended that this type of treatment should be required to demonstrate its treatment effectiveness by means of additional monitoring if the recycled water is intended to be used for nonrestricted recreation. The Department concurred in this recommendation. This subsection sets forth the monitoring that would need to be performed during the first two years of operation if disinfected tertiary recycled water is proposed to be used in lieu of conventionally treated recycled water.

The Department determined that 12 samples of pathogenic organisms taken at monthly intervals followed by quarterly monitoring for at least an additional year would provide sufficient data to establish the effectiveness of the treatment process and also provide valuable data needed to evaluate the health risk associated with the project. Although the purpose of the demonstration would be to establish that the recycled water is essentially free of enteric virus, the advisory panel recommended that monitoring for giardia and cryptosporidium also be performed during this demonstration period as this information would be useful in evaluating the effectiveness of

the treatment process and would be valuable in establishing a possible basis for future standards for these organisms.

(c) The requirement that the coliform densities specified for disinfection shall be met at a point between the disinfection process and the point of entry to the use area is necessary to assure that coliform bacteria are monitored prior to the recycled water being introduced into the actual use impoundment.

(d) This subsection is the same as existing section 60317 for restricted recreational impoundments except that it has been reworded for better clarity. Use of this type of recycled water for fish hatchery impoundments would be adopted since this type of use was not included in existing regulations. The Department has determined that the degree of public exposure to impoundments at a fish hatchery (where such public access is allowed) is similar to a restricted recreational impoundment and a similar treatment requirement is, therefore, warranted.

(e) The requirement of this subsection is the same as existing requirements (section 60303) except for the exclusion of decorative fountains. The Department has determined ("Review of Health Risks Relating to the Ingestion and Inhalation of Constituents of Recycled Water." Department of Health Services 1992) that decorative fountains are capable of producing a mist that can increase the exposure hazard to the public through inhalation and, therefore, requires a higher level of treatment. The treatment requirement for recycled water for use in decorative fountains is specified in section 60306 (a).

Section 60306. Use of Recycled Water for Cooling

This section is proposed to be added to existing regulations to cover the use of recycled water for cooling purposes. This is a relatively new use of recycled water that was not recognized when the existing regulations were adopted. Cooling towers are generally equipped with drift eliminators to minimize the loss of cooling system water, thereby reducing the necessity to add water to the cooling system; drift eliminators would also provide specific health protective benefits when recycled water is used in cooling towers by minimizing the potential

exposure to microorganisms contained in the droplets of cooling water. The use of drift eliminators is a prevailing practice not primarily necessitated by the use of recycled water for this purpose. The use of recycled water for cooling falls into two categories based on whether or not a mist is produced that could contact members of the public.

(a) The purpose of this subsection would be to set forth the requirement for disinfected tertiary treatment of the recycled water in cooling systems that generally produce a mist (also known as drift) as part of the cooling process. This level of treatment is necessary to ensure that the mist does not pose a potential risk of infection to workers and the public via inhalation or contact with particles that remain in the air after the mist evaporates.

(b) This subsection allows the use of a lesser treated (disinfected secondary-23) recycled water in those situations where the cooling system does not produce a mist. Since there is a lesser likelihood of public contact or inhalation under these circumstances, the Department has determined ("Review of Health Risks Relating to the Ingestion and Inhalation of Constituents of Recycled Water." Department of Health Services 1992, section 3) that use of disinfected secondary-23 recycled water in lieu of disinfected tertiary recycled water provides adequate public health protection.

(c) This subsection adds additional requirements for cooling systems that produce a mist during the cooling process. The subsection requires the use of a drift eliminator whenever the cooling systems is used in conjunction with an air conditioning system. The Department has determined that the requirement to minimize drift is warranted due to the higher risk of inhalation associated with use of recycled water in air conditioning systems ("Review of Health Risks Relating to Ingestion and Inhalation of Constituents of Recycled Water." Department of Health Services 1992, pages 20-26).

The requirement for use of a biocide, such as chlorine, in the operation of the cooling system using recycled water is necessary to assure that pathogenic organisms of wastewater origin do not grow or regrow in the recirculated water. Biocides and other conditioning chemicals are

generally used in recirculating cooling towers regardless of the water source. Since cooling systems operate on a continuous recirculating basis, the lack of disinfectant treatment (such as periodic shock treatment) of the recirculated water could lead to the eventual growth of pathogenic organisms in the recycled water.

Section 60307. Use of Recycled Water for Other Purposes.

The purpose of this section would be to identify additional uses of recycled water that should be allowed and are not covered by the existing title 22, Division 4 regulations. The uses are broken into two categories, those that have a fairly high potential for public exposure thus requiring a high level of treatment and those with little public exposure thus allowing a lesser degree of treatment.

(a) Each of the uses specified in this subsection are new uses for recycled water that are not covered in the existing title 22, Division 4 regulations. These uses pose as much risk for public contact with the recycled water through direct contact, inhalation, or ingestion, as do those listed in section 60304(a) which require disinfected tertiary treatment to reduce the risk of infection. Therefore, the Department has determined that the recycled water used for these purposes must meet the definition for a disinfected tertiary recycled water in order to avoid unreasonable health risks.

This subsection also permits a recycled water to be produced without the use of chemical coagulation for the uses set forth in this section provided certain turbidity levels are not exceeded. As described under section 60303 (a), the disinfection process can be effective for moderate exposure uses without the need for coagulation as long as the turbidities remain below 5 NTU and the filter effluent turbidity does not exceed 2 NTU. This provision would allow some recycling projects to save treatment costs and still provide a recycled water which is safe for the uses stated in this section.

(b) The uses listed in this subsection are also new uses for recycled water, however, these uses have considerably less potential for public contact than the uses specified in subsection (a)

and thus do not require that same high level of treatment. The use of disinfected secondary-23 recycled water is allowed because the Department has determined that the probable risk of infection from the use of this type of recycled water for the listed uses are comparable to existing allowed uses for disinfected secondary-23 recycled water. Therefore, use of disinfected secondary-23 recycled water for these uses would not result in an unreasonable risk of infection to the public.

(c) Subsection (c) allows the use of undisinfected secondary recycled water to be used for the flushing of sanitary sewers. While this use has some potential for exposure or contact by the employees engaging in this activity, these employees are trained in the handling of untreated wastewater.

ARTICLE 3. USE AREA REQUIREMENTS

Section 60310. Use Area Requirements

(a), (b), (c) These subsections would establish setbacks or buffer zones around domestic water supply wells to provide assurance that recycled water would not enter and potentially contaminate a domestic water supply well. These types of setbacks are currently common practice and are reflected in several state and local regulations with respect to septic tanks, leach fields, and wastewater disposal areas. Providing an appropriate distance from a well allows sufficient movement through the soil to eliminate the entry of pathogenic organism since the ability to travel through soil for such organisms is limited. The distances set forth in the proposed regulation varies dependent upon the degree of prior treatment of the recycled water. The distances established in this subsection were determined by the Department to represent an adequate degree of protection and are consistent with current guidelines and practices already in use.

With respect to use of disinfected tertiary recycled water, the Department has included language that allows the elimination of the 50 foot setback if specific mitigation measures are present and taken. The Department has determined that the combination of these factors provides an

equivalent degree of protection for disinfected tertiary recycled water and has already approved several such installations in recent years.

(d) This requirement would assure that recycled water used for the various purposes set forth in sections 60302 through 60306 would be confined to the designated area of use and not allowed to affect persons outside of the designated area. The Regional Water Quality Control Boards have developed "best management practices" to control certain runoff situations and occasionally allows runoff to occur subject to these practices. This would be allowable where this runoff is approved by the Boards in the establishment of water recycling requirements. Provisions are also added to assure that areas that have a high risk potential for possible contamination are not affected by drifting spray or runoff from use of a recycled water.

(e) This subsection would provide assurance that mist or spray from an irrigation project that uses recycled water, other than disinfected tertiary recycled water, does not come into contact with sensitive areas where children or other vulnerable members of the public may be exposed. A 100 foot setback was determined by the Department to be an adequate buffer against inadvertent spray drift based on the document "Review of Health Risks Related to Ingestion and Inhalation of Constituents of Recycled Water." Department of Health Services 1992.

(f) The purpose of this subsection would be to alert workers and members of the public that recycled water is being used in a particular area and that this water is considered unsafe for drinking. The purpose of requiring an international symbol in addition to the English wording of the signs would be to assure that persons who do not read or understand English would be properly alerted to avoid drinking the recycled water. This symbol is consistent with the symbol being used on a voluntary basis by several recycled water agencies. Use of wording in another language in lieu of the symbol would not be practical because of the multitude of languages that would have to be included. This approach has been included in guidance which the Department has used for several years in evaluating recycling facilities. Thus many existing facilities already conform. The Department does not believe that it is necessary to specify the size of the letters and symbol since recycling facilities operating under the guidance have created signs that

adequately display both the wording and the symbol without such specifications. However, the overall size of the sign is specified to establish the minimum dimensions necessary to catch the eye of anyone in the vicinity.

(g) Whenever recycled water is used in a piping system in a facility or area that also receives potable water by means of a separate piping system, a possibility for cross connections exists. Cross connections can allow unsafe water to be drawn back into and contaminate the potable drinking water supply. The purpose of these subsections would be to make it clear that no physical connections between the two systems is allowed (except as allowed under section 7604, title 17). Hose bibs provide an easy and quick means for intentionally or inadvertently creating such a physical connection by simple means of a double connected garden hose. The prohibition of hose bibs on the recycled water system would minimize this possibility. Provision has been allowed for use of detachable "quick couplers" which would not be available to the public or unknowledgeable workers.

ARTICLE 4. DUAL PLUMBED RECYCLED WATER SYSTEMS

Section 60313. General Requirements

Subsection (a). The proper oversight and daily management of a recycled water system that is utilized for dual plumbing is extremely important for public health protection. For example, failure to adequately monitor the quality of the recycled water, inspect the facilities for cross connections or properly test the systems could lead to serious contamination of the potable water supplies. Public water systems are already required to conduct and maintain comprehensive cross connection control programs and have the expertise needed to assure that potential contamination problems do not occur. In order to assure responsible oversight and operation of such a system, the Department has determined that it is necessary that the system be under the direct control of a public agency or a public water system. This subsection makes it clear that only such an agency may deliver recycled water to dual plumbed facilities.

Subsection (b) The purpose of subsection (b) would be to assure that certain types of facilities that have unusually high risk potential do not receive recycled water for indoor use. These

facilities include residential type facilities which are well defined in the Uniform Building Code and facilities that produce food or beverages such as food processing plants, restaurants, bottling plants, and similar establishments. The potential risk for food or beverage contamination with subsequent human ingestion is sufficiently great in the Department's opinion that these facilities should be excluded from the allowable internal use of recycled water via dual plumbed facilities. See also the discussion of section 60302 which is also applicable to this subsection.

Subsection (c) Section 13522.5 of the Water Code requires the submission of an engineering report to the State Regional Water Quality Control Board. Existing section 60323 (California Code of Regulations) already requires certain information to be included in the engineering report. Section 60323, however, focuses on the treatment of the recycled water and does not include the information necessary to evaluate a proposed dual plumbed facility. The purpose of this subsection would be to make it clear that additional information, as specified in section 60314, must be submitted as part of the required engineering report.

Since plumbing systems are extremely difficult and expensive to remove or modify after they have been installed, the requirement to submit the proposal prior to installation or construction is necessary.

Section 60314. Report Submittal.

The purpose of this section would be to make it clear what information must be submitted as part of the engineering report.

Subsection (a) sets forth the information that the Department has determined is necessary to evaluate the degree of health risk. The number, type, and location of each facility and type of use to be made of the recycled water is necessary to assure that the proposed method of distribution and plumbing layout is appropriate for the type of public or employee exposure that would be encountered at each facility. The number of persons served is necessary to determine the degree of overall risk since the more persons potentially exposed the greater the hazard and need for possible additional protective measures. The requirement for identification of the person

responsible for operation of the dual plumbed system at each facility is necessary to assure the agency and the Department that someone has been designated that responsibility and allows the agency to know whom to contact should any problems with the recycled water occur.

Subsection (a) (2) is necessary to provide the Department with the details of how the piping system would be constructed and installed. This information is necessary to assure that the potable water supply would not be subjected to unreasonable risk of cross connection or possible backflow.

The purpose of subsection (a) (3) would be to require the agency to describe how the provisions of sections 60315 and 30616 are proposed to be complied with. The description of these methods prior to construction of the project are necessary in order for the Department to make a reasonable judgment that the proposed system as planned to be operated by the agency would not pose unreasonable risks to public health. Since there are various methods available to test the integrity of the recycled water system, it is necessary for the agency to describe which method they propose to use so that the Department can properly evaluate the proposal and include any appropriate conditions in its approval.

Subsection (b) allows a project proponent to submit one report covering multiple facilities where this would be practical. Since not all facilities would necessarily be hooked up at the outset, the submission of plans and specifications for individual facilities covered by the report could be submitted at a later date prior to the actual hookup of the facility. The purpose of this subsection would be to simplify the report process and eliminate unnecessary paperwork.

Section 60315. Design Requirements.

Using the potable water system as a source of makeup water (to be used when the supply of recycled water may not be sufficient to maintain pressure and supply users) requires a direct connection between the two systems thus creating a potential serious hazard to the potable water system. The purpose of this subsection would be to allow for such a situation provided the potable water system is protected by an air gap assembly. This type of backflow protection is

similar and consistent with backflow requirements for similar hazardous conditions that are specified in sections 7602 and 7603 of the California Code of Regulations.

Section 60316. Operation Requirements.

Subsection (a) The purpose of this subsection would be to require that the dual plumbed system be inspected and tested initially for cross connections prior to use of the recycled water system. As discussed under several previous sections, a high potential for the creation of cross connections exists whenever a dual plumbed system is used. These cross connections can be inadvertently created after the system has been installed by unknowing workers or plumbers. A cross connection can go undetected for a period of time as long as there is not a drop in pressure in the potable water system. It is necessary, therefore, to periodically inspect the system to detect any visible cross connections that may have been created. The Department has determined that annual inspection of the system provides reasonable assurance of detection of cross connections and does not pose significant costs to the recycled water system. This is the same inspection frequency required of public water systems for backflow prevention devices. Some cross connections, however, may be buried or hidden behind walls and may not be visibly detectable. The Department has determined therefore, that the recycled water system should be tested by one of several means to detect leaks or cross connections. Some existing facilities have utilized the injection of dye into the recycled water system combined with a pressure drop in the potable system to detect cross connections. Other methods are also available. The proposed regulation allows the user to propose the method of testing to be used. The Department has determined that a physical test conducted at least every four years is a reasonable frequency to conduct such tests. More frequent would provide better assurance but would present unreasonable costs to the user. Less frequent could expose consumers to an unreasonable risk. This testing frequency has also been recommended by the California Ad-Hoc Dual Plumbing Committee (an independent informal panel established in 1993 by the Department of Water Resources and The Department of Health Services. See Appendix number 2 for membership listing.) for inclusion into section R-10 of the California Uniform Plumbing Code.

The type of inspection and testing required by this subsection is complex and requires someone who has been trained to evaluate cross connection hazards and conduct appropriate testing. The American Water Works Association tests and certifies cross connection control specialists on a voluntary basis. The Department has determined that a specialist thus certified would constitute an acceptable trained individual. The requirement for submission of a report to the Department would be to assure that the inspection and testing has been performed and completed.

Subsection (b) This subsection requires the agency to notify the Department whenever an actual backflow of recycled water to the potable water system has occurred. It is important for the Department to be notified of such an occurrence so that the degree of immediate risk of contamination may be evaluated and to allow the Department to determine if mitigation measures such as the issuance of a boil water notice to the public needs to be taken. Allowing 24 hours to notify the Department does not impose an unreasonable burden on the agency and allows the Department to react quickly to take additional steps to protect the public if necessary.

Subsection (c). This subsection would ensure that all cross connection control devices are installed and inspected according to the procedures established in regulation that cover specifics related to inspection and maintenance.

ARTICLE 6. SAMPLING AND ANALYSIS

Section 60321. Sampling and Analysis.

This section has been deleted and replaced with a new section 60321 that has been rewritten for better clarity. With the exception of the language regarding determination of compliance with the turbidity standard, the requirements of the proposed section 60321 are essentially the same as the existing section. The means of determining compliance with the turbidity requirement in the existing section 60321 is not clearly stated. As required in the existing section, turbidity analysis must be performed by a continuous recording turbidimeter. This results in a very large amount of turbidity data that cannot be conveniently incorporated into a compliance calculation, and is not necessary to assure adequate process performance. The proposed section 60321 would allow

the selection of a value each four hours from the continuous record to be used in the determination of compliance. This is consistent with the approach used in the drinking water filtration regulation (title 22, CCR, Division 4, chapter 17, section 64655). The monthly reporting of turbidity data is consistent with other water quality data reporting (CCR section 64451) and enables the regulatory agency to properly track the process performance.

New language would be adopted requiring the results of the daily turbidity compliance determinations to be submitted monthly to the regulatory agency. The current section 60321 is silent on the reporting frequency thus creating confusion. The Department has determined that monthly submittal of this data is sufficient for compliance determinations and oversight by the regulatory agency and that it would be unreasonable to require daily submittal. In addition, this reporting period is consistent with other reporting requirements administered by the Department's Drinking Water Program.

Subsection (c) simply clarifies who is responsible for conducting the sampling since the present section 60321 is silent on this point.

TITLE 17, DIVISION 1, CHAPTER 5

ARTICLE 1

Section 7604. Type of Protection Required.

This section has been reorganized to remove recycled water from the previous subsection (a) and create a new subsection for recycled water uses. Existing paragraph (a)(2) has been redesignated as (a)(1), and the word "may", which was omitted in printing, has been restored.

Existing subsection (a) (3) has been redesignated as (c) (2) and has been modified in order to be consistent with the changes made in title 22, Article 4, sections 60312 through 60316. The existing section 7604 requires an air gap for premises where recycled water is used except that under certain circumstances, an RP could be used instead of an air gap. Since these circumstances are covered under the changes to Article 4, there is no reason to continue to

require an air gap, therefore, the minimum requirement is now proposed as an RP and the special circumstance language stricken.

Subsection (c) (3) is added to make it clear that the requirement of subsection (c) (2) does not apply to individual residences that use recycled water for landscape irrigation. This would be an unreasonable requirement on individual homeowners and is not necessary as a result of the Article 4 changes. Instead subsection (c) (3) reduces the requirement from RP devices to double check valves for approved dual plumbed use areas. This change is appropriate because of the additional safety factors built in as a result of proposed sections 60312 through 60316. Since a project proponent has the option to include additional backflow prevention measures in the project proposal, allowance has been made to use an alternative backflow prevention plan where the local water utility is satisfied that the alternative plan provides equivalent protection for their potable water system. The Department would review and approve the alternative plan in those instances where the public water supply utility is also the recycled water supplier to avoid a utility from approving its own plan.

Similarly, subsection (d) (4) modifies existing subsection (c) to make it clear that dual plumbed facilities that use potable water for fire protection within buildings and recycled water in a separate piping system for external use are allowed to install double check valves in lieu of an RP device

ALTERNATIVES CONSIDERED

These proposed regulations were developed with input from a Water Reclamation Advisory Panel. This panel was made up of representatives from wastewater treatment agencies, water recycling and distribution agencies, local health departments and affected state agencies. During the panel discussions, alternatives to specific details were evaluated. The proposed regulations represent a general consensus (although not necessarily unanimous) agreement of the group that these regulations would be the least burdensome to the regulated community while still maintaining appropriate public health protection.

The Department has determined that no alternative considered would be more effective in protecting public health, or as effective and less burdensome to affected private persons, than the proposed regulations.

LOCAL MANDATE DETERMINATION

The proposed regulations do not impose a mandate on local agencies which requires state reimbursement pursuant to Part 7, (commencing with Section 17500) of Division 4 of the Government Code. The regulations do not mandate the use of recycled water. This is a discretionary action on the part of the user. While in certain circumstances, a local agency can mandate the use of recycled water, that mandate is a result of such local action and is not a result of or related to these regulations.

The Department of Health Services has identified potential costs which may be incurred by existing users to modify the signs currently used to warn the public of the use of recycled water. To the extent public agencies use recycled water, some additional cost, therefore, may be incurred by a few local agencies depending upon their particular circumstances. However, these costs are not the result of a "new program or higher level of service" within the meaning of Article XIII B, Section 6 of the California Constitution because they apply generally to all public and private individuals and entities that utilize recycled water and do not impose unique requirements on local government. Therefore, no state reimbursement of these costs is required.

BUSINESS IMPACT

The treatment and use of recycled water has been covered by existing regulations for many years. The proposed regulations would amend the existing regulations governing recycled water by expanding the range of allowable uses of recycled water, establishing criteria for those new uses, and eliminating the areas of ambiguity in the existing regulations.

The production and/or use of recycled water is, for the most part, a discretionary activity. These regulations do not mandate that anyone produce or use recycled water, but there are potential effects on those businesses that choose to produce or use recycled water.. Producers can be drinking water or waste water utilities. Users can be various types of businesses and developments within a community that chose to use recycled water as a source of water for the purposes spelled out in the proposed regulations.

For communities where development has been constrained by limited water resources, recycled water can provide a new source of water and, as such, may enable businesses or residential areas to develop beyond what might have otherwise been possible. Since the proposed regulations would expand the approved uses for recycled water, recycled water would have a broader range of applications, thus making recycled water a more viable option for a community. In addition, the use of recycled water can potentially free some quantity of potable water for drinking and other appropriate uses where potable water is the only option. Based on this, the Department has determined that the regulations might affect the following:

1. The creation or elimination of jobs within the State of California. The requirements summarized above may create and/or enable the creation of jobs wherever recycled water is produced and/or used. Utilities choosing to produce recycled water may need

additional staff in order to manage and monitor the treatment processes involved.

Likewise, users of recycled water may need additional staff to ensure that the water is properly handled. Communities with currently limited water resources that avail themselves of the opportunity to use recycled water, may experience business expansion and development and, thus, an increase in jobs.

2. The expansion of businesses currently doing business within the State of California. Since the proposed regulations would expand the uses for recycled water, the demand for this resource is likely to increase and, therefore, more utilities would probably go into the production of recycled water. Also, utilities already producing recycled water might, if they are able, increase their production. Thus, these utilities would be expanding their services and clientele. For this reason, if no other, there would be some expansion.

Since water is an expensive commodity for businesses which use a significant amount, the use of recycled water, where approvable, would result in a cost savings, enabling possible expansion for such businesses. For communities where water resources has limited development, the availability of recycled water could result in expansion of businesses previously constrained.

3. The creation of new businesses or the elimination of existing businesses within the State of California. Since the proposed regulations would expand the uses for recycled water, the demand for this resource is likely to increase and, therefore, more utilities would probably go into the production of recycled water.

In addition, there may be would-be businesses unable to start up due to lack of available water resources or the cost of potable water, which might be able to establish themselves if they were able to utilize recycled water because of the broader range of uses under the proposed regulations.

CHAPTER 3

WATER RECYCLING RECLAMATION CRITERIA

ARTICLE 1

DEFINITIONS

~~60301. Definitions.~~

~~(a) Reclaimed Water. Reclaimed water means water which, as a result of treatment of domestic wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.~~

~~(b) Reclamation Plant. Reclamation plant means an arrangement of devices, structures, equipment, processes and controls which produce a reclaimed water suitable for the intended reuse.~~

~~(c) Regulatory Agency. Regulatory agency means the California Regional Water Quality Control Board in whose jurisdiction the reclamation plant is located.~~

~~(d) Direct Beneficial Use. Direct beneficial use means the use of reclaimed water which has been transported from the point of production to the point of use without an intervening discharge to waters of the state.~~

~~(e) Food Crops. Food crops mean any crops intended for human consumption.~~

~~(f) Spray Irrigation. Spray irrigation means application of reclaimed water to crops by spraying it from orifices in piping.~~

~~(g) Surface Irrigation. Surface irrigation means application of reclaimed water by means other than spraying such that contact between the edible portion of any food crop and reclaimed water is prevented.~~

~~(h) Restricted Recreational Impoundment. Restricted recreational impoundment is a body of reclaimed water in which recreation is limited to fishing, boating, and other non body contact water recreation activities.~~

~~(i) Nonrestricted Recreational Impoundment. A nonrestricted recreational impoundment is an impoundment of reclaimed water in which no limitations are imposed on body contact water sport activities.~~

~~(j) Landscape Impoundment. A landscape impoundment is a body of reclaimed water which is used for aesthetic enjoyment or which otherwise serves a function not intended to include public contact.~~

~~(k) Approved Laboratory Methods. Approved laboratory methods are those specified in the latest edition of "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation and which are conducted in laboratories approved by the State Department of Health.~~

~~(l) Unit Process. Unit process means an individual stage in the wastewater treatment sequence which performs a major single treatment operation.~~

~~(m) Primary Effluent. Primary effluent is the effluent from a wastewater treatment process which provides removal of sewage solids so that it contains not more than 0.5 milliliters per liter per hour of settleable solids as determined by an approved laboratory method.~~

~~(n) Oxidized Wastewater. Oxidized wastewater means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen.~~

~~(o) Biological Treatment. Biological treatment means methods of wastewater treatment in which bacterial or biochemical action is intensified as a means of producing an oxidized wastewater.~~

~~(p) Secondary Sedimentation. Secondary sedimentation means the removal by gravity of settleable solids remaining in the effluent after the biological treatment process.~~

~~(q) Coagulated Wastewater. Coagulated wastewater means oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated by the addition of suitable floc forming chemicals or by an equally effective method.~~

~~(r) Filtered Wastewater. Filtered wastewater means an oxidized, coagulated, clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 turbidity units and does not exceed 5 turbidity units more than 5 percent of the time during any 24 hour period.~~

~~(s) Disinfected Wastewater. Disinfected wastewater means wastewater in which the pathogenic organisms have been destroyed by chemical, physical or biological means.~~

~~(t) Multiple Units. Multiple units means two or more units of a treatment process which operate in parallel and serve the same function.~~

~~(u) Standby Unit Process. A standby unit process is an alternate unit process or an equivalent alternative process which is maintained in operable condition and which is capable of~~

~~providing comparable treatment for the entire design flow of the unit for which it is a substitute.~~

~~(v) Power Source. Power source means a source of supplying energy to operate unit processes.~~

~~(w) Standby Power Source. Standby power source means an automatically actuated self starting alternate energy source maintained in immediately operable condition and of sufficient capacity to provide necessary service during failure of the normal power supply.~~

~~(x) Standby Replacement Equipment. Standby replacement equipment means reserve parts and equipment to replace broken-down or worn out units which can be placed in operation within a 24 hour period.~~

~~(y) Standby Chlorinator. A standby chlorinator means a duplicate chlorinator for reclamation plants having one chlorinator and a duplicate of the largest unit for plants having multiple chlorinator units.~~

~~(z) Multiple Point Chlorination. Multiple point chlorination means that chlorine will be applied simultaneously at the reclamation plant and at subsequent chlorination stations located at the use area and/or some intermediate point. It does not include chlorine application for odor control purposes.~~

~~(aa) Alarm. Alarm means an instrument or device which continuously monitors a specific function or a treatment process and automatically gives warning of an unsafe or undesirable condition by means of visual and audible signals.~~

~~(bb) Person. Person also includes any private entity, city, county, district, the State or any department or agency thereof.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.100. Approved Laboratory.

"Approved laboratory" means a laboratory that has been certified by the Department to perform microbiological analyses pursuant to section 116390, Health and Safety Code.

Authority cited : Section 13521, Water Code

Reference : Sections 13520 and 13521, Water Code

Section 60301.160. Coagulated Wastewater.

"Coagulated wastewater" means oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated upstream from a filter by the addition of suitable floc-forming chemicals.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.170. Conventional Treatment.

"Conventional treatment" means a treatment chain that utilizes a sedimentation unit process between the coagulation and filtration processes and produces an effluent that meets the definition for disinfected tertiary recycled water.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.200. Direct Beneficial Use.

"Direct beneficial use" means the use of recycled water that has been transported from the point of treatment or production to the point of use without an intervening discharge to waters of the State.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.220. Disinfected Secondary-2.2 Recycled Water.

"Disinfected secondary-2.2 recycled water" means recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.225. Disinfected Secondary-23 Recycled Water.

"Disinfected secondary-23 recycled water" means recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30 day period.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.230. Disinfected Tertiary Recycled Water.

"Disinfected tertiary recycled water" means a filtered and subsequently disinfected wastewater that meets the following criteria:

(a) The filtered wastewater has been disinfected by either:

(1) A chlorine disinfection process following conventional treatment or its equivalent that provides a CT (the product of total chlorine residual and modal contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or

(2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque-forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.

(b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.240. Drift.

"Drift" means the amount of water that escapes to the atmosphere as water droplets from a cooling system.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.245. Drift Eliminator.

"Drift eliminator" means a feature of a cooling system that reduces to a minimum the generation of drift from the system.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.250. Dual Plumbed System.

"Dual plumbed svstem" or "dual plumbed" means a system that utilizes separate piping svstems for recvcled water and potable water within a facility and where the recycled water is used for either of the following purposes:

- (a) To serve plumbing outlets used by the public within a building or
- (b) Landscape irrigation at individual residences.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.300. F-Specific Bacteriophage MS-2.

"F-specific bacteriophage MS-2" means a strain of a specific type of virus that infects coliform bacteria that is traceable to the American Type Culture Collection (ATCC 15597B1) and is grown on lawns of E. coli (ATCC 15597).

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.310. Facility.

"Facility" means any type of building or structure, or a defined area of specific public use that receives water for domestic use from a public water system as defined in section 116275 of the Health and Safety Code.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.320. Filtered Wastewater.

"Filtered wastewater" means an oxidized wastewater that meets the criteria in subsection (a) or (b):

(a) Has been coagulated and passed through natural undisturbed soils or a bed of filter media pursuant to the following:

(1) At a rate that does not exceed 5 gallons per minute per square foot of surface area in mono, dual or mixed media gravity or pressure filtration systems, or does not exceed 2 gallons per minute per square foot of surface area in traveling bridge automatic backwash filters; and

(2) So that the turbidity of the filtered wastewater does not exceed any of the following:

(A) A daily average of 2 NTU;

(B) 5 NTU more than 5 percent of the time within a 24-hour period; and

(C) 10 NTU at any time.

(b) Has been passed through a microfiltration, ultrafiltration, nanofiltration, or reverse osmosis membrane so that the turbidity of the filtered wastewater does not exceed any of the following:

(1) 0.2 NTU more than 5 percent of the time within a 24-hour period; and

(2) 0.5 NTU at any time.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.330. Food Crops.

"Food crops" means any crops intended for human consumption.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.400. Hose Bibb.

"Hose bibb" means an outdoor faucet or similar device to which a common garden hose can be readily attached.

Authority cited: Section 13521, Water Code.

Reference: Sections 13520 and 13521, Water Code.

Section 60301.550. Landscape Impoundment.

"Landscape impoundment" means an impoundment of recycled water which is stored or used for aesthetic enjoyment or landscape irrigation, or which otherwise serves a similar function and is not intended to include public contact.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.600. Modal Contact Time.

"Modal contact time" means the amount of time elapsed between the time that a tracer, such as salt or dye, is injected into the influent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.620. Nonrestricted Recreational Impoundment.

"Nonrestricted recreational impoundment" means an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.630. NTU.

"NTU" (Nephelometric turbidity unit) means a measurement of turbidity as determined by the ratio of the intensity of light scattered by the sample to the intensity of incident light as measured by method 2130 B. in Standard Methods for the Examination of Water and Wastewater, 19th ed.; Eaton, A. D., Clesceri, L. S., and Greenberg, A. E., Eds; American Public Health Association: Washington, DC, 1995; p. 2-8.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.650. Oxidized Wastewater.

"Oxidized wastewater" means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.700. Recycled Water Agency.

"Recycled water agency" means the public water system, or a publicly owned or operated recycled water system, proposing to deliver recycled water to a facility.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.710. Recycling Plant.

"Recycling plant" means an arrangement of devices, structures, equipment, processes and controls which produce recycled water.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.740. Regulatory Agency.

"Regulatory agency" means the California Regional Water Quality Control Board in whose jurisdiction the recycling plant is located.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.750. Restricted Access Golf Course.

"Restricted access golf course" means a golf course where public access is controlled so that areas irrigated with recycled water cannot be used as if they were part of a park, playground, or school yard and where irrigation is conducted only in areas and during periods when the golf course is not being used by golfers.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.760. Restricted Recreational Impoundment.

"Restricted recreational impoundment" means an impoundment of recycled water in which recreation is limited to fishing, boating, and other non-body-contact water recreational activities.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.800. Spray Irrigation.

"Spray irrigation" means the application of recycled water to crops to maintain vegetation or support growth of vegetation by applying it from sprinklers or orifices in piping. Spray irrigation does not include drip irrigation.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.830. Standby Unit Process.

"Standby unit process" means an alternate unit process or an equivalent alternative process which is maintained in operable condition and which is capable of providing comparable treatment of the actual flow through the unit for which it is a substitute.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.900. Undisinfected Secondary Recycled Water.

"Undisinfected secondary recycled water" means oxidized wastewater.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60301.920. Use Area.

"Use area" means an area of recycled water use with defined boundaries. A use area may contain one or more facilities.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~ARTICLE 2. IRRIGATION OF FOOD CROPS.~~~~Section 60303. Spray Irrigation.~~

~~Reclaimed water used for the spray irrigation of food crops shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within a 30 day period. The median value shall be determined from the bacteriological results of the last 7 days for which analyses have been completed.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~Section 60305 Surface Irrigation.~~

~~(a) Reclaimed water used for surface irrigation of food crops shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.~~

~~(b) Orchards and vineyards may be surface irrigated with reclaimed water that has the quality at least equivalent to that of primary effluent provided that no fruit is harvested that has come in contact with the irrigating water or the ground.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~Section 60307. Exeptions.~~

~~Exceptions to the quality requirements for reclaimed water used for irrigation of food crops may be considered by the State Department of Health on an individual case basis where the reclaimed water is to be used to irrigate a food crop which must undergo extensive commercial, physical or chemical processing sufficient to destroy pathogenic agents before it is suitable for human consumption.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~Article 3. Irrigation of Fodder, Fiber, and Seed Crops.~~

~~Section 60309. Fodder, Fiber, and Seed Crops.~~

~~Reclaimed water used for the surface or spray irrigation of fodder, fiber, and seed crops shall have a level of quality no less than that of primary effluent.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~Section 60311. Pasture for Milking Animals.~~

~~Reclaimed water used for the irrigation of pasture to which milking cows or goats have access shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 23 per 100 milliliters as determined from the bacteriological results of the last 7 days for which analyses have been completed.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~ARTICLE 4. Landscape Irrigation.~~~~Section 60313. Landscape Irrigation.~~

~~(a) Reclaimed water used for the irrigation of golf courses, cemeteries, freeway landscapes, and landscapes in other areas where the public has similar access or exposure shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if the median number of coliform organisms in the effluent does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of coliform organisms does not exceed 240 per 100 milliliters in any two consecutive samples.~~

~~(b) Reclaimed water used for the irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater or a wastewater treated by a sequence of unit processes that will assure an equivalent degree of treatment and reliability. The wastewater shall be considered adequately disinfected if the median number of coliform organisms in the effluent does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of coliform organisms does not exceed 23 per 100 milliliters in any sample.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~ARTICLE 5. Recreational Impoundments.~~~~Section 60315. Nonrestricted Recreational Impoundment.~~

~~Reclaimed water used as a source of supply in a nonrestricted recreational impoundment shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within any 30 day period. The median value shall be determined from the bacteriological results of the last 7 days for which analyses have been completed.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~Section 60317. Restricted Recreational Impoundment.~~

~~Reclaimed water used as a source of supply in a restricted recreational impoundment shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

~~Section 60319. Landscape Impoundment.~~

~~Reclaimed water used as a source of supply in a landscape impoundment shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Article 2. SOURCES OF RECYCLED WATER.

Section 60302. Source Specifications.

The requirements in this chapter shall only apply to recycled water from sources that contain domestic waste, in whole or in part.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

ARTICLE 3. USES OF RECYCLED WATER.Section 60303. Exceptions.

The requirements set forth in this chapter shall not apply to the use of recycled water onsite at a water recycling plant, or wastewater treatment plant, provided access by the public to the area of onsite recycled water use is restricted.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60304. Use of Recycled Water for Irrigation.

(a) Recycled water used for the irrigation of the following shall be a disinfected tertiary recycled water except that coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU at any time:

- (1) Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop,
- (2) Parks and playgrounds,
- (3) School yards,
- (4) Residential landscaping,
- (5) Unrestricted access golf courses, and
- (6) Any other irrigation use not specified in this section and not prohibited by other sections of the California Code of Regulations.

(b) Recycled water used for the irrigation of food crops where the edible portion is produced above ground and not contacted by the recycled water shall be at least disinfected secondary-2.2 recycled water.

(c) Recycled water used for the irrigation of the following shall be at least disinfected secondary-23 recycled water:

- (1) Cemeteries,

- (2) Freeway landscaping,
- (3) Restricted access golf courses,
- (4) Ornamental nursery stock and sod farms where access by the general public is not restricted,
- (5) Pasture for animals producing milk for human consumption, and
- (6) Any nonedible vegetation where access is controlled so that the irrigated area cannot be used as if it were part of a park, playground or school yard

(d) Recycled wastewater used for the irrigation of the following shall be at least undisinfected secondary recycled water:

- (1) Orchards where the recycled water does not come into contact with the edible portion of the crop,
- (2) Vineyards where the recycled water does not come into contact with the edible portion of the crop,
- (3) Non food-bearing trees (Christmas tree farms are included in this category provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting or allowing access by the general public),
- (4) Fodder and fiber crops and pasture for animals not producing milk for human consumption,

- (5) Seed crops not eaten by humans,
- (6) Food crops that must undergo commercial pathogen-destroying processing before being consumed by humans, and
- (7) Ornamental nursery stock and sod farms provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public.

(e) No recycled water used for irrigation, or soil that has been irrigated with recycled water, shall come into contact with the edible portion of food crops eaten raw by humans unless the recycled water complies with subsection (a).

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60305. Use of Recycled Water For Impoundments.

(a) Except as provided in subsection (b), recycled water used as a source of water supply for nonrestricted recreational impoundments shall be disinfected tertiary recycled water that has been subjected to conventional treatment.

(b) Disinfected tertiary recycled water that has not received conventional treatment may be used for nonrestricted recreational impoundments provided the recycled water is monitored for the presence of pathogenic organisms in accordance with the following:

- (1) During the first 12 months of operation and use the recycled water shall be sampled and analyzed monthly for *Giardia*, enteric viruses, and *Cryptosporidium*. Following the first 12 months of use, the recycled water shall be sampled and analyzed quarterly for *Giardia*, enteric viruses, and *Cryptosporidium*. The ongoing monitoring may be discontinued after the first two years of operation with the approval of the department. This monitoring shall be in addition to the monitoring set forth in section 60321.
- (2) The samples shall be taken at a point following disinfection and prior to the point where the recycled water enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency.

(c) The total coliform bacteria concentrations in recycled water used for nonrestricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall comply with the criteria

specified in section 60301.230 (b) for disinfected tertiary recycled water.

(d) Recycled water used as a source of supply for restricted recreational impoundments and for any publicly accessible impoundments at fish hatcheries shall be at least disinfected secondary-2.2 recycled water.

(e) Recycled water used as a source of supply for landscape impoundments that do not utilize decorative fountains shall be at least disinfected secondary-23 recycled water.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60306. Use of Recycled Water for Cooling.

(a) Recycled water used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist shall be a disinfected tertiary recycled water.

(b) Use of recycled water for industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying, or any mechanism that creates a mist shall be at least disinfected secondary-23 recycled water.

(c) Whenever a cooling system, using recycled water in conjunction with an air conditioning facility, utilizes a cooling tower or otherwise creates a mist that could come into contact with employees or members of the public, the cooling system shall comply with the following:

- (1) A drift eliminator shall be used whenever the cooling system is in operation.
- (2) A chlorine, or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60307. Use of Recycled Water for Other Purposes.

(a) Recycled water used for the following shall be disinfected tertiary recycled water except that coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU at any time:

- (1) Flushing toilets and urinals,
- (2) Priming drain traps,
- (3) Industrial process water that may come into contact with workers,
- (4) Structural fire fighting,
- (5) Decorative fountains,
- (6) Commercial laundries,
- (7) Consolidation of backfill around potable water pipelines,
- (8) Artificial snow making for commercial outdoor use,
- (9) Commercial car washes where the washing is not done by hand and where the general public is excluded from the washing process, and

(b) Recycled water used for the following uses shall be at least disinfected secondary-23 recycled water:

- (1) Industrial boiler feed,
- (2) Nonstructural fire fighting,
- (3) Backfill consolidation around nonpotable piping,
- (4) Soil compaction,
- (5) Mixing concrete,
- (6) Dust control on roads and streets,
- (7) Cleaning roads, sidewalks and outdoor work areas,
and

(c) Recycled water used for flushing sanitary sewers shall be at least undisinfected secondary recycled water.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

ARTICLE 4. USE AREA REQUIREMENTS.Section 60310. Use Area Requirements.

(a) No irrigation with disinfected tertiary recycled water shall take place within 50 feet of any domestic water supply well unless all of the following conditions have been met:

- (1) A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface.
- (2) The well contains an annular seal that extends from the surface into the aquitard.
- (3) The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities.
- (4) The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well.
- (5) The owner of the well approves of the elimination of the buffer zone requirement.

(b) No impoundment of disinfected tertiary recycled water shall occur within 100 feet of any domestic water supply well.

(c) No irrigation with, or impoundment of, disinfected secondary-2.2 or disinfected secondary-23 recycled water shall take place within 100 feet of any domestic water supply well.

(d) No irrigation with, or impoundment of, undisinfected secondary recycled water shall take place within 150 feet of any domestic water supply well.

(e) Any use of recycled water shall comply with the following:

- (1) Any irrigation runoff shall be confined to the recycled water use area unless otherwise authorized by the regulatory agency.
- (2) Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities.
- (3) Drinking water fountains shall be protected against contact with recycled water spray, mist, or runoff.

(f) No spray irrigation of any recycled water, other than disinfected tertiary recycled water, shall take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground, or school yard.

(g) All use areas where recycled water is used that are accessible to the public shall be posted with conspicuous signs, in a size no less than 4 inches high by 8 inches wide, that include the following wording: "RECYCLED WATER - DO NOT DRINK". Each sign shall display an international symbol similar to that shown in Figure 1.

(h) Except as allowed under section 7604 of title 17, California Code of Regulations, no physical connection shall be made or allowed to exist between any recycled water system and any separate system conveying potable water.

(i) The recycled water piping system shall not include any hose bibbs. Only quick couplers that differ from those used on

the potable water system shall be used on the recycled water piping system.

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

ARTICLE 5. DUAL PLUMBED RECYCLED WATER SYSTEMS.Section 60313. General Requirements.

(a) No person other than a recycled water agency shall deliver recycled water to a dual-plumbed facility.

(b) No recycled water agency shall deliver recycled water for any internal use to any individually-owned residential units including free-standing structures, multiplexes, or condominiums.

(c) No recycled water agency shall deliver recycled water for internal use except for fire suppression systems, to any facility that produces or processes food products or beverages. This exclusion does not apply to a cafeteria or snack bar in a facility whose primary function does not involve the production or processing of foods or beverages.

(d) No recycled water agency shall deliver recycled water to a facility using a dual plumbed system unless the report required pursuant to section 13522.5 of the Water Code, and which meets the requirements set forth in section 60314, has been submitted to the regulatory agency.

Authority cited: Section 13521 Water Code

Reference: Sections 13521, 13522.5, 13523.1, 13553 and
13554 Water Code

Section 60314. Report Submittal.

(a) For dual-plumbed recycled water systems, the report submitted pursuant to section 13522.5 of the Water Code shall contain the following information in addition to the information required by section 60323:

(1) A detailed description of the intended use area identifying the following:

(A) The number, location, and type of facilities within the use area proposing to use dual plumbed systems,

(B) The average number of persons estimated to be served by each facility on a daily basis,

(C) The specific boundaries of the proposed use area including a map showing the location of each facility to be served,

(D) The person or persons responsible for operation of the dual plumbed system at each facility, and

(E) The specific use to be made of the recycled water at each facility.

(2) Plans and specifications describing the following:

(A) Proposed piping system to be used,

(B) Pipe locations of both the recycled and potable systems,

(C) Type and location of the outlets and plumbing fixtures that will be accessible to the public, and

(D) The methods and devices to be used to prevent backflow of recycled water into the public water system.

(3) The methods to be used by the recycled water agency to assure that the installation and operation of the dual plumbed system will not result in cross connections between the recycled water piping system and the potable water piping system. This shall include a description of pressure, dye or other test methods to be used to test the system every four years.

(b) A master plan report that covers more than one facility or use site may be submitted provided the report includes the information required by this section. Plans and specifications for individual facilities covered by the report may be submitted at any time prior to the delivery of recycled water to the facility.

Authority cited: Sections 13521 and 13522.5, Water Code; and Section 116375, Health and Safety Code.

Reference: Sections 13521, 13522.5, 13523.1, 13553 and 13554, Water Code.

Section 60315. Design Requirements.

The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of sections 7602 (a) and 7603 (a) of title 17, California Code of Regulations, and the approval of the public water system has been obtained.

Authority cited: Section 13521, Water Code; and Section 116375, Health and Safety Code.

Reference: Sections 13521, 13523.1, 13553 and 13554, Water Code.

Section 60316. Operation Requirements.

(a) Prior to the initial operation of the dual-plumbed recycled water system and annually thereafter, the dual plumbed system within each facility and use area shall be inspected for possible cross connections with the potable water system. The recycled water system shall also be tested for possible cross connections at least once every four years. The testing shall be conducted in accordance with the method described in the report submitted pursuant to section 60314. The inspections and the testing shall be performed by a cross connection control specialist certified by the California-Nevada section of the American Water Works Association. A written report documenting the result of the inspection and testing for the prior year shall be submitted to the department within 30 days following completion of the testing.

(b) The recycled water agency shall notify the department of any incidence of backflow from the dual-plumbed recycled water system into the potable water system within 24 hours of the discovery of the incident.

(c) Any backflow prevention device installed on the dual-plumbed recycled water system to protect the public water system shall be inspected and maintained in accordance with section 7605 of Title 17, California Code of Regulations.

Authority cited: Section 13521, Water Code; and Section 116375, Health and Safety Code.

Reference: Sections 13521, 13553 and 13554, Water Code.

ARTICLE 6. Sampling and Analysis.~~Section 60321. Sampling and Analysis.~~

~~(a) Samples for settleable solids and coliform bacteria, where required, shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities and disinfection procedures. Turbidity analysis, where required, shall be performed by a continuous recording turbidimeter.~~

~~(b) For uses requiring a level of quality no greater than that of primary effluent, samples shall be analyzed by an approved laboratory method of settleable solids.~~

~~(c) For uses requiring an adequately disinfected, oxidized wastewater, samples shall be analyzed by an approved laboratory method for coliform bacteria content.~~

~~(d) For uses requiring an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater, samples shall be analyzed by approved laboratory methods for turbidity and coliform bacteria content.~~

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

Section 60321. Sampling and Analysis.

(a) Disinfected secondary-23, disinfected secondary-2.2, and disinfected tertiary recycled water shall be sampled at least once daily for total coliform bacteria. The samples shall be taken from the disinfected effluent and shall be analyzed by an approved laboratory.

(b) Disinfected tertiary recycled water shall be continuously sampled for turbidity using a continuous turbidity meter and recorder following filtration. Compliance with the daily average operating filter effluent turbidity shall be determined by averaging the levels of recorded turbidity taken at four-hour intervals over a 24-hour period. Compliance with turbidity pursuant to section 60301.320(b) shall be determined by averaging the levels of recorded turbidity taken at 1.2-hour intervals over a 24-hour period. The results of the daily average turbidity determinations shall be reported monthly to the regulatory agency.

(c) The producer or supplier of the recycled water shall conduct the sampling required in subsections (a) and (b).

Authority cited: Section 13521, Water Code

Reference: Sections 13520 and 13521, Water Code

TITLE 17
DIVISION 1
CHAPTER 5
Group 4

ARTICLE 1.

Section 7604. Type of Protection Required.

The type of protection that shall be provided to prevent backflow into the public water supply shall be commensurate with the degree of hazard that exists on the consumer's premises. The type of protective device that may be required (listed in an increasing level of protection) includes: Double check Valve Assembly--(DC), Reduced Pressure Principle Backflow Prevention Device--(RP) and an Air gap Separation--(AG). The water user may choose a higher level of protection than required by the water supplier. The minimum types of backflow protection required to protect the public water supply, at the water user's connection to premises with various degrees of hazard, are given in Table 1. Situations not covered in Table 1 shall be evaluated on a case-by-case basis and the appropriate backflow protection shall be determined by the water supplier or health agency.

TABLE 1

TYPE OF BACKFLOW PROTECTION REQUIRED

<i>Degree of Hazard</i>	<i>Minimum Type of Backflow Prevention</i>
(a) Sewage and Hazardous Substances	

~~(1) Premises where the public water supply is~~

~~used to supplement the reclaimed water supply.~~

~~AG~~

- ~~(2)~~ (1) Premises where there are wastewater pumping and/or treatment plants and there is no interconnection with the potable water system. This does not include a single-family residence that has a sewage lift pump. A RP may be provided in lieu of an AG if approved by the health agency and water supplier. AG
- ~~(3)~~ Premises where reclaimed water is used and there is no interconnection with the potable water system. A RP may be provided in lieu of an AG if approved by the health agency and water supplier. AG
- ~~(4)~~ (2) Premises where hazardous substances are handled in any manner in which the substances may enter the potable water system. This does not include a single-family residence that has a sewage lift pump. A RP may be provided in lieu of an AG if approved by the health agency and water supplier. AG
- ~~(5)~~ (3) Premises where there are irrigation systems into which fertilizers, herbicides, or pesticides are, or can be, injected. RP

(b) Auxiliary Water Supplies

- (1) Premises where there is an unapproved auxiliary water supply which is interconnected with the public water system. A RP or DC may be provided in lieu of an AG if approved by the health agency and water supplier. AG

- (2) Premises where there is an unapproved auxiliary water supply and there are no interconnections with the public water system. A DC may be provided in lieu of a RP if approved by the health agency and water supplier. RP

(c) Recycled Water

- (1) Premises where the public water system is used to supplement the recycled water supply. AG
- (2) Premises where recycled water is used, other than as allowed in paragraph (3), and there is no interconnection with the potable water system. RP
- (3) Residences using recycled water for landscape irrigation as part of an approved dual plumbed use area established pursuant to sections 60313 through 60316 unless the recycled water supplier obtains approval of the local public water supplier, or the Department if the water supplier is also the supplier of the recycled water, to utilize an alternative backflow protection plan that includes an annual inspection and annual shutdown test of the recycled water and potable water systems pursuant to subsection 60316(a). DC

~~(c)~~ (d) Fire Protection Systems

- (1) Premises where the fire system is directly supplied from the public water system and there is an unapproved auxiliary water supply on or to the premises (not interconnected). DC
- (2) Premises where the fire system is supplied from the public water system and interconnected with an unapproved auxiliary water supply. A RP may AG

be provided in lieu of an AG if approved by the health agency and water supplier.

(3) Premises where the fire system is supplied from the public water system and where either elevated storage tanks or fire pumps which take suction from private reservoirs or tanks are used. DC

(4) Buildings where the fire system is supplied from the public water system and where recycled water is used in a separate piping system within the same building. DC

~~(d)~~ (e) Dockside Watering Points and Marine Facilities

(1) Pier hydrants for supplying water to vessels for any purpose. RP

(2) Premises where there are marine facilities. RP

~~(f)~~ (f) Premises where entry is restricted so that inspections for cross-connections cannot be made with sufficient frequency or at sufficiently short notice to assure that they do not exist. RP

~~(g)~~ (g) Premises where there is a repeated history of cross-connections being established or re-established. RP

Authority cited: Sections ~~208 and 4026~~ 116375, Health and Safety Code; and Section 13521, Water Code.

Reference: Section ~~4026~~ 116375, Health and Safety Code; and Sections 13520, 13521 and 13554 (a) (3), Water Code.

*Uniform Plumbing Code, Appendix J –
Reclaimed Water Systems for Nonresidential Buildings*

APPENDIX J

RECLAIMED WATER SYSTEMS FOR NON-RESIDENTIAL BUILDINGS

J 1 Reclaimed Water Systems – General

(a) The provisions of this appendix shall apply to the installation, construction, alteration, and repair of reclaimed water systems intended to supply water closets, urinals, and trap primers for floor drains and floor sinks. Use is limited to these fixtures that are located in non-residential buildings. Fixtures within residential buildings are excluded from the list of approved uses. The reclaimed water system shall have no connection to any potable water system, with or without mechanical backflow prevention devices. If reclaimed water is utilized on the premises, all potable water supplies shall be provided with appropriate backflow protection, as required by the authority having jurisdiction. Except as otherwise provided for in this appendix, the provisions of this Code shall be applicable to reclaimed water system installations.

(b) No permit for any reclaimed water system shall be issued until complete plumbing plans, with appropriate data satisfactory to the Administrative Authority, have been submitted and approved. No changes or connections shall be made to either the reclaimed water system or the potable water system within any site containing a reclaimed water system, without approval by the Administrative Authority.

(c) Before the building may be occupied, the installer shall perform the initial cross-connection test in the presence of the Administrative Authority and other authorities having jurisdiction, and the test shall be ruled successful by the Administrative Authority before final approval is granted.

J 2 Definitions

Reclaimed water is water which, as a result of tertiary treatment of domestic wastewater by a public agency, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. The level of treatment and quality of the reclaimed water shall be approved by the public health authority having jurisdiction.

For the purpose of this appendix, tertiary treatment shall result in water which is adequately oxidized, clarified, coagulated, filtered and disinfected, so that at some location in the treatment process, the seven- (7) day median number of total coliform bacteria in daily samples does not exceed two and two tenths (2.2) per one hundred (100) milliliters, and the number of total coliform bacteria

does not exceed twenty-three (23) per one hundred (100) milliliters in any sample. The water shall be filtered so that the daily average turbidity does not exceed two (2) turbidity units upstream from the disinfection process.

Specifically excluded from this definition is "graywater," which is defined in Appendix G of this Code.

J 3 Permit

It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any reclaimed water system within a building or on a premise without first obtaining a permit to do such work from the Administrative Authority.

J 4 Drawings and Specifications

The Administrative Authority may require any or all of the following information to be included with or in the plot plan before a permit is issued for a reclaimed water system.

(a) A plot plan drawn to scale: completely dimensioned; showing lot lines; structures; location of all present and proposed potable water supply and meters, water wells, streams, auxiliary water supply and systems, reclaimed water supply and meters; drain lines; and locations of private sewage disposal systems and one hundred (100) percent expansion areas, or building sewer connected to the public sewer.

(b) Details of construction, including riser diagrams or isometrics, and a full description of the complete installation, including installation methods, construction and materials as required by the Administrative Authority. To the extent permitted by structural conditions, all reclaimed water risers within the toilet room, including appurtenances such as air/vacuum relief valves, pressure reducing valves, etc., shall be installed in the opposite end of the room containing the served fixtures from the potable water risers, or opposite walls as applicable. To the extent permitted by structural conditions, reclaimed water headers and branches off of risers shall not be run in the same wall or ceiling cavity of the toilet room where potable water piping is run.

(c) Detailed initial and annual testing requirements as outlined elsewhere in this appendix.

J 5 Pipe Material/Pipe Identification

Reclaimed water piping and fittings shall be as required in this Code for potable water piping and fittings. All reclaimed water pipe and fittings shall be continuously wrapped with purple-colored Mylar tape. The wrapping tape shall have a minimum nominal thickness of five ten-thousandths (0.0005) inch (0.127 mm) and a minimum width of two (2) inches (51 mm). Tape shall be fabricated of polyvinyl chloride with a synthetic rubber adhesive and a clear polypropylene protective coating or approved equal. The tape shall be purple in color (Pantone color #512) and shall be imprinted in nominal one-half (1/2) inch (12.7 mm) high, black, uppercase letters, with the words "CAUTION: RECLAIMED WATER, DO NOT DRINK". The lettering shall be imprinted in two (2) parallel lines, such that after wrapping the pipe with a one-half (1/2) width overlap, one (1) full line of text shall be visible. Wrapping tape is not required for buried PVC pipe manufactured with purple color integral to the plastic and marked on opposite sides to read "CAUTION: RECLAIMED WATER, DO NOT DRINK" in intervals not to exceed three (3) feet (914 mm).

All valves, except fixture supply control valves, shall be equipped with a locking feature. All mechanical equipment which is appurtenant to the reclaimed water system shall be painted purple to match the Mylar wrapping tape.

J 6 Installation

- (a) Hose bibbs shall not be allowed on reclaimed water piping systems.
- (b) The reclaimed water system and the potable water system within the building shall be provided with the required appurtenances (valves, air/vacuum relief valves etc.) to allow for deactivation or drainage as may be required by J 8 of this appendix.
- (c) Reclaimed water pipes shall not be run or laid in the same trench as potable water pipes. A ten (10) foot (3048 mm) horizontal separation shall be maintained between pressurized buried reclaimed and potable water piping. Buried potable water pipes crossing pressurized reclaimed water pipes shall be laid a minimum of twelve (12) inches (305 mm) above the reclaimed water pipes. Reclaimed water pipes laid in the same trench or crossing building sewer or drainage piping shall be installed in compliance with Sections 609.0 and 720.0 of this Code. Reclaimed water pipes shall be protected similar to potable water pipes.

J 7 Signs

- (a) **Room Entrance Signs.** All installations using reclaimed water for water closets and/or urinals shall be identified with signs. Each sign shall contain one-half (1/2) inch (12.7 mm) letters of a highly visible color on a contrasting background. The location of the sign(s) shall be such that the sign(s) shall be visible to all users. The number and location of the signs shall be approved by the Administrative Authority and shall contain the following text:

TO CONSERVE WATER, THIS BUILDING USES
RECLAIMED
WATER TO FLUSH TOILETS AND URINALS.

- (b) **Equipment Room Signs.** Each equipment room containing reclaimed water equipment shall have a sign posted with the following wording in one (1) inch (25.4 mm) letters on a purple background:

CAUTION
RECLAIMED WATER, DO NOT DRINK.
DO NOT CONNECT TO DRINKING WATER
SYSTEM.

NOTICE
CONTACT BUILDING MANAGEMENT BEFORE
PERFORMING ANY WORK ON THIS WATER
SYSTEM.

This sign shall be posted in a location that is visible to anyone working on or near reclaimed water equipment.

- (c) Where tank-type water closets are flushed with reclaimed water, the tank shall be labeled:

RECLAIMED WATER – DO NOT DRINK

- (d) **Valve Access Door Signs.** Each reclaimed water valve within a wall shall have its access door into the wall equipped with a warning sign approximately six (6) inches by six (6) inches (152 mm x 152 mm) with wording in one half (1/2) inch (12.7 mm) letters on a purple background. The size, shape and format of the sign shall be substantially the same as that specified in subsection (b) above. The signs shall be attached inside the access door frame and shall hang in the center of the access door frame. This sign requirement shall be applicable to any and all access doors, hatches, etc. leading to reclaimed water piping and appurtenances.

- (e) **Valve Seals.** Each valve or appurtenance shall be sealed in a manner approved by the Administrative Authority after the reclaimed system has been approved, and placed into operation. These seals shall either be a crimped lead wire seal, or a plastic break-away seal which, if broken after system approval, shall be deemed conclusive evidence that

the reclaimed water system has been accessed. The seals shall be purple with the words "RECLAIMED WATER", and shall be supplied by the reclaimed water purveyor, or by other arrangements acceptable to the Administrative Authority.

J 8 Inspection and Testing

(a) Reclaimed water piping shall be tested as outlined in this Code for testing of potable water piping.

(b) An initial and subsequent annual cross-connection inspection and test shall be performed on both the potable and reclaimed water systems as follows:

(1) **Visual Dual System Inspection.** Prior to commencing the cross-connection testing, a dual system inspection shall be conducted by the Administrative Authority and other authorities having jurisdiction.

(i) Meter locations of the reclaimed water and potable water lines shall be checked to verify that no modifications were made, or cross-connections are visible.

(ii) All pumps and equipment, equipment room signs, and exposed piping in equipment room shall be checked.

(iii) All valves shall be checked to insure that valve lock seals are still in place and intact. All valve control door signs shall be checked to verify that no signs have been removed.

(2) **Cross-Connection Test.** The following procedure shall be followed by the applicant in the presence of the Administrative Authority and other authorities having jurisdiction to determine if a cross-connection occurred.

(i) The potable water system shall be activated and pressurized. The reclaimed water system shall be shut down and completely drained.

(ii) The potable water system shall remain pressurized for a minimum period of time specified by the Administrative Authority while the reclaimed water system is empty. The minimum period the reclaimed water system is to remain depressurized shall be determined on a case by case basis, taking into account the size and complexity of the potable and reclaimed water distribution systems, but in no case shall that period be less than one (1) hour.

(iii) All fixtures, potable and reclaimed, shall be tested and inspected for flow. Flow

from any reclaimed water system outlet shall indicate a cross-connection. No flow from a potable water outlet would indicate that it may be connected to the reclaimed water system.

(iv) The drain on the reclaimed water system shall be checked for flow during the test and at the end of the period.

(v) The potable water system shall then be completely drained.

(vi) The reclaimed water system shall then be activated and pressurized.

(vii) The reclaimed water system shall remain pressurized for a minimum period of time specified by the Administrative Authority while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case by case basis, but in no case shall that period be less than one (1) hour.

(viii) All fixtures, potable and reclaimed shall be tested and inspected for flow. Flow from any potable water system outlet shall indicate a cross-connection. No flow from a reclaimed water outlet would indicate that it may be connected to the potable water system.

(ix) The drain on the potable water system shall be checked for flow during the test and at the end of the period.

(x) If there is no flow detected in any of the fixtures which would have indicated a cross-connection, the potable water system shall be repressurized.

(3) In the event that a cross-connection is discovered, the following procedure, in the presence of the Administrative Authority, shall be activated immediately:

(i) Reclaimed water piping to the building shall be shut down at the meter, and the reclaimed water riser shall be drained.

(ii) Potable water piping to the building shall be shut down at the meter.

(iii) The cross-connection shall be uncovered and disconnected.

(iv) The building shall be retested following procedures listed in subsections (b)(1) and (b)(2) above.

(v) The potable water system shall be chlorinated with fifty (50) ppm chlorine for twenty-four (24) hours.

(vi) The potable water system shall be flushed after twenty-four (24) hours, and a standard bacteriological test shall be performed. If test results are acceptable, the potable water system may be recharged.

(c) An annual inspection of the reclaimed water system, following the procedures listed in subsection J 8 (b)(1), shall be required. Annual cross-connection testing, following the procedures listed in subsection J 8 (b)(2), shall be required by the Administrative Authority, unless site conditions do not require it. In no event shall the test occur less often than once in four (4) years. Alternate testing requirements may be allowed by the Administrative Authority for institutional buildings.

The Health Officer or other designated appointee may substitute for the Administrative Authority in the above mentioned inspection and tests.

J 9 Sizing

Reclaimed water piping shall be sized as outlined in this Code for sizing potable water piping.

J 10 Approved Uses of Reclaimed Water

Reclaimed water is allowed in all non-residential buildings to supply fixtures as specified in this appendix, except where prohibited by statute, regulation, or ordinance.

Recycled Water Use Criteria
Los Angeles County Health Department

COUNTY OF LOS ANGELES - DEPARTMENT OF HEALTH SERVICES
PUBLIC HEALTH PROGRAMS AND SERVICES - ENVIRONMENTAL HEALTH
CROSS-CONNECTION & WATER POLLUTION CONTROL PROGRAM
2525 Corporate Place, Monterey Park, CA 91754 (213) 881-4140
(323)

A GUIDE TO SAFE RECYCLED WASTEWATER USE, PIPELINE CONSTRUCTION AND INSTALLATION

INTRODUCTION: As a result of increasing availability of recycled wastewater and the consequent need or desire for the transmission and use thereof, this Department has found it necessary to develop the following guidelines for recycled wastewater pipeline construction, installation and safe recycled wastewater use for the protection of domestic water supplies and public health.

1. Recycled wastewater shall meet requirements specified in "Wastewater Reclamation Criteria": Title 22, Division 4, Chapter 3, Section 60301 through 60355 of the California Code of Regulations and regulations and guidelines of the regulatory agencies.
2. Recycled wastewater use shall be compatible with State Department of Health Services and Regional Water Quality Control Board requirements.
3. Plans and specifications for recycled wastewater distribution, use and operational practices shall be submitted for review and approval to the County of Los Angeles Department of Health Services prior to implementation.
4. Prior to commencing construction the Contractor shall contact the Los Angeles County Department of Health Services to arrange for inspection of all on-site recycled and potable water work. No excavation or open trench may be backfilled without first securing Health Department approval. If any piping, recycled or potable, is installed prior to plan check approval and/or inspection, all or any portion of the system may be required to be exposed and corrected as necessary.
5. **SEPARATION** - In order to minimize construction accidents resulting in pipeline breaks, infiltration of wastewater from leaking wastewater lines into domestic water lines, or accidental cross-connections between recycled wastewater and potable water systems, maximum attainable separation of recycled wastewater lines and potable water lines shall be practiced.
 - a. Parallel construction: there shall be at least a ten foot (10') separation, all distances measured from pipeline outside diameter.
 - b. Cross-Over construction: As perpendicular as possible; one foot (1') separation, with potable above recycled; full pipe length centered over crossing.
 - c. Alternate Cross-Over construction (distance not maintained): Either the potable or recycled water lines may be sleeved with the same class piping for one full pipe length (minimum ten feet) centered over the cross-over.
 - d. The recycled wastewater system shall be constructed in conformance with potable water system construction standards and in accordance with all other governing codes, rules and regulations.
 - e. Unused or abandoned potable water lines are to be severed as close to water mains as practical, capped and a ten-foot section of abandoned line removed and cemented under Health Department supervision.

Existing On-site piping - To the extent feasible, maximum separation of recycled wastewater and potable water lines shall be practiced upon system addition or modification.
6. **IDENTIFICATION:** - All recycled wastewater lines (pressure/non-pressure), valve boxes, hydrants and appurtenances shall be identified to clearly distinguish between recycled wastewater, non-potable and potable water systems.
 - a. **RECYCLED WASTEWATER** - All buried recycled wastewater lines (pressure/non-pressure) shall be identified by continuous lettering on three inch (3") minimum width purple tape with one inch black or white contrasting lettering bearing the continuous wording "Caution Recycled Water" permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and/or vaults, exposed piping, hydrants and quick couplers.

The use of purple colored pipe with continuous wording "Caution Recycled Water" printed on opposite sides of the pipe is an acceptable alternative to warning tape.
 - b. **POTABLE WATER** - All potable water lines shall be installed in accordance with the Uniform Plumbing Code and all other governing codes, rules and regulations. Buried potable water lines shall be identified by continuous lettering on three inch (3") minimum width blue tape with one inch white lettering bearing the continuous wording "Potable Water" permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and/or vaults, exposed piping and hydrants.

Identification tape is not necessary for extruded colored PVC with continuous wording "Potable Water" printed in contrasting lettering on opposite sides of the pipe.

- c. **NON-POTABLE WATER** - All non-potable irrigation/industrial water lines (pressure/non-pressure) shall be identified by continuous lettering on three inch (3") minimum width tape with one inch contrasting lettering bearing the continuous wording "Non-Potable Water" permanently affixed at ten foot intervals atop all horizontal piping, laterals and mains. Identification tape shall extend to all valve boxes and/or vaults, exposed piping, hydrants and quick couplers. Non-potable water is water supplied from the potable water system through an appropriate backflow preventer.
- d. Exposed piping, valve boxes, vaults, control valves, quick coupling valves, outlets and related appurtenances shall be color coded and labeled or tagged to differentiate between recycled wastewater, potable water and non-potable water systems, ie.,
 - i. "Caution Recycled Water Do Not Drink" in black or white contrasting lettering on a purple background.
 - ii. "Potable Water" in white lettering on a blue background.
 - iii. "Non-Potable Water - Do Not Drink" in contrasting lettering from the background.

Tags shall be identified with the appropriate wording on both sides. Tags identifying recycled water shall have the appropriate wording on one side and symbol on the opposite side.



- 7. Aquifers shall be protected against contamination by recycled wastewater via deteriorated or inadequately protected waterwell casings by correcting these physical deficiencies. Recycled wastewater shall not be sprayed on well pump installations and appurtenances.
- 8. An on-site water supervisor having the responsibility for the protection of the potable water system from cross-connections, shall be appointed as provided for under Title 17, Section 7586, California Code of Regulations. The water supervisor shall be responsible for installation, operation, and maintenance of the recycled wastewater and potable water systems, prevention of potential hazards, implementing these guidelines and coordination with the cross-connection control program of the water purveyor and this Department. Authorizations for piping changes or additions to either the potable or recycled wastewater systems shall be subject to review and approval by the water supervisor. The name and position of this individual shall be reported to the water purveyor and the County of Los Angeles Department of Health Services.
- 9. As-built plans shall be prepared and updated as necessary by the user showing the location of recycled wastewater and potable water system piping.
- 10. In areas of public access to recycled wastewater systems, hose bibbs shall not be permitted in order to prevent the unauthorized use of recycled wastewater. Quick-couplers are permissible in lieu of hose bibb outlets and shall only be connected to recycled wastewater lines.

In areas not accessible to the public, hose bibbs may be permitted provided they are properly identified with permanently affixed tags, labels, or plates with the wording "Recycled Water - Do Not Drink" in English and symbol.

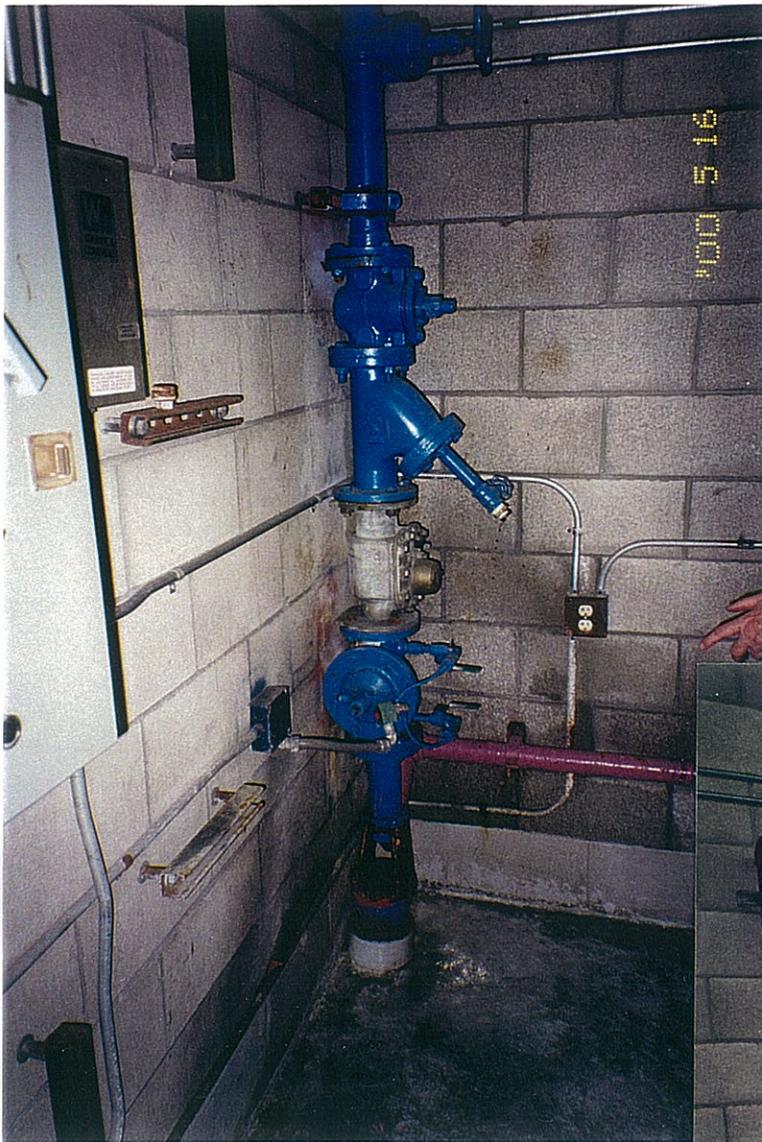


- 11. Exposure of drinking fountains and picnic tables to direct recycled wastewater spray shall be minimized by a combination of selective location of such equipment and by appropriate irrigation system design.
 - a. Recycled wastewater spraying shall be done in hours of least public exposure.
 - b. Areas where recycled wastewater is released, used or impounded shall be posted (e.g., RECYCLED WATER - DO NOT DRINK), to inform the public that recycled water is being used.
 - c. Irrigation practice shall be controlled to prevent surface runoff of recycled wastewater from lands owned or controlled by the user.

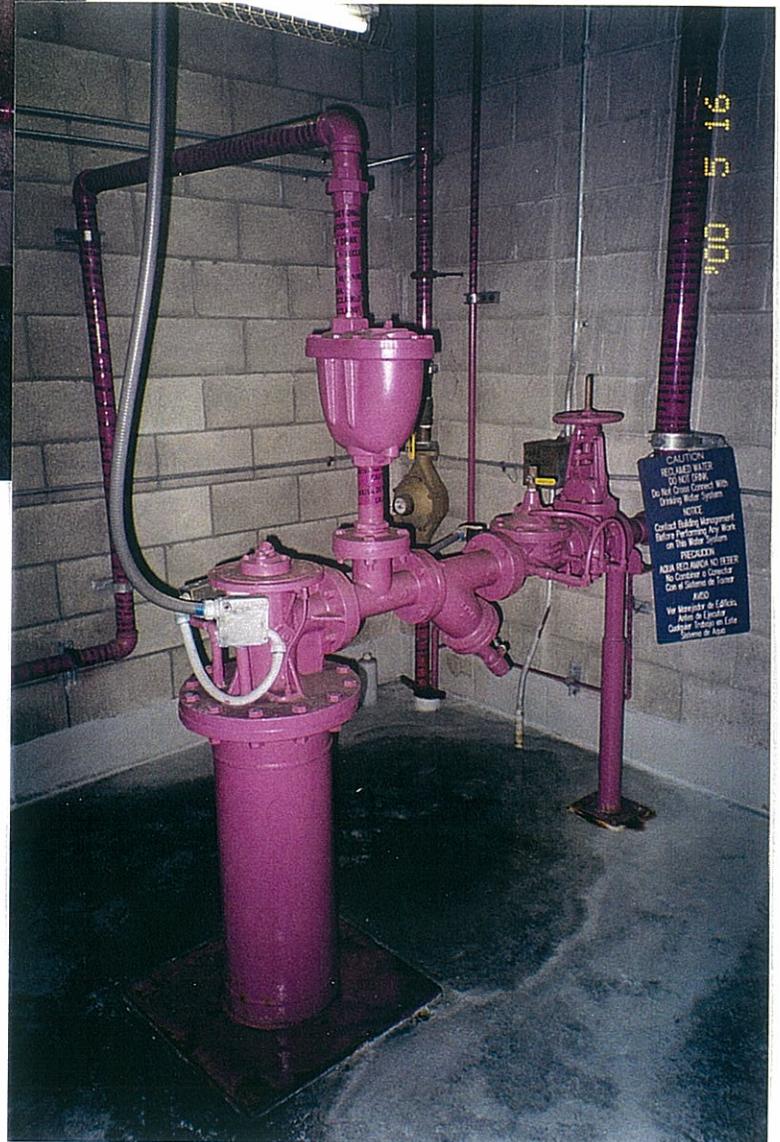
12. BACKFLOW PROTECTION

- a. There shall be no interconnection between the Potable Water System and the Recycled Water System within the user's premises.
- b. A dye or pressure test must be utilized to confirm the physical separation of the recycled and potable water systems. Said testing shall be performed in conjunction with the Water Purveyor and this Department and conducted before the introduction of recycled wastewater.
- c. Contact the local water purveyor regarding required backflow protection at the potable water service connection(s) to recycled water use sites.
- d. In order to maintain the water quality in a recycled wastewater distribution system a backflow prevention device(s) may be required at the recycled wastewater meter or at specific on-site locations where said use could degrade the quality of the recycled wastewater supply.

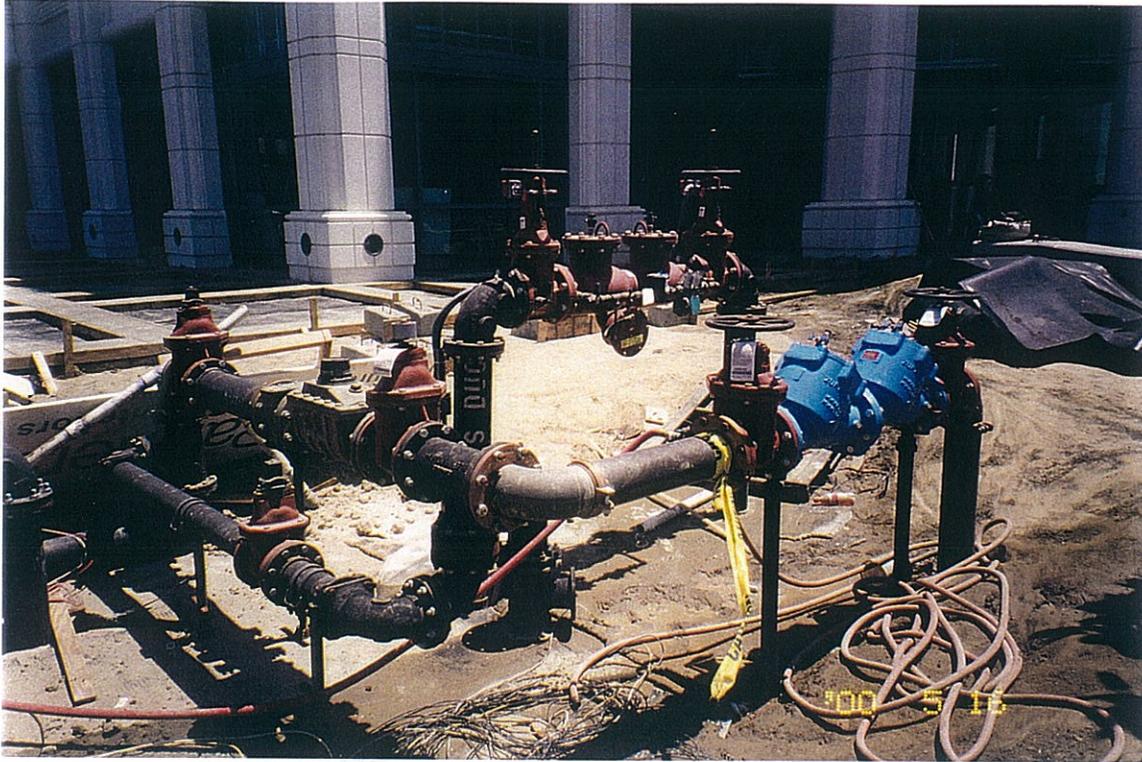
Project Photographs



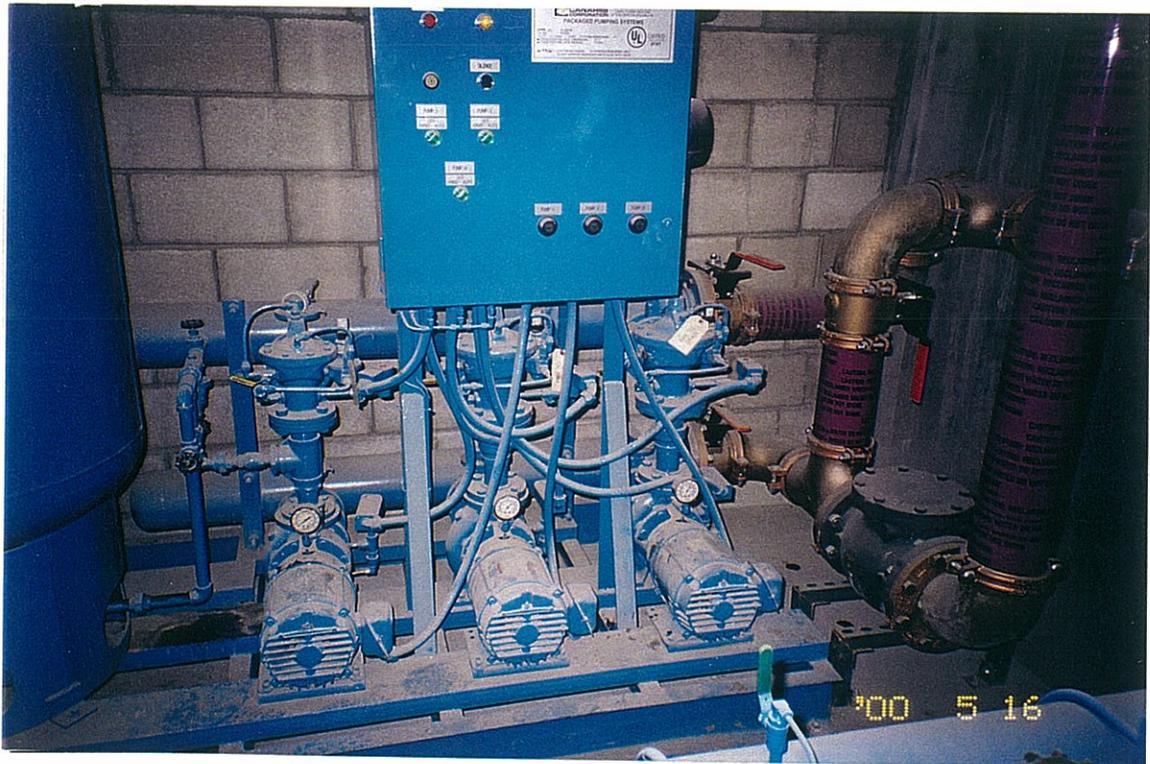
Airgapped potable water makeup line into 70,00-gallon recycled water storage reservoir (airgap at floor level)



Irrigation water pump on 70,000-gallon recycled water storage reservoir

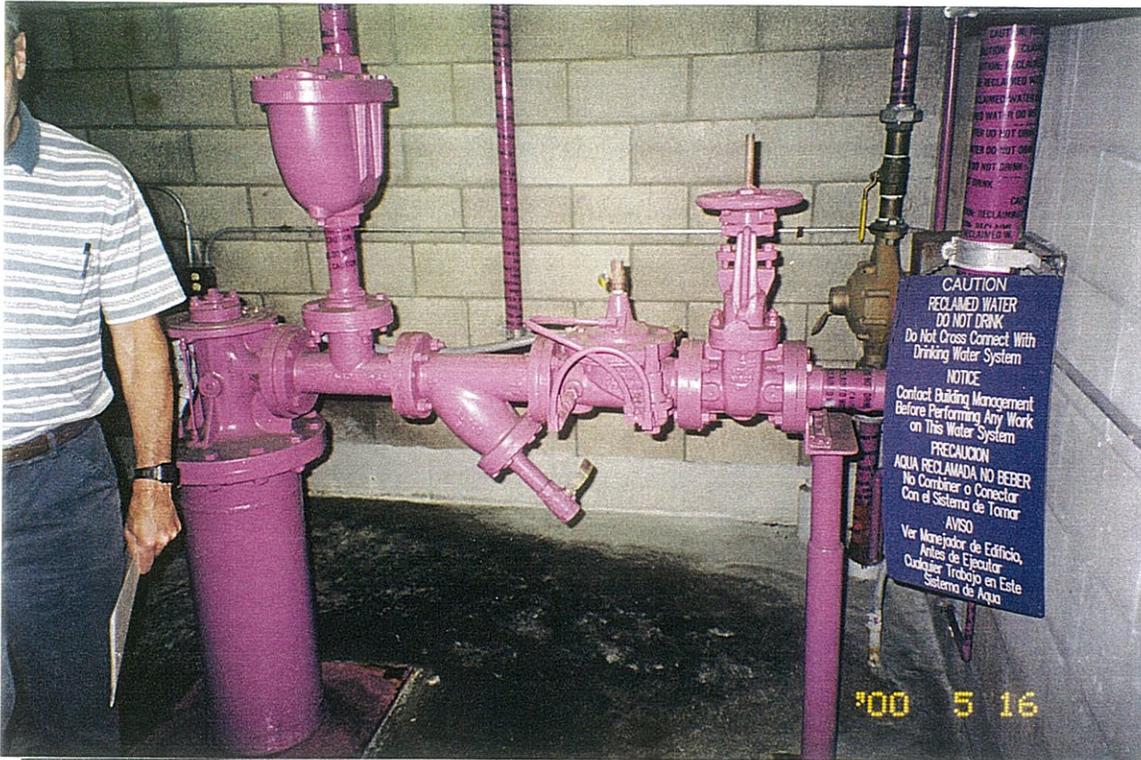


Two potable water meters for Phase II development

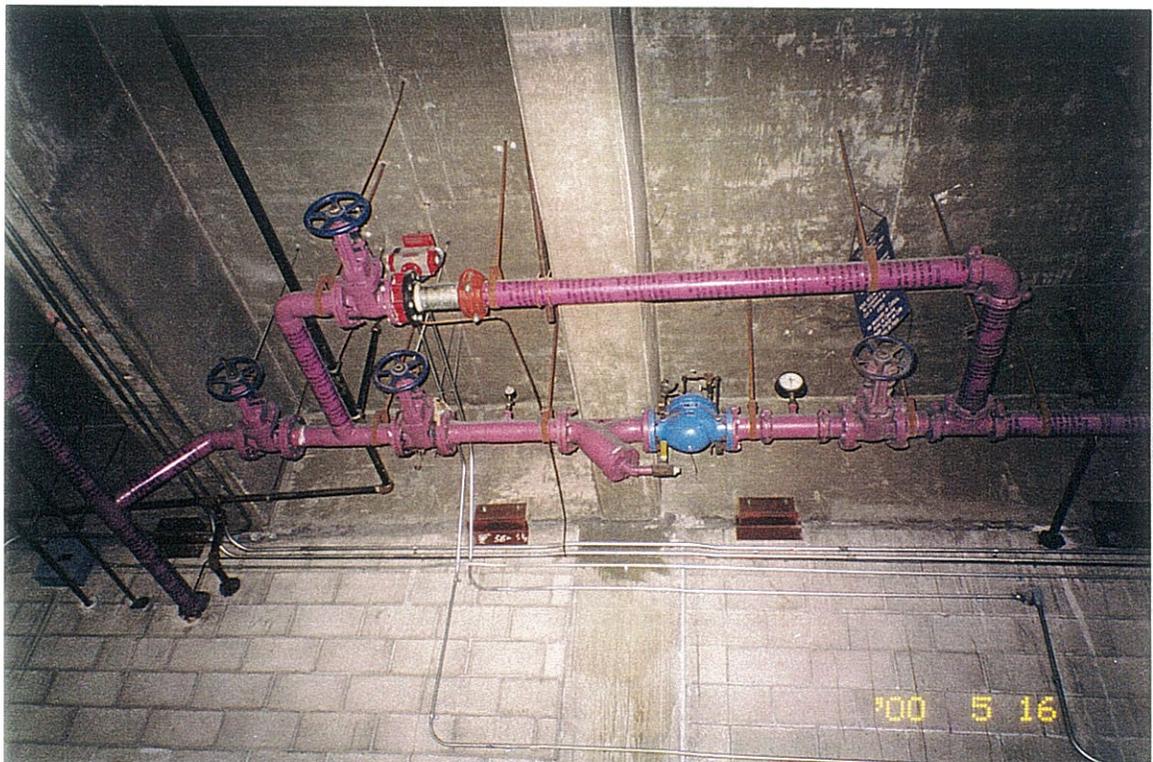


*Recycled water booster station for Phase II development
(painting of equipment not yet completed)*

City of Santa Monica
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Submersible irrigation water pump on top of 70,000-gallon recycled water reservoir serving Phase I/Phase II landscape irrigation and ornamental lake makeup. Located in Phase I.



Typical recycled waterlines within buildings



*One of several spray fountains and recirculation system
(not part of lake) using only potable water*



Lake aeration devices



Ornamental lake



Ornamental lake – water fowl in rear



Temporary intertie between potable and recycled water piping systems. To be removed later. Piping identification within Phase II equipment room not yet completed.

Site of recycled water service for Phase I at Olympic and 26th Street



City of Santa Monica
Supplemental Engineering Report



Effluent pump station at City's treatment plant—two pumps, each 550 gpm each with room for a third pump. Hypochlorination behind second pump. Airgapped potable water makeup right of second pump receiving reservoir (below) opening covered with board



BOYLE ENGINEERING CORPORATION