United Water Conservation District

Urban Water Management Plan

For the Oxnard-Hueneme System

Adopted by the UWCD board of directors on July 9, 2008

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1.0 Introduction

United Water Conservation District, among its many activities, operates the Oxnard-Hueneme System (OH System), which supplies drinking water to cities and urban areas on the Oxnard Plain. The OH water supply is an important part of the infrastructure of those cities. A safe and reliable water supply is necessary to protect the health of residents and to maintain a healthy local economy. This Urban Water Management Plan provides planning information on the reliability and future availability of the OH water supply.

2.0 Background and History of United Water

United Water Conservation District manages groundwater and delivers water to cities and agriculture within a large part of Ventura County. Ventura County ranks around 13th among all counties in the U.S. in agricultural production, with over one billion dollars in annual revenues, largely due to reliable, low-cost water. Ventura County is first in the nation in strawberries, lemons and celery. Among United's urban water customers are the cities of Oxnard, Ventura, Port Hueneme, and two U.S. Naval bases. The District got its name in 1954 when farmers and cities "united" to develop local water supplies. United Water is a public agency with an elected board of directors.

The original founding organization for United Water was called the Santa Clara River Protective Association. It was formed in 1925 to protect the runoff of the Santa Clara River from being appropriated and exported outside the watershed. One reason local farmers formed the Association was to prevent the Los Angeles Department of Water and Power from exporting local water to Los Angeles. The Association was followed in 1927 by the Santa Clara Water Conservation District, which was formed to obtain water rights, recharge groundwater, and to serve river water to local farms. In those days, surface water from the Santa Clara River was diverted near Saticoy for use on farms in the valley and on the Oxnard Plain. The District began a systematic program of groundwater recharge in 1928, primarily by constructing spreading grounds along the Santa Clara River in Piru, Santa Paula, and Saticoy.

In the early 1900s, groundwater was so plentiful in the Oxnard Plain that water wells would run freely under artesian pressure. Seeping groundwater caused the ocean to be fresh near the coast, and ships refilled their water stores while anchored offshore. But by the early 1950s, over-pumping had caused seawater to intrude into about 20 square miles of the aquifer near the coast, causing some wells to become unusable. In 1954, cities and farmers "united" to solve these problems, and formed United Water Conservation District to recharge underground aquifers and to supply water to cities and farms. The former Santa Clara Water Conservation District, which was not allowed by statute to serve municipalities, was dissolved. Many water facilities were built in the 1950s, including the Santa Felicia Dam (Lake Piru), new spreading grounds at Saticoy and El Rio, the OH drinking water system, and the Pleasant Valley pipeline (to replace canals on the Oxnard Plain). Since then, other facilities have been built as needed to manage local water, including the Pumping Trough Pipeline (serving agriculture on the Oxnard Plain), the improved Freeman Diversion Dam on the Santa Clara River, and the OH system improvements in 1998. Since it was formed in 1954, United has equally served both cities and farms within its service area. In many ways, United is a microcosm of water management practices within the State of California.

3.0 United Water's Mission Statement

United's goals are best exemplified in its mission statement:

> *United Water Conservation District shall manage, protect, conserve, and enhance the water resources of the Santa Clara River, its tributaries and associated aquifers, in the most cost-effective and environmentally balanced manner.*

Associated with the District's mission statement are several guiding principles. The guiding principle most closely associated with its drinking water system is as follows:

> *Deliver safe and reliable drinking water that meets current and future health standards to cities and urban areas.*

4.0 Requirement to Prepare an UWMP

The Urban Water Management Planning Act (Water Code 10610 *et al*.) requires urban water suppliers to evaluate their current and projected water sources/supplies, water uses, supply reliability, comparison of supply and demand, water demand management (conservation) programs, wastewater recycling and drought contingency planning. United Water is required to prepare an UWMP because it supplies more than 3,000 acre-feet of water annually and treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

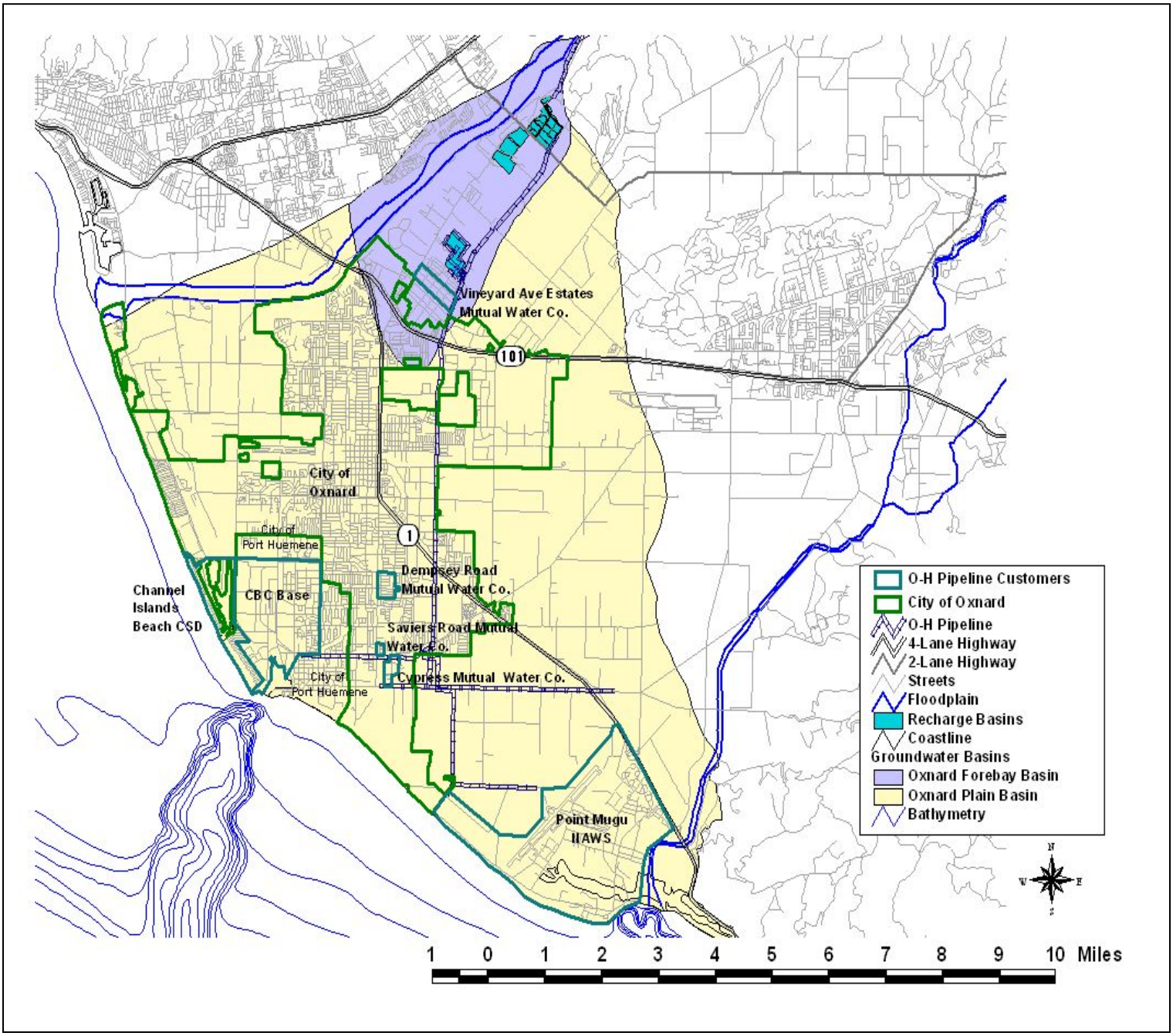
This Urban Water Management Plan is limited primarily to the Oxnard-Hueneme drinking water system. Other facilities are evaluated herein only to the extent that they may affect the OH water supply.

5.0 Service Area

The service area of the OH system is located on the Oxnard Plain, in the vicinity of Oxnard, as shown on Figure 5-1. The OH System supplies part of all of the drinking water supply for the wholesale customers listed below:

- The City of Oxnard (Oxnard)
- Port Hueneme Water Agency (PHWA) consisting of
  - The City of Port Hueneme
  - Two U.S. Naval bases, now jointly called Naval Base Ventura County
  - Channel Islands Community Services District (CIBCSD)
- Dempsey Road Mutual Water Company
- Cypress Mutual Water Company
- Saviers Road Mutual Water Company
- Vineyard Avenue Estates Mutual Water Company
- Ocean View Municipal Water District (OVMWD)
- Rio Del Valle and Rio Real Schools

Figure 5-1
OH System Service Area Map



In addition, there are a few small customers along the Mugu Lateral Pipeline, which was formerly part of the OH System. The Mugu Lateral has been leased by PHWA and those customers now receive water directly from PHWA.

The City of Oxnard has three sources of water: United Water's OH System, Calleguas MWD, and their own City wells. Water received from Calleguas MWD is imported from Northern California, and is of higher quality (lower total dissolved solids and minerals) than local water. Oxnard blends its Calleguas and local (United plus City wells) supplies at about a one-to-one ratio to deliver water of a reasonable quality and taste. In effect, the use of OH water reduces the use of water imported from the north.

Port Hueneme Water Agency receives United's OH water and treats it with RO, EDR, and/or ultrafiltration to remove the salts and improve its quality. PHWA also receives water directly from Calleguas MWD.

Ocean View MWD provides OH water primarily to agricultural customers. There are a few domestic services on the Ocean View pipeline, to farm houses and businesses. The Ocean View pipeline (a lateral to the OH pipeline) is owned by the City of Oxnard. United Water reads the Ocean View meters every month, collects payments from the Ocean View customers, and pays Ocean View MWD the amount received, less administrative costs. Maintenance on the Ocean View pipeline is performed by Oxnard under contract to Ocean View MWD. The number of Ocean View customers has been declining over time due to the high cost of the water, and the future of the Ocean View pipeline is the subject of ongoing concern.

The four mutual water companies (Dempsey, Cypress, Saviers and Vineyard) all receive and deliver United's water without blending or further treatment.

5.1 Climate

The OH service area is on the Oxnard plain, which has a mild Mediterranean style climate, with cool, wet winters and mild, dry summers. Temperatures only rarely fall below freezing in the winter. Average rainfall in the Oxnard plain is around 13 inches per year, most of it falling from December through April. A higher quantity of rainfall falls in the mountains of the watershed, contributing to the local water supply. Historical rainfall in nearby Santa Paula is plotted in Figure 5-2. An example of a normal water year would be 1976, with an annual precipitation of 12.91 in. A single dry year is best exemplified in 1948 which only received 3.37 in. of precipitation. The driest 3-year period occurred between 1988 and 1990, when the average precipitation was only 7.56 in.

Water demands can increase in late summer and fall during brief "Santa Ana" conditions, characterized by hot, dry winds. Occasional east winds in the fall also increase irrigation water demands for a few days at a time. During the few frost days, some growers use water to prevent their crops from freezing, increasing demands in those early mornings.

Figure 5-2
Historical Rainfall in Santa Paula

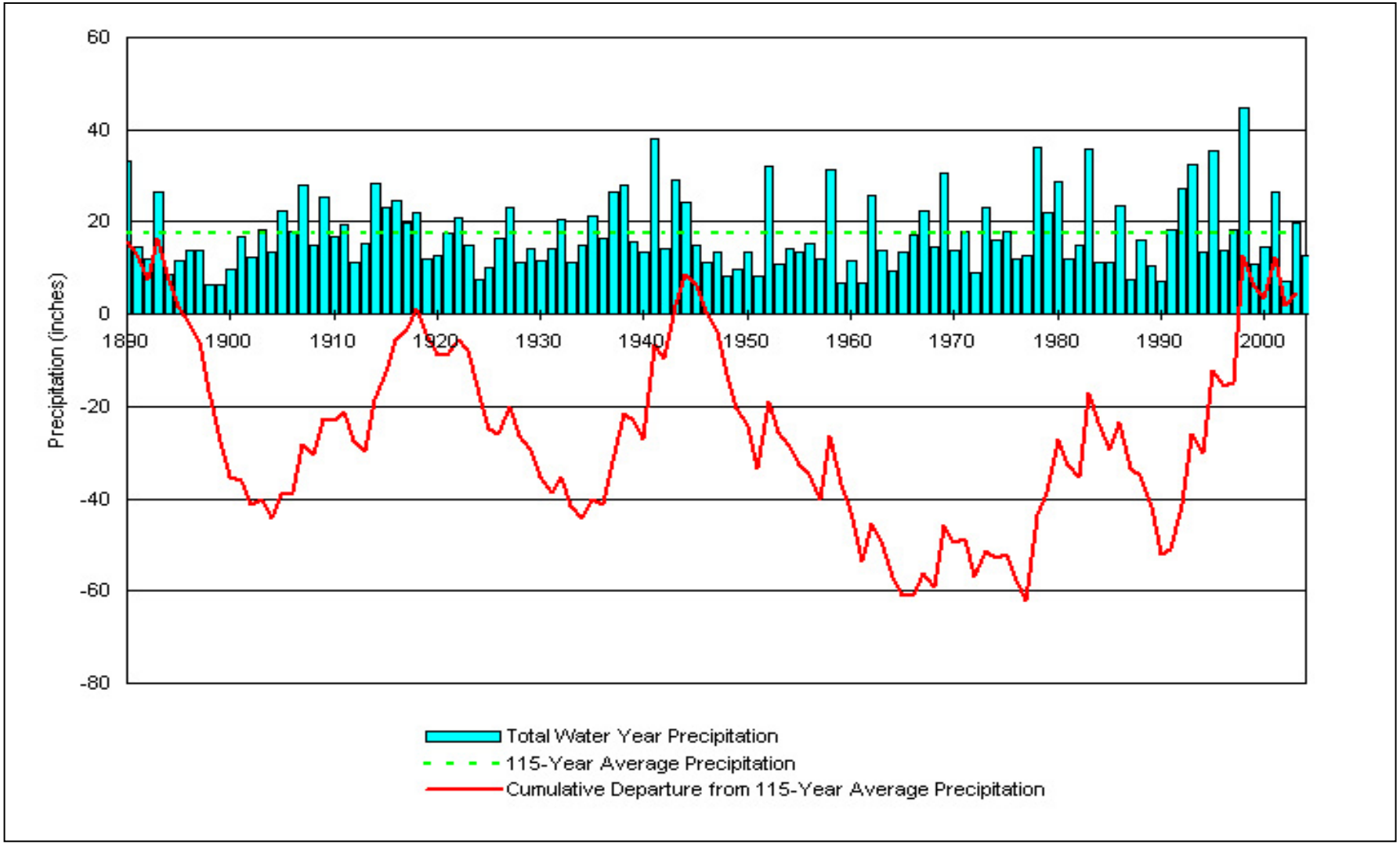


Table 5-1: Average ETo and Temperature

	January	February	March	April	May	June
Standard Average ETo (in.)†	1.83	2.20	3.42	4.49	5.25	5.67
Average Temperature (°F)‡	65.4	66.3	66.2	67.8	68.8	71.2

	July	August	September	October	November	December
Standard Average ETo (in.)†	5.86	5.61	4.49	3.42	2.36	1.83
Average Temperature (°F)‡	74.0	75.0	75.1	74.1	70.5	66.6

† Avg. Monthly ETo since Oct. 2001 at CIMIS station 156, Oxnard,CA.
‡ Avg. Max. Temp. from 1948 – 2003. Station no. 046569 Oxnard, CA. Western Regional Climate Center

6.0 Description of the Oxnard-Hueneme Delivery System

6.1 OH Facilities

The OH System facilities supply drinking water to United's customers on the Oxnard Plain. A schematic of the OH facilities in El Rio is shown in Figure 6-1. The OH pipeline, along with other District facilities, is shown in Figure 6-2. The OH system includes the following major components:

Shallow wells: The OH system has nine shallow aquifer wells, located primarily around the perimeter of the El Rio spreading grounds. These wells include Wells Nos. 2A, 3, 4, 5, 6, 7, 8, 11, and 15. These wells are rather old, with most constructed using cable tool methods in the 1950s. Wells 2A and 11 are newer wells. These nine wells are perforated in the higher quality, upper aquifer system, which is directly recharged by surface water diverted from the Santa Clara River. Despite their age, these wells have performed well over the last 50 years, and maintain fairly high specific capacities. The wells are maintained by periodic replacements of pumps, column piping, tubing, electric motors and other components as necessary. From time to time the well casings are "shot" with low grade explosive charges to restore their specific capacities. There is some risk to this procedure and, in 2000, Well No. 2A partly collapsed and a section of the casing had to be relined. Acid treatment of the wells has not been successful in the past.

El Rio spreading grounds: All of the OH shallow wells except Well No. 11 are located immediately adjacent to the El Rio spreading grounds. Water diverted from the Santa Clara River at the Freeman Diversion is recharged into groundwater at El Rio via those spreading grounds. Although the spreading grounds are not part of the OH system, they have a big impact on its operation. While spreading operations are underway, the well water is similar in water quality to the river water. The river water used for recharge is usually of higher quality than ambient groundwater. When spreading has stopped for a few months, well water quality can decline.

Tracer studies have shown that water recharged into the spreading ponds takes just a couple of days to migrate into the well production zones.

Deep Wells: In addition to the shallow aquifer wells, the OH system includes three deep aquifer wells constructed in the 1980's. These are Wells Nos. 12, 13 and 14, located along Rose Avenue. These wells are perforated in the deeper aquifer, separated from the shallow aquifer by a clay layer. Due to high iron and manganese in the groundwater pumped from these wells, they are used primarily as backup wells. These deep wells are operated under a waiver provided by the California Department of Health Services. This waiver was allowed after conducting a survey of our OH customers, which must be done every seven years. The deep aquifer wells were used extensively in the 1985-1991 drought. However, they have not been used to supply OH water since 1992, except for one week during construction of the El Rio Improvements in 1997. They are maintained and tested periodically in preparation for any future drought.

OH Disinfection Facility: The disinfection building is a state-of-the-art facility constructed in 1998. It houses up to 8 one-ton cylinders of chlorine liquid/gas. After primary chlorination, ammonia is added, using a 19% aqueous ammonia solution. The disinfection residual is provided by chloramines, a combination of chlorine and ammonia. The chlorine building includes a scrubber system (caustic soda) to de-active any chlorine leaks, and backup power generation.

OH Clearwells: The OH system has two 8 million gallon clearwells (reservoirs), located near the disinfection building. Water pumped from the OH wells is stored in the clearwells before being repumped to customers. The clearwells are made with a plastic (polyethylene) lining and plastic floating cover. Having two clearwells provides redundancy for maintenance.

OH Electric Booster Plant: The OH booster plant pumps water from the OH clearwells into the OH pipeline. Water is delivered to OH customers on demand at a constant pressure (60 psi at the plant in El Rio). The pumps consist of four 400 HP electric-driven vertical turbine pumps. To accommodate rapid fluctuations in demand, the motors are driven by variable frequency drives (VFD's). One of the four pumps serves as a backup pump. In the event of a power failure (and a failure of the gas-driven pumps), water can be delivered by gravity from the clearwells into the OH pipeline.

OH Plant Facilities

Figure 6-1

UNITED WATER CONSERVATION
(Detail B)

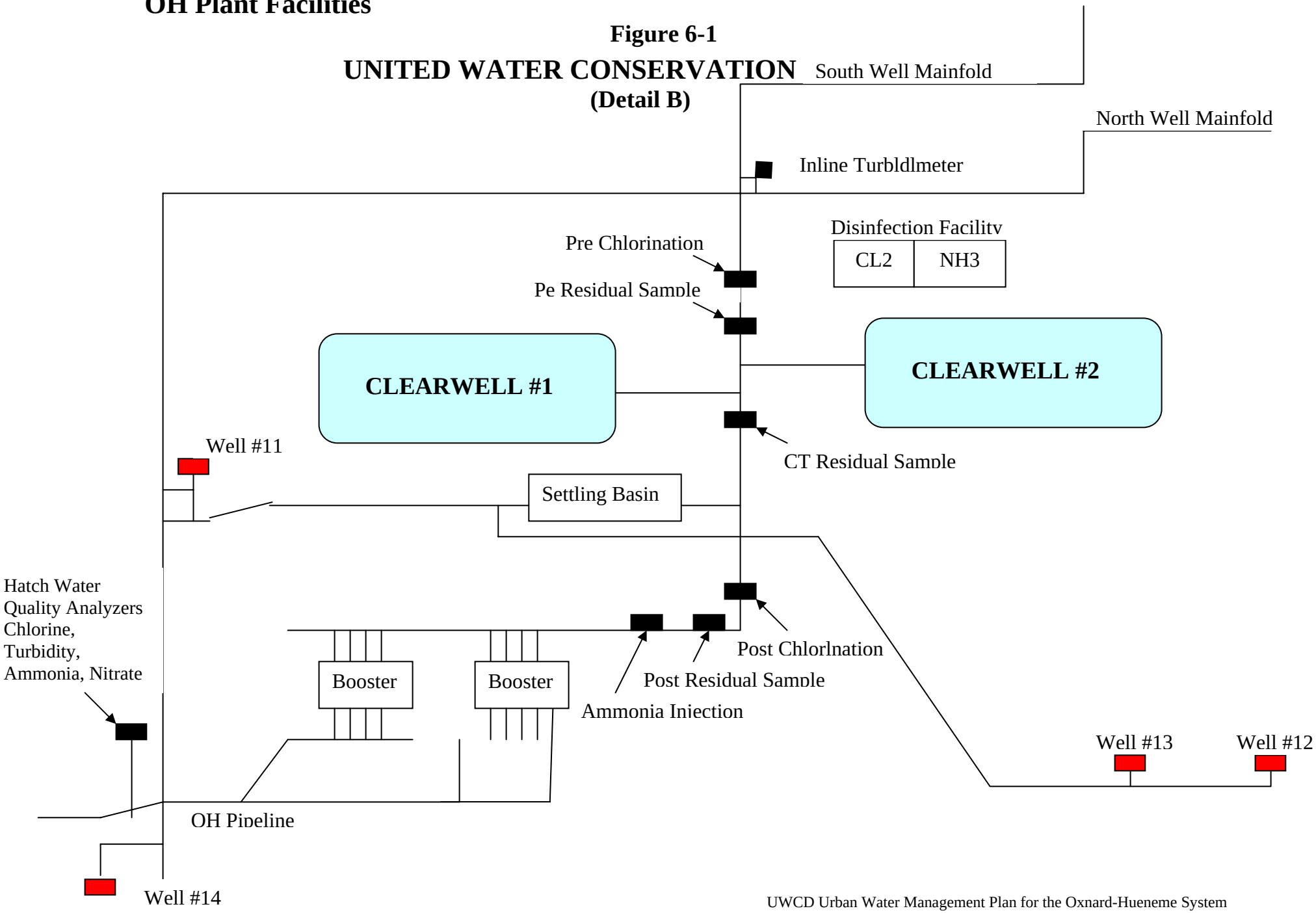
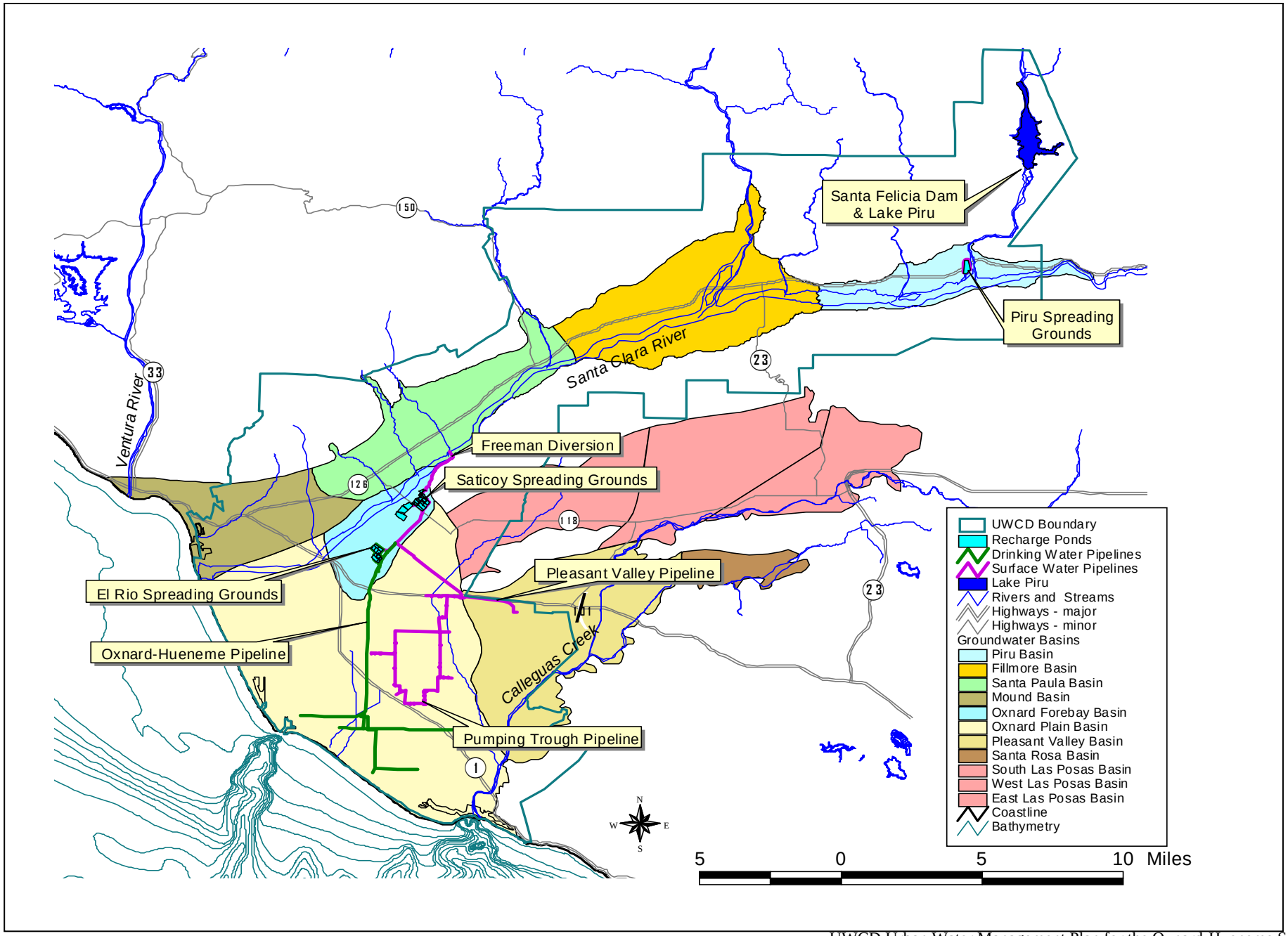


Figure 6-2

UWCD Facilities



OH Gas-Driven Booster Plant: Prior to construction of the electric-driven booster plant in 1997, water was pumped by natural-gas driven engines. There are four 400 HP natural-gas driven engines that run four centrifugal pumps, housed in a block building. The old booster plant is kept in service as a backup to the electric booster plant in case of power outages or mechanical failures. It also allows the District to participate in Demand Relief Programs, in which the electric-driven motors are turned off, upon request, during peak periods of electric power demands. The gas booster plant is operated under a permit from the Ventura County Air Pollution Control District (APCD).

El Rio Plant: The complex consisting of the two booster plants, the chlorine building, the clearwells, and associated office and shop buildings are commonly referred to as the El Rio Plant.

OH Pipeline: The OH pipeline includes 12 miles of varying diameter cement-mortar lined and coated steel pipes, starting at 54-inches in diameter at the OH plant in El Rio, and tapering to 16-inches at the furthest reach. There are no individual retail customers on the OH pipeline (except for one farmhouse). Instead, large turnouts are provided to retail water agencies.

750 KW Generator: The OH system includes a 750 KW backup generator. In the event of a massive power failure, this generator will power the OH shallow wells for direct delivery to customers.

SCADA System: The SCADA System (Supervisory Control and Data Acquisition) is the automated control system that monitors and operates United's facilities, including the OH System. Routine checks and adjustments are made by the SCADA system. The system includes telephone dial-out so that operators can be called 24-hours a day in the event of emergencies or alarm conditions. Alarm conditions include low chlorine residuals, mechanical failures, low system pressures, power outages, and over 500 different things that can go wrong. United is in the middle of a conversion to a new SCADA system, based on Allen-Bradley components.

6.2 OH Design Capacities

The OH System is designed to deliver a peak flow of 53 CFS to its customers, via the OH pipeline. That capacity is based on maintaining a pressure of 60 psi at the booster plant, and providing adequate flow pressures at our customers' turnouts. In practice, the pressure provided to our customers exceeds their needs. For example, Oxnard reduces the OH line pressure at their blending stations. PHWA uses a pressure reducing valve to decrease the line pressure before treatment. A detailed hydraulic analysis has not been done to determine whether the OH deliveries could be increased within the limits of the existing pipeline pressure capacities.

The OH wellfield has a combined capacity of about 73 CFS, as detailed in Table 6-1. In general, there is surplus well capacity in the wellfield, which is needed for blending and backup purposes.

6.3 Treatment methods

Due to the proximity between the OH shallow wells and the El Rio spreading grounds (within 25 feet in places), the shallow wells are considered to be "groundwater under the influence of surface water." This means that the requirements of the Surface Water Treatment Rule (SWTR) are applicable. Previous particulate analyses of the well water indicate that the surface water effects are largely attenuated by filtration of the surface water through the soil between the time it is spread and the time it reaches the wells. This "natural filtration" has many benefits and is used in Europe to provide filtration of surface water. Some researchers argue that natural filtration is superior to conventional filtration. For purposes of the SWTR, California DHS considers the natural filtration of the OH wellfield to be equivalent to slow sand filtration, and credits the system with 2 logs removal via filtration (99% of Giardia-size pathogens removed).

The SWTR requires surface water to be disinfected for a sufficient contact time to kill viruses and pathogens. Primary disinfection for the OH system is provided by chlorine, before the addition of ammonia. The OH clearwells include baffles to force the water to flow around a circuitous path, providing sufficient contact time in the reservoir to meet the requirements of the SWTR. The monitoring requirements of the SWTR are followed to ensure that sufficient contact time is obtained. Monthly reports on the treatment results are provided to DHS.

After the chlorinated water leaves the clearwells, ammonia is injected into the water to form chloramines, a long-lasting disinfection residual. Chloramination is used because of the reduced tendency to form trihalomethanes and other organic decay byproducts that can cause cancer. Chloramines are also longer lasting, and are compatible with the chloraminated water used by the two largest OH customers, Oxnard and PHWA.

Water from the deep aquifer wells is high in iron and manganese. When those wells are pumped, a sequestering agent, Aqua-Mag, is added to the well water to sequester the iron and manganese. Such sequestering reduces the aesthetic impacts of water high in iron and manganese.

OH WELL CHARACTERISTICS

Table 6-1

Well No.	Source Aquifer	Well Depth (feet)	Well (1) Capacity (gpm)	Pump Bowl Depth (feet)	Driver Size (hp)	DRIVER TYPE
2A	UAS	320	2755	176	100	U.S. Electric Motor
3	UAS	303	2238	155	100	U.S. Electric Motor
4	UAS	303	2270	155	100	U.S. Electric Motor
5	UAS	303	2482	177	100	U.S. Electric Motor
6	UAS	301	2318	187	100	U.S. Electric Motor
7	UAS	326	2195	177	100	U.S. Electric Motor
8	UAS	314	2743	187	100	U.S. Electric Motor
11	UAS	360	3336	163	150	U.S. Electric Motor
12	LAS	1112	2676	478	400	Westinghouse Softstart
13	LAS	1418	2944	351	300	Westinghouse Softstart
14	LAS	1470	3367	387	500	Westinghouse Softstart
15	UAS	330	3500	192	150	U.S. Motor and Allen-Bradley Softstart

Notes:
(1) As of October 1992
* Inactive well
UAS = Upper Aquifer System
LAS = Lower Aquifer System

6.4 Groundwater Recharge Facilities

Although they are not part of the OH System, United's groundwater recharge facilities contribute to the groundwater supply pumped from the OH wells. The Freeman diversion is a roller compacted concrete (RCC) dam on the Santa Clara River in Saticoy. Up to 375 CFS of river water is diverted there into canals, which carry the water to the spreading grounds, including the El Rio spreading grounds adjacent to the OH wellfield. After the water is filtered at a microscreen facility in Saticoy, the diverted water is conveyed to El Rio through a buried pipeline along Rose Avenue,.

6.5 Operations Staff

The OH System is operated by a highly trained and competent staff. The OH system is rated by DHS as a T4/D4 system, which requires certified Grade 4 operators for the treatment system and certified Grade 4 distribution system operators. The District presently has four Grade 4 treatment operators on staff.

The OH System is monitored 24-hours a day by operations staff. Each week, one of six operators is assigned "rotating shift" duty, during which they are on call to respond to alarms and emergencies. While on call, they carry pagers and cell phones which are automatically called by the SCADA system with verbal notification of any alarm conditions. For example, they might receive a call with a voice message "low chlorine levels in the clearwell." The operators can query the system remotely and decide whether they need to respond to the emergency. They are able to respond to emergencies within a 30-minute period.

7.0 Present and Future Population Served

Information on the local population served is shown in Table 7-1. The OH System serves a population of about 180,000 people. That number is expected to increase to around 215,000 people by 2020. However, the water deliveries for the OH System are set by contract, and will not be affected by future population growth.

8.0 Water Supply

The water supply for the OH system is provided solely by local groundwater, pumped from the 12 OH wells. Groundwater is recharged by the Santa Clara River, by some direct percolation of rainfall in limited areas, and by United Water's groundwater recharge operations.

8.1 Oxnard Plain Groundwater Basins

The aquifers within United's boundaries, including the Oxnard Plain aquifers, are shown on Figure 8-1. A generalized cross section of the aquifers is shown in Figure 8-2. There are several aquifers at varying depths in the Oxnard Plain The OH wells are located in the part of the aquifer system called the Oxnard Forebay, or the Montalvo Forebay. The Forebay is an important part of the aquifer system, where the aquifers come together and are unconfined. The Forebay is recharged from the Santa Clara River in its riverbed and

by river water that is diverted to United's spreading basins. In areas outside the Forebay, the aquifers are covered by a confining clay layer. The Forebay is hydraulically connected to the other aquifers in the Oxnard Plain basin. Thus, the primary recharge to the Oxnard Plain basin is from underflow from the Forebay rather than from deep percolation of water from surface sources on the plain. In some areas of the Oxnard Plain, a semi-perched aquifer sits above the confining clay; this perched water is of poor quality and is not used as a water supply.

The groundwater levels in the Oxnard Plain aquifers change considerably from year to year depending on drought and pumping levels. The historical water levels in key wells are shown in Figure 8-3.

8.2 Strategy for Recharging the Oxnard Plain Aquifers

The strategy of United's groundwater recharge operation is to recharge surface water from the Santa Clara River into two spreading grounds and a mined gravel pit in the Oxnard Forebay. These grounds include the Saticoy spreading grounds northeast of Highway 118 and the El Rio Spreading grounds at the El Rio plant. Near the Saticoy spreading grounds is the Noble pit, a former gravel pit mined of its aggregate, and now converted to recharge basins. Water recharged in these facilities migrates over time into the other Oxnard Plain aquifers towards the coast.

Another element in United's recharge operations is the supply of surface water to farms in the eastern Oxnard Plain. This surface water reduces pumping in the critical eastern part returned to artesian conditions, flowing water above the ground. By contrast, during drought periods, groundwater can drop to critical levels.

of the aquifer system, providing "in-lieu" groundwater recharge. (Water that is not pumped is left in the ground for future use.)

Grant conditions provided to United by the State Water Resources Control Board also place limits on how the groundwater basin are operated. These conditions are provided in Appendix C. Once the groundwater level in the Oxnard Forebay falls below a preset critical level, recharge operations have priority over agricultural irrigation, and the deep aquifer wells must be pumped in preference to the shallow aquifer wells. This condition does not affect the OH water supply, but it does affect the quality of the water delivered. However, in a water supply emergency, water deliveries to the OH System would have a higher priority than the grant conditions, to protect human health.

8.3 Moving Pumping Inland

The primary purpose of constructing the OH System in the 1950s was to move pumping inland, away from the coast, as illustrated in Figure 8-4. As seawater encroached into the aquifers near the coastline, it threatened the water supply of urban areas. There are hydrogeological benefits to moving pumping inland, closer to the points of recharge. More water can be pumped from those locations without drawing groundwater levels below sea level, which draws seawater into the aquifers. Those hydrogeologic benefits remain valid today. It is important for the OH System remain viable and cost-effective, so that the OH Customers will continue to use OH water instead of their own wells. The GMA allocation of the OH wellfield (discussed below) provides such an incentive.

Table 7-1
Population & Demographic Characteristics: 2000

Table DP-1. Profile of General Demographic Characteristics: 2000
Geographic Area: Ventura County, California
[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	753,197	100.0
SEX AND AGE		
Male	375,988	49.9
Female	377,209	50.1
Under 5 years	56,231	7.5
5 to 9 years	63,350	8.4
10 to 14 years	60,126	8.0
15 to 19 years	55,677	7.4
20 to 24 years	46,380	6.2
25 to 34 years	104,166	13.8
35 to 44 years	126,980	16.9
45 to 54 years	102,747	13.6
55 to 59 years	34,854	4.6
60 to 64 years	25,882	3.4
65 to 74 years	40,244	5.3
75 to 84 years	27,271	3.6
85 years and over	9,289	1.2
Median age (years)	34.2	(X)
18 years and over	538,953	71.6
Male	266,134	35.3
Female	272,819	36.2
21 years and over	507,972	67.4
62 years and over	91,529	12.2
65 years and over	76,804	10.2
Male	32,416	4.3
Female	44,388	5.9
RACE		
One race	723,624	96.1
White	526,721	69.9
Black or African American	14,664	1.9
American Indian and Alaska Native	7,106	0.9
Asian	40,284	5.3
Asian Indian	4,123	0.5
Chinese	6,343	0.8
Filipino	15,548	2.1
Japanese	4,840	0.6
Korean	3,309	0.4
Vietnamese	3,308	0.4
Other Asian [1]	2,813	0.4
Native Hawaiian and Other Pacific Islander	1,671	0.2
Native Hawaiian	394	0.1
Guamanian or Chamorro	327	-
Samoan	559	0.1
Other Pacific Islander [2]	391	0.1
Some other race	133,178	17.7
Two or more races	29,573	3.9
Race alone or in combination with one or more other races: [3]		
White	552,424	73.3
Black or African American	18,240	2.4
American Indian and Alaska Native	13,270	1.8
Asian	48,856	6.5
Native Hawaiian and Other Pacific Islander	3,502	0.5
Some other race	148,362	19.7

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	753,197	100.0
Hispanic or Latino (of any race)	251,734	33.4
Mexican	211,925	28.1
Puerto Rican	2,286	0.3
Cuban	1,043	0.1
Other Hispanic or Latino	36,480	4.8
Not Hispanic or Latino	501,463	66.6
White alone	427,449	56.8
RELATIONSHIP		
Total population	753,197	100.0
In households	739,985	98.2
Householder	243,234	32.3
Spouse	144,778	19.2
Child	246,465	32.7
Own child under 18 years	187,911	24.9
Other relatives	58,900	7.8
Under 18 years	20,506	2.7
Nonrelatives	46,608	6.2
Unmarried partner	12,355	1.6
In group quarters	13,212	1.8
Institutionalized population	4,668	0.6
Noninstitutionalized population	8,544	1.1
HOUSEHOLD BY TYPE		
Total households	243,234	100.0
Family households (families)	182,959	75.2
With own children under 18 years	96,626	39.7
Married-couple family	144,778	59.5
With own children under 18 years	75,382	31.0
Female householder, no husband present	26,528	10.9
With own children under 18 years	15,085	6.2
Nonfamily households	60,275	24.8
Householder living alone	45,931	18.9
Householder 65 years and over	17,993	7.4
Households with individuals under 18 years	106,140	43.6
Households with individuals 65 years and over	54,516	22.4
Average household size	3.04	(X)
Average family size	3.46	(X)
HOUSING OCCUPANCY		
Total housing units	251,712	100.0
Occupied housing units	243,234	96.6
Vacant housing units	8,478	3.4
For seasonal, recreational, or occasional use	2,653	1.1
Homeowner vacancy rate (percent)	0.9	(X)
Rental vacancy rate (percent)	2.6	(X)
HOUSING TENURE		
Occupied housing units	243,234	100.0
Owner-occupied housing units	164,380	67.6
Renter-occupied housing units	78,854	32.4
Average household size of owner-occupied units	3.03	(X)
Average household size of renter-occupied units	3.08	(X)

- Represents zero or rounds to zero. (X) Not applicable.
[1] Other Asian alone, or two or more Asian categories.
[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.
[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table 7-1

Figure 8-1

Groundwater Basins within United Water

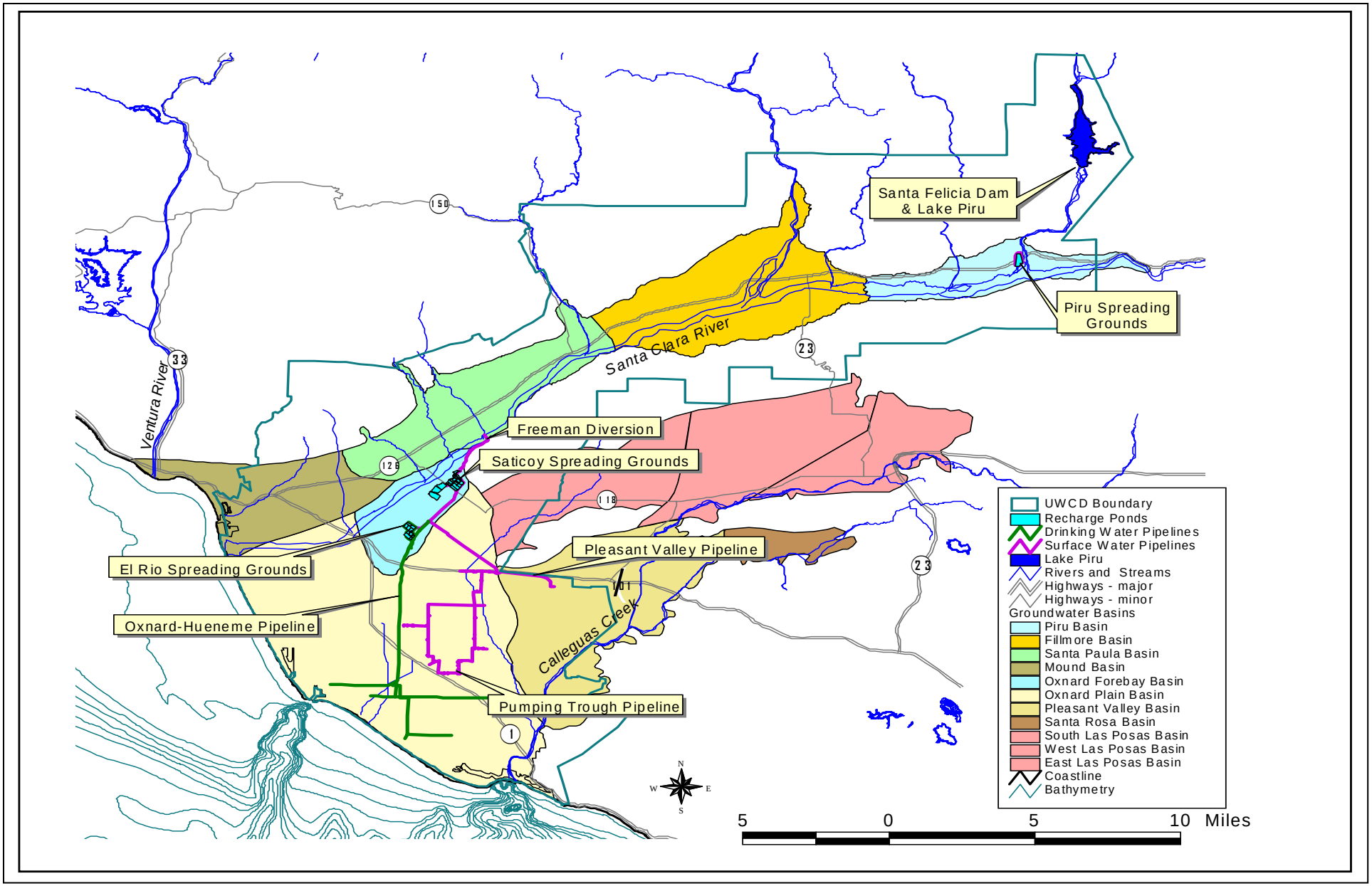
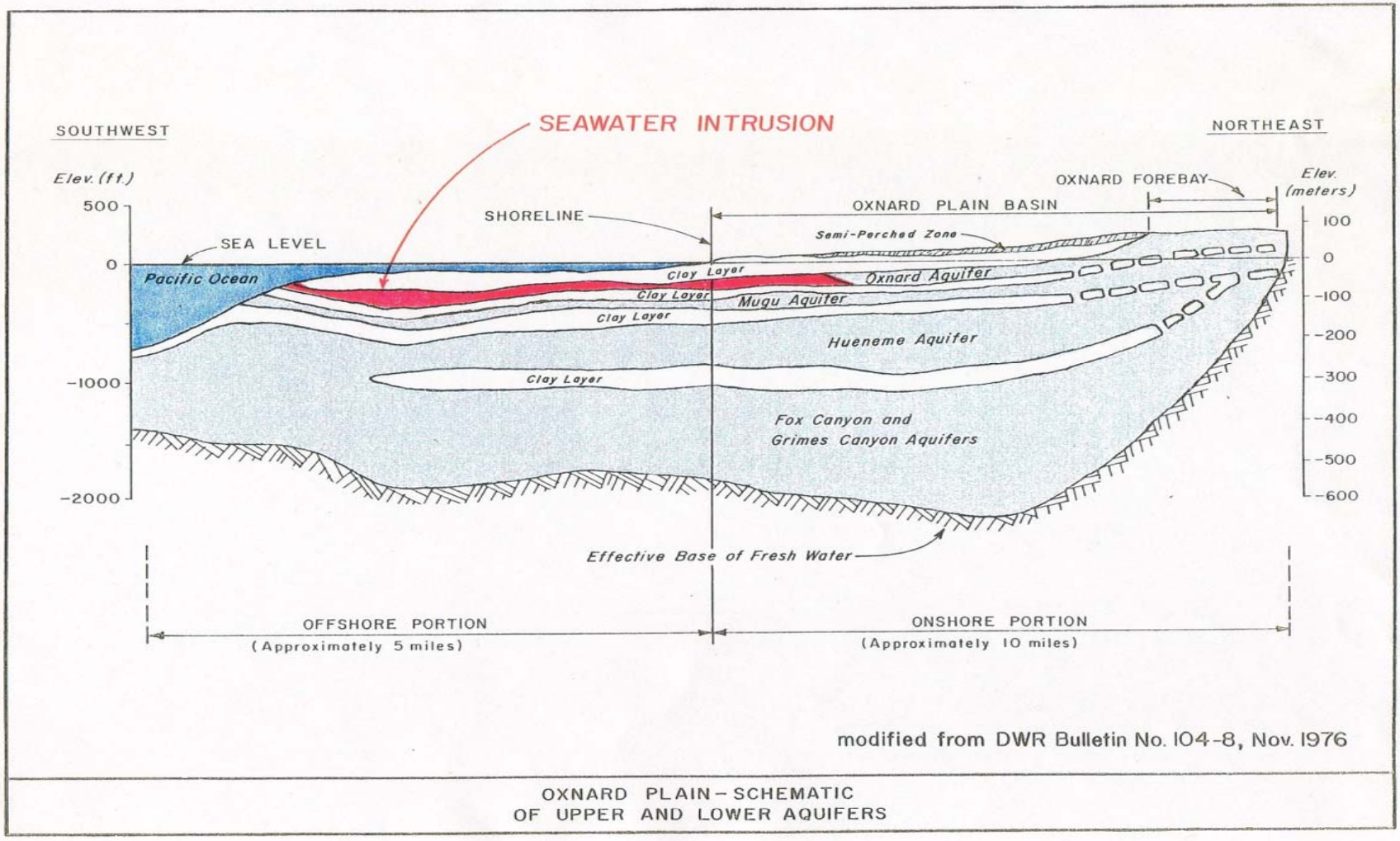


Figure 8-2

Cross Section of the Oxnard Plain Aquifers



OXNARD PLAIN – SCHEMATIC
OF UPPER AND LOWER AQUIFERS

Figure 8-3

Historical Groundwater Levels in Key Wells

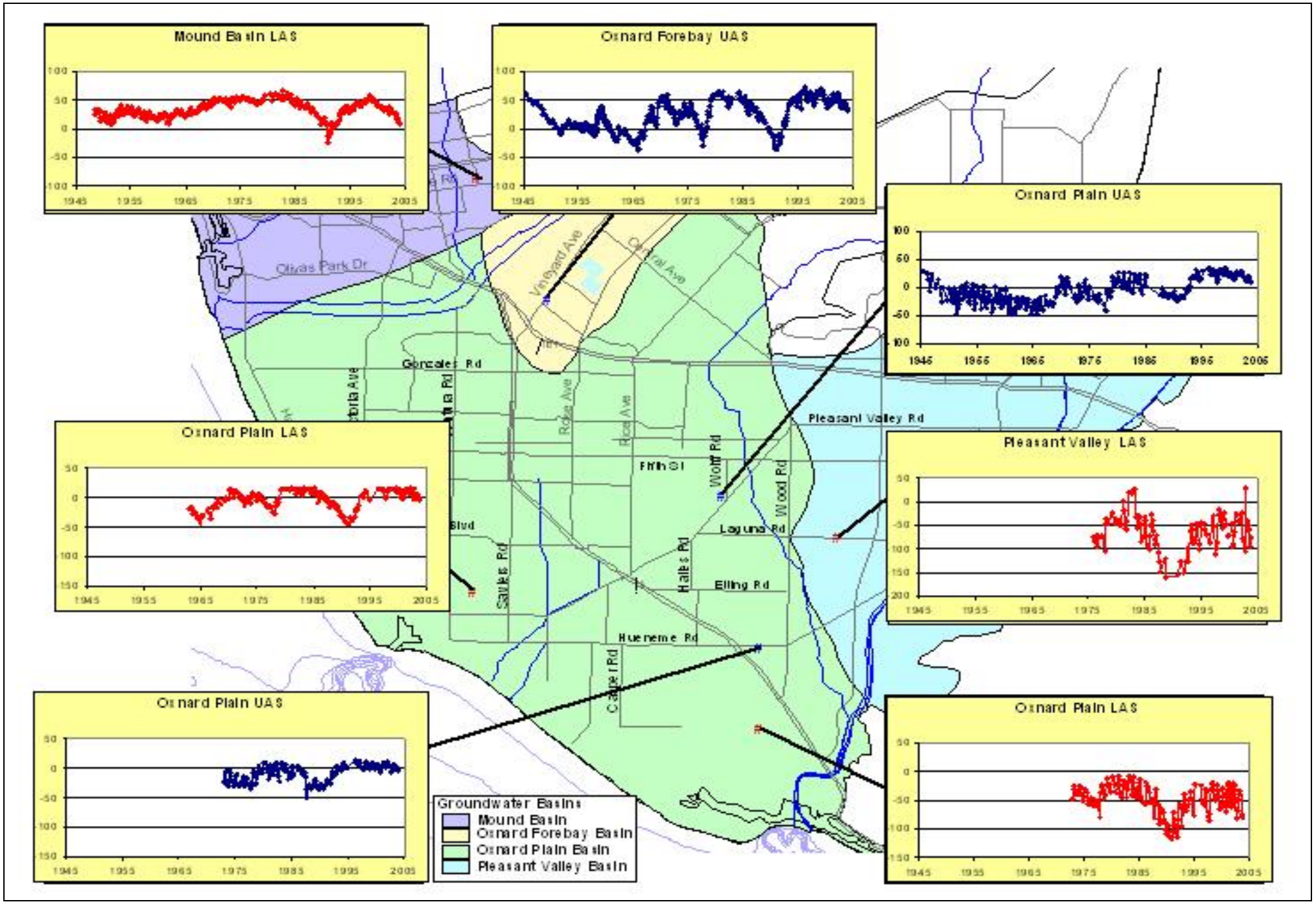
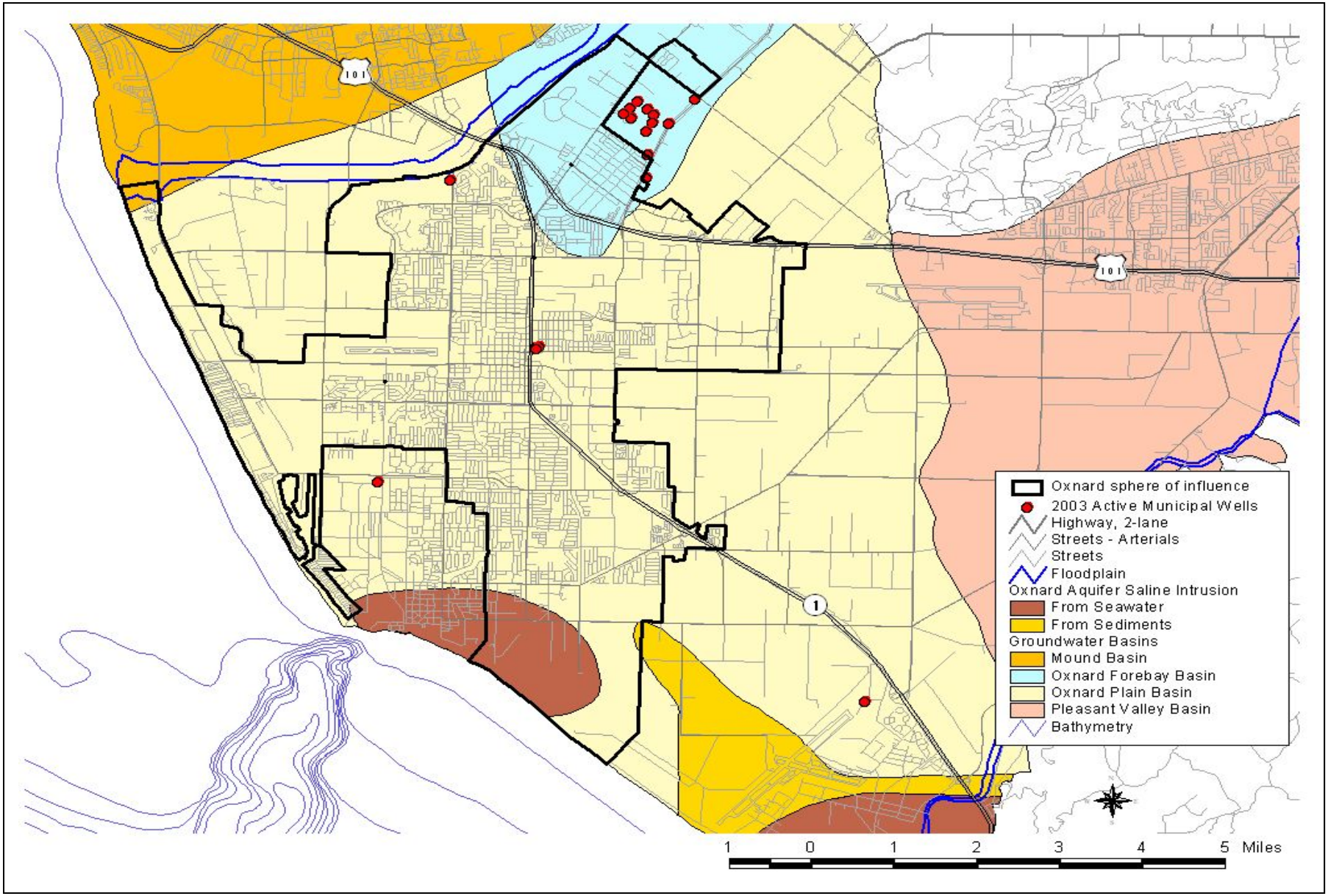


Figure 8-4

OH System Moves Pumping Inland



8.4 Surface Water Availability

Closely related to the availability of groundwater is the availability of surface water in the Santa Clara River, used to recharge the Oxnard Plain aquifers. The Santa Clara River carries high flows in most winters, but nearly stops flowing in the late summer. Peak flows in large winter storms have exceeded 140,000 CFS. By late summer, those flows usually recede to a range of 5-20 CFS. In some years, the river has dried up completely by late summer. That has not happened since the last drought, before the construction of the improved Freeman diversion; and it remains to be seen whether the improved Freeman diversion will dry up in droughts, given higher wastewater production upstream in the watershed.

Surface water flows can vary considerably from year to year. United's operating strategy is to spread as much water as possible in wet years. Although groundwater levels in the Oxnard Plain can respond rapidly to a wet year, the normal trend is for groundwater levels to gradually change over a multiple-year period in response to changing hydrologic conditions. After the wet year of 1995, many wells in the Oxnard Plain temporarily

The amount of groundwater in storage in the Oxnard Plain is far greater than the annual pumping demands placed on it. Water stored underground allows United's constituents, including OH customers, to continue using water during dry periods.

8.5 Lake Piru Operations

In addition to its groundwater recharge facilities, United Water owns and operates Lake Piru. Winter storm runoff is stored in the lake for later release downstream. In the late summer or early fall, water is released from Lake Piru at a high flow of 400 to 600 CFS. Typically around 10,000 to 50,000 AF of water is released downstream each year. Average releases are some 27,000 AF per year. Some of that water reaches the Freeman diversion 26 miles downstream, and is used to recharge the Oxnard Plain. Since the Oxnard plain aquifers are in a state of overdraft, United's operating priority is to convey as much water as possible to the Freeman diversion each year. However, the upstream groundwater basins (the Piru basin, Fillmore basin, and Santa Paula basin) naturally percolate some of the water released each year. The percentage of water reaching the Freeman diversion from Lake Piru has varied from about 20% to almost 90%, depending on many factors.

In the past, United Water has exercised its option to perform an early release from Lake Piru when high nitrates threatened the OH wellfield. That option remains available for any future water quality emergencies in the OH wellfield.

8.6 Overdraft of the Oxnard Plain Aquifers

The construction of the improved Freeman diversion has helped bring the upper aquifer into balance. Seawater intrusion has been at least partly reversed in the upper aquifer.

However, the deep aquifer system is still being "mined." Extractions exceed recharge by approximately 20,000 AF/Yr. What this means is that the seawater intrusion front for the deep aquifers has advanced onshore in some areas. Thus, current groundwater management strategies deal with intrusion of both the upper and lower aquifers.

8.7 Minimizing Imported Water

Some OH customers also receive water from Calleguas MWD. That water is imported from Northern California. To the extent that those customers utilize OH water, that amount of water does not need to be imported into Ventura County.

9.0 Historic Water Demands

Historic water demand on the OH system are listed in Table 9-1, and plotted in Figure 9-1.

Historic water use from the deep aquifer wells is summarized in Table 9-2. As can be seen, those wells are only used in drought conditions. The OH System is operated under an agreement between United Water and the OH Customers. In that agreement, each customer is assigned an annual allocation for OH water, and a maximum flow rate at which water can be received. A list of OH customers and their contract amounts for OH water is provided in Table 9-3.

In practice, peak flows to each customer are not metered. There is no way to know whether a customer is exceeding its peak flow capacity. Fortunately, total peak flows leaving the OH plant, which are metered, have not exceeded the total design capacity of 53 CFS. In fact, peak flows have been reduced since PHWA's treatment plant has gone on line. If problems with peak flows were to occur, it would be feasible to install peak flow meterheads and require the OH customers to remain within their limits.

10.0 Water Demand Management

10.1 Fox Canyon GMA

The Fox Canyon Groundwater Management Agency (GMA) was formed by Act 2750, passed by the California Legislature, to monitor and control pumping within the GMA boundaries, shown in Figure 10-1. To fund its activities, the GMA collects an annual charge (per acre-foot of pumped water) from all pumpers within its boundaries. The GMA has the authority to pass ordinances to control the pumping of groundwater in its service area. GMA Ordinance 5 (now replaced by Ordinance 8) controls the amount of water that can be pumped from the Oxnard Plain and Las Posas area. Each pumper is assigned a historical allocation based on his 1985-1989 pumping from each well. Pumping is to be cut back 5% every five years, up to a maximum reduction of 25% in 2010. The cutbacks required by year are summarized in Table 10-1. The 2005 cutbacks have been delayed by a year for further study.

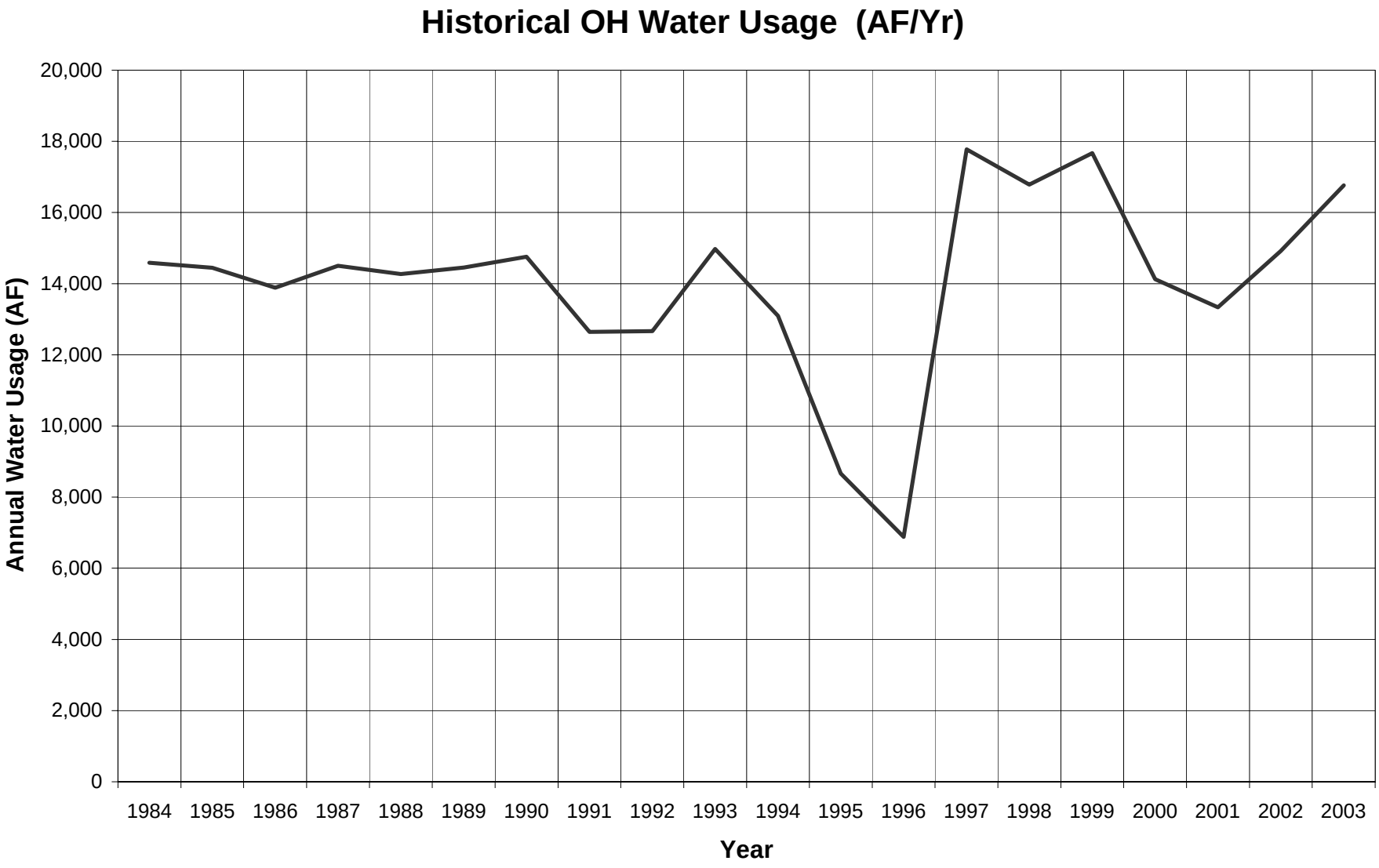
United Water Conservation District

Historical OH Water Demand
Table 9-1

Calendar Year	Total OH Water Usage (AF)
1984	14,588
1985	14,445
1986	13,884
1987	14,501
1988	14,270
1989	14,457
1990	14,757
1991	12,644
1992	12,699
1993	14,978
1994	13,093
1995	8,666
1996	6,881
1997	17,776
1998	16,785
1999	17,673
2000	14,122
2001	13,339
2002	14,920
2003	16,761
2004	12,075

Note: In 1995 and 1996, Oxnard took less OH water than usual because of a low-cost Calleguas MWD water program.

Figure 9-1


Historical OH Water Usage (AF/Yr)
Annual Water Usage (AF)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Year

United Water Conservation District

OH Deep Aquifer Well Pumping History
Table 9-2

Calendar Year	Deep Aquifer Pumping (AF)
1984	0
1985	0
1986	2
1987	564
1988	43
1989	711
1990	2,796
1991	1,597
1992	97
1993	206
1994	67
1995	28
1996	33
1997	62
1998	168
1999	12
2000	91
2001	18
2002	793
2003	10
2004	437

Note: In 2002 and 2004, deep aquifer wells were pumped to the irrigation pipeline (Not part of the OH System).

OH Customer Sub-allocations
Table 9-3

OH Customer	OH Sub-Allocation (AF)
City of Oxnard	
Oxnard	6,237.78
Ocean View MWD	2,729.55
Oxnard SUBTOTAL	**8,967.33**
Port Hueneme Water Agency	
Port Hueneme	3,593.18
NAWS Point Mugu	899.19
USN CBC	120.18
Channel Islands Beach CSD	0.00
PHWA SUBTOTAL	**4,612.55**
Mutual Water Companies	
Cypress Mutual	96.20
Dempsey Road Mutual	194.47
Saviers Road Mutual	27.57
Vineyard Avenue Estates	266.00
Mutual SUBTOTAL	**584.24**
Other OH Customers	
Donions Recharge	5.25
Kunho (Del Norte)	9.50
Rio Del Valle Schools	26.70
Ventura Co Game Preserve	1.28
Other Customer SUBTOTAL	**42.73**
TOTAL OH SUBALLOCATIONS	**14,206.85**
TOTAL NUMBER OF ACCTS.	**15**

The GMA cutbacks were originally intended to bring the upper aquifer into balance by the year 2010. A pumper can build up GMA "credits" if he pumps less than his allocation in any given year. However, if a pumper runs out of credits and pumps in excess of his reduced annual pumping allocation, he will be assessed a GMA penalty for each AF of excess water pumped. The GMA penalty is presently set at $725 per AF, which is considered to be the cost of purchasing imported water.

10.2 Groundwater Management Plan

Both United Water and the GMA operate under the guidelines of a groundwater management plan prepared by the GMA. A copy of the plan is provided in Appendix A.

10.3 Water Demand Management

The OH wellfield is subject to the same pumping limitations and GMA penalties as any other pumpers. The total available GMA allocations for the OH wellfield are summarized in Table 10-2.

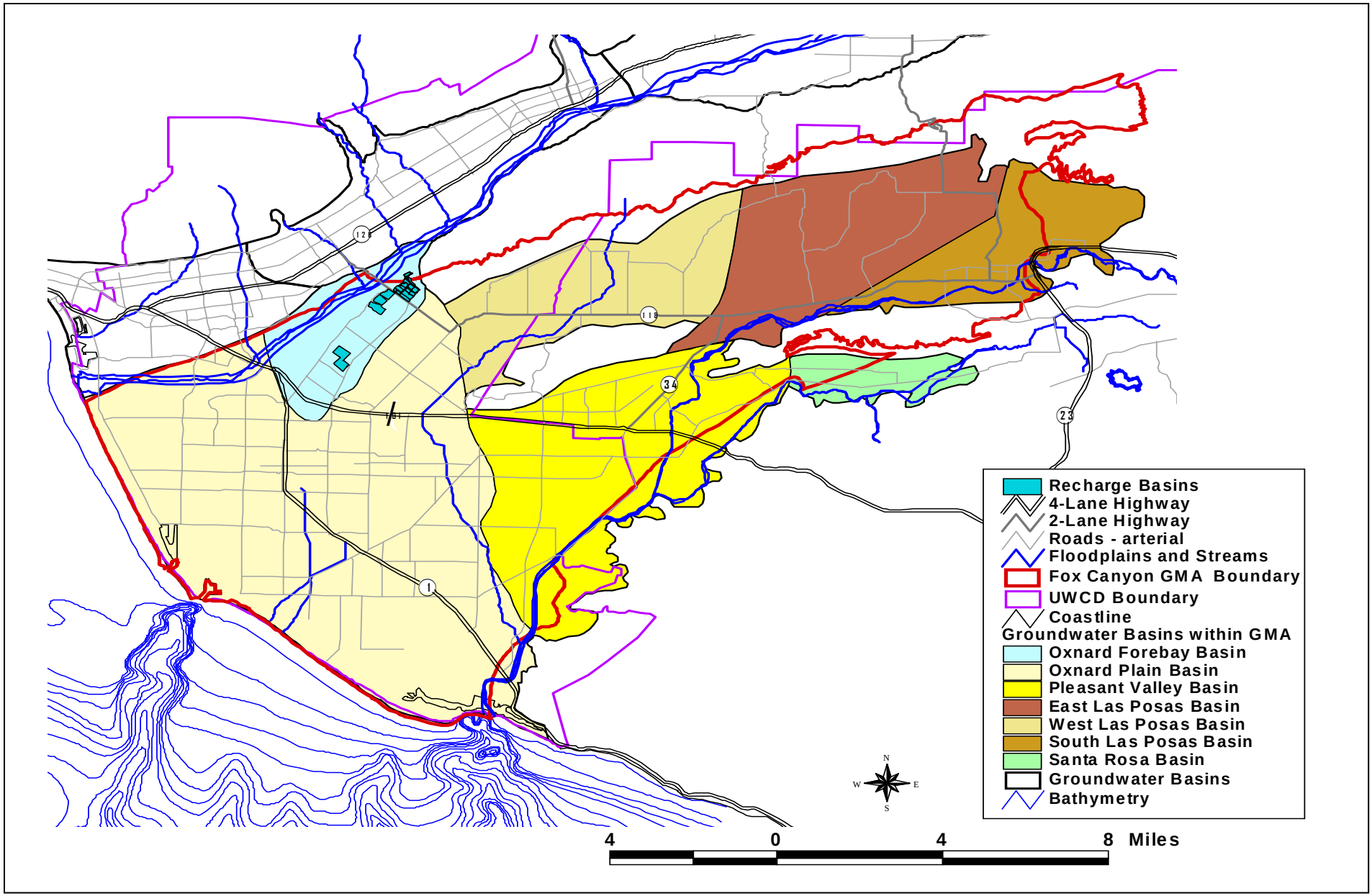
The GMA pumping limitations and penalties provide a very strong incentive for OH customers to reduce their pumping. Each OH customer has an allocation as listed in Table 9-3. By the terms of the OH Agreement, each customer's allocation is referred to as that customer's suballocation. If a customer pumps more than his reduced suballocation, then that customer is liable for any GMA penalties that may accrue. There are provisions in the OH Agreement for payment in advance to cover penalties for over-pumping. At an additional cost of $725 per AF, OH customers are encouraged to conserve water and use other sources that may be available.

10.4 Projected Water Demands

Projected water demands for the OH System are estimated in Table 10-3. These demands are based on customers staying within their GMA suballocation, including reductions. To the extent that these projections are ever exceeded, additional funds should be available, through GMA penalties, to import additional water supplies into Ventura County.

Figure 10-1

GMA Boundaries



GMA Pumping Reductions by Year
Table 10-1

Years	Reduction Required	Pumping Allowed
1991	None	100%
1992-1994	5%	95%
1995-1999	10%	90%
2000-2004	15%	85%
2005-2009	20%	80%
2010 and beyond	25%	75%

OH Historical GMA Allocation
Table 10-2

Source	Historical Allocation (AF/Yr)	Year Effective
OH Pumping 1985 – 1989	14,673.628	1991
Noble Pit allocation transfer	203.428	1994
Transfer from Vineyard Avenue Estates	266.000	1997
Transfer from Rio Del Valle Schools	26.700	1997
TOTAL OH HISTORICAL ALLOCATION	**15,169.756**	

United Water Conservation District

Projected OH Water Demands
Table 10-3

Year	Total Pumping (AF/Yr)	GMA Reductions
2005	12,140	85%
2006	12,140	80%
2007	12,140	80%
2008	12,140	80%
2009	12,140	80%
2010	11,380	75%
2011	11,380	75%
2012	11,380	75%
2013	11,380	75%
2014	11,380	75%
2015	11,380	75%
2016	11,380	75%
2017	11,380	75%
2018	11,380	75%
2019	11,380	75%
2020	11,380	75%
2021	11,380	75%
2022	11,380	75%
2023	11,380	75%
2024	11,380	75%
2025	11,380	75%

11.0 Water Quality Issues

11.1 Blending of OH Wells

The major water quality problem for the OH system is the occasional presence of high nitrate levels in some of the shallow aquifer wells. The OH wellfield is surrounded by strawberry fields, which are fertilized with nitrate-based fertilizer. There are also domestic septic systems in the El Rio area, both for individual residences and for institutions like Rio Mesa High School. It is thought that septic systems and agriculture contribute about equally to the nitrate problem. Since El Rio is located within the Oxnard Forebay, both fertilizers and leached wastewater percolate easily into the drinking water aquifer.

Typically, nitrates are low in the winter and spring, while surface water from the Santa Clara River is being recharged into the El Rio spreading grounds. The river water is usually low in nitrates, normally well under 10 mg/L; and that water strongly influences the wells. Normally, surface spreading stops around June of each year, due to reduced river flows. After that point, nitrate levels in some wells may increase. The increase is usually gradual, but sudden jumps in nitrate levels are frequently observed. It is not uncommon for one or more wells to exceed the Maximum Contaminant Level (MCL) for nitrate of 45 mg/L. Nitrate levels in each OH well are sampled and analyzed once a week, and nitrate levels are watched closely. When a well begins to approach the MCL, it is either not used, or is placed at the bottom of the call-on list; so that it is the last well called upon to meet demand. All of the OH wells feed into a common manifold near the chlorine building. This allows a blending operation which results in a delivered nitrate level within the MCL. To provide an emergency warning capability, there is a nitrate analyzer to continually monitor nitrate levels delivered from the El Rio plant. If nitrate levels approach the MCL, an alarm is sent out to the on-call operator.

During very dry periods, such as near the end of a several year drought, nitrate levels in some wells can exceed 100 mg/L or, less commonly, even 200 mg/L. Several wells can have high nitrates at one time. By that time, blending may no longer be adequate to ensure safe drinking water. At that time, a decision would be made to turn on the deep aquifer wells, which are very low in nitrates. With that additional supply, it is expected that nitrates in delivered water can be kept under the MCL.

11.2 MTBE Concerns

Several years ago, MTBE's from spilled gasoline were detected at the Poole Oil site along Vineyard Avenue, about 1,300 feet away from the nearest OH well (Well No. 15). United's groundwater staff have been closely involved in monitoring that MTBE spill and the associated cleanup, which has nearly been completed. Most of the evidence indicates that the spill has been cleaned up and/or has migrated downstream from the wellfield. Each month, MTBE samples are taken from the two OH wells closest to the spill, Wells No. 7 and 15. So far, no MTBE has been detected. However, there is some uncertainty as to what will happen to MTBE levels once groundwater levels rise after the next wet

cycle. This problem will be monitored for several more years. In the event MTBE's are detected in any OH wells, use of those wells would be curtailed and, if necessary, the deep aquifer wells would be used.

11.3 Deep Aquifer Wells

The deep aquifer OH wells have not been used for production for over 10 years. They would be pumped only in extreme conditions, as follows:

Very high nitrate levels in the shallow wells
Low groundwater levels in the Oxnard Forebay
Water quality or other emergency with the shallow water wells.
Failure of the shallow wellfield

Although not used for production, the deep wells are usually run once a month to take water samples, and to test the equipment. Operating the deep aquifer wells introduces additional water quality problems. The high iron and manganese in those wells exceeds secondary MCL's. Despite the sequestering agent added, some effects on the chlorination residual can be expected. The deep wells have not been operated since the chloramination of the OH water was started in 2000.

Maintaining a balance between chlorine and ammonia is tricky at best, and adding varying blends of deep and shallow aquifer water to the mix can introduce chemical imbalances. This problem will require close operator oversight, and will have to be addressed on a trial and error basis once the deep wells come into use for the first time.

Operating the deep aquifer wells could also affect PHWA. It is United's understanding that there could be some scaling problems on the RO and ultrafiltration membranes at the PHWA treatment plant if deep well water is delivered. The OH water is normally fairly low in turbidity, and PHWA just uses bag filters to remove particulate matter. When iron and manganese react with chlorine, a precipitate can occur. The bag filters may not be heavy-duty enough to remove such fine particles. In addition, iron and manganese can cause heavy scaling just by their chemical nature. In the event the deep aquifer wells are used, United must give PHWA advance notice so that they can put anti-scaling measures into place, and weigh the option of receiving Calleguas water during such periods. They would also need to implement monitoring measures, to catch any problems early. The RO membranes are very costly and scaling presents a significant risk.

From time to time, iron and manganese treatment of the OH deep aquifer well water is considered. However, considering how seldom those wells are used, such additional treatment does not appear to be cost-effective or necessary at this time.

11.4 Flushing program

One typical problem with chloraminated water is the risk of nitrification in pipelines and reservoirs. With nitrification, ammonia-eating bacteria grow in the pipeline and cause the disinfection residual to drop, creating water quality problems including unpleasant odors. The OH system is fairly resistant to such nitrification because there are few dead spots where the water does not flow. The major area of concern is near the end of the OH pipeline, past the main PHWA turnout. Flows in that area can be low, causing the potential for nitrification.

To reduce the problem of nitrification, periodic flushes of the OH pipeline are conducted. These flushes can also introduce new water quality problems, particularly for PHWA. Flushes stir up sediment etc. in the pipeline, which can enter the PHWA turnout. High turbidities measured at their plant will shut it down automatically, to protect the equipment. It is necessary to notify PHWA in advance of doing a flush, so that they can shut down for a day or so. Even so, PHWA can have difficulties coming back on line, due to sediment that settles out in their pipeline.

11.5 Line Breaks And Repairs

After an OH line break, it is sometimes necessary to sterilize the pipeline and do a flush. This requires coordination with the OH customers. An emergency flush can create the same water quality problems for PHWA as a planned flush described above. One fortunate aspect of an unplanned flush is that it can delay the need for a subsequent regularly scheduled flush.

11.6 2003 Consumer Confidence Report

As a drinking water system, the OH System is subject to the annual reporting requirements of California and Federal regulations. An annual Consumer Confidence Report (CCR) is prepared for the OH System, and delivered to all OH customers. The larger OH customers (Oxnard and PHWA) use United's information to prepare their own CCR's. However, the smaller mutual water companies, who utilize OH water almost exclusively, use United's CCR as their own, and deliver it directly to their customers. A copy of the 2003 CCR is provided in Appendix B.

12.0 Reliability of the OH Water Supply

The reliability of the OH water supply depends on several factors discussed above: groundwater conditions, weather trends, United's management of surface and ground water, the GMA's demand management efforts, water conservation, and, perhaps most importantly, water quality limitations. The worst drought experienced by the OH System was the 1985-91 seven year drought. By the end of that drought, nitrate levels in some OH wells were high, and groundwater levels had fallen below several well pump intakes.

To maintain pumping capacity, several well pumps were reinstalled with deeper bowls. Deep aquifer wells were also used to help meet demand.

The last drought occurred before the improved Freeman diversion was completed. Since the Oxnard Plain aquifer is recharged through runoff from the Santa Clara River Watershed, the water diverted through the Freeman diversion has improved our ability to recharge groundwater. OH demand is being decreased due to the GMA pumping reductions. Water conservation by agriculture has decreased agricultural demands by as much as 25%. Overall, conditions are much improved since the last drought. It is projected that the OH System will be able to meet its contracted deliveries in the worst expected drought. Thus the reliability of the OH water supply is not expected to be dependant on the runoff from any given set of water years.

13.0 Demand Management Measures

United is primarily a water wholesaler and so does not sell directly to members of the public. Thus we are not directly involved with implementing many of the DMMs outlined in Water Code § 10631 (f). However, our customers implement many of their own DMMs to reduce demand in their jurisdictions. The City of Oxnard is currently implementing or is planning to implement all of the DMMs listed in Water Code § 10631 (f)(1). United does periodically conduct education campaigns promoting water conservation as described below. However, these campaigns are aimed at members of the general public who are not direct customers of United.

13.1 System Water Audits, Leak Detection and Repair

On a monthly basis, United tracks potential leakage in the OH system by comparing the amount of water delivered to customers to the amount of water produced from the OH wells. These water losses typically average less than 5%. However, losses (unmetered water) have occurred from time to time due to undetected pipeline leaks, meter failures, improper meter operation, clearwell leaks, construction activities, leaking check valves, and large amounts of flushing. A certain percentage of water loss is built into the OH Agreement, in that the OH wellfield GMA allocation exceeds the amount of water contracted to customers. However, any excessive water losses are costly to the extent that they contribute to any GMA penalties from overpumping. That provides a motivation for keeping water losses to a minimum.

Whenever water losses exceed about 5% in two consecutive months, District staff conduct a thorough review of available data to determine the cause of the water loss. When the source of the loss is determined, District staff repair the faulty line and restore normal water flow. Due to the relatively young age of our infrastructure (District pipelines only date back to 1954), wholesale replacement of pipelines is not necessary at this point.

The last major audit of our OH system was performed in 2001 by Heath Consultants. While United has not scheduled another audit in the near future, United staff performs a yearly maintenance program of our OH system. Every year, a portion of the 53 blind flanges in our pipeline, a major source of leaks, are replaced. The replacement rate is roughly 10% of the total number of flanges, or 5-6 flanges per year. This program helps top prevent major leaks and subsequent water loss, although the exact amount of water saved is not known.

Table 13-1: System Water Audits, Leak Detection and Repair

Actual	2001	2002	2003	2004	2005
% of unaccounted water	5	5	5	5	5
miles of mains surveyed	10.7	10.7	10.7	10.7	10.7
miles of lines repaired	1	0	0	0	0
actual expenditures - $	$9,000	0	0	0	0
actual water savings - AFY	569	0	0	0	0

Planned	2006	2007	2008	2009	2010
% of unaccounted water	5	5	5	5	5
miles of mains surveyed	10.7	10.7	10.7	10.7	10.7
miles of lines repaired	1	0	0	0	0
projected expenditures - $	$9,000	0	0	0	0
projected water savings - AFY	569	0	0	0	0

13.2 Metering with Commodity Rates

The biggest problem with water losses in the OH pipeline is caused by inaccurate meters used at Oxnard's turnouts. At less than 20% of full flow, Oxnard's old venturi meters read very little of the flow. Low-flow Rosemount meter heads are present, but not hooked up. (Low-flow meterheads are hooked up to the Calleguas supply, but not to the United supply.) These meters are in the process of being replaced with mag meters, as part of Oxnard's blending station upgrades. Staff will also visit Oxnard's facilities, to find out whether Oxnard's Venturi meters could be contributing to water loss. Oxnard's old venturi meters at its blending stations have a bypass tube that, if inadvertently left open, can cause the meter to read very low.

Starting in 1995, all propeller meters at OH turnouts have been rotated at least once every two years. Such meters tend to slow down with age and wear. Replacement meters are in stock for almost all OH meters. When a meter is rotated, a new meter is installed and the old meter is sent to a meter shop for calibration and repairs. The rebuilt meters are then kept until they can be used for the next rotation. While there are a total of 16 meters, United only replaces the 11 propeller meters. The other 5 meters are maintained by the city of Oxnard. The bi-annual cost of meter rotation averages around $10,000 per rotation.

Precise water savings from this program are difficult to calculate, as old meters would normally fail at different rates and with differing levels of severity. However, since the propeller meters are designed with a ±2% margin or error then we can say with certainty that our water loss from meter inaccuracy does not exceed 2% of total flows.

Table 13 -2: Metering with Commodity Rates

Actual	2001	2002	2003	2004	2005
# of unmetered accounts	0	0	0	0	0
# of retrofit meters installed	11	0	11	0	11
# of accounts w/o commodity rates	0	0	0	0	0
actual expenditures - $	$10,000	0	$10,000	0	$10,000
actual water savings - AFY	<11,152	<11,152	<11,152	<11,152	<11,152

Planned	2006	2007	2008	2009	2010
# of unmetered accounts	0	0	0	0	0
# of retrofit meters installed	0	11	0	11	0
# of accounts w/o commodity rates	0	0	0	0	0
actual expenditures - $	0	$10,000	0	$10,000	0
actual water savings - AFY	<11,152	<11,152	<11,152	<11,152	<11,152

In spring 2005 a number of meters were replaced by United's customers on the O-H pipeline. Since that time, calculated line losses have ranged from negative 3% (gain) to 6% loss, averaging 1.3% line loss. Calculated annual line losses totaled 189, 144 and 128 acre-feet for the years 2005, 2006 and 2007, respectively. Given the maintenance schedules described in this section, line losses exceeding 200 acre-feet per year are not anticipated before the year 2025.

13.3 Wholesale Agency Programs

As a wholesale agency, United does not directly implement many of the DMMs commonly performed by retail water agencies. However, United does assist our customers in their efforts to conserve water and reduce demand by implementing our own public information campaigns. Since 1997, United Water has had a Water Conservation Program to encourage its customers to conserve water. This program is run by United's Water Conservation Coordinator. The objective of the WCP is to identify, promote, and assist in the implementation of water conservation and groundwater protection activities. The WCP includes the following elements and objectives:

School Education:
Develop specific programs targeting grades 3-6
Provide classroom presentations
Provide educational and promotional materials (stickers, pencils, videos, etc.)
Attend school functions and provide materials and a booth
Provide tours of United's facilities

General Public Objectives:
Develop specific programs targeting the general public and the Spanish speaking population
Provide water education/conservation and groundwater protection information through mail
Provide educational and promotional materials
Attend functions, provide material and booth (Science Fair, Farm Fest, etc.)
Provide tours of United's facilities

Urban Use Objectives:
Provide landscape water conservation information for new and existing single-family homes
Provide information on reducing water waste
Provide educational and promotional materials
(low flow toilets, xeriscape gardening, leak detection)
Provide information to landscape architects and nurseries
Provide tours of United's facilities

Agricultural Use Objective:
Provide educational seminars on irrigation systems
Provide educational seminars on fertilization
Provide educational and promotional materials on water education/conservation and groundwater protection
Provide tours of United's facilities

Industrial Use Objective:
Provide educational seminars on water conservation and groundwater protection
Provide educational and promotional materials

United's Water Conservation Program makes use of the following resources:

Groundwater Guardian Program: A group of community and affiliate representatives for development of activities for groundwater protection and education.

California Water Awareness Campaign: Provides packets of information for teachers during May – Water Awareness Month.

Water Education Foundation: Provides teaching tools and materials (books, videos, etc.).

ACWA: Provides teaching tools and materials.

DWR and MWD: Provides teaching tools and materials.

UWCD: Funds speakers, educational materials, teaching tools, and trinkets (cups, water bottles, pens, pencils, etc.).

United's water conservation program is well received and appreciated by its constituents.

Table 13 -3: Wholesale Agency Programs and Expenditures

	Number of agencies assisted				
Program Activities	2001	2002	2003	2004	2005
Public Information	15	15	15	0	0
School Education	0	15	15	15	15
Actual Expenditures	$10,000	$8,000	$7,000	$1,500	$15,000

	Number of agencies to be assisted				
Program Activities	2006	2007	2008	2009	2010
Public Information	15	15	15	15	15
School Education	15	15	15	15	15
Actual Expenditures	$28,000	$11,000	$8,000	$8,000	$8,000

13.4 Conservation Pricing

As described in section 10.3, the pumping allocations for each of our customers are being reduced from their historical levels. Water conservation is encouraged by the assessment of a fee of $725 for each acre-foot which is pumped beyond the reduced allocation. Regular water rates are provided in Table 13-5.

13.5 Water Conservation Coordinator

United has employed a Water Conservation Coordinator since 2005 to oversee our Water Conservation Program and promote water conservation. Prior to that year, responsibility for overseeing our Water Conservation Program was assigned to different staff members. The expenditures for these staff positions are reflected in the pre-2005 numbers in the table below.

Table 13 -4: Water Conservation Coordinator staff and budget

Actual	2001	2002	2003	2004	2005
No. of full-time positions	1	1	1	1	1
No. of full/part-time staff	1	1	1	1	1
Actual expenditures	$15,143	$16,435	$30,557	$31,220	$10,115

Planned	2006	2007	2008	2009	2010
No. of full-time positions	1	1	1	1	1
No. of full/part-time staff	1	1	1	1	1
Projected expenditures	$5,000	$5,000	$6,000	$6,000	$6,000

Table 13-5
FISCAL YEAR 2007 / 2008
UNITED WATER CONSERVATION DISTRICT
WATER RATES

Per Acre Foot

PIPELINES

Pleasant Valley Pipeline	**$51.65**	AG
Pumping Trough Pipeline	**$135.65**	AG
Saticoy Well Field	**$15.00**	AG

Oxnard Hueneme Pipeline:

OH	**$224.70**	**(Variable Rate)**
OH	**$161.20**	**(Marginal Rate)**
OV / OX	**$171.40**	**(Variable Rate)**
OV / OX	**$107.90**	**(Marginal Rate)**

Annual Fixed Charge: **$26,653** x UPC of each OH customer

Supplemental M&I

Calleguas Member Agencies	**$154.00**	($142 CMWD + $12 UWCD)
Non Member Agencies	**$233.00**	($221 CMWD + $12 UWCD)

Billed on behalf of Ocean View Municipal Water District

Ocean View Pipeline	**$395.00**	($391 OV + $4 UWCD)

GROUNDWATER

Zones	AG	M&I
A	**$11.65**	**$34.95**
B	**$26.65**	**$79.95**
C	**$16.65**	**$49.95**

14.0 Other Sources of Water

14.1 State Project Water

The Ventura County Flood Control District (now the Watershed Protection District) is a contractor for the State Water Project, SWP, with an annual entitlement to 20,000 acre-feet per year of State water. The County in turn contracted with three local agencies to distribute that SWP water entitlement: 5,000 AF/Yr to Casitas Municipal Water District, 10,000 AF/Yr to the City of Ventura, and 5,000 AF/Yr to United Water Conservation District. United Water is the only agency of the three that has received any of its SWP water. To deliver SWP water to United Water, the California Department of Water Resources releases the water from Pyramid Lake, where it flows down Piru Creek into Lake Piru. The water can then be released downstream as part of the annual water conservation release from Lake Piru. Some of that water will arrive at the Freeman diversion, where it can be recharged into the Oxnard plain aquifers, contributing to the OH water supply.

In 2004, United purchased some of the City of Ventura's annual entitlement to SWP water. Some 2,000 AF of the City's entitlement was delivered into Lake Piru that year. That was the first time Ventura had ever ordered any of their water. (Some of the water recharged aquifers used by Ventura.) There is potential for the purchase of some or all of Ventura and Casitas' SWP water in future years.

The purchase of SWP water is not part of the normal operation of the OH System and United has no plans to do so on a long-term basis. United purchases that water for the benefit of the aquifer system, on behalf of all pumpers. In practice, the SWP water is purchased with funds from United's State Water Fund, which is financed through local property taxes. However, such property tax assessments are not collected from areas annexed to Calleguas MWD, primarily Oxnard and PHWA. Those areas purchase SWP water directly from Calleguas MWD, offsetting pumping and benefiting the aquifers as much as does United's purchase of SWP water. Historically, a sharp distinction has always been made between those who are annexed to Calleguas MWD and those who are not. Calleguas and its parent agency, Metropolitan Water District, are the sole suppliers of SWP water within their service areas.

In future emergencies or severe droughts, additional SWP water might become available to supply water to the El Rio spreading grounds. Institutional and contractual arrangements would need to be made, including agreements with Calleguas MWD.

14.2 Supplemental M&I Water Program

The Supplemental M&I Water Program is a new program that will allow OH customers to pump additional water above their reduced OH suballocation. This is a joint program between United Water and Calleguas MWD. Calleguas MWD has partially funded the Conejo Creek diversion, which pumps recycled water from Conejo Creek to Pleasant Valley County Water District, PVCWD, in the eastern part of the Oxnard Plain.

PVCWD will then reduce their groundwater pumping. GMA credits accumulated as a result of that reduced pumping will be transferred from PVCWD to Calleguas MWD. Those credits will then be transferred from Calleguas MWD to United Water, and credited to the OH wellfield. That will allow additional pumping from the OH wellfield, which will be delivered to participating OH customers. As part of this program, participating OH customers will pay a surcharge for any supplemental water received.

That surcharge will be transferred to Calleguas MWD as partial compensation for their costs for the Conejo Creek project. As of 2004, two OH customers have expressed interest in this program: Oxnard and Cypress Mutual. More information on this program is provided in Appendix D. As part of this program, United's groundwater management team will exercise discretion on how much supplemental M&I water can safely be used each year without adverse impacts to the aquifers.

15.0 Future Water Supply Projects and Programs

United has several future water supply projects that are being studied and considered, as discussed below:

15.1 Freeman Expansion Project

The Freeman diversion can presently divert more water than can be put to beneficial use. In most years, the District can divert its limit of 375 CFS for up to about four weeks. After that point, the spreading ponds exhibit reduced percolation rates, and the gravel pits are nearly full. Some water that would otherwise be diverted must then flow to the ocean.

The Freeman Expansion Project would deliver surface water diverted at the Freemen diversion into new gravel pits near United's existing facilities. Those new gravel pits would include the Riverpark pits, and the Ferro pit, which have already mined of their aggregate. Use of those pits would increase the yield of the Freeman diversion, increasing the amount of water recharged into the aquifers.

The Freeman Expansion Project would be constructed in two phases. Phase 1 may start as early as 2007, and would convey up to 375 CFS of diverted water into the new gravel pits. This phase would not require a change to United's water license to divert water. The Phase 1 facilities are shown in Figure 15-1. Phase 2 would increase the diversion rate to 1,000 CFS, which would require a change to United's surface diversion water rights. Receiving a new permit from the State Water Resources Control Board to increase the diversion rate could take 10 years or more. Therefore, Phase 2 would be constructed after the year 2014. The Phase 2 facilities are shown in Figure 15-2.

The Freeman Expansion Project would improve the reliability of the OH water supply. With an increased yield of up to 10,000 AF/Yr on average, this would go a long way toward bringing the Oxnard Plain aquifers into long-term balance.

Figure 15-1

Freeman Expansion Project, Phase 1

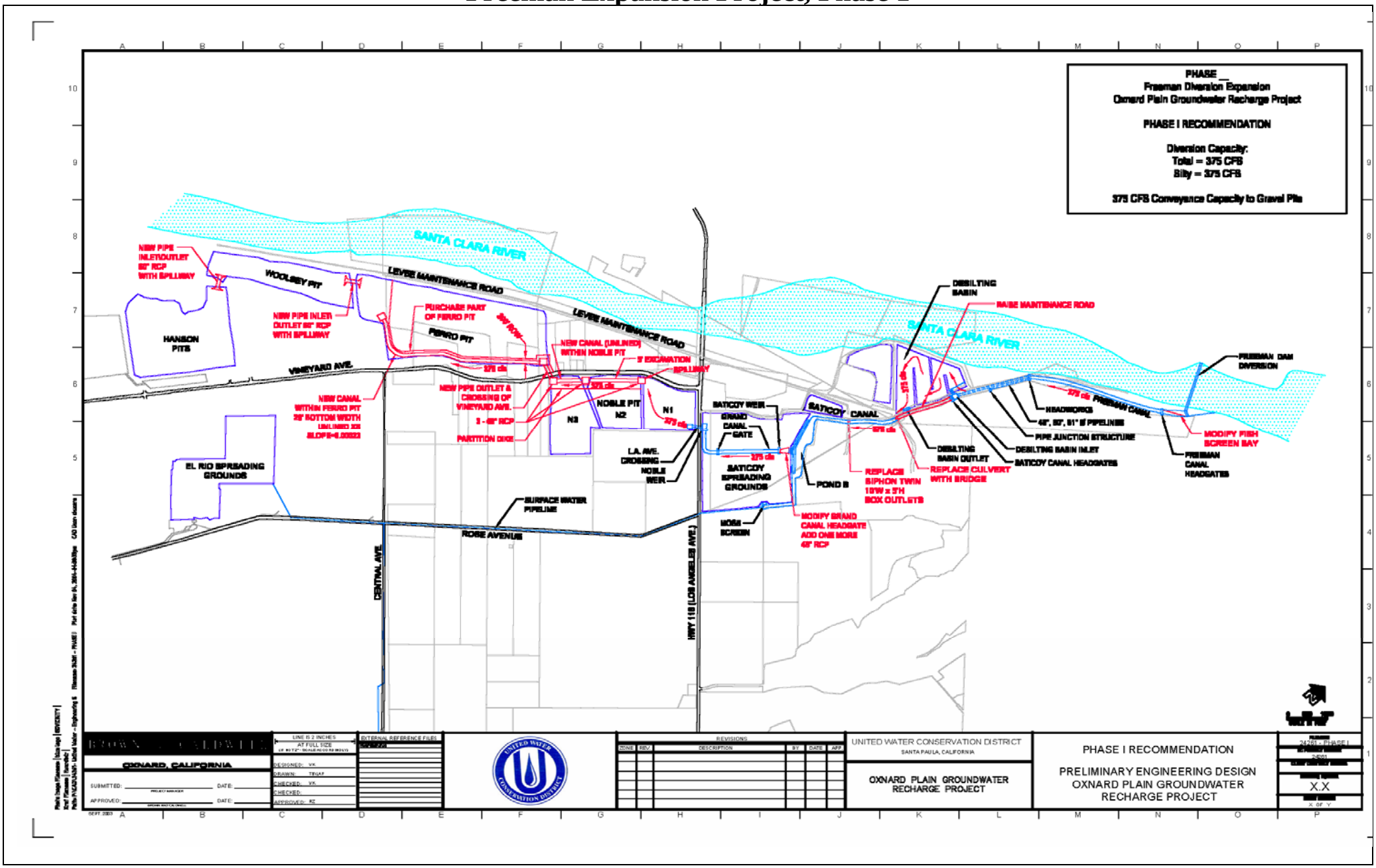
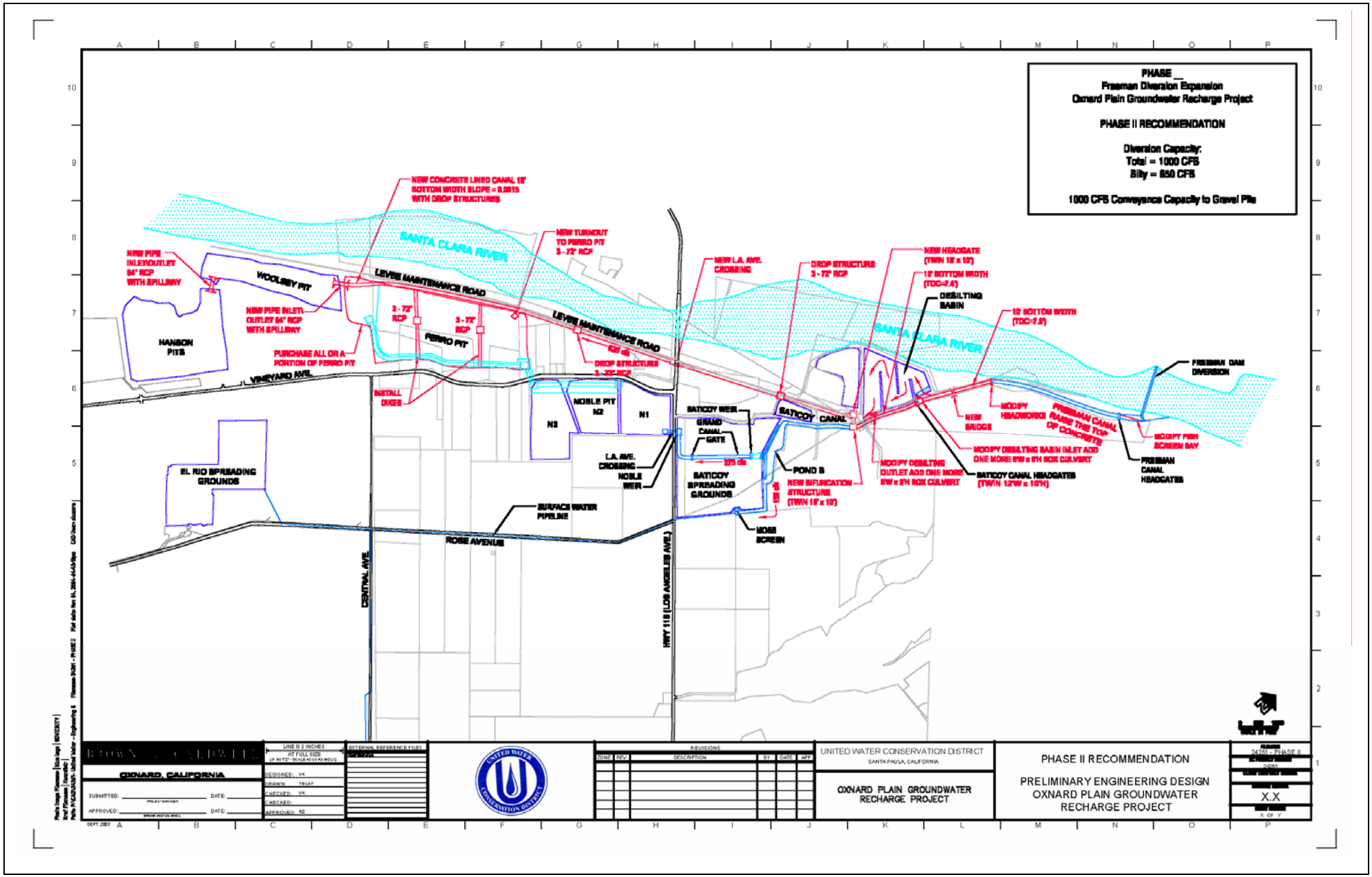


Figure 15-2

Freeman Expansion Project, Phase 2



15.2 Oxnard's GREAT Program

The City of Oxnard is implementing its GREAT program, which will develop additional water supplies for the City. The GREAT program includes several elements, including advanced treatment of wastewater, injection of treated wastewater into the ground, supply of treated wastewater to agricultural users in the Oxnard plain, treatment of OH water to remove salts, and transfers of GMA credits to Oxnard and United to allow increased pumping. The GREAT program will affect the delivery of water through the OH system. Some of the additional water to be received by Oxnard will be delivered through the OH System. In general, RO plants are operated at a steady flow. So, instead of peaking on demand, demands on the OH system should flatten. That would improve the reliability of the OH supply during peak periods.

The GREAT program has undergone, and will continue to undergo, extensive hydrogeological evaluation to ensure that it will not harm the Oxnard Plain aquifers. It is therefore assumed that the GREAT program will benefit the aquifers. Oxnard is the largest OH customer. By improving the overall reliability of Oxnard's water supply, the GREAT program will help ensure the reliability of the water supply for all OH users.

15.3 Sewering El Rio

One of the most important future projects to protect water quality of the OH wellfield will be to install sewers in the El Rio area, located next to, but downgradient of, the OH wellfield. That area consists primarily of residences that are served by individual septic systems. Such septic systems are a source of nitrates, which leach into the groundwater supply. Ventura County is taking the lead role on a project to connect those residences into the City of Oxnard's wastewater collection system. Depending on the amounts of funding that become available, this project could begin construction within the next 10 years.

15.4 Desalination

While United has no plans to develop capabilities to deliver desalinated water, we are continually looking for new ways to develop available resources to improve the OH system and our groundwater recharge activities.

16.0 Water Shortage Contingency Plans

Several water shortage scenarios are possible for the OH system, as discussed below:

16.1 Historic Three-Year Drought

As previously discussed, there is expected to be an adequate water supply during the worst drought conditions that have historically been experienced in the service area. Under those conditions, it would be feasible to lower the pump bowls to be able to

continue deliveries, if necessary. Drought conditions result in dropping groundwater levels. Groundwater in the Oxnard plain is less susceptible to brief droughts, like a three-year drought. Longer droughts, in the range of 7-20 years, are more important for local groundwater supplies.

What is significant is that the OH system survived the last drought without any reductions to OH customers. And that was before the construction of the improved Freeman diversion and other facilities. No institutional restrictions will limit pumping during droughts. It is concluded that the OH system will have adequate water during the worst foreseeable 3-year drought. The quality of the water is a bigger concern than its availability, as discussed below.

16.2 Long-Term Droughts

The highest risk to the OH water supply will occur during long-term droughts, on the order of five years or more. Under those conditions, the groundwater levels in the Oxnard Forebay will drop below the 80,000 AF storage limit, triggering the SWRCB grant conditions. That means that the deep aquifer wells will be used in preference to shallow aquifer wells. That will decrease water quality (secondary standards) of delivered water but will not affect the supply. The delivery of drinking water to OH customers is a higher priority than the grant conditions. Thus, during temporary emergencies, such as mechanical failure of one or more deep aquifer wells, as much water would be pumped from the shallow wellfield as needed to meet OH demands.

16.3 Response to High Nitrate Levels

A significant risk to the reliability of the OH supply is the potential for high nitrates during drought conditions, as described above. In severe droughts, when river water is not available, it is conceivable that many of the shallow OH wells may exceed the MCL for nitrate. Under severe conditions, it may not be possible to blend the available wells to meet the nitrate standard. Nitrate is a primary drinking water standard and must not be exceeded without stringent public notification requirements, and likely the supply of bottled water to some customers. Nitrate levels exceeding the MCL can adversely affect the health of newborn children, which is a scenario to be avoided if at all possible. In the event of a nitrate emergency, United Water, as a wholesale supplier, would work with its customers and the Department of Health to determine an appropriate response by each agency.

Nitrate contamination affects only the shallow aquifer wells. In the event of extensive nitrate contamination of the shallow wells, the deep aquifer wells would be used. Use of the deep aquifer wells would allow some blending with the better shallow wells. With half the shallow wells under the MCL for nitrate of 45 mg/L, full OH deliveries could be made.

United Water is presently conducting studies of nitrate levels to determine their origin and figure out how they reach drinking water wells. Current thinking is that nitrates

reside in a thin layer of water at the top of the aquifer. When dry conditions cause that layer to lie within a well's perforations, then high nitrate water is pumped by that well, raising nitrate levels. The present focus of United's nitrate studies is on the collection of data, including several wells with different sampling depths. One goal of the studies will be to assess the risk of nitrate surges in dry periods. However, several years of further study will be needed to obtain final study results.

Based on historical data, it is United's assessment that under all foreseeable groundwater conditions, with the current wells and operation of the OH System, we will be able to blend water to meet our OH customers' demands without exceeding the MCL for nitrates.

16.4 Response to Groundwater Contamination

Another potential risk to the OH water supply could develop as the result of groundwater contamination. This could be created by several sources: spillage of agricultural chemicals, runoff from industrial areas, accidents involving tanker trucks of hazardous chemicals, sewage spills and the like. The District's response to such contamination would be handled on a case-by-case basis. In the case of the recent MTBE contamination in the Forebay, United's Groundwater Department staff became closely involved in oversight of the cleanup program. The two wells closest to the spillage site were tested monthly for MTBE's. Had MTBE's been detected in those wells, they would have been shut off and pumping would have been shifted to wells farther away from the spill; more frequent sampling would also have been undertaken. It is possible that the deep aquifer wells, not as susceptible to surface water contamination, would be pumped to reduce pumping from the remaining shallow wells. Fortunately, the OH System has reserve well capacity to allow shifting of pumping to other wells. However, severe contamination, especially during a high nitrate period, could conceivably result in a reduced pumping capacity that would not meet demands.

The District has prepared a Source Water Assessment of potential sources of contamination of its groundwater supply. That assessment is available for public review at the District's offices.

16.5 Response to Upstream Sewage Spills

The OH wells are located immediately adjacent to recharge ponds in El Rio. The surface water recharged there is subject to contamination by upstream sewage treatment plants. Such contamination could overwhelm the natural filtration and disinfection process, reducing the safety of the OH water for potable uses. Fortunately, it takes several days for water diverted at the Freeman diversion to reach the El Rio spreading grounds. Several times during the last decade, there have been sewage spills into the Santa Clara River. Most of those have been small, and their effects were not measurable at the Freeman diversion. However, one untreated wastewater spill from the Santa Paula wastewater plant caused a high spike in coliform levels at the Freeman diversion.

In almost every case, we have received timely notice from one or more agencies of such spills. The Santa Paula wastewater plant operators, the County Environmental Health

Division, the Ventura County Office of Emergency Services, and others are aware of our recharge operation and call us in the event of any spills or emergencies. When we receive such a notification, our normal practice is to stop recharging water at the El Rio spreading grounds. We do that even for minor events, in case the initial assessment of the extent of the spill turns out to be wrong – it is better to err on the safe side. After significant events, we begin monitoring coliform levels at the Freeman diversion and in the desilting basin. Once we have confirmed that levels of coliform have returned to ambient levels, then we can resume recharge operations at El Rio.

The water diverted from the Santa Clara River is raw surface water, and has natural levels of coliform in it. Our desilting basin can effectively restore coliform to ambient levels at low flows. Nevertheless, sewage contamination of river water is a potential problem that is important, and is closely monitored by District staff.

16.6 Upstream Petroleum Spills

There is considerable crude oil production and transportation in the Santa Clara River watershed. From time to time there have been oil spills that reached the river. There have been several such incidents over the last decade, including a major pipeline break after the Northridge earthquake, and an oil truck that crashed into Santa Paula Creek. We have usually received good advance notification of such incidents. We have even received calls from concerned citizens who observed oil in the water before we received any official notifications. Oil spills are easy to see and they receive a good deal of press and public attention.

Our usual practice is to stop diverting water altogether after we receive word of an oil spill. We also take samples of the water in the river, at the diversion. However, we usually do not measure any detectable levels of hydrocarbons, even when we see oil floating on the surface, due to the large amount of dilution that take place. Unlike sewage spills, which are harder to detect, we can easily see oil floating on the river water after an oil spill. Once we have determined the real extent of the spill, and after the oil sheen has returned to ambient levels, we resume water diversions. The desilting basin also provides some detention time to help any crude oil decompose, or be digested by microorganisms.

As a point of reference, there are natural oil seeps in the watershed, and even under the best of circumstances one can observe occasional swirls of oil on the surface of the river water. These natural seeps can be observed along Highway 150 near St. Thomas Aquinas College, and in Sespe Creek near the confluence with Tar Creek. In Sespe Creek, one can even observe trout living in deep pools of clear water that has an oil sheen on top. After one storm that caused flash floods near sulfur mountain, we found gobs of tar in our fish ladder. The presence of crude oil in the watershed is a natural phenomenon.

16.7 Short-Term Power Outages

The OH System is well protected against short-term power outages, lasting under 12 hours. When power is lost to the OH wellfield, the wells stop pumping into the clearwells. Fortunately, the two 8.4 MG reservoirs (clearwells) provide nearly one day's storage under average demand conditions. Thus the wellfield can be out of service for a while before the system runs out of water.

When power is lost to the OH electric booster pumps, the natural gas-driven booster pumps start automatically, and take over the pumping within a minute or so. The

pressure in delivered water drops for a few seconds, and then recovers to a slightly lower level. For control reasons, the gas-driven pumps maintain a pressure of 40 psi at the OH plant, lower than the normal 60 psi maintained by the electric booster pumps. When power comes back on, the electric pumps resume pumping, and the normal 60 psi is resumed. When that happens, the control system slows down the natural-gas engines, and they idle until the operator arrives to shut them down manually.

To maintain power to our facilities during brief power outages there are several standby diesel generators at the OH plant:

1) A standby generator next to the gas-driven booster plant, which drives the SCADA system and much of the plant (but not the booster pumps).

2) A standby generator within the chlorine building which operates the disinfection facilities during power outages.

3) A standby generator near the shop building that operates the metering and post-chlorination detectors during power outages.

4) The SCADA system floats off of batteries, which power inverters. When power is lost, the SCADA system continues to function off the batteries with all of its control and data capabilities intact. During the outage, the battery charger continues to be powered by the standby generator.

All of these components have been tested many times during brief power outages. We are able to routinely deliver water to OH customers during power outages.

16.8 Natural Gas Outages

The standby gas-driven booster pumps depend on the supply of natural gas. If an emergency were to occur that resulted in the loss of natural gas alone, the OH supply would not be affected, because pumping would continue via electric power.

If an emergency caused loss of both natural gas and electric power, the OH booster pumps would not work. It would not be possible to deliver water to OH customers at a pressure of 60 psi. Fortunately, it is possible to deliver water to our customers by gravity

from the clearwells. That was how the system was operated before 1967 – water flowed by gravity into the OH pipeline to the customers, who are at a lower elevation than the plant. The booster plant was built in 1967 because Oxnard wanted to be able to blend OH water with higher pressure water from Calleguas MWD without repumping. During the construction of the 1997 El Rio Improvements, a 24-inch bypass pipe and valve was constructed between the clearwell manifold and the booster pump discharge pipes. When pressure in the OH line drops below a certain point, a "fail-open" valve automatically opens to allow water to flow from the clearwells into the OH pipeline. The maximum amount of water that can flow by gravity is limited to around 25 CFS. But that will meet the most important water needs of the OH customers. Under low pressure conditions, less water will be used by the customers. (Less water comes out of a tap at low pressure.)

Under gravity flow conditions, the two schools in El Rio will not receive water at adequate pressure for domestic purposes. Without an alternate supply of water, the schools would need to be closed for the day. The supply to Vineyard Avenue Estates would also be at low pressure, but they have the ability to repump from their tank to attain adequate pressure. Both of these customers were added to the OH System in the 1990s, and neither had been previously served by gravity flow.

Natural gas outages are rare. Unlike electric outages, we have never experienced a loss of natural gas. Even after the 1994 Northridge earthquake, when electric power was out for 10 hours, water lines broke, and phone lines were down; there was plenty of natural gas.

16.9 Long-term Power Outage

A long-term power outage could be caused by a severe earthquake, sabotage, or major equipment failure in the power grid. An example is the major east coast power failure of 2003, precipitated by cascading failures in the interconnected power supply. With California power lines passing over many earthquake faults, and a single western power grid between Canada and Mexico, such a power failure is not out of the question in our area. After the 1994 Northridge earthquake, local power was out for about 10 hours. Deregulation of the power industry has also reduced the numbers of crews available to make emergency repairs, which could delay resumption of power after any large scale emergency.

The OH System has a 750 KW diesel-powered generator for the OH wellfield. The generator is supplied by an 8,000 gallon diesel tank, which has enough fuel to last three days, more with rationing. The generator is able to supply temporary power only to the OH shallow water wells. It has enough power to run 6 or 7 of the OH wells at one time. This would allow a continued water supply to OH customers at a somewhat reduced flow.

The 750 KW gen-set does not come on automatically after major outages. Instead, operations staff must start the generator manually. As discussed above, OH water will continue to be delivered automatically after any power outage. However, the clearwells will eventually run out of water after 12 to 24 hours. A decision to start the generator

would be made if there are indications that the power will be off for some time. Such indications could come from SCE, press reports, a lack of good reports, or a sense that an emergency is severe enough that power is unlikely to be restored soon.

The 750 KW generator will deliver water into the clearwells, to keep them full. If natural gas is available (or power is available at the electric booster pumps), then water would be pumped from the clearwells into the OH pipeline at pressure. If natural gas is not available, then the water would flow by gravity from the clearwells into the OH line. Under the worst case scenario, United could deliver water at a lower-than-normal pressure to our OH customers as follows: wells powered by the 750 KW generator would pump water into the clearwell, which feeds the OH line by gravity, while disinfection is powered by another standby generator.

Therefore, under the worst-case power-loss scenario, United should be able to continue water deliveries to OH customers.

16.10 Major Equipment Failure

The OH water supply could be interrupted for any one of the following reasons:

1) Microbial contamination Should positive coliforms be detected in violation of the Coliform Rule, we may have to issue a boil order notice to the public and/or the retail customers, depending on the nature of the event and on recommendation by the Department of Health Services.

2) Major Pipeline Failure The OH pipeline is a single line, with no loops. If it fails catastrophically, the OH supply would be interrupted to any customers downstream of any isolation valve, until repairs could be made. There are not many isolation valves in the pipeline, so a break in a critical spot could interrupt the supply to all customers.

3) Failure of the Clearwells If both clearwells were to fail, it would not be possible to deliver disinfected water from the shallow wells, since contact time is provided by the clearwells. However, it may be possible to continue delivering water to those OH customers who have no other source of supply. Oxnard, PHWA and the Ocean View pipeline would be shut off from the OH supply. Wells 11, 12, and 13, which are not under the influence of surface water, would be operated through the small settling basin. The post chlorination location would become the sole chlorine injection point. Ammonia injection would be discontinued, because of the difficulty of maintaining the right mixture. Then water could be delivered to the smaller OH customers. The settling basin does not have an overflow. So the trick will be to keep the water in the settling basin at the right level, without overtopping the basin. The booster pumps would be shut off, and water would be delivered by gravity.

4) Disinfection Building Failure In the event of a fire or major damage to our disinfection building, we would not be able to disinfect the OH supply. We would

immediately stop pumping from the OH wells, to preserve any disinfected water already in the clearwells. We would then shut off all customers who have other sources of water, including the Ocean View pipeline. We would then remove the skid-mounted hypochlorite disinfection unit from the PTP system. (The farmers can do without chlorination of their irrigation supply for a while.) The skid unit would be installed at the El Rio plant and rigged to pump into the OH system, with large amounts of flushing water. We could then chlorinate a limited amount of water for use by those OH customers who do not have other sources of supply. Contact time can be obtained in the pipeline at low flows. Once this temporary system is working, we could then open the Ocean View pipeline, after we have notified the OVMWD customers that water use there must be limited to domestic purposes. This temporary setup could be operated indefinitely, until repairs could be made to the disinfection facility. However, the disinfected water would be chlorinated, but not chloraminated.

5) SCADA System Failure If the SCADA system, including some major instrumentation components, fails completely for some reason, it could disrupt our ability to deliver water. Once an assessment of the problem is made, adjustments could be made to our operation to continue serving water. For example, wells could be turned on and off manually, chlorine dosage rates could be set manually, and the booster pump VFD's can be set to deliver water at a range of pressures. Staff would be placed on 24-hour shifts to continually operate the system. We could draw operators from other locations (Saticoy) to help keep the system running at all hours. We expect to be able to deliver water in the event of a control system failure.

16.11 Fifty Percent Reduction In Supply

Our two largest OH customers have other sources of water. Oxnard receives water from Calleguas MWD and City wells, and PHWA receives water from Calleguas. In the event of a fifty percent reduction in supply, United would ask those two customers to take additional water from Calleguas. Oxnard could also pump their own wells. In a real, long-term emergency it may be possible, with approval of the GMA, to transfer some OH credits to Oxnard so that they could pump their own wells. Calleguas MWD also has GMA credits, and a transfer of those credits could be considered in any unexpected County-wide emergency.

The other OH customers, including the four mutual water companies and the schools, do not have other reliable sources of water. In a water shortage emergency, preference would be given to providing OH water to such customers.

In the event that temporary or long-term reductions in water deliveries are required for the OH delivery system, usage updates would be provided to our customers more frequently than they are under normal operating conditions. Flow meters exist at all delivery points along the pipeline, and under normal conditions these meters are read and recorded on a monthly basis. If reductions in water deliveries are required, meters could be read more frequently and promptly reported to the water user. This frequent reporting

of water usage, likely on a weekly basis, will assist water retailers in budgeting their reduced supply for the OH system. The frequent reading and reporting of existing meters will serve as an effective means of determining actual reductions in water usage.

16.12 Interruption of Water Supplies

The OH water supply could be interrupted for any of the following reasons:

1) Major equipment failure
2) Severe earthquake
3) Sabotage
4) Acts of war

In the event of such an interruption, we may shut off the OH water supply to Oxnard, PHWA, and Ocean View MWD. We would notify our remaining customers to conserve water as much as possible. We would then try to make the water remaining in the clearwell last as long as possible.

In such an emergency, United would likely retain the ability to pump water out of its wells, using its 750 KW generator. We would be able to fill water trucks, water buffaloes, and the like at the plant. We would allow the public and other agencies to refill water containers there. Temporary connections would be made to hydrants etc. to allow that to happen. Access to our water would be provided along Rose Avenue, where there is easy access. We prepared for a similar scenario as part of our "Y2K" readiness program.

17.0 Mandatory water use prohibitions

As a water wholesaler, United has no direct relationship with retail water customers. Our two largest customers, Port Hueneme Water Agency and the City of Oxnard, sell water retail and have their own water conservation measures, including water use prohibitions. During a 10%-50% water shortage, such prohibitions can include using potable water for street washing, filling of decorative fountains, car washing or filling or refilling pools. Financial penalties are outlined in our customers' respective UWMPs. United does not expect to receive any revenue or expenditure impacts from these measures, as we supply water by contract.

18.0 Vulnerability Assessment

In 2003, United Water received an EPA grant to prepare a Vulnerability Assessment of its water supply. A consultant was hired to prepare the VA. The VA focused on various types of threats including terrorist attacks and sabotage. Various weaknesses were investigated and steps were designed to reduce the risk of damage to the OH water supply and injuries to customers. Many of the recommendations in the VA were put into effect.

In accordance with the VA, United staff are trained in how to respond to potential attacks. Because of the sensitive nature of the VA, it is not made available to the general public.

19.0 Reclaimed Water Supply

Several sources of reclaimed wastewater are available in United's service area. Some of that reclaimed water is already being put to beneficial use, either directly or indirectly. United does not operate any wastewater recycling facilities, but many water agencies within our service area do. Wastewater from these facilities eventually finds its way into our system, either directly through groundwater recharge or indirectly through stream discharges. Since we do not directly control these sources of recycled wastewater, we do not engage in any activities to encourage recycled water use. However, these sources contribute to the water supply through the initiative of the agencies which control them. The sources of recycled water are summarized below:

1) Los Angeles County There are two wastewater treatment plants in Los Angeles County that discharge tertiary treated wastewater into the Santa Clara River, upstream from United's service area. A total of over 30 CFS is discharged at present. Due to growth in Los Angeles County, that flow is increasing over time. During most of the year, this reclaimed water flows down the Santa Clara River and percolates into the Piru groundwater basin, where it blends with local groundwater and is repumped, or it migrates underground toward the Fillmore basin. In wetter periods, when the Santa Clara River is flowing well, the wastewater blends with surface water and contributes to the surface water supply. Some of that water is diverted at the Freeman diversion. Fortunately, in such wet periods, a great deal of blending with natural storm water occurs. Only in very wet periods, when flows at the Freeman diversion exceed 375 CFS, does that reclaimed water flow to the ocean. That happens about four weeks a year on average. Thus, little of the reclaimed water produced in Los Angeles County goes to waste, and is used indirectly, after mixing with other water sources and being filtered underground.

2) Fillmore and Piru Wastewater Treatment Plants The Fillmore wastewater treatment plant and the Piru wastewater treatment plant both discharge treated wastewater into percolation ponds. That water recharges the Fillmore and Piru groundwater basins, and is beneficially used via well pumping, after mixing with local groundwater supplies and being filtered underground.

3) Santa Paula Wastewater Treatment Plant The Santa Paula wastewater treatment plant is located about two miles upstream of the Freeman diversion. It discharges about 2 MGD of secondary effluent into the Santa Clara River. Most of the water discharged from the plant blends with other water and is diverted at the Freeman diversion, and used for groundwater recharge. River water is also distributed to growers for agricultural irrigation. During low flow periods, when a greater percentage of the surface water is wastewater, most of that water is delivered to farmers. The Santa Paula wastewater plant has occasionally suffered

spills that have halted United's diversions. The City of Santa Paula is currently designing an upgrade to the plant. The City may eventually use some of their reclaimed water for irrigation purposes. When that happens, the wastewater will continue to contribute to the local water supply.

4) Saticoy Sanitary District Saticoy Sanitary District operates a wastewater plant about two miles downstream of the Freeman diversion. They percolate about 130 AF/Yr of wastewater into percolation ponds north of the Santa Clara River. That water recharges the Oxnard Forebay, and indirectly contributes to the water supply for the OH system. Although that reclaimed water is unlikely to migrate towards the OH wellfield, it supplies other pumpers that draw from the Forebay.

5) City of Oxnard The City of Oxnard operates a wastewater plant that discharges some 20,000 AF/Yr of secondary effluent into the ocean. That represents a significant water resource that could benefit the Oxnard plain. The City of Oxnard has investigated the beneficial use of that wastewater through further treatment, which would allow it to be used for agricultural irrigation and even direct groundwater recharge. Use of the City's reclaimed water is part of the City's GREAT program, described above, which is in the early stages of implementation. The GREAT program is expected to provide 1,275 AFY of recycled water treated to tertiary standards for M&I use by 2010, as well as 6,050 AFY for use by agricultural customers. This amount is expected to grow to 17,500 AFY by 2030. This water could be delivered directly to agricultural customers, used as part of a seawater intrusion barrier or injected directly into groundwater wells. The GREAT program will encourage use of recycled water by pricing it well below the price of non-recycled water, making more water available for groundwater recharge. United will participate in several stages of that program, in partnership with Oxnard. Thus, reclaimed water will become an important part of the water supply picture on the Oxnard plain.

6) The City of Ventura The City of Ventura operates a wastewater plant that discharges into the Santa Clara River estuary, from where it flows into the ocean. The city is required by permit to discharge at least 5.6 MGD into the estuary, to maintain habitat there. Wastewater flows above 5.6 MGD are pumped and used for irrigation purposes at the River Ridge Golf Course, the Olivas Park Golf Course, and other locations. In peak demand summer months, there is little unused reclaimed water from this plant. Therefore, there is only a limited potential to increase reclaimed water use from this source.

7) Conejo Creek Project At the Conejo Creek diversion on Conejo Creek just south of the Ventura Freeway, water from the creek is pumped to irrigation customers, including Pleasant Valley County Water District on the eastern Oxnard plain. PVCWD pumps its own groundwater from the Oxnard plain aquifers and also receives river water from United Water. Thus, any Conejo Creek water received by PVCWD reduces their use of surface and groundwater. This increases the amount of water available to others. Part of the water in Conejo Creek comes

from the Hill Canyon Wastewater Treatment Plant, operated by the City of Thousand Oaks. Thus, the Conejo Creek project is partly a reclaimed water project.

Table 19-1: Wastewater collection and treatment (AFY)

	2000	2005	2010	2015	2020	2025	2030
Wastewater collected and treated in service area	41,633	41,780	54,623	59,887	59,352	52,833	48,133
Volume that meets recycled standards	0	0	6,775	13,550	17,500	17,500	17,500

Table 19-2: Disposal of wastewater (non-recycled) AFY

Method of Disposal	Treatment Level	2000	2005	2010	2015	2020	2025	2030
Percolation-Evaporation Ponds	Secondary	1,230	1,377	1,545	1,734	1,949	1,949	1,949
Stream Discharges	Secondary	40,403	40,403	53,078	58,153	57,403	52,703	48,003

Table 19-3: Recycled Water Uses – Actual and Potential (AFY)

	Treatment Level	2005	2010	2015	2020	2025	2030
Wildlife Habitat	Tertiary	7,463	7,463	7,463	7,463	7,463	7,463
Groundwater Recharge	Secondary	34,187	43,643	45,519	43,009	36,490	31,790
Agriculture	Tertiary	0	3,388	6,775	8,750	8,750	8,750

Note: United did not create a 2000 UWMP and so does not have any projection of recycled water use for 2005 to compare to the actual 2005 level.

21.0 Adoption of the Urban Water Management Plan

A hearing for the Urban Water Management Plan was held on January 12, 2005, at United's regular board meeting in Santa Paula. The hearing consisted of a brief presentation on the plan, and response to questions from the public and other agencies.

After the hearing, copies of the draft UWMP were sent to the following agencies for review and comment:

City of Oxnard
Port Hueneme Water Agency
Calleguas MWD
City of Ventura
Fox Canyon GMA/County of Ventura
Vineyard Avenue Estates
Dempsey Road Mutual Water Company
Cypress Mutual Water Company
Saviers Road Mutual Water Company
Ocean View MWD
El Rio School District
Pleasant Valley County Water District
Frank B and Associates

In addition to city and county agencies, we value the input of social, cultural and economic community groups in our service area and encourage them to comment on this and any future UWMP.

The final 2005 UWMP was adopted by the Board of directors on February 9, 2005. The 2005 UWMP is available for public review at United's Santa Paula office.

Appendix A

GMA Groundwater Management Plan

Appendix B

2003 Consumer Confidence Report

Appendix C

SWRCB Grant Conditions for Operating the Forebay

Appendix D

Supplemental M&I Water Program

Appendix E

Adoption of UWMP
Minutes of the February 9, 2005 Board Meeting

Board of Directors
Sheldon G. Berger, President
Roger Orr, Vice President
Bruce Dandy, Secretary/Treasurer
Robert Eranio
Lynn Maulhardt
Daniel C. Naumann
F.W. Richardson

Legal Counsel
Philip C. Drescher

General Manager
Dana L. Wisehart

UNITED WATER CONSERVATION DISTRICT
"Conserving Water Since 1927"

MINUTES
REGULAR BOARD MEETING

February 9, 2005, 1:00 P.M.
UWCD Board Room, 106 North 8th Street, Santa Paula, California

Directors Present:

Sheldon Berger, President, Division 7
Roger Orr, Vice President, Division 2
Bruce Dandy, Secretary/Treasurer, Division 5
Robert Eranio, Division 3
Lynn Maulhardt, Division 4
Dan Naumann, Division 6
F.W. Richardson, Division 1

Directors Absent:

None

Staff Present:

Dana Wisehart, General Manager
Philip Drescher, Legal Counsel
Michelle Kinnun, Administrative Secretary
Ann Katz, Executive Coordinator, Clerk of the Board
Steve Bachman, Groundwater Resources Manager
John Dickenson, Engineering Manager
Jim Kentosh, Operations & Maintenance Manager
Mike Solomon, Chief Financial Officer
Doug West, Park & Recreation Services Manager
Tony Blankenship, Operations Superintendent
Craig Morgan, Associate Civil Engineer
Jim Grisham, Senior Engineer

Visitors Present:

Frank Brommenschenkel, Frank B. & Associates
Anthony Emmert, City of Oxnard
Mike Miller, PVCWD

1. FIRST OPEN SESSION 12:00 P.M.

Items to be discussed in Executive (Closed) Session were announced.

1.1 Public Comments - No comments.

1.2 EXECUTIVE (CLOSED) SESSION 12:05 P.M.

The board discussed matters outlined on the agenda's attached Exhibit A.

2. SECOND OPEN SESSION 1:00 P.M.

Called to order by Chairman Berger.

2.1 Pledge of Allegiance

2.2 Open Forum – No public comments.

2.3 Approval of Agenda - Motion to approve agenda, Naumann; Second, Richardson. Agenda approved unanimously.

2.4 Approval of Minutes - The board reviewed the minutes of the regular board meeting of January 12, 2005 and the special emergency board meeting of January 19, 2005. Motion to approve minutes of January 12, 2005, Richardson; Second, Dandy. Motion to approve minutes of January 19, 2005, Richardson; Second, Orr. Minutes approved unanimously.

2.5 Oral Report Regarding Executive (Closed) Session – Philip Drescher

The board discussed the following in executive session; three matters involving potential litigation, two matters involving real property negotiations.

2.6 Board Communication - No discussion.

3. ADMINISTRATIVE MATTERS – Dana Wisehart

3.1 Oral Report on Staff Calendar, Activities and Administrative Monthly Report - Dana Wisehart reported on upcoming water events and issues discussed at the previous month's committee meetings.

3.2 Resolution No. 2005-01 - Pre-Tax Payroll Deduction Plan for CalPERS Service Credit Purchases

Motion Motion to approve, Maulhardt; Second, Dandy. Roll call vote: 7 ayes (Berger, Dandy, Eranio, Maulhardt, Naumann, Orr, Richardson); 0 nays; 0 absent. Motion approved unanimously.

3.3 Public Hearing - Proposal of Ordinance No. 9 to Increase the Compensation of the Board of Directors

Motion Public comment was requested. No public comments. Compensation would increase from $121.50 to $127.50 per day, according to the recommendation of the finance committee. Hearing script attached. Ordinance

No. 9 was introduced by Director Naumann. Motion to approve, Naumann; Second, Maulhardt. Roll call vote: 7 ayes (Berger, Dandy, Eranio, Maulhardt, Naumann, Orr, Richardson); 0 nays; 0 absent. Motion approved unanimously.

4. WATER CONSERVATION & LEGISLATIVE MATTERS – Staff

4.1 Monthly Water Conservation Report – Michelle Kinnun
A summary of current water conservation activities was presented.

4.2 Monthly Legislative Report & Reading File – Ann Katz
An update on federal and state legislation/governmental affairs, and legislative news of interest to the district was presented.

5. ENGINEERING DEPARTMENT – John Dickenson

5.1 Monthly Report – It was reported that the results of the upcoming Santa Felicia Dam Probable Maximum Flood Study will be important for future projects that may be funded by bond funds, such as repairs and upgrades to Santa Felicia Dam spillway.

5.2 Report on Flood Restoration Activities - Craig Morgan reported on damages and recommended repairs to the riprap at the Freeman diversion. Jim Grisham discussed bridge, levee and picnic area damages and recommended repairs in the Lake Piru area. Tony Blankenship discussed damage and recommended repairs to the Santa Felicia Dam outlet channel. A diver was scheduled to inspect the intake facility at the dam prior to opening the cone valves. PowerPoint slides attached.

5.3 Santa Felicia Dam / FERC Relicensing / Consulting Fees for Completion of "Exhibit E." Not to exceed $64,000. Unbudgeted.
Motion The finance committee recommended approval. Motion to approve, Naumann; Second, Maulhardt. Roll call vote: 7 ayes (Berger, Dandy, Eranio, Maulhardt, Naumann, Orr, Richardson); 0 nays; 0 absent. Motion approved unanimously.

5.4 Authorize Emergency Expenditure for Santa Felicia Dam / Lake Piru Debris Removal. Not to exceed $175,000.
Motion Doug West reported that bids from other debris removal contractors had exceeded $500,000. PowerPoint slide attached. Motion to approve, Naumann; Second, Richardson. Roll call vote: 7 ayes (Berger,

Dandy, Eranio, Maulhardt, Naumann, Orr, Richardson); 0 nays; 0 absent. Motion approved unanimously.

6. GROUNDWATER DEPARTMENT – Steve Bachman

6.1 Monthly Report – The Fillmore basin is full and may be at a record high level since 1950. The Piru basin recently had 1600 acre feet of available storage, and may be close to full now. Water levels in the forebay are up significantly – approximately 40 feet near the district's Saticoy spreading grounds. The Regional Board recently rolled out its agricultural waiver program, but it still needs final approval. A Santa Paula Technical Advisory Committee meeting was scheduled to discuss groundwater and surface water issues relative to the wastewater treatment plant, water assessments, and the Fagan Canyon housing development.

Note: *At approximately 2:30 p.m., Chairman Berger excused himself from the meeting and Vice-Chairman Orr presided over the remainder of the meeting.*

7. OPERATIONS & MAINTENANCE DEPARTMENT – Tony Blankenship

7.1 Monthly Report - It was reported that the fish ladder was running and there were high flows in the Santa Clara River and over the spillway at Santa Felicia Dam.

8. RESOURCE PLANNING – James M. Kentosh

8.1 Monthly Report - United is working with Calleguas MWD on a joint water resources master plan. The district has received a preliminary report from Brown & Caldwell on the Freeman Expansion Project.

8.2 Adoption of an Urban Water Management Plan
Motion Motion to approve, Naumann; Second, Richardson. Roll call vote: 6 ayes (Dandy, Eranio, Maulhardt, Naumann, Orr, Richardson); 0 nays; 1 absent (Berger). Motion approved unanimously.

9. PARK & RECREATION DEPARTMENT – Doug West

9.1 Monthly Report - The recreation area at Lake Piru was reopened to the public on Saturday February 5th, after being closed due to damages and road closures caused by recent rain storms.

10. FINANCE DEPARTMENT – Mike Solomon

10.1 Monthly Report - The report was presented. No discussion.

10.2 Monthly Investment Report - The December investment report was presented. No discussion.

10.3 FY 2004-05 Second Quarter Financial Report – The report was presented. No discussion.

10.4 Proposed Revisions to District's Investment Policy
Motion The finance committee recommended approval. The revisions will give the district greater flexibility. Motion to approve, Naumann; Second, Dandy. Roll call vote: 6 ayes (Dandy, Eranio, Maulhardt, Naumann, Orr, Richardson); 0 nays; 1 absent (Berger). Motion approved unanimously.

11. PENDING LEGAL CLAIMS – Philip Drescher
No new claims. No discussion.

12. ADJOURNMENT 2:45 P.M.
To the next regular board meeting on March 9, 2005 or call of the chair.

ATTEST: _____
Bruce E. Dandy, Secretary/Treasurer