



SANTA FE IRRIGATION DISTRICT

RECYCLED WATER MASTER PLAN

August 29, 2005

SUBMITTED BY:
DUDEK & ASSOCIATES, INC.



ACKNOWLEDGEMENT

This Recycled Water Master Plan is a result of the combined efforts of the Santa Fe Irrigation District Staff and Dudek and Associates, Inc., with the support and authorization of the Santa Fe Irrigation District Board of Directors. This partnership has resulted in a comprehensive plan for future recycled water system development as a key element of the District's overall water supply strategy.

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ABBREVIATIONS

AAD	average annual demand
ABPP	alternative backflow prevention plan
afy	acre-feet per year
APN	assessors parcel number
BMP	Best management practices
CDFG	California Department of Fish and Game
CSD	community service district
DHS	Department of Health Services
Dudek	Dudek and Associates, Inc.
EDR	electro-dialysis reversal
EID	El Dorado Irrigation District
EPA	Environmental Protection Agency
GIS	geographic information system
gpd	gallons per day
HA	Hydrologic Area
HAARF	Hale Avenue Resource Recovery Facility
HOA	homeowners association
LSF	Lomas Santa Fe
LSFBPS	Lomas Santa Fe Booster Pump Station
LSFR	Lomas Santa Fe Reservoir
MGD	million gallons per day
mg/l	milligrams per liter (<i>also expressed as parts per million</i>)
MPN	median most probable number of total coliform bacteria
msl	mean seal level
MWD	Metropolitan Water District
NCWRP	North City Water Reclamation Plant
OMWD	Olivenhain Municipal Water District
OWD	Otay Water District
OWR	Office of Water Recycling
RO	reverse osmosis
RP	reduced pressure
RSF	Rancho Santa Fe
RSFWTP	Rancho Santa Fe Wastewater Treatment Plant
RW	recycled water
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SDCWA	San Diego County Water Authority
SDWD	San Dieguito Water District
SEJPA	San Elijo Joint Powers Authority
SFID	Santa Fe Irrigation District
SFR	Single family residence
TDS	total dissolved solids
USGS	United States Geographical Survey
VFD	variable frequency drive
WFP	water filtration plant
WRF	water recycling funding
WPCF	water pollution control facility
WTP	water or wastewater treatment plant



ES EXECUTIVE SUMMARY

ES.1 BACKGROUND

This Recycled Water Master Plan was commissioned to develop a strategic framework for expanding the distribution of recycled water and was partially funded by a Proposition 13 grant in conjunction with the San Diego County Water Authority. Santa Fe Irrigation District (SFID) is the purveyor of both potable water and recycled water to customers within the community of Rancho Santa Fe, the City of Solana Beach and a portion of Fairbanks Ranch. About 70% of the potable water demands for SFID are met with imported water, with the remaining 30% coming from the local water supply. SFID recycled water demands, which currently total approximately 500 afy, are supplied from the San Elijo Joint Powers Authority (SEJPA). SEJPA owns and operates a recycled water treatment facility and distribution system that serves customers in Solana Beach, plus additional customers in other water districts. SFID has set a goal of supplying the Rancho Santa Fe (RSF) golf course with recycled water and meeting ten percent of its total water demand, or 1,300 afy, with recycled water. This will require an additional source of recycled water. The SFID Recycled Water Master Plan is a comprehensive effort to identify potential recycled water customers, evaluate recycled water supply sources, and develop distribution system alternatives to achieve the recycled water goal.

ES.2 MARKET ASSESSMENT

A primary objective of this master planning effort is to identify potential recycled water markets. Potential recycled water customers were identified using various investigative methods and demand projections were made for each potential recycled water customer. The Rancho Santa Fe (RSF) Golf Course is SFID's largest potable water customer, with water demands averaging approximately 320 afy over the past five years. With the exception of the RSF Golf Course, the potential recycled water markets are primarily individual homeowners with residential or agriculture meters.

Residential and commercial customers with demands of 10 afy or more and irrigation and agriculture meters with demands of at least 5 afy were considered to be potential recycled water customers. The total potential recycled water demand is estimated at 2,037 afy. Only the larger concentrations of major customers will ultimately be supplied with recycled water, as it would be prohibitively expensive to design a recycled water system to serve all the identified potential users. Based on existing recycled water demands of approximately 500 afy, approximately 800 afy of additional recycled water demand, or 40 percent of the potential demand identified, is required to meet the District's recycled water goal of 1,300 afy.

ES.3 POTENTIAL RECYCLED WATER SOURCES

Expansion of supply from the SEJPA and additional sources of recycled water from the City of San Diego North City Water Reclamation Plant (NCWRP) and local Community Service Districts (CSDs) were evaluated with respect to water quality and the quantity of recycled water that could be produced and delivered. In determining the acceptability of recycled water for landscape irrigation



purposes, a TDS concentration of 1,000 mg/L, which is the threshold in many municipal recycled water programs, was considered to be the maximum acceptable level. It is estimated that the SEJPA could supply an additional 400 afy to either customers in Solana Beach (from an expansion of the existing distribution system) or to RSF from a new distribution system. The City of San Diego is aggressively pursuing customers in an effort to meet their reuse goal, and there is excess capacity in their distribution system to supply SFID. It is estimated that the NCWRP could potentially supply up to 800 afy of recycled water demand. Three local CSDs, the RSF CSD, Fairbanks Ranch CSD and Whispering Palms CSD, have cooperative arrangements that allow each agency to share operations staff and equipment. Although none of the CSD facilities are currently producing recycled water, previous studies have investigated the construction of advanced treatment facilities, which could be constructed at one or more of the treatment plants and supply up to 350 afy of recycled water demand. Partial demineralization would be required for CSD effluent to meet SFID recycled water quality objectives.

ES.4 RECYCLED WATER SUPPLY OPTIONS

Recycled water distribution system alternatives were developed to meet the SFID recycled water goal using combinations of recycled water supply sources. Facilities were sized based on hydraulic computer simulations. All proposed distribution systems included a storage reservoir and pump station located at the RSF Golf Course. The distribution system alternatives were reduced to four final options, and life cycle cost estimates were prepared for each option, as shown in Table ES-1.

Table ES-1
RECYCLED WATER SUPPLY OPTIONS

Option No.	Recycled Water Supply Source	Projected Demand Served	Opinion of Probable Costs				Phase I Project Cost to supply RSF Golf Course
			Construction Estimate	Capital Project Cost ⁽¹⁾	Annual O&M Cost	Total Life Cycle Cost ⁽²⁾	
A	SEJPA to Solana Beach	90 AFY ⁽³⁾	\$477,000	\$744,000	\$11,493/yr	\$16,626,000	\$11,589,000
	City of San Diego to RSF	710 AFY	\$9,352,000	\$14,589,000	\$82,423/yr		
	TOTALS	800 AFY	\$9,829,000	\$15,333,000	\$93,916/yr		
B	SEJPA to Solana Beach	375 AFY	\$5,227,000	\$8,154,000	\$78,200/yr	\$17,928,000	\$7,622,000
	Local CSDs to RSF	321 AFY	\$4,946,000	\$7,716,000	\$71,300/yr		
	TOTALS	696 AFY	\$10,173,000	\$15,870,000	\$149,500/yr		
C	SEJPA to Solana Beach	90 AFY ⁽³⁾	\$477,000	\$744,000	\$11,493/yr	\$18,672,000	\$11,298,000
	City of San Diego to RSF GC	310 AFY	\$7,282,000	\$11,360,000	\$45,823/yr		
	Local CSDs to RSF	400 AFY	\$2,904,000	\$4,530,000	\$90,735/yr		
	TOTALS	800 AFY	\$10,663,000	\$16,634,000	\$148,051/yr		
D	SEJPA to Solana Beach	90 AFY	\$477,000	\$744,000	\$11,493/yr	\$16,593,000	\$7,867,000
	SEJPA to RSF Golf Course	311 AFY	\$5,063,000	\$7,898,000	\$71,833/yr		
	Local CSDs to RSF	342 AFY	\$3,716,000	\$5,797,000	\$73,190/yr		
	TOTALS	743 AFY	\$9,256,000	\$14,439,000	\$156,515/yr		

(1) Capital project costs are based on estimated construction costs with a 20% construction contingency and an additional 30% for engineering, administrative, legal, environmental and permitting costs.

(2) Life Cycle Costs are calculated by adding capital project costs to the present worth of annual O&M costs, assuming an amortization of 30 years at 6%.

(3) Additional demand in Solana Beach can be supplied with this option, resulting in a total demand greater than 800 AFY.



The recycled water supply options each supply approximately 800 afy of recycled water demand to meet the SFID recycled water goal. All supply options increase demand from the existing SEJPA distribution system in Solana Beach, and have one or two additional supply sources for the RSF Golf Course and other demands within Rancho Santa Fe. Two of the options could ultimately be expanded to serve an even larger demand.

The four supply options were evaluated with respect to selection criteria established in conjunction with the SFID. The selection criteria considered were:

- Project capital costs
- O&M costs
- Project cost and schedule to supply the RSF Golf course (Phase I system)
- System expansion potential
- Degree of local control with participating agencies.

The numerical ranking applied to these criteria indicated that Option D is the preferred option, with Options A, B and C ranked 2, 3 and 4, respectively.

ES.5 PROJECT IMPLEMENTATION

SFID will need to enter into a long term agreement with the City of San Diego or other agencies, which can be a complex arrangement with political and legal ramifications. The total cost that SFID will have to pay for recycled water from any of the identified sources is unknown at this time, and could effect the selection of a preferred option. Revenues generated from the sale of recycled water will be used for operating and maintenance expenses, repayment of loans, and capital improvements. It is anticipated that the revenues generated from recycled water sales will not be sufficient to pay off the construction loans that will be required, and it is assumed that grant funding and/or other revenue sources will need to be obtained. It is recommended that a separate financial evaluation be performed on at least the top two supply options when additional cost information is available.



1.0 INTRODUCTION

This Recycled Water Master Plan was authorized by the Santa Fe Irrigation District Board of Directors and prepared by Dudek and Associates, Inc. (Dudek) in accordance with the terms of the Agreement for Professional Services dated October 20, 2004 and the revised scope of services dated April 28, 2005. The study was commissioned to develop a strategic framework for the distribution of recycled water and was partially funded by a Proposition 13 grant (Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act) in conjunction with the San Diego County Water Authority from the California State Department of Water Resources.

1.1 OVERVIEW

The Santa Fe Irrigation District (SFID) was formed in 1923 under the California Irrigation District Act. The District encompasses 15.9 square miles in northern San Diego County, extending from the coast to approximately seven miles inland. Water and related services are provided to a population of approximately 20,600 within the community of Rancho Santa Fe, the City of Solana Beach and a portion of Fairbanks Ranch. SFID is governed by a Board of Directors: one member elected from each of the five divisions within the District. Figure 1-1 illustrates the SFID service area.

Both the local and imported water sources are delivered to the R.E. Badger Filtration Plant, jointly owned and operated by the SFID and the San Dieguito Water District (SDWD).

Recycled water is currently supplied to fourteen SFID customers in the City of Solana Beach from 38 recycled water meters. Under an existing sales agreement signed in 1996, SEJPA staff operates and maintains the recycled water distribution system and SFID staff reads and maintains the water meters, and bills the recycled water customers.

A limited amount of groundwater from individual wells not connected to the potable water system is used primarily for irrigation in the eastern portions of the SFID. This water is generally of low quality, with high total dissolved solids (TDS) levels due to saltwater intrusion.

1.2 WATER REUSE GOAL

The San Diego region currently imports between 80 and 90 percent of its water from hundreds of miles away. In July 2003, the Governor's Recycled Water Task Force released a report that identifies recycled water as a significant additional source of water for the State of California. It is noted that except for the specific areas mentioned above, the potential incidental recycled water customers in Rancho Santa Fe are fairly spread out. Agriculture demands, in particular, are not concentrated in any particular area.

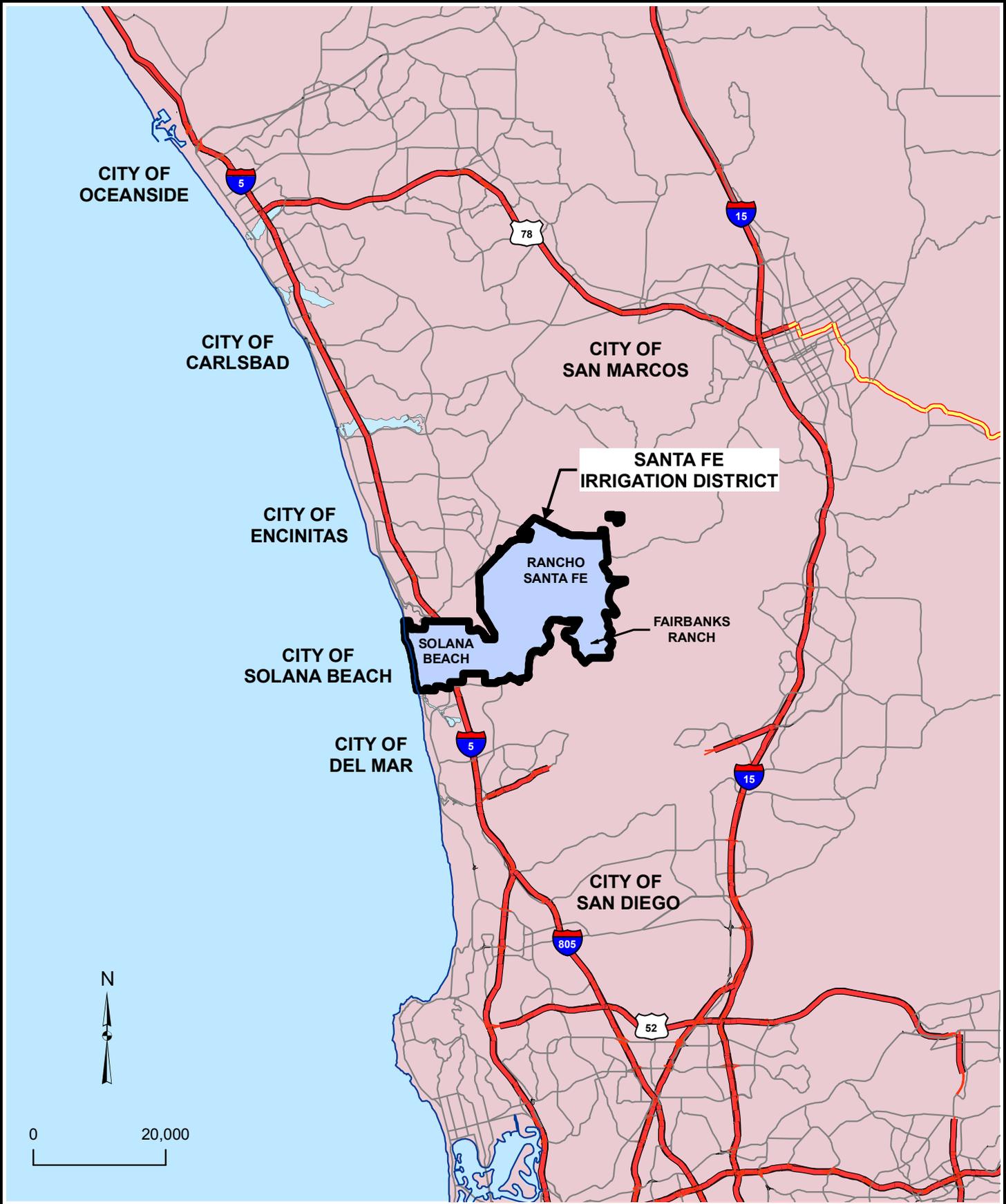


FIGURE 1-1
SANTA FE IRRIGATION DISTRICT
VICINITY MAP





Locally, the SDCWA views recycled water as an important part of the region's water portfolio, as it is a locally produced source of water that is drought resistant. In the late 1980's, SFID and the SEJPA entered into an agreement to provide recycled water to various large irrigation demands in Solana Beach. Current recycled water deliveries to SFID are approximately four percent of the District's potable water demand. The SFID Board recognizes the value of this resource, and would like to increase the use of recycled water within its service area.

The supply of recycled water to customers within its service area benefits all users within the SFID. Recycled water directly offsets potable water use and reduces the amount of water that must be imported, thereby lowering potable water costs for all users in the District. The Rancho Santa Fe Golf Course has expressed an interest in acquiring recycled water to ensure a more reliable water source. This golf course extends through the center of the community and is viewed a major community asset, providing both recreation and visual aesthetics. A single season of water rationing during a drought could have a devastating and long term impact on this resource.

SFID has set a goal of supplying the golf course with recycled water and meeting ten percent of its total water demand with recycled water. Based on an existing demand of approximately 13,400 afy, the recycled water supply goal is therefore set at approximately 1,300 afy. This is viewed as a long term goal and will require that an additional source of recycled water be identified and delivered to the SFID.

1.3 PURPOSE AND SCOPE

The SFID Recycled Water Master Plan is a comprehensive effort to evaluate and document potential recycled water supply sources and the distribution of recycled water within the SFID service area. Several previous planning studies have investigated the supply of recycled water from multiple sources to specific areas within the SFID service area. Recycled water planning efforts conducted by the SEJPA address the supply of recycled water to areas within the City of Solana Beach. Previous studies conducted by various wastewater agencies have investigated the supply of recycled water to the Rancho Santa Fe Golf Course. Most recently, a recycled water feasibility study jointly funded by the SFID and the Olivenhain Municipal Water District (OMWD) investigated the delivery of recycled water from the City of San Diego's North City Reclamation Plant.

This Recycled Water Master Plan addresses recycled water goals for the entire District. Multiple sources of recycled water are evaluated to serve the Rancho Santa Fe Golf Course and other major potential customers within the existing SFID service area. Key master planning objectives include:

- Develop a recycled water delivery goal and distribution system planning criteria
- Document the existing SFID recycled water customers and demand
- Identify potential future recycled water customers
- Identify and evaluate potential recycled water supply sources
- Develop and evaluate alternative distribution systems
- Perform comparative analyses to identify a recommended approach to meet the recycled water delivery goal



1.4 REPORT ORGANIZATION

This section briefly summarizes the content and format for this Recycled Water Master Plan report. It is noted that this study was authorized and partially funded under the Water Recycling Facilities Planning Grant program administered by the State Office of Water Recycling (OWR). A model outline for facilities planning documents is contained in the Water Recycling Funding (WRF) Guidelines. The focus of this study is on distribution system expansion and recycled water supply source evaluation, and applicable and pertinent elements of the WRF outline are incorporated into the report format. Where appropriate, we have attempted to reference other planning documents that address key program elements not addressed herein.

Report sections are as follows:

Chapter 1 – Introduction

This introductory chapter provides a general overview of the existing recycled water program and a summary of the project scope and key study objectives.

Chapter 2 – Project Background

This chapter presents background information on the SFID and local water supply issues that form the basis for considering an expanded recycled water system. A discussion of potable water supply and distribution, local land use, growth projections, and physical topography is included.

Chapter 3 – Existing Recycled Water System

Chapter 3 provides a detailed discussion of the SFID existing recycled water program. It describes the existing treatment processes at the SEJPA and summarizes the recycled water treatment, storage and distribution facilities and proposed improvements. A discussion of water quality and a summary of the existing recycled water customers are provided. Regulations mandating the use of recycled water and regulatory requirements are also summarized.

Chapter 4 – Market Assessment

Chapter 4 presents the types of recycled water use that are approved in California and applicable in the SFID service area. The comprehensive market assessment effort performed as part of this study is summarized and potential recycled water users are identified. Summary lists of potential users are provided. Customer on-site retrofit and residential cross connection issues are also addressed.

Chapter 5 – Potential Recycled Water Supply Sources

This chapter identifies potential recycled water sources. Water quality, available supply, and operational limitations are identified. Terms of agreements with outside agencies are discussed.

Chapter 6 – Project Alternative Analysis

Chapter 6 presents distribution system alternatives and potential recycled water customers for the potential sources of supply identified in Chapter 5. Design and planning criteria are summarized



and an overview of the hydraulic analyses performed is provided. A preliminary environmental assessment is provided. Opinions of probable construction costs are developed for each alternative.

Chapter 7 –Project Implementation

Chapter 7 presents options of meeting the SFID recycled water goal with combinations of supply sources and associated distribution system alternatives. Opportunities for project phasing are identified and project life cycle costs are estimated. Evaluation criteria are developed to compare and rank each option. Supporting information is provided on implementation, phasing, funding, permitting, facility siting and other related issues.



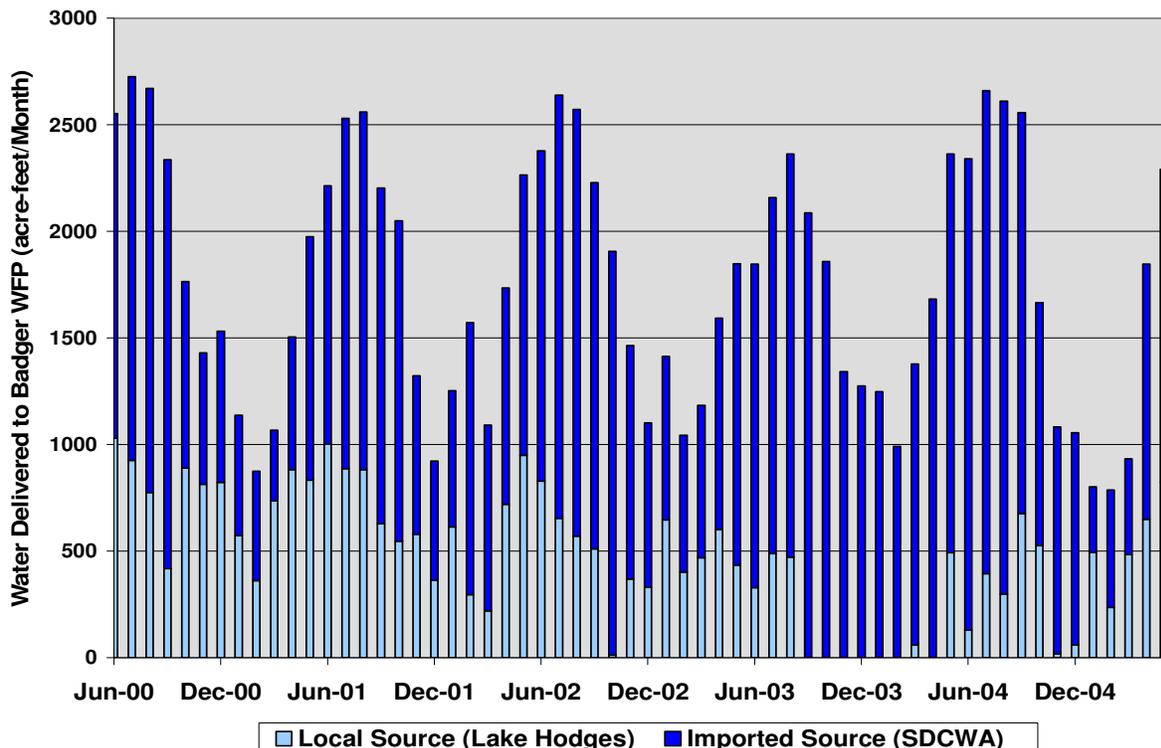
2.0 PROJECT BACKGROUND

Santa Fe Irrigation District (SFID) is responsible for purveying potable water and recycled water within its service area boundaries. Most of the potable water supply is imported from the Colorado River and Northern California, as the local supply from Lake Hodges is not sufficient to meet existing demands. The District's reliance on imported water is not surprising, given the semi-arid climate, average annual rainfall of approximately 11 inches per year, and periodic droughts. Expansion of the water recycling program will directly offset existing potable use and lessen the dependence on imported water. This section provides an overview of the SFID potable water system, land use, and other issues that are relevant to the recycled water system planning process.

2.1 POTABLE WATER SUPPLY

SFID receives its potable water from the R.E. Badger Filtration Plant, a 40 million gallon per day (MGD) water treatment plant owned jointly with the SDWD. The R.E. Badger Filtration Plant is located northeast of the SFID in Rancho Santa Fe. Both imported and local waters are supplied to the filtration plant. Water deliveries in 2004 were approximately 13,400 acre-feet to SFID and 7,500 acre-feet to SDWD. The monthly supply of water to the R.E. Badger Filtration Plant over the past five years is shown in Figure 2-1.

Figure 2-1
MONTHLY WATER SUPPLY TO THE R.E. BADGER FILTRATION PLANT





Local water is obtained from Lake Hodges, which is located just south of the City of Escondido and several miles east of the R.E. Badger Filtration Plant. Lake Hodges has the largest drainage basin of any surface water source in San Diego County and is owned by the City of San Diego. There are currently no connections to the City of San Diego water supply system, and SDWD and SFID have water rights to the stored water. The amount of available local water varies with the seasonal rainfall, and the local supply is not always reliable due to droughts. Given the high cost of imported water, local water is utilized to the maximum extent possible. Over the past five years, local water has averaged 28 percent of the total potable water supply. In 2008, the SDCWA is expected to complete construction of a portion of the Emergency Storage Project, which will connect Lake Hodges to the SDCWA's aqueducts. After the project is completed, the SDWD and SFID will have a perpetual property right to 7,500 acre feet of water from Lake Hodges. The impact on local water deliveries to the R.E. Badger Filtration Plant is currently being evaluated.

Imported water is purchased from the SDCWA. SFID became a member agency of the SDCWA in 1948, when local water supplies could no longer provide a sufficient, reliable source to meet increasing water demands. The SDCWA delivers water through their aqueducts to the R.E. Badger Filtration Plant from Lake Skinner, located near Hemet in Riverside County. Lake Skinner is a blend of water imported by the Metropolitan Water District of Southern California from the Colorado River and the State Water Project, originating in Northern California.

Currently, there is no use of groundwater sources by SFID. The groundwater is of marginal quality, with a high TDS concentration due to seawater intrusion. Groundwater pumped from private wells is used for irrigation and agricultural purposes in the eastern portions of the District. The SFID has 17 groundwater well permits on file, however there may be additional groundwater wells in operation.

2.2 POTABLE WATER DISTRIBUTION

Potable water is delivered to approximately 7,000 service connections throughout the SFID. A brief description of the SFID potable water distribution system is appropriate in the context of a recycled water planning study because it is generally desirable to deliver recycled water at pressures roughly equal to those in the existing potable water system.

The major distribution facilities in the SFID include transmission mains, a treated water reservoir, 38 pressure reducing stations, inter-agency interconnects, a booster pump station (emergency or high demand use only) and telemetry equipment. Water is supplied by gravity from the Badger WFP Clearwell, and no pump stations are required under normal operating conditions. Fourteen separate service zones, referred to by their maximum operating hydraulic grade in feet, regulate pressures in the distribution system. The 520 Zone is supplied directly from the Badger Clearwell and most of the remaining zones are supplied from pressure reducing stations directly off this backbone pressure zone. SFID design criteria specify that service pressures are to be maintained between 40 and 150 psi. The SFID service zones and adjacent water districts are shown in Figure 2-2.



INSERT FIG 2-2

Adjacent Water Districts and SFID Potable Water Service Zones



Potable water is billed at a flat rate every two months. The 2005 commodity charge for water is \$1.76 per hundred cubic feet (HCF). An agricultural rate of \$1.56 per HCF is available to customers who qualify for the program. In order to qualify, water must be used for growing agricultural products for commerce and a minimum of one acre of a single type of commercial crop must be grown. There are 35 existing agricultural accounts located in Rancho Santa Fe area. Base meter fees, ranging from \$18.79 for a ¾-inch meter to \$273.55 for a 6-inch to 10-inch meter, are also charged for each two-month billing cycle. A tiered water rate structure is currently being considered by the District.

2.3 LAND USE OVERVIEW

The SFID is comprised of a variety of land uses including residential, estate residential, commercial and parks. Approximately 88 percent of the of land area is designated as residential. The City of Solana Beach is an established beach community with commercial districts located primarily along the Highway 101 corridor, Cedros Avenue, and Lomas Santa Drive, the primary east-west thoroughfare. There are several schools, two golf courses, local parks, a train station, and a large regional park located in Solana Beach. The community of Rancho Santa Fe is more rural, and is characterized primarily by large estate lots, many of which are 3 acres or larger. Rancho Santa Fe has a small village center, several schools, the Rancho Santa Fe Golf course, several private horse ranches, and an extensive riding trail system. Most of the residences have extensive landscaping, with groves of trees surrounding many of the larger estate homes. The groves are primarily citrus trees, with lemon trees being the most common. While some groves produce fruit that is sold commercially, many are maintained primarily for aesthetics. Fairbanks Ranch is a residential community with varied land use. The portion of Fairbanks Ranch within SFID includes single family homes and a recreation center.

2.4 POPULATION PROJECTIONS OF STUDY AREA

The 2005 population within SFID according to the SANDAG 2030 City/County forecast is 20,212. The population in 2030 is projected to be 21,774, which is 7.7 percent increase. Vacant parcels within the District total approximately 430 acres, or approximately 4 percent of the total acreage. The City of Solana Beach will experience very little population growth, as the 2030 population is projected to be only 2 percent higher than the existing population.

From a recycled water master planning perspective, it is important to understand the likely buildout condition for vacant parcels and all other undeveloped areas in the planning area. Maximizing potential recycled water use at new sites is very important and should be considered in the land use planning and development review processes. The SFID, however, is near complete buildout, and there are no changes expected in the service area. A summary of existing vacant lots indicates that there are less than 150 vacant residential lots and 14 acres of vacant commercial/hotel space. There are no specific planning areas. New development will occur primarily with the construction of new homes on individual vacant lots, subdivision of larger residential lots, and redevelopment of commercial parcels in Solana Beach.



2.5 PHYSICAL TOPOGRAPHY

The terrain of SFID consists of rolling hills and valleys, with elevations ranging from sea level to approximately 400 feet above mean sea level (msl). The San Dieguito River flows through Rancho Santa Fe and discharges to the ocean south of Solana Beach. The northern SFID Boundary is generally defined by the southern shore of the Escondido Creek and the San Elijo Lagoon. The SFID spans both the Carlsbad Hydrologic Unit, which includes the Escondido Creek, and the San Dieguito Hydrologic Unit, which includes the San Dieguito River and its tributaries, Lake Hodges, and the San Dieguito Reservoir. Recycled water delivered to the SFID must meet the groundwater water quality objectives of each inclusive Hydrologic Area (HA) and Hydrologic Sub Area (HSA). The HA and HSA within the SFID are:

- Escondido Creek HA, San Elijo HAS, basin unit number 4.61
- Solana Beach HA, Rancho Santa Fe HAS, basin unit number 5.11

The ground water quality objectives for the applicable hydrologic basins are provided in Table 2-1. These objectives were obtained from the California Regional Water Quality Control Board *Water Quality Control Plan for the San Diego Basin*, dated September 1994. It is noted that the water quality objectives for the Solana Beach HA apply only to areas east of Interstate 5.

**Table 2-1
 GROUND WATER QUALITY OBJECTIVES**

Hydrologic Area	Basin Unit No.	Constituent (mg/l or as noted)												
		TDS	Cl	SO ₄	%Na	NO ₃	Fe	Mn	MBAS	B	ODOR	Turb NTU	Color Units	F
San Elijo	4.61	2800	700	600	60	45	0.3	0.1	0.5	1.0	none	5	15	1.0
Solana Beach	5.10	1500	500	500	60	45	0.9	0.2	0.5	0.8	none	5	15	1.0



3.0 EXISTING RECYCLED WATER SYSTEM

Portions of the City of Solana Beach are currently provided recycled water from the San Elijo Joint Powers Authority (SEJPA), which owns and operates a recycled water facility and distribution system. SEJPA recycled water is sold under terms of a 20-year sales agreement between the SFID and the SEJPA, dated October 10, 1996. This section provides an overview of the recycled water program and a summary of existing SFID recycled water customers.

3.1 PROGRAM OVERVIEW

The San Elijo Joint Powers Authority (SEJPA) owns and operates a Title 22 Recycled Water (RW) Facility located in Cardiff-by-the-Sea. Recycled water produced at the facility is distributed to customers for irrigation within the San Dieguito Water District (SDWD), the Santa Fe Irrigation District (SFID), and the City of Del Mar service areas. In the SFID, recycled water is currently distributed to customers in Solana Beach. Recycled water is delivered to SFID under a twenty-year “take or pay” agreement, which runs through the year 2016 and is renewable. SFID is currently purchasing more than the minimum contract purchase amount of 393 afy.

SEJPA staff operates and maintains the recycled water distribution system and SFID staff installs, reads and maintains the water meters, and bills the recycled water customers. SEJPA receives the full retail sales revenue generated by recycled water sales, less a SFID administration fee of \$34 per acre-feet. SEJPA also receives both the SDCWA and MWD recycled water subsidies. Because of the large debt incurred during construction of the recycled water facilities, the most significant operating cost for the recycled water program is the debt service payment. Although annual revenues are currently less than expenses, the financial health of the program is projected to improve with increased recycled water sales.

The agreement with SEJPA links the cost of recycled water to the commodity cost of potable water. Two recycled water rates are currently available to SFID customers. A standard discounted rate equal to 85-percent of the retail potable water rate is provided for customers that pay their own on-site retrofit costs. Customers who choose to have the SEJPA pay for retrofit costs initially pay the full potable water price for recycled water. The 15-percent cost difference is credited back to the SEJPA until the retrofit costs are paid back, at which time they switch to the standard discounted recycled rate. There are currently no recycled water capacity fees or base meter fees assessed to SFID recycled water users.

3.2 RECYCLED WATER TREATMENT

The SEJPA Facility consists of the Water Pollution Control Facility (WPCF) and Recycled Water Facility (RW Facility), located just north of the San Elijo Lagoon and east of Interstate 5.- The RW Facility began operation in 2000 to produce Title 22 recycled water for non-potable water use. It consists of a tertiary treatment system with a rated capacity of 2.48 MGD (1,720 gpm) and a distribution system pump station. Secondary effluent can be treated from two separate sources: the



SEWPCF and the City of Escondido Hale Avenue Resource Recovery Facility (HARRF). Recycled water demands supplied by the distribution system currently total approximately 1,300 afy (1.16 MGD).

The major unit processes at the San Elijo WPCF and RW Facility, excluding solids handling processes, include:

- Headworks Screening/Grit Removal
- Primary Sedimentation
- Flow Equalization
- Aeration
- Secondary Sedimentation
- Chlorination
- Polymer and Alum Addition
- Sand Filtration
- Disinfection (sodium hypochlorite)

3.3 RECYCLED WATER QUALITY

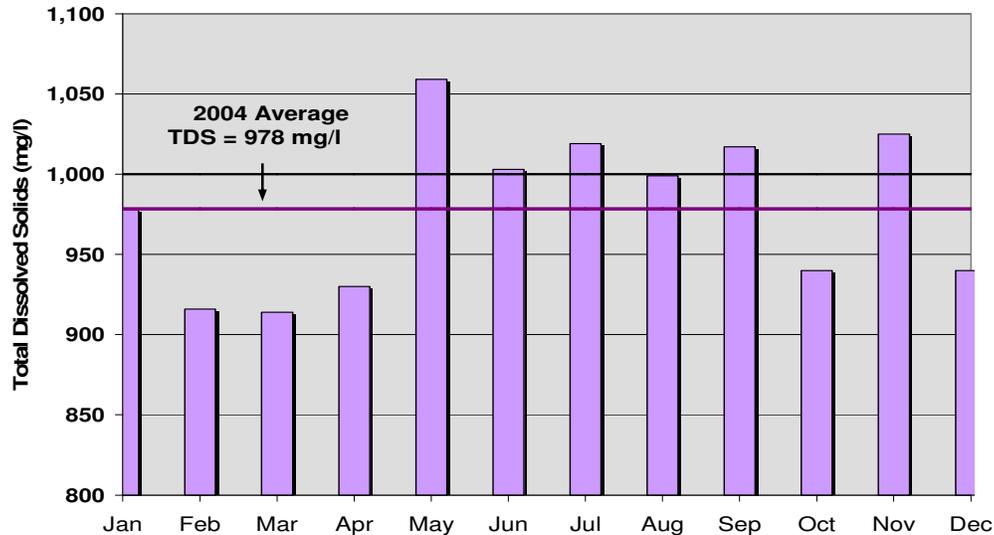
The San Elijo RW Facility WRF produces a high quality disinfected tertiary effluent suitable for unrestricted reuse. Secondary effluent from the San Elijo WPCF typically meets or exceeds all discharge requirements, but can vary in water quality. Production rates are sometimes reduced to compensate and improve water quality parameters. Secondary effluent from Escondido's HARRF became available to the San Elijo RW facility in 2003 with construction of the Escondido Outfall Connection Pipeline. The effluent from the Escondido Ocean Outfall is currently preferred over effluent from the SEWPCF because of its improved water quality.

Total Dissolved Solids (TDS) levels are a common indicator of water quality, and are the parameter of most concern for irrigation customers. Various plant types, especially sub-tropicals, are sensitive to high TDS levels. A TDS level of 1,000 mg/l or less is generally considered acceptable in this region for irrigation purposes. In 2004, the effluent from the San Elijo RW Facility averaged 978 mg/l of TDS. The monthly TDS levels in 2004 are shown in Figure 3-1.

Although the TDS levels for 2004 averaged less than 1,000 mg/l, levels during the peak irrigation months of May through September averaged 1,019 mg/l. SEJPA staff actively manage the quality of the recycled water, but the RW Facility does not have reverse osmosis (RO) or electro-dialysis reversal (EDR) facilities to further reduce TDS levels. It is noted that supplemental potable can be blended with recycled water at the LSF Reservoir, and is required during the summer months to meet peak demands. TDS levels in potable water from the SFID generally range from 550 to 780 mg/l. During the May through September period in 2004, supplemental potable water averaged 8% of the total recycled demand. The average TDS level of recycled water delivered to most customers in 2004 was therefore kept below 1,000 mg/l during the summer months.



Figure 3-1
2004 SAN ELIJO RECYCLED WATER TDS LEVELS

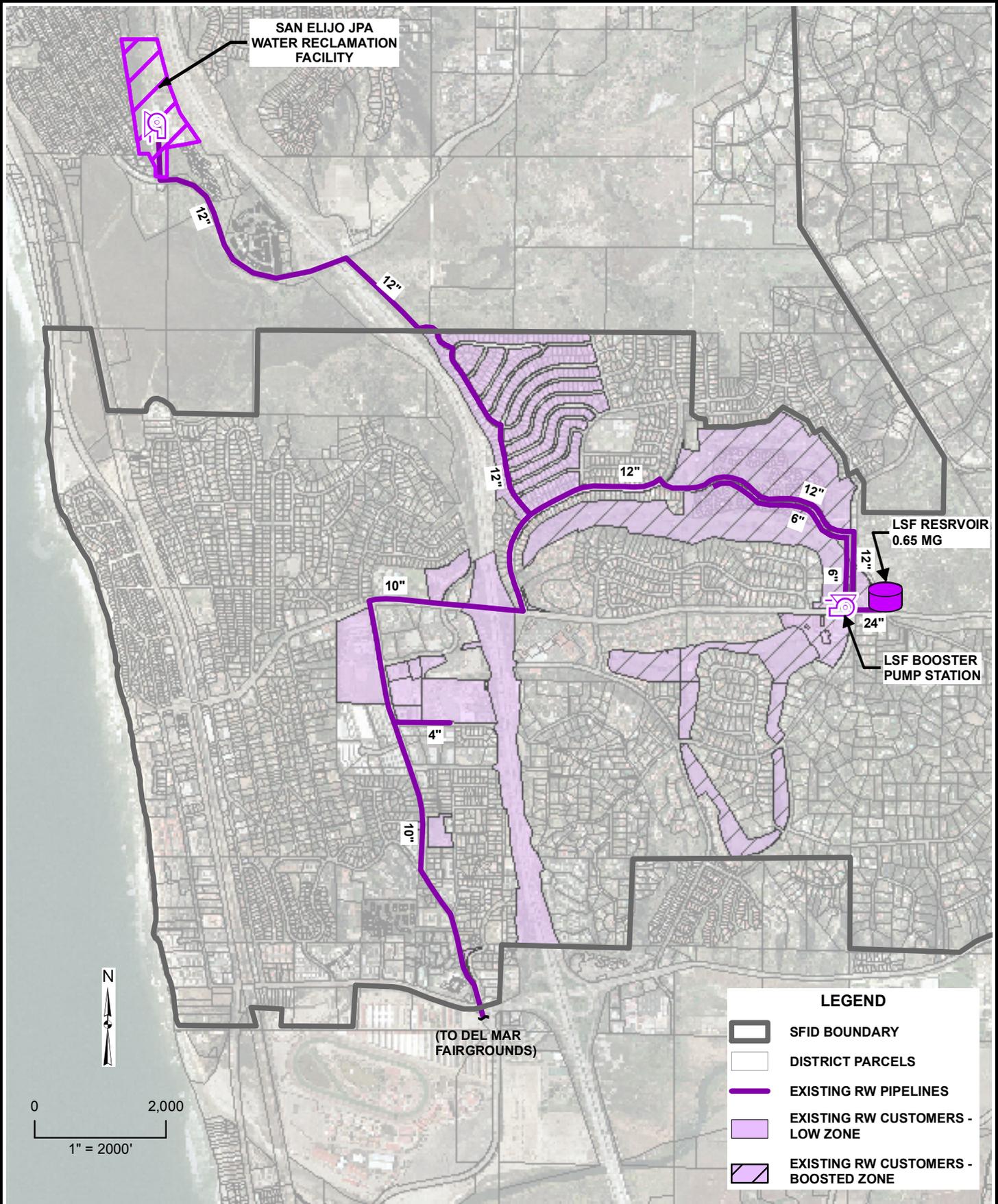


The main determination of recycled water TDS levels is the quality of the wastewater that is treated. The effluent from the Escondido Ocean Outfall currently has lower TDS levels and, as stated previously, is preferred over effluent from the SEWPCF. This effluent source is not assured for the future, however. The City of Escondido has plans to discharge brine into the outfall on a regular basis, which will dramatically reduce the water quality. SEJPA Staff is currently working with the City of Escondido to regulate the brine discharge, which may potentially allow the SEJPA to continue treating Escondido effluent by avoiding timeframes when the brine is conveyed in the outfall.

3.4 RECYCLED WATER DISTRIBUTION SYSTEM

Recycled water from the San Elijo RW Facility enters a 25,000 gallon clearwell, where it is then pumped into two separate distribution systems supplying three different communities. The North Distribution System is located entirely within the City of Encinitas and serves customers within the SDWD. The South Distribution System serves customers within the SFID in Solana Beach, and the Del Mar Fairgrounds. The RW Distribution Pump Station has three pumps. One pump with a design capacity of approximately 1,150 gpm is dedicated to the South Distribution System, and another pump of slightly smaller capacity is dedicated to the North System. The third pump is a backup pump that can be used to supply either system. Potable water can be blended with recycled water at the clearwell to reduce TDS levels, however blending is not currently performed at this location.

The South Distribution System is illustrated on Figure 3-2. The distribution system facilities include 4-inch to 24-inch diameter pipelines, the Lomas Santa Fe Reservoir (LSFR), and the Lomas Santa Fe Booster Pump Station (LSFBPS). A 12-inch diameter pipeline extends south and east approximately 3.5 miles to the LSFR. A 10-inch diameter pipeline extends off the main 12-inch



LEGEND	
	SFID BOUNDARY
	DISTRICT PARCELS
	EXISTING RW PIPELINES
	EXISTING RW CUSTOMERS - LOW ZONE
	EXISTING RW CUSTOMERS - BOOSTED ZONE

FIGURE 3 - 2
EXISTING SEJPA
SOUTH DISTRIBUTION SYSTEM





diameter pipeline just east of Interstate Highway 5 and north of Lomas Santa Fe Drive. The 10-inch diameter pipeline extends west and south in Stevens Avenue to the Del Mar Fairgrounds.

The LSFR is a 100-foot diameter buried concrete reservoir constructed under the playing fields at San Dieguito Park. The reservoir has a high water elevation of 329 feet above msl and a capacity of 650,000 gallons based on the overflow elevation and the tank bottom. Accounting for freeboard and dead storage at the tank bottom, the active or usable storage capacity is approximately 500,000 gallons. Approximately 600 gpm of potable water from SFID can be added to the reservoir from a 4-inch meter to supplement storage volumes during peak irrigation demands. Per the sales agreement, SEJPA is billed at the SFID domestic potable water rate for all supplemental potable water used in the recycled water system.

The LSF BPS, which is supplied from the LSFR, supplies recycled water to a boosted pressure zone with a hydraulic grade of approximately 490 feet. Customers served from the boosted zone are the LSF Country Club, LSF Golf Course and the St. Francis Court homeowners association (HOA). The booster pump station maintains a discharge pressure of approximately 90 psi with variable speed pump drives. The station has three vertical turbine pumps controlled by a single variable speed drive and a single constant-speed pump for use during low demands. The maximum pump station capacity is approximately 3,000 gpm. Peak irrigation times at the LSF Country Club and Golf Course are coordinated and scheduled so that the pump station capacity is not exceeded.

3.5 SFID RECYCLED WATER CUSTOMERS

Recycled water is currently supplied to 14 customers from 38 meters within the City of Solana Beach. Four additional recycled water meters have recently been installed and will soon be connected to the distribution system. The RW customers include San Dieguito Park, Lomas Santa Fe Golf Course and Country Club, CalTrans, the City of Solana Beach, and several homeowner associations (HOAs). SEJPA and SFID are currently investigating the supply of recycled water to private homeowners on estate lots just east of San Dieguito Park, along El Camino Real and Linea Del Cielo. This action, if allowed, will be the first supply of recycled water to an individual residence in San Diego County, and will require approval from the Department of Health Services. A summary of existing recycled water meters and 2004 demands is provided in Table 3-1.

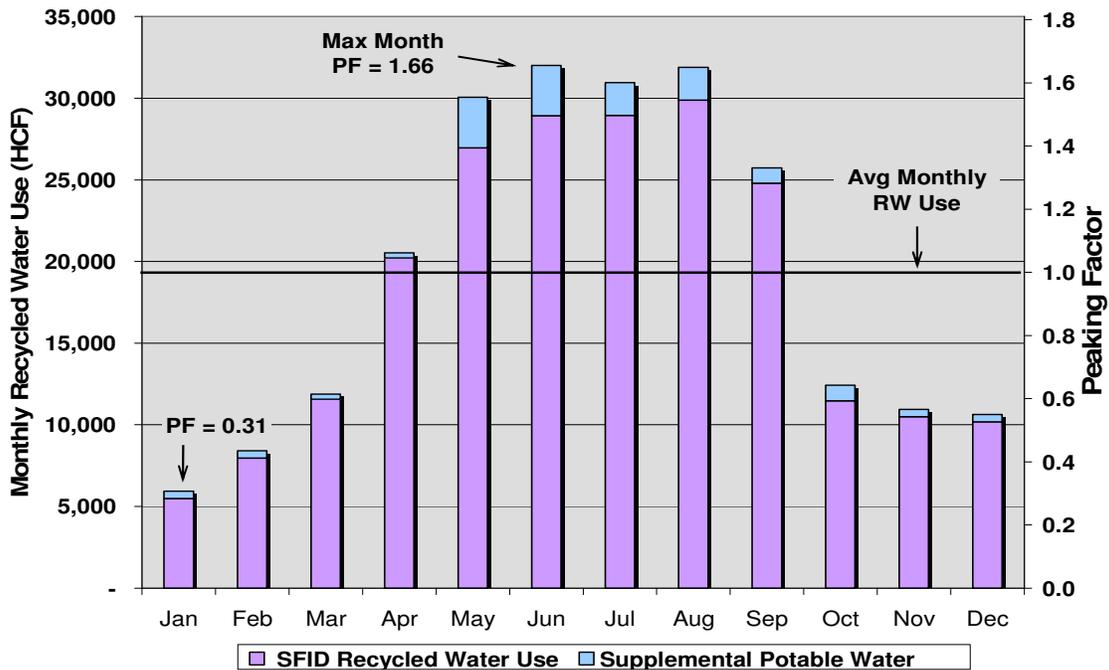
The RW customers in Table 3-1 are listed in the approximate order in which they were connected to the system. RW connections and meters have been installed for the Solana Beach Towne Centre, the last customer in the table, but a water system shut-down test needs to be performed before recycled water can be delivered. There are two recycled water billing codes listed in the table. User code "RW" designates that the customer is billed at the basic RW rate of 85% of the potable water rate. These customers have constructed their own on-site retrofits. Code "RC" is for customers who have chosen to take advantage of a loan program to finance customer retrofits. The "RC" rate is the same as the basic potable water rate, which is charged for recycled water until the loan obligation is satisfied. It is noted that recycled water customers are billed every month, unlike the SFID potable water customers who are on a two-month billing cycle.



3.6 RECYCLED WATER DEMANDS AND PEAKING

Recycled water demands fluctuate depending on the time of day and season of the year. Demands peak during the summer months because of greater irrigation needs, and daily demands are concentrated within a 9-hour watering window for nighttime irrigation. The monthly recycled water use for SFID customers in 2004 based on billing records is illustrated in Figure 3-3. The RW Facility is reliant on potable water to supplement recycled water supplies during peak demand periods, and supplemental potable water is supplied from the SFID to the South Distribution System at the LSF Reservoir. In 2004, approximately 33 AFY of potable water, or 6% of the total South Distribution System demand, was supplied with potable water. The supplemental potable water supply is also illustrated in Figure 3-3.

Figure 3-3
SFID 2004 SEASONAL RECYCLED WATER DEMAND



Including the potable water usage, the average annual demand supplied to SFID recycled water customers in 2004 was approximately 500 afy. The maximum month demand was approximately 0.8 MGD, which is 1.66 times the average annual demand. Based on daily system demands recorded by the SEJPA SCADA system, the entire San Elijo RW Distribution System experienced a maximum day demand in 2003 that was 2.16 times higher than the average annual demand. Thus the maximum day demand factor, which is used to size supply facilities, can be approximated at 2.2 times the average annual demand.



3.7 REGULATIONS MANDATING RECYCLED WATER USE

The SFID Board of Directors passed several resolutions mandating the use of recycled water. Resolution No. 90-13 amends the Emergency Water Management Program to require the use of recycled water, when available, for the irrigation of greenbelts, cemeteries, golf courses, parks and highway landscaped areas. Resolution No. 95-15 establishes Rules and Regulations for Reclaimed and Non-Potable Water Service. Section 3 of this resolution mandates the use of reclaimed and non-potable water, and states: “the use of potable water for the irrigation of greenbelts, cemeteries, golf courses, parks, and highway landscaped areas, filling artificial lakes or industrial processes constitutes an unreasonable use of water where non-potable or reclaimed water is available for such uses as determine by the District”. Resolution No. 97-25 further amends the Rules and Regulations, stating in Section 7: “The District shall make preliminary determinations as to which existing potable water customers shall be converted for the use of reclaimed water service. Each water customer shall be notified of the basis for a determination that conversion to reclaimed water service will be required, as will the proposed conditions and schedules for conversion.” A provision in this section allows for water customers to file a written notice of objection, and to request reconsideration of the proposed conditions or schedule for conversion.

To date, all customers have connected to the recycled water system voluntarily. SFID recycled water customers have the incentives of lower water rates and a more reliable water supply in the event of a drought. The threat of water rationing, especially to irrigation customers, is very real. In February 1992, drought conditions in southern California were critical, prompting serious discussion by the SDCWA for mandatory water rationing to its members. Water rationing was only avoided as a result of significant rains during that March and April. As recent as the summer of 2004, lower than average rainfall for five consecutive years had reduced the water levels in Lake Hodges so that it was essentially unusable as a local water supply.

Most customers are very aware of the water supply situation, and consider the availability of recycled water as a great benefit. SEJPA and SFID staff have identified a number of potential recycled water customers meeting criteria that are conducive to recycled water use. These customers generally have significant irrigation water use, control of irrigation systems by trained personnel, and are in close proximity to the existing RW distribution system.

3.8 PUBLIC OUTREACH

Public outreach is a major component of any successful municipal recycled water program. The SEJPA has been proactive in informing the community about the benefits of recycled water through various outlets over the past decade. Printed brochures and other documents have been made available to residents and interested parties during the planning process and throughout design and construction of water recycling facilities. This public outreach effort will become even more important as the recycled water system is expanded and smaller, privately owned sites are connected. SFID is now becoming involved in the public outreach effort, and has informed the community through the local newspaper about the future delivery of recycled water to Rancho Santa



Fe. SFID is planning to update their website and will include information on recycled water, including user guides, approved uses, and links to other pertinent websites, under the section on conservation.

3.9 REGULATORY REQUIREMENTS

Since passage of the Porter Cologne Water Quality Act in 1969, water reclamation has been a key component of water supply planning in California. The California Water Code contains numerous statutory requirements that promote beneficial reuse of recycled water as well as specific authority for implementation of municipal recycled water programs. The Porter-Cologne Act itself, contained within the Water Code, includes all provisions for permitting water recycling facilities.

This section briefly describes some of the regulatory framework in place to ensure safe and proper implementation and operation of recycled water systems statewide. Appendix C contains a more comprehensive compendium of State laws related to water recycling.

3.9.1 DHS Requirements

Regulation of public health associated with the use of recycled water in California is the responsibility of the state Department of Health Services (DHS). This is the same agency that regulates drinking water in the state.

Governing regulations implemented by DHS for recycled water are set forth in Title 22, Division 4 of the California Code of Regulations, Wastewater Recycling Criteria (Title 22). This body of regulation establishes specific criteria for treatment, distribution, and application statewide. Process requirements and physical/chemical characteristics are governed under Title 22.

Approved uses of recycled water, and the requisite level of treatment for each use type, are described in Section 4.1 of this report. Article 4 of Title 22 sets forth general restrictions on user sites and application of recycled water as follows:

- No irrigation with disinfected tertiary water shall take place within 50 feet of any domestic water supply well, unless conditions of Article 4 are met
- No impoundment of disinfected tertiary recycled water shall take place within 100 feet of any domestic water supply well
- Irrigation runoff shall be confined to the recycled water use area
- Spray, mist or runoff shall not enter dwellings, designated outdoor eating areas, or food handling areas
- Drinking water fountains shall be protected against contact with recycled water spray, mist or runoff
- All use areas where recycled water is used that are accessible to the public shall be posted with conspicuous signs
- No physical connection shall be made or allowed to exist between any recycled water system and any separate system conveying potable water



- Recycled water system shall not include any hose bibs; only quick couplers that differ from those used on the potable water system shall be used on the recycled water piping system

DHS also has requirements for preventing backflow of recycled water into the public water system and for avoiding cross-connection between the recycled and potable water systems. These requirements are codified in Title 17 of the California Code of Regulations. Title 17 requirements are discussed later in this report in the context of cross connection control requirements.

3.9.2 NPDES Permit Requirements

The San Elijo Water Reclamation Facility operates under NPDES Order Number R9-2005-01, which regulates the discharge of effluent through the San Elijo Outfall, and Order Number 2000-10 which regulates the discharge of recycled water for beneficial use. Generally, Regional Water Quality Control Boards (RWQCBs) issue requirements for individual water recycling projects to formally implement DHS requirements and to apply site or area specific restrictions to protect water quality and public health.

The RWQCB is largely responsible for the review and approval of plans and engineering reports related to recycled water systems and infrastructure. Individual RWQCB approval of certain anticipated user sites will be required prior to connection.

3.9.3 Other Applicable Requirements

The Uniform Plumbing Code contains design and construction requirements for interior use of recycled water for toilet/urinal flushing and trap priming. This type of use is limited to non-residential buildings. Appendix J of the California Plumbing Code contains more comprehensive requirements for recycled water system piping, valves and other materials, as well as construction, inspection and testing. A proposed update to Appendix J is currently being considered.

The American Water Works Association (AWWA) has also established guidelines for design construction and operating of recycled water systems. These guidelines provide essential design criteria and specifications for the construction of transmission, storage, pumping, and other facilities. Also included is a description of system operation and maintenance requirements pursuant to applicable state regulations.

Sections of the Government Code and the Streets and Highways Code mandate the use of recycled water at public facilities and in roadways and highway corridors.

Specific requirements for user site retrofitting and cross connection control are discussed in Section 4.4 of this report.



4.0 MARKET ASSESSMENT

A primary objective of this master planning effort is to identify potential recycled water customers. This chapter outlines the general types of recycled water uses appropriate for consideration in the SFID. Potential reuse customers are identified using various investigative methods and demand projections are made for each potential recycled water customer.

4.1 RECYCLED WATER OVERVIEW

Recycled water use in California is allowed under Title 22 of the California Code of Regulations. Title 22 specifies allowable uses of recycled water based the level of treatment provided (bacteriological criteria). Four categories of recycled water have been established as follows:

- Disinfected Tertiary Recycled Water
- Disinfected Secondary Recycled Water (2.2 MPN)
- Disinfected Secondary Recycled Water (23 MPN)
- Undisinfected Secondary Recycled Water

For each of the above categories, Title 22 sets forth a list of specifically approved or authorized types of uses. Disinfected tertiary recycled water is commonly referred to being suitable for unrestricted reuse. Recycled water produced at the San Elijo RW Facility meets this criterion.

4.2 RECYCLED WATER USE TYPES

Throughout the state, recycled water is being used in a wide variety of applications. Use types differ based on local conditions, accepted practices and supply availability. Approved use types are discussed in the following sections.

4.2.1 *Landscape Irrigation Uses*

Landscape irrigation is the primary use of recycled water in most if not all municipal systems in California. In addition to the potable water savings and reduced water costs that result from recycled water use, landscaping and turf grass benefit from nutrient concentrations in recycled water and users typically require less fertilizer for optimum growth.

- **Parks/Playgrounds** - City and County owned parks, playgrounds and recreational facilities are generally appropriate sites for recycled water use and can be a major source of demand in some communities. Playing fields at schools also fall into this category. A portion of the San Dieguito Regional Park, La Colonia Park in Solana Beach, and playgrounds on a private school in Solana Beach and are currently being supplied with recycled water. Two public schools in Solana Beach and the remaining irrigation meters at San Dieguito Park are planned to ultimately be connected to the recycled water system. There is a public elementary school and a small private school in Rancho Santa Fe.



- **Golf Courses** – Golf course irrigation is historically the most prevalent use of recycled water in the state. The Encinitas Golf Course, Lomas Santa Fe Golf Course and Executive Golf Course are all irrigated with recycled water from the San Elijo RW Facility. Several golf courses in the vicinity, including the Torrey Pines and La Costa Golf Courses, are irrigated with recycled water and most of the others are in the planning process of converting to recycled water. The only golf course within SFID that is not supplied with recycled water is the Rancho Santa Fe Golf Course.
- **Residential Common Area Landscaping** - Common area landscaping at apartments buildings, condominium complexes and single family developments maintained by HOA or a similar entity can be served recycled water. Four HOAs in Solana Beach are currently supplied with recycled water and several more have been identified as potential future recycled water customers. For these properties, it is generally easier to convert to recycled water if separate irrigation meters are on the property.
- **Single Family Residential Property Landscaping** - Residential water consumption is divided between indoor and outdoor demands. In San Diego County, outdoor water use for single family homes is typically 40 to 50% percent of total residential consumption, although this percentage can be much higher for large estate lots. For most residential areas, it is rarely practical or economical to serve recycled water to single family dwellings due to small individual demands and requirements for backflow/cross connection control and dual meters. There are numerous residential properties in Rancho Santa Fe, however, with large lots, extensive landscaping, and annual water demands in excess of 10 afy (the average residence uses less than 0.5 afy). These estate properties are considered to be potential recycled water customers. It is noted that most agencies supplying recycled water in California limit residential use to irrigation systems controlled by a HOA. To date, only the El Dorado Irrigation District provides recycled water to individual private residences.
- **Commercial/Industrial Property Landscaping** – Some commercial shopping centers, business parks and industrial sites have extensive irrigated landscaping and use significant amounts of potable water. Two commercial centers in Solana Beach have recycled water meters, and several more are potential future users. Again, those sites with separate irrigation meters are generally the easiest to retrofit for recycled water use.
- **Freeway Landscaping** – Irrigation of freeway and highway landscaping is a major recycled water use type in California. Caltrans has specific policies and design criteria for the use of recycled water within highway corridors. Interstate 5 landscaping in Solana Beach is irrigated with recycled water.
- **Open Space / Median Strips** – Median strips, roadside landscaping, and irrigated open space and green belt areas are generally ideal sites for recycled water application. Although these sites are not typically major water users, they generally have dedicated irrigation systems and are easily retrofit and isolated from potable service. There are several such areas within Solana Beach that already receive recycled water. The extensive horse trail



system in Rancho Santa Fe, which is maintained by the Rancho Santa Fe Association, is a potential recycled water site that falls into this category.

4.2.2 Agricultural Irrigation Uses

The Metropolitan Water District offers an agricultural rebate program, which is implemented by the SFID through an agricultural water rate. There are currently 35 existing agricultural accounts in the Rancho Santa Fe area, and SFID staff estimates that only about half of the eligible agricultural customers are participating in this program. The conversion of agricultural meters to recycled water use should be relatively easy, since the existing water system supplies only irrigation demands. Typical agricultural uses include:

- **Food Crops** – Irrigation of food crops for human consumption has only recently become a well accepted use of recycled water in California, even though Title 22 allows the use of filtered tertiary effluent on food crops and root crops, even when it contacts the edible portion of the plant. A comprehensive scientific study in Monterey County performed over the past two decades, with supplemental virus studies recently finalized, has validated the safe use of disinfected tertiary effluent on food crops consumed raw. These studies have been the basis for increased use of recycled water for food crop irrigation statewide. Certain row crops such as strawberries are salt sensitive and may not be appropriate for production using recycled water.
- **Orchards/Vineyards** – Orchard and vineyard irrigation is an approved use of recycled water with only limited restrictions. Some species, avocados in particular, are salt-sensitive and are not typically irrigated with water high in TDS or other specific salts. Citrus trees have been shown to be very tolerant of elevated TDS levels.
- **Pasture/Rangeland** – Recycled water may be used to irrigate pasture and rangeland. It may also be used to irrigated fodder crops of all types. The bulk of this type of agriculture use within SFID are horse farms in the Rancho Santa Fe and Fairbanks Ranch area. Secondary effluent from the Whispering Palms Water Pollution Control Facility is currently used for pasture irrigation at Rancho Paseana, a thoroughbred horse farm located adjacent to SFID.
- **Nurseries/Ornamental Plants** – Recycled water can generally be used at wholesale nurseries and at retail nurseries to a lesser extent. There are no nurseries located within SFID with significant water demands.

4.2.3 Other Approved Uses

There are a variety of other recycled water use types allowed under Title 22. Based on the nature of SFID's commercial and industrial base, most of these uses are not realistic candidates for implementation. However, it may be appropriate to pursue connection of certain types of users if they are in close proximity to existing distribution mains.



- **Construction Dust Control/Compaction** - Recycled water is commonly used for dust control and compaction on construction projects. It is recommended that the SFID make provisions, in the form of special hydrants or filling stations in the recycled water distribution system at appropriate and accessible locations.
- **Industrial Uses** - There are a variety of industrial uses of recycled water that are approved in California. Industrial and commercial facilities with evaporative cooling towers and similar HVAC equipment may be candidates for recycled use. Water Code Sections 13552.6 and 13552.8 provide that, under certain conditions, public agencies may require the use of recycled water for cooling towers and air-conditioning devices.
- **Commercial Car Washes** - Recycled water may be used in commercial car washes that are not open to the public and do not use heated water. Although most current car washes employ on-site water recirculation and treatment systems, they still use significant amounts of water. Car washes can therefore be considered as incidental users of recycled water.
- **Interior Uses / Dual Plumbed Systems** - Use of recycled water for interior uses such as flushing toilets and urinals, priming drain taps and other inside domestic uses is not widely practiced in California. Large scale dual piping projects do exist in Irvine, but these systems were installed during initial construction. Retrofit of existing structures to meet the Title 22 standards for dual plumbed recycled water systems is not generally considered economical.
- **Commercial Laundries** - Commercial laundries are major water users and in other parts of the state they have been retrofitted to use recycled water in their rinse cycles. SFID does not have any major commercial laundries or uniform operations.
- **Fountains/Water Features** - Recycled water may be used in fountains and water features. This type of use is generally incidental to other landscaping uses at golf courses, residential common areas, commercial properties irrigated with recycled water and other similar applications.
- **Sewer Flushing/Street Sweeping** - Sewer flushing and street sweeping are common, approved uses of recycled water in most municipal systems. Hydrants and filling stations should be constructed in strategic locations throughout the distribution system to maximize these types of uses.

4.2.4 Uses Not Considered for SFID

There are several categories of recycled water use that are being explored, studied or implemented in other parts of California and across the country. These include but are not limited to groundwater recharge with downgradient extraction, aquifer injection as a barrier to saltwater intrusion, and indirect potable reuse. These categories of reuse typically require more extensive treatment (multiple barriers) and are pursued when more conventional reuse alternatives have been exhausted or, more typically, as research or pilot study applications. These more complex categories of reuse were not considered for SFID as part of this master planning effort, as conventional recycled water demands can be developed to meet the District's water recycling goal.



4.3 MARKET ASSESSMENT PROCEDURES

The established goal for the recycled water distribution system is 1,300 afy, which is based on supplying ten percent of the SFID potable water demand with recycled water. Approximately 800 afy of additional potential recycled water use must be identified to meet this goal. Potential recycled water users were identified using a variety of methods. In this study, the term major recycled water market is used to define a single user, or cluster of users in close proximity, with potential recycled water demands in excess of 50 afy. Users with smaller water demands are termed “incidental” users. Incidental users considered in this study generally have existing water demands in excess of 5 afy for landscape and agriculture accounts (fully convertible to recycled water use) and 10 afy for residential, government and “other” accounts (only a portion of the water usage can be converted to recycled water).

4.3.1 GIS Based Analysis

SFID maintains a CAD-based system of utilities and planning information. The District’s parcel map, aerial photographs, land use and zoning information, topographic information, and roads and utility data were obtained in shapefile format for use on this project. A water billing account geographical information system (GIS) was developed by linking assessors parcel numbers (APNs) in the meter accounts with the SFID parcel map. Many irrigation accounts, and a small percentage of other account types, did not have an associated APN. For those accounts with significant water usage, the billing data was manually linked to the parcel map based on the service address. Linking water consumption data to the parcel map allowed visual queries to be performed as an aid in identifying potential recycled water customers. The development of recycled water hydraulic models also utilized the District’s parcel map and billing GIS.

4.3.2 Potable Water Consumption Data

Potable water billing accounts and consumption records over the past three years were downloaded from the SFID *Datastream* billing system and researched to identify potential recycled water customers. Analysis of water billing data was performed utilizing queries with the billing system GIS. Several plots were generated, showing the location of various users categories. Tables of large users were also generated, combining water use from multiple water meters on the property and meters from adjacent properties with the same ownership. Several potential large recycled water customers and clusters of customers were identified. To focus the analysis of consumption data on likely recycled water customers, a meter type analysis was also performed.

The SFID water billing system defines 15 potable water account types. There are ten account types which could potentially include future recycled water customers. A summary of these accounts and the 2003 water demand for each applicable category are shown in Table 4-1. It is noted that there are 28 accounts with water demands greater than 20 afy. Of these, the Rancho Santa Fe Golf Course, with an average annual water demand of approximately 340 afy, is by far the largest potable water user.



4.3.3 Groundwater Well Permits

Groundwater continues to be used for irrigation in some areas of Rancho Santa Fe, but the water quality has been degrading due to seawater intrusion. SFID has 17 permits on file for groundwater wells. Most of these wells are on single family estate lots in the northern portion of the District near Escondido Creek. Many of the properties with wells also have high potable water use, indicating that the wells may no longer be used on a regular basis. Well permits were reviewed and customers on large lots with groundwater wells were identified as potential recycled water customers.

4.3.4 Irrigated Area Analysis

Recent aerial photos were reviewed to identify large irrigated parcels within the SFID boundary which had no potable water meter accounts, or accounts that indicated relatively little water use, and no groundwater permits. These parcels are assumed to be irrigated with well water. Two such parcels were identified. These sites, both single family parcels in Rancho Santa Fe, were added to the list of potential recycled water users.

4.4 CUSTOMER ON-SITE RETROFITS

Irrigation system retrofit costs for the customer must be taken into consideration when determining which customers can be considered as potential recycled water customers. Conversion of an existing potable irrigation system to recycled water use will be costly, since each customer, at a minimum, must prepare as-built drawings of the irrigation system, pay fees for plan check inspections and County Health Department approval, install quick couplers in place of hose bibs, erect signage in public areas, and tag and label valve boxes and other irrigation control equipment. Residential customers with dual plumbed systems (both recycled and potable water systems on-site) will be required to purchase and install an approved backflow prevention device for the potable water meter and separate the potable and recycled water systems. Irrigation systems may need to be automated with time clocks and modified to prevent overspray and run-off. In addition, a recycled water site supervisor must be designated. The site supervisor is required to attend a one-day recycled water certification workshop offered through the SDCWA. It is noted that there are also costs for a service lateral and meter, but these items are assumed to be a part of the recycled water distribution system and are included as a SFID cost for this Master Plan.

The cost to retrofit an existing irrigation system to deliver recycled water is very site specific. For connection to the SEJPA system, the SEJPA pays for construction of the service lateral and a new recycled water meter. Customer retrofit costs have ranged from \$3,000 to \$150,000 (the Del Mar Fairgrounds). Customer costs were reduced by the SEJPA and water district personnel taking an active role in the retrofit process. Specifically, SEJPA Staff assists the property owner in developing the retrofit strategy, conducting cross-connection inspections and coverage tests, meeting with the Department of Health Services, and assisting with permitting, contractor bids, and construction inspections.



Most customers that use small volumes of non-potable water will not find it cost effective to connect to the recycled water system. Even with a minimum retrofit cost of \$3,000, it would take nearly five years to payback the initial investment based on a water use of 5 afy and the current discounted recycled water rate (85% of potable water rates). Since an estimation of individual site retrofit costs cannot be made without significant effort and site visits, minimum water demands were used to determine which customers would be considered as potential incidental recycled water customers. For this Master Plan, potable water demands of at least 10 afy for residential meters and at least 5 afy for irrigation and agriculture meters were required for existing water customers to be considered as potential recycled water customers.

4.5 RANCHO SANTA FE GOLF COURSE

The Rancho Santa Fe (RSF) Golf Course is SFID's largest potable water customer, with water demands averaging approximately 320 afy over the past five years. The RSF Golf Course opened in 1929 and is now managed and operated by the RSF Association. Although the golf course has been renovated over the years, it lacks an irrigation pond and separate irrigation systems for the greens and fairways, which makes the conversion to a recycled water system more difficult.

The supply of recycled water to the RSF Golf Course has been investigated in the past. In the mid 1990's, plans were prepared to add tertiary treatment facilities to the Rancho Santa Fe CSD wastewater treatment plant and construct a recycled water distribution system to supply the RSF Golf Course. A more recent effort in 2002 produced the *Reclaimed Water Demineralization Facility and Conveyance System Improvements* report. This study investigated the supply of recycled water to the RSF Golf Course from the San Elijo Recycled Water Facility, and included a demineralization facility and separate distribution system to supply the golf course. These proposed recycled water systems were never implemented due to water quality concerns or project costs.

Golf Course staff have recently shown a renewed interest in irrigating with recycled water. In a letter to the SFID dated January 18, 2005, the RSF Golf Club General Manager stated that having a source of high-quality recycled water to irrigate the golf course is a high-priority. The Golf Club is committed to improving their current irrigation system to make it capable of delivering recycled water to a majority of the property, while retaining a potable water irrigation system for the greens and other sensitive areas. It will also be important for the golf course to retain the use of a potable water supply in the event that recycled water is undeliverable or unusable due to quality problems.

As part of this Master Planning effort, a meeting was held with the Golf Course superintendent and irrigation consultant to discuss recycled water delivery options. With a portion of the turf grass irrigation system remaining on a potable water supply, the projected recycled water demand for the golf course is estimated at approximately 270 afy. Potable water is currently supplied from the 520 pressure zone (Badger Clearwell elevation) through a single irrigation meter on Via del la Cumbre. The recycled water system will be designed to supply water at this same location and pressure. RSF Golf Course irrigation system peaking and hydraulic requirements are discussed in Chapter 6 of this report.



4.6 POTENTIAL RECYCLED WATER CUSTOMERS

Potential recycled water users were identified for all areas of the SFID. In Solana Beach, the only major recycled water market identified, San Dieguito Park, is planned to be added to the SEJPA system in the next few years. Incidental potential recycled water customers in Solana Beach are distributed primarily along Lomas Santa Fe Drive or in the southern portion of the City, along Via de la Valle. They include commercial properties with landscape irrigation, residential developments with common area landscaping, and two schools.

Rancho Santa Fe is unique in that, with the exception of the RSF Golf Course, the potential recycled water markets are primarily individual homeowners with residential or agriculture meters. The highest concentration of potential residential users is located directly west of the San Dieguito Reservoir, where there is potentially 250-300 afy of irrigation demand from four residential property owners. Most of the demand in this area is currently supplied from residential (RL) meter accounts. There are clusters of potential customers with smaller demands west of the reservoir along Camino Del Norte, south of the eastern end of the RSF Golf Course, along Las Colinas and El Mirador, and in the northern Fairbanks Ranch area.

Exhibit A-1 in Appendix A illustrates the location of potential recycled water demands. Parcels are highlighted according to the existing potable water meter types. For residential and commercial meters, parcels with demands of 10 afy or more are highlighted. For irrigation and agriculture meters, parcels with demands of 5 afy or more are highlighted. Parcels with potentially high recycled water demands that are currently irrigated with well water are also highlighted on Exhibit A-1. It is noted that except for the specific areas mentioned above, the potential incidental recycled water customers in Rancho Santa Fe are fairly spread out. Agriculture demands, in particular, are not concentrated in any particular area.

A summary table of the potential recycled water users is provided in Table 4-2. Potable water usage is based on SFID water billing data from 2002 through 2004. Individual water meters in this table are grouped by parcel and customer name. For residential, commercial and government meter accounts, recycled water demand estimates were generally made based on the potable water demand and an assumed irrigation percentage. For schools and apartment complexes lacking irrigation meters (RM meters only), aerial photographs were reviewed to estimate the size and water demand of the landscaped areas. It is noted that water use for irrigation is affected by rainfall and is therefore somewhat variable from year to year.

The total potential recycled water demand estimated in Table 4-2 is 2,037 afy, which is based on 131 new recycled water customers. Only the larger concentrations of major customers will ultimately be supplied with recycled water, as it would be prohibitively expensive to design a recycled water system to serve all the identified potential users. Based on existing recycled water demands of approximately 500 afy, approximately 800 afy of additional recycled water demand, or 40 percent of the potential demand identified, is required to meet the District's recycled water goal of 1,300 afy.



service connections. This is especially important for areas where the onsite recycled water pressure is higher than the pressure provided from the potable water system, as may be the case in areas of Rancho Santa Fe.

There are two primary types of backflow prevention devices used for residential applications: the reduced pressure (RP) principal backflow and the double check valve backflow assembly. Both the RP and double check devices are typically installed above grade at or near the location of the potable water meter. This installation is not always ideal from an aesthetic perspective and some agencies allow below grade installation of double check devices. Title 17 requires inspection and maintenance of backflow prevention devices that are installed to protect the public water system at sites with dual-plumbing for recycled water use.

Backflow devices on individual potable service lines are not mandatory, however. Title 17 allows for no backflow device if annual shutdown tests are performed at each service location. An approved Alternative Backflow Protection Plan (ABPP) is required in this case. This approach is rarely employed.

4.7.1 Individual SFR Parcel Landscaping

The SEJPA is currently investigating extension of recycled water service to individual single family residence (SFR) parcels. The El Dorado Irrigation District (EID), in Placerville, California, is an agency that provides recycled water to single family residential parcels. EID has developed comprehensive design standards and use guidelines for service to residential parcels. Each parcel is dual plumbed and has both potable and recycled water meters. Below grade backflow protection devices (double check assemblies) are required for each potable service connection. A copy of the EID design and construction standards is included in Appendix E for reference.

The downside to allowing below grade backflow devices is the threat of failure due to flooding or general neglect. EID requires annual inspections of each backflow device which serves to minimize the potential problems.

The City of San Diego requires installation of reduced pressure (RP) backflow devices at each potable meter when individual parcels or HOAs are using recycled water. However, in at least one instance, the City has relaxed this standard and allowed an HOA retrofit project to proceed without backflow devices. In this case, installation of individual double check assemblies and installation of large RP devices on four primary mains entering the site were both found to be cost prohibitive. The project was allowed to proceed with the ABPP approach and annual cross connection testing.

The Irvine Ranch Water District (IRWD) currently has approximately 2,000 recycled water meters serving HOAs. Most of these were new construction with design review and inspection provided by the District. IRWD does not require backflow protection on potable water service unless a pool or laundry is served. While technically permissible under state law, this ABPP approach does not offer the same level of protection as an approach that strictly requires backflow prevention devices.



It is recommended that SFID develop standards that require individual backflow devices for individual residential parcels receiving recycled water. Installation of double check assemblies below grade could be considered in conjunction with a routine inspection and maintenance program.

4.7.2 HOA Controlled Common Area Landscaping

Many water reuse agencies purvey recycled water for irrigation of common area landscaping at subdivisions or developments maintained by a homeowners association (HOA). Common areas typically include parks, playgrounds, lawns and planter areas. In certain areas of the state, HOAs that provide front-yard maintenance have been permitted to use recycled water for landscape and lawn irrigation at individual parcels. Although the recycled water system is theoretically operated and maintained by the HOA, the irrigation piping is on individual lots and the potential for cross connection with the potable water system is increased. Backflow device requirements for this scenario are similar to those for recycled water service to individual SFR parcels.

SFID should develop clear standards and requirements for the various classes of residential recycled water service.

4.8 WATER RECLAMATION QUESTIONNAIRE

As part of this Master Planning effort, a single-page recycled water questionnaire was developed to elicit information on current water usage, types of existing vegetation, water features, water wells, and the willingness to accept recycled water. SFID mailed the questionnaires to over 100 potential recycled water customers, mostly single family homeowners in Rancho Santa Fe, in June 2005. The water quality questionnaire is provided in Figure 4-1 and returned questionnaires are included in Appendix B. In summary, nearly all the respondents were interested in obtaining recycled water, although a few were somewhat hesitant and had concerns. It was apparent that a few of the respondents did not realize that potable water would still be provided for interior use and swimming pools. Most considered all the recycled water benefits listed on the form to be important, such as an uninterrupted supply of water during drought and less reliance on imported water, but a few checked only reduced water rates as the primary benefit.



5.0 POTENTIAL RECYCLED WATER SOURCES

Additional recycled water sources will be required to meet the SFID recycled water delivery goal of 1,300 afy. Water quality criteria is first discussed. The supply limitations and distribution system expansion capability of the SEJPA are evaluated. Additional sources of recycled water from the City of San Diego North City Water Reclamation Plant and local Community Service Districts are evaluated with respect to water quality and the quantity of recycled water that could be produced and delivered.

5.1 WATER QUALITY CRITERIA

In determining the acceptability of recycled water for landscape irrigation purposes, there are several important considerations including physical and chemical makeup of delivered water. Various publications and studies have reported crop and species tolerances for chemical constituents in recycled water. Salinity is generally the critical parameter considered when evaluating recycled water quality and its applicability for reuse in landscape irrigation applications. Total dissolved solids (TDS) is the standard measure of recycled water salinity, although electrical conductivity (EC) is sometimes used as a correlated measure of salinity.

A TDS concentration of 1,000 mg/L is a threshold value used in many municipal recycled water programs. TDS concentrations above 1,000 mg/L may be expected to result in deleterious impacts to sensitive ornamental plants, turf grass and agricultural crops. Some salt sensitive species (e.g. strawberries, avocados, star jasmine, roses, etc.) can be impacted by lower concentrations. As a comparison, potable water TDS concentrations from the R.E Badger Filtration Plant are generally in the 600 to 800 mg/l range, but were as high as 976 mg/l in 2004. The potable water TDS values will vary depending on the source of influent water, imported or local. Recycled water sources considered for the SFID will have TDS levels below 1,000 mg/l.

If soil salinity problems are experienced due to accumulation of salts, periodic leaching can minimize impacts on plants. This is accomplished by flushing soils with excess volumes of water to mobilize salts and allow them to pass below plant root zones. Leaching occurs naturally in Southern California during the occasional heavy winter rainstorms.

Specific ion toxicity can be a concern in water recycling applications. Wastewaters contain numerous soluble constituents that remain in the effluent even after treatment. Sodium, chloride, boron and nitrogen, in high concentrations, are of particular concern in landscape irrigation because of their potentially toxic effects on some plants. Toxicity can arise from both root and foliar absorption of these constituents. Chlorides in recycled water are typically the most troublesome anions; at elevated concentrations they can cause subnormal plant growth rates, yellowing of leaves and excessive exfoliation. Chloride thresholds for plant impacts are typically above 100 mg/L. Additional concerns with recycled water can arise from high chlorine levels, which can shorten the life of irrigation components.



5.2 SAN ELIJO RECYCLED WATER FACILITY

The San Elijo RW Facility currently supplies approximately 500 afy of recycled water to SFID customers in Solana Beach. The RW facility, distribution system and existing recycled customers are described in detail in Chapter 3.0 of this report. Adding new users to an existing recycled distribution system is the most cost effective way to increase recycled water use, as the major distribution facilities have already been constructed. The SEJPA, with the aid of a consultant, is currently evaluating ways of optimizing system operations and expanding the distribution system to increase recycled water sales. A technical and financial evaluation of the San Elijo RW Facility and recommend improvements to optimize system performance and increase revenues will be provided in a report that will be completed later this year. It is anticipated that this study will recommend adding new users to the system improve the financial outlook for the SEJPA.

5.2.1 Water Quality

Based on the recycled water sales agreement between SFID and SEJPA signed in 1996, recycled water average TDS concentrations will be a maximum of 1,000 mg/l in April through September, and a maximum of 1,100 mg/l for the remainder of the year. As previously discussed in Section 3.3 of this report, TDS concentrations averaged 978 mg/l in 2004. With careful management of the treatment process by SEJPA Staff and continued access to City of Escondido secondary effluent from the HARRF, TDS levels should remain below the 1,000 mg/l threshold value.

5.2.2 Existing Operational Limitations

Hydraulic conditions at the SEJPA RW Facility currently limit the additional demand that can be served. Although the rated capacity of the RW Facility is 1,720 gpm (2.48 MGD), the recycled water production rate is currently less than the rated capacity. The recycled water distribution system is designed to use supplemental potable water to meet peak summer demands. A 4-inch potable water meter at the LSF Reservoir can supply approximately 600-800 gpm from the SFID 520 Zone to maintain reservoir water levels. According to SFID Staff, there have been several days this year when the potable water supply valve is open for almost the entire irrigation period. SFID requires that this valve is closed by 5:00 am to prevent pressure drops in the potable water system.

The SEJPA has hired an engineering consultant to develop a computer model of the distribution system, and hydraulic simulations have been performed to assess the effect of additional demands on the distribution system. Based on these simulations, additional users in SFID can continue to be added to the distribution system. At some time in the future, however, a higher supply rate of supplemental potable water will be required to meet peak summer demands. The amount of additional demand that could be added to the SEJPA South Distribution System without improvements to the RW Facility or installation of a larger potable water meter at the LSF Reservoir will be investigated with the hydraulic model. SFID will need to analyze the impact of higher demands on the potable water system to determine if a larger meter can be installed for supplemental potable water to the recycled water system.



5.2.3 Planned System Expansion

It is anticipated that the SEJPA will construct improvement projects in the future to increase the recycled water production rate to the full permitted capacity of 2.48 MGD (1,720 gpm). With a higher recycled water production rate, additional demands can be supplied. SEJPA staff have projected that approximately 400 afy of additional demand could ultimately be supplied from the San Elijo RW Facility. Additional hydraulic analysis will be required to determine if this future demand could be supplied to SFID customers from the existing South Distribution System. While the existing South Distribution System Pump Station and pipelines have excess capacity, it is anticipated that a larger supplemental potable water meter and/or additional storage capacity would be required to supply significantly higher recycled water demands in SFID. Options to increase the storage capacity include construction of a second reservoir adjacent to the LSF Reservoir or construction of an irrigation pond at the Lomas Santa Fe Country Club. If additional storage is constructed, it is estimated that average annual demands approaching 400 afy could potentially be added to the South Distribution System.

Another option to utilize the SEJPA recycled water supply is to deliver recycled water to the RSF Golf Course. The *Preliminary Design Report for the Reclaimed Water Demineralization Facility and Conveyance System Improvements*, prepared for the SEJPA in 2002, planned treatment system upgrades and a distribution system to supply the RSF Golf Course with recycled water. The treatment system upgrades included a microfiltration unit and RO system to provide tertiary treated demineralized water with a TDS concentration of 500 mg/l. The proposed distribution system utilized an abandoned SDWD 30-inch diameter pipeline that extends from the R.E Badger WFP to the SEJPA, traversing Rancho Santa Fe. A booster pump station and storage reservoir were sited at the RSF Golf Course. This project was never pursued further because of high construction and operating costs. The projected construction cost of the demineralization facilities was approximately two million dollars and operating costs were estimated at \$500 per acre-foot of water produced. Construction costs of \$1,530,000 were also included for slip-lining of the 30-inch diameter supply pipeline.

The option to supply the RSF Golf Course from the SEJPA is now being reconsidered as a viable option. The RSF Golf Course has committed to re-designing their irrigation system to separate the greens from the fairways. Recycled water can be used directly on the fairways, which comprise approximately 80-90 percent of the total irrigation demand, without demineralization treatment. In addition, more recent discussions with SFID and SEJPA staff have indicated that slip-lining of the 30-inch diameter SDWD pipeline is probably not required. The general consensus is that only the upstream reinforced concrete pipe sections of this pipeline are in bad condition. The downstream pipeline section that would be used to supply the RSF Golf Course is constructed of Class III concrete cylinder pipe, and operating pressures in the recycled water system would be lower than previous operating pressures.

Supplying the RSF Golf Course would be advantages to the SEJPA since a single customer would be connected instead of multiple smaller customers on the existing distribution system. Most of the remaining potential recycled water users identified are smaller incidental users, and the time commitment required by SEJPA limits the number of new connections to about three per year. At



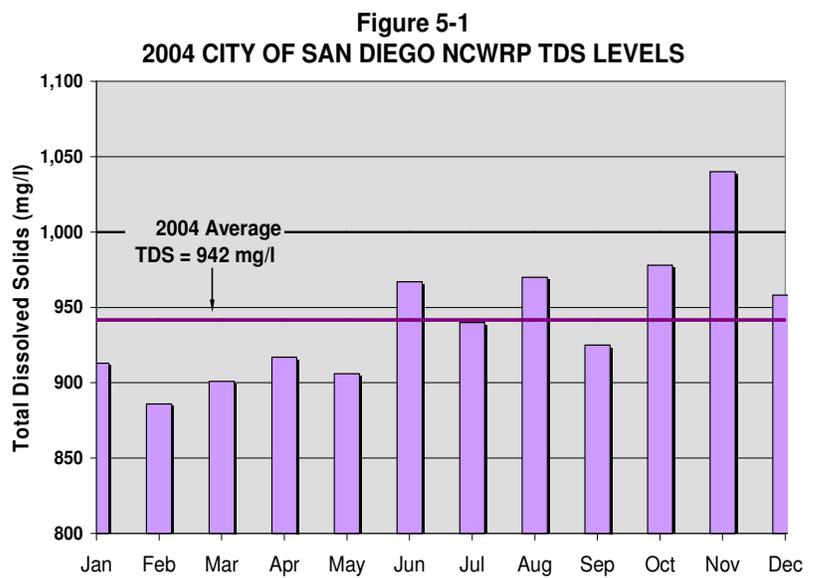
this rate it may take approximately 15 years to connect potential customers that will add as much demand as the RSF Golf Course would generate. SEJPA has agreed to consider supply to the RSF Golf Course assuming SFID will construct the distribution facilities, including a variable frequency drive (VFD) supply pump station at the San Elijo RW Facility. SEJPA Staff would likely operate the pump station and construct adequate storage at the RW Facility. It is noted that if the RSF Golf Course is supplied recycled water from the SEJPA, there would only be approximately 100 afy of recycled water available to future users from the existing distribution systems.

5.3 CITY OF SAN DIEGO NORTH CITY WATER RECLAMATION FACILITY

The City of San Diego has an extensive water recycling program and operates the North City Water Reclamation Plant (NCWRP) and the South Bay Reclamation Plant. The NCWRP has a capacity of 30 MGD and began supplying recycled water to northern areas of the city in 1998. Only a portion of the recycled water produced is currently being sold due to a lack of customers. The City of San Diego received construction grants from the Environmental Protection Agency (EPA) for the NCWRP, which stipulate that 50 percent of the influent flow must be beneficially reused by the year 2010. San Diego is aggressively pursuing customers in an effort to meet this goal. In addition to serving City of San Diego customers, the City of Poway, the Otay Water District (OWD), and the Olivenhain Municipal Water District (OMWD) are supplied recycled water at a wholesale rate under separate purchase agreements.

5.3.1 Water Quality

The NCRWP utilizes EDR to partially demineralize the recycled water. In the water purchase agreements with outside agencies, a maximum TDS level of 1,000 mg/l is specified. Table 5-1 illustrates the average monthly TDS concentrations in 2004. While the average TDS concentration was 942 mg/l, the November average was 1,040, which exceeds the 1,000 mg/l threshold. Average TDS concentrations in 2002 and 2003 were 896 mg/l and 920mg/l, respectively. At no time did monthly averages exceed 1,000 mg/l during these years.



The City of Poway has reported occasional problems with inconsistent chlorination, high Boron and high ammonia levels in the recycled water they receive from the NCWRP. The chlorination problem appears to be related to a remote chlorination batch process at the Miramar Reservoir, which is planned to be replaced by a more automated chlorine injection system.



5.3.2 Supply Hydraulics

The City of San Diego's recycled water distribution system extends to the northwest border of the City with Fairbanks Ranch on San Dieguito Road. A 12-inch diameter pipeline in the City of San Diego 600 Zone extends 4,800 feet north and west in San Dieguito Road to a 6-inch diameter meter that supplies the OMWD recycled water system. This location on San Dieguito Road, approximately 400 feet east of the intersection with Circa Oriente, is the proposed supply point for the SFID. The hydraulic grade is high enough to supply SFID customers without pumping.

The City of San Diego maintains a hydraulic model of their recycled water system. Based on ultimate simulations performed with the model, there is excess capacity in the distribution system to supply SFID. San Diego requires that outside agencies receiving recycled water provide storage in their systems to limit peaking off the San Diego system. A storage facility would be used to supplement supply during the nighttime irrigation period and store unused water during the day, maintaining a relatively constant supply of recycled water to SFID throughout the day. With recycled water storage in the SFID distribution system, the maximum flow rate provided by the City of San Diego would be based on the maximum day demand provided over a 24-hour period, and not peak irrigation demands, which would be much higher.

5.3.3 Terms of Agreement

The City of San Diego has required wholesale agencies to enter into 20-year "take or pay" agreements for the purchase of recycled water. The City of Poway, OMWD, and OWD have all entered into such agreements. The most recent agreement was signed with OMWD, and City of San Diego Staff have said that an agreement with SFID would most likely be similar to their agreement. Table 5-1 summarizes each of the wholesale agreements.

The City of San Diego is selling recycled water at a discounted rate to attract new customers. The wholesale commodity charge for the two most recent agreements is the same rate that City of San Diego customers pay for recycled water. Currently the rate is set at 50 percent of the potable water rate, but this percentage is expected to increase in the future. A letter from the SFID General Manager to the City of San Diego Water Department Director dated May 31, 2005 outlined proposed principals of understanding for a recycled water purchase agreement. The intent of this letter is to begin negotiations with the City and to determine if SFID is eligible to keep the \$350/AF subsidies currently offered by the MWD and SDCWA. The letter included a description and figure of the proposed SFID recycled water distribution system and draft schedule of delivery for a 20-year term contract. The contract terms proposed were similar to the existing agreement with OMWD except SFID would keep the MWD and SDCWA subsidies.



Table 5-1
CITY OF SAN DIEGO WHOLESALE PURCHASE AGREEMENTS

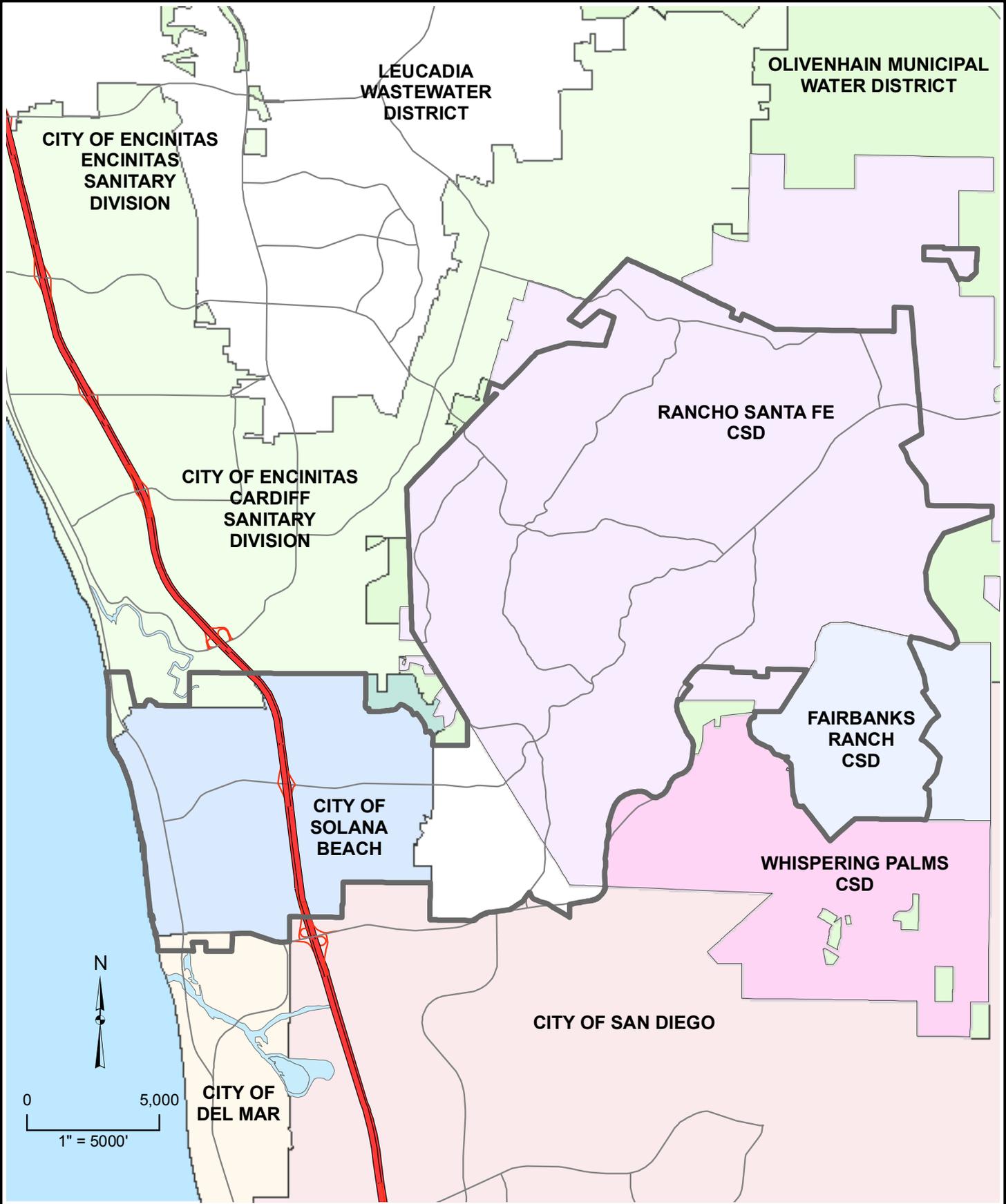
City of San Diego Recycled Water Contract Fee Components	WHOLESALE WATER AGENCY		
	City of Poway	Otay Water District	Olivenhain Municipal Water District
Date of Contract		10/20/2003	11/17/2004
Term of Contract	20 years	20 years	20 years
Source of Water	North City Water Reclamation Plant	South Bay Water Reclamation Plant	North City Water Reclamation Plant
Commodity Charge Initial Rate & Escalation Method	\$450/AF Tied to City of SD CPI	\$350/AF Tied to City of SD RW rates	\$350/AF Tied to City of SD RW rates
Premium Charge (for non-Participating Agency)	None	None	\$25/AF
Capacity Reservation Fee (based on purchase amount over the life of the contract)	None	\$3,600,000 (\$35/AF)	\$400,000 (\$50/AF)
Terms of Capacity Reservation Fee:	N/A	50% up front/ 50% upon delivery or 1/2007	70% up front/ 30% within 9 mos.
Monthly Meter Fee* (same rate as City of SD customers)	None	\$2,324 (6-in)	\$1,286 (6-in)
Subsidies & Grants (MWD-\$250/AF & SDCWA \$100/AF)	City of SD applies and receives	Otay applies and receives	City of SD applies and receives

* Monthly meter fee reflects 2005 rates

The MWD and SDCWA subsidies are offered to help recycled water purveyors defray recycled water distribution system construction costs. In the wholesale purchase agreements with the City of Poway and the OMWD, the City of San Diego kept the subsidies because the distribution systems were funded by private developers. OWD negotiated to receive these funds in their contract. To date there has been no response from the City of San Diego regarding the proposed principals of understanding or distribution of subsidies.

5.4 LOCAL COMMUNITY SERVICE DISTRICTS

Wastewater service to Rancho Santa Fe, Fairbanks Ranch and adjoining unincorporated areas of San Diego County is provided from three community service districts (CSDs): Rancho Santa Fe CSD, Fairbanks Ranch CSD and Whispering Palms CSD. These three CSDs have cooperative arrangements that allow each agency to share operations staff and equipment. The service area of the local CSDs and the other surrounding wastewater agencies are shown in Figure 5-2. Although none of the CSD wastewater treatment facilities are currently producing tertiary treated effluent conforming to Title 22 regulations, advanced treatment facilities could be added to one or more of the treatment plants. The Whispering Palms CSD is currently conducting a study to evaluate advanced treatment options and identify potential recycled water customers. Each CSD is described in the following report sections.



LEGEND

 **SFID BOUNDARY**

FIGURE 5 - 2

**LOCAL WASTEWATER AGENCIES
AND COMMUNITY SERVICE DISTRICTS**





5.4.1 Rancho Santa Fe Community Service District

The Rancho Santa Fe CSD was formed in 1981 and currently serves a population of approximately 5,630 within the community of Rancho Santa Fe. SFID supplies a majority of the service area with potable water. The service area encompasses approximately 9,910 acres and is nearly built out. There are a large number of parcels that have private septic systems, primarily in the southwest corner of the service area. Future wastewater flows are projected to increase as the collection system is expanded and existing residences connect to the system.

Current Rancho Santa Fe CSD facilities include the Rancho Santa Fe Wastewater Treatment Plant (RSFWTP), the Santa Fe Valley Wastewater Reclamation Facility (SFVWRF), nine pumping stations, and reclaimed water pipelines for the re-use of treated wastewater. The capacity of the RSFWTP was increased to 0.45 MGD in 1989. Secondary effluent is disposed of at on-site percolation beds. The SFVWRF has been sized for the ultimate buildout of the Santa Fe Valley Specific Plan Area. Future flows to the RSFWTP will be from the construction of individual homes and the conversion of existing parcels from private septic systems to sewer.

In the early 1990's, the use of tertiary treated effluent to irrigate the Rancho Santa Fe Golf Course was investigated. A wastewater discharge permit to allow the discharge of up to 0.45 MGD of tertiary effluent by spray irrigation at the Rancho Santa Fe Golf Course was obtained in 1991. Percolation ponds were purposed to remain as a fail-safe discharge mechanism when the golf course could not be irrigated. Design plans for the construction of water reclamation treatment facilities and a distribution system to supply the Rancho Santa Fe Golf Course from the RSFWTP were prepared in 1995. The system design was based on a recycled water flow capacity of 0.25 MGD for the Phase 1 system, and 0.5 MGD for an ultimate system. Distribution system facilities at the treatment plant included a 0.23 MG recycled water storage basin and a recycled water pump station with a capacity of 800 gpm. A separate irrigation pump station with a capacity of 1,400 gpm and a wet well was located at the golf course. A potable water connection with an air-gap was provided at the wet well to supplement the recycled water supply.

The TDS concentration of the Rancho Santa Fe effluent averaged 1,159 mg/l based on 1990 and 1991 monitoring reports. The incremental increase in TDS concentration over the potable water supply is higher than typical, and this has been attributed to high levels of groundwater infiltration due to an aging collection system. Tertiary facilities and a distribution system to supply the RSF Golf Course were never constructed due to the water quality, which was deemed unacceptable by the RSF Golf Club.

5.4.2 Whispering Palms Community Service District

Whispering Palms was started in the late 1960s as a planned subdivision with a professionally designed golf course. Because the development was in an unincorporated area of San Diego County, the County of San Diego formed the Whispering Palms Sanitation District in 1968. In 1987, the Whispering Palms residents voted to dissolve the old sanitation district and created the Whispering Palms Community Services District. The Whispering Palms CSD currently serves a population of approximately 2,500 in the Whispering Palms Subdivision, South Fairbanks Ranch



area and other unincorporated areas of San Diego county. The service area is supplied potable water from the Olivenhain MWD, which will soon supply the Whispering Palms Golf Course with recycled water from the City of San Diego NCWRP.

The first Whispering Palms treatment plant utilized open oxidation ponds which percolated to the San Dieguito River Basin. An activated sludge, secondary treatment plant with a capacity of 0.20 MGD was constructed in 1981 and expanded to 0.30 MGD in 1986. A chlorine contact tank was added to allow the effluent to be sold for pasture irrigation to an adjacent horse ranch. In 1991 the capacity of the Whispering Palms WTP was expanded one last time to 0.40 MGD. During the expansion, the plant underwent a significant retrofit and design change. The plant produces a quality effluent that continues to be sold for pasture irrigation at the Rancho Paseana horse ranch, located within the OMWD. The remainder of the effluent is disposed of utilizing on-site percolation ponds.

The Whispering Palms CSD is considering an upgrade to their treatment process to produce recycled water, and is currently conducting a recycled water feasibility study. A direct supply of recycled water to the Fairbanks Ranch Golf Course and/or Morgan Run Golf Course is being investigated, as well as delivery to the OMWD or the SFID.

5.4.3 Fairbanks Ranch Community Service District

The County of San Diego formed the Fairbanks Ranch Sanitation District in 1979 to provide wastewater service to Fairbanks Ranch. In 1991 the sanitation district was dissolved and the Fairbanks Ranch CSD was formed. The service area encompasses approximately 1,240 acres and is almost completely built out. Potable water supply for the Fairbanks Ranch CSD is provided by the SFID and the OMWD.

The Fairbanks Ranch WTP, which is located in the SFID, uses a modified secondary treatment process and is rated at a capacity of 0.20 MGD. Additional treatment facilities are currently being constructed to increase the rated plant capacity to 0.275 MGD. Treated effluent is disposed of by percolation ponds at two disposal sites. The primary disposal area consists of four percolation ponds on a lot adjacent to the San Dieguito River within the SFID. Four additional interim/emergency percolation ponds are located adjacent to the treatment plant.

5.4.4 Flow Quantity And Quality

Recent flow and effluent quality data was provided by CSD Staff for this report. Table 5-2 summarizes the wastewater flows and TDS concentrations of the effluent produced at each local CSD wastewater treatment plant in 2004. Assumptions for the production of recycled water that could potentially be supplied to SFID are made based on this information and discussions with CSD Staff. It is assumed that recycled water treatment facilities would be constructed by the CSDs and the recycled water could be used to irrigate the RSF Golf Course and other identified demands from a distribution system constructed by SFID.



Table 5-2
FLOW SUMMARY FROM LOCAL CSD WASTEWATER TREATMENT PLANTS

Wastewater Treatment Plant	2004 Effluent Quantity			2004 Effluent Quality	
	Average Daily Flow (MGD)	Max Month Daily Flow (MGD)	Projected Future Flow (MGD)	Average TDS (mg/l)	TDS Range (mg/l)
Whispering Palms	0.224	0.285	0.40	1083	894 -1356
Rancho Santa Fe	0.290	0.363	0.60	1295	1236 -1378
Fairbanks Ranch	0.224	0.288	0.275	944	862 - 998
TOTALS	0.738	0.936	1.275	1,124*	

* Weighted average proportioned by the average daily flow

As can be seen from Table 5-2, the existing average daily flow from each individual WTP is too low to supply summer season golf course demands, which are projected to be approximately 500,000 gpd for the fairways. Since new tertiary treatment facilities will need to be constructed, it is proposed that these facilities are constructed at only one of the treatment plant sites. The secondary effluent from one or both of the other treatment plants could then be pumped to the water recycling facilities and treated at a single location. For the purposes of this Master Plan, it is assumed that recycled water facilities could be constructed at the Rancho Santa Fe WTP, since treatment facilities and a recycled water distribution system were previously designed, and the treatment plant site is closest to Rancho Santa Fe.

Based on the water quality data provided for 2004, only effluent from the Fairbanks Ranch WTP is consistently under the 1,000 mg/l threshold value for recycled water use. When secondary effluent from the CSD plants is combined, demineralization of a portion of the tertiary effluent will be required. Based on the TDS levels from 2004, the demineralized flow will generally be below 15 percent of the total flow to achieve an overall TDS of 1,000 mg/l or less. During summer irrigation periods the demineralized flow may total up to 75,000 gallons per day, with an average flow rate of approximately 50 gpm. While not a large flow, the CSD plants do not have access to outfalls for brine disposal. The brine would therefore need to be trucked to a disposal site.



6.0 PROJECT ALTERNATIVE ANALYSIS

The existing SEJPA recycled water system was designed to deliver recycled water to selected large volume customers, and additional capacity exists to supply a limited amount of future SFID customers. This section identifies potential distribution systems that could deliver recycled water to new SFID customers from the three sources previously identified in Chapter 5. The design criteria used to size distribution facilities are first presented, including the development of hydraulic computer models. Delivery of recycled water to the Rancho Santa Fe Golf Course is considered from all the identified sources. Key distinguishing factors in the alternative systems include the recycled water delivery location and grade, and the extension of service to potential customers north of the RSF Golf Course.

6.1 PLANNING AND DESIGN BASIS

Table 6-1 summarizes the major planning and design criteria for the recycled water distribution system. Specific criteria are discussed in the following report sections.

Table 6-1
DISTRIBUTION SYSTEM PLANNING AND DESIGN CRITERIA

CATEGORY	CRITERIA
Recycled Water Reuse Goal	1,300 afy
Recycled Water Supply	Maximum Month Demand, with supplemental potable water to provide maximum day demands
System Pressure	200 psi = Maximum Desired Pressure 65 psi = Minimum Residual Pressure 25 psi = Max Pressure Drop (from static pressure)
Pipelines	8 fps – Maximum Velocity at Peak Flow 5 ft / 1000 ft = Maximum Headloss at Peak Flow
Irrigation Water Demand Factors	2.4 x AAD = Maximum Day Demand 2.0 x AAD = Maximum Month Demand 6.4 x ADD = Peak Hour Irrigation Demand (over 9 hour irrigation period)
RSF Golf Course Water Demand Factors	2.8 x AAD = Maximum Day Demand 2.2 x AAD = Maximum Month Demand 1,600 gpm = Peak Hour Irrigation Demand
Storage Reservoirs	Operational/daily storage capacity based on volume difference between system demand and supply rate during the peak irrigation period.



6.1.1 Recycled Water Supply

The SEJPA recycled water system is designed to be supplemented with potable water to meet peak demands. This is a valid design approach, if potable water can be provided at a suitable location, since it optimizes water reuse relative to the production capacity while reducing the required capacity of recycled water supply facilities. Recycled water systems proposed to supply Rancho Santa Fe are designed based on a maximum recycled water supply equivalent to the projected maximum month demands and a normal summer irrigation cycle for the RSF Golf Course. Supplemental potable water will be required to meet the demands of a golf course “super irrigation” cycle, which is used infrequently as part of the seasonal turf management program (discussed in Section 6.1.4 below).

6.1.2 Delivery and System Pressure Criteria

Recycled water distribution systems typically operate with fewer pressure zones than potable water systems, with a corresponding increase in pressure range. To minimize irrigation system retrofits for existing customers, however, recycled water pressures should be similar to existing potable water system pressures. Most of Rancho Santa Fe, including the golf course, is supplied from a 520 potable water zone, as shown previously in Figure 2-2. The Rancho Santa Fe Golf Course requires a minimum pressure of 125 psi for their irrigation system. This requirement sets the hydraulic grade of a distribution system to supply Rancho Santa Fe at approximately 500 feet.

The minimum operating pressure for the recycled water system for all other areas is set to 65 psi, as most irrigation systems operate best at high pressures. In addition to providing pressures within a minimum and maximum range, the recycled water system will be designed to limit the daily pressure variance to approximately 25 psi. The pressure variance or “swing” is the difference between pressures during peak demand periods (maximum friction loss in pipes) and static pressures. Irrigation systems are designed based on a specific pressure range, and a large pressure swing can affect the area coverage of spray irrigation heads. It is noted that some proposed future customers to the existing San Elijo RW distribution system will require private booster pumps.

6.1.3 Peak Demand Criteria

A recycled water distribution system is designed to supply demands that vary seasonally and throughout the day. Based on a review of water meter data for potable water irrigation accounts in Rancho Santa Fe (excluding the RSF Golf Course), the maximum month demand is estimated to be approximately 2.0 times the average annual demand (AAD). The maximum day demand will be higher. The maximum day demand is defined as the average water delivery rate in a 24-hour period corresponding to the highest water use day of the year. The maximum day demand is affected by both weather conditions and irrigation schedules. The recycled water distribution system will be designed to supply a maximum day demand that is 2.4 times higher than the AAD. Landscape irrigation with recycled water will be limited to a nine hour irrigation period during the night. Peak flows during the 9 hour irrigation window are assumed at 6.4 times the AAD (peaking factor = 2.4 *²

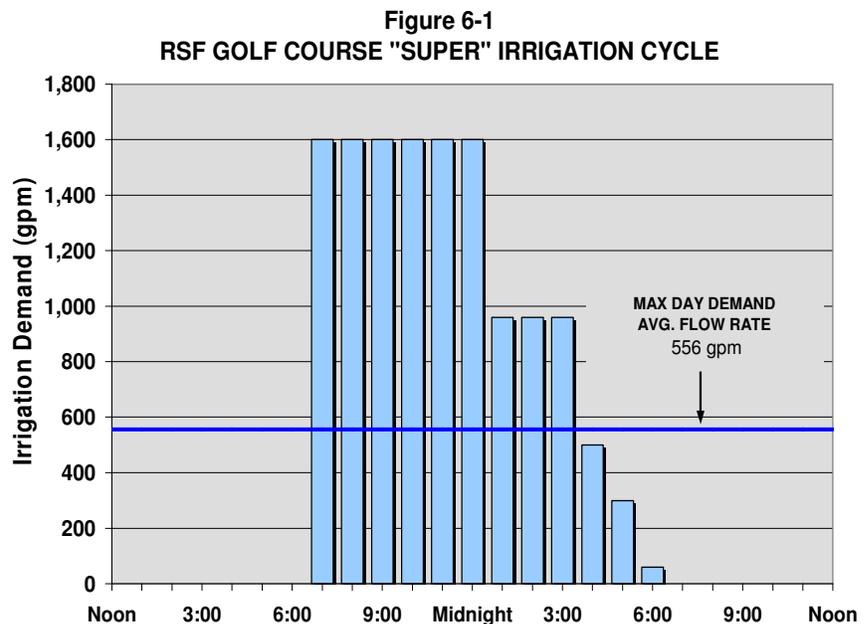


24/9). These peaking factors are slightly higher than those used to design the SEJPA recycled water system, which is appropriate since coastal areas have milder summer temperatures and thus experience somewhat lower water peaking rates.

6.1.4 Rancho Santa Fe Golf Course Peak Demands

The Rancho Santa Fe Golf Course is the largest SFID potable water customer, with an average annual demand of approximately 320 afy. When the golf course irrigation system is converted for recycled water use, the greens will remain on the potable water system, and the recycled water demand is projected to be approximately 272 afy, or 85 percent of existing demands. Specific peaking factors are developed for golf course irrigation demands based on the existing water use.

The golf course irrigation system is computer controlled, and specific irrigation cycles are programmed and adjusted regularly. Based on information obtained from the RSF Golf Club superintendent, the golf course peak irrigation demand is 1,600 gpm. The maximum irrigation cycle consumes approximately 800,000 gallons of water and extends over a period of nearly 12 hours. This irrigation cycle, which is illustrated in Figure 6-1, is referred to as a “super cycle” and is used infrequently. The normal summer irrigation cycle consumes approximately 600,000 gallons, and occurs over a period of approximately 9 hours. Golf Course Staff indicated that the irrigation system will be completely re-designed within the next 7-10 years to accommodate shorter irrigation cycle with a planned peak hour demand of 2,500 gpm. The recycled water distribution system will be designed for a peak hour flow



to the golf course of 1,600 gpm, but have the capacity to provide a 2,500 gpm flow rate with system improvements (additional pumping capacity) in the future. The recycled water system will also be designed to use supplemental potable water to meet the irrigation demands of a “super cycle”.

6.1.5 Storage Criteria

It is assumed that recycled water will be produced and delivered to the distribution system at a relatively constant flow rate throughout the day. A storage reservoir will be provided in the distribution system to supplement supply when nighttime irrigation demands exceed the supply rate, and store water during the day. Stored water that is used for this purpose is termed operational or daily storage. Unlike the potable water system, storage in the recycled water system is not allocated



for emergency or fire flow conditions. The entire usable volume of a recycled water storage tank is therefore assumed to be available for operational storage. A storage reservoir also provides a location where supplemental potable water can be introduced to the recycled water system through an air-gap connection.

The required volume of operational storage is calculated based on the recycled water supply rate, projected maximum day demands, and irrigation schedules. For the SFID recycled water system, a 9-hour nighttime irrigation period is assumed for future customers. No demands are assumed on the system during the remaining 15 hours of the day, which is the tank-filling period. It is noted that elevations within SFID are not high enough to provide for gravity storage and an “open” system. A storage reservoir will therefore be located below the required hydraulic grade, and recycled water will be pumped from the reservoir into the distribution system.

As part of this Master Planning effort, field inspections with engineering and environmental staff were conducted at several potential reservoir sites in Rancho Santa Fe. Two potential reservoir sites were identified at the RSF Golf Course, one at the western end of the golf course and the other near the intersection of Lago Lindo and Via de la Cumbre, just east of the maintenance building. A third potential site was identified on a District-owned parcel at the San Dieguito Reservoir. For aesthetic reasons, a buried storage reservoir will be assumed at these sites.

Early on in this Master Planning effort, the San Dieguito Reservoir and existing raw water pump station were considered as potential recycled water facilities. Until recent construction of a new delivery pipeline and pump station, the San Dieguito Reservoir was a part of the local water delivery system. Water from Lake Hodges flowed by gravity into San Dieguito Reservoir, and then was pumped to the R.E. Badger Filtration Plant. With these facilities no longer needed for the delivery of local water, the potential to partition the reservoir into a wetlands area and a smaller, operational storage area was proposed. Later in the project, SFID staff were informed that the San Dieguito Reservoir has been filling naturally, and the existing pump station is used periodically to deliver raw water to the BE Badger Filtration Plant. The San Dieguito Reservoir and Pump Station were therefore eliminated from consideration as recycled water facilities.

6.1.6 Utility Separations

Criteria for pipeline separations are established by the California Department of Health Services. Reclaimed water mains are treated as sewer mains for separation purposes. The California Department of Health Services requires at least a 10-foot horizontal separation between parallel potable water mains and reclaimed water mains. For pipelines stacked vertically, potable water pipelines must be above recycled water pipelines, which must be above sewer pipelines. A minimum vertical separation of one foot is required.

6.2 HYDRAULIC ANALYSIS

The sizing of proposed recycled water facilities is based on water system models and hydraulic analyses performed under maximum day irrigation scenarios. Hydraulic models of proposed distribution systems were developed using the MWH Soft *H₂ONET*[®] hydraulic modeling program.



Pipeline alignments were digitized on the District's parcel map and elevations were obtained from USGS topographic maps. Projected demands for potential recycled water customers were input at corresponding locations in the model. The maximum day demand condition was modeled utilizing separate peaking curves developed for golf course irrigation cycles and general nighttime irrigation demands. Extended 24-hour simulations were run assuming a 9-hour irrigation period followed by a 15-hour period with no demands. This situation results in the most conservative scenario for the determination of the required storage capacity. Pump stations and reservoirs were sized to meet maximum day demand demands and pipelines were sized to limit the water velocity and meet pressure requirements.

6.3 PLANNING LEVEL COST EVALUATION

Planning level cost estimates were prepared to compare and evaluate the different recycled water distribution system alternatives. The opinions of probable construction and operations and maintenance (O&M) costs consider delivery and distribution pipelines, storage reservoirs and pump station costs. All costs are referenced to the current Engineering News Record Construction Cost Index (ENR CCI) for the Los Angeles area.

Capital cost estimates are based on unit construction costs developed from recent construction projects and previous experience with similar projects. Unit costs for pipelines constructed in the Rancho Santa Fe riding trail system are approximately 40 percent lower than for pipelines constructed in existing streets. This cost reduction is based on easier construction, less traffic control, and no associated paving costs. Construction costs for a buried storage reservoir are based on a unit cost of \$1.80 per gallon. Pump station costs are based on recent bid pricing for similar size projects constructed for other agencies with consideration given to station complexity (variable speed or fixed speed motors and associated controls). Land acquisition costs are not included in the reservoir or pump station costs. An above ground pump station in an architecturally designed building is assumed at the Rancho Santa Fe Golf Course. A cost of \$20,000 for each potential recycled water customer was included to cover service lateral and meter costs.

Annual O&M costs are estimated for each costing category. O&M costs take into account scheduled maintenance, periodic refurbishment, and the cost of both materials and personnel. Pipeline O&M costs are assumed to be 0.25% of the capital construction costs per year. Pump station maintenance costs are assumed to be 1.0% of capital construction costs per year plus an additional energy cost based on an electric power charge of \$0.15 per kilowatt-hour. Reservoir maintenance costs are assumed to be 0.5% of capital construction costs per year. A minimum annual cost of \$800 for each recycled water customer is assumed for periodic site inspections, testing, administration costs and customer relation services. A higher annual customer cost is assumed for large volume users.

Construction costs of the alternative projects will depend on the actual labor and material costs, actual site conditions, final project scope, project schedule and other variables that are not yet defined. As a result, the final construction costs may vary from the estimates presented herein. The costs presented for comparison in this chapter are construction costs only, and do not include engineering, administration, legal, environmental, permitting or contingency costs.



6.4 RECYCLED WATER SUPPLY ALTERNATIVES

Individual distribution system alternatives were first developed to maximize the potential supply from each recycled water source identified in Chapter 5. Separate hydraulic models were developed for the distribution system alternatives. Pipeline sizes were adjusted based on simulation results to satisfy design criteria. The required storage capacity was also determined based on simulation results, assuming that storage reservoirs in the distribution system will be nearly empty at the end of the maximum day demand irrigation period. Figures illustrating pipeline alignments and sizes, proposed storage and pump station locations, and the potential recycled water customers served are included for each alternative together with an opinion of probable construction and O&M costs. Tables of potential recycled water customers served from each alternative are included in Appendix D. Recycled water parcel numbers on the distribution system figures correspond to the customer reference numbers in Appendix D tables. The following report sections provide a description of each of the proposed distribution system alternatives.

6.4.1 SEJPA Supply Alternatives

It is estimated that the San Elijo RW Facility can supply approximately 400 afy of additional demands with some minor facility improvements constructed at the treatment plant (refer to Chapter 5). SEJPA supply alternatives developed for this Master Plan include both the expansion of the existing San Elijo RW distribution system to utilize the remaining available supply in Solana Beach and a new distribution system to supply the Rancho Santa Fe Golf Course. A more cost-effective system to supply a lesser number of customers in Solana Beach was also developed. It is noted that the financial success of the SEJPA program is based on balancing costs with revenues, and the financial goal of the SEJPA is to increase recycled water sales while minimizing new capital expenditures. An aggressive expansion of the RW distribution system by the SEJPA to supply customers in SFID would therefore not likely be pursued without financial incentives.

Expansion of the existing South Distribution System. Adding recycled water customers to an existing distribution system is a cost-effective way to help meet the recycled water use goal, as the major infrastructure has already been constructed. A detailed market assessment was performed to identify potential recycled water customers in Solana Beach that could be served from an expansion of the existing distribution system. The location of each potential customer was plotted and the required pipeline extensions from the existing distribution system were identified. Some users were eliminated from consideration, as they were too remote from existing pipelines to be economically served.

Forty potential recycled water customers were identified with projected recycled water demands totaling 375 afy. A list of these customers is provided in Table D-1 in Appendix D. The location of existing and proposed recycled water customers and proposed pipeline extensions to the existing distribution pipelines are illustrated on Exhibit A-2, in Appendix A. The estimated construction and annual O&M costs are provided in Table 6-2. It is noted that SEJPA is responsible for O&M costs per the 1996 agreement with SFID for the sale of recycled water. Annual O&M costs are estimated in Table 6-2 for comparison purposes with other supply alternatives.



Table 6-2
OPINION OF PROBABLE COSTS FOR EXPANSION OF THE SEJPA DISTRIBUTION SYSTEM -
375 AFY

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total ⁽¹⁾	Projected Annual Cost ⁽²⁾	
					Maintenance Cost	Energy Cost
Demands served from existing distribution pipelines (132 afy)						
Pipeline to Santa Victoria School	4 in.	900 ft	\$115 /ft	\$ 104,000	\$ 260	--
Pipeline to San Dieguito Park	6 in.	2,600 ft	\$129 /ft	\$ 334,000	\$ 835	--
Service laterals and meters	varies	11	\$20,000	\$ 220,000	\$ 9,800	--
			subtotal	\$658,000	\$10,895/yr	\$10,800/yr
				\$4,985/AF		
Pipeline Extension to estate lots (106 afy)						
Pipeline	4 in.	7,700 ft	\$115 /ft	\$ 886,000	\$ 2,215	--
Pipeline	6 in.	800 ft	\$129 /ft	\$ 103,000	\$ 258	--
Service laterals and meters	varies	12	\$20,000	\$ 240,000	\$ 10,100	--
			subtotal	\$1,229,000	\$12,573/yr	\$8,700/yr
				\$11,594/AF		
Western extension in Via de la Valle (97 afy)						
Pipeline	4 in.	4,954 ft	\$115 /ft	\$ 570,000	\$ 1,425	--
Pipeline	6 in.	4,450 ft	\$129 /ft	\$ 572,000	\$ 1,430	--
Service laterals and meters	varies	15	\$20,000	\$ 300,000	\$ 12,000	--
			subtotal	\$1,442,000	\$14,855/yr	\$7,900/yr
				\$14,866/AF		
Extension to Las Vistas HOA (40 afy)						
Pipeline extension to San Andreas Dr.	6 in.	4,800 ft	\$129 /ft	\$ 619,000	\$ 1,548	--
Pipeline extension to LSF CC Villas	4 in.	600 ft	\$115 /ft	\$ 69,000	\$ 173	--
Service laterals and meters	varies	2	\$20,000	\$ 40,000	\$ 1,600	--
			subtotal	\$728,000	\$3,320/yr	\$3,300/yr
				\$18,200/AF		
New buried reservoir in San Dieguito Park	0.65 MG	1	\$1.80 /gal	\$ 1,170,000	\$5,850/yr	\$0
TOTALS FOR SEJPA EXPANSION OF 375 AFY				\$5,227,000	\$47,500/yr	\$30,700/yr
				\$13,939/AF		

ENR CCI = 8250

- (1) Construction costs do not include costs for engineering, administration, legal, environmental, permitting or contingencies.
(2) O&M costs are currently the responsibility of the SEJPA. Energy costs are based on additional run time for the existing SEJPA supply pump station, assuming an electrical power cost of \$0.15 per kilowatt-hour.

The future recycled water facilities are grouped into four categories in Table 6-2 based on the average construction cost per acre-foot. The first category supplies customers that can be added directly to the existing distribution system from a service lateral or very short pipeline extension. The second phase conversion of San Dieguito Park is assumed in this category, even though a longer on-site pipeline line may be required. It is estimated that 132 afy of recycled demand could be potentially be added to the distribution system at minimal cost.

The next facility category supplies residential estate lots from a proposed looped distribution system east of San Dieguito Park. The residential lots will require private pumps to boost irrigation system pressures. SEJPA and SFID Staff have already held initial site investigations at the Brandes residence, the largest single water user in this group with a projected recycled water demand of 51 afy. An additional looped pipeline extension at the south end of the



distribution system along Via de la Valle is proposed to supply an additional 97 afy of recycled water. Customers in this group include residential HOAs and the Solana Beach Rail Trail project, which is still in the final phases of construction and which has been designed for recycled water use. The last group in Table 6-2 supplies two potential users which would be served from a relatively long pipeline extension to the Las Vista HOA, which has a projected recycled water demand of 28 afy.

Most of the 40 potential customers identified in Appendix D for this distribution system have incidental demands but are located adjacent to a recycled water pipeline. The issues of connecting small users were addressed in Section 4.4 of this report. It is noted that several customers will require private pumps to boost irrigation system pressures. This will increase on-site retrofit costs and require that the customers operate and maintain the pumps. The identified recycled water demand is considered to be an optimistic projection, as site visits were not conducted to most of these sites to assess the feasibility of converting to recycled water.

Hydraulic simulations were not performed on the SEJPA distribution system, however computer modeling results provided by the SEJPA were reviewed. On the basis of this model, it is concluded that the existing distribution pipelines and supply pump station serving the South Distribution System are adequately sized for the additional 375 AFY of demand identified. However, the storage capacity in the existing San Dieguito Park appears to be insufficient, resulting in unacceptably high flow rates and quantities of supplemental potable water to meet peak demands. Additional storage would be required, either a second buried reservoir in San Dieguito Park or an irrigation pond at the Lomas Santa Fe Country Club, to supply the potential recycled demand identified for this alternative.

A smaller set of demands was subsequently identified that could potentially be supplied from the existing distribution system without additional storage. A shortened list of customers with a potential recycled water demand of 247 afy is provided in Table D-2 in Appendix D. Figure 6-2 illustrates the proposed distribution system, which has fewer proposed pipeline extensions. The potential demand identified nearly matches the demand that was added to the future distribution system in the analysis provided by the SEJPA. In their analysis, it is noted that supplemental potable water is supplied at a flow rate of 1,200 gpm, which is nearly double the flow that is delivered through the existing meter (refer to report section 5.2.2). Table 6-3 provides a cost estimate for the facilities identified in Figure 6-2.



Table 6-3

**OPINION OF PROBABLE COSTS FOR EXPANSION OF THE SEJPA DISTRIBUTION SYSTEM -
247 AFY**

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total ⁽¹⁾	Projected Annual Cost ⁽²⁾	
					Maintenance Cost	Energy Cost
Demands served from existing distribution pipelines (132 afy)						
Pipeline to Santa Victoria School	4 in.	900 ft	\$115 /ft	\$ 104,000	\$ 260	--
Pipeline to San Dieguito Park	6 in.	2,600 ft	\$129 /ft	\$ 334,000	\$ 835	--
Service laterals and meters	varies	11	\$20,000	\$ 220,000	\$ 9,800	--
			subtotal	\$658,000	\$10,895/yr	\$10,800/yr
				\$4,985/AF		
Pipeline Extension to Brandis residence (51 afy)						
Pipeline	6 in.	800 ft	\$129 /ft	\$ 103,000	\$ 258	--
Service laterals and meters	varies	1	\$20,000	\$ 20,000	\$ 1,300	--
			subtotal	\$123,000	\$1,558/yr	\$4,200/yr
				\$2,412/AF		
Western extension in Via de la Valle (63 afy)						
Pipeline	6 in.	4,500 ft	\$129 /ft	\$ 579,000	\$ 1,448	--
Service laterals and meters	varies	7	\$20,000	\$ 140,000	\$ 5,600	--
			subtotal	\$719,000	\$7,048/yr	\$5,100/yr
				\$11,413/AF		
TOTALS FOR SEJPA EXPANSION OF 247 AFY				\$1,500,000	\$19,500/yr	\$20,100/yr
				\$6,073/AF		

ENR CCI = 8250

- (1) Construction costs do not include costs for engineering, administration, legal, environmental, permitting or contingencies.
 (2) O&M costs are currently the responsibility of the SEJPA. Energy costs are based on additional run time for the existing SEJPA supply pump station, assuming an electrical power cost of \$0.15 per kilowatt-hour.

SEJPA supply to the RSF Golf Course. A separate distribution system to supply the RSF Golf Course from the SEJPA was developed. A list of the potential recycled customers supplied is provided in Table D-3 in Appendix D and the proposed distribution system is illustrated in Figure 6-3. The proposed distribution system includes a new supply pump station at the SEJPA and utilizes the abandoned 30-inch diameter SDWD low pressure pipeline to deliver recycled water to a buried 0.5 MG reservoir at the golf course. A 10-inch diameter pipeline constructed within the RSF horse trail system transports water between the 30-inch pipeline and the reservoir. A pump station adjacent to the reservoir boosts pressures and supplies a distribution system serving the RSF Golf Course, a public elementary school and the RSF HOA. Based on conversations with SFID and SEJPA staff, it is assumed that the 30-inch pipeline can be used as-is, and will not require relining (refer to section 5.2.3). There could be potential problems with water quality, however, as the portion of 30-inch diameter pipeline that will be used has a volume of over 500,000 gallons, which is approximately twice the projected average daily demand.

The total recycled water demand supplied with the distribution system on Figure 6-3 is projected to be 304 AFY. It is noted that there is not enough recycled water produced at the SEJPA to serve the large irrigation demands of customers located north of the golf course. Furthermore, if the RSF Golf Course is supplied from the SEJPA there would be only 100 afy of recycled water



INSERT FIGURE 6-3

SEJPA Supply to Rancho Santa Fe



available for future connections to the existing distribution system. Therefore, either the expanded distribution system proposed in Figure 6-2 or the new distribution system to supply the golf course in Figure 6-3 could be constructed, but not both. The cost estimate for this alternative is provided in Table 6-4.

Table 6-4
OPINION OF PROBABLE COSTS FOR SEJPA SUPPLY TO RSF – 304 AFY

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total ⁽¹⁾	Projected Annual Costs	
					Maintenace Cost	Energy Cost ⁽²⁾
Booster VFD Pump Station at SEJPA	500 gpm @ 180'		LS	\$ 500,000	\$ 5,000	\$ 13,300
Pipeline to Reservoir (in horse trail)	10 in.	8,000 ft	\$89 /ft	\$ 714,000	\$ 1,785	--
Reservoir at Golf Course (buried)	0.50 MG	1	\$1.80 /gal	\$ 900,000	\$ 4,500	--
VFD Pump Station at Golf Course	1,700 gpm @ 325'		LS	\$ 1,200,000	\$ 12,000	\$ 24,000
Pipeline to Golf Course Meter	16 in.	2,900 ft	\$227 /ft	\$ 659,000	\$ 1,648	--
Pipeline to school	4 in.	600 ft	\$115 /ft	\$ 69,000	\$ 173	--
Service laterals and meters	varies	3	\$20,000	\$ 60,000	\$ 4,900	--
TOTALS FOR SEJPA SUPPLY TO RSF - 304 AFY				\$4,102,000	\$30,000/yr	\$37,300/yr
				\$13,493/AF		

ENR CCI = 8250

(1) Construction costs do not include costs for engineering, administration, legal, environmental, permitting or contingencies.

(2) Based on an electrical power cost of \$0.15 per kilowatt-hour.

6.4.2 City of San Diego Supply Alternative

Several alternative distribution systems were initially proposed to supply the Rancho Santa Fe Golf Course and other major users in Rancho Santa Fe from the City of San Diego NCRWP. A previous recycled water feasibility study prepared by a consultant for SFID and OMWD proposed that SFID take delivery of City of San Diego recycled water through the OMWD recycled water distribution system. Beginning this year, recycled water will be delivered from the NCWRP to OMWD through a 6-inch meter and pressure reducing station at the City of San Diego border on San Dieguito Road. A SFID meter on OMWD's recycled water distribution system located further to the north would reduce the length of new delivery pipeline that would need to be constructed. Additionally, this supply option proposed to utilize the raw water pipeline that previously supplied San Dieguito Reservoir from Lake Hodges as a recycled water delivery main, further reducing the length of new delivery pipelines.

Upon further analysis of this option, it was revealed that the recycled water supplied to SFID would, under certain circumstances, originate from the OMWD 4S Treatment Plant and not the NCWRP. This would necessitate having additional contracts with OMWD. It was also determined that the raw water supply pipeline to San Dieguito Reservoir was still in periodic use, and R.E. Badger WFP Staff want to maintain the use of this pipeline in the future. For these reasons, the option to receive recycled water through the OMWD distribution system was eliminated from further consideration.



A separate metered connection to SFID adjacent to the existing OMWD meter located on San Dieguito Road is now proposed. The City of San Diego delivery pipeline in San Dieguito Road supplies recycled water from the City's 600 Zone. The hydraulic grade would be reduced at the meter to a 500 Zone to supply the RSF Golf Course and other demands in Rancho Santa Fe without pumping. Pressures in the southern part of the district will be high, and pressure regulators will be required at some sites. Figure 6-4 illustrates the proposed recycled water distribution system supplied from the City of San Diego. This system supplies the golf course, several large users between the supply point and the golf course, and large irrigation demands in the northern portion of the District. The recycled water demand that could potentially be served from this system is 710 AFY. The 21 potential customers are listed in a Table D-4 in Appendix D.

A distribution system supplied from San Diego could be constructed in two phases. Most of the facilities would be constructed in the first phase, as the City of San Diego requires wholesale customers to provide storage in their system. The initial phase would serve the RSF Golf Course and seven additional customers along the delivery pipeline, with a total estimated demand of 399 AFY. The pipeline will cross the San Dieguito River, and microtunnel or directional drill construction methods are proposed between El Sicomoro and Calle Camposeco, as shown on Figure 6-4. This potential alignment was verified in the field, and it was determined that adequate staging areas exist for the microtunnel entrance and exit locations. SFID Staff expressed interest in constructing a potable water line with the recycled water line in this alignment to provide a second source of supply to the Fairbanks Ranch area.

The proposed delivery pipeline will extend to a buried 1.0 MG reservoir at the golf course. A booster pump station will be required to pump water out of the reservoir during peak demand periods. The reservoir will refill through a pressure sustaining valve during non-irrigation periods. In the second construction phase a 12-inch diameter distribution pipeline is proposed to be constructed from the reservoir and pump station to user sites in the northern service area. The proposed alignment for this pipeline is in a horse trail that runs along the alignment for the 30-inch SDWD pipeline. Instead of constructing a new pipeline in this alignment, the 30-inch diameter pipeline could potentially be sliplined for use as a recycled water distribution pipeline. Alternative pipeline alignments are also shown on Figure 6-4.

An estimate of construction and O&M costs is provided in Table 6-5. An advantage of a delivery system supplied from the City San Diego is that water is delivered at a high pressure that can serve the RSF directly. Only the supplemental portion of recycled water that comes from storage during peak demand periods will need to be pumped. This reduces the required size of the pump station and significantly reduces energy costs.



Insert Figure 6-4

City of San Diego NCWRP Supply to Rancho Santa Fe



Table 6-5
OPINION OF PROBABLE COSTS FOR CITY OF SAN DIEGO SUPPLY TO RSF - 710 AFY

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total ⁽¹⁾	Projected Annual Costs	
					Maintenance Cost	Energy Cost ⁽²⁾
Pipeline to RSF Golf Course (399 AFY)						
6" Meter & PRV	6 in.	1	n/a	n/a	--	--
Pipeline	12 in.	15,400 ft	\$179 /ft	\$ 2,750,000	\$ 6,875	--
Pipeline	16 in.	2,900 ft	\$227 /ft	\$ 659,000	\$ 1,648	--
HDPE Pipeline (microtunnel)	16 in.	1,000 ft	\$1,100 /ft	\$ 1,100,000	\$ 568	--
Reservoir (buried)	1.0 MG	1	\$1.80 /gal	\$ 1,800,000	\$ 9,000	--
VFD Pump Station at GC	1,500 gpm @ 325'		LS	\$ 1,100,000	\$ 11,000	\$ 15,800
Service laterals and meters	varies	8	\$20,000	\$ 160,000	\$ 8,900	--
			subtotal	\$7,569,000	\$37,991/yr	\$15,800/yr
				\$18,970/AF		
Supply North to users near San Dieguito Reservoir (311 AFY)						
12" pipeline	12 in.	9,150 ft	\$150 /ft	\$ 1,373,000	\$ 3,433	--
add'l pump capacity	700 gpm @ 325'		LS	\$ 150,000	\$ 1,500	\$ 12,300
Service laterals and meters	varies	13	\$20,000	\$ 260,000	\$ 11,400	--
			subtotal	\$1,783,000	\$16,333/yr	\$12,300/yr
				\$5,733/AF		
TOTALS FOR CITY OF SAN DIEGO SUPPLY TO RSF - 710 AFY				\$9,352,000	\$54,323/yr	\$28,100/yr
				\$13,172/AF		

ENR CCI = 8250

(1) Construction costs do not include costs for engineering, administration, legal, environmental, permitting or contingencies.

(2) Based on an electrical power cost of \$0.15 per kilowatt-hour.

6.4.3 Local Community Service Districts Supply Alternative

Based on the criteria that a recycled water supply meet maximum month demands, combined effluent from the three local CSDs could potentially supply the Rancho Santa Fe Golf Course and approximately 130 AFY of additional demands. Figure 6-5 illustrates the proposed delivery and distribution system, which assumes construction of a Rancho Santa Fe Water Reclamation Facility. Recycled water would be pumped in a low pressure pipeline to a proposed reservoir at the golf course. A booster pump station at the reservoir would then supply the recycled water distribution system. The potential recycled water customers that are proposed to be served are listed in Table D-5 in Appendix D. The recycled water demands from these customers are projected to be 321 AFY. Although a larger demand could potentially be served based on the available supply, there are no additional potential recycled water customers in close proximity to the distribution system. The combined flow from the CSD's treatment plants is not sufficient to serve the RSF Golf Course and large customers identified in the northern portion of the service area. Constructing the required a long length of pipeline to serve only a portion of the northern demands would not be cost effective. Planning cost estimates for the delivery system shown on Figure 6-5 are provided in Table 6-6.



INSERT Figure 6-5

Local Community Service Districts Supply to Rancho Santa Fe



Table 6-6
OPINION OF PROBABLE COSTS FOR LOCAL CSD SUPPLY TO RSF - 321 AFY

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total ⁽¹⁾	Projected Annual Costs	
					Maintenance Cost	Energy Cost ⁽²⁾
Supply Pump Station at RSF WRP	500 gpm @ 170'		LS	\$ 400,000	\$ 4,000	\$ 13,300
Low pressure pipeline to reservoir	8 in.	9,400 ft	\$143 /ft	\$ 1,343,000	\$ 3,358	--
Reservoir at Golf Course (buried)	0.60 MG	1	\$1.80 /gal	\$ 1,080,000	\$ 5,400	--
VFD Pump Station at Golf Course	1,750 gpm @ 325'		LS	\$ 1,200,000	\$ 12,000	\$ 25,400
Pipeline to Golf Course Meter	16 in.	2,900 ft	\$227 /ft	\$ 659,000	\$ 1,648	--
Pipeline to RSF Inn	4 in.	1,600 ft	\$115 /ft	\$ 184,000	\$ 460	--
Service laterals and meters	varies	4	\$20,000	\$ 80,000	\$ 5,700	--
TOTALS FOR LOCAL CSDs SUPPLY TO RSF - 321 AFY				\$4,946,000	\$32,600/yr	\$38,700/yr
				\$15,408/AF		

ENR CCI = 8250

(1) Construction costs do not include costs for engineering, administration, legal, environmental, permitting or contingencies.

(2) Based on an electrical power cost of \$0.15 per kilowatt-hour.

6.5 COST COMPARISON

Cost estimate breakdowns for each supply alternative are provided in Tables 6-2 through 6-5. A summary of the opinion of probable construction and annual O&M costs for each supply alternative is provided in Table 6-7. Unit costs per acre-foot of recycled water supplied in a year are calculated for comparison. Combinations of supply alternatives to meet the District's recycled water goal are presented in Chapter 7.

Table 6-7
COST COMPARISON OF SUPPLY ALTERNATIVES

Supply Alternative	Report Figure	Opinion of Probable Costs		Projected Recycled Demand	Costs per AFY supplied	
		Construction	Annual O&M		Construction	Annual O&M
Maximum expansion of SEJPA system	Exhibit A-2	\$5,227,000	\$78,200/yr	375 AFY	\$ 13,939	\$209/yr
Limited expansion of SEJPA system	Fig 6-2	\$1,500,000	\$39,600/yr	247 AFY	\$ 6,073	\$160/yr
SEJPA supply to Rancho Santa Fe	Fig 6-3	\$4,102,000	\$67,300/yr	304 AFY	\$ 13,493	\$221/yr
City of San Diego supply to Rancho Santa Fe	Fig 6-4	\$9,352,000	\$82,423/yr	710 AFY	\$ 13,172	\$116/yr
Local CSDs supply to Rancho Santa Fe	Fig 6-5	\$4,946,000	\$71,300/yr	321 AFY	\$ 15,408	\$222/yr



6.6 PRELIMINARY ENVIRONMENTAL ASSESSMENT

A field visit and preliminary environmental inspections were performed at three locations to evaluate site feasibility for construction of proposed pipeline, reservoir and pump station facilities and to identify potential biological resources and potential biological constraints to development. Findings for two sites are summarized in the following sections. A third site at the San Dieguito Reservoir was also evaluated, but construction of a reservoir and pump station at this location was eliminated from further consideration due to cost and phasing issues. This initial environmental assessment was conducted for planning purposes only. Documentation in support of the California Environmental Quality Act (CEQA) will be prepared and submitted during the design phase.

6.6.1 *San Dieguito River Crossing between El Sicomoro and Calle Camposeco*

The El Sicomoro/Calle Camposeco easement crossing would be required for the supply of recycled water from the City of San Diego NCWRP. The crossing involve micro-tunneling beneath the San Diego River to connect pipelines proposed within El Sicomoro and Calle Camposeco. El Sicomoro is an existing paved road that terminates approximately 150 feet to the west of the river channel. El Sicomoro would likely be used as the exit site for construction of the tunneled pipeline. Calle Camposeco is located approximately 1,200 feet to the east of the San Dieguito River and is elevated above the main river channel. From Calle Camposeco the proposed pipeline would be trenched along an existing horse trail down to the river elevation and through the grounds at the Buie horse ranch located along the west side of the San Dieguito River. Construction staging and the entry site for tunneling the pipeline would be located on the Buie horse ranch on an existing dirt pad adjacent to the San Dieguito River.

Sensitive resources present at the end of El Sicomoro include a two-foot wide intermittent concrete-lined drainage channel extending from the culvert outlet at the end of the paved roadway to disturbed wetlands vegetation dominated by giant reed adjacent to the San Dieguito River. The intermittent drainage channel and wetlands vegetation are under the jurisdiction of the California Department of Fish and Game (CDFG) as wetlands, pursuant to Section 1602 of the California Fish and Game Code; under the jurisdiction of the U.S. Army Corps of Engineers (ACOE) pursuant to Section 404 of the federal Clean Water Act as waters of the United States, including wetlands, and wetlands under the jurisdiction of the Regional Water Quality Control Board (RWQCB) pursuant to Section 401 of the federal Clean Water Act and Porter Cologne Act. Jurisdictional wetlands vegetation within the San Diego River includes southern willow scrub which is potential habitat for the state- and federally-listed endangered least Bell's vireo and southwestern willow flycatcher.

No sensitive resources are present along the proposed alignment from Calle Camposeco to the easement crossing location the Buie horse ranch. The proposed alignment from Calle Camposeco to the edge of the Buie horse ranch would be within an existing horse trail consisting of disturbed habitat. Ornamental plantings on the adjacent property occur along the north side of the horse trail. Sensitive resources in adjacent areas are limited to disturbed coastal sage scrub along the west-facing slopes to the south of the horse trail. Coastal sage scrub is potential habitat for the federally-listed threatened California gnatcatcher. The alignment from the end of the horse trail to the



pipeline entry point at the edge of the San Dieguito River would be through existing developed land consisting of open playing fields and dirt roads. The staging area and tunneling entry point would be located within an existing dirt pad adjacent to the river. Portions of the San Dieguito River adjacent to the proposed staging area include southern willow scrub and disturbed wetlands habitat under the jurisdiction of CDFG, ACOE and RWQCB. Southern willow scrub is potential habitat for the state- and federally-listed least Bell's vireo and southwestern willow flycatcher.

Direct impacts to sensitive resources appear to be avoidable by locating project access and construction within existing developed or disturbed areas and implementing standard construction Best Management Practices (BMPs) to prevent impacts due to dust, erosion, runoff, etc. within adjacent sensitive areas. Construction during the breeding season (April 10-July 31 for vireo and flycatcher, February 15-August 31 for gnatcatcher) would require focused surveys of suitable habitat within 500 feet of construction to determine the presence or absence of the species adjacent to the project. If adjacent habitat is determined to be occupied, noise mitigation measures may be necessary to prevent indirect impacts due to noise during construction.

6.6.2 Reservoir/Pump Station site at Rancho Santa Fe Golf Course

Recycled water service to the RSF Golf Course will require construction of a buried reservoir and booster pump station. A site for these facilities was identified along Via de la Cumbre, at the west end of the Rancho Santa Fe Golf Course driving range. The reservoir and pump station would be located within the golf course grounds and associated pipelines would be within existing roads. Sensitive resources in the area are limited to an existing creek that flows along the south and west side of the driving range. The creek and associated wetlands vegetation are under the jurisdiction of CDFG, ACOE and RWQCB.

Project access and construction of the proposed reservoir and pump station at the Rancho Santa Fe Golf Course would be within existing disturbed or developed areas and would avoid potential impacts to sensitive resources. Potential indirect impacts to the adjacent creek would be avoided by implementing standard construction BMPs to prevent impacts due to dust, erosion, runoff, etc. within adjacent sensitive areas.



7.0 PROGRAM IMPLEMENTATION

The recycled water distribution system alternatives presented in the previous chapter were developed to maximize the demand that could be supplied from the three supply sources identified: the SEJPA, the City of San Diego NCWRP, and the local CSDs. In this chapter, combinations of these supply sources and integrated distribution systems are identified and evaluated with respect to the District's recycled water supply goal. Life cycle cost estimates are provided for each supply option and selection criteria are defined together with a numerical ranking system to aid in the selection of a preferred alternative.

7.1 IMPLEMENTATION APPROACH

SFID will need to secure additional sources of recycled water to meet the District's recycled water supply goal of 1,300 afy. This will involve entering into a long term agreement with another City or agency, which can be a complex arrangement with political and legal ramifications. A clear benefit must be established to the agencies involved and to the community as a whole. This Master Plan identifies potential recycled water markets, sources of supply, and distribution system alternatives. However, the complete cost of obtaining recycled water and the specific type of agreement that must be negotiated are unknown at this time. Potential recycled water projects and options are identified herein to allow the District to begin discussions with selected agencies to determine if there is a mutual benefit and consensus to proceed further. Developing a recycled water supply for the Rancho Santa Fe Golf Course is a high priority. A distribution system that can be constructed to initially supply the golf course and then expanded later to other areas will potentially benefit the District the most.

7.2 RECYCLED WATER SUPPLY COMBINATION OPTIONS

The San Elijo Recycled Water Facilities currently supplies approximately 500 afy of recycled water to SFID customers in Solana Beach. SEJPA and SFID have a very cooperative relationship, and the recycled water program has benefited both agencies over the past five years. But the SEJPA has the staff and financial resources to add only about three new users per year to the system. SFID will need to enter into agreements with other agencies to secure a source of recycled water to meet the District's recycled goal in a timely manner.

Potential recycled water supply sources and distribution systems developed for each source can be combined to provide options that supply an additional 800 afy of recycle water demand to meet the SFID recycled water goal. Table 7-1 summarizes the identified supply options, labeled as Options A through D, and lists the recycled water demand served. All supply options increase demand from the existing SEJPA distribution system in Solana Beach, and have one or two additional supply sources for the RSF Golf Course and other demands within Rancho Santa Fe. It is noted that the demands for each option total approximately 800 afy for comparison purposes, however additional demands could be supplied from the existing SEJPA distribution system for two of the options. The projected demands listed are also considered an approximation at this planning level stage, since on-site inspections were not conducted as a part of this study.



Table 7-1 also provides planning level life cycle cost estimates to compare and evaluate the four supply options. Total project capital costs are estimated from the opinion of probable construction costs. A 20 percent construction contingency is assumed, and the estimated construction cost with contingencies is increased by 30 percent to for engineering, administration, legal, environmental and permitting costs. Life cycle costs are developed by amortizing annual O&M costs and adding these costs to the project cost. A discussion of each supply option and detailed costs tables are provided in the subsections below.

**Table 7-1
RECYCLED WATER SUPPLY OPTIONS**

Option No.	Recycled Water Supply Source	Projected Demand Served	Opinion of Probable Costs				Phase I Project Cost to supply RSF Golf Course
			Construction Estimate	Capital Project Cost ⁽¹⁾	Annual O&M Cost	Total Life Cycle Cost ⁽²⁾	
A	SEJPA to Solana Beach	90 AFY ⁽³⁾	\$477,000	\$744,000	\$11,493/yr	\$16,626,000	\$11,589,000
	City of San Diego to RSF	710 AFY	\$9,352,000	\$14,589,000	\$82,423/yr		
	TOTALS	800 AFY	\$9,829,000	\$15,333,000	\$93,916/yr		
B	SEJPA to Solana Beach	375 AFY	\$5,227,000	\$8,154,000	\$78,200/yr	\$17,928,000	\$7,622,000
	Local CSDs to RSF	321 AFY	\$4,946,000	\$7,716,000	\$71,300/yr		
	TOTALS	696 AFY	\$10,173,000	\$15,870,000	\$149,500/yr		
C	SEJPA to Solana Beach	90 AFY ⁽³⁾	\$477,000	\$744,000	\$11,493/yr	\$18,672,000	\$11,298,000
	City of San Diego to RSF GC	310 AFY	\$7,282,000	\$11,360,000	\$45,823/yr		
	Local CSDs to RSF	400 AFY	\$2,904,000	\$4,530,000	\$90,735/yr		
	TOTALS	800 AFY	\$10,663,000	\$16,634,000	\$148,051/yr		
D	SEJPA to Solana Beach	90 AFY	\$477,000	\$744,000	\$11,493/yr	\$16,593,000	\$7,867,000
	SEJPA to RSF Golf Course	311 AFY	\$5,063,000	\$7,898,000	\$71,833/yr		
	Local CSDs to RSF	342 AFY	\$3,716,000	\$5,797,000	\$73,190/yr		
	TOTALS	743 AFY	\$9,256,000	\$14,439,000	\$156,515/yr		

- (1) Capital project costs are based on estimated construction costs with a 20% construction contingency and an additional 30% for engineering, administrative, legal, environmental and permitting costs.
- (2) Life Cycle Costs are calculated by adding capital project costs to the present worth of annual O&M costs, assuming an amortization of 30 years at 6%.
- (3) Additional demand in Solana Beach can be supplied with this option, resulting in a total demand greater than 800 AFY.

7.2.1 Option A

The City of San Diego is the only single source that can supply both the RSF Golf Course and large irrigation demands north of the golf course and west of the San Dieguito Reservoir. Supply Option A maximizes recycled water supply from the City of San Diego, and assumes that additional demand is served from the existing SEJPA distribution system in Solana Beach. The proposed Option A distribution system is illustrated in Figure 7-1 and construction and operating cost projections are provided in Table 7-2. Initial costs to supply the RSF Golf Course are high with this option, since a long delivery main with a river crossing is required.



INSERT Fig 7-1

Option A



Table 7-2
OPINION OF PROBABLE COSTS FOR OPTION A

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total	Projected Annual Costs	
					Maintenance Cost	Energy Cost ⁽¹⁾
Additional demands served from SEJPA distribution pipelines (90 afy)						
Pipeline to Brandis Residence	6 in.	800 ft	\$129 /ft	\$ 103,000	\$ 258	--
Pipeline to San Dieguito Park	6 in.	2,600 ft	\$129 /ft	\$ 334,000	\$ 835	--
Service laterals and meters	varies	2	\$20,000	\$ 40,000	\$ 3,100	--
subtotal				\$477,000	\$4,193/yr	\$7,300/yr
Demands served in RSF from the City of San Diego (710 afy)						
<i>refer to Table 6-5</i>				subtotal	\$9,352,000	\$54,323/yr
TOTALS				\$9,829,000	\$58,516/yr	\$35,400/yr
Construction contingency: x 20%				\$11,794,800		
Engineering, administration, legal, environmental, permitting: x30%				\$15,333,240		
TOTAL PROJECT COST FOR OPTION A - 800 AFY				\$15,333,000	O&M = \$93,916/AF	

ENR CCI = 8250

(1) Based on an electrical power cost of \$0.15 per kilowatt-hour.

The additional demand supplied from the existing SEJPA distribution system is calculated at 90 afy, which is the additional amount required to reach the recycled water goal over the City of San Diego supply. Recycled water from the SEJPA is assumed supplied to the San Dieguito Park and the Brandis residence, two customers for which recycled water planning efforts have already been initiated. Since additional demands could be supplied from the existing SEJPA distribution system with minimum capital expenditures, the selection of Option A would allow the SFID to exceed its recycled water goal.

Upfront capacity fees would be required for Option A to obtain recycled water from the City of San Diego. The capacity reservation fees in OMWD's contract were \$50/AF for recycled water purchased over the 20 year contract. Assuming a similar rate, the fee would likely be around \$500,000 for an ultimate supply of 710 afy.

7.2.2 Option B

Option B attempts to meet the SFID water recycling goal without purchasing recycled water from the City of San Diego. In Option B, recycled water from the local CSD's supply Rancho Santa Fe while supply to Solana Beach from the SEJPA is maximized. Under this option, the recycled water goal of 1,300 afy (500 afy existing, 800 afy future) would be short by approximately 100 afy. Although construction costs are similar to Option A, phase I costs to supply the RSF Golf Course are significantly lower. This is due to a shorter transmission main and smaller reservoir size. Option B is illustrated in Figure 7-2 and construction and operating cost projections are provided in Table 7-3. It is noted that this option will require a long lead time for delivery of water to the RSF Golf Course.



INSERT Fig 7-2

Option B



Table 7-3
OPINION OF PROBABLE COSTS FOR OPTION B

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total	Projected Annual Costs	
					Maintenance Cost	Energy Cost ⁽¹⁾
Additional demands served from the SEJPA in Solana Beach (375 afy)						
<i>refer to Table 6-2</i>			<i>subtotal</i>	\$5,227,000	\$47,500/yr	\$30,700/yr
Demands served in RSF from Local CSDs (321 afy)						
<i>refer to Table 6-6</i>			<i>subtotal</i>	\$4,946,000	\$32,600/yr	\$38,700/yr
TOTALS				\$10,173,000	\$80,100/yr	\$69,400/yr
Construction contingency: x 20%				\$12,207,600		
Engineering, administration, legal, environmental, permitting: x30%				\$15,869,880		
TOTAL PROJECT COST FOR OPTION B - 696 AFY				\$15,870,000	O&M = \$149,500/AF	

ENR CCI = 8250

(1) Based on an electrical power cost of \$0.15 per kilowatt-hour.

7.2.3 Option C

In Option C, the existing SEJPA distribution system to Solana Beach is expanded and a new distribution system is constructed to supply the Rancho Santa Fe Golf Course from the City of San Diego NCWRP. When recycled water becomes available from the local CSD's, it is combined with City of San Diego supplies. Recycled water from the proposed Rancho Santa Fe Water Reclamation Plant would be pumped to a high pressure and then supplied directly into the City of San Diego delivery pipeline in Via de Santa Fe. At the time this second supply source is added a 12-inch diameter distribution pipeline would be constructed to serve large irrigation demands north of the golf course.

The distribution system for Option C is illustrated in Figure 7-3 and construction and operating costs are provided in Table 7-4. With only the golf course planned to be supplied from the City of San Diego, the capacity reservation fee would be lower than for Option A and is estimated at approximately \$300,000, assuming a similar fee structure to OMWD. As with Option A, the selection of Option C would allow SFID to potentially exceed the recycled water goal, since additional demands could be added to the SEJPA distribution system in Solana Beach.



INSERT Fig 7-3

Option C



**Table 7-4
OPINION OF PROBABLE COSTS FOR OPTION C**

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total ⁽²⁾	Projected Annual Costs	
					Maintenance Cost	Energy Cost ⁽¹⁾
Additional demands served from SEJPA distribution pipelines (90 afy)						
Pipeline to Brandies Residence	6 in.	800 ft	\$129 /ft	\$ 103,000	\$ 258	--
Pipeline to San Dieguito Park	6 in.	2,600 ft	\$129 /ft	\$ 334,000	\$ 835	--
Service laterals and meters	varies	2	\$20,000	\$ 40,000	\$ 3,100	--
			subtotal	\$477,000	\$4,193/yr	\$7,300/yr
Golf Course demands served from the City of San Diego (310 afy)						
6" Meter & PRV	6 in.	1	n/a	n/a	--	--
Pipeline	10 in.	9,800 ft	\$160 /ft	\$ 1,563,000	\$ 3,908	--
Pipeline	12 in.	5,600 ft	\$179 /ft	\$ 1,000,000	\$ 2,500	--
Pipeline	16 in.	2,900 ft	\$227 /ft	\$ 659,000	\$ 1,648	--
HDPE Pipeline (microtunnel)	14 in.	1,000 ft	\$1,100 /ft	\$ 1,100,000	\$ 568	--
Reservoir (buried)	1.0 MG	1	\$1.80 /gal	\$ 1,800,000	\$ 9,000	--
VFD Pump Station at GC	1,500 gpm @ 325'		LS	\$ 1,100,000	\$ 11,000	\$ 12,300
Service laterals and meters	varies	3	\$20,000	\$ 60,000	\$ 4,900	--
			subtotal	\$7,282,000	\$33,523/yr	\$12,300/yr
Demands served in RSF from Local CSDs (400 afy)						
Supply Pump Station at RSF WRP	500 gpm @ 480'		LS	\$ 700,000	\$ 7,000	\$ 46,800
Conn. to pipeline in El Sicomoro	8 in.	2,250 ft	\$143 /ft	\$ 321,000	\$ 803	--
12" north distribution pipeline	12 in.	9,150 ft	\$150 /ft	\$ 1,373,000	\$ 3,433	--
add'l pump capacity	700 gpm @ 325'		LS	\$ 150,000	\$ 1,500	\$ 15,800
Service laterals and meters	varies	18	\$20,000	\$ 360,000	\$ 15,400	--
			subtotal	\$2,904,000	\$28,135/yr	\$62,600/yr
			TOTALS	\$10,663,000	\$65,851/yr	\$82,200/yr
			Construction contingency: x 20%	\$12,795,600		
			Engineering, administration, legal, environmental, permitting: x30%	\$16,634,280		
TOTAL PROJECT COST FOR OPTION C - 800 AFY				\$16,634,000	O&M =\$148,051/AF	

ENR CCI = 8250

(1) Based on an electrical power cost of \$0.15 per kilowatt-hour.

7.2.4 Option D

Option D is based on a combined supply from the SEJPA and local CSD's to deliver recycled water to Rancho Santa Fe. In this option, the distribution system to the RSF Golf Course from the SEJPA is constructed first. The reservoir at the golf course is constructed with a larger capacity based on ultimate demands. The delivery system to supply recycled water from the CSD's is constructed at a later date, at which time a northern distribution pipeline would be constructed. This option is estimated to have the lowest overall construction cost, and one of the lowest Phase I costs to supply the golf course. Operation of the distribution and supply system would be relatively simple, since each supply source would have a separate delivery pipeline to fill the reservoir and all demands would be supplied from the VFD pump station at the golf course. The distribution system for Option D is illustrated in Figure 7-4 and construction and operating costs are provided in Table 7-5.



INSERT FIG 7-4

Option D



Table 7-5
OPINION OF PROBABLE COSTS FOR OPTION D

Proposed Facility	Size/ Capacity	Quantity	Unit Cost	Construction Cost Total	Projected Annual Costs	
					Maintenance Cost	Energy Cost ⁽¹⁾
Additional demands served from SEJPA distribution pipelines (90 afy)						
Pipeline to Brandis Residence	6 in.	800 ft	\$129 /ft	\$ 103,000	\$ 258	--
Pipeline to San Dieguito Park	6 in.	2,600 ft	\$129 /ft	\$ 334,000	\$ 835	--
Service laterals and meters	varies	2	\$20,000	\$ 40,000	\$ 3,100	--
			subtotal	\$477,000	\$4,193/yr	\$7,300/yr
Supply Golf Course demands from SEJPA (311 afy)						
Booster VFD Pump Station at SEJPA	500 gpm @ 180'		LS	\$ 500,000	\$ 5,000	\$ 12,800
Pipeline to Reservoir (in horse trail)	10 in.	8,000 ft	\$89 /ft	\$ 714,000	\$ 1,785	--
Reservoir at Golf Course (buried)	1.00 MG	1	\$1.80 /gal	\$ 1,800,000	\$ 9,000	--
VFD Pump Station at Golf Course	1,700 gpm @ 325'		LS	\$ 1,350,000	\$ 13,500	\$ 24,000
Pipeline to Golf Course Meter	16 in.	2,900 ft	\$227 /ft	\$ 659,000	\$ 1,648	--
Service laterals and meters	varies	2	\$20,000	\$ 40,000	\$ 4,100	--
			subtotal	\$5,063,000	\$35,033/yr	\$36,800/yr
Demands served in RSF from Local CSDs (342 afy)						
Supply Pump Station at RSF WRP	500 gpm @ 170'		LS	\$ 400,000	\$ 4,000	\$ 13,300
Low pressure pipeline to reservoir	8 in.	9,400 ft	\$143 /ft	\$ 1,343,000	\$ 3,358	--
add'l pump capacity at golf course PS	1,500 gpm @ 325'		LS	\$ 300,000	\$ 3,000	\$ 33,100
12" north distribution pipeline	12 in.	9,150 ft	\$150 /ft	\$ 1,373,000	\$ 3,433	--
Service laterals and meters	varies	15	\$20,000	\$ 300,000	\$ 13,000	--
			subtotal	\$3,716,000	\$26,790/yr	\$46,400/yr
				TOTALS	\$9,256,000	\$66,015/yr
				Construction contingency: x 20%	\$11,107,200	
				Engineering, administration, legal, environmental, permitting: x30%	\$14,439,360	
TOTAL PROJECT COST FOR OPTION D - 743 AFY				\$14,439,000	O&M =\$156,515/AF	

ENR CCI = 8250

(1) Based on an electrical power cost of \$0.15 per kilowatt-hour.

With Option D, the total demand served is projected to be approximately 60 AFY short of the recycled water goal. Under Option D, SFID would need to secure the entire remaining capacity at the SEJPA to meet the recycled water goal.

7.3 RANKING OF OPTIONS

The four supply options are evaluated with respect to selection criteria established in conjunction with the SFID. The options are ranked relative to each other in each category, with a numerical ranking of 1 being assigned to the preferred option and 4 to the least preferred option. Table 7-6 summarizes the results of the numerical ranking, which indicates that Option D is the preferred recycled water supply option. The selection/ranking categories are described below:



Table 7-6
SUPPLY OPTION RANKING MATRIX

Option No.	Overall Capital Costs	O&M Costs	RSF Golf Course Cost	RSF Golf Course Schedule	Expansion Potential	Local Control	Numerical Score	Ranking
A	2	1	4	2	2	4	15	2
B	3	3	1	4	4	1	16	3
C	4	3	4	2	1	3	17	4
D	1	4	1	1	3	1	11	1

1= preferred option, 4 = least preferred option

Overall Capital Costs - The evaluation of the total estimated capital project cost is based on the probable cost estimates summarized in Table 7-1. Estimates of capacity reservation fees for options with supply from the City of San Diego are added to the project costs, since these fees are required to be paid prior to or within the first year of recycled water deliveries. A ranking of 1 is assigned to the option with the lowest overall capital cost.

Operations and Maintenance Costs - Estimated annual O&M costs for each option are summarized in the Table 7-1. A ranking of 1 is assigned to the option with the lowest O&M costs.

Rancho Santa Fe Golf Course Costs - The evaluation of capital costs to supply the Rancho Santa Fe Golf Course is based on the Phase I probable cost estimates summarized in Table 7-1. The costs are based on the minimum facilities that must be constructed to supply the golf course with recycled water at existing potable water delivery rates.

Rancho Santa Fe Golf Course Schedule - Options are evaluated based on how quickly the RSF golf course could be supplied with recycled water. The evaluation considers the availability of recycled water from each supply source and, for sources that are not readily available, the length of time required to obtain or develop the source of supply. The construction schedule for delivery/distribution system facilities is not considered, since all options will require construction of a pump station, buried reservoir and delivery pipelines.

Expansion Potential - The ability to expand recycled water deliveries beyond the SFID goal is desirable. Each option's potential for future expansion is assessed based on the ability to obtain additional recycled water supplies. It is assumed that supply from the City of San Diego could be increased in the future, based on the ultimate capacity of the NCWRP and provisions in existing contracts with outside agencies to increase delivery rates and renegotiate contract terms when the contract expires. In contrast, supply from the SEJPA is assumed limited to the capacity of the existing recycled water treatment facilities. The recycled water supply from the local CSDs is based on existing and future projected wastewater flows into the plants.



Local Control – Entering into new contracts with outside agencies is less desirable than working with local wastewater agencies that already serve portions of SFID, and have a vested interest in their customers. SFID has good working relationships with neighboring water and wastewater agencies. Negotiating new agreements with these agencies is considered to be more desirable and less risky than entering into a new contract with the City of San Diego.

7.4 COST OF RECYCLED WATER

The total cost that SFID will have to pay for recycled water from any of the identified sources is unknown at this time. Wholesale costs and projected revenues from recycled water sales will be different for each of the four recycled water supply options, and could effect the selection of a preferred option.

Wholesale agencies purchase recycled water from the City of San Diego based on a 20-year “take or pay” agreement (see section 5.3.3). With Options A and C, a new contract between the City of San Diego and SFID will need to be negotiated, and it is assumed that this contract will be similar to the OMWD agreement. Based on this assumption, a capacity reservation fee ranging from approximately \$300,000 to \$500,000 will be required. This cost was included in evaluation of capital costs in the ranking matrix, since it is required to be paid up front. Recent conversations with City of San Diego staff, however, have indicated that a higher reservation capacity fee may be charged. It is also not known if SFID would receive the \$350/AF subsidies from MWD and the SDCWA.

SFID does not currently purchase water at a wholesale price from the SEJPA, because SEJPA staff operates and maintains the San Elijo RW system. SEJPA sells recycled water at 85 percent of the potable water rate and uses the revenue to pay its large debt service and cover O&M costs. SFID receives a \$35/AF administration fee for reading and maintaining meters and billing customers. It is noted that the cost of adding SFID customers to the SEJPA existing distribution system as shown in the cost tables is therefore not a true cost to SFID, since SEJPA now pays for the new facilities, meter connections and laterals. If recycled water were to be supplied to Rancho Santa Fe from the SEJPA, or an aggressive expansion of the Solana Beach distribution system were to be pursued, it is assumed that a new contract will be negotiated. For the supply of recycled water to Rancho Santa Fe, SFID would most likely become a wholesaler of recycled water and operate and maintain the recycled water booster pump station, reservoir, and distribution system. SFID would also be responsible for the installation of laterals, providing assistance with on-site retrofits, and installing meters for new customers. It is not clear what agency would operate the RSF supply pump station at the SEJPA. It is noted that SEJPA is relying on revenues from future sales of recycled water to help pay off their debt service and become financially solvent.

Water recycling facilities do not currently exist at any of the local CSD treatment plants, and preliminary design studies have not yet been performed. Coordination and agreement between the three CSDs would need to occur before any agreements could be worked out with SFID. It is noted that the local CSDs may also choose to pursue other potential buyers of recycled water. Whispering Palms CSD is currently conducting a recycled water market assessment and has identified the



Fairbanks Ranch Country Club, Morgan Run Country Club, and the OMWD as potential markets for recycled water in addition to SFID.

Revenues generated from the sale of recycled water will be used for operating and maintenance expenses, repayment of loans, and capital improvements. It is recommended that a separate financial evaluation be performed on at least the top two supply options when additional cost information is available.

7.5 PROPOSITION 50 FUNDING

In November 2002, California voters approved Proposition 50, which authorizes the State to sell bonds to support a variety of water projects. The primary intent of these programs is to fund local projects that will enhance water supply reliability and increase the beneficial use of existing supplies. SFID previously submitted a proposal package to obtain Proposition 50 funding through the SDCWA. Grant funding for the amount of \$2,450,000 was requested for the design and construction of a project to provide over 400 afy of recycled water to Rancho Santa Fe. SFID has not received any notice on this project funding to date.

It is anticipated that the revenues generated from recycled water sales will not be sufficient to pay off the construction loans that will be required. It is therefore assumed that grant funding and/or other revenue sources will need to be obtained for the construction of a recycled water distribution system.

7.6 OTHER PROGRAM IMPLEMENTATION CONSIDERATIONS

This section provides an overview of several administrative and program-level considerations that should be undertaken to facilitate expansion of the recycled water customer base.

7.6.1 User Agreements and Contracts

SFID should develop formal recycled water user agreements that set forth specific requirements for recycled water use on private parcels. User contracts, commitment letters and similar instruments should also be prepared to document and formalize agreements with prospective recycled water users.

7.6.2 Design and Construction Standards

As the number of users grow it will be important to have comprehensive engineering and construction standards for on-site recycled water system improvements. Standards should cover retrofits and modifications to existing sites and new construction. SFID may elect to adopt the SEJPA standards. Appendix E contains example design and construction standards, including standard details, from another recycled water purveyor. The standards may be stand alone or they may be integrated into the District's existing standards for water system improvements. Design and construction standards should include requirements for signage and noticing at user sites. Ideally, these will be uniform district-wide and will be aesthetically pleasing.



7.6.3 Cross Connection Control Program

SEJPA staff currently provides services for the cross connection control program. SFID Staff will need to take on these responsibilities within Rancho Santa Fe. This section presents several elements of a municipal cross connection control program that are necessary to prevent contamination of the potable water supply.

Backflow Prevention Device Testing. Inspection and testing of backflow protection devices is a key element of any cross connection control program. All backflow assemblies should be tested by a certified inspector at the time of installation and periodically after being put into service. Generally, inspections are required annually and more frequently where there are instances of repeated failure. Annual testing is usually the duty of the user, however, some agencies perform inspections and testing internally.

Shut Down Testing. Shut down testing, or cross connection compliance testing, is a critical step in the user site retrofit process. SFID staff should witness all tests to ensure the integrity of on-site distribution systems. Periodic shut down testing at user sites should also be performed to verify that no cross connections have been made inadvertently (or intentionally) at user sites.

User Site Inspections. Routine unannounced inspections of commercial, industrial and residential sites should be an element of the cross connection control program. All user agreements should contain provisions that allow for periodic and unannounced inspections. Changes in property ownership and/or tenancy should also trigger reporting and inspection requirements. Site inspections are intended to verify compliance with recycled water use restrictions and site requirements (e.g. sprinkler overspray, site runoff, signage, etc.)



APPENDIX A – Report Exhibits

Exhibit A-1 SFID Major Water Users

Exhibit A-2 Potential Ultimate Expansion of San Elijo RW Distribution System



INSERT EXHIBIT A-1



INSERT EXHIBIT A-2



APPENDIX C – Compendium of Recycled Water Regulations

Appendix C

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Compendium of State Laws Regarding Water Recycling

Introduction

Legal requirements applicable to recycled water are found in State statutes (laws) and regulations. Statutes are the body of laws approved by the State Legislature and signed by the Governor. Most statutes are codified for ease of reference. Most statutes relevant to recycled water are contained in the Water Code, but there are important references in the Public Resources Code, Health and Safety Code, and other codes. A portion of the Water Code is designated the Porter-Cologne Water Quality Control Act, which includes the permitting of wastewater treatment plants and water recycling facilities, as well as other water quality-related provisions.

Regulations are adopted by State agencies in order to implement the statutes. They are contained in the California Code of Regulations (CCR). The CCR is divided into titles and each title is assigned to particular agencies. The most relevant titles for recycled water are Title 17, which contains regulations to protect against cross-connections between potable and nonpotable water systems, and Title 22, which includes health-related requirements for recycled water systems, such as the types of treatment needed. These two titles are adopted by the Department of Health Services.

The Water Code defines "reclaimed water" or "recycled water" to mean water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. In 1995, provisions of the Water Code, Fish and Game Code, Health and Safety Code, and other statutes were amended to replace terms such as wastewater "reclamation" and "reclaimed water" with "water recycling" and "recycled water." The legislation (AB 1247, Setencich) was intended to enhance public acceptance of recycled water supplies.

Recycled Water - Definition

WATER CODE SECTION 13050 (n)

"Recycled water" means water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefor considered a valuable resource.

WATER CODE SECTION 26

For the purposes of this code, "recycled water" or "reclaimed water" has the same meaning as recycled water as defined in subdivision (n) of Section 13050.

Recycled Water - Recycling Criteria

WATER CODE SECTIONS 13520-13529.4

13520. As used in this article "recycling criteria" are the levels of constituents of **recycled water**, and means for assurance of reliability under the design concept which will result in **recycled water** safe from the standpoint of public health, for the uses to be made.

13521. The State Department of Health Services shall establish uniform statewide **recycling** criteria for each varying type of use of **recycled water** where the use involves the protection of public health.

13522. (a) Whenever the State Department of Health Services or any local health officer finds that a contamination exists as a result of the use of **recycled water**, the department or local health officer shall order the contamination abated in accordance with the procedure provided for in Chapter 6 (commencing with Section 5400) of Part 3 of Division 5 of the Health and Safety Code. (b) The use of **recycled water** in accordance with

the uniform statewide **recycling** criteria established pursuant to Section 13521, for the purpose of this section, does not cause, constitute, or contribute to, any form of contamination, unless the department or the regional board determines that contamination exists.

13522.5. (a) Except as provided in subdivision (e), any person **recycling** or proposing to **recycle water**, or using or proposing to use **recycled water**, within any region for any purpose for which **recycling** criteria have been established, shall file with the appropriate regional board a report containing information required by the regional board. (b) Except as provided in subdivision (e), every person **recycling water** or using **recycled water** shall file with the appropriate regional board a report of any material change or proposed change in the character of the **recycled water** or its use. (c) Each report under this section shall be sworn to, or submitted under penalty of perjury. (d) This section shall not be construed so as to require any report in the case of any producing, manufacturing, or processing operation involving the **recycling of water** solely for use in the producing, manufacturing, or processing operation. (e) Except upon the written request of the regional board, a report is not required pursuant to this section from any user of **recycled water** which is being supplied by a supplier or distributor for whom a master **recycling** permit has been issued pursuant to Section 13523.1.

13522.6. Any person failing to furnish a report under Section 13522.5 when so requested by a regional board is guilty of a misdemeanor.

13522.7. The Attorney General, at the request of the regional board, shall petition the superior court for the issuance of a temporary restraining order, temporary injunction or permanent injunction, or combination thereof, as may be appropriate, requiring any person not complying with Section 13522.5 to comply forthwith.

13523. (a) Each regional board, after consulting with and receiving the recommendations of the State Department of Health Services and any party who has requested in writing to be consulted, and after any necessary hearing, shall, if in the judgment of the board, it is necessary to protect the public health, safety, or welfare, prescribe **water reclamation** requirements for water which is used or proposed to be used as **reclaimed water**. (b) The requirements may be placed upon the person **reclaiming water**, the user, or both. The requirements shall be established in conformance with the uniform statewide **reclamation** criteria established pursuant to Section 13521. The regional board may require the submission of a preconstruction report for the purpose of determining compliance with the uniform statewide **reclamation** criteria. The requirements for a use of **reclaimed water** not addressed by the uniform statewide **reclamation** criteria shall be considered on a case-by-case basis.

13523.1. (a) Each regional board, after consulting with, and receiving the recommendations of, the State Department of Health Services and any party who has requested in writing to be consulted, with the consent of the proposed permittee, and after any necessary hearing, may, in lieu of issuing waste discharge requirements pursuant to Section 13263 or **water reclamation** requirements pursuant to Section 13523 for a user of **reclaimed water**, issue a master **reclamation** permit to a supplier or distributor, or both, of **reclaimed water**. (b) A master **reclamation** permit shall include, at least, all of the following: (1) Waste discharge requirements, adopted pursuant to Article 4 (commencing with Section 13260) of Chapter 4. (2) A requirement that the permittee comply with the uniform statewide **reclamation** criteria established pursuant to Section 13521. Permit conditions for a use of **reclaimed water** not addressed by the uniform statewide **water reclamation** criteria shall be considered on a case-by-case basis. (3) A requirement that the permittee establish and enforce rules or regulations for **reclaimed water** users, governing the design and construction of **reclaimed water** use facilities and the use of **reclaimed water**, in accordance with the uniform statewide **reclamation** criteria established pursuant to Section 13521. (4) A requirement that the permittee submit a quarterly report summarizing **reclaimed water** use, including the total amount of **reclaimed water** supplied, the total number of **reclaimed water** use sites, and the locations of those sites, including the names of the hydrologic areas underlying the **reclaimed water** use sites. (5) A requirement that the permittee conduct periodic inspections of the facilities of the **reclaimed water** users to monitor compliance by the users with the uniform statewide **reclamation** criteria established pursuant to Section 13521 and the requirements of the master **reclamation** permit. (6) Any other requirements determined to be appropriate by the regional board.

13523.5. A regional board may not deny issuance of **water reclamation** requirements to a project which violates only a salinity standard in the basin plan.

13524. No person shall **recycle water** or use **recycled water** for any purpose for which **recycling** criteria have been established until **water recycling** requirements have been established pursuant to this article or a regional board determines that no requirements are necessary.

13525. Upon the refusal or failure of any person or persons **recycling water** or using **recycled water** to comply with the provisions of this article, the Attorney General, at the request of the regional board, shall petition the superior court for the issuance of a temporary restraining order, preliminary injunction, or permanent injunction, or combination thereof, as may be appropriate, prohibiting forthwith any person or persons from violating or threatening to violate the provisions of this article.

13525.5. Any person **recycling water** or using **recycled water** in violation of Section 13524, after such violation has been called to his attention in writing by the regional board, is guilty of a misdemeanor. Each day of such **recycling** or use shall constitute a separate offense.

13526. Any person who, after such action has been called to his attention in writing by the regional board, uses **recycled water** for any purpose for which **recycling** criteria have been established prior to the establishment of **water recycling** requirements, is guilty of a misdemeanor.

13527. (a) In administering any statewide program of financial assistance for water pollution or water quality control which may be delegated to it pursuant to Chapter 6 (commencing with Section 13400) of this division, the state board shall give added consideration to water quality control facilities providing optimum **water recycling** and use of **recycled water**. (b) Nothing in this chapter prevents the appropriate regional board from establishing waste discharge requirements if a discharge is involved.

13528. No provision of this chapter shall be construed as affecting the existing powers of the State Department of Health Services.

13529. The Legislature hereby finds and declares all of the following: (a) The purpose of Section 13529.2 is to establish notification requirements for unauthorized discharges of **recycled water** to waters of the state. (b) It is the intent of the Legislature in enacting this section to promote the efficient and safe use of **recycled water**. (c) The people of the state have a primary interest in the development of facilities to **recycle water** to supplement existing water supplies and to minimize the impacts of growing demand for new water on sensitive natural water bodies. (d) A substantial portion of the future water requirements of the state may be economically met by the beneficial use of **recycled water**. (e) The Legislature has established a statewide goal to **recycle** 700,000 acre-feet of water per year by the year 2000 and 1,000,000 acre-feet of water per year by the year 2010. (f) The use of **recycled water** has proven to be safe and the State Department of Health Services is drafting regulations to provide for expanded uses of **recycled water**.

13529.2. (a) Any person who, without regard to intent or negligence, causes or permits an unauthorized discharge of 50,000 gallons or more of **recycled water**, as defined in subdivision (c), or 1,000 gallons or more of **recycled water**, as defined in subdivision (d), in or on any waters of the state, or causes or permits such unauthorized discharge to be discharged where it is, or probably will be, discharged in or on any waters of the state, shall, as soon as (1) that person has knowledge of the discharge, (2) notification is possible, and (3) notification can be provided without substantially impeding cleanup or other emergency measures, immediately notify the appropriate regional board. (b) For the purposes of this section, an unauthorized discharge means a discharge not authorized by waste discharge requirements pursuant to Article 4 of Chapter 4 (commencing with Section 13260), **water reclamation** requirements pursuant to Section 13523, a master **reclamation** permit pursuant to Section 13523.1, or any other provision of this division. (c) For the purposes of this section, "**recycled water**" means wastewater treated as "**disinfected tertiary 2.2 recycled water**," as defined or described by the State Department of Health Services or wastewater receiving advanced treatment beyond disinfected tertiary 2.2 **recycled water**. (d) For purposes of this section, "**recycled water**" means "**recycled water**," as defined in subdivision (n) of Section 13050, which is treated at a level less than "**disinfected tertiary 2.2 recycled water**," as defined or described by the State Department of Health Services. (e) The requirements in this section supplement, and shall not supplant, any other provisions of law.

13529.4. (a) Any person refusing or failing to provide the notice required by Section 13529.2, or as required by a condition of waste discharge requirements requiring notification of authorized releases of **recycled water** as defined in Section 13529.2, may be subject to administrative civil liability in an amount not to exceed the following: (1) For the first violation, or a subsequent violation occurring more than 365 days from a previous violation, five thousand dollars (\$5,000). (2) For a second violation occurring within 365 days of a previous violation, ten thousand dollars (\$10,000). (3) For a third or subsequent violation occurring within 365 days of a previous violation, twenty-five thousand dollars (\$25,000). (b) The penalties in this section supplement, and shall not supplant, any other provisions of law.

TITLE 22 CODE OF REGULATIONS - SECTION 60321

60321. Sampling and analysis - (a) Disinfected secondary-23, disinfected secondary-2.2, and disinfected tertiary **recycled water** shall be sampled at least once daily for total coliform bacteria. The samples shall be taken from the disinfected effluent and shall be analyzed by an approved laboratory. (b) Disinfected tertiary **recycled water** shall be continuously sampled for turbidity using a continuous turbidity meter and recorder following filtration. Compliance with the daily average operating filter effluent turbidity shall be determined by averaging the levels of recorded turbidity taken at four-hour intervals over a 24-hour period. Compliance with turbidity pursuant to section 60301.320 (a)(2)(B) and (b)(1) shall be determined using the levels of recorded turbidity taken at intervals of no more than 1.2-hours over a 24-hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2-hours may be substituted for a period of up to 24-hours. The results of the daily average turbidity determinations shall be reported quarterly to the regulatory agency. (c) The producer or supplier of the **recycled water** shall conduct the sampling required in subsections (a) and (b).

Recycled Water - Water Recycling Act of 1991

WATER CODE SECTIONS 13575-13583

13575. (a) This chapter shall be known and may be cited as the **Water Recycling Act of 1991**. (b) As used in this chapter, the following terms have the following meanings: (1) "Customer" means a person or entity that purchases water from a retail water supplier. (2) "Entity responsible for groundwater replenishment" means any person or entity authorized by statute or court order to manage a groundwater basin and acquire water for groundwater replenishment. (3) "**Recycled water**" has the same meaning as defined in subdivision (n) of Section 13050. (4) "**Recycled water producer**" means any local public entity that produces **recycled water**. (5) "**Recycled water wholesaler**" means any local public entity that distributes **recycled water** to retail water suppliers and which has constructed, or is constructing, a **recycled water** distribution system. (6) "Retail water supplier" means any local entity, including a public agency, city, county, or private water company, that provides retail water service. (7) "Retailer" means the retail water supplier in whose service area is located the property to which a customer requests the delivery of **recycled water** service.

13576. The Legislature hereby makes the following findings and declarations: (a) The State of California is subject to periodic drought conditions. (b) The development of traditional water resources in California has not kept pace with the state's population, which is growing at the rate of over 700,000 per year and which is anticipated to reach 36 million by the year 2010. (c) There is a need for a reliable source of water for uses not related to the supply of potable water to protect investments in agriculture, greenbelts, and recreation and to replenish groundwater basins, and protect and enhance fisheries, wildlife habitat, and riparian areas. (d) The environmental benefits of **recycled water** include a reduced demand for water in the Sacramento-San Joaquin Delta which is otherwise needed to maintain water quality, reduced discharge of waste into the ocean, and the enhancement of groundwater basins, recreation, fisheries, and wetlands. (e) The use of **recycled water** has proven to be safe from a public health standpoint, and the State Department of Health Services is updating regulations for the use of **recycled water**. (f) The use of **recycled water** is a cost-effective, reliable method of helping to meet California's water supply needs. (g) The development of the infrastructure to distribute **recycled water** will provide jobs and enhance the economy of the state. (h) Retail water suppliers and **recycled water** producers and wholesalers should promote the substitution of **recycled water** for potable water and imported water in order to maximize the appropriate cost-effective use of **recycled water** in California. (i) **Recycled water** producers, retail water suppliers, and entities responsible for groundwater replenishment should cooperate in joint technical, economic, and environmental studies, as appropriate, to determine the feasibility of providing

recycled water service. (j) Retail water suppliers and **recycled water** producers and wholesalers should be encouraged to enter into contracts to facilitate the service of **recycled** and potable water by the retail water suppliers in their service areas in the most efficient and cost-effective manner. (k) **Recycled water** producers and wholesalers and entities responsible for groundwater replenishment should be encouraged to enter into contracts to facilitate the use of **recycled water** for groundwater replenishment if **recycled water** is available and the authorities having jurisdiction approve its use. (l) Wholesale prices set by **recycled water** producers and **recycled water** wholesalers, and rates that retail water suppliers are authorized to charge for **recycled water**, should reflect an equitable sharing of the costs and benefits associated with the development and use of **recycled water**.

13577. This chapter establishes a statewide goal to **recycle** a total of 700,000 acre-feet of water per year by the year 2000 and 1,000,000 acre-feet of water per year by the year 2010.

13578. (a) In order to achieve the statewide goal for **recycled water** use established in Section 13577 and to implement the Governor's Advisory Drought Planning Panel Critical Water Shortage Contingency Plan recommendations, Section F2, as submitted December 29, 2000, the department shall identify and report to the Legislature on opportunities for increasing the use of **recycled water**, as defined in paragraph (3) of subdivision (b) of Section 13575, and identify constraints and impediments, including the level of state financial assistance available for project construction, to increasing the use of **recycled water**. (b) The department shall convene a task force, to be known as the 2002 **Recycled Water** Task Force, to advise the department in implementation of subdivision (a), including making recommendations to the Legislature regarding the following: (1) How to further the use of **recycled water** in industrial and commercial applications, including, but not limited to, those applications set forth in Section 13552.8. The task force shall evaluate the current regulatory framework of state and local rules, regulations, ordinances, and permits to identify the obstacles and disincentives to industrial and commercial **reuse**. Issues to be investigated include, but are not limited to, applicability of visual inspections instead of pressure tests for cross-connections between potable and nonpotable water systems, dual piping trenching restrictions, fire suppression system design, and backflow protections. (2) Changes in the Uniform Plumbing Code, published by the International Association of Plumbing and Mechanical Officials, that are appropriate to facilitate the use of **recycled water** in industrial and commercial settings. The department shall make recommendations to the California Building Standards Commission with regard to suggested revisions to the California Plumbing Code necessary to incorporate the changes identified by the task force. (3) Changes in state statutes or the current regulatory framework of state and local rules, regulations, ordinances, and permits appropriate to increase the use of **recycled water** for commercial laundries and toilet and urinal flushing in structures including, but not limited to, those defined in subdivision (c) of Section 13553. The department shall identify financial incentives to help offset the cost of retrofitting privately and publicly owned structures. (4) The need to reconvene the California Potable **Reuse** Committee established by the department in 1993 or convene a successor committee to update the committee's finding that planned indirect potable **reuse** of **recycled water** by augmentation of surface water supplies would not adversely affect drinking water quality if certain conditions were met. (5) The need to augment state water supplies using water use efficiency strategies identified in the CALFED Bay-Delta Program. In its report pursuant to subdivision (a), the department shall identify ways to coordinate with CALFED to assist local communities in educating the public with regard to the statewide water supply benefits of local **recycling** projects and the level of public health protection ensured by compliance with the uniform statewide water **recycling** criteria developed by the State Department of Health Services in accordance with Section 13521. (6) Impediments or constraints, other than water rights, related to increasing the use of **recycled water** in applications for agricultural, environmental, or irrigation uses, as determined by the department. (c) (1) The task force shall be convened by the department and be comprised of one representative from each of the following state agencies: (A) The department. (B) The State Department of Health Services. (C) The state board. (D) The California Environmental Protection Agency. (E) The CALFED Bay-Delta Program. (F) The Department of Food and Agriculture. (G) The Building Standards Commission. (H) The University of California. (I) The Resources Agency. (2) The task force shall also include one representative from a recognized environmental advocacy group and one representative from a consumer advocacy group, as determined by the department, and one representative of local agency health officers, one representative of urban water wholesalers, one representative from a groundwater management entity, one representative of water districts, one representative from a nonprofit association of public and private members created to further the use of **recycled water**, one representative of commercial real estate, one representative of land development, one representative of industrial interests, and at least two representatives from each of the following as defined in Section 13575:

(A) **Recycled water producer.** (B) **Recycled water wholesaler.** (C) Retail water supplier. (d) The department and the task force shall report to the Legislature not later than July 1, 2003. (e) The department shall carry out the duties of this section only to the extent that funds pursuant to Section 79145, enacted as part of the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Division 26 (commencing with Section 79000)), are made available for the purposes of this section.

13579. (a) In order to achieve the goals established in Section 13577, retail water suppliers shall identify potential uses for **recycled water** within their service areas, potential customers for **recycled water** service within their service areas, and, within a reasonable time, potential sources of **recycled water**. (b) **Recycled water producers** and **recycled water wholesalers** may also identify potential uses for **recycled water**, and may assist retail water suppliers in identifying potential customers for **recycled water** service within the service areas of those retail water suppliers. (c) **Recycled water producers**, retail water suppliers, and entities responsible for groundwater replenishment may cooperate in joint technical, economic, and environmental studies, as appropriate, to determine the feasibility of providing **recycled water** service and **recycled water** for groundwater replenishment consistent with the criteria set forth in paragraphs (1) to (3), inclusive, of subdivision (a) of Section 13550 and in accordance with Section 60320 of Title 22 of the California Code of Regulations.

13580. (a) A retail water supplier that has identified a potential use or customer pursuant to Section 13579 may apply to a **recycled water producer** or **recycled water wholesaler** for a **recycled water supply**. (b) A **recycled water producer** or **recycled water wholesaler** that has identified a potential use or customer pursuant to Section 13579 may, in writing, request a retail water supplier to enter into an agreement to provide **recycled water** to the potential customer. (c) A customer may request, in writing, a retailer to enter into an agreement to provide **recycled water** to the customer. (d) (1) An entity responsible for groundwater replenishment that is a customer of a retail water supplier and that has identified the potential use of **recycled water** for groundwater replenishment purposes may, in writing, request that retail water supplier to enter into an agreement to provide **recycled water** for that purpose. That entity may not obtain **recycled water** for that purpose from a **recycled water producer**, a **recycled water wholesaler**, or another retail water supplier without the agreement of the entity's retail water supplier. (2) An entity responsible for groundwater replenishment that is not a customer of a retail water supplier and that has identified the potential use of **recycled water** for groundwater replenishment purposes may, in writing, request a retail water supplier, a **recycled water producer**, or a **recycled water wholesaler** to enter into an agreement to provide **recycled water** for that purpose.

13580.5. (a) (1) Subject to subdivision (e) of Section 13580.7, a retail water supplier that receives a request from a customer pursuant to subdivision (c) of Section 13580 shall enter into an agreement to provide **recycled water**, if **recycled water** is available, or can be made available, to the retail water supplier for sale to the customer. (2) Notwithstanding paragraph (1), in accordance with a written agreement between a **recycled water producer** or a **recycled water wholesaler** and a retail water supplier, the retail water supplier may delegate to a **recycled water producer** or a **recycled water wholesaler** its responsibility under this section to provide **recycled water**. (b) A customer may not obtain **recycled water** from a **recycled water producer**, a **recycled water wholesaler**, or a retail water supplier that is not the retailer without the agreement of the retailer. (c) If either a **recycled water producer** or a **recycled water wholesaler** provides a customer of a retail water supplier with a written statement that it can and will provide **recycled water** to the retailer, the retail water supplier shall, not later than 120 days from the date on which the retail water supplier receives the written statement from the customer, by certified mail, return receipt requested, submit a written offer to the customer. A determination of availability pursuant to Section 13550 is not required. (d) If the state board pursuant to Section 13550 makes a determination that there is available **recycled water** to serve a customer of a retail water supplier, the retail water supplier, not later than 120 days from the date on which the retail water supplier receives a copy of that determination from the customer, by certified mail, return receipt requested, shall submit a written offer to the customer.

13580.7. (a) This section applies only to a retail water supplier that is a public agency. (b) A customer may request, in writing, a retail water supplier to enter into an agreement or adopt **recycled water** rates in order to provide **recycled water** service to the customer. The retail water supplier, by certified mail return receipt requested, shall submit a written offer to the customer not later than 120 days from the date on which the retail water supplier receives the written request from the customer. (c) If no rate is in effect for **recycled water** service within the service area of a retail water supplier, the rate and conditions for **recycled water** service shall be established by contract between the retail water supplier and the customer, not later than 120 days from the

date on which the customer requests a contract, or, by resolution or ordinance by the retail water supplier, not later than 120 days from the date on which the retail water supplier receives the customer's written request for an ordinance or resolution. (d) A rate for **recycled water** service established by contract, ordinance, or resolution, shall reflect a reasonable relationship between the amount of the rate and the retail cost of obtaining or producing the **recycled water**, the cost of conveying the **recycled water**, and overhead expenses for providing **recycled water** service. Capital costs of facilities required to serve the customer shall be amortized over the economic life of the facility, or the length of time the customer agrees to purchase **recycled water**, whichever is less. The rate shall not exceed the estimated reasonable cost of providing the service, and any additional costs agreed to by the customer for **recycled water** supplemental treatment. (e) The rate for **recycled water** shall be comparable to, or less than, the retail water supplier's rate for potable water. If **recycled water** service cannot be provided at a rate comparable to, or less than, the rate for potable water, the retail water supplier is not required to provide the **recycled water** service, unless the customer agrees to pay a rate that reimburses the retail water supplier for the costs described in subdivision (c). (f) The offer required by subdivisions (c) and (d) of Section 13580.5 shall identify all of the following: (1) The source for the **recycled water**. (2) The method of conveying the **recycled water**. (3) A schedule for delivery of the **recycled water**. (4) The terms of service. (5) The rate for the **recycled water**, including the per-unit cost for that water. (6) The costs necessary to provide service and the basis for determining those costs. (g) This section does not apply to **recycled water** service rates established before January 1, 1999, or any amendments to those rates.

13580.8. (a) This section applies only to a retail water supplier that is regulated by the Public Utilities Commission. (b) Rates for **recycled water** that is provided to the customer by a retail water supplier regulated by the Public Utilities Commission shall be established by the commission pursuant to Section 455.1 of the Public Utilities Code. A regulated water utility may request the commission to establish the rate or rates for the delivery of **recycled** or nonpotable water, with the objective of providing, where practicable, a reasonable economic incentive for the customer to purchase **recycled** or nonpotable water in place of potable water. (c) A regulated water utility may propose a rate or rates for **recycled** or nonpotable water by tariff or by contract between the retail water supplier and the customer. Where the rate or rates are set by contract, the water utility and its customer shall meet, confer, and negotiate in good faith to establish a contract rate. (d) The commission shall, as appropriate, provide a discount from the general metered rate of the water utility for potable water by either of the following means: (1) Passing through to the customer the net reduction in cost to the water utility in purchasing and delivering **recycled** or nonpotable water as compared to the cost of purchasing and delivering potable water. (2) Granting to the customer a uniform discount from the water utility's general metered potable water rate when the discount in paragraph (1) is determined to be an insufficient incentive for the customer to convert to the use of **recycled** or nonpotable water. If the commission provides for a discount pursuant to this paragraph that is greater than the water utility's reduction in cost, the commission shall authorize the water utility to include the aggregate amount of that discount in its revenue requirements to be applied to, and recovered in, rates that are applicable to all general metered customers.

13580.9. (a) Notwithstanding any other provision of law, and except as otherwise previously provided for in a contract agreed to by the customer and the City of West Covina, if the purchaser, contractor, or lessee of, or successor to, all or a portion of the water utility owned by the City of West Covina is a retail water supplier that is regulated by the Public Utilities Commission, rates for **recycled** or nonpotable water service to a closed hazardous waste and solid waste facility located within the boundaries of the City of West Covina for the purposes of irrigation, recreation, or dust suppression or any other use at that facility shall be established in accordance with subdivisions (a) to (e), inclusive, of Section 13580.7, and if there is a failure to agree on the terms and conditions of a **recycled** or nonpotable water supply agreement for the delivery of water for those purposes by that purchaser, contractor, lessee, or successor, Section 13581 shall apply. (b) For the purpose of this section, nonpotable water that is not the result of the treatment of waste shall be treated as the equivalent of **recycled water** if it is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefor considered a valuable resource, if the use of that water will not adversely affect downstream water rights, degrade water quality, or be injurious to plant life, fish, or wildlife, as provided by statute or by regulations of the State Department of Health Services and the state board or a regional board, as appropriate.

13581. (a) If there is a failure to agree on terms and conditions of a **recycled water** supply agreement involving a retail water supplier that is a public agency within 180 days from the date of the receipt of a request for **recycled water** pursuant to subdivision (c) of Section 13580, a written statement pursuant to subdivision (c) of

Section 13580.5, or a determination of availability pursuant to subdivision (d) of Section 13580.5, any party may request a formal mediation process. The parties shall commence mediation within 60 days after the mediation request is made. If the parties cannot agree on a mediator, the director shall appoint a mediator. The mediator may recommend to the parties appropriate terms and conditions applicable to the service of **recycled water**. The cost for the services of the mediator shall be divided equally among the parties to the mediation and shall not exceed twenty thousand dollars (\$20,000). (b) If the parties in mediation reach agreement, both parties together shall draft the contract for the **recycled water** service. The parties shall sign the contract within 30 days. (c) If the parties in mediation fail to reach agreement, the affected retail water supplier shall, within 30 days, by resolution or ordinance, adopt a rate for **recycled water** service. The agency action shall be subject to validating proceedings pursuant to Chapter 9 (commencing with Section 860) of Part 2 of Title 10 of the Code of Civil Procedure, except that there shall not be a presumption in favor of the retail water supplier under the action taken to set the rate for **recycled water** service. The mediator shall file a report with the superior court setting forth the recommendations provided to the parties regarding appropriate terms and conditions applicable to the service of **recycled water**. Each party shall bear its own costs and attorney's fees.

13581.2. If the retail water supplier is regulated by the Public Utilities Commission, and there is a failure to agree on terms and conditions of a **recycled water** supply agreement with a customer within 180 days from the date of the receipt of a request for **recycled water** pursuant to subdivision (c) of Section 13580, a written statement pursuant to subdivision (c) of Section 13580.5, or a determination of availability pursuant to subdivision (d) of Section 13580.5, the matter shall be submitted to the Public Utilities Commission for resolution, and the commission shall determine a contract rate or rates for **recycled water** as provided in Section 13580.8.

13582. This chapter is not intended to alter either of the following: (a) Any rights, remedies, or obligations which may exist pursuant to Article 1.5 (commencing with Section 1210) of Chapter 1 of Part 2 of Division 2 of this code or Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code. (b) Any rates established or contracts entered into prior to January 1, 1999.

13583. (a) If a retail water supplier that is a public agency does not comply with this chapter, the customer may petition a court for a writ of mandate pursuant to Chapter 2 (commencing with Section 1084) of Title 1 of Part 3 of the Code of Civil Procedure. (b) If a retail water supplier is regulated by the Public Utilities Commission and does not comply with this chapter, the Public Utilities Commission may order the retailer to comply with this chapter after receiving a petition from the customer specifying the provisions of this chapter with which the retailer has failed to comply.

Recycled Water and Water Supply Augmentation

WATER CODE SECTIONS 13510-13512

13510. It is hereby declared that the people of the state have a primary interest in the development of facilities to **recycle** water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state.

13511. The Legislature finds and declares that a substantial portion of the future water requirements of this state may be economically met by beneficial use of **recycled water**. The Legislature further finds and declares that the utilization of **recycled water** by local communities for domestic, agricultural, industrial, recreational, and fish and wildlife purposes will contribute to the peace, health, safety and welfare of the people of the state. Use of **recycled water** constitutes the development of "new basic water supplies" as that term is used in Chapter 5 (commencing with Section 12880) of Part 6 of Division 6.

13512. It is the intention of the Legislature that the state undertake all possible steps to encourage development of **water recycling** facilities so that **recycled water** may be made available to help meet the growing water requirements of the state.

WATER CODE SECTION 13142.5

(e) (1) Adequately treated **recycled water** should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone, and consideration, in statewide programs of financial assistance for water pollution or water quality control, shall be given to providing optimum **water recycling** and use of **recycled water**.

WATER CODE SECTIONS 78500-78500.2

78500. This division shall be known and may be cited as the Safe, Clean, Reliable Water Supply Act.

78500.2. In placing this measure before the voters, the Legislature hereby finds and declares all of the following: (a) The state faces a water crisis that threatens our economy and environment. (b) The state's growing population has increasing needs for safe water supplies which are essential to the public health, safety, and welfare. (c) It is of paramount importance that the limited water resources of the state be protected from pollution, and conserved and **recycled** whenever economically, environmentally, and technically feasible. (d) The state should plan to meet the water supply needs of all beneficial uses of water, including urban, agricultural, and environmental, utilizing a wide range of strategies including water conservation and **recycling**, conjunctive use of surface and groundwater supplies, water transfers, and improvements in the state's water storage and delivery systems to meet the growing water needs of the state. (e) This measure is a necessary first step toward providing for the state's long-term water supply requirements through a number of water management strategies. (f) The San Francisco Bay/Sacramento San Joaquin Delta Estuary (the Bay-Delta) is of statewide and national importance. The Bay-Delta provides habitat for more than 120 species of fish and wildlife and serves as a major link in our water delivery system for businesses and farms statewide and more than 22 million residents. (g) The state has signed an historic accord with federal officials and statewide water interests that calls for the development of a comprehensive and long-term solution for the water supply reliability, water quality, and environmental problems of the Bay-Delta. (h) Federal and state representatives have initiated a program known as CALFED, to develop a comprehensive and long-term solution to the problems associated with the Bay-Delta, including an equitable allocation of program costs among beneficiary groups. The success of the CALFED program is vital to the environmental and economic well-being of the state.

HEALTH AND SAFETY CODE SECTION 116551

The department shall not issue a permit to a public water system or amend a valid existing permit for the use of a reservoir as a source of supply that is directly augmented with **recycled water**, as defined in subdivision (n) of Section 13050 of the Water Code, unless the department does all of the following: (a) Performs an engineering evaluation that evaluates the proposed treatment technology and finds that the proposed technology will ensure that the **recycled water** meets or exceeds all applicable primary and secondary drinking water standards and poses no significant threat to public health. (b) Holds at least three duly noticed public hearings in the area where the **recycled water** is proposed to be used or supplied for human consumption to receive public testimony on that proposed use. The department shall make available to the public, not less than 10 days prior to the date of the first hearing held pursuant to this subdivision, the evaluations and findings made pursuant to subdivision (a).

TITLE 22 CODE OF REGULATIONS - SECTION 60320

60320. Groundwater recharge - (a) **Reclaimed water** used for groundwater recharge of domestic water supply aquifers by surface spreading shall be at all times of a quality that fully protects public health. The State Department of Health Services' recommendations to the Regional Water Quality Control Boards for proposed groundwater recharge projects and for expansion of existing projects will be made on an individual case basis where the use of **reclaimed water** involves a potential risk to public health. (b) The State Department of Health Services' recommendations will be based on all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal. (c) The State Department of Health Services will hold a public hearing prior to making the final determination regarding the public health aspects of each groundwater recharge project. Final recommendations will be submitted to the Regional Water Quality Control Board in an expeditious manner.

Recycled Water and Water Management Planning

WATER CODE SECTIONS 10610-10610.2

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following: (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands. (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level. (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate. (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years. (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies. (6) Implementing effective water management strategies, including groundwater storage projects and **recycled water** projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of **recycled water**. (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities. (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability. (9) The quality of source supplies can have a significant impact on water management strategies and supply reliability. (b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

WATER CODE SECTION 10630

It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

WATER CODE SECTION 10631

A plan shall be adopted in accordance with this chapter ...

WATER CODE SECTION 10633

The plan shall provide, to the extent available, information on **recycled water** and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following: (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal. (b) A description of the quantity of treated wastewater that meets **recycled water** standards, is being discharged, and is otherwise available for use in a **recycled water** project. (c) A description of the **recycled water** currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use. (d) A description and quantification of the potential uses of **recycled water**, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial **reuse**, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses. (e) The projected use of **recycled water** within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of **recycled water** in comparison to uses previously projected pursuant to this subdivision. (f) A description of actions, including financial incentives, which may be taken to encourage the use of **recycled water**, and the projected results of these actions in terms of acre-feet of **recycled water** used per year. (g) A plan for optimizing the use of **recycled water** in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets **recycled water** standards, and to overcome any obstacles to achieving that increased use.

Recycled Water and California Water Plan Update**WATER CODE SECTIONS 10004-10004.6**

10004. (a) The plan for the orderly and coordinated control, protection, conservation, development, and utilization of the water resources of the state which is set forth and described in Bulletin No.1 of the State Water Resources Board entitled "Water Resources of California," Bulletin No. 2 of the State Water Resources Board entitled, "Water Utilization and Requirements of California," and Bulletin No. 3 of the department entitled, "The California Water Plan," with any necessary amendments, supplements, and additions to the plan, shall be known as "The California Water Plan." (b) (1) The department shall update The California Water Plan on or before December 31, 2003, and every five years thereafter. The department shall report the amendments, supplements, and additions included in the updates of The California Water Plan, together with a summary of the department's conclusions and recommendations, to the Legislature in the session in which the updated plan is issued. (2) The department shall establish an advisory committee, comprised of representatives of agricultural and urban water suppliers, local government, business, production agriculture, and environmental interests, and other interested parties, to assist the department in the updating of The California Water Plan. The department shall consult with the advisory committee in carrying out this section. The department shall provide written notice of meetings of the advisory committee to any interested person or entity that request the notice. The meetings shall be open to the public. (3) The department shall release a preliminary draft of The California Water Plan, as updated, upon request, to interested persons and entities throughout the state for their review and comments. The department shall provide these persons and entities an opportunity to present written or oral comments on the preliminary draft. The department shall consider these comments in the preparation of the final publication of The California Water Plan, as updated.

10004.5. As part of the requirement of the department to update The California Water Plan pursuant to subdivision (b) of Section 10004, the department shall include in the plan a discussion of various strategies, including, but not limited to, those relating to the development of new water storage facilities, water conservation, **water recycling**, desalination, conjunctive use, and water transfers that may be pursued in order to meet the future **water** needs of the state. The department shall also include a discussion of the potential for alternative **water** pricing policies to change current and projected uses. The department shall include in the plan a discussion of the potential advantages and disadvantages of each strategy and an identification of all federal and state permits, approvals, or entitlements that are anticipated to be required in order to implement the various components of the strategy.

10004.6. (a) As part of updating The California Water Plan every five years pursuant to subdivision (b) of Section 10004, the department shall conduct a study to determine the amount of water needed to meet the state's future needs and to recommend programs, policies, and facilities to meet those needs. (b) The department shall consult with the advisory committee established pursuant to subdivision (b) of Section 10004 in carrying out this section. (c) On or before January 1, 2002, and one year prior to issuing each successive update to The California Water Plan, the department shall release a preliminary draft of the assumptions and other estimates upon which the study will be based, to interested persons and entities throughout the state for their review and comments. The department shall provide these persons and entities an opportunity to present written or oral comments on the preliminary draft. The department shall consider these documents when adopting the final assumptions and estimates for the study. For the purpose of carrying out this subdivision, the department shall release, at a minimum, assumptions and other estimates relating to all of the following: (1) Basin hydrology, including annual rainfall, estimated unimpaired stream flow, depletions, and consumptive uses. (2) Groundwater supplies, including estimates of sustainable yield, supplies necessary to recover overdraft basins, and supplies lost due to pollution and other groundwater contaminants. (3) Current and projected land use patterns, including the mix of residential, commercial, industrial, agricultural, and undeveloped lands. (4) Environmental water needs, including regulatory instream flow requirements, nonregulated instream uses, and water needs by wetlands, preserves, refuges, and other managed and unmanaged natural resource lands. (5) Current and projected population. (6) Current and projected water use for all of the following: (A) Interior uses in a single-family dwelling. (B) Exterior uses in a single-family dwelling. (C) All uses in a multifamily dwelling. (D) Commercial uses. (E) Industrial uses. (F) Parks and open spaces. (7) Evapotranspiration rates for major crop types, including estimates of evaporative losses by irrigation practice and the extent to which evaporation reduces transpiration.

(8) Current and projected adoption of urban and agricultural conservation practices. (9) Current and projected supplies of water provided by **water recycling** and **reuse**. (d) The department shall include a discussion of the potential for alternative water pricing policies to change current and projected water uses identified pursuant to paragraph (6) of subdivision (c). (e) Nothing in this section requires or prohibits the department from updating any data necessary to update The California Water Plan pursuant to subdivision (b) of Section 10004.

Recycled Water / Water Quality Control

WATER CODE SECTIONS 13142 - 13142.5

13142. State policy for water quality control shall consist of all or any of the following: (a) Water quality principles and guidelines for long-range resource planning, including ground **water** and surface water management programs and control and use of **recycled water**. (b) Water quality objectives at key locations for planning and operation of water resource development projects and for water quality control activities. (c) Other principles and guidelines deemed essential by the state board for water quality control. The principles, guidelines, and objectives shall be consistent with the state goal of providing a decent home and suitable living environment for every Californian.

13142.5. In addition to any other policies established pursuant to this division, the policies of the state with respect to water quality as it relates to the coastal marine environment are that: (a) Wastewater discharges shall be treated to protect present and future beneficial uses, and, where feasible, to restore past beneficial uses of the receiving waters. Highest priority shall be given to improving or eliminating discharges that adversely affect any of the following: (1) Wetlands, estuaries, and other biologically sensitive sites. (2) Areas important for water contact sports. (3) Areas that produce shellfish for human consumption. (4) Ocean areas subject to massive waste discharge. Ocean chemistry and mixing processes, marine life conditions, other present or proposed outfalls in vicinity, and relevant aspects of areawide waste treatment management plans and programs, but not of convenience to the discharger, shall for the purposes of this section, be considered in determining the effects of such discharges. Toxic and hard-to-treat substances should be pretreated at the source if such substances would be incompatible with effective and economical treatment in municipal treatment plants. (b) For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. (c) Where otherwise permitted, new warmed or cooled water discharges into coastal wetlands or into areas of special biological importance, including marine reserves and kelp beds, shall not significantly alter the overall ecological balance of the receiving area. (d) Independent baseline studies of the existing marine system should be conducted in the area that could be affected by a new or expanded industrial facility using seawater in advance of the carrying out of the development. (e) (1) Adequately treated **recycled water** should, where feasible, be made available to supplement existing surface and underground supplies and to assist in meeting future water requirements of the coastal zone, and consideration, in statewide programs of financial assistance for water pollution or water quality control, shall be given to providing optimum **water recycling** and use of **recycled water**. (2) If **recycled water** is available for industrial use, any discharge to waters in the coastal zone, including the San Francisco Bay, after industrial use, may be authorized if all of the following conditions are met: (A) The discharge will not unreasonably affect beneficial uses. (B) The discharge is consistent with applicable water quality control plans and state policy for water quality control. (C) The use of **recycled water** is consistent with Chapter 7 (commencing with Section 13500). (D) The discharge is consistent with all applicable requirements of Chapter 5.5 (commencing with Section 13370). (E) The discharge is to the same general receiving water location as that to which the wastewater would be discharged if not reused. (3) Any requirement imposed pursuant to Section 13263 or 13377 shall be adjusted to reflect a credit for waste present in the **recycled water** before **reuse**. The credit shall be limited to the difference between the amount of waste present in the nonrecycled water supply otherwise available to the industry and the amount of waste present in the **recycled water**. (4) If the amount of waste in the discharge exceeds prescribed requirements because the amount of waste in the **recycled water** is in excess of that agreed to be furnished by the supplier to the discharger, no enforcement action shall be taken against the discharger unless both of the following statements apply: (A) The supplier of the **recycled water** fails to correct the problem within 30 days after the cause of the problem is identified, or within any greater period of time agreed to by the appropriate regional board. (B) The discharger continues to receive the **recycled water** from the supplier. (f) This section shall not apply to industrial discharges into publicly owned treatment works.

Recycled Water and Conservation / Unreasonable Use of Water

WATER CODE SECTION 461

It is hereby declared that the primary interest of the people of the state in the conservation of all available water resources requires the maximum reuse of **reclaimed water** in the satisfaction of requirements for beneficial uses of water.

WATER CODE SECTIONS 13550-13556

13550. (a) The Legislature hereby finds and declares that the use of potable domestic water for nonpotable uses, including, but not limited to, cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if **recycled water** is available which meets all of the following conditions, as determined by the state board, after notice to any person or entity who may be ordered to use **recycled water** or to cease using potable water and a hearing held pursuant to Article 2 (commencing with Section 648) of Chapter 1.5 of Division 3 of Title 23 of the California Code of Regulations: (1) The source of **recycled water** is of adequate quality for these uses and is available for these uses. In determining adequate quality, the state board shall consider all relevant factors, including, but not limited to, food and employee safety, and level and types of specific constituents in the **recycled water** affecting these uses, on a user-by-user basis. In addition, the state board shall consider the effect of the use of **recycled water** in lieu of potable water on the generation of hazardous waste and on the quality of wastewater discharges subject to regional, state, or federal permits. (2) The **recycled water** may be furnished for these uses at a reasonable cost to the user. In determining reasonable cost, the state board shall consider all relevant factors, including, but not limited to, the present and projected costs of supplying, delivering, and treating potable domestic water for these uses and the present and projected costs of supplying and delivering **recycled water** for these uses, and shall find that the cost of supplying the treated **recycled water** is comparable to, or less than, the cost of supplying potable domestic water. (3) After concurrence with the State Department of Health Services, the use of **recycled water** from the proposed source will not be detrimental to public health. (4) The use of **recycled water** for these uses will not adversely affect downstream water rights, will not degrade water quality, and is determined not to be injurious to plantlife, fish, and wildlife. (b) In making the determination pursuant to subdivision (a), the state board shall consider the impact of the cost and quality of the nonpotable water on each individual user. (c) The state board may require a public agency or person subject to this article to furnish information which the state board determines to be relevant to making the determination required in subdivision (a).

13551. A person or public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, shall not use water from any source of quality suitable for potable domestic use for nonpotable uses, including cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses if suitable **recycled water** is available as provided in Section 13550; however, any use of **recycled water** in lieu of water suitable for potable domestic use shall, to the extent of the **recycled water** so used, be deemed to constitute a reasonable beneficial use of that water and the use of **recycled water** shall not cause any loss or diminution of any existing water right.

13552. The amendments to Sections 13550 and 13551 of the Water Code made during the first year of the 1991-92 Regular Session are not intended to alter any rights, remedies, or obligations which may exist prior to January 1, 1992, pursuant to, but not limited to, those sections or Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code.

13552.2. (a) The Legislature hereby finds and declares that the use of potable domestic water for the irrigation of residential landscaping is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water**, for this use, is available to the residents and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (b) The state board may require a public agency or person subject to this section to submit information that the state board determines may be relevant in making the determination required in subdivision (a).

13552.4. (a) Any public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, may require the use of **recycled water** for irrigation of residential landscaping, if all of the following requirements are met: (1) **Recycled water**, for this use, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (2) The use of **recycled water** does not cause any loss or diminution of any existing water right. (3) The irrigation systems are constructed in accordance with Chapter 3 (commencing with Section 60301) of Division 4 of Title 22 of the California Code Regulations. (b) This section applies to both of the following: (1) New subdivisions for which the building permit is issued on or after March 15, 1994, or, if a building permit is not required, new structures for which construction begins on or after March 15, 1994, for which the State Department of Health Services has approved the use of **recycled water**. (2) Any residence that is retrofitted to permit the use of **recycled water** for landscape irrigation and for which the State Department of Health Services has approved the use of **recycled water**. (c) (1) Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to any project which only involves the repiping, redesign, or use of **recycled water** for irrigation of residential landscaping necessary to comply with a requirement prescribed by a public agency under subdivision (a). (2) The exemption in paragraph (1) does not apply to any project to develop **recycled water**, to construct conveyance facilities for **recycled water**, or any other project not specified in this subdivision.

13552.6. (a) The Legislature hereby finds and declares that the use of potable domestic water for floor trap priming, cooling towers, and air-conditioning devices is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water**, for these uses, is available to the user, and the water meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (b) The state board may require a public agency or person subject to this section to submit information that the state board determines may be relevant in making the determination required in subdivision (a).

13552.8. (a) Any public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, may require the use of **recycled water** in floor trap priming, cooling towers, and air-conditioning devices, if all of the following requirements are met: (1) **Recycled water**, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (2) The use of **recycled water** does not cause any loss or diminution of any existing water right. (3) If public exposure to aerosols, mist, or spray may occur, appropriate mist mitigation or mist control is provided, such as the use of mist arrestors or the addition of biocides to the water in accordance with criteria established pursuant to Section 13521. (4) The person intending to use **recycled water** has prepared an engineering report pursuant to Section 60323 of Title 22 of the California Code of Regulations that includes plumbing design, cross-connection control, and monitoring requirements for the public agency, which are in compliance with criteria established pursuant to Section 13521. (b) This section applies to both of the following: (1) New industrial facilities and subdivisions for which the building permit is issued on or after March 15, 1994, or, if a building permit is not required, new structures for which construction begins on or after March 15, 1994, for which the State Department of Health Services has approved the use of **recycled water**. (2) Any structure that is retrofitted to permit the use of **recycled water** for floor traps, cooling towers, or air-conditioning devices, for which the State Department of Health Services has approved the use of **recycled water**. (c) (1) Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to any project which only involves the repiping, redesign, or use of **recycled water** for floor trap priming, cooling towers, or air-conditioning devices necessary to comply with a requirement prescribed by a public agency under subdivision (a). (2) The exemption in paragraph (1) does not apply to any project to develop **recycled water**, to construct conveyance facilities for **recycled water**, or any other project not specified in this subdivision.

13553. (a) The Legislature hereby finds and declares that the use of potable domestic water for toilet and urinal flushing in structures is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water**, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (b) The state board may require a public agency or person subject to this section to furnish whatever information may be relevant to making the determination required in subdivision (a). (c) For the purposes of this section and Section 13554, "structure" or "structures" means commercial, retail, and office buildings, theaters, auditoriums, schools, hotels, apartments, barracks, dormitories, jails, prisons, and reformatories, and other structures as determined by the

State Department of Health Services. (d) Nothing in this section or Section 13554 applies to a pilot program adopted pursuant to Section 13553.1.

13553.1. (a) The Legislature hereby finds and declares that certain coastal areas of the state have been using sea water to flush toilets and urinals as a means of conserving potable water; that this practice precludes the beneficial **reuse** of treated wastewater and has had a deleterious effect on the proper wastewater treatment process, and has led to corrosion of the sea water distribution pipelines and wastewater collection systems; and that this situation must be changed. (b) There is a need for a pilot program to demonstrate that conversion to the use of **recycled water** in residential buildings for toilet and urinal flushing does not pose a threat to public health and safety. (c) A city that is providing a separate distribution system for sea water for use in flushing toilets and urinals in residential structures may, by ordinance, authorize the use of **recycled water** for the flushing of toilets and urinals in residential structures if the level of treatment and the use of the **recycled water** meets the criteria set by the State Department of Health Services.

13554. (a) Any public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, may require the use of **recycled water** for toilet and urinal flushing in structures, except a mental hospital or other facility operated by a public agency for the treatment of persons with mental disorders, if all of the following requirements are met: (1) **Recycled water**, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing. (2) The use of **recycled water** does not cause any loss or diminution of any existing water right. (3) The public agency has prepared an engineering report pursuant to Section 60323 of Title 22 of the California Code of Regulations that includes plumbing design, cross-connection control, and monitoring requirements for the use site, which are in compliance with criteria established pursuant to Section 13521. (b) This section applies only to either of the following: (1) New structures for which the building permit is issued on or after March 15, 1992, or, if a building permit is not required, new structures for which construction begins on or after March 15, 1992. (2) Any construction pursuant to subdivision (a) for which the State Department of Health Services has, prior to January 1, 1992, approved the use of **recycled water**. (c) Division 13 (commencing with Section 21000) of the Public Resources Code does not apply to any project which only involves the repiping, redesign, or use of **recycled water** by a structure necessary to comply with a requirement issued by a public agency under subdivision (a). This exemption does not apply to any project to develop **recycled water**, to construct conveyance facilities for **recycled water**, or any other project not specified in this subdivision.

13554.2. (a) Any person or entity proposing the use of **recycled water** shall reimburse the State Department of Health Services for reasonable costs that department actually incurs in performing duties pursuant to this chapter. (b) (1) Upon a request from the person or entity proposing the use of **recycled water**, the State Department of Health Services shall, within a reasonable time after the receipt of the request, provide an estimate of the costs that it will reasonably incur in the performance of its duties pursuant to this chapter. (2) For purposes of implementing subdivision (a), that department shall maintain a record of its costs. In determining those costs, that department may consider costs that include, but are not limited to, costs relating to personnel requirements, materials, travel, and office overhead. The amount of reimbursement shall be equal to, and may not exceed, that department's actual costs. (c) With the consent of the person or entity proposing the use of **recycled water**, the State Department of Health Services may delegate all or part of the duties that department performs pursuant to this chapter within a county to a local health agency authorized by the board of supervisors to assume these duties, if, in the judgment of that department, the local health agency can perform these duties. Any person or entity proposing the use of **recycled water** shall reimburse the local health agency for reasonable costs that the local health agency actually incurs in the performance of its duties delegated pursuant to this subdivision. (d) (1) Upon a request from the person or entity proposing the use of **recycled water**, the local health agency shall, within a reasonable time after the receipt of the request, provide an estimate of the cost it will reasonably incur in the performance of its duties delegated under subdivision (c). (2) The local health agency, if delegated duties pursuant to subdivision (c), shall maintain a record of its costs that include, but is not limited to, costs relating to personnel requirements, materials, travel, and office overhead. The amount of reimbursement shall be equal to, and may not exceed, the local health agency's actual costs. (e) The State Department of Health Services or local health agency shall complete its review of a proposed use of **recycled water** within a reasonable period of time. That department shall submit to the person or entity proposing the use of **recycled water** a written determination as to whether the proposal submitted is complete for purposes of review within 30 days from the date of receipt of the proposal and shall approve or disapprove the proposed use within 30 days from the date on which that

department determines that the proposal is complete. (f) An invoice for reimbursement of services rendered shall be submitted to the person or entity proposing the use of **recycled water** subsequent to completion of review of the proposed use, or other services rendered, that specifies the number of hours spent by the State Department of Health Services or local health agency, specific tasks performed, and other costs actually incurred. Supporting documentation, including receipts, logs, timesheets, and other standard accounting documents, shall be maintained by that department or local health agency and copies, upon request, shall be provided to the person or entity proposing the use of **recycled water**. (g) For the purposes of this section, "person or entity proposing the use of **recycled water**" means the producer or distributor of **recycled water** submitting a proposal to the department.

13554.3. The State Water Resources Control Board may establish a reasonable schedule of fees by which it is reimbursed for the costs it incurs pursuant to Sections 13553 and 13554.

13555.2. The Legislature hereby finds and declares that many local agencies deliver **recycled water** for nonpotable uses and that the use of **recycled water** is an effective means of meeting the demands for new water caused by drought conditions or population increases in the state. It is the intent of the Legislature to encourage the design and construction of water delivery systems on private property that deliver water for both potable and nonpotable uses in separate pipelines.

13555.3. (a) Water delivery systems on private property that could deliver **recycled water** for nonpotable uses described in Section 13550, that are constructed on and after January 1, 1993, shall be designed to ensure that the water to be used for only potable domestic uses is delivered, from the point of entry to the private property to be served, in a separate pipeline which is not used to deliver the **recycled water**. (b) This section applies to water delivery systems on private property constructed within either of the following jurisdictions: (1) One that has an urban water management plan that includes the intent to develop **recycled water** use. (2) One that does not have an urban water management plan that includes **recycled water** use, but that is within five miles of a jurisdiction that does have an urban water management plan that includes **recycled water** use, and has indicated a willingness to serve the water delivery system. (c) This section does not preempt local regulation of the delivery of water for potable and nonpotable uses and any local governing body may adopt requirements which are more restrictive than the requirements of this section.

13556. In addition to any other authority provided in law, any water supplier described in subdivision (b) of Section 1745 may acquire, store, provide, sell, and deliver **recycled water** for any beneficial use, including, but not limited to, municipal, industrial, domestic, and irrigation uses, if the water use is in accordance with statewide **recycling** criteria and regulations established pursuant to this chapter.

STREETS AND HIGHWAYS CODE SECTION 92.3

- (a) The department shall do both of the following: (1) Discontinue further water intensive freeway landscaping and use drought resistant landscaping whenever feasible, taking into consideration such factors as erosion control and fire retardant needs. (2) Eliminate any dependency on imported water for landscaping as soon as practicable.
- (b) The department shall require the use of **recycled water** for the irrigation of freeway landscaping when it finds and determines that all of the following conditions exist: (1) The **recycled water** is of adequate quality and is available in adequate quantity for the proposed use. (2) The proposed use of the **recycled water** is approved by the California regional water quality control board having jurisdiction. (3) There is a direct benefit to the state highway program for the proposed use of **recycled water**. (4) The **recycled water** is supplied by a local public agency or water public utility able to contract for delivery of water and the installation, maintenance, and repair of facilities to deliver the water. (5) The installation of the water delivery facilities does not unreasonably increase any hazard to vehicles on the freeway or create unreasonable problems of highway maintenance and repair.
- (c) In cooperation with local public agencies and water public utilities, the department shall permit local public agencies and water public utilities to place transmission lines for **recycled water** in freeway rights-of-way for use by the local public agencies and water public utilities to transmit **recycled water** to others, when to do so will promote a beneficial use of **recycled water** and that transmission does not unreasonably interfere

with use of the freeway or unreasonably increase any hazard to vehicles on the freeway, subject to paragraphs (1) to (5), inclusive, of subdivision (b) and the following additional requirements: (1) The local public agency or water public utility holds the department harmless for any liability caused by a disruption of service to other users of the **recycled water** and will defend the department in any resulting legal action and pay any damages awarded as a result of that disruption. (2) The department, in cooperation with the local public agency or water public utility, may temporarily interrupt service in order to add to or modify its facilities without liability, as specified in paragraph (1). (3) The local public agency or water public utility obtains and furnishes the department an agreement by all other users of **recycled water** from the transmission system holding the department harmless for any disruption in service. (4) The local public agency or water public utility has furnished the department a list of other **recycled water** users and information on any backup system or other source of water available for use in case of a service disruption. (5) The local public agency is responsible for the initial cost or any relocation cost of the **recycled water** transmission lines for service to other users in the right-of-way and waives its rights to require the department to pay the relocation costs pursuant to Sections 702 and 704. (6) The local public agency or water public utility maintains the water transmission system subject to reasonable access for maintenance purposes to be negotiated between the department and the local public agency or water public utility. (7) The department has first priority with respect to the **recycled water** supply contracted for by the department. (8) The local public agency or water public utility installs an automatic control system which will allow the water transmission system to be shut down in case of an emergency. The department shall have access to all parts of the transmission system for purposes of the agreement. (9) All transmission lines are placed underground and as close as possible to the freeway right-of-way boundary or at other locations authorized by the department. (10) The plans and specifications for the **recycled water** transmission facilities have been approved by the department prior to construction.

- (d) As used in this section: (1) "Local public agency" means any local public agency which transmits or supplies **recycled water** to others. (2) "Water public utility" means any privately owned water corporation which is subject to the jurisdiction and control of the Public Utilities Commission.

Recycled Water - Water Recycling in Landscaping Act

GOVERNMENT CODE SECTIONS 65601-65607

65601. This article shall be known and may be cited as the **Water Recycling in Landscaping Act**.

65602. The Legislature finds and declares all of the following: (a) The waters of the state are of limited supply and are subject to ever-increasing demands. (b) The continuation of California's economic prosperity is dependent on adequate supplies of water being available for future uses. (c) It is the policy of the state to promote the efficient use of water through the development of **water recycling** facilities. (d) Landscape design, installation, and maintenance can and should be water efficient. (e) The use of potable domestic water for landscaped areas is considered a waste or unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if **recycled water** is available that meets the conditions described in Section 13550 of the Water Code.

65603. Unless the context requires otherwise, the definitions used in this section govern the construction of this article: (a) "Designated **recycled water** use area" means areas within the boundaries of the local agency that can or may in the future be served with **recycled water** in lieu of potable water and are so designated by the local agency. (b) "Local agency" means any city, county, or city and county. (c) "**Recycled water** producer" means any local public or private entity that produces **recycled water** in accordance with the conditions described in Section 13550 of the Water Code.

65604. If a **recycled water** producer determines that within 10 years the **recycled water** producer will provide **recycled water** within the boundaries of a local agency that meets all of the conditions described in Section 13550 of the Water Code, the **recycled water** producer shall notify the local agency of that fact and shall identify in the notice the area that is eligible to receive the **recycled water**, and the necessary infrastructure that the **recycled water** producer or retail water supplier will provide to support delivery of the **recycled water**.

65605. (a) Within 180 days of receipt of notification from a **recycled water** producer pursuant to Section 65604, the local agency shall adopt and enforce a **recycled water** ordinance pursuant to this article. (b) The ordinance shall include, but not be limited to, provisions that do all of the following: (1) State that it is the policy of the local agency that **recycled water** determined to be available pursuant to Section 13550 of the Water Code shall be used for nonpotable uses within the designated **recycled water** use area set forth by the local agency when the local agency determines that there is not an alternative higher or better use for the **recycled water**, its use is economically justified, and its use is financially and technically feasible for projects under consideration by the local agency. (2) Designate the areas within the boundaries of the local agency that can or may in the future use **recycled water**, including, but not limited to, existing urban areas in lieu of potable water. (3) Establish general rules and regulations governing the use and distribution of **recycled water** in accordance with applicable laws and regulations. (4) Establish that the use of the **recycled water** is determined to be available pursuant to Section 13550 of the Water Code in new industrial, commercial, or residential subdivisions located within the designated **recycled water** use areas for which a tentative map or parcel map is required pursuant to Section 66426. These provisions shall require a separate plumbing system to serve nonpotable uses in the common areas of the subdivision, including, but not limited to, golf courses, parks, greenbelts, landscaped streets, and landscaped medians. The separate plumbing system to serve nonpotable uses shall be independent of the plumbing system provided to serve domestic, residential, and other potable water uses in the subdivision. (5) Require that **recycled water** service shall not commence within the designated **recycled water** use area in any service area of a private utility, as defined in Section 1502 of the Public Utilities Code, or to any service area of a public agency retail water supplier that is not a local agency, as defined in subdivision (b) of Section 65603, except in accordance with a written agreement between the **recycled water** producer and the private utility or public agency retail water supplier that shall be made available in a timely manner by the **recycled water** producer to the local agency adopting the ordinance pursuant to this article.

65606. The **recycled water** ordinance adopted by a local agency pursuant to Section 65605 shall not apply to either of the following: (a) A tentative map as defined in Section 66424.5, or a development, as defined in Section 65927, that was approved by the local agency prior to the receipt of notification from a **recycled water** producer pursuant to Section 65604. (b) A subdivision map application that is deemed complete pursuant to Section 65943 prior to the local agency's receipt of a notice from a **recycled water** producer pursuant to Section 65604.

65607. (a) This article shall not apply to any local agency that adopted a **recycled water** ordinance or other regulation requiring the use of **recycled water** in its jurisdiction prior to January 1, 2001. (b) This article does not alter any rights, remedies, or obligations that may exist pursuant to Chapter 7 (commencing with Section 13500) of Division 7 of the Water Code. (c) This article does not alter any rights, remedies, or obligations that may exist pursuant to Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code.

Recycled Water - Different Uses

TITLE 22 CODE OF REGULATIONS SECTIONS 60303-60310

60303. Exceptions -The requirements set forth in this chapter shall not apply to the use of **recycled water** onsite at a **water recycling** plant, or wastewater treatment plant, provided access by the public to the area of onsite **recycled water** use is restricted.

60304. Use of **recycled water** for irrigation - (a) **Recycled water** used for the surface irrigation of the following shall be a disinfected tertiary **recycled water**, except that for filtration pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes: (1) Food crops, including all edible root crops, where the **recycled water** comes into contact with the edible portion of the crop, (2) Parks and playgrounds, (3) School yards, (4) Residential landscaping, (5) Unrestricted access golf courses, and (6) Any other irrigation use not specified in this section and not prohibited by other sections of the California Code of Regulations. (b) **Recycled water** used for the

surface irrigation of food crops where the edible portion is produced above ground and not contacted by the **recycled water** shall be at least disinfected secondary-2.2 **recycled water**. (c) **Recycled water** used for the surface irrigation of the following shall be at least disinfected secondary-23 **recycled water**: (1) Cemeteries, (2) Freeway landscaping, (3) Restricted access golf courses, (4) Ornamental nursery stock and sod farms where access by the general public is not restricted, (5) Pasture for animals producing milk for human consumption, and (6) Any nonedible vegetation where access is controlled so that the irrigated area cannot be used as if it were part of a park, playground or school yard (d) **Recycled wastewater** used for the surface irrigation of the following shall be at least undisinfected **secondary recycled water**: (1) Orchards where the **recycled water** does not come into contact with the edible portion of the crop, (2) Vineyards where the **recycled water** does not come into contact with the edible portion of the crop, (3) Non food-bearing trees (Christmas tree farms are included in this category provided no irrigation with **recycled water** occurs for a period of 14 days prior to harvesting or allowing access by the general public), (4) Fodder and fiber crops and pasture for animals not producing milk for human consumption, (5) Seed crops not eaten by humans, (6) Food crops that must undergo commercial pathogen-destroying processing before being consumed by humans, and (7) Ornamental nursery stock and sod farms provided no irrigation with **recycled water** occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public. (e) No **recycled water** used for irrigation, or soil that has been irrigated with **recycled water**, shall come into contact with the edible portion of food crops eaten raw by humans unless the **recycled water** complies with subsection (a).

60305. Use of **recycled water** for impoundments - (a) Except as provided in subsection (b), **recycled water** used as a source of water supply for nonrestricted recreational impoundments shall be disinfected tertiary **recycled water** that has been subjected to conventional treatment. (b) Disinfected tertiary **recycled water** that has not received conventional treatment may be used for nonrestricted recreational impoundments provided the **recycled water** is monitored for the presence of pathogenic organisms in accordance with the following: (1) During the first 12 months of operation and use the **recycled water** shall be sampled and analyzed monthly for Giardia, enteric viruses, and Cryptosporidium. Following the first 12 months of use, the **recycled water** shall be sampled and analyzed quarterly for Giardia, enteric viruses, and Cryptosporidium. The ongoing monitoring may be discontinued after the first two years of operation with the approval of the department. This monitoring shall be in addition to the monitoring set forth in section 60321. (2) The samples shall be taken at a point following disinfection and prior to the point where the **recycled water** enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency. (c) The total coliform bacteria concentrations in **recycled water** used for nonrestricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall comply with the criteria specified in section 60301.230 (b) for disinfected tertiary **recycled water**. (d) **Recycled water** used as a source of supply for restricted recreational impoundments and for any publicly accessible impoundments at fish hatcheries shall be at least disinfected secondary-2.2 **recycled water**. (e) **Recycled water** used as a source of supply for landscape impoundments that do not utilize decorative fountains shall be at least disinfected secondary-23 **recycled water**.

60306. Use of **recycled water** for cooling - (a) **Recycled water** used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist shall be a disinfected tertiary **recycled water**. (b) Use of **recycled water** for industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying, or any mechanism that creates a mist shall be at least disinfected secondary-23 **recycled water**. (c) Whenever a cooling system, using **recycled water** in conjunction with an air conditioning facility, utilizes a cooling tower or otherwise creates a mist that could come into contact with employees or members of the public, the cooling system shall comply with the following: (1) A drift eliminator shall be used whenever the cooling system is in operation. (2) A chlorine, 54 or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other microorganisms.

60307. Use of **recycled water** for other purposes - (a) **Recycled water** used for the following shall be disinfected tertiary **recycled water**, except that for filtration being provided pursuant to Section 60301.320(a) coagulation need not be used as part of the treatment process provided that the filter effluent turbidity does not exceed 2 NTU, the turbidity of the influent to the filters is continuously measured, the influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and that there is the capability to automatically activate chemical addition or divert the wastewater should the filter influent turbidity exceed 5

NTU for more than 15 minutes: (1) Flushing toilets and urinals, (2) Priming drain traps, (3) Industrial process water that may come into contact with workers, (4) Structural fire fighting, (5) Decorative fountains, (6) Commercial laundries, (7) Consolidation of backfill around potable water pipelines, (8) Artificial snow making for commercial outdoor use, and (9) Commercial car washes, including hand washes if the **recycled water** is not heated, where the general public is excluded from the washing process. (b) **Recycled water** used for the following uses shall be at least disinfected secondary-23 **recycled water**: (1) Industrial boiler feed, (2) Nonstructural fire fighting, (3) Backfill consolidation around nonpotable piping, (4) Soil compaction, (5) Mixing concrete, (6) Dust control on roads and streets, (7) Cleaning roads, sidewalks and outdoor work areas and (8) Industrial process water that will not come into contact with workers. (c) **Recycled water** used for flushing sanitary sewers shall be at least undisinfected secondary **recycled water**.

60310. Use area requirements - (a) No irrigation with disinfected tertiary **recycled water** shall take place within 50 feet of any domestic water supply well unless all of the following conditions have been met: (1) A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface. (2) The well contains an annular seal that extends from the surface into the aquitard. (3) The well is housed to prevent any **recycled water** spray from coming into contact with the wellhead facilities. (4) The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well. (5) The owner of the well approves of the elimination of the buffer zone requirement. (b) No impoundment of disinfected tertiary **recycled water** shall occur within 100 feet of any domestic water supply well. (c) No irrigation with, or impoundment of, disinfected secondary-2.2 or disinfected secondary-23 **recycled water** shall take place within 100 feet of any domestic water supply well. (d) No irrigation with, or impoundment of, undisinfected secondary **recycled water** shall take place within 150 feet of any domestic water supply well. (e) Any use of **recycled water** shall comply with the following: (1) Any irrigation runoff shall be confined to the **recycled water** use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency. (2) Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities. (3) Drinking water fountains shall be protected against contact with **recycled water** spray, mist, or runoff. (f) No spray irrigation of any **recycled water**, other than disinfected tertiary **recycled water**, shall take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground, or school yard. (g) All use areas where **recycled water** is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following wording: "**RECYCLED WATER - DO NOT DRINK**". Each sign shall display an international symbol similar to that shown in figure 60310-A. The Department may accept alternative signage and wording, or an educational program, provided the applicant demonstrates to the Department that the alternative approach will assure an equivalent degree of public notification. (h) Except as allowed under section 7604 of title 17, California Code of Regulations, no physical connection shall be made or allowed to exist between any **recycled water** system and any separate system conveying potable water. (i) The portions of the **recycled water** piping system that are in areas subject to access by the general public shall not include any hose bibbs. Only quick couplers that differ from those used on the potable water system shall be used on the portions of the **recycled water** piping system in areas subject to public access.

Recycled Water and Wetlands / Environmental Restoration

FISH AND GAME CODE SECTION 1421

When creating new wetlands, the board shall give preference to lands most suitable for this purpose due to elevations, existence of levees, proximity to existing wetlands that are protected, and potential sources of water. These potential sources of water are limited to all of the following: (a) Water rights which are attached to the land to be restored including groundwater associated with the property. (b) Water willingly made available for a wetlands conservation project through water conservation. (c) **Recycled water**. (d) Undeveloped water supplies of the state. (e) Water marketed for wetlands purposes by a willing seller. (f) Water otherwise made available for wetlands purposes by private, nonprofit, local, and regional entities.

Recycled Water and Water Rights

WATER CODE SECTION 1010

- (a) (1) The cessation of, or reduction in, the use of water under any existing right regardless of the basis of right, as the result of the use of recycled water, desalinated water, or water polluted by waste to a degree which unreasonably affects the water for other beneficial uses, is deemed equivalent to, and for purposes of maintaining any right shall be construed to constitute, a reasonable beneficial use of water to the extent and in the amount that the recycled, desalinated, or polluted water is being used not exceeding, however, the amount of such reduction. (2) No lapse, reduction, or loss of any existing right shall occur under a cessation of, or reduction in, the use of water pursuant to this subdivision, and, to the extent and in the amount that recycled, desalinated, or polluted water is used in lieu of water appropriated by a permittee pursuant to Chapter 6 (commencing with Section 1375) of Part 2, the board shall not reduce the appropriation authorized in the user's permit. (3) The use of recycled, desalinated, or polluted water constitutes good cause under Section 1398 to extend the period specified in a permit for application of appropriated water to beneficial use to the extent and in the amount that recycled, desalinated, or polluted water is used. The extension by the board shall be granted upon the same terms as are set forth in the user's permit, and for a period sufficient to enable the permittee to perfect his appropriation, while continuing to use recycled, desalinated, or polluted water. (4) The board, in issuing a license pursuant to Article 3 (commencing with Section 1610) of Chapter 9 of Part 2, shall not reduce the appropriation authorized by permit, to the extent and in the amount that reduction in a permittee's use, during the perfection period, including any extension as provided in this section, has resulted from the use of recycled, desalinated, or polluted water in lieu of the permittee's authorized appropriation. (5) The board may require any user of water who seeks the benefit of this section to file periodic reports describing the extent and amount of the use of recycled, desalinated, or polluted water. To the maximum extent possible, the reports shall be made a part of other reports required by the board relating to the use of water. (6) For purposes of this section, the term "recycled water" has the same meaning as in Division 7 (commencing with Section 13000).
- (b) Water, or the right to the use of water, the use of which has ceased or been reduced as the result of the use of recycled, desalinated, or polluted water as described in subdivision (a), may be sold, leased, exchanged, or otherwise transferred pursuant to any provision of law relating to the transfer of water or water rights, including, but not limited to, provisions of law governing any change in point of diversion, place of use, and purpose of use due to the transfer.

GOVERNMENT CODE SECTIONS 25701-25703

25701. The board of supervisors may enter into contracts with municipalities, sanitation districts, sanitary districts or other incorporated bodies within the county, providing for the delivery to the county of sewage, or other waste water, or both, produced by or coming from such incorporated bodies.

25702. The board of supervisors may acquire, construct, repair, manage, and maintain all works necessary or proper for the treatment, purification, and **reclamation of water** from sewage or other waste waters, or both, and may **reclaim** any sewage or other waste water obtained pursuant to contracts entered into pursuant to this article, or obtained otherwise.

25703. The board of supervisors may dispose of **recycled water** and any byproducts of that **recycling**, pursuant to this article, in any one or more of the following ways: (a) Sale to the county and the inhabitants thereof. (b) Sale to any public entity or water corporation. (c) Replenishment of the underground water supplies anywhere within the county. (d) Sale to any city or, with the consent of the city legislative body expressed by ordinance, to the inhabitants thereof.

Recycled Water - Delivery / Piping

HEALTH AND SAFETY CODE SECTION 116815

- (a) All pipes installed above or below the ground, on and after June 1, 1993, that are designed to carry **recycled water**, shall be colored purple or distinctively wrapped with purple tape.

- (b) Subdivision (a) shall apply only in areas served by a water supplier delivering water for municipal and industrial purposes, and in no event shall apply to any of the following: (1) Municipal or industrial facilities that have established a labeling or marking system for **recycled water** on their premises, as otherwise required by a local agency, that clearly distinguishes **recycled water** from potable water. (2) Water delivered for agricultural use. (c) For purposes of this section, "**recycled water**" has the same meaning as defined in subdivision (n) of Section 13050 of the Water Code.

WATER CODE SECTION 13555.3

- (a) Water delivery systems on private property that could deliver **recycled water** for nonpotable uses described in Section 13550, that are constructed on and after January 1, 1993, shall be designed to ensure that the water to be used for only potable domestic uses is delivered, from the point of entry to the private property to be served, in a separate pipeline which is not used to deliver the **recycled water**.
- (b) This section applies to water delivery systems on private property constructed within either of the following jurisdictions: (1) One that has an urban water management plan that includes the intent to develop **recycled water** use. (2) One that does not have an urban water management plan that includes **recycled water** use, but that is within five miles of a jurisdiction that does have an urban water management plan that includes **recycled water** use, and has indicated a willingness to serve the water delivery system.
- (c) This section does not preempt local regulation of the delivery of water for potable and nonpotable uses and any local governing body may adopt requirements which are more restrictive than the requirements of this section.

TITLE 22 CODE OF REGULATIONS - SECTIONS 60313-60316

60313. General requirements - (a) No person other than a **recycled water** agency shall deliver **recycled water** to a dual-plumbed facility. (b) No **recycled water** agency shall deliver **recycled water** for any internal use to any individually-owned residential units including free-standing structures, multiplexes, or condominiums. (c) No **recycled water** agency shall deliver **recycled water** for internal use except for fire suppression systems, to any facility that produces or processes food products or beverages. For purposes of this Subsection, cafeterias or snack bars in a facility whose primary function does not involve the production or processing of foods or beverages are not considered facilities that produce or process foods or beverages. (d) No **recycled water** agency shall deliver **recycled water** to a facility using a dual plumbed system unless the report required pursuant to section 13522.5 of the Water Code, and which meets the requirements set forth in section 60314, has been submitted to, and approved by, the regulatory agency.

60314. Report submittal - (a) For dual-plumbed **recycled water** systems, the report submitted pursuant to section 13522.5 of the Water Code shall contain the following information in addition to the information required by section 60323: (1) A detailed description of the intended use area identifying the following: (A) The number, location, and type of facilities within the use area proposing to use dual plumbed systems, (B) The average number of persons estimated to be served by each facility on a daily basis, (C) The specific boundaries of the proposed use area including a map showing the location of each facility to be served, (D) The person or persons responsible for operation of the dual plumbed system at each facility, and (E) The specific use to be made of the **recycled water** at each facility. (2) Plans and specifications describing the following: (A) Proposed piping system to be used, (B) Pipe locations of both the **recycled** and potable systems, (C) Type and location of the outlets and plumbing fixtures that will be accessible to the public, and (D) The methods and devices to be used to prevent backflow of **recycled water** into the public water system. (3) The methods to be used by the **recycled water** agency to assure that the installation and operation of the dual plumbed system will not result in cross connections between the **recycled water** piping system and the potable water piping system. This shall include a description of pressure, dye or other test methods to be used to test the system every four years. (b) A master plan report that covers more than one facility or use site may be submitted provided the report includes the information required by this section. Plans and specifications for individual facilities covered by the report may be submitted at any time prior to the delivery of **recycled water** to the facility.

60315. Design requirements - The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed **recycled water** system unless the connection between the two systems is protected by

an air gap separation which complies with the requirements of sections 7602 (a) and 7603 (a) of title 17, California Code of Regulations, and the approval of the public water system has been obtained.

60316. Operation requirements - (a) Prior to the initial operation of the dual-plumbed **recycled water** system and annually thereafter, the **Recycled Water** Agency shall ensure that the dual plumbed system within each facility and use area is inspected for possible cross connections with the potable water system. The **recycled water** system shall also be tested for possible cross connections at least once every four years. The testing shall be conducted in accordance with the method described in the report submitted pursuant to section 60314. The inspections and the testing shall be performed by a cross connection control specialist certified by the California-Nevada section of the American Water Works Association or an organization with equivalent certification requirements. A written report documenting the result of the inspection or testing for the prior year shall be submitted to the department within 30 days following completion of the inspection or testing. (b) The **recycled water** agency shall notify the department of any incidence of backflow from the dual-plumbed **recycled water** system into the potable water system within 24 hours of the discovery of the incident. (c) Any backflow prevention device installed to protect the public water system serving the dual-plumbed **recycled water** system shall be inspected and maintained in accordance with section 7605 of Title 17, California Code of Regulations.

TITLE 22 CODE OF REGULATIONS - SECTION 60323

60323. Engineering report - (a) No person shall produce or supply **reclaimed water** for direct reuse from a proposed **water reclamation** plant unless he files an engineering report. (b) The report shall be prepared by a properly qualified engineer registered in California and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed **reclamation** system. The report shall clearly indicate the means for compliance with these regulations and any other features specified by the regulatory agency. (c) The report shall contain a contingency plan which will assure that no untreated or inadequately treated wastewater will be delivered to the use area.

**RECYCLED WATER ON-SITE
DESIGN AND CONSTRUCTION STANDARDS
FOR
RESIDENTIAL DUAL PLUMBED HOMES**

**El Dorado Irrigation District
2890 Mosquito Road
Placerville, California**

JUNE 2003

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SECTION 1.0

INTRODUCTION AND GENERAL POLICIES

1.1 SCOPE

The design and construction of residential dual plumbed home on-site recycled water facilities for landscape irrigation systems shall comply with these standards set forth herein, the Engineer's Report, and to any conditions, standards, and requirements set forth by the District in addition to these standard specifications.

1.2 INTERPRETATION

The District shall decide all questions of interpretation of "good engineering practice," guided by the various standards and manuals.

1.3 APPLICABLE CODES AND POLICIES

Ordinances, requirements, and applicable standards of governmental agencies having jurisdiction within the District's service area shall be observed in the design and construction of on-site recycled water systems. Such requirements include but are not limited to current revisions of the following:

- A. The Uniform Plumbing Code as amended by the County of El Dorado.
- B. Municipal Code of the County of El Dorado, as applicable.
- C. State of California, Department of Health Services, Title 22.
- D. Regional Water Quality Control Board Regulations.
- E. Regulations and Policy Statements, as adopted and amended by the Board of Directors of the El Dorado Irrigation District.

1.4 EL DORADO IRRIGATION DISTRICT JURISDICTION

The District is responsible for the approval of plans and inspection of all residential dual plumbed home on-site recycled water systems within the District's service area. Where repairs or replacement of a service line on the upstream side of the meter is required, it shall be the responsibility of the District, unless it is a system upgrade, in which case the owner or customer will be billed for the work. Conversely, the cost of repairs or replacement of the on-site facilities shall be the responsibility of the property owner.

1.5 DEVELOPER'S ENGINEER/LANDSCAPE ARCHITECT RESPONSIBILITY

These standards establish uniform policies and procedures for the design and construction of dual plumbed home on-site recycled water facilities. They are not intended to be a substitute for knowledge, judgment, or experience. The contained procedures shall be reviewed by the engineer/landscape architect and shall be applied as necessary to the project. Proposed deviations to these standards shall be submitted in writing in conjunction with the plan review submittal.

The plans shall be revised or supplemented at any time it is determined that the District's requirements have not been met.

Before design, the developer must obtain approval to use recycled water for the proposed system and verification of locations and size of proposed points of connection.

1.6 PROHIBITIONS AND LIMITATIONS

Design of dual plumbed home on-site recycled water facilities shall conform to the following:

- A. The recycled water system shall be separate and independent of any potable water system. Cross connections between potable water facilities and recycled water facilities are prohibited.
- B. Hose bibs on recycled water facilities are prohibited. Where potable and recycled water is used on-site, potable water hose bibs must be attached to the house.
- C. Patios, swimming pools, and spas, etc. shall be protected from the spray of recycled water.
- D. Overspray and run-off shall be limited or prevented.
- E. Potable and recycled water lines must maintain required separation at all times.
- F. Recycled water shall not be used for any purpose other than landscape irrigation.
- G. The system shall be designed to irrigate the on-site area within the hours of 9:00 p.m. and 6:00 a.m.

1.7 BACKFLOW PREVENTION AND CROSS CONNECTION

Backflow prevention devices will not be required on the recycled water service using recycled water. However, in accordance with Section 7, Cross Connection and Backflow Prevention, in the Design and Construction Standards, backflow prevention devices will be required at the potable water meter when a parcel receives potable and recycled water service. No connection between the recycled waterline and the potable waterline is allowed.

SECTION 2.0

PLAN PREPARATION AND REVIEW

2.1 GENERAL

Completed construction drawings for all dual plumbed home on-site recycled water systems must be submitted to the District for plan checking and approval before construction. Fifteen (15) working days should typically be allowed for plan check. Two (2) blueprints of the plans (landscape sheets only), either 24" x 36" or 30" x 42" must be submitted. The plans must show the potable water system and recycled water system facilities together. The District will review the plans and will return one set with any comments. After all revisions have been incorporated into the plans, two (2) sets of the plans must be submitted to the District for inspection use. Minor changes to the system will be reviewed by the District. If major changes are made to the irrigation system, the owner, applicant, or customer shall provide new blueprints.

2.2 SUBMITTAL

The submittal of landscape irrigation plans for plan checking is to ensure that the proposed use of recycled water conforms to the approved uses as set forth in the Engineer's Report.

2.3 AGREEMENTS

Before recycled water can be supplied to a residential site, a Standard Agreement for Use of Recycled Water must be signed and recorded. The Agreement sets forth the requirements for service.

In a residential dual plumbed subdivision, all homes are required to use recycled water for landscape irrigation. Deed restrictions are detailed in the documents: "Declaration of Restrictions Regarding The Use of Recycled Water for Landscape Irrigation."

2.4 DATA REQUIRED ON PLANS

Specific information is required to be included in the plan set as described below.

- A. General On-Site Recycled Water Notes - On-site recycled water notes are to be shown on all on-site residential recycled water system construction plans.
- B. Irrigation Equipment Legend - For irrigation systems, a legend showing the pertinent data for the materials used in the system shall be recorded on the plans. The legend shall include a pipe schedule listing pipe sizes and materials of construction, a listing of valve types, and the following information for each type of sprinkler head:

1. Manufacturer name and model number.
2. Sprinkler radius (feet).
3. Operating pressure (psi).
4. Flow (gpm).
5. Sprinkler pattern.

C. Irrigation Details - The following irrigation exhibits and details are provided for reference.

1. Irrigation System Schematic Layout: Potable Water and Recycled Water Services
2. Example of Irrigation Plan
3. Example of Irrigation Plan Legend
4. Automatic Controller Detail
5. Buried Electric Remote Control Valve
6. Pipe Trenching Under Pavement
7. Pipe Trenching Detail
8. General On-Site Recycled Water Notes

D. Sheets to be Included - The following sheets shall be included in the set:

1. Cover sheet showing project location and all recycled and potable on-site water lines.
2. Irrigation details..

2.5 APPROVAL FOR CONSTRUCTION

Upon receipt of two (2) sets of the approved on-site irrigation plans, a pre-inspection meeting may be scheduled by contacting the El Dorado Irrigation District at (530) 642-4513 two (2) working days in advance.

SECTION 3.0

DESIGN AND CONSTRUCTION REQUIREMENTS

3.1 RECYCLED WATER SYSTEM DESIGN GUIDELINES FOR FRONT AND BACK YARDS - GENERAL REQUIREMENTS

Recycled water service and domestic potable water service for each residential lot will be provided by the subdivision developer. The recycled water service is typically provided at the opposite lot end from the potable service.

Recycled water will not be used for any other purpose except for irrigation. Recycled water lines may not enter the house.

The piping system for the recycled water irrigation system will be constructed and maintained to be easily differentiated from the potable water piping system. The recycled water system piping will be purple plastic pipe. See Recycled Water Irrigation System materials list for more information.

All pressure main line piping from the recycled water system shall be installed to maintain 10 feet minimum horizontal separation from all potable water piping. Where recycled and potable water pressure main line piping cross, the recycled water piping shall be installed below the potable water piping in a purple-colored PVC sleeve which extends a minimum of 5 feet on either side of the potable water piping. Provide a minimum vertical clearance of 12 inches.

Drip irrigation systems are required for shrub plantings and some groundcover plantings. The use of drip systems within the dripline of the canopy of existing oak trees is required. Environmental factors such as evaporation and wind tend to have the least effect on this type of irrigation system. Physical maintenance of this type of system is usually higher. Additionally, drip irrigation systems contribute minimally to soil erosion problems on sloped planting areas.

It is recommended to install purple irrigation PVC sleeves beneath driveways, walkways or other paved areas. Install the necessary number of sleeves, properly sized, to accommodate the irrigation system mainline, lateral lines, and controller wiring.

Sprinkler heads and spray patterns shall be contained within the home lot property line and shall not overlap or overspray into the adjacent property. Adjust sprinkler heads and spray patterns to minimize overspray onto adjacent hardscapes, patios, decks, pools, fences, etc.

Space and install sprinklers and turf rotors no more than 80% of the manufacturer's recommended radius listing for that particular head. Ensure head to head coverage of the spray pattern with no dry spots.

The maximum flow for each valve system shall not exceed 15 gallons per minute, nor shall operating flows exceed 15 gallons per minute at any one time.

For drip irrigation systems, install an in-line pressure reducing valve down stream of the remote control valve. The pressure reducing valve shall be placed below grade in a plastic valve box and adjusted to the proper operating pressure for the drip system.

For drip irrigation systems, install an in-line Wye filter down stream of the remote control valve and upstream of the pressure reducing valve. The filter shall be placed below grade in a plastic valve box. Install drip tubing a minimum of four inches below grade.

No backflow device is required on recycled water service.

A pressure reducing valve will be installed by the District downstream of the recycled water meter below grade in a rectangular box of sufficient size to easily allow repair or replacement. Pressure reducing valve shall be pre-set at 40 psi.

Hose bibs and quick coupling valves are prohibited on the residential recycled water system.

No white PVC piping will be allowed for recycled water irrigation system mainlines and laterals.

The irrigation system for turf will be operated between the hours of 9:00 p.m. and 6:00 a.m. Drip irrigation systems will be allowed to be operated at anytime.

Monitor and maintain the system to minimize equipment and material failure. Broken sprinkler heads, leaks, unreliable valves, etc., should be repaired as soon as they become apparent.

Recycled water is not potable water and therefore not suitable for human consumption.

Recycled water is highly treated domestic wastewater and its clarity to the human eye is indistinguishable from domestic water. The standards imposed for treatment of recycled water quality are established by various governmental regulatory agencies, including the State of California Department of Health Services, California Code of Regulations, Title 22, and these standards may change from time to time.

Irrigate in a manner that will minimize runoff, pooling, and ponding. The application rate will not exceed the infiltration rate of the soil. Timers will be adjusted so as to be compatible with the lowest soil infiltration rate present. This procedure may be facilitated by the efficient scheduling of the automatic control clocks (i.e., employing the repeat function to break up the total irrigation time into cycles that will promote maximum soil absorption). When using any type of irrigation system, care will be exercised by controlling the delivery rate of water so as not to overcome the soil's water absorption rate. Overwhelming the soil absorption rate may cause water run-off and soil

erosion. Proper programming of the automatic irrigation controller, knowing the plant material's water needs, familiarity with the soil's water absorption characteristics and slope aspects are necessary for responsible water resource management and good irrigation practice.

Remote Control Valves: Buried below grade remote control valves. Anti-siphon control valves will not be allowed.

Educate all maintenance personnel, family members, and guests, on a continuous basis, of the presence of recycled water and that it is not approved for drinking purposes.

Obtain prior approval for all proposed changes and modifications to any on-site facilities. Such changes must be submitted to, and approved, by the District and designed in accordance with these standards.

3.2 POTABLE WATER SYSTEM DESIGN GUIDELINES – GENERAL REQUIREMENTS

The potable water service and the recycled water service for each residential dual plumbed home will be provided by the homebuilder's underground contractor.

The potable water system will be protected by an appropriate backflow prevention device at the potable water meter when recycled water will be used for irrigation. Assemblies will be installed downstream of, but immediately next to, the potable water meter and the pressure-reducing valve.

The backflow device will be installed below grade in a rectangular box so that the top of the assembly is a maximum of ten inches clear of the box lid. The backflow device will be centered in the box and the box will be clean of mud and other debris to a point of six inches below the bottom of the assembly. Do not disturb the backflow device or modify the grade around the assembly when landscaping the front yard. Backflow devices that do not meet the District standards will be corrected at the owner's expense. Neither the owner nor their contractor may remove or modify the water meter or the backflow device.

The water used within the residence and outside in the yard(s) through hose bibs will be potable water. All hose bibs shall be connected to the house.

Fill lines for pools and/or water features of any kind are prohibited on the recycled water system. These uses shall be connected to the potable water system. Copper pipe will be used for all potable lines. The location of the copper lines shall be indicated on the plans. The inspection of the installation prior to the covering of the pipe is required by the District.

All pressure main line piping from the recycled water system shall be installed to maintain 10 feet minimum horizontal separation from all potable water piping. Where recycled and potable water pressure main line piping cross, the recycled water piping shall be installed below the potable water piping in a Class 200 purple-colored PVC

sleeve which extends a minimum of 5 feet on either side of the potable water piping. Provide a minimum vertical clearance of 12 inches

3.3 IRRIGATION SYSTEM MATERIALS FOR RECYCLED WATER

Irrigation systems for residential landscapes shall be designed and constructed with proven name-brand equipment, materials and automatic controllers. All materials and equipment shall be listed and indicated on the irrigation plan submittal for approval by the District.

3.4 PIPE SELECTION

All buried on-site piping in the recycled water system shall be purple PVC pipe with stenciling identifying it as recycled water in accordance with the AWWA Guidelines for the Distribution of Nonpotable Water. Stenciling shall include; CAUTION RECYCLED WATER - DO NOT DRINK; nominal pipe size; PVC-1120; pressure rating in pounds per square inch at 73 degrees; and ASTM designations such as 1785, 2241, 2672, or 3139. Stenciling shall be placed continuous on two sides of the pipe.

All on-site recycled water piping shall be installed in accordance with the Uniform Plumbing Code and all other local governing codes, rules, and regulations.

PVC constant pressure main line piping, 2 inches and larger, shall be rubber-ring joint, PVC Class 160, or solvent weld joint, PVC Class 315.

PVC constant pressure main line piping, 1-1/2 inches and smaller, shall be solvent weld joint, PVC Schedule 40.

All potable water lines in landscapes shall be copper lines. Examples of potable water uses are a pool, fountain, or other uses not designated as acceptable for recycled water.

3.5 FITTINGS

PVC plastic pipe fittings shall be installed below grade.

All PVC plastic pipe fittings shall be rigid PVC virgin Type I, minimum Schedule 40, with working pressure no higher than that of the pipe. Sockets shall be tapered to conform to the outside diameter of the pipe, as recommended by the pipe manufacturer. All Schedule 40 fittings shall conform to ASTM D 2466. Schedule 80 fittings shall conform to ASTM D 2464 and D 2467.

PVC fittings shall be Schedule 40 solvent weld and factory manufactured, or Schedule 40 with rubber-ring joint.

3.6 DEPTH OF PIPING

For on-site residential recycled water piping, the minimum depth from finished grade to top of pipe (minimum cover) shall be twelve (12) inches below sub-grade or twelve (12) inches below the potable waterline.

3.7 SEPARATION REQUIREMENTS

All new buried piping must be installed in accordance with the pipe separation requirements indicated below.

A. Horizontal Separation

A.1 Buried Recycled and Potable Water Pipelines

Constant Pressure Lines - A minimum ten (10) foot separation between parallel buried constant pressure recycled and potable water pipelines must be maintained. Intermittent Pressure Lines -- A Minimum of (1) one foot separation between parallel buried recycled and potable water pipelines must be maintained.

If separation cannot be maintained, then a special construction detail to minimize cross connections and contamination potential must be included with the plans and is subject to approval by the District. Potable and recycled water pipelines shall not be installed in the same trench.

A.2 Buried Recycled Water and Sewer Pipelines

A minimum of one (1) foot separation between buried recycled water and sewer pipelines must be maintained. If a (1) one foot separation cannot be maintained, then a special construction detail to minimize contamination potential must be included with the plans and is subject to approval by the District. Sewer and recycled water pipelines shall not be installed in the same trench.

B. Vertical Separation

B.1 Buried Recycled and Potable Water Pipelines

Recycled water pipelines must be located a minimum of one (1) foot below the potable water pipelines.

B.2 Buried Recycled Water and Sewer Pipelines

A minimum of one (1) foot separation between buried recycled water and sewer pipelines must be maintained. If a (1) one foot separation cannot be maintained, then a special construction detail to minimize contamination potential must be included with the Recycled Water Service plans and is subject to approval by the District. Sewer and recycled water pipelines shall not be installed in the same trench.

3.8 WARNING TAPE

- A. General - Warning tape shall be installed 3-inches above the top of pipe center and shall run continuously for the entire length of all main line piping. This is applicable to both recycled and potable waterlines.
- B. Recycled Water - Warning tape shall be purple plastic with black printing having the words "CAUTION: RECYCLED WATER – DO NOT DRINK" imprinted in minimum 1-inch high letters. Imprinting shall be continuous and permanent. The overall width shall be a minimum of 3-inches.
- C. Potable Water - Warning tape shall be blue plastic with black printing having the words "CAUTION BURIED WATER LINE BELOW" imprinted in minimum 1-inch high letters. Imprinting shall be continuous and permanent. The overall width shall be a minimum of 3-inches.

3.9 WARNING LABELS

The District may require warning labels, as approved by the District, to be installed on facilities, such as controller panels. Warning labels shall be constructed of a purple weatherproof material with the warning permanently stamped or molded into the label. The warning shall contain the following information: "RECYCLED WATER – DO NOT DRINK" and the international "Do Not Drink" symbol, such as a glass of water with a slash through it.

Controller marking sticker No. 4100 shall read in English "ATTENTION – CONTROLLER UNIT FOR RECYCLED WATER." Attach inside controller cabinet door.

3.10 VALVE BOXES

Valves, both above and below grade, shall be housed in an approved lockable purple valve box. A tag reading "CAUTION: RECYCLED WATER – DO NOT DRINK" shall be installed, as approved by the District.

All gate valves, manual control valves, electrical control valves, and pressure reducing valves for on-site non-residential recycled water systems shall be installed below grade in a purple valve box. Electrical and manual control valve boxes shall have a warning label permanently molded into or affixed onto the lid with rivets, bolts, etc.

3.11 WARNING TAGS

Tags shall be weatherproof plastic, 3" by 4", purple in color, with the words "WARNING - RECYCLED WATER - DO NOT DRINK". Imprinting shall be permanent and black in color. Use tags manufactured by T. Christy Enterprises or approved equal.

All recycled water sprinkler control valves, pressure regulators, quick couplers, and

isolation valves shall be tagged with purple warning tags.

One tag shall be attached to each appurtenance in one of the following manners:

- A. Attach to valve stem directly with plastic tie wrap, or
- B. Attach to solenoid wire directly with plastic tie wrap, or
- C. Attach to the body of the relative appurtenance with a plastic tie wrap.

3.12 SIGNAGE

All subdivisions where recycled water is used, shall be posted with conspicuous signs in a size no less than 4-inches high by 8-inches wide, that include the following wording: "RECYCLED WATER - DO NOT DRINK". Each sign shall also display the international "DO NOT DRINK" symbol, such as a glass of water with a slash through it.

3.13 CONTROL OF RUNOFF AND APPLICATION AREAS

On-site recycled water facilities shall be designed to prevent discharge onto areas not under control of the user.

Recycled water shall be applied at a rate that does not exceed the infiltration rate of the soil. Where varying soil types are present, the design of the recycled water facilities shall be compatible with the lowest infiltration rate present. Copies of the developer's soils test reports shall be made available to the District upon request.

Spray heads shall be adjusted to minimize overspray onto areas not under the control of the customer, i.e. pool decks, private patios, streets, and sidewalks.

SECTION 4.0

INSPECTION AND TESTING REQUIREMENTS

4.1 GENERAL

The District will inspect the construction of residential dual plumbed on-site irrigation facilities and shall be notified two working days in advance of installation by the applicant, owner, or customer. The District Office shall be called at (530) 642-4000. In no case shall irrigation lines be backfilled before inspection by the District.

If the residential dual plumbed on-site irrigation system is installed prior to plan approval and/or inspection, all or any portion of the system must be exposed and corrected as directed by the District in accordance with these standard specifications. Failure to comply may result in termination of service as provided for in Regulation 4 of the District Rules and Regulations.

Subsequent to plan approval, field conditions may dictate modifications to the residential dual plumbed on-site irrigation system either in material or in intended use. If directed by the District the owner, applicant, or customer shall perform all changes or modify the on-site non-residential system to fully comply with these standards and with the District Rules and Regulations.

4.2 SELECTING A CONTRACTOR

- A. The District maintains a list of "Authorized Contractors" who have completed an orientation class on recycled water use.
- B. If hiring a contractor to design, install, modify or repair a recycled water irrigation system, only "Authorized Contractors" are allowed to work on the systems. Please check with the District for the most current list of "Authorized Contractors".

4.3 INSPECTION AND TESTING

- A. Testing and inspection of water systems in dual plumbed homes receiving recycled water will be in accordance with the El Dorado Irrigation District's Recycled Water Manual: Design, Review and Inspection Procedures. Random inspections may also occur.
- B. Initially, before activation of recycled water service, and annually thereafter, EID will inspect both the exterior potable and full yard recycled water irrigation systems on the site. EID will perform a cross connection shutdown test initially, once every four years, and at changes of ownership. Additional cross-connection tests may be performed by EID where, when, and if needed.
- C. Backflow prevention assemblies require annual testing. The cost for the test and any repair shall be at the customer expense. The District shall notify the customer in writing prior to the annual test.
- D. For single-family residences receiving recycled water, the owner shall be responsible for providing access and cooperation to the District representative, to perform cross-

connection inspection or other system inspections that the District requires. This inspection shall include a visual check of the entire system to verify that no cross-connections have been made. The owner will be responsible for correcting any work, at their sole expense, which violates the District regulations

4.4 COVERAGE TEST

The owner, applicant, or customer is responsible for controlling overspray and runoff of the system. To ensure the limitation of overspray and runoff, an inspection of the completed on-site irrigation system by the District is required. When the sprinkler system is completed and the planting installed, the owner or owner's representative shall contact the District at (530) 642-4000 and arrange for a coverage test. The owner or owner's representative must be in attendance and have persons capable of making system adjustments. If modifications to the system are required, other than minor adjustments, the owner will be notified in writing of the changes required. To avoid termination of service, the modifications must be made in a timely manner. All modifications to the system are the responsibility of the owner, applicant, or customer and said owner, applicant, or customer shall pay all costs associated with such modifications.

4.5 DISTRICT ACCEPTANCE

Upon completion of construction, final inspection by the District, submission of record drawings, signing of a recycled water agreement, training, and payment of any outstanding monies, the irrigation system shall be accepted by the District. At that time, service connection to the recycled water line may be made. The on-site facilities shall be owned, operated, and maintained by the Owner.

4.6 RECORD DRAWINGS

Record drawings shall be prepared and show all changes in the work constituting departures from the original drawings. All conceptual or major design changes, including any changes that may be affected by the requirements of these standard specifications, shall be approved by the District before implementing the change in the construction contract. Failure to receive prior approval may result in termination of service.

The applicant, owner, or customer shall provide a complete set of "RECORD DRAWINGS" to the District upon completion of construction. Failure to provide record drawings may result in termination of service.

4.7 FAILURE TO COMPLY

Failure to comply with any or all of the standards, herein is a violation of the District Policies and Regulations and may result in termination of service until the appropriate corrective steps have been taken.

ON-SITE RECYCLED WATER NOTES FOR RESIDENTIAL SITES

1. The installation of the recycled water system shall be accomplished under the approval, inspection, and to the satisfaction of the El Dorado Irrigation District (EID).
2. Contractor shall schedule a pre-construction conference with EID at (530) 622-4513 two (2) working days in advance of starting work. Construction shall begin no later than five (5) days after the pre-construction conference.
3. The El Dorado Irrigation District shall be notified two (2) days prior to the start of construction at (530) 622-4513 and each workday thereafter until completion of the project.
4. The homeowner shall be responsible for providing access to and cooperation with the District Inspector to perform all testing and inspections.
5. Connections to the existing recycled water facilities shall be done by a licensed contractor in accordance with EID tie-in procedures.
6. There shall be no direct connections between the potable and recycled water systems.
7. Recycled water shall not be used for any purpose other than landscape irrigation.
8. Hose bibs are prohibited on the recycled water system.
9. Water used in hose bibs shall be potable water and all hose bibs shall be affixed to the house.
10. The potable water system shall be protected by an approved backflow prevention device. No backflow prevention device is required on the recycled water service.
11. Fill lines for water features shall be connected to the potable water system using copper pipe.
12. A minimum of ten (10) feet horizontal separation must be maintained at all times between the constant pressure recycled and potable water lines. A minimum of one (1) foot vertical separation must be maintained at all times between the recycled and potable water lines with the recycled waterline below the potable.
13. Blue warning tape shall be placed over the pipe in the trench of all pipe carrying potable water.

EL DORADO IRRIGATION DISTRICT

RECYCLED WATER NOTES
ON-SITE NOTES FOR RESIDENTIAL SITES

DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO. OSR-1
APPROVED C. MEGERDIGIAN	DATE 9/5/02				Pg 1 of 2

14. Purple warning tape shall be placed over the pipe in the trench of all pipe carrying recycled water.
15. Recycled water piping shall be purple and identified as recycled water pipes by continuous marking on both sides. The markings shall include the following: "WARNING RECYCLED WATER - DO NOT DRINK", nominal pipe size, pressure rating, and ASTM designations.
16. All recycled water sprinkler control valves, isolation valves, quick couplers, regulators, ARVs, and appurtenances shall be tagged. Identification shall be weatherproof purple plastic, 3-inches by 4-inches with the words "WARNING RECYCLED WATER - DO NOT DRINK". Imprinting shall be permanent and black in color. Use tags manufactured by T. Christy Enterprises or approved equal.
17. All spray heads shall be adjusted to minimize overspray onto adjacent hardscapes.
18. After installation of the recycled and potable water service, a cross connection test and inspection of the irrigation system will be performed. The homeowner or contractor shall arrange with the District for an irrigation coverage test. Modifications to the irrigation system may be required.
19. Use of recycled water at this site is subject to the requirements of an Engineer's Report approved by EID.
20. Failure to comply with any of the EL Dorado Irrigation District Standards and Regulations may result in termination of recycled and/or potable water service.

EL DORADO IRRIGATION DISTRICT					
RECYCLED WATER NOTES ON-SITE NOTES FOR RESIDENTIAL SITES					
DRAWN BY C. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO. OSR-1 Pg 2 of 2
APPROVED C. MEGERDIGIAN	DATE 9/5/02				

	REMOTE CONTROL VALVE	ELECTRIC CONTROL VALVE WITH RECYCLED ID TAGS.
	PRESSURE REGULATING VALVE	WILKINS 70 SERIES, 3/4" SIZE WITH RECYCLED ID TAGS.
	ISOLATION VALVE	WITH RECYCLED ID TAGS.
	IRRIGATION CONTROLLER	EXTERIOR MOUNT WITH RECYCLED WATER LABEL.
	POTABLE WATER HOSE BIB	
	VALVE	
	BACKFLOW PREVENTER	
	RECYCLED WATER MAINLINE	SCH. 40 PURPLE PVC PIPE, SIZE PER PLAN
	POTABLE WATER MAINLINE	SCH 40 WHITE PVC WITH 3" WARNING TAPE
	RECYCLED WATER LATERAL	CLASS 200 PURPLE PVC PIPE, SIZE PER PLAN
	RECYCLED WATER SLEEVING	2" SCHEDULE 40 PURPLE PVC PIPE
	POTABLE WATER FEATURE FILL LINE	COPPER PIPE
	POINT OF CONNECTION (P.O.C.)	LOCKED VALVE TO BACK YARD

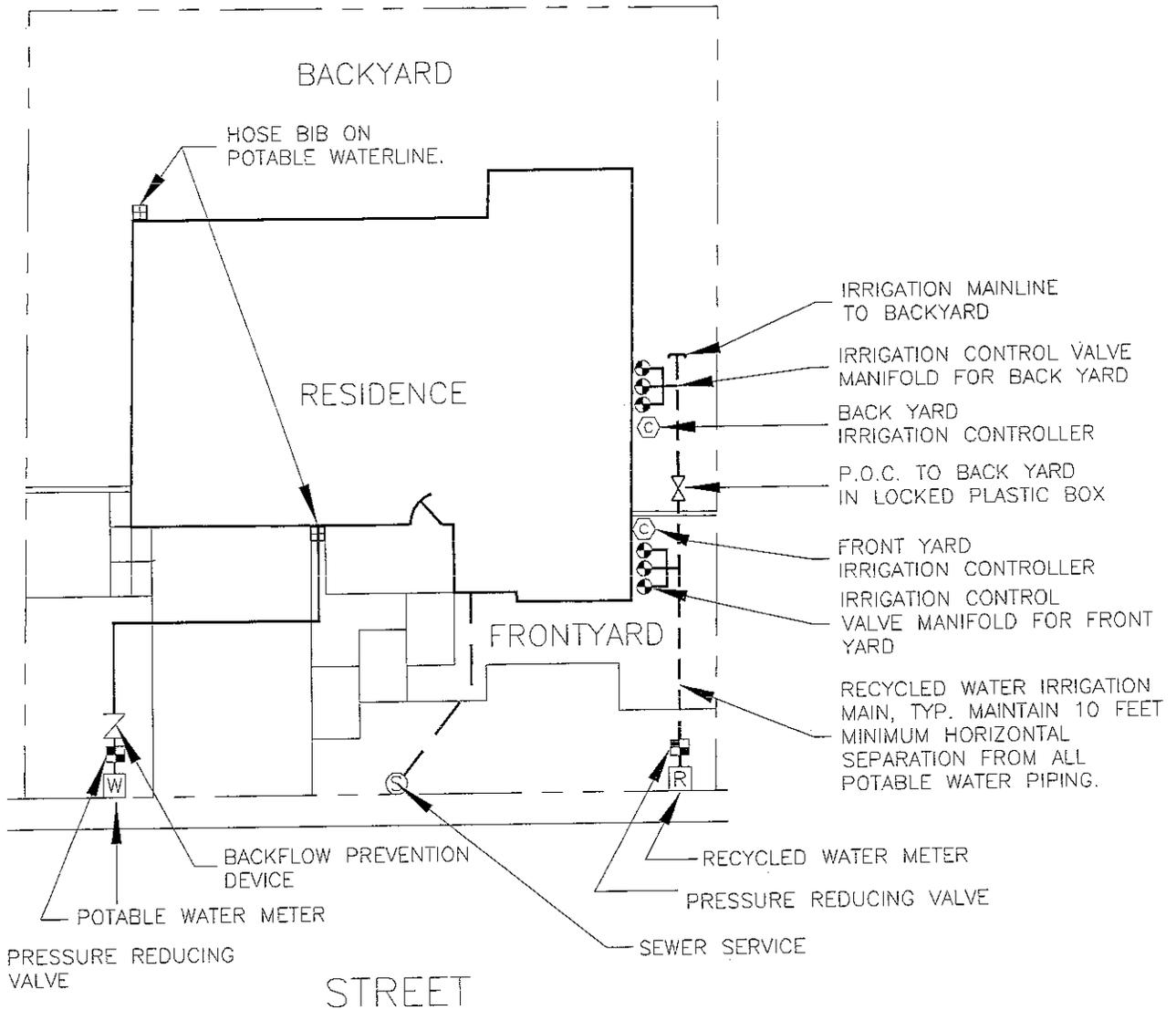


NOTES:

- 1.) INSTALLATION OF RECYCLED WATER IRRIGATION SYSTEM SHALL BE IN CONFORMANCE WITH ON-SITE DESIGN AND CONSTRUCTION STANDARDS.

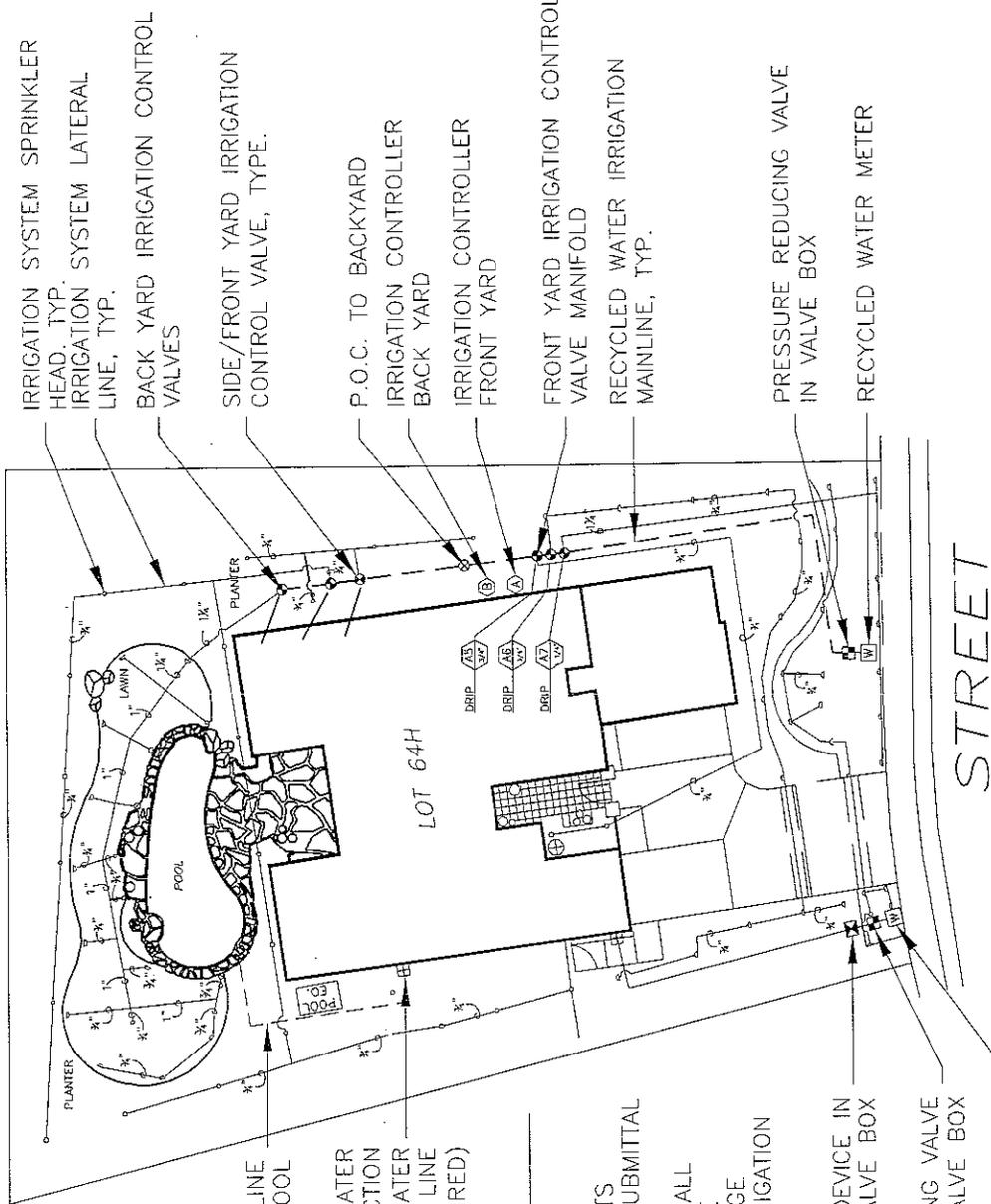
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<i>EL DORADO IRRIGATION DISTRICT</i>					
TYPICAL IRRIGATION LEGEND					
RECYCLED WATER					
DRAWN BY G BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO. OSR-2
APPROVED C MEGERDIGIAN	DATE 9/10/02				



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EL DORADO IRRIGATION DISTRICT					
RESIDENTIAL DUAL PLUMBED SERVICE SCHEMATIC					
DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO. OSR - 3
APPROVED C. MEGERDIGIAN	DATE 9/6/02				



STREET

COPPER FILL LINE TO POOL

POTABLE WATER HOSE BIB: CONNECTION FOR POOL/WATER FEATURE FILL LINE (COPPER PIPE REQUIRED)

- NOTES:
1. THIS EXAMPLE OF AN IRRIGATION PLAN SUBMITTAL REPRESENTS THE MINIMUM PLAN SUBMITTAL REQUIREMENT.
 2. IRRIGATION LEGEND SHALL BE INCLUDED ON THE PLAN. SEE NEXT PAGE FOR EXAMPLE OF IRRIGATION PLAN LEGEND.

BACKFLOW PREVENTION DEVICE IN VALVE BOX

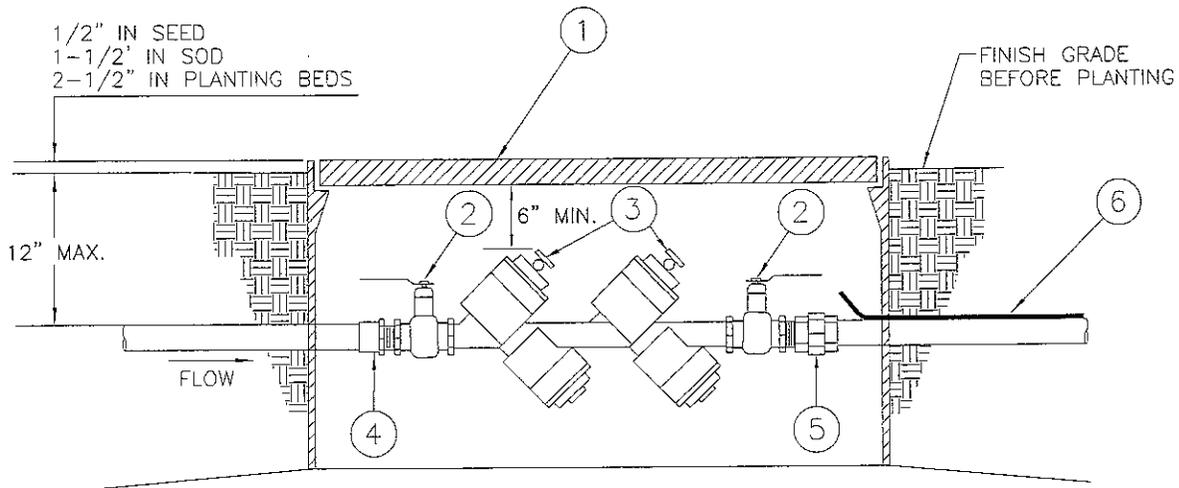
PRESSURE REDUCING VALVE IN VALVE BOX

POTABLE WATER METER

EL DORADO IRRIGATION DISTRICT

TYPICAL HOUSE IRRIGATION LAYOUT

DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID. STANDARD DRAWING NO. OSR - 4
	DATE 9/10/02				
APPROVED					



ITEM #	DESCRIPTION
①	METER BOX 12"x20" (MIN.) CONCRETE BOX & STEEL LID IN TRAFFIC AREAS.
②	BALL VALVE, SUPPLIED WITH BACKFLOW PREVENTER BY MANUFACTURER.
③	DOUBLE CHECK BACKFLOW PREVENTER
④	SCH. 40 PVC ADAPTOR, TYP.
⑤	SCH. 80 PVC UNION DOWNSTREAM OF VALVE
⑥	IDENTIFICATION TAPE--"CAUTION : BURIED POTABLE WATER LINE"

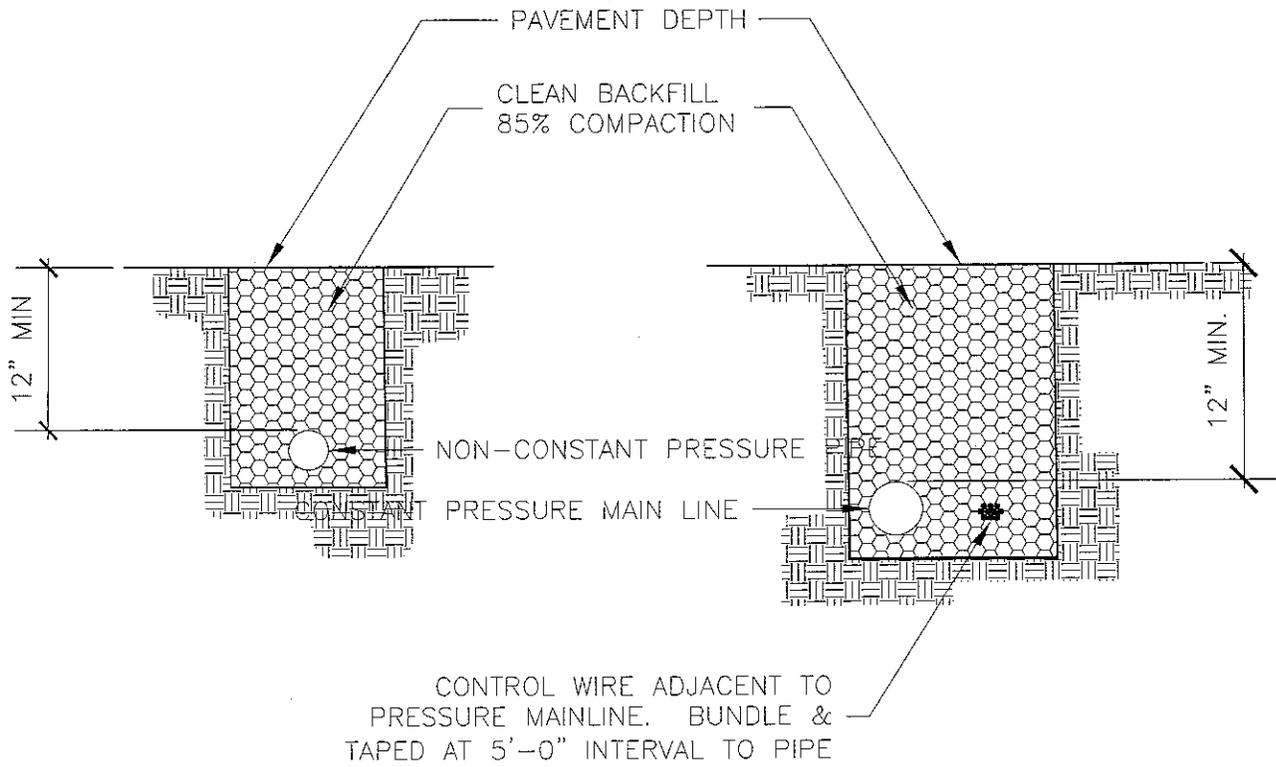
CONSTRUCTION NOTES

1. PLACE VALVE BOX AT RIGHT ANGLES TO STRUCTURES OR HARDSCAPING
2. INSTALL VALVE BOX SO THAT TOP OF VALVE BOX IS FLUSH WITH ADJACENT HARDSCAPING.
3. GATE VALVE AND FITTINGS SHALL BE LINE SIZE UNLESS NOTED OTHERWISE.

EL DORADO IRRIGATION DISTRICT

POTABLE WATER DOUBLE CHECK VALVE
BACKFLOW PREVENTER DETAIL

DRAWN BY	SCALE	REVISION	DATE	BY	EID STANDARD DRAWING NO.
G. BARRITT	NONE				
APPROVED	DATE				



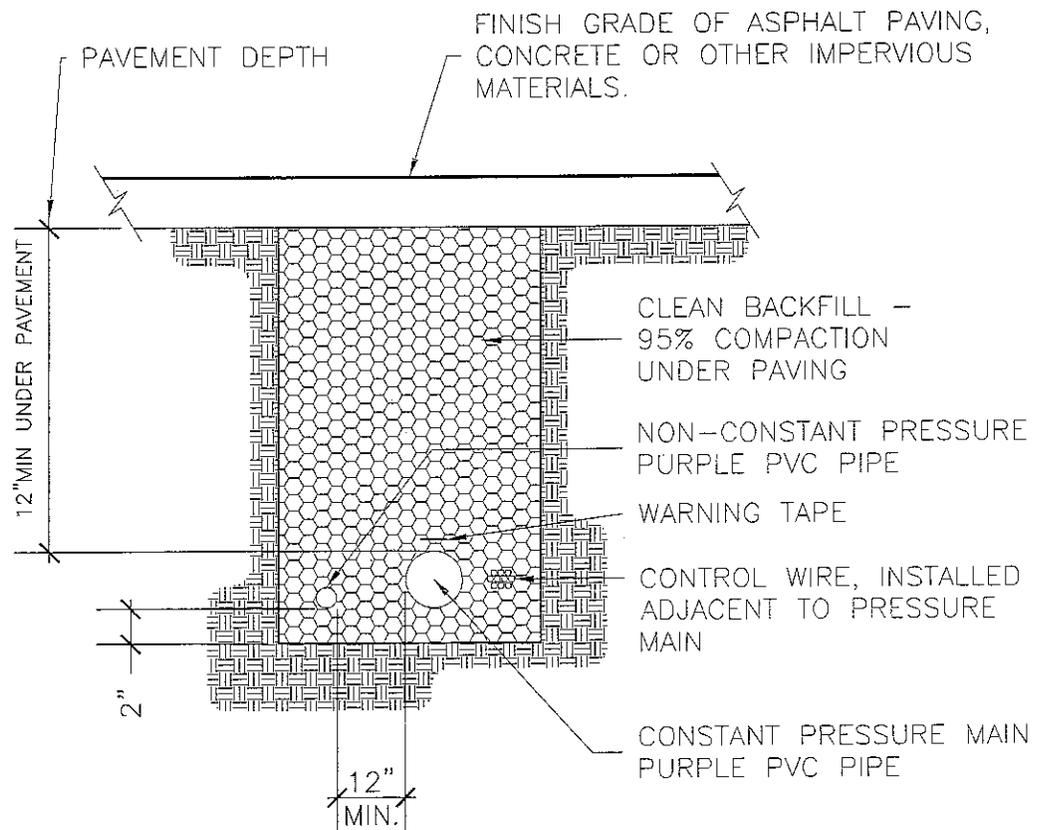
NOTES

1. SLEEVES UNDER CONCRETE ARE RECOMMENDED. USE SCH 40 PURPLE PVC FOR SLEEVES AND EXTEND SLEEVES 12" BEYOND EDGE OF PAVING AT BOTH ENDS.

EL DORADO IRRIGATION DISTRICT

ONSITE IRRIGATION PIPE TRENCHING DETAIL
RECYCLED WATER SYSTEM

DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO. OSR-6
APPROVED C. MEGERDIGIAN	DATE 9/10/02				



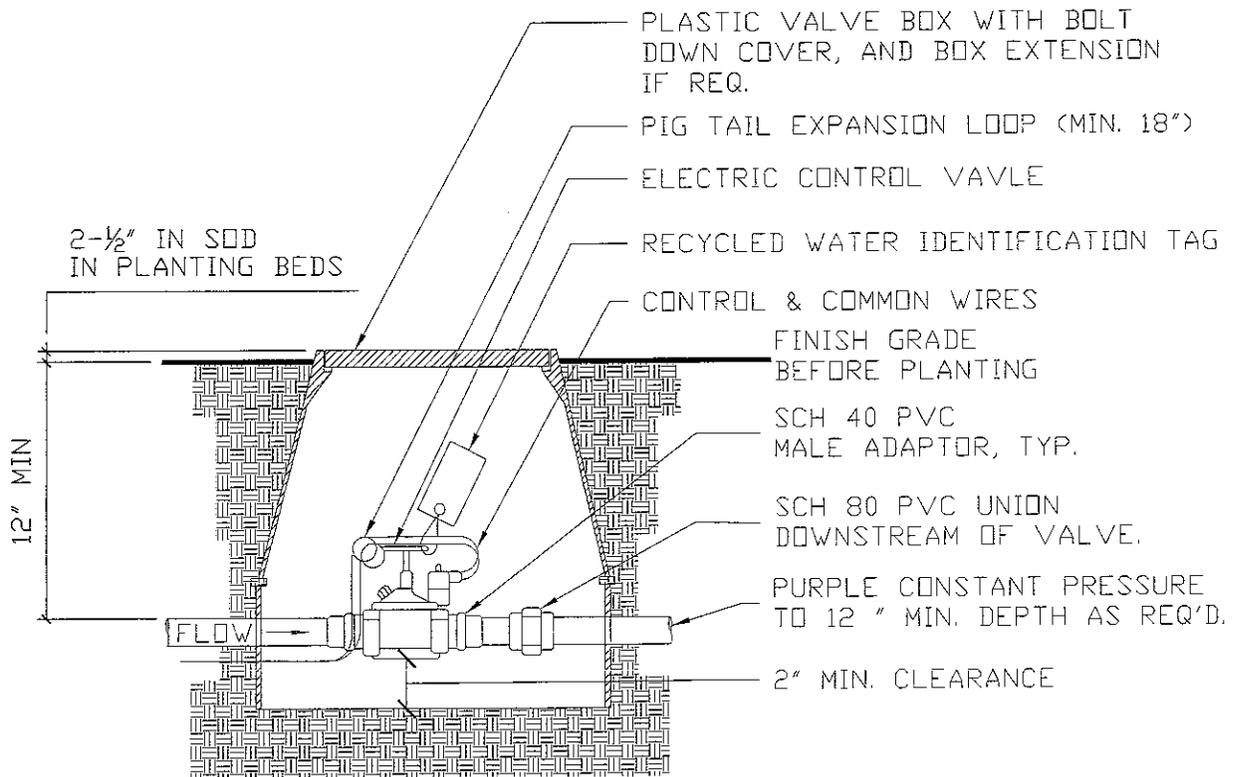
NOTES

1. SLEEVES UNDER CONCRETE ARE RECOMMENDED ONLY. IF INSTALLED USE SCH 40 PURPLE PVC FOR SLEEVES AND EXTENDED SLEEVES 12" BEYOND EDGE OF PAVING AT BOTH ENDS.

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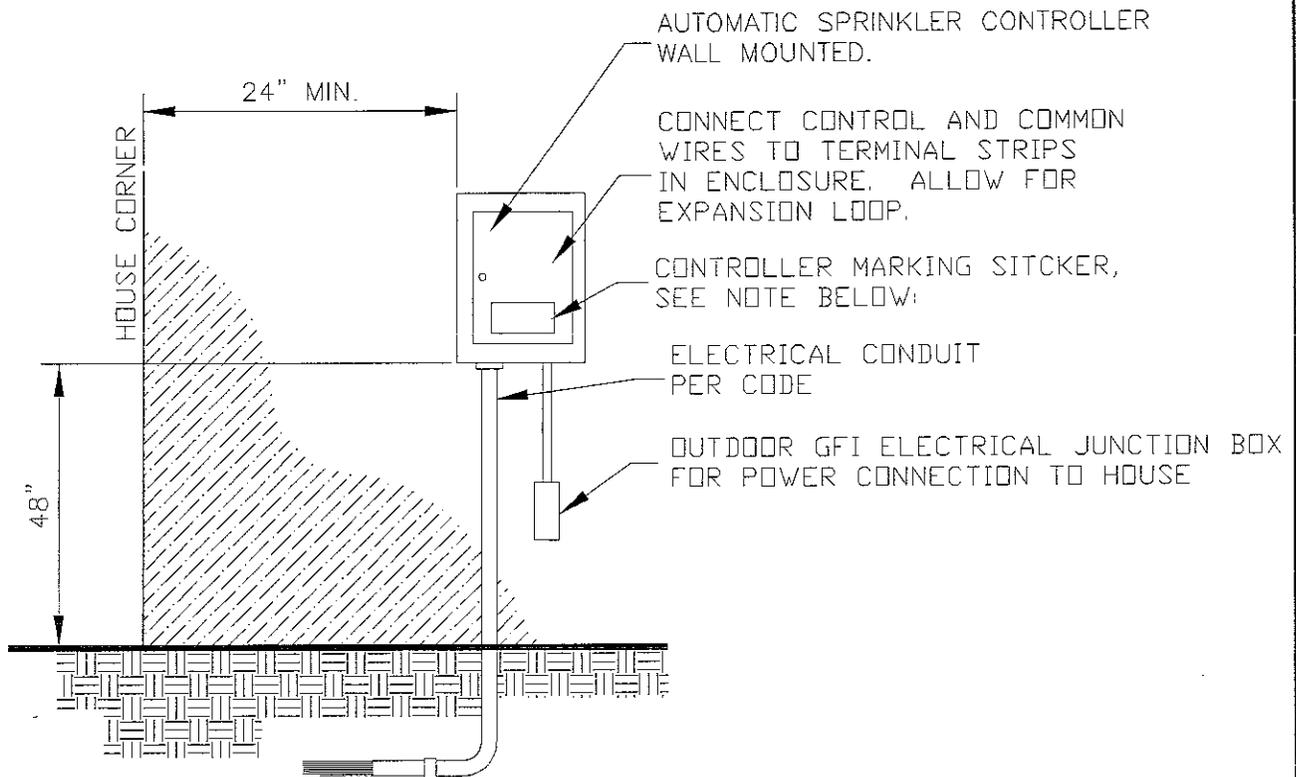
EL DORADO IRRIGATION DISTRICT					
ONSITE IRRIGATION PIPE TRENCHING UNDER PAVEMENT RECYCLED WATER SYSTEM					
DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO. OSR-7
APPROVED C. MEGERDIGIAN	DATE 9/10/02				



NOTES

1. ATTACH DOUBLE SIDED IDENTIFICATION TAGS LABELED IN ENGLISH AND SPANISH: "WARNING - RECYCLED WATER DO NOT DRINK".

EL DORADO IRRIGATION DISTRICT					
ONSITE IRRIGATION BURIED ELECTRIC REMOTE CONTROL VALVE					
DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO.
APPROVED C. MEGERDIGIAN	DATE 9/10/02				OSR-8



NOTES:

1. CONTROL WIRING (AWG. UF #14). SECURE TO TERMINAL STRIP PROVIDED IN ENCLOSURE.
2. COMMON WIRE TO BE WHITE & CONTROL WIRE TO BE RED. BUNDLE AND TAPE WIRING AT INTERVALS OF 10'-0" O.C.
3. NO SPLICES TO BE MADE BETWEEN CONTROLLER AND VALVE.
4. PAINT CONTROLLER AND ELECTRICAL CONDUIT TO MATCH BUILDING EXTERIOR.
5. INSTALL ON/OFF SWITCH FOR ELECTRICAL SUPPLY INSIDE OF CONTROLLER.
6. INSTALL CONTROLLER MARKING STICKER:
"ATTENTION - CONTROLLER UNIT FOR RECYCLED WATER"
ATTACH STICKER INSIDE CONTROLLER CABINET DOOR.

EL DORADO IRRIGATION DISTRICT

ONSITE IRRIGATION
AUTOMATIC CONTROLLER - WALL MOUNT

DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO.
APPROVED C. MEGERDIGIAN	DATE 9/10/02				OSR-9

**ON-SITE RECYCLED WATER NOTES
FOR NON-RESIDENTIAL SITES**

1. The installation of the recycled water system shall be accomplished under the approval, inspection, and to the satisfaction of the El Dorado Irrigation District (EID).
2. Contractor shall schedule a pre-construction conference with EID at (530) 622-4513 two (2) working days in advance of starting work. Construction shall begin no later than five (5) days after the pre-construction conference.
3. The El Dorado Irrigation District shall be notified two (2) days prior to the start of construction at (530) 622-4513 and each workday thereafter until completion of the project.
4. The property owner shall be responsible for providing access to and cooperation with the District Inspector to perform all testing and inspections.
5. Connections to the existing recycled water facilities shall be done by a licensed contractor in accordance with EID tie-in procedures.
6. There shall be no direct connections between the potable and recycled water systems.
7. Recycled water shall not be used for any purpose other than as approved in the User Reclamation Plan.
8. Hose bibs are prohibited on the recycled water system.
9. Water used in hose bibs shall be potable water and all hose bibs shall be affixed to the building.
10. The potable water system shall be protected by an approved backflow prevention device. No backflow prevention device is required on the recycled water service.
11. Fill lines for water features shall be connected to the potable water system using copper pipe.
12. A minimum of ten (10) feet horizontal separation must be maintained at all times between the constant pressure recycled and potable water lines. A minimum of one (1) foot vertical separation must be maintained at all times between the recycled and potable water lines with the recycled waterline below the potable.
13. Blue warning tape shall be placed over the pipe in the trench of all pipe carrying potable water.
14. Purple warning tape shall be placed over the pipe in the trench of all pipe carrying recycled water.

<i>EL DORADO IRRIGATION DISTRICT</i>					
<i>RECYCLED WATER NOTES FOR NON-RESIDENTIAL SITES</i>					
<small>DRAWN BY</small> G. BARRITT	<small>SCALE</small> NONE	<small>REVISION</small>	<small>DATE</small>	<small>BY</small>	<small>EID STANDARD DRAWING NO.</small> OSR-10
<small>APPROVED</small> C. MEGERDIGIAN	<small>DATE</small> 10/16/03				

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15. Recycled water piping shall be purple and identified as recycled water pipes by continuous marking on both sides. The markings shall include the following: "WARNING RECYCLED WATER - DO NOT DRINK", nominal pipe size, pressure rating, and ASTM designations.
16. All recycled water sprinkler control valves, isolation valves, quick couplers, regulators, ARVs, and appurtenances shall be tagged. Identification shall be weatherproof purple plastic, 3-inches by 4-inches with the words "WARNING RECYCLED WATER - DO NOT DRINK". Imprinting shall be permanent and black in color. Use tags manufactured by T. Christy Enterprises or approved equal.
17. All areas where recycled water is used shall be posted with signs. Each sign shall state "RECYCLED WATER - DO NOT DRINK" and display the international "Do Not Drink" symbol.
18. All spray heads shall be adjusted to eliminate overspray onto adjacent hardscapes.
19. Before activation of the recycled and potable water service, a cross connection test and inspection of the irrigation system will be performed. The property owner or contractor shall arrange with the District for an irrigation coverage test. Modifications to the irrigation system may be required.
20. Use of recycled water at this site is subject to the requirements of a User Reclamation Plan approved by EID.
21. Failure to comply with any of the EL Dorado Irrigation District Standards and Regulations may result in termination of recycled and/or potable water service.

EL DORADO IRRIGATION DISTRICT

RECYCLED WATER NOTES
FOR NON-RESIDENTIAL SITES

DRAWN BY G. BARRITT	SCALE NONE	REVISION	DATE	BY	EID STANDARD DRAWING NO.
APPROVED C MEGERDIGIAN	DATE 10/16/03				OSR-10 Pg 2 of 2