Yorba Linda Water District
1717 E. Miraloma Avenue • Placentia, CA 92870

Water Recycling Facilities Planning Study

Final

July 2011

Report Prepared By:

Malcolm Pirnie, Inc.

8001 Irvine Center Drive
Suite 1100
Irvine, CA 92618
(949) 450-9901

6808001

Contents

List of Tables

List of Figures

Appendices

Acronyms Used in the Report

AFY	Acre-Foot per Year
AOP	Advanced Oxidation Process
AWWA	American Water Works Association
CDPH	California Department of Public Health
CRW	Colorado River Water
DHS	Orange County Department of Health Services
DSS	Decision Support System
EPA	Environmental Protection Agency
FPGP	Facilities Planning Grant Program
GWRS	Groundwater Replenishment System
LRP	Local Resources Program
MBR	Membrane Bioreactor
MF	Microfiltration
MGD	Millions of gallon per day
MWD	Metropolitan Water District
NTU	Nephelometric Turbidity Units
OCSD	Orange County Sanitation District
OCWD	Orange County Water District
RO	Reverse Osmosis
RWQCB	California Regional Water Quality Control Board
SARI	Santa Ana Regional Interceptor
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TEES	Technical, Economic, Environmental And Social
TSS	Total Suspended Solids
UV	Ultraviolet Light
UWMP	Urban Water Management Plan
WRP	Water Reclamation Plant
YLCC	Yorba Linda Country Club

Executive Summary

The Yorba Linda Water District (District) currently provides water service to over 24,000 homes and businesses within a 23 square-mile territory including the City of Yorba Linda, portions of Brea, Placentia, Anaheim, and a small unincorporated area in the County of Orange. The District also owns and maintains approximately 150 miles of sewer pipes and a lift station, which provides sewer service to over 14,500 homes and businesses within a 12 square-mile territory. This service area includes the western half of the City of Yorba Linda, portions of Brea, Anaheim and Placentia, and a small unincorporated area in the County of Orange, which covers 14,500 acres serving a population of approximately 75,000 (source-UWMP)

There are currently no existing recycled water treatment facilities in or around the Yorba Linda Water District. The wastewater generated in the District's service area is currently treated by Orange County Sanitation District's (OCSD) Regional Wastewater Treatment facilities. Since the completion of the Groundwater Replenishment System (GWRS) by the Orange County Water District (OCWD), a portion of the treated wastewater from OCSD has been used to recharge the Orange County Groundwater Basin.

The District is interested in evaluating opportunities to divert raw sewage from the existing trunk system to a new treatment facility that would produce Title 22 recycled water within the District. The recycled water could then be used for landscape irrigation to golf courses, parks, and street medians throughout the District's service area. The goal of this project was to develop a Water Recycling Facilities Plan for the District.

This water recycling facilities plan was developed by analyzing the existing water resources in the District's service area and the potential non-potable water end users. The results of the water demands analysis were then used to develop and define recycled/non-potable supply alternatives. Finally, the output of the recycled/non-potable supply alternatives analysis was used to develop a recommended recycled water facilities program.

The report considers the following approaches in developing a successful implementable plan:

- Maximize cost-effective and reliable non-potable water use;
- Minimize wastewater treatment and disposal facilities costs; and
- Strategically locate a new potential satellite water reclamation plant (WRP) near major recycled water demands to minimize distribution costs.

Three primary supply alternatives were developed and evaluated in this effort to offset the District's potable water demands. Each alternative was evaluated and rated for alignment with the District's mission statement, based on technical, economic,

environmental and social performances. These alternatives are delineated below, with summarized highlights of each.

Alternative 1: Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)

- Partner with the City of Anaheim to utilize treated brackish groundwater.
- Connect to City of Anaheim's existing non-potable water transmission main at Yorba Regional Park's Pump Station No.5.
- Construct new non-potable water transmission main and pump station to convey approximately 94 AFY (0.08 MGD) to Eastside Community Park, Saint Francis of Assisi School and Jean Woodward Park.

Alternative 2: Satellite Water Reclamation Plant

- Construct raw wastewater diversion in trunk system upstream of the SARI.
- Develop satellite water reclamation plant.
- Deliver recycled water to meet existing irrigation demands within the vicinity of the treatment site.
- Recycle 480-1097 AFY (0.43 - 0.98 MGD) to offset potable water demands with potential for expansion.
- Sub-alternatives developed as follows:
  - Alternative 2A: Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)
  - Alternative 2B: Satellite Water Reclamation Plant (Aera Energy Wastewater Line)
  - Alternative 2C: Satellite Water Reclamation Plant (Combined Project)

Alternative 3: Interagency Project with Orange County Water District (OCWD)

- Partner with OCWD to utilize recycled water.
- Add recycled water to Anaheim Lake recharge basin.
- Construct raw wastewater diversion in trunk system upstream of the SARI.

- Develop satellite water reclamation plant.
- Deliver recycled water to meet existing irrigation demands within the vicinity of the treatment site.

The alternatives were evaluated based upon technical, economic, environmental and social performance. Based upon the results of the alternatives analysis, it is recommended to integrate all of the alternatives into one project at different phases, as this approach will allow the District to create the most economical recycled water program. The following table shows the phasing and associated costs for the recommended program. The implementation of the alternatives is based on the degree of interest from potential users and the degree of coordination required by each of the alternatives.

Table ES-1: Recycled Water Program Phasing and Costs

Program Phasing	Alternative		Capacity (AFY)		Capital Cost ($M)	
	No.	Description	Project	Program[b]	Project	Program[b]
1	2A	Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)	480	480	$16.90	$16.9
2	2B	Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)	617	1,097	$12.2	$29.1
3	1	Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)	94	1,191	$1.69	$30.8
4	3	Satellite Water Reclamation Plant (Interagency Project with OCWD)	2,756	3,947	$29.2	$60.0

Notes: a. Annual Costs included annualized capital costs and Annual O&M Costs; b. Cumulative value for the program

As shown, it is recommended that Alternative 2A be implemented first as it has been presented with the strongest user support. If this project moves forward, the estimated start of construction is projected to be the beginning of 2015.

1. Introduction

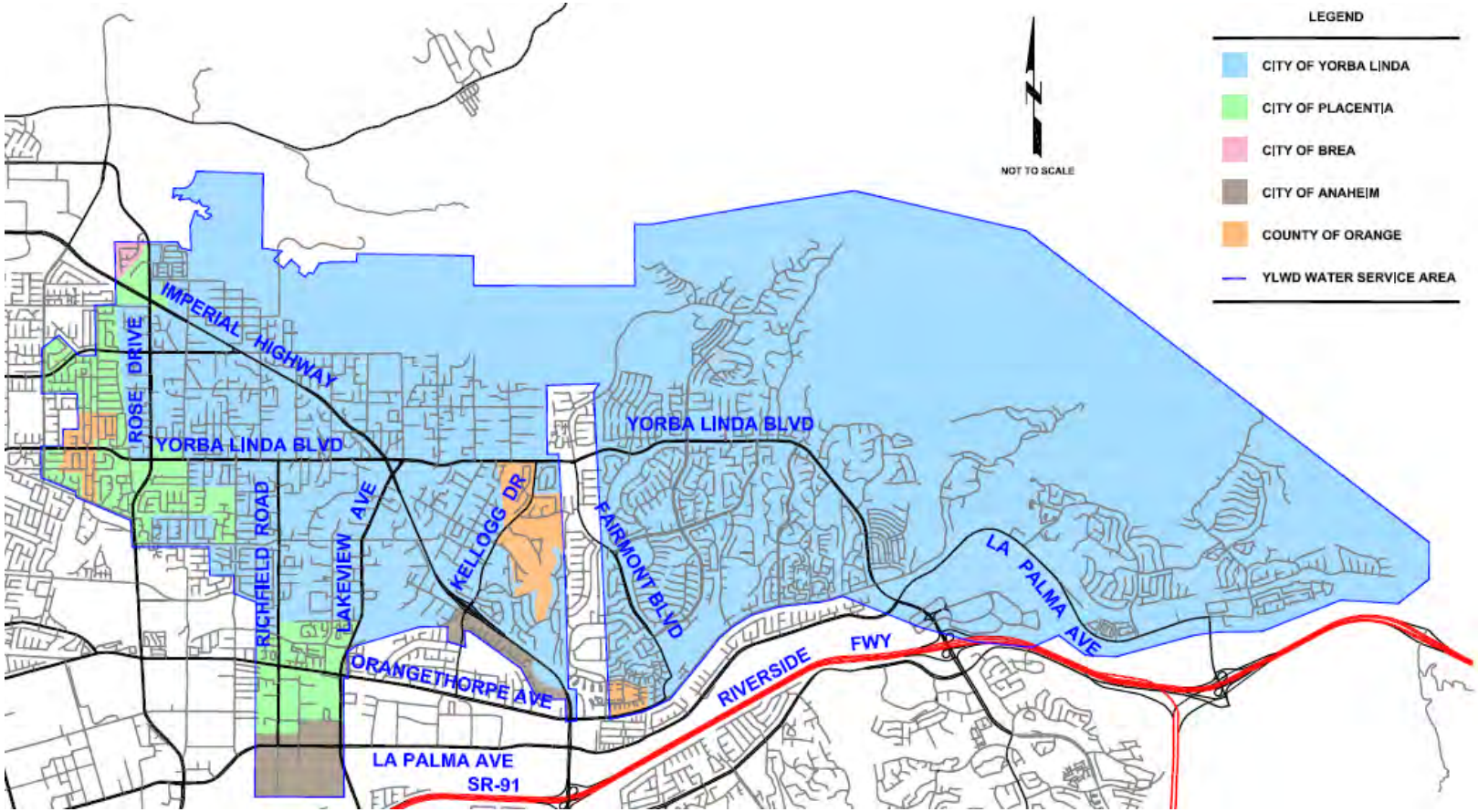
The Yorba Linda Water District (District) currently provides water service to over 24,000 homes and businesses within a 23 square-mile territory including the City of Yorba Linda, portions of Brea, Placentia, Anaheim, and a small unincorporated area in the County of Orange. The District also owns and maintains approximately 150 miles of sewer pipes and a lift station, which provides sewer service to over 14,500 homes and businesses within a 12 square-mile territory. This service area includes the western half of the City of Yorba Linda, portions of Brea, Anaheim and Placentia, and a small unincorporated area in the County of Orange, which covers 14,500 acres serving a population of approximately 75,000 (source-UWMP). Figure 1-1 is a map of the District's service area.

Local groundwater supplies, managed by the Orange County Water District (OCWD), account for approximately half of the District's water resources. The District also utilizes imported water from the State Water Project (SWP) and the Colorado River water (CRW) supplied by Metropolitan Water District (MWD) to supplement local groundwater supplies.

The District does not currently recycle any of its wastewater. The wastewater generated in the District's service area is treated by Orange County Sanitation District's (OCSD) Regional Wastewater Treatment facilities. Since the completion of the Groundwater Replenishment System (GWRS) by OCWD, a portion of the treated wastewater from OCSD has been used to recharge the Orange County Groundwater Basin.

With the support of the State Water Resources Control Board (SWRCB) Facilities Planning Grant Program (FPGP), this project was initiated to develop a Water Recycling Facilities Plan. Specifically, this project considered multiple recycled/non-potable water supply alternatives with the intent of selecting a program for use of recycled/non-potable water.

Figure 1-1: Yorba Linda Water District Service Area



1.1. Project Grant Information

The following is a list of project details specifically related to the State Water Resources Control Board (SWRCB) Water Recycling Facilities Planning Grant Program:

Project Title: Water Recycling Facilities Plan

Provision: Water Code § 79140 (Proposition 13 Water Recycling)

Terms of Agreement: December 17, 2009 through June 17, 2013

Grantee Information:

Project Representative Information: Mr. Kenneth R. Vecchiarelli, P.E.
Project Director
1717 E. Miraloma Avenue
Placentia, CA 92870

Contact Person Information: Steve Conklin, P.E.
Grant Contact
1717 E. Miraloma Avenue
Placentia, CA 92870

Grant Awarded: $75,000

1.2. Project Objectives

The intent of this project was to develop a Water Recycling Facilities Plan. The recommended program established in this project will serve as guidelines for future projects including environmental permitting, design and construction of the recommended water recycling facilities. The success of this project will increase the reliability of supply and provide diversification to the District's water portfolio. Since the District relies solely on a combination of OCWD managed groundwater and MWD managed imported water for its current water supply, this project will help to lessen the burden on these water bodies and help to ensure a sustainable water resource for the District in the future. It is believed that there will not be any duplication of service issues between the District and other existing agencies as a result of this project. There is a private company that is servicing a small strip of area within the District; however this service area is not included in the project.

1.3. Scope of Final Report

This study addresses the following items related to water recycling facility development:

- Evaluation of potential sites and selection of a preferred site;
- Evaluation of sewer flow monitoring data and wastewater quality testing to determine treatment requirements;
- Identification of recycled water users and demands;
- Identification of alternative sources of recycled/non-potable water;
- Designation of proposed recycled water service area and distribution system; and
- Evaluation of process train and costs for potential recycled water facility alternatives.

1.4. Approach, Methods and Techniques

These objectives were achieved through the following approach, methods and techniques. First, data was collected in order to evaluate existing water resources in the District's service area and analyze potential end users of non-potable water. The results of the water demands analysis were used to develop and define recycled/non-potable supply alternatives.

This study focused on resolving the following challenges for the District:

- Maximize cost-effective and reliable non-potable water use;
- Minimize wastewater treatment and disposal facilities costs; and
- Strategically locate a new potential satellite water reclamation plant (WRP) near major recycled water demands to minimize distribution costs.

The output of the recycled/non-potable supply alternatives analysis was used to develop a recommended recycled water facilities program.

This study is organized as follows:

- **Executive Summary.** This section is a summary that briefly describes the project, its purpose and findings.
- **Section 1 – Introduction.** This section provides background project information, grant information and the goals and objectives of this project.

- **Section 2 – Project Definition.** This section defines the study location and potential recycled market within the study area.
- **Section 3 – Potential Non-Potable Water Sources.** This section reviews the potential recycled/non-potable water sources available in the District's service area and evaluates regulatory water quality considerations.
- **Section 4 – Supply Alternatives Development and Evaluation.** This section reviews the non-potable water supply alternatives that have been developed and evaluated in this effort.
- **Section 5 – Summary and Findings.** This section summarizes the key findings and implications of these findings for the proposed Water Recycling Facilities program.

2. Project Definition

This chapter addresses the key components that define this recycled water plan; namely, background on the District and the study area along with potential recycled/non-potable water demands.

2.1. Project Background

Yorba Linda Water District provides residential, commercial, industrial, landscape and agricultural water services within its service area. The District's water system utilizes nine active production wells pumping from the Orange County Groundwater basin. Groundwater accounts for approximately 50% of the District's water resources. Imported water, supplied through one untreated water and three treated water connections, supplements the local groundwater supply. In addition, the District operates the following water facilities to provide reliable service to its customers:

- 12 booster pumping stations
- 14 water storage reservoirs
- 36 pressure reducing stations
- 10 emergency interconnections with neighboring agencies

The District also owns and operates the sewer collection system within its service area along with the Locke Ranch area. The District's sewer collection system serves over 13,000 customers within its service area via approximately 132 miles of varying diameter sewer mains, sub-trunks and a sewer lift station. The Locke Ranch area adds an additional 1,565 customers and 18 miles to the District's sewer collection system.

Water resources in Yorba Linda consist of the following:

- Groundwater extracted from wells in the Orange County Groundwater Basin
- Colorado River Water from the Colorado River Aqueduct
- State Water Project water
- Surface water from the Santa Ana River
- Urban and Storm runoff

Precipitation in this semi-arid environment averages 14 inches per year and does not directly provide significant additional water supply. The Orange County Groundwater Basin is partially naturally recharged by precipitation; however, most of the recharged water comes from imported water, the Santa Ana River (combination of storm flows and upstream recycled water) and recycled water supplied by OCWD.

The groundwater basin will continue to serve as one of the main sources of the District's water supply; however recharge from precipitation is becoming less reliable. Moreover the cost to purchase imported water will continue to increase as the amount of available water continues to decrease. Therefore, it is pertinent that the District develop other more self reliant alternatives to ensure that reliable water resources will be available to meet the District's users' water demands in the coming future.

2.2. Potential Recycled Water Market

Existing and potential future non-potable water categories were identified through discussions with the District and include the following:

- Parks
- School grounds
- Golf courses

Particular emphasis was placed on the larger water users in the District, since these potential recycled water customers could become the "anchor" users when developing distribution systems. Irrigation demand is one of the more readily acceptable uses of recycled/non-potable water, and thus was the focus of this study. There is only nominal industrial water use in the District.

2.2.1. Quantification of Demands

Urban landscape irrigation has the greatest reuse potential in the District and includes categories such as parks, schools and golf courses. Actual irrigation meter use data from January 2007 through March 2010 was provided by the District and was used to quantify the non-potable water demands for a majority of the District's customers.

The average annual demand that was used as the basis of this study was an average of the 2007, 2008 and 2009 average annual demand data. To develop a seasonal peaking factor, the ratio of the max monthly usage to average annual usage was calculated for each meter over the same three year calendar period. The average seasonal peaking factor between 2007 and 2009 was 2.1 times that of average day demand. The peak hour irrigation demand factor assumes that the system would operate on an 8 hour night irrigation cycle

for landscape applications, therefore a peak hour demand factor of 3.0 was assumed for all existing customers.

The District's irrigation meter data only accounts for a small portion of the water used at the golf courses identified within the District's service area. The Black Gold Golf Club currently uses untreated imported water from MWD to meet a majority of its irrigation demands from the existing OC-36 turnout. Meter data from the turnout was obtained from the Metropolitan Water District of Southern California for the 2007, 2008, 2009 calendar years. It was assumed that the Black Gold Golf Club was the only customer served by this turnout. For the Yorba Linda Country Club, groundwater from the club's own wells satisfy the majority of the irrigation demands, and this demand data was provided for this study.

An additional demand factor that was considered is the effect of climate change on usage patterns. Generating estimates of the impacts on demands resulting from temperature increases associated with climate change is beyond the scope of this effort. However, recent studies indicate that outdoor water use would be significantly influenced by changes in climate due to impacts on evapotranspiration rates with negligible impacts to indoor water use. Some estimates are that warming associated with climate change could gradually increase by 0.9°F to 2.7°F on average by 2030, which could increase demands by as much as 5% due to impacts on evapotranspiration rates. The precision of this variable may need to be re-evaluated in the future as the scientific community refines its information and predictive models.

The following are the main demand factors used in this study:

- Total average demand based upon the average of the District's meter data from January 2007 through December 2009.
- Metropolitan Water District of Southern California's OC-36 meter data from January 2007 through December 2009 was used to determine the Black Gold Golf Course's irrigation demands.
- Irrigation demands met by groundwater were provided directly from the Yorba Linda Country Club.
- 5% factor was added to the annual average irrigation demands to account for the effects of climate change.
- Total max day demand assumes a seasonal peaking factor of 2.1.
- Peak hour demand assumes 8 hour irrigation for landscape applications.

2.2.2. Existing Non-Potable Water Demands

Based upon the irrigation meter data provided by the District, OC-36 meter data, and demands provided by the Yorba Linda Country Club, existing non-potable water demands within the District's service area are approximately 1,580 AFY. Table 2-1 summarizes the potential non-potable water demand, and Table 2-2 provides the list of potential non-potable water demand users.

Table 2-1: Summary of Potential Non-Potable Water Demand

Category	Total Average Demand (AFY)	Total Max Day Demand (gpd)	Peak Hour Demand (gpm)
Parks	475	891,000	1,860
Golf Courses	900	1,690,000	3,500
Schools	201	377,000	785

The locations of the potential non-potable water customers identified by the District are highlighted in Figure 2-1.

Table 2-2: Potential Recycled/Non-Potable Water Customers

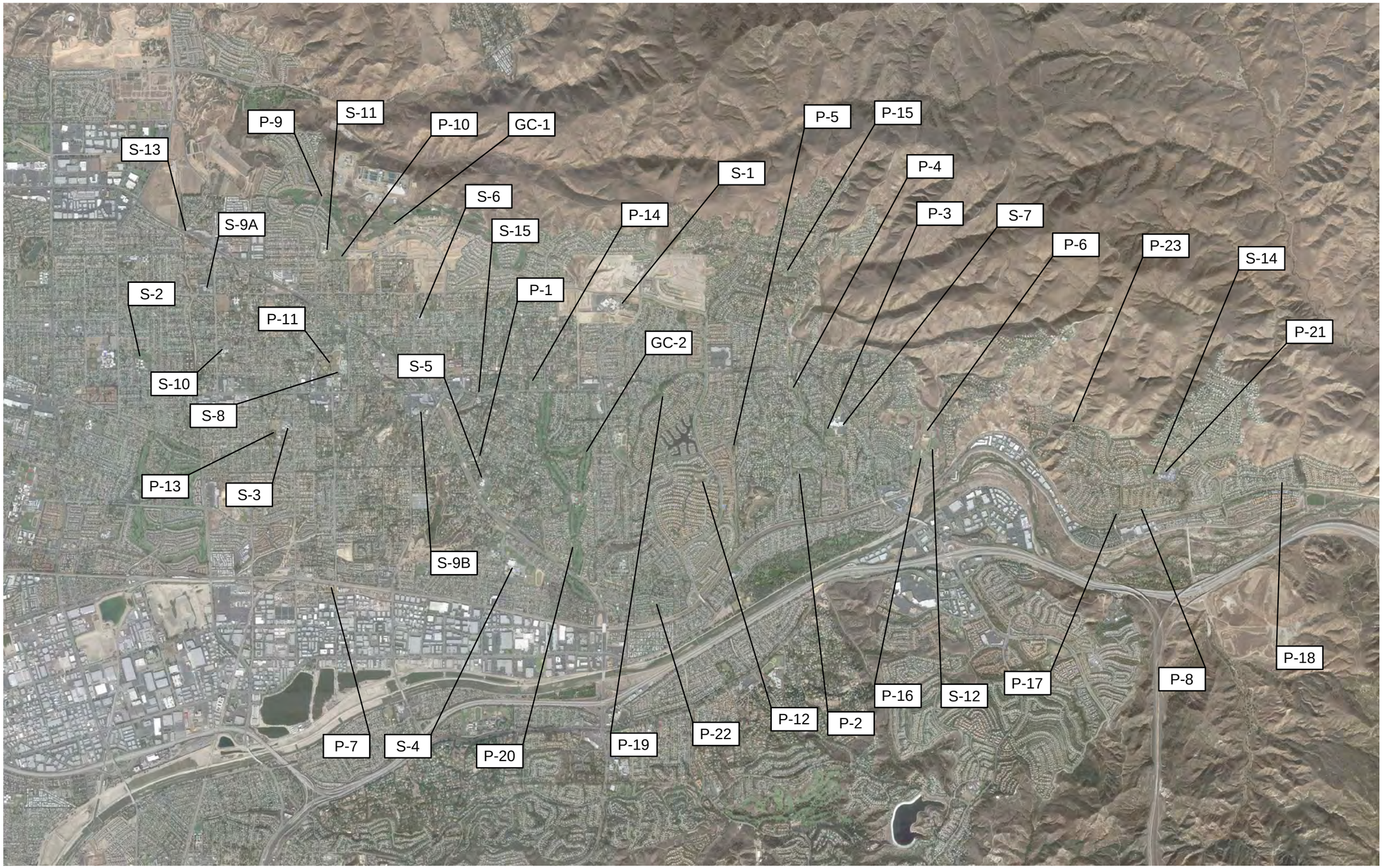
Vicinity Map ID	Potential Recycled/Non-Potable Water Customers	Total Average Demand (AFY)	Max Day Demand Factor	Total Max Day Demand (gpd) (d)	Peak Hour Demand Factor	Peak Hour Demand (gpm) (e)	Number of Irrigation Meters	Address	City	Zip
Parks										
P-1	Buena Vista Equestrian Center (a)	7.8	2.1	14,546	3	30.3	1	18661 Buena Vista Avenue	Yorba Linda	92886
P-2	Dominguez Trailside Park (a)	23.2	2.1	43,421	3	90.5	3	Dominguez Ranch Road and Trailside Drive	Yorba Linda	92886
P-3	Travis Ranch Park (a)	31.8	2.1	59,548	3	124.1	4	21305 Via Parque	Yorba Linda	92887
P-4	Arroyo Park (a)	22.3	2.1	41,836	3	87.2	3	Yorba Linda Boulevard and Yorba Ranch Road	Yorba Linda	92886
P-5	Las Palomas Tennis Park (a)	9.0	2.1	16,823	3	35.0	1	Avenida El Cid and Via Belarmino	Yorba Linda	92887
P-6	Jean Woodward Park (a)	52.3	2.1	98,080	3	204.3	8	Eastside Circle and Aviemore	Yorba Linda	92887
P-7	Parque de Los Ninos (a)	9.0	2.1	16,908	3	35.2	1	Orangethorpe Avenue and Richfield Road	Placentia	92870
P-8	Via Las Brisas - Landscape (a)	2.4	2.1	4,542	3	9.5	1	24652 1/4 Via Las Brisas	Yorba Linda	92887
P-9	Valley View - Landscape (a)	10.7	2.1	20,149	3	42.0	2	3595 1/2 E Valley View Circle & 3500 Valley View Restroom	Yorba Linda	92886
P-10	Lakeview - Landscape (a)	21.5	2.1	40,271	3	83.9	2	17604 1/2 Lakeview Avenue & 17606 1/2 Lakeview Avenue	Yorba Linda	92886
P-11	Valley View Sports Park (a)	25.0	2.1	46,884	3	97.7	2	4756 Valley View Avenue	Yorba Linda	92886
P-12	Nathan Shapell Park (a)	40.7	2.1	76,341	3	159.0	3	Village Center Drive and Vista Del Mar	Yorba Linda	92887
P-13	Parque De Los Vaqueros (a)	18.9	2.1	35,452	3	73.9	2	Carlsbad Street and Mesa Verde Circle	Placentia	92870
P-14	Jessamyn West Park (a)	15.5	2.1	29,123	3	60.7	2	19115 Yorba Linda Boulevard	Yorba Linda	92886
P-15	San Antonio Park (a)	30.9	2.1	57,982	3	120.8	2	San Antonio Road and View Park Drive	Yorba Linda	92887
P-16	Eastside Community Park (a)	10.6	2.1	19,811	3	41.3	2	5400 Eastside Circle	Yorba Linda	92887
P-17	Vista Lampara - Landscape (a)	10.6	2.1	19,821	3	41.3	2	24580 Via Lampara	Yorba Linda	92887
P-18	Brush Canyon Park (a)	16.6	2.1	31,162	3	64.9	2	28282 Brush Canyon	Yorba Linda	92887
P-19	Kingsbriar Park (a)	63.9	2.1	119,810	3	249.6	2	Kingsbriar Drive and Brookmont Drive	Yorba Linda	92886
P-20	Roland Bigonger Park (a)	10.7	2.1	20,034	3	41.7	1	Parkside Drive and Sandy Hill Lane	Yorba Linda	92886
P-21	Bryant Ranch Park (a)	17.6	2.1	32,928	3	68.6	1	Paseo De Toronto and Elizabeth Drive	Yorba Linda	92887
P-22	Woodgate Park (a)	10.7	2.1	20,023	3	41.7	1	Parkwood Court and Leafwood Court	Yorba Linda	92886
P-23	Box Canyon Park (a)	13.7	2.1	25,641	3	53.4	1	Via Lomas De Yorba and Foxtail Drive	Yorba Linda	92887
Golf Courses										
GC-1	Black Gold Golf Club (b)	479	2.1	898,052	3	1870.9	2 & OC-36 Meter	1 Black Gold Drive	Yorba Linda	92886
GC-2	Yorba Linda Country Club (c)	420	2.1	787,500	3	1640.6	2 & GW Wells	19400 Mountain View Avenue	Yorba Linda	92886
Schools										
S-1	N. Orange County Community College (b)	3.6	2.1	6,763	3	14.1	2	4175 Fairmont Boulevard	Yorba Linda	92886
S-2	Charles Wagner Elementary School (a)	23.2	2.1	43,546	3	90.7	2	717 E Yorba Linda Boulevard	Placentia	92870
S-3	Van Buren Elementary School (a)	15.8	2.1	29,578	3	61.6	2	1245 N Van Buren Street	Yorba Linda	92886
S-4	Esperanza High School (a)	15.9	2.1	29,877	3	62.2	2	1891 Kellogg Drive	Anaheim	92807
S-5	Linda Vista Elementary School (a)	9.7	2.1	18,148	3	37.8	1	5600 Ohio Street	Yorba Linda	92886
S-6	Mabel Paine Elementary School (a)	16.2	2.1	30,450	3	63.4	2	4444 Plumosa Drive	Yorba Linda	92886
S-7	Travis Ranch Elementary School (a)	14.8	2.1	27,791	3	57.9	4	5200 Via De La Escuela	Yorba Linda	92887
S-8	Yorba Linda Middle School (a)	15.7	2.1	29,470	3	61.4	2	4701 Casa Loma	Yorba Linda	92886
S-9A	Friends Christian School (a)	2.0	2.1	3,838	3	8.0	1	Rose Drive and Bastanchury Road	Yorba Linda	92886
S-10	Rose Drive Elementary School (a)	18.5	2.1	34,653	3	72.2	2	4700 Rose Drive	Yorba Linda	92886
S-11	School - Valley View (a)	21.1	2.1	39,648	3	82.6	3	3900, 3934, & 3932 1/2 Valley View Avenue	Yorba Linda	92886
S-12	Saint Francis of Assisi School (a)	31.3	2.1	58,604	3	122.1	1	5300 1/2 Eastside Circle	Yorba Linda	92887

Vicinity Map ID	Potential Recycled/Non-Potable Water Customers	Total Average Demand (AFY)	Max Day Demand Factor	Total Max Day Demand (gpd) (d)	Peak Hour Demand Factor	Peak Hour Demand (gpm) (e)	Number of Irrigation Meters	Address	City	Zip
S-13	Kindercare Learning Centers (a)	3.8	2.1	7,102	3	14.8	2	1001 East Imperial Highway	Placentia	92870
S-14	Bryant Ranch Elementary School (a)	4.2	2.1	7,859	3	16.4	1	24695 1/2 Paseo de Toronto	Yorba Linda	92887
S-15	Calvary Christian High School (a)	1.1	2.1	2,007	3	4.2	1	18821 Yorba Linda Boulevard	Yorba Linda	92886
S-9B	Friends Christian School (a)	3.9	2.1	7,226	3	15.1	1	5211 Lakeview Avenue	Yorba Linda	92886
Total (Rounded)		**1580**	-----	**2,950,000**	-----	**6,150**	-----	-----	-----	-----

(a) Total Average Demand based upon the average of the District's meter data from January 2007 through December 2009. A 5% factor was added to account for the effects of climate change.

(b) Total Average Demand for the District water meters based upon the average of the District's meter data from January 2008 through December 2009. Total Average Demand served by raw water from Metropolitan based upon the average of Metropolitan's OC-36 turnout data from January 2007 through December 2009. A 5% factor was added to account for the effects of climate change.

(c) Total Average Demand for the District water meters based upon an average of the District's meter data from January 2008 through December 2009. Total average demand served by groundwater provided by the Yorba Linda Country Club. A 5% factor was added to account for the effects of climate change.



Not to Scale

LEGEND

P-X	Potential Park Non-Potable Water Customer
S-X	Potential School Non-Potable Water Customer
GC-X	Potential Golf Course Non-Potable Water Customer

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

POTENTIAL RECYCLED/NON-POTABLE WATER CUSTOMERS

MALCOLM PIRNIE, INC.

JULY 2011

FIG 2-1

2.2.3. Future Non-Potable Water Demands

Based upon conversations with the District, no new potential future non-potable water demand customers have been identified within their service area. Therefore, this study only considers the existing non-potable water demands.

2.3. Stakeholder Meetings

Stakeholder meetings were held with the major user candidates to receive their feedback and interest in the use of recycled/non-potable water. The District plans to obtain signed letters of intent from each of the Stakeholders at a future date when the project is further along in development. A sample letter of intent can be found in Appendix C.

2.3.1. Yorba Linda Country Club (YLCC)

A meeting was held at the Yorba Linda Country Club (YLCC) on January 14, 2011 to introduce the alternatives being developed as a part of this study to the golf course superintendent. YLCC confirmed that they are interested and in support of using reclaimed water at the property. The golf course has separate irrigation meters and does not have any mixed use, reducing the complexity of the retrofit requirements. Please refer to the meeting minutes in Appendix B for more details.

2.3.2. Placentia/Yorba Linda Unified School District

On January 20, 2011, the District met with the Placentia/Yorba Linda Unified School District (School District). The School District became interested in recycled water after reading a news article discussing the costs savings realized by the neighboring Ontario-Montclair School District since switching over to recycled water. The School District then contacted the water district to discuss the possibility of switching to recycled water at their schools. Please refer to the meeting minutes in Appendix B for more details.

2.3.3. City of Yorba Linda/Black Gold Golf Club

On January 26, 2011, the District met with the Black Gold Golf Club, which is owned by the City of Yorba Linda and is the largest user within the District's service area. Besides the golf course, the City also has numerous parks within the District's service area which will make up a sizable portion of the recycled water demand. The City is interested and in support of using recycled water to promote environmental friendliness within the City. The clay soil at the golf course might provide some challenges and details will need to be worked out to ensure a smooth transition to recycled water. At the minimum, recycled water salinity would need to match the existing potable water supply. A copy of the meeting minutes is included in Appendix B.

2.3.4. Public Board Meeting

The Water Recycling Facilities Planning Study Draft Report was discussed a Public Board Meeting held on May 12, 2011. The preliminary results of the study including the project background, potential sites for a treatment facility, and project alternatives with estimated costs were presented and discussed. No members of the public in attendance addressed the Board regarding this report. A copy of the meeting minutes is included in Appendix B.

3. Potential Non-Potable Water Sources

In this study, two categories of potential non-potable/recycled water were identified including:

- Recycled water from the sewer
- Brackish groundwater

Both sources would require treatment to ensure compliance with California Department of Public Health (CDPH) Title 22 regulations. This section will review recycled water regulations, define irrigation water quality standards and expand upon the potential recycled/non-potable water sources including water quality, treatment requirements and potential treatment sites.

3.1. Regulatory and Water Quality Considerations

Water reuse regulations and guidelines have been developed to ensure public safety in case of exposure to recycled water. This section will review regulations and guidelines related to the required level of treatment and approved uses of recycled water.

3.1.1. Recycled Water Regulations

The following references regulate recycled water treatment, distribution and operation in California:

- California Department of Public Health (CDPH): California Code of Regulations, Title 17 (Division 1, Chapter 5, Group 4)
- California Department of Public Health: California Code of Regulations, Title 22 (Division 4)
- State Water Resources Control Board: California Code of Regulations, Title 23 (Division 3)

The following agencies enforce California regulations:

- California Regional Water Quality Control Board (RWQCB)
- Orange County Department of Health Services (DHS)
- California Department of Public Health (CDPH)

Other reputable organizations have developed recycled water guidelines. However, these guidelines are to serve as industry standards and are not enforced by the RWQCB and/or

CDPH. The following references are national and local guidelines for recycled water use, but are not enforced as regulations:

- U.S. Environmental Protection Agency (EPA): Guidelines For Water Reuse
- CA-NV American Water Works Association (AWWA): Guidelines For Distribution of Non-potable Water
- CA-NV AWWA: Guidelines For the On-Site Retrofit of Facilities Using Disinfected Tertiary Recycled Water

The following regulations and guidelines in this section are based upon the documents listed above. CDPH identifies 3 classes of recycled water, as summarized in Table 3-1.

Table 3-1: California Recycled Water Standards

Recycled Water Classes	Turbidity	Total Coliforms (b)
Disinfected Secondary - 2.2 (a)	-	2.2 MPN / 100 mL (median - 7 daily samples) 23 MPN / 100 mL (c)
Disinfected Secondary – 23 (a)	-	23 MPN / 100 mL (median - 7 daily samples) 240 MPN / 100 mL (c)
Disinfected Tertiary (d)	**Conventional** 2 NTU (24-hr avg) 5 NTU (5% per 24-hr) 10 NTU (single max) **Membrane** 0.2 NTU (5% per 24-hr) 0.5 NTU (single max)	2.2 MPN / 100 mL (median - 7 daily samples) 23 MPN / 100 mL (c) 240 MPN / 100 mL (single sample max)

(a) Oxidized and disinfected

(b) After disinfection

(c) Does not exceed value in more than one sample in 30 days

(d) Filtered and disinfected

The recycled water classes are differentiated by the water quality and the treatment requirements. The approved uses for each class of recycled water are stipulated by CDPH and summarized in Table 3-2.

Table 3-2: Approved Uses of Recycled Water

Approved Uses of Recycled Water	Recycled Water Quality
Irrigation	
Food Crops where recycled water contacts edible portion of crop, including all root crops.	Disinfected Tertiary
Parks and playgrounds	Disinfected Tertiary
School Yards	Disinfected Tertiary
Residential landscaping	Disinfected Tertiary
Unrestricted access golf courses	Disinfected Tertiary
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	Disinfected Tertiary
Food crops where edible portion is produced above ground and not contacted by recycled water	Disinfected Secondary - 23
Cemeteries	Disinfected Secondary - 23
Freeway landscaping	Disinfected Secondary - 23
Restricted access golf courses	Disinfected Secondary - 23
Ornamental nursery stock and sod farms	Disinfected Secondary - 23
Pasture for milk animals	Disinfected Secondary - 23
Non-edible vegetation with access control to prevent use as park, playground, or schoolyard	Disinfected Secondary - 23
Orchards with no contact between edible portion and recycled water	Undisinfected Secondary
Vineyards with no contact between edible portion and recycled water	Undisinfected Secondary
Nonfood-bearing trees including Christmas trees not irrigated less than 14 days before harvest	Undisinfected Secondary
Fodder crops and fiber crops	Undisinfected Secondary
Seed crops not eaten by humans	Undisinfected Secondary
Food crops that undergo commercial pathogen-destroying processing before consumption by humans	Undisinfected Secondary
Ornamental nursery stock, sod farms, not irrigated less than 14 days before harvest	Undisinfected Secondary
Impoundments	
Non-restricted recreational impoundments, with supplemental monitoring for pathogenic organisms	Disinfected Tertiary
Restricted recreational impoundments and publicly accessible fish hatcheries	Disinfected Tertiary
Landscape impoundments without decorative fountains	Disinfected Tertiary
Cooling or Air Conditioning	
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser or spraying that creates a mist.	Disinfected Secondary - 23
Industrial or commercial cooling or air conditioning not involving cooling tower, evaporative condenser, or spraying that creates a mist	Disinfected Secondary - 23

Approved Uses of Recycled Water	Recycled Water Quality
Other Uses	
Flushing toilets and urinals	Disinfected Tertiary
Priming drain taps	Disinfected Tertiary
Industrial process water that may contact workers	Disinfected Tertiary
Structural fire fighting	Disinfected Tertiary
Decorative fountains	Disinfected Tertiary
Commercial laundries	Disinfected Tertiary
Consolidation of backflow material around potable water pipelines	Disinfected Tertiary
Artificial snowmaking for commercial outdoor use	Disinfected Tertiary
Commercial car washes not done by hand and excluding the general public from washing process	Disinfected Tertiary
Industrial boiler feed	Disinfected Secondary - 23
Nonstructural fire fighting	Disinfected Secondary - 23
Backfill consolidation around non-potable piping	Disinfected Secondary - 23
Soil compaction	Disinfected Secondary - 23
Mixing concrete	Disinfected Secondary - 23
Dust control on roads and streets	Disinfected Secondary - 23
Cleaning roads, sidewalks, and outdoor work areas	Disinfected Secondary - 23
Flushing sanitary sewers	Undisinfected Secondary

Disinfected tertiary recycled water is suitable for all non-potable water uses. Based upon the potential recycled water market identified in the District (refer to Section 2.2), it was assumed that all recycled water would meet or exceed the disinfected tertiary standards.

3.2. Irrigation Water Quality Standards

As a majority of the potential recycled/non-potable water users within the District are for irrigation, the following table depicts the irrigation water quality assumptions used in this report. Table 3-3 includes both CDPH guidelines for use of non-potable water sources and best practice from other successful recycled water projects.

Table 3-3: Recycled Water Quality Standards

Constituent	Irrigation Recycling Standards
Ammonia (mg/L)	ND
Coliform, Total (MPN/100 mL)	2.2
Nitrate (N) (mg/L)	5
Copper (µg/L)	200
Lead (µg/L)	5000
Phosphate (P) (mg/L)	1
Turbidity (NTU)	2
Oil and Grease	ND
Total Suspended Solids (TSS) (mg/L)	2
Trash	ND
Total Dissolved Solids (TDS) (mg/L)	500-1000
Conductivity (µS)	600-1200
Urea (µg/L)	ND
Detergent (mg/L)	ND
Chlorine (mg/L)	1-2
Zinc, Total (µg/L)	2000

ND = Non-Detect

For comparison, the water quality of the District's existing potable water supply is included in Appendix A. The treatment requirements developed for each potential recycled/non-potable water source are designed to meet the recycled water quality standards in Table 3-3.

3.3. Recycled Water

Domestic, commercial and industrial sources of wastewater generated in the District's service area are treated by OCSD's Regional Wastewater Treatment Facilities, specifically OCSD Plant No.1 (Fountain Valley, CA) and OCSD Plant No. 2 (Huntington Beach, CA). OCSD's Plant No.2 currently discharges the treated wastewater to the ocean. However, OCSD's Plant No.1 wastewater is currently recycled for groundwater replenishment by OCWD.

In addition, a portion of the District's wastewater is tributary to the Santa Ana Regional Interceptor (SARI) that flows for treatment at OCSD's Plant No.2. The SARI line collects high salinity commercial and industrial waste along with some domestic wastewater flows.

3.3.1. GWRS Service

A potential source of recycled water near the District's service area is the GWRS pipeline. The GWRS is high quality recycled water used for groundwater recharge and injection. Secondary effluent from OCSD's Plant No. 1 is diverted to OCWD for advanced treatment for GWRS.

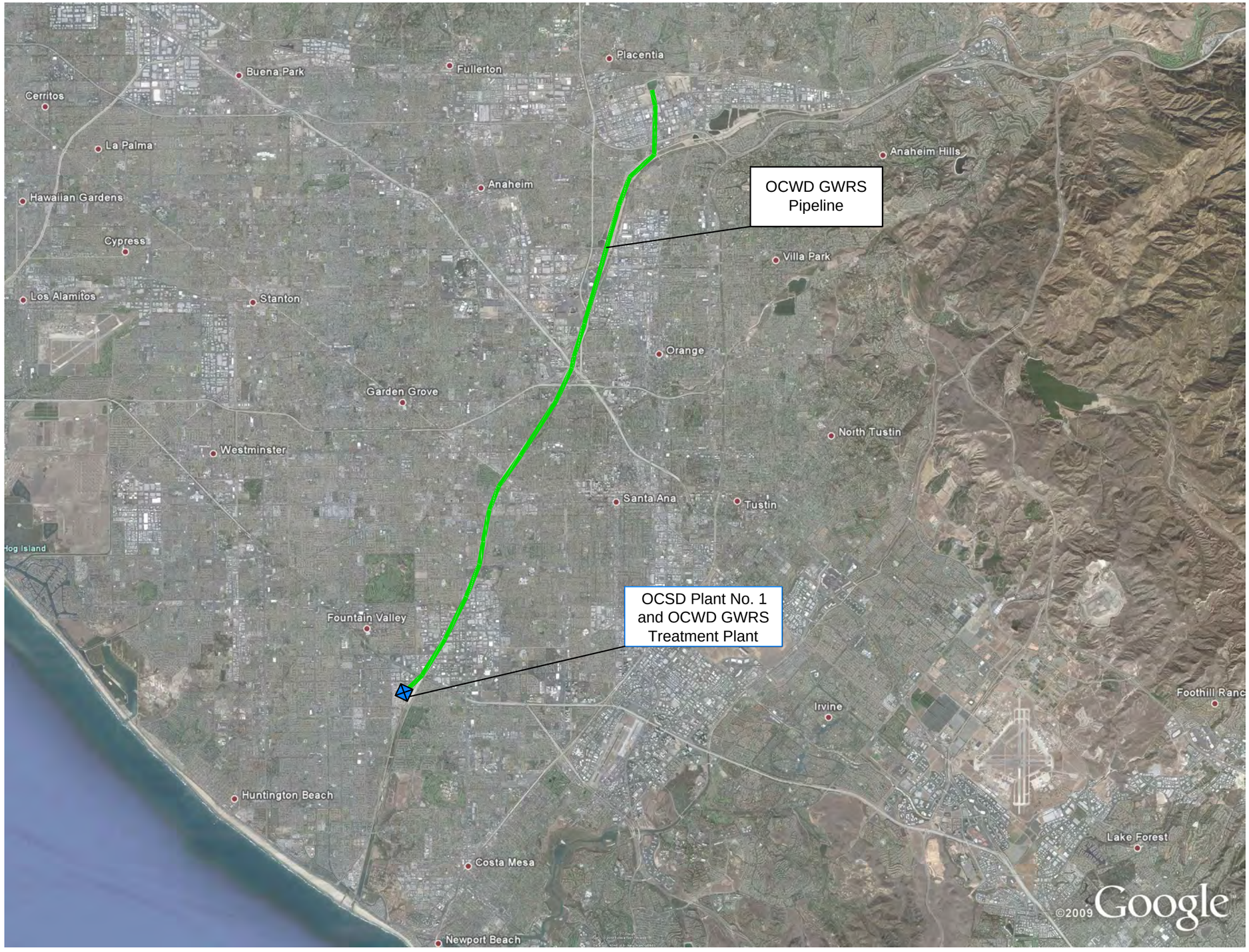
The first step in the advanced treatment train is microfiltration (MF). MF is primarily responsible for removing turbidity, particulates, and pathogens. Commercially available microfiltration membranes are limited to hollow fiber configurations. Each hollow fiber tube has size controlled pores in the material to achieve the appropriate level of filtration without jeopardizing the strength of the membrane fiber.

As a second step, effluent from the microfiltration unit feeds a reverse osmosis (RO) system. The RO unit is able to remove salts, hardness, pathogens, turbidity, disinfection by-product (DBP) precursors, pesticides, color and other contaminants. Unlike the MF system, the RO system operates at higher pressures. Pressure is applied to the concentrate side of a semi-permeable membrane, forcing water and other small ions or molecules through the membrane. The portion of the water that does not pass through the membrane along with the concentrated contaminants is referred to as brine or concentrate.

The third and final barrier of protection is an advanced oxidation process (AOP). AOP includes ultraviolet disinfection and oxidation with the addition of hydrogen peroxide. AOP also removes low molecular weight organics that may pass through RO at low concentrations.

The first construction phase of the GWRS project was completed in January 2008 and included 70 mgd of treatment capacity. The Phase 2 expansion of the GWRS system has been initiated to increase the capacity of the system by 30 mgd for a total of 100 mgd of capacity. Phase 2 is expected to be operational in 2012.

Figure 3-1 depicts the GWRS pipeline that delivers recycled water from Fountain Valley to either the Miller Basin or Kraemer Basin in Anaheim for groundwater recharge. The pipeline potentially has excess capacity for use by the Yorba Linda Water District.



N.

Not to Scale

LEGEND

OCWD GWRS Pipeline

Existing Wastewater Treatment Facility

MALCOM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

GWRS PIPELINE

MALCOM PIRNIE, INC.

JULY 2011

FIG 3-1

Diversion of the recycled water from the GWRS pipeline to provide recycled water for use in the District's service area was one potential alternative considered in this study. Four turnouts were included in the design of the GWRS pipeline as shown in Table 3-4.

Table 3-4: GWRS Pipeline

Turnout	Location	Size
1	Edinger Avenue	78 x 30
2	Willowick Golf Course / OCTA R/W	72 x 30
3	Ball Road	66 x 60
4	Miraloma Avenue	60 x 30

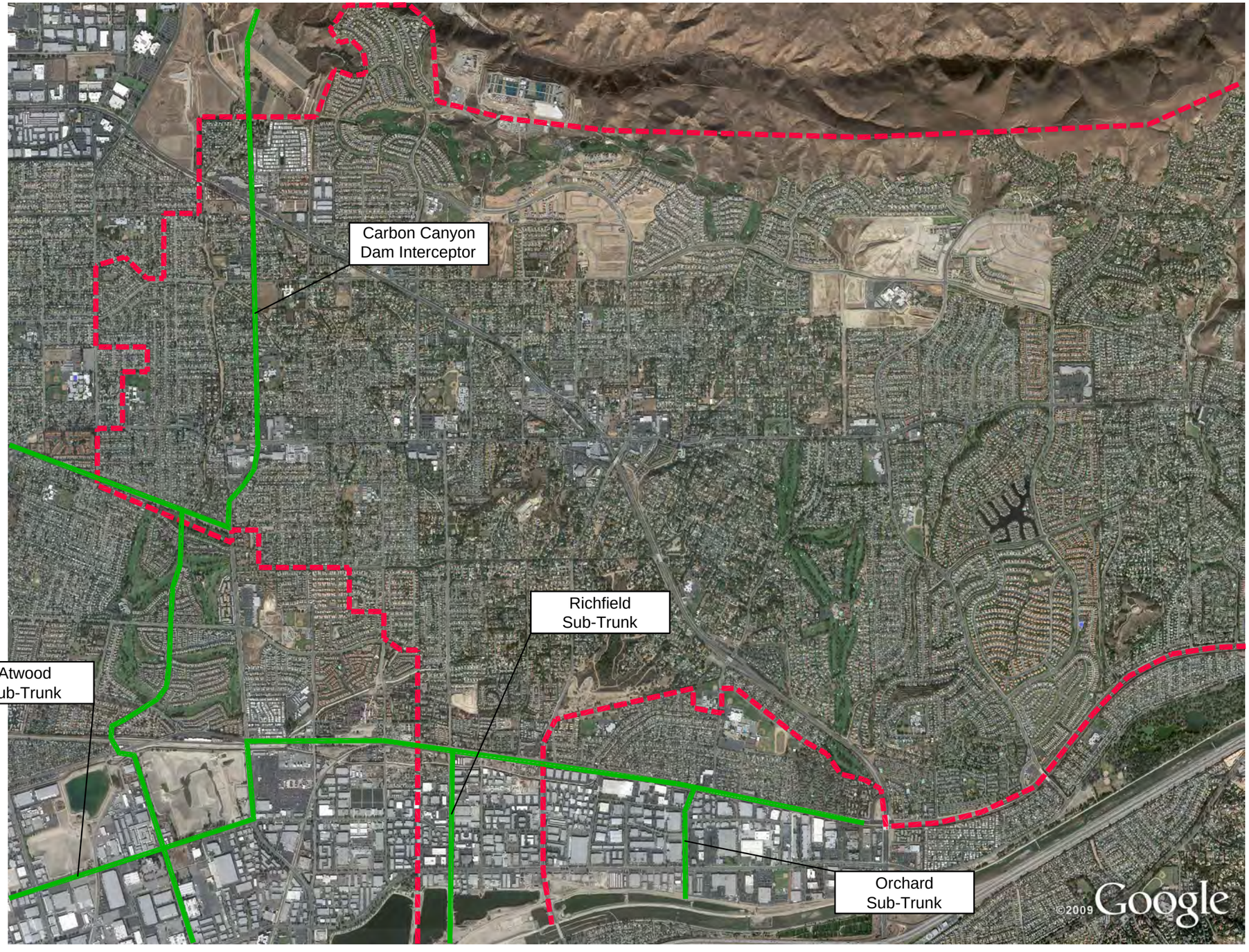
Source: OCWD Long-Term Facilities Plan (2006).

None of the existing turnouts are in the District's service area. The Miraloma turnout is closest connection point for the District. There are already several potential industrial non-potable water uses in Anaheim which are ideally suited for the higher GWRS water quality. In addition, the Alta Vista Golf Club in Placentia, which is outside the District's service area, is the nearest large non-potable water irrigation demand. Given the capacity constraints of GWRS water for uses other than groundwater replenishment and the potential non-potable water applications in Anaheim and Placentia, GWRS water for irrigation use in the District's service area was not explored further.

3.3.2. Satellite Water Reclamation Facility

Alternatively, a satellite water reclamation facility was given further consideration as a potential recycled water source. A satellite water reclamation facility diverts wastewater from the sewer collection system upstream of the regional water reclamation plant for treatment in addition to using the same wastewater collection system to dispose of any residuals from the recycled water treatment processes. This study focused on diverting wastewater from trunk sewers that are tributary to the SARI, which is conveyed to OCSD's Plant No.2, to avoid reducing secondary flows to the GWRS system.

Figure 3-2 highlights the portion of OCSD's sewer collection system in and around the District's service area.



N.

Not to Scale

LEGEND

- Approx. Yorba Linda Service Boundary
- OCSD Sewer Mains

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

EXISTING OCSD SEWER COLLECTION SYSTEM
AROUND YORBA LINDA SERVICE AREA

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-2

As shown in Figure 3-2, the Atwood, Richfield and Orchard sub-trunks flow tributary to the SARI. Therefore, areas were identified within the District's sewer system that would flow tributary to these sub-trunks. Although the Atwood sub-trunk can be diverted to Plant No. 1, it is assumed that flow could continue to SARI and be available for the project.

3.3.3. Sewer Flow Monitoring

The District provided sewer flow monitoring data collected at varying intervals and locations from January 29, 2010 to April 14, 2010 as part of its sewer master plan update. Three sewer flow monitoring data reports prepared by Downstream Services, Inc. were provided and included the following:

- Sewer Master Plan Update Results, Phase 1 (March 2010)
- Sewer Master Plan Update Results, Phase 2 (April 2010)
- Sewer Master Plan Update Results, Phase 3 (May 2010)

Based upon a review of Sewer Master Plan results, two manholes were identified to explore further based upon their location and flow. The first location was identified as Site P1-8 in Downstream Services, Inc. Phase 1 report. P1-8 is located in a 15-inch sewer main southwest of Acacia Hill Drive and Country View Drive (adjacent to the Yorba Linda Country Club). The second location was identified as P2-1 in Downstream Services, Inc. Phase 2 Report. P2-1 is a manhole in a 24-inch sewer main located in Richfield Road, north of Jackson Way. Table 3-5 summarizes the sewer flow monitoring results at P1-8 and P2-1 during the study period.

Table 3-5: Sewer Flow Monitoring Data

Site #	Project Date		Pipe Diameter	Depth (inches)	Velocity (ft/sec)	Flow (mgd)
	Start	Finish	(inches)	Average	Average	Average
Phase 1 - Sewer Master Plan Update Results (a)						
P1-8	1/29/2010	2/17/2010	15	7.18	4.13	1.59
Phase 2 - Sewer Master Plan Update Results (b)						
P2-1	2/20/2010	3/14/2010	24	6.42	3.27	1.46
Total						**3.05**

(a) Source: Downstream Services, Inc. IDModeling Sewer Master Plan Update Results, Phase 1, March 2010

(b) Source: Downstream Services, Inc. IDModeling Sewer Master Plan Update Results, Phase 2, April 2010

Figure 3-3 depicts the location of the P1-8 and P2-1 manholes.

N

Not to Scale

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

SEWER FLOW MONITORING LOCATIONS

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-3

Both sewer locations have sufficient wastewater flows to meet a portion of the District's average annual non-potable water demands.

The District's sewer collection system is also divided into two separate drainage basins, i.e. Drainage A-1 Basin and Drainage A-2 Basin. P1-8 is located within Drainage A-1 basin and P2-1 is located within Drainage A-2 basin. Therefore, both of the District's drainage basins also have sufficient wastewater flows to meet the non-potable water demands.

As both manhole locations were tributary to the SARI, a recycled water treatment facility was given further consideration.

A preliminary storage analysis was performed and the details of that analysis are attached in Appendix F.

3.3.4. Wastewater Quality Testing

Sewer flow samples were collected to further define the constituents in the raw wastewater. A sample was taken from the P1-8 and P2-1 locations to get a representative sample from both drainage areas. The samples were collected on June 24, 2010. Table 3-6 summarizes the results of the wastewater quality testing.

Table 3-6: Wastewater Quality Testing

Parameter	Method	Units	Result	
			P1-8	P2-1
Microbiological Analyses				
Total Coliform (15 Tube)	SM 9221	MPN/100 mL	>1,600	>1,600
Fecal Coliform (15 Tube)	SM 9221	MPN/100 mL	>1,600	>1,600
General Physical Analyses				
Apparent Color	SM 2120B	Color Units	350	625
Turbidity	EPA 180.1	NTU	170	260
General Chemical Analyses				
Alkalinity, Total (as $CaCO_3$)	SM 2320B	mg/L	320	430
Ammonia (NH_3)	EPA 350.1	mg/L	33	37
Bicarbonate (HCO_3)	SM 2320B	mg/L	390	520
Biochemical Oxygen Demand	SM 5210B	mg/L	220	170
Chloride (Cl)	EPA 300.0	mg/L	190	200
Specific Conductance (E.C.)	SM 2510B	umhos/cm	1,600	1,700
Fluoride (F)	EPA 300.0	mg/L	0.73	0.50
Hardness, Total (as $CaCO_3$)	SM 2340C	mg/L	270	330
MBAS (LAS Mole. Wt. 326.5)	SM 5540C	mg/L	6.7	12
Nitrate as N (NO_3-N)	EPA 353.2	mg/L	ND	ND
Oil & Grease	EPA 1664A	mg/L	31	43
pH (Lab)	SM 4500HB	pH units	7.4	7.7
Ortho-Phosphate (PO_4)	HACH 8048	mg/L	5.7	5.8
Settleable Solids	SM 2540F	mL/L/hr	18	13
Sulfate (SO_4)	EPA 300.0	mg/L	210	160
Non-Filterable Residue/TSS	SM 2540D	mg/L	280	410
Total Filterable Residue/TDS	SM 2540C	mg/L	930	1,000
Metals				
Boron (B)	EPA 200.7	µg/L	440	460
Calcium (Ca)	EPA 200.7	mg/L	81	85
Copper (Cu)	EPA 200.7	µg/L	73	80
Lead (Pb)	SM3113-B	µg/L	ND	ND
Magnesium (Mg)	EPA 200.7	mg/L	25	26
Potassium (K)	EPA 200.7	mg/L	26	27
Silica (SiO_2)	EPA 200.7	mg/L	16	16
Sodium (Na)	EPA 200.7	mg/L	200	200
Zinc (Zn)	EPA 200.7	µg/L	160	160

The following is a description of each potential wastewater quality parameter of concern:

Ammonia

Ammonia often occurs in wastewater as a result of fertilizer runoff. Ammonia was detected during wastewater quality sampling. Treatment will be required to reduce the concentration of ammonia to meet the non-detectable irrigation recycling standards.

Total Coliforms

Total Coliforms were tested as an indicator of microbial wastewater quality. Microbial contaminants are naturally present in the environment. According to CDPH Title 22 Disinfected Tertiary Recycled Water Criteria, the median concentration of total coliform bacteria measure in the filtered and subsequently disinfected wastewater should not exceed 2.2 counts per 100 mL. Total Coliforms were greater than 1,600 MPN per 100 mL. Treatment will be required to reduce the total coliforms to less than 2.2 counts per 100 mL to meet the irrigation recycling standards.

Color

The color in the raw wastewater ranged from 350 to 625 color units. Color is an indicator of naturally occurring organic materials. Treatment will be required to reduce the organic chemical contaminants of concern.

Turbidity

Turbidity is a general indicator of microbial water quality. Turbidity during sampling ranged from 170 nephelometric turbidity units (NTU) to 260 NTU. Turbidity for filtered wastewater is regulated by CDPH Title 22 Disinfected Tertiary Recycled Water Criteria. Treatment will be required to ensure compliance with CDPH Title 22 regulations.

Total Dissolved Solids

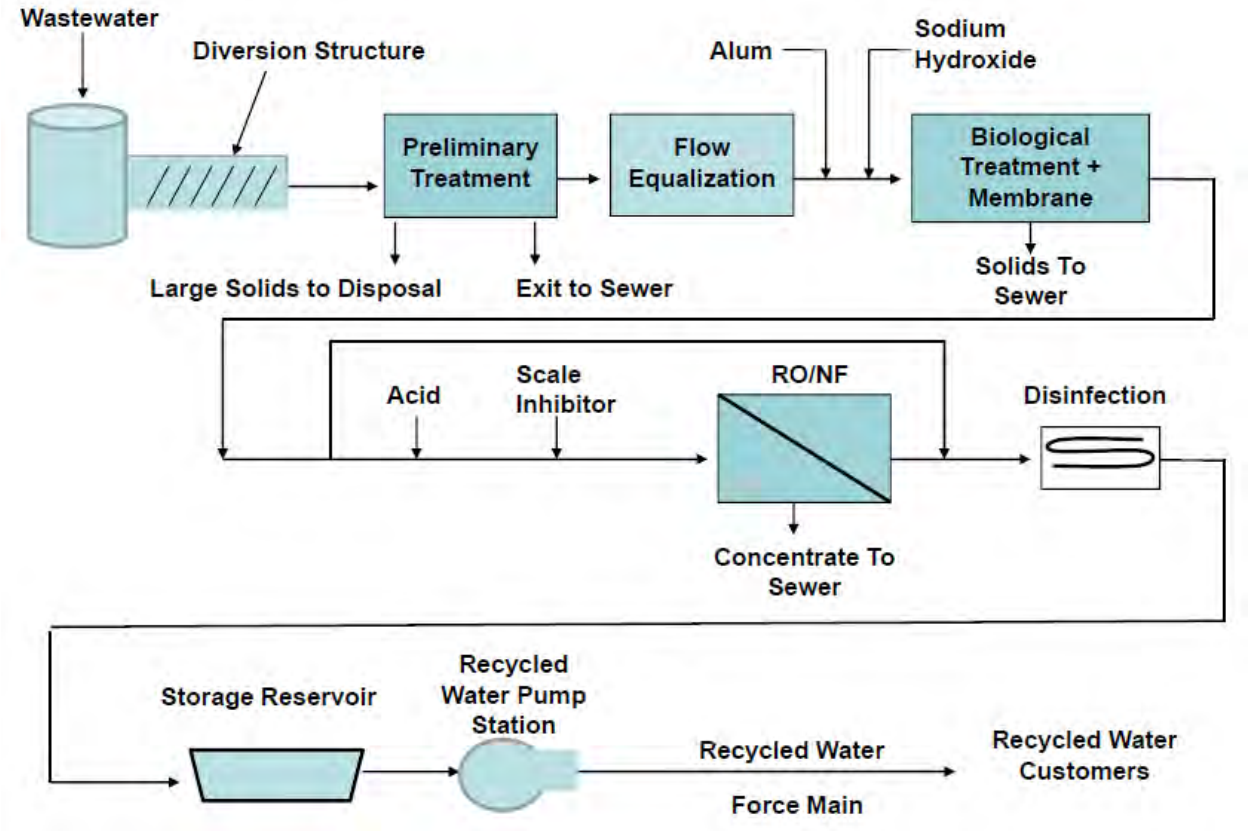
As determined from Specific Conductance tests, the total dissolved solids ranged from 930 mg/L to 1,000 mg/L, and is a potential contaminant of concern. The District's current potable water supply has an average Total Dissolved Solids (TDS) concentration of 615.8 mg/L. The elevated salt concentration in the wastewater may present a challenge for use as an irrigation water source. Treatment would be required to reduce the concentrations of salts to match the existing potable water supply.

Technologies that can be used to reliably meet the established recycling standards and ensure compliance with CDPH's Title 22 regulations is expanded upon in the following section.

3.3.5. Satellite Water Reclamation Facility Treatment Requirements

Removal of contaminants from wastewater is achieved through a combination of treatment technologies. For the purposes of this study, the following recycled water treatment train was assumed for all satellite water reclamation plant alternatives (refer to Figure 3-4)

Figure 3-4: Membrane Bioreactor Treatment Train



Preliminary Treatment

The objective of preliminary treatment is to remove debris from the raw wastewater as it enters the recycled water treatment facility in order to protect downstream processes. Removal of debris from the raw water involves the following steps:

- Raw wastewater is pumped through bar screens to remove any large solid materials in the wastewater. Anything that is too large to pass through the spaces between the bars, such as paper or cloth, is removed.

- After flowing through bar screens, water is treated to remove sand, gravel or other heavy solid materials. These heavy inorganic materials are separated in grit handling equipment which allows the heavy inorganic materials to settle.

Primary Treatment

Following the removal of coarse materials, the wastewater is treated to remove suspended solids and organic matter. This separation process involves the following steps:

- Water is transported to large sedimentation tanks in order to allow the heavy materials to settle on the bottom of the tank while at the same time allowing lighter materials to float to the top.

- Mechanical scrapers remove the settled materials from the bottom of the tank and the scum floating on the top of the tank for treatment, usually by dewatering, prior to final disposal.

Secondary Treatment

The objective of secondary treatment is to remove organic material that was not removed during primary treatment. This is typically accomplished through an aerobic biological process. By supplying microorganisms already in the wastewater with oxygen and a substrate to live, microorganisms multiply and feed aggressively on the organic matter.

A common suspended growth process is a membrane bioreactor (MBR). Membranes are submerged in an activated sludge basin, and flow is drawn into the membrane under vacuum, while solids are retained within the tank. The biomass is retained within the reactor. MBR improves the solids removal in comparison to non-membrane treatment alternatives.

Nanofiltration (NF)/Reverse Osmosis (RO)

Based upon the wastewater quality, a partial flow NF/RO treatment for TDS and hardness removal is recommended.

Reverse osmosis is a pressure-driven and diffusion-controlled membrane technology which utilizes hydraulic pressure to force water molecules through a semi-permeable membrane. Pressure is applied to the concentrate side of a semi-permeable membrane, forcing water and other small ions or molecules through the membrane. The portion of water that does not pass through the membrane along with the concentrated contaminants is referred to as brine or concentrate. RO membranes can reject solutes as small as 0.0001 micrometer, which is in the ionic or molecular size range. Large particles such as suspended solids, colloidal particles and pathogens are removed via sieving and size exclusion. Small particles such as dissolved salts and dissolved organics are removed via size exclusion as well as diffusion.

The RO unit consists of a series of membrane elements (membrane array) arranged in stages, usually with a decreasing number of membrane elements in each succeeding stage. The flux and recovery rates determine the size and number of membrane elements per vessel, the total number of pressure vessels, and the number of stages.

Pretreatment is typically required upstream of the RO membrane to remove particulates that could negatively impact membrane performance and efficiency. Anti-scalant is added to keep salts from precipitating on the feed side of the membrane. Cartridge filters with a pore size of 5 to 20 microns are used upstream of the membranes to help remove particles such as silts that may potentially foul the downstream RO membrane.

Disinfection

After particulate matter has been removed, the final barrier of protection is the addition of a chemical disinfectant to inactivate remaining viruses and bacteria not removed during previous treatment methods. Conventional disinfection typically involves chlorine disinfection; however, alternative disinfection methods include ozone (O_3), chlorine dioxide (ClO_2), ultraviolet light (UV), or a combination thereof. The type of disinfectant residual, applied dosage, and contact time influence the degree and type of inactivation.

For this project, further consideration was given to chlorine. The added cost of using UV or ozone was considered excessive based upon the raw water quality and was not considered further because more cost effective disinfectants would meet the water quality treatment goals. Chlorine is available as free chlorine (chlorine gas or Cl_2) or hypochlorite solutions. Chlorine gas, stored in liquid form, has lower costs but inherent risks. Hypochlorites, applied in solution or powder form, could be generated onsite and were the recommended disinfection method.

3.3.6. Potential Water Reclamation Facility Sites

In order to evaluate potential water reclamation facility sites, an initial survey was completed by analyzing aerial images of the District's service area using Google Earth Pro software. This initial survey identified over ten potential sites. The sites identified in the initial survey were narrowed based upon the proximity to the sewer flow monitoring data. Seven sites were identified in the vicinity of P1-8 and P2-1 and were explored further with site visits. Figure 3-5 highlights the potential sites identified in comparison to the location of P1-8 and P2-1.

N

Not to Scale

LEGEND

Site X — Potential Water Reclamation Plant Sites

Site X — Monitoring Manhole Location

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

POTENTIAL WATER RECLAMATION FACILITY SITES

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-5

Of the seven sites identified, Site 2 and Site 4 were not considered further following the site visit because they had been developed into residences. Site 3, Site 5 and Site 6 were also not considered further because of the space available and proximity to residential developments. Based upon the site visit, Site 1 and Site 7 were selected to explore further based upon their available footprint, proximity to the sewer and close proximity to recycled water users.

Potential Site 1

Site 1 is located east of the intersection of Fee Ana Street and Nancita Street, behind some existing industrial buildings. Figure 3-6 depicts the location of Site 1.

It was not possible to access the property from the industrial park during the site visits; however, an obstructed view of the site was available from Orangethorpe (view obstructed by railroad tracks). The site is located within an industrial park and is bounded by industry on both sides.

The site is approximately 2.2 acres. There is a for sale sign on the property listed under Ashwill Associates as a contractors yard. The site is located approximately ¼ mile from the Richfield sub-trunk at Orangethorpe Avenue.

N

Not to Scale

LEGEND

Approximate Site Boundary

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

POTENTIAL SATELLITE WRP SITE 1

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-6

Potential Site 7

The second potential site investigated is the Yorba Linda Reservoir property near Lakeview and Orchard. Figure 3-7 highlights the location of the site.

The Yorba Linda Reservoir property is the largest of the sites considered. It is located adjacent to an elementary school and neighborhood. The site is also located approximately 0.7 miles from the Richfield sub-trunk on along Orchard Drive. Figure 3-8 depicts the ownership of the property.

The site is primarily owned by the Orange County Flood Control District and additional discussions will be needed before using this property as a treatment site.

N.

Not to Scale

LEGEND

Approximate Site Boundary

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

POTENTIAL SATELLITE WRP SITE 7

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-7

N

Not to Scale

Legend

- Parcel Potential Treatment Plant
- Yorba Linda Reservoir
- YLWD Service Boundary

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

AUWC RESERVOIR PROPERTY

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-8

3.3.6.1. Treatment Site Comparison

In assessing a preferred treatment site, the proximity of the site to recycled water users, available land, and proximity and availability of sewer water were taken into consideration. Table 3-7 compares the viable alternative treatment sites based upon the observations made during the field visit.

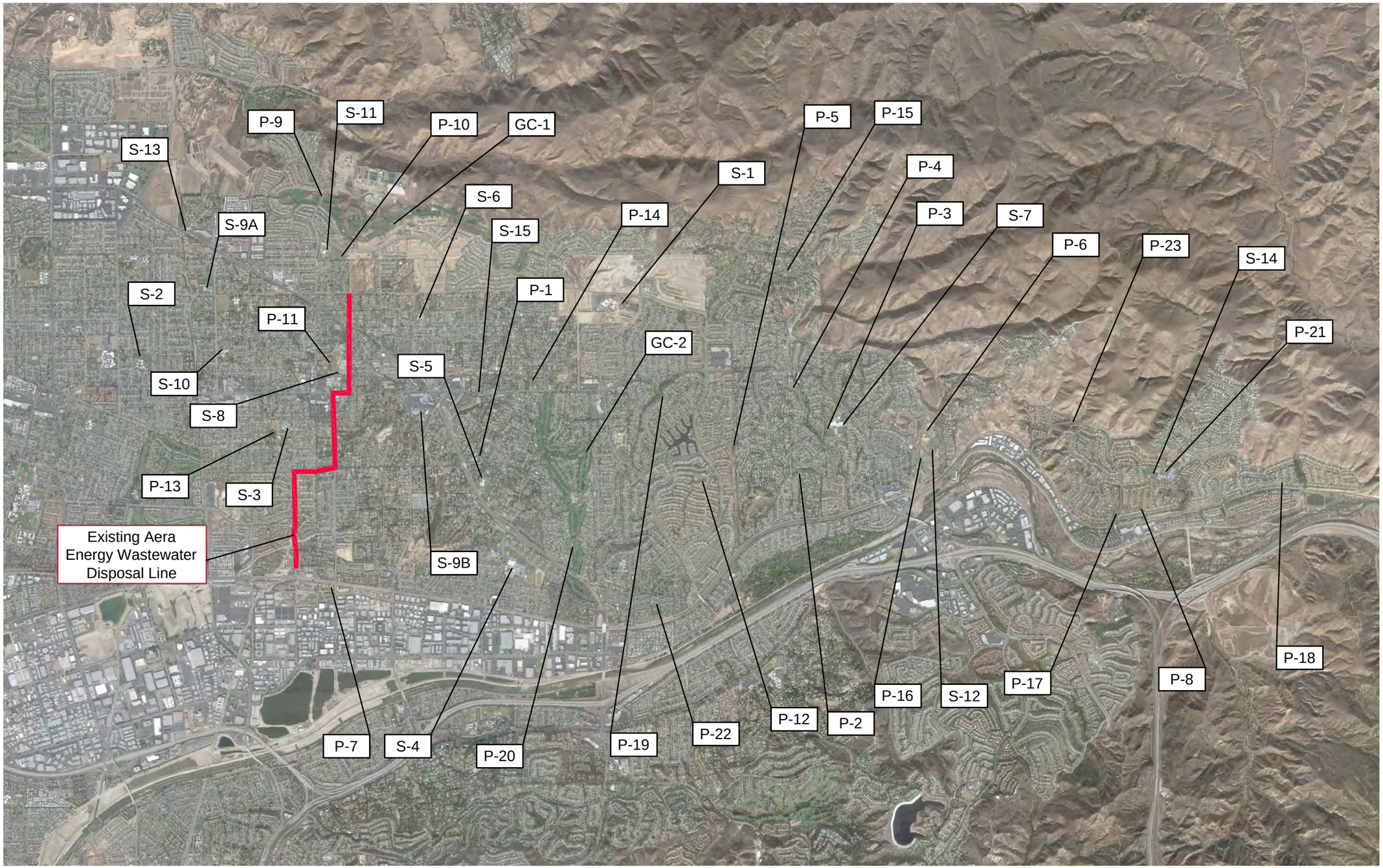
Table 3-7: Treatment Site Comparison

Potential Treatment Site	Advantages	Disadvantages
Site 1	•Available Space •Proximity to sewer •Located in industrial park •Property currently undeveloped	•Site for sale as contractor yard •Proximity to recycled water users
Site 7	•Available Space •Proximity to sewer •Proximity to recycled water users •Site accessibility	•Site owned by Orange County Flood Control District

Both sites have sufficient space to construct a recycled water facility and are in close proximity to a potential sewer diversion upstream of the SARI. Site 7 is the current preferred site because of its proximity to the recycled water customers. Purchasing the property from Orange County Flood may not be viable. If that is the case, Site 1 is ideally situated in an industrial park and the property is currently for sale.

3.3.7. Satellite WRP Additional Consideration

Aera Energy discontinued use of a wastewater pipeline that bisects the District's service area in 2004. The steel pipeline extends from the intersection of Bastanchury and Casa Loma to the intersection of Van Buren and Orangethorpe. Figure 3-9 depicts the layout of the Aera Energy wastewater line in relation to the potential non-potable water customers identified within the study area.



N

Not to Scale

LEGEND

P-X	Potential Park Non-Potable Water Customer
S-X	Potential School Non-Potable Water Customer
GC-X	Potential Golf Course Non-Potable Water Customer

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

POTENTIAL RECYCLED/NON-POTABLE WATER CUSTOMERS

MALCOLM PIRNIE, INC.

JULY 2011

FIG 3-9

Aera Energy had used the pipeline to dispose of wastewater associated with oil production under an Industrial Wastewater Class 1 Permit. According to Aera Energy, a majority of pipeline is an 8-inch main; however, there may be some segments as small as 6-inch and other as large as 10-inch.

The Aera Energy wastewater pipeline is in the vicinity of several potential recycled/non-potable water customers including Black Gold Golf Club, a large irrigation water user. As such, the potential of converting this abandoned pipeline for non-potable water use was explored further as a part of this study.

3.3.8. Decision Support System Planning Tool

To assist in the evaluation of a satellite water reclamation facility, Malcolm Pirnie has developed the Decision Support System (DSS) for the Water Reuse Foundation. DSS is an excel spreadsheet based planning tool to streamline and develop a standardized approach to evaluate a satellite water reclamation plant (WRP) as an alternative to a regional WRP. The DSS tool guides the user to input data regarding the satellite versus regional treatment facility options. For a satellite water treatment facility, the input data includes:

- Desired treatment capacity
- Approximate location of facility
- Available land area
- Elevation in relation to the nearest wastewater interceptor
- Type of end use
- Potential end users and their demands
- Conceptual layout of recycled water distribution system

In addition, for a regional water recycling facility, the tool also includes an input to indicate whether an expansion of the existing regional water recycling facility is required.

Once data has been entered to evaluate a satellite alternative to a regional one, the tool will display the cost comparison between the two facilities. To further compare the facilities, the user can then weight the importance of several performance factors including:

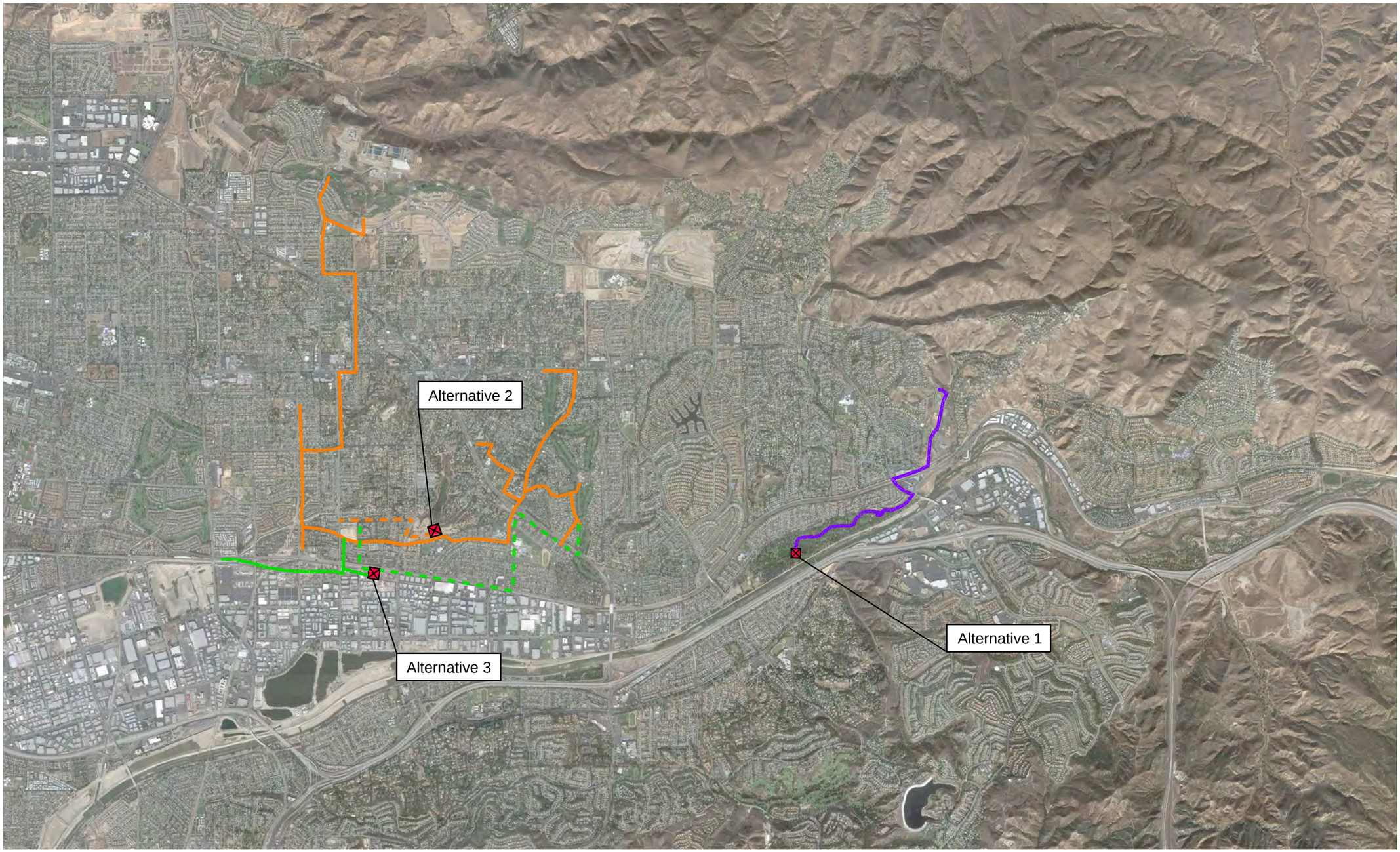
- Affordability of Investment
- Operational Affordability
- Life Cycle Affordability
- Land Availability
- Ease of Development
- Ease of Operation and Maintenance

- System Reliability
- Potable Supply Benefits
- Avoided Costs
- Community Acceptance
- Environmental Compatibility
- Other

As regional water reclamation facilities are not a viable alternative in the District, the DSS tool was used to analyze the feasibility of multiple satellite WRP alternatives in the District. For each satellite alternative considered, the desired treatment capacity, land area, end use (i.e. California Direct Use), and elevation in relation to the nearest wastewater interceptor were input to estimate the satellite facility costs. The facility costs calculated by the DSS tool include solids return/piping costs. The output of the DSS tool also provided the basis for the hydraulic, BOD and Total Suspended Solids (TSS) loads passed onto the regional facility that were used in this study. The recycled water distribution system costs were developed separately.

4. Supply Alternatives Development and Evaluation

Based upon a review of the irrigation demands and potential recycled/non-potable water sources, three primary supply alternatives were developed and evaluated in this effort to offset the District's potable water demands. The general location of these three alternatives is shown in Figure 4-1.



N

Not to Scale

LEGEND

Proposed Satellite WRP

Proposed Recycled Water Distribution Line

Proposed Raw Wastewater Transmission Line

Alternative 1

Alternative 2

Alternative 3

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

POTENTIAL RECYCLED/NON-POTABLE WATER ALTERNATIVES

MALCOLM PIRNIE, INC.

JULY 2011

FIG 4-1

These alternatives are delineated below, with summarized highlights of each.

Alternative 1: Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)

- Partner with the City of Anaheim to utilize treated brackish groundwater.
- Connect to City of Anaheim's existing non-potable water transmission main at Yorba Regional Park's Pump Station No.5.
- Construct new non-potable water transmission main and pump station to convey approximately 94 AFY (0.08 MGD) to Eastside Community Park, Saint Francis of Assisi School and Jean Woodward Park.

Alternative 2: Satellite Water Reclamation Plant

- Construct raw wastewater diversion in trunk system upstream of the SARI.
- Develop satellite water reclamation plant.
- Deliver recycled water to meet existing irrigation demands within the vicinity of the treatment site.
- Recycle 480 - 1097 AFY (0.43 - 0.98 MGD) to offset potable water demands with potential for expansion.
- Sub-alternatives developed as follows:
  - Alternative 2A: Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)
  - Alternative 2B: Satellite Water Reclamation Plant (Aera Energy Wastewater Line)
  - Alternative 2C: Satellite Water Reclamation Plant (Combined Project)

Alternative 3: Interagency Project with Orange County Water District (OCWD)

- Partner with OCWD to utilize recycled water.
- Add recycled water to Anaheim Lake recharge basin.
- Construct raw wastewater diversion in trunk system upstream of the SARI.
- Develop satellite water reclamation plant.

- Deliver recycled water to meet existing irrigation demands within the vicinity of the treatment site.

4.1. Program Assumptions

The following program assumptions were used when developing the recycled/non-potable water alternatives:

- Water quality of non-potable supply alternatives to meet or exceed CDPH's Title 22 Irrigation Standards.
- Irrigation use patterns were summarized in Section 2.2 and include the following:
  - Total average demand based upon the average of the District's meter data from January 2007 through December 2009.
  - Metropolitan Water District of Southern California's OC-36 meter data from January 2007 through December 2009 was used to determine the Black Gold Golf Course's irrigation demands. All flows from OC-36 were assumed to serve the Black Gold Golf Course.
  - Irrigation demands met by groundwater were provided directly from the Yorba Linda Country Club.
  - 5% factor was added to the annual average irrigation demands to account for the effects of climate change.
  - Total max day demand assumes a seasonal peaking factor of 2.1.
  - Peak hour demand assumes 8 hour irrigation for landscape applications.
- Reduced reliability of purchased water from State Water Project and Colorado River Water.
- Richfield sub-trunk flows tributary to the SARI line.
- Retrofits are needed at each end-user's site and costs for the retrofits are assumed to be the end-users' responsibility. Examples of retrofits include but are not limited to: backflow prevention devices, addition of warning signs around property, pipe and fixture color marking with purple color. More analyses will be needed to determine what is needed at each reuse site.
- It is assumed that each end user would still be connected to and have access to use the District's water supply system as the backup supply should an emergency situation arise.

4.2. Economic Analysis Criteria

A uniform set of cost estimating criteria was applied to the economic analysis of all the alternatives. The criteria are summarized in Table 4-1. The cost estimates for this study are "order of magnitude" level, with a precision range of ± 30 percent.

Table 4-1: Economic Analysis Criteria

Criteria	Factor
1. Construction Cost ($)	Current estimated costs at mid-point of construction period; excludes escalation
2. Capital Cost ($)	Construction cost plus 30% for engineering and construction contingencies
3. Land Cost ($)	$1.0 million/acre
4. Capital Recovery Cost($)	6% bond rate 30 years bond life
Criteria	**Factor**
5. O&M Cost ($/year)	Current levels; excludes escalation Power costs at 15¢ per kilowatt per hour (kWh)
6. Annual Cost ($/year)	Capital recovery plus O&M
7. Project Yield (AFY)	Max day project yield/supply
8. Project Utilization Factor (PUF) (%)	90% for online facilities
9. Operating Yield (AFY)	Project Yield x Project Utilization Factor
10. Project Unit Cost ($/AFY)	Annual Cost ÷ Operating Yield

In addition, it was assumed that all recycled water alternatives would qualify for a $250/AF MWD Local Resources Program (LRP) rebate.

4.3. Evaluation Rating Factors

The District's Mission Statement is that *Yorba Linda Water District will provide reliable, high quality water and sewer services in an environmentally responsible manner at the most economical cost to our customers.* Each alternative was evaluated and rated for alignment with the District's mission statement. The evaluation rating factors were grouped into the following categories:

- Technical Performance

- Economic Performance
- Environmental Performance
- Social Performance

The performance of each category was evaluated further based upon the following criteria:

- Technical Performance – the more favorable alternatives under this category are virtually unlimited, drought proof supplies. The less favorable alternatives under this category are those sources with limited reliability, such as imported water supplies susceptible to drought.
- Economic Performance – the more favorable alternatives under this category are those with lower project unit cost per acre-foot compared to the other alternatives. The less favorable alternatives under this category are those with the highest project unit costs per acre-foot compared to the other alternatives.
- Environmental Performance – the more favorable alternatives under this category are those that provide a safe source of recycled water in an environmentally responsible manner. The less favorable alternatives are those that have the potential for negative environmental impacts.
- Social Performance – the more favorable alternatives under this category are those that are perceived favorably by the public while at the same time contribute to improving the District's customer service. The less favorable alternatives under this category are those that do not contribute to improving customer service and/or satisfaction and/or have the potential for opposition from the public.

The standardized matrix showing the Technical, Economic, Environmental and Social (TEES) factors is shown in Table 4-2.

Table 4-2: Standard TEES Rating Form

	Description	Rating
Technical Performance	Reliablity of Supply	
Economic Performance	Prudent Financial and Resource Management	
Environmental Performance	Public Safety and Environmental Responsibility	
Social Performance	Public Perception and Acceptance	

+: Positive Performance, -: Average Performance, x: Poor Performance

The TEES performance ratings demonstrate the relative emphasis of the various evaluation criteria. For example, Technical Performance could be driven by reliability of supply and/or level of diversification. Economic Performance could be influenced by capital costs or by operation and maintenance cost. Environmental Performance

may address water quality, habitat impacts and/or energy utilization/carbon footprint. Social Performance may be linked to public and stakeholder acceptance, customer service and/or political acceptability.

4.4. Supply Alternatives

For each of the supply alternatives, the following were included in the evaluation:

- Fact Sheet

  -Project Description

  -Project Features

  -Project Metrics

  -Benefits/Constraints

- Assumptions
- Vicinity Map
- Evaluation Performance

  -Rating of key performance indicators (TEES matrix)

- Preliminary Cost Estimate (priority projects only)

Alternative No. 1 Fact Sheet: Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)

Description

- City of Anaheim is investigating the opportunity of developing a new wellfield to extract brackish groundwater at Yorba Regional Park in Anaheim.
- Intent is to provide a regional source of non-potable water to meet the demands of Yorba Regional Park along with a cluster of irrigation users within the District's service area.

Alternative 1 Metrics	
Yield (AFY)	94
Capital Costs ($M)	$1.69
Unit Capital Costs ($/gallon)	$20.11
Total Annual Cost ($M/year)	$0.20
Project Unit Cost ($/AF)	$2,110

Facility Features

- City of Anaheim to develop new well field at Yorba Regional Park. Treatment includes the following:
  - Partial flow NF/RO treatment for TDS and hardness removal. Product water TDS goal to match existing delivered water quality (average of 650 mg/L).
  - NF/RO treatment approximately 36% of total product water, approx. 300 gpm
  - Raw water bypass accounts for approx. 525 gpm.
  - Total product water delivered from site is 825 gpm
- Partner with the City of Anaheim to utilize treated brackish groundwater.
- Connect to City of Anaheim's existing non-potable water transmission main at Yorba Regional Park's Pump Station No.5.
- Construct new non-potable water transmission main (4-inch to 8-inch) and pump station to primarily serve Eastside Community Park, Saint Francis of Assissi School and Jean Woodward Park.

Benefits

- Alternative does not require any added operational complexity.
- Partnering with the City of Anaheim.
- Provides new source of groundwater without straining existing supplies.

Constraints

- Agreement with City of Anaheim for purchased water.

Alternative 1- Assumptions

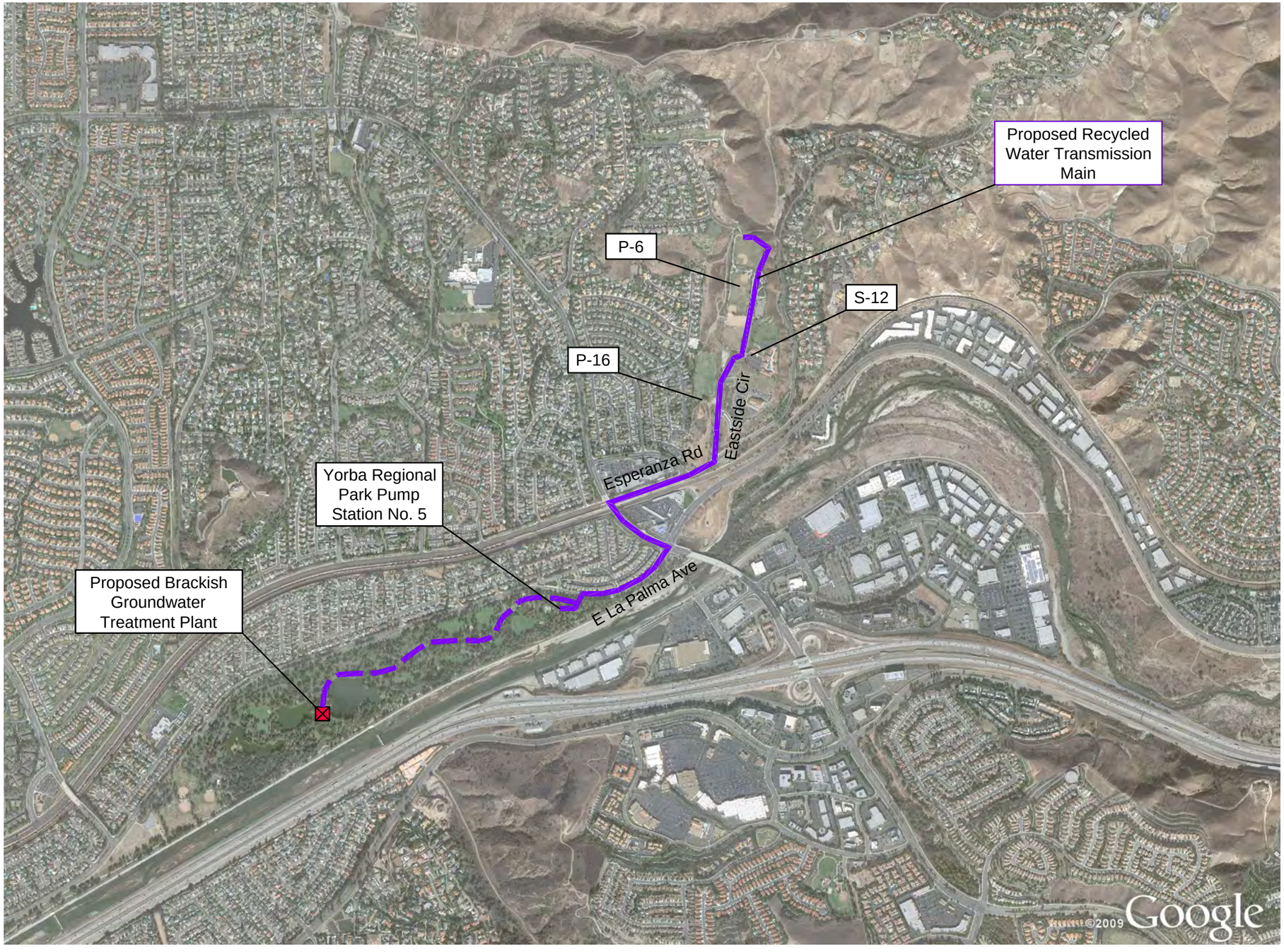
1. Total average demands for irrigation customers based upon the District's meter data from January 2007 through December 2009. A 5% factor was added to account for the effects of climate change.
2. Total max day demand assumes a seasonal peaking factor of 2.1.
3. Peak hour irrigation demand assumes 8 hour night irrigation for landscape irrigation applications.
4. Partial flow NF/RO treatment for TDS removal operated at 80% NF/RO recovery.
5. Product water TDS goal to match existing delivered water quality. Brackish groundwater TDS 1,000 mg/L.
6. Existing well capacity at Yorba Regional Park in Anaheim is 600 gpm.
7. Wellfield and treatment facilities sized to meet peak hour demands.
8. Recycled/non-potable water pump stations and transmission mains sized to meet peak hour irrigation demands.
9. Agreements required with Anaheim to purchase treated brackish groundwater. Cost estimates assume 80% of Metropolitan Tier 1 rate ($701/AF) for purchased water costs.

Alternative 1- TEES Criteria

	Description	Rating
Technical Performance	Reliability of Supply	+
Economic Performance	Prudent Financial and Resource Management	-
Environmental Performance	Public Safety and Environmental Responsibility	-
Social Performance	Public Perception and Acceptance	+

+: Positive Performance, -: Average Performance, x: Poor Performance

Figure 4-2 shows the general location of this alternative.



N

Not to Scale

LEGEND

- P-X — Potential Park Non-Potable Water Customer
- S-X — Potential School Non-Potable Water Customer
- Proposed Brackish Groundwater Treatment Facility
- Proposed Recycled Water Transmission Main
- Potential City of Anaheim Project

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

ALTERNATIVE 1 REGIONAL BRACKISH GROUNDWATER TREATMENT (ON-SITE AT YORBA LINDA REGIONAL PARK)

MALCOLM PIRNIE, INC.

JULY 2011

FIG 4-2

Table 4-3: Cost Estimate Alternative 1 – Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)

Cost Criteria	Notes	Cost
CONSTRUCTION COST ($)[1]		**$1,300,000**
Non-potable water transmission	4-inch to 8-inch, approx. 8,200 feet	$813,000
Groundwater Pumping	approx. 370 gpm	$196,000
Onsite Facilities	11 connections	$275,000
CAPITAL COST ($)[2]		**$1,690,000**
LAND COST ($)[3]		**$0**
CAPITAL RECOVERY COST ($/year)[4]		**$123,000**
OPERATION & MAINTENANCE COST ($/year)		**$77,000**
Non-potable water transmission		$4,000
Power		$20,000
Purchased Water Costs[9]		$52,800
ANNUAL COST ($/year)[5]		**$200,000**
PROJECT YIELD (AFY)[6]		**94**
PROJECT UTILIZATION FACTOR[7]		**90%**
OPERATING YIELD (AFY)[8]		**85**
PROJECT UNIT COST ($/AF)[9]		**$2,110**

[1]CURRENT ESTIMATED COSTS AT MID-POINT OF CONSTRUCTION; EXCLUDES ESCALATION. COST ESTIMATES ARE BASED UPON AVAILABLE EXISTING STUDIES, RECENT PROJECTS WITH SIMILAR COMPONENTS, MANUFACTURER'S BUDGET ESTIMATES , STANDARD CONSTRUCTION COST ESTIMATING MANUALS AND ENGINEERING JUDGEMENT.

[2]CONSTRUCTION COST PLUS 30% FOR ENGINEERING AND CONSTRUCTION CONTINGENCIES.

[3]$1.0 MILLION PER ACRE.

[4]6% BOND RATE, 30 YEAR BOND LIFE.

[5]CAPITAL RECOVERY PLUS O&M.

[6]PROJECTED YIELD/SUPPLY AT FULL CAPACITY.

[7]90% FOR ONLINE FACILITIES.

[8]PROJECT YIELD X PROJECT UTILIZATION FACTOR.

[9]ANNUAL COST ÷ OPERATING YIELD. INCLUDES $250/AF METROPOLITAN REBATE.

Alternative No. 2A Fact Sheet: Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)

Description

- Construct raw wastewater diversion in trunk system that runs tributary to the SARI.
- Develop new satellite WRP at the Yorba Linda Reservoir Site.
- Deliver recycled water to meet existing irrigation demands within the vicinity of the treatment site.

Alternative 2A Metrics	
Yield (AFY)	480
Capital Costs ($M)	$16.90
Unit Capital Costs ($/gallon)	$39.43
Total Annual Cost ($M/year)	$1.27
Project Unit Cost ($/AF)	$2,690

Facility Features

- Divert 530,000 gpd from the 24-inch sewer main on Richfield Road north of Jackson Way that is tributary to the Richfield sub-trunk and Santa Ana River Interceptor.
- Develop new 0.53 mgd satellite WRP at the Yorba Linda Reservoir site (Site 7) sized for average day flow scenarios while accommodating peak hour flows to account for diurnal variation. Facility includes 920,000 gallon storage reservoir to accommodate peak hour demands.
  - Satellite WRP to treat wastewater to meet CDPH's Disinfected Tertiary Recycled water quality requirements including MBR, membrane filtration and disinfection unit processes. Facility assumed to operate at 90% recovery.
  - Treatment includes sidestream NF/RO (approx. 40% of total product water) to treat MBR effluent to meet 650 mg/L TDS goal.
- Residual solids disposal (approx. 95,000 gpd) to regional collection system for treatment at OCSD's Plant No.2.
- New 1,900 gpm pump station and approx. 4 miles of new recycled water transmission mains varying in diameter from 4-inch to 14-inch.

Benefits

- Alternative provides source diversification and offers reliable supply to offset potable water demands.
- Satellite WRP reduces hydraulic load to sewer resulting in avoided cost to wastewater collection/treatment system.

Constraints

- Alternative requires added treatment and operational complexity to the District
- Yorba Linda Reservoir site use contingent upon agreements with Orange County Flood Control District
- Significant capital investment required.
- Agreements would be required with OCSD for diversion of raw wastewater and return of waste flows.

Alternative 2A- Assumptions

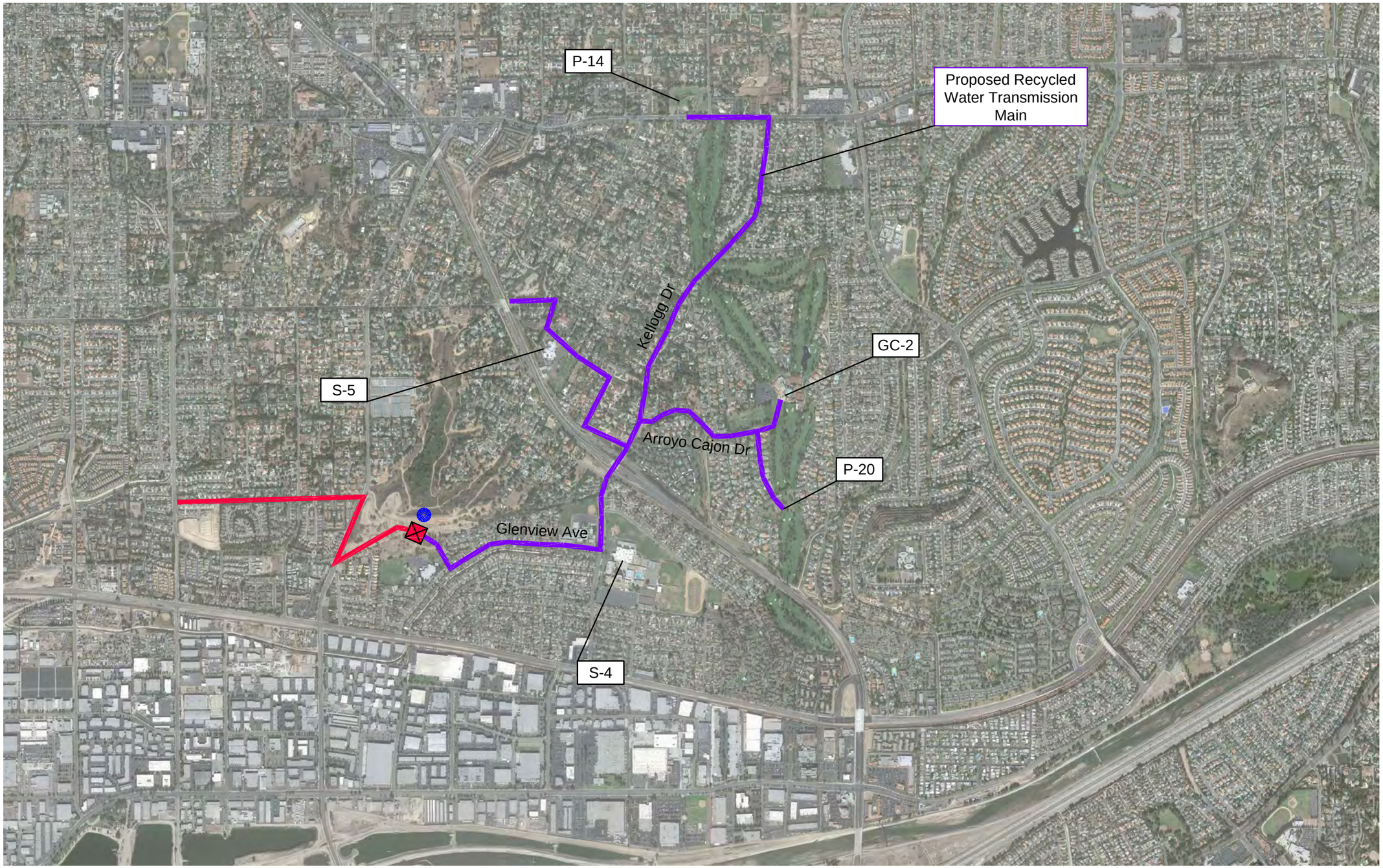
1. Total average demands for irrigation customers based upon the District's meter data from January 2007 through December 2009 and information provided directly from the Yorba Linda Country Club. A 5% factor was added to account for the effects of climate change.
2. Total max day demand assumes a seasonal peaking factor of 2.1.
3. Satellite WRP sized for total average day demand (0.53 mgd) while accommodating peak hourly flows (2.7 mgd) to account for diurnal variations.
4. Peak hour irrigation demand assumes 8 hour night irrigation for landscape irrigation applications.
5. Recycled water storage was sized for the 8 hour/day peak hour irrigation demand. Based on the 2.7 mgd peak hours flows, a 920,000 gallon storage reservoir will be constructed for this alternative.
6. Satellite WRP residual solids 550 lbs/day BOD and 1,100 lbs/day TSS.
7. Recycled/non-potable water pump station and transmission mains sized for peak hour irrigation demands.
8. Cost estimates assume that Yorba Linda Reservoir site is available.
9. Partial flow NF/RO treatment for TDS removal operated at 90% recovery.
10. Product water TDS goal to match existing potable water quality (650 mg/L). Raw wastewater TDS 965 mg/L.
11. Richfield sub-trunk is tributary to the SARI line.
12. MBR treatment train operated at 90% capacity.
13. Yorba Linda Country Club retires its current onsite wells

Alternative 2A – TEES Criteria

	Description	Rating
Technical Performance	Reliability of Supply	+
Economic Performance	Prudent Financial and Resource Management	-
Environmental Performance	Public Safety and Environmental Responsibility	-
Social Performance	Public Perception and Acceptance	+

+: Positive Performance, -: Average Performance, x: Poor Performance

Figure 4-3 shows the general location of this alternative.



LEGEND

- Proposed Satellite WRP
- P-X — Potential Park Non-Potable Water Customer
- S-X — Potential School Non-Potable Water Customer
- GC-X — Potential Golf Course Non-Potable Water Customer
- Proposed Raw Wastewater Transmission Main
- Proposed Recycled Water Transmission Main
- Recycled Water Storage

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

ALTERNATIVE 2A SATELLITE WATER RECLAMATION PLANT
(YORBA LINDA RESERVOIR SITE)

MALCOLM PIRNIE, INC.

Revised SEPT 2011

FIG 4-3

Table 4-4: Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)

Cost Criteria	Notes	Cost
CONSTRUCTION COST ($)[1]		**$13,000,000**
Satellite WRP	0.53 mgd	$7,150,800
NF/RO	170,000 gpd (product)	$337,000
Peaking Reservoir	920,000 gallons	$1,380,000
Recycled Water Transmission	4-inch to 14-inch, approx. 4 miles	$3,150,000
Recycled Water Pump Station	1,900 gpm, 200 hp	$612,000
Onsite Facilities	10 connections	$400,000
CAPITAL COST ($)[2]		**$16,900,000**
LAND COST ($)[3]	1 acre	**$1,000,000**
CAPITAL RECOVERY COST ($/year)[4,11]		**$970,000**
OPERATION & MAINTENANCE COST ($/year)		**$300,000**
Non-potable water transmission		$20,000
Power		$62,000
Satellite WRP		$506,000
Equivalent O&M Cost[10]		(288,000)
ANNUAL COST ($/year)[5]		**$1,270,000**
PROJECT YIELD (AFY)[6]		**480**
PROJECT UTILIZATION FACTOR[7]		**90%**
OPERATING YIELD (AFY)[8]		**432**
PROJECT UNIT COST ($/AFY)[9]		**$2,690**

[1]CURRENT ESTIMATED COSTS AT MID-POINT OF CONSTRUCTION; EXCLUDES ESCALATION. COST ESTIMATES ARE BASED UPON AVAILABLE EXISTING STUDIES, RECENT PROJECTS WITH SIMILAR COMPONENTS, MANUFACTURER'S BUDGET ESTIMATES , STANDARD CONSTRUCTION COST ESTIMATING MANUALS AND ENGINEERING JUDGEMENT.

[2]CONSTRUCTION COST PLUS 30% FOR PLANNING, ENGINEERING AND CONSTRUCTION CONTINGENCIES.

[3]$1.0 MILLION PER ACRE.

[4]6% BOND RATE, 30 YEAR BOND LIFE.

[5]CAPITAL RECOVERY PLUS O&M.

[6]PROJECTED YIELD/SUPPLY AT FULL CAPACITY.

[7]90% FOR ONLINE FACILITIES.

[8]PROJECT YIELD X PROJECT UTILIZATION FACTOR.

[9]ANNUAL COST ÷ OPERATING YIELD. INCLUDES $250/AF METROPOLITAN REBATE.

[10]INCLUDES REDUCTION IN O&M COSTS BY $288,000 TO ACCOUNT FOR LOWER OCSD CLASS 1 PERMIT CHARGES.

[11]INCLUDES REDUCTION IN CAPITAL RECOVERY COSTS BY $330,000 TO ACCOUNT FOR LOWER OCSD CAPITAL FACILITIES CHARGES.

Alternative No. 2B Fact Sheet: Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)

Description

- Construct raw wastewater diversion in trunk system that runs tributary to the SARI.
- Develop satellite WRP at the Yorba Linda Reservoir Site.
- Utilize abandoned Aera Energy Wastewater Line to convey recycled water to potential end users.

Alternative 2B Metrics	
Yield (AFY)	617
Capital Costs ($M)	$17.7
Unit Capital Costs ($/gallon)	$32.14
Total Annual Cost ($M/year)	$1.47
Project Unit Cost ($/AF)	$2,400

Facility Features

- Divert raw wastewater from sewer main on Richfield Road north of Jackson Way that is tributary to the Richfield sub-trunk and Santa Ana River Interceptor.
- Develop new satellite water reclamation facility at the Yorba Linda Reservoir Site to treat wastewater flows to meet CDPH's disinfected tertiary recycled water requirements. Treatment includes sidestream NF/RO (approx. 40% of total product water) to treat MBR effluent to meet TDS goal. Facility designed to treat average daily flows (0.7 mgd) in addition to accommodating diurnal variations (i.e. 3.5 mgd peak hourly flows).
- Residual solids disposal (approx. 121,000 gpd) to regional collection system for treatment at OCSD's Plant No.2.
- Facility includes 900,000 gallon buried storage reservoir at Black Gold Golf Club to accommodate peak hour irrigation demands of the anchor user, and another 300,000 gallon storage reservoir to accommodate the peak hour demands of the rest of the users.
- Refurbish Aera Energy wastewater disposal line for recycled water conveyance.
- New 1,200 gpm pump station and approx. 3.5 miles of new recycled water transmission mains varying in diameter from 4-inch to 8-inch.

Benefits

- Alternative provides source diversification and offers reliable supply to offset potable water demands.
- Satellite WRP reduces hydraulic load to sewer resulting in avoided cost to wastewater collection/treatment system.
- Utilization of existing pipeline for recycled water transmission minimized capital investment in conveyance infrastructure.

Constraints

- Alternative requires added treatment and operational complexity to the District
- Yorba Linda Reservoir site use contingent upon agreements with Orange County Flood Control District.
- Significant capital investment required.
- Agreements would be required with OCSD for diversion of raw wastewater and return of waste flows.

Alternative 2B- Assumptions

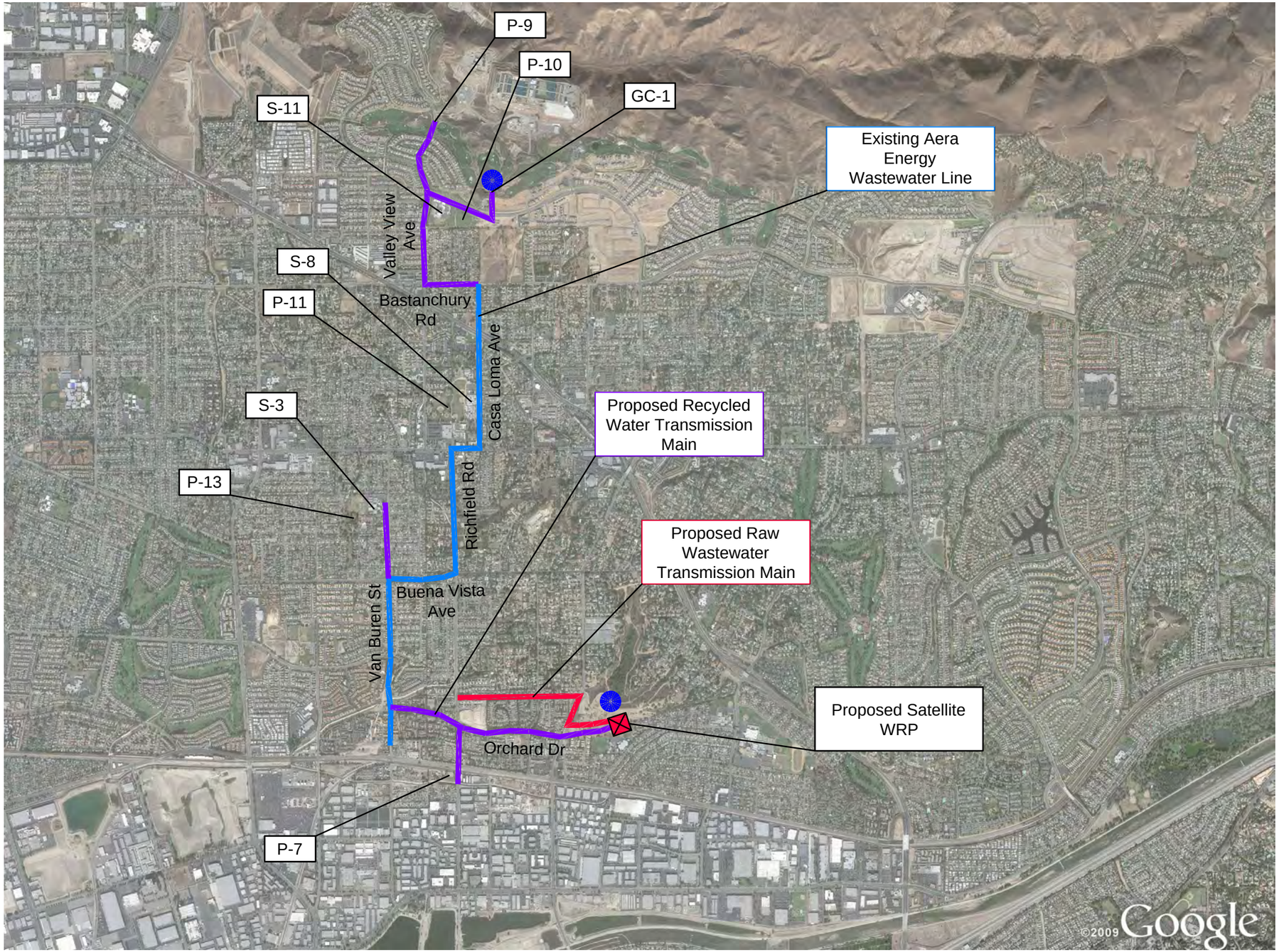
1. Total Average Demands for irrigation customers based upon the District's meter data from January 2007 through December 2009 and OC-36 data. A 5% factor was added to account for the effects of climate change.
2. Total max day demand assumes a seasonal peaking factor of 2.1.
3. Peak hour irrigation demand assumes 8 hour night irrigation for landscape irrigation applications.
4. Treatment facilities sized to meet Alternative 2B average day demands while accommodating peak hour flows to account for diurnal variations (3.5 mgd).
5. Recycled water storage was sized for the 8 hour/day peak hour irrigation demand. Based on the 3.5 mgd peak hours flows, 1,200,000 gallons storage (2 reservoirs) will be constructed for this alternative.
6. Satellite WRP residual solids 700 lbs/day BOD and 1,400 lbs/day TSS.
7. Wastewater diversion sized to meet peak hour demands.
8. Partial flow NF/RO treatment for TDS removal operated at 80% NF/RO recovery.
9. Product water TDS goal to match existing potable water quality (650 mg/L). Raw wastewater TDS 965 mg/L.
10. Recycled water transmission main and pump station sized for average annual demands.
11. Cost estimates assume that Yorba Linda Reservoir site is available and a site is available at Black Gold Golf Course for storage reservoirs.
12. Richfield sub-trunk is tributary to the SARI line.
13. MBR treatment train operated at 90% capacity.

Alternative 2B- TEES Criteria

	Description	Rating
Technical Performance	Reliability of Supply	+
Economic Performance	Prudent Financial and Resource Management	-
Environmental Performance	Public Safety and Environmental Responsibility	-
Social Performance	Public Perception and Acceptance	+

+: Positive Performance, -: Average Performance, x: Poor Performance

Figure 4-4 shows the general location of this alternative.



N

Not to Scale

LEGEND

- Proposed Satellite WRP
- P-X — Potential Park Non-Potable Water Customer
- S-X — Potential School Non-Potable Water Customer
- GC-X — Potential Golf Course Non-Potable Water Customer
- Proposed Raw Wastewater Transmission Main
- Proposed Recycled Water Transmission Main
- Existing Aera Energy Wastewater Line
- Recycled Water Storage

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

ALTERNATIVE 2B SATELLITE WATER RECLAMATION PLANT
(AERA ENERGY WASTEWATER LINE)

MALCOLM PIRNIE, INC.

Revised SEPT 2011

FIG 4-4

Table 4-5: Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)

Cost Criteria	Notes	Cost
CONSTRUCTION COST ($)[1]		**$13,600,000**
Satellite WRP	0.67 mgd	$7,984,000
NF/RO Treatment	215,000 gpd (product)	$432,000
Recycled Water Transmission	4-inch to 8-inch, approx. 3.5 miles	$1,660,000
Recycled Water Pump Station	1,200 gpm	$724,000
2 Peaking Reservoirs	1,200,000 gallons	$1,800,000
Aera Energy Pipeline	Purchase and rehabilitation	$500,000
Onsite Facilities	19 connections	$475,000
CAPITAL COST ($)[2]		**$17,700,000**
LAND COST ($)[3]	1 acre	**$1,000,000**
CAPITAL RECOVERY COST ($/year)[4,11]		**$1,130,000**
OPERATION & MAINTENANCE COST ($/year)		**$340,000**
Non-potable water transmission		$8,000
Power		$110,000
Satellite WRP		$572,000
Equivalent O&M Cost[10]		(350,000)
ANNUAL COST ($/year)[5]		**$1,470,000**
PROJECT YIELD (AFY)[6]		**617**
PROJECT UTILIZATION FACTOR[7]		**90%**
OPERATING YIELD (AFY)[8]		**555**
PROJECT UNIT COST ($/AFY)[9]		**$2,400**

[1]CURRENT ESTIMATED COSTS AT MID-POINT OF CONSTRUCTION; EXCLUDES ESCALATION. COST ESTIMATES ARE BASED UPON AVAILABLE EXISTING STUDIES, RECENT PROJECTS WITH SIMILAR COMPONENTS, MANUFACTURER'S BUDGET ESTIMATES , STANDARD CONSTRUCTION COST ESTIMATING MANUALS AND ENGINEERING JUDGEMENT.

[2]CONSTRUCTION COST PLUS 30% FOR PLANNING, ENGINEERING AND CONSTRUCTION CONTINGENCIES.

[3]$1.0 MILLION PER ACRE.

[4]6% BOND RATE, 30 YEAR BOND LIFE.

[5]CAPITAL RECOVERY PLUS O&M.

[6]PROJECTED YIELD/SUPPLY AT FULL CAPACITY.

[7]90% FOR ONLINE FACILITIES.

[8]PROJECT YIELD X PROJECT UTILIZATION FACTOR.

[9]ANNUAL COST ÷ OPERATING YIELD. INCLUDES $250/AF METROPOLITAN REBATE.

[10]INCLUDES REDUCTION IN O&M COSTS BY $350,000 TO ACCOUNT FOR LOWER OCSD CLASS 1 PERMIT CHARGES.

[11]INCLUDES REDUCTION IN CAPITAL RECOVERY COSTS BY $230,000 TO ACCOUNT FOR LOWER OCSD CAPITAL FACILITIES CHARGES.

Alternative No. 2C Fact Sheet: Satellite Water Reclamation Plant (Combined Project)

Description

- Construct raw wastewater diversion in trunk system that runs tributary to the SARI.
- Develop satellite WRP at the Yorba Linda Reservoir Site.
- Expand recycled water service to include potential non-potable water customers in both Alternative 2A and 2B.

Alternative 2C Metrics	
Yield (AFY)	1,097
Capital Costs ($M)	$29.30
Unit Capital Costs ($/gallon)	$29.92
Total Annual Cost ($M/year)	$2.02
Project Unit Cost ($/AF)	$1,800

Facility Features

- Divert sewer flows from 24-inch sewer main on Richfield Road north of Jackson Way that is tributary to the Richfield sub-trunk and Santa Ana River Interceptor.
- Develop new satellite water reclamation facility at the Yorba Linda Reservoir Site to treat wastewater flows to meet CDPH's disinfected tertiary recycled water requirements. Treatment includes sidestream NF/RO (approx. 40% of total product water) to treat MBR effluent to meet TDS goal. Facility designed to treat average daily flows (1.2 mgd) in addition to accommodating diurnal variations (i.e. 6.2 mgd peak hourly flows)
- Satellite WRP to treat wastewater to meet CDPH's Disinfected Tertiary Recycled water quality requirements including MBR, membrane filtration and disinfection unit processes. Facility assumed to operate at 90% recovery.
- Residual solids disposal (approx. 220,000 gpd) to regional collection system for treatment at OCSD's Plant No.2.
- New pump stations and approx. 8 miles of new recycled water transmission mains varying in diameter from 4-inch to 14-inch.

Benefits

- Alternative provides source diversification and offers reliable supply to offset potable water demands.
- Satellite WRP reduces hydraulic load to sewer resulting in avoided cost to wastewater collection/treatment system.

Constraints

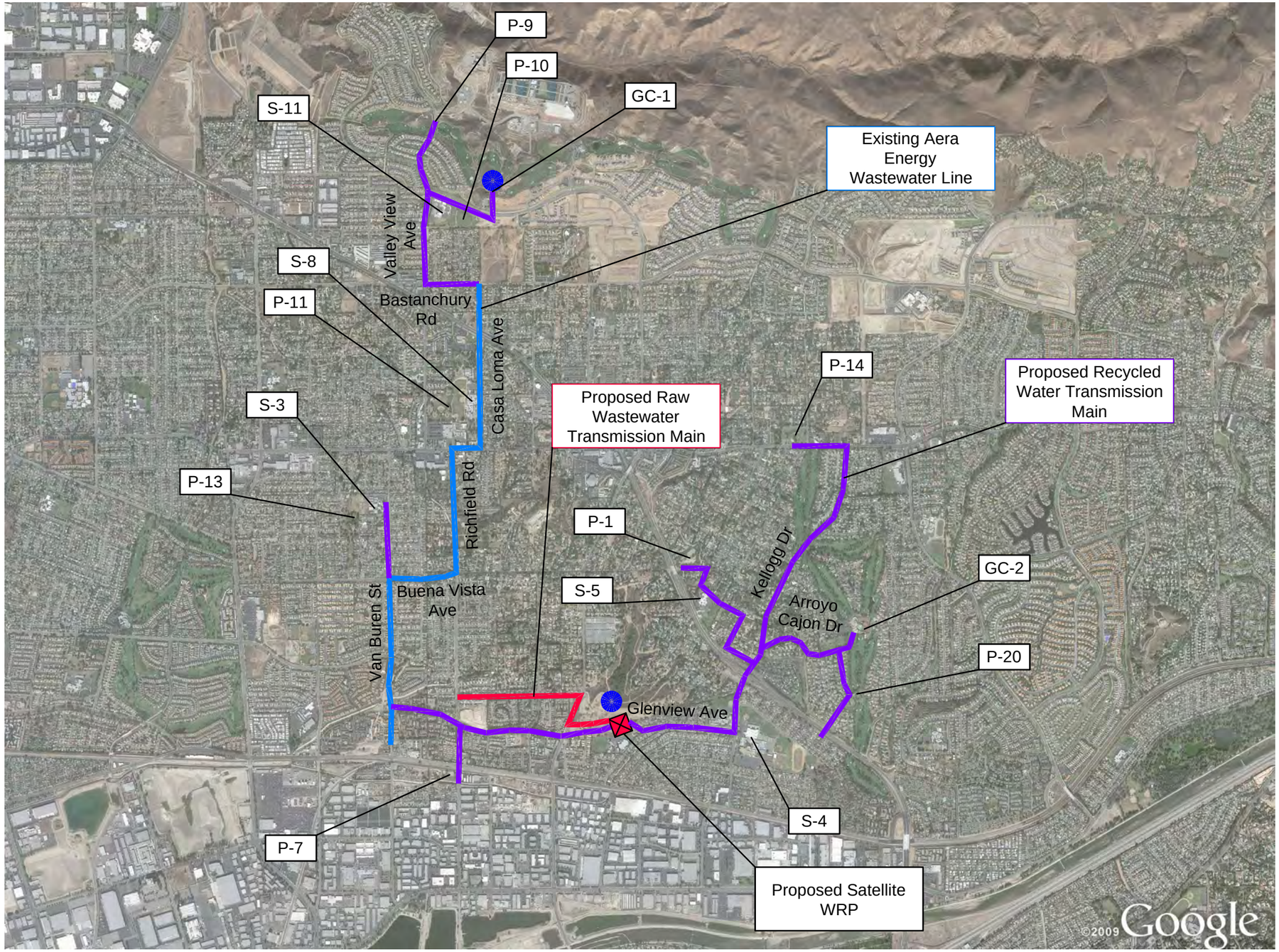
- Alternative requires added treatment and operational complexity to the District
- Yorba Linda Reservoir site use contingent upon agreements with Orange County Flood Control District.
- Significant capital investment required.
- Agreements would be required with OCSD for diversion of raw wastewater and return of waste flows.

Alternative 2C- Assumptions

1. Total average day demands for irrigation customers based upon the District's meter data from January 2007 through December 2009, information provided directly from the Yorba Linda Country Club, and OC-36 data. A 5% factor was added to account for the effects of climate change.
2. Total max day demand assumes a seasonal peaking factor of 2.1.
3. Peak hour irrigation demand assumes 8 hour night irrigation for landscape irrigation applications.
4. Peak hour water storages are the same as Alternatives 2A and 2B.
5. Satellite WRP residual solids 1,300 lbs/day BOD and 2,500 lbs/day TSS.
6. Recycled/non-potable water pump station and transmission mains east of the satellite WRP sized to meet peak hour irrigation demands and recycled/non-potable water pump station and transmission mains west of the satellite WRP sized to meet average annual day demands due to Aera Energy pipeline size constraints.
7. Wastewater diversion sized to meet peak hour demands for the irrigation users identified for Alternative 2C. The wastewater diversion is sized to the average day sewer flow from the eastern most service area.
8. Treatment facilities sized to meet Alternative 2C average day demands while accommodating peak hour flows to account for diurnal variations for the service area as identified in Alternative 2C.
9. Cost estimates assume that Site 1 is available and a site is available at Black Gold Golf Course for storage reservoirs.
10. Partial flow NF/RO treatment for TDS removal operated at 90% NF/RO recovery.
11. Product water TDS goal to match existing potable water quality (615 mg/L). Raw wastewater TDS 965 mg/L.
12. MBR treatment train operated at 90% capacity.
13. Richfield sub-trunk is tributary to the SARI line.
14. Yorba Linda Country Club retires its current onsite wells.

Alternative 2C- TEES Criteria

	Description	Rating
Technical Performance	Reliability of Supply	+
Economic Performance	Prudent Financial and Resource Management	-
Environmental Performance	Public Safety and Environmental Responsibility	-
Social Performance	Public Perception and Acceptance	+



N

Not to Scale

LEGEND

- Proposed Satellite WRP
- P-X — Potential Park Non-Potable Water Customer
- S-X — Potential School Non-Potable Water Customer
- GC-X — Potential Golf Course Non-Potable Water Customer
- Proposed Raw Wastewater Transmission Main
- Proposed Recycled Water Transmission Main
- Existing Aera Energy Wastewater Line
- Recycled Water Storage

MALCOLM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

ALTERNATIVE 2C SATELLITE WATER RECLAMATION PLANT
(COMBINED PROJECT)

MALCOLM PIRNIE, INC.

Revised SEPT 2011

FIG 4-5

Table 4-6: Satellite Water Reclamation Plant (Combined Project)

Cost Criteria	Notes	Cost
CONSTRUCTION COST ($)[1]		**$22,500,000**
Recycled Water Transmission	4-inch to 14-inch, approx. 8miles	$4,800,000
Aera Energy Pipeline	Purchase and rehabilitation	$500,000
Satellite WRP	1.2 mgd	$11,031,000
NF/RO Treatment	380,000 gpd	$768,000
Recycled Water Pump Stations	1-1,900 gpm; 1-1,200 gpm	$1,340,000
Alternative 2B Water Reservoirs	1,200,000 gallons	$1,800,000
Alternative 2A Reservoir	920,000 gallons	$1,380,000
Onsite Facilities	29 connections	$875,000
CAPITAL COST ($)[2]		**$29,300,000**
LAND COST ($)[3]	1 acre	**$1,000,000**
CAPITAL RECOVERY COST ($/year)[4,11]		**$1,640,000**
OPERATION & MAINTENANCE COST ($/year)		**$380,000**
Non-potable water transmission		$24,000
Power		$172,000
Satellite WRP		$820,000
Equivalent O&M Cost[10]		(638,000)
ANNUAL COST ($/year)[5]		**$2,020,000**
PROJECT YIELD (AFY)[6]		**1,097**
PROJECT UTILIZATION FACTOR[7]		**90%**
OPERATING YIELD (AFY)[8]		**987**
PROJECT UNIT COST ($/AFY)[9]		**$1,800**

[1]CURRENT ESTIMATED COSTS AT MID-POINT OF CONSTRUCTION; EXCLUDES ESCALATION. COST ESTIMATES ARE BASED UPON AVAILABLE EXISTING STUDIES, RECENT PROJECTS WITH SIMILAR COMPONENTS, MANUFACTURER'S BUDGET ESTIMATES , STANDARD CONSTRUCTION COST ESTIMATING MANUALS AND ENGINEERING JUDGEMENT.

[2]CONSTRUCTION COST PLUS 30% FOR PLANNING, ENGINEERING AND CONSTRUCTION CONTINGENCIES.

[3]$1.0 MILLION PER ACRE.

[4]6% BOND RATE, 30 YEAR BOND LIFE.

[5]CAPITAL RECOVERY PLUS O&M.

[6]PROJECTED YIELD/SUPPLY AT FULL CAPACITY.

[7]90% FOR ONLINE FACILITIES.

[8]PROJECT YIELD X PROJECT UTILIZATION FACTOR.

[9]ANNUAL COST ÷ OPERATING YIELD. INCLUDES $250/AF METROPOLITAN REBATE.

[10]INCLUDES REDUCTION IN O&M COSTS BY $638,000 TO ACCOUNT FOR LOWER OCSD CLASS 1 PERMIT CHARGES.

[11]INCLUDES REDUCTION IN CAPITAL RECOVERY COSTS BY $560,000 TO ACCOUNT FOR LOWER OCSD CAPITAL FACILITIES CHARGES.

Alternative No. 3 Fact Sheet: Interagency Project with Orange County Water District (OCWD)

Description

- Partner with OCWD to utilize recycled water
- Add recycled water to Anaheim Lake recharge basin
- Construct raw wastewater diversion in trunk system upstream of the SARI
- Develop satellite water reclamation plant.

Alternative 3 Metrics	
Yield (AFY)	3,853
Capital Costs ($M)	$58.50
Unit Capital Costs ($/gallon)	$17.00
Total Annual Cost ($M/year)	$3.92
Project Unit Cost ($/AF)	$880

Facility Features

- Divert sewer flows from 24-inch sewer main on Richfield Road north of Jackson Way that is tributary to the Richfield sub-trunk and Santa Ana River Interceptor.
- Divert sewer flows from 15-inch sewer main on Arcacia Hill Drive and Country View Drive.
- Develop new satellite water reclamation facility at the Fee Ana Street and Nancita Street Site to treat wastewater flows to meet CDPH's disinfected tertiary recycled water requirements. Treatment includes sidestream NF/RO (approx. 40% of total product water) to treat MBR effluent to meet TDS goal. Facility designed to treat average daily flows (4.5 mgd).
- Satellite WRP to treat wastewater to meet CDPH's Disinfected Tertiary Recycled water quality requirements including MBR, membrane filtration and disinfection unit processes. Facility assumed to operate at 90% recovery.
- Residual solids disposal (approx. 760,000 gpd) to regional collection system for treatment at OCSD's Plant No.2.
- New pump stations and approx. 9 miles of new recycled water transmission mains varying in diameter from 4-inch to 14-inch.

Benefits

- Alternative provides source diversification and offers reliable supply to offset potable water demands.
- Satellite WRP reduces hydraulic load to sewer resulting in avoided cost to wastewater collection/treatment system.
- Alternative provides additional source for basin recharge

Constraints

- Alternative requires added treatment and operational complexity to the District
- Site use contingent upon the availability of the land
- Significant capital investment required.
- Agreements would be required with OCSD for diversion of raw wastewater and return of waste flows, and with OCWD on cost sharing of project

Alternative 3- Assumptions

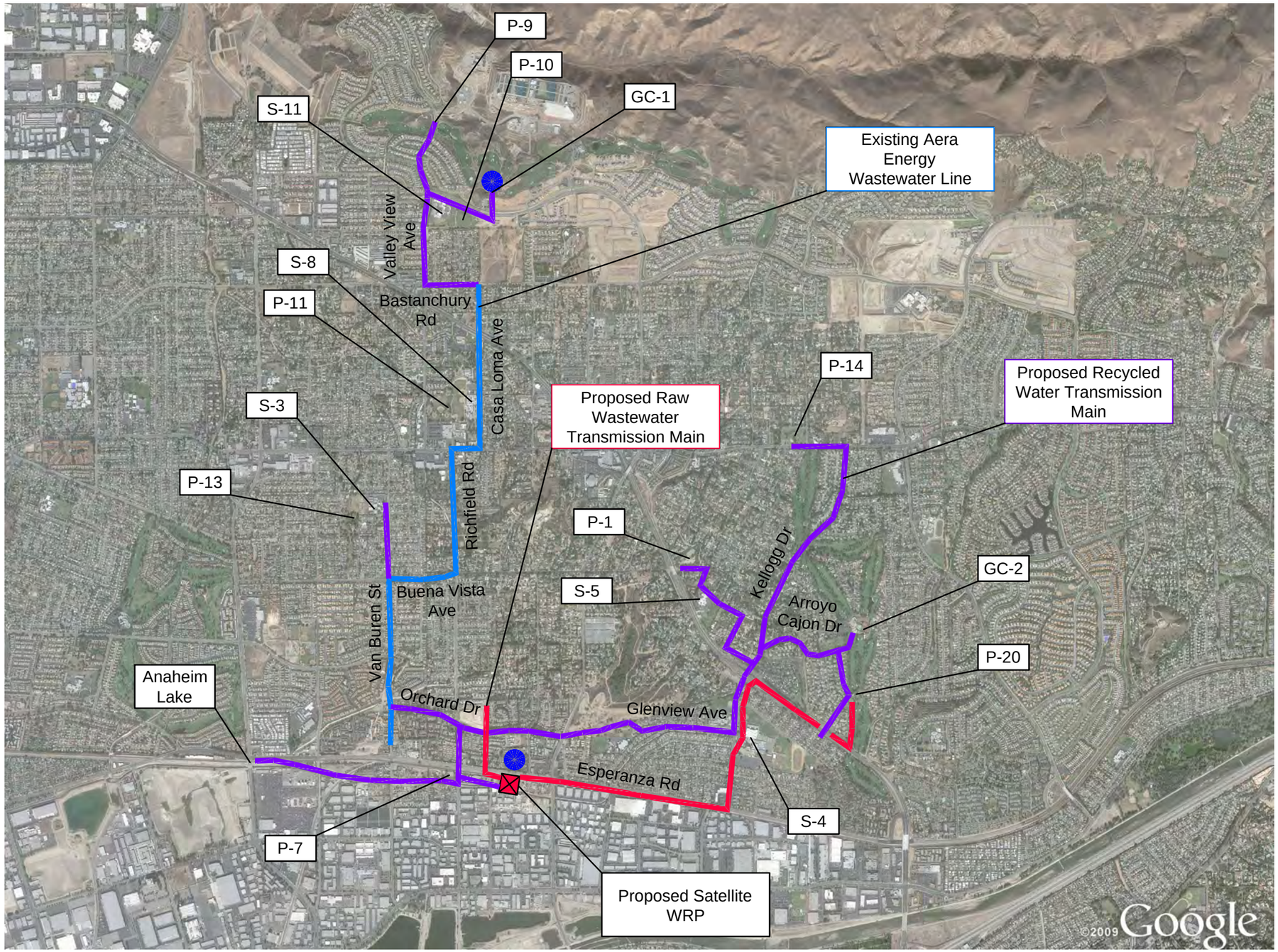
1. Total average day demands for irrigation customers based upon the District's meter data from January 2007 through December 2009, information provided directly from the Yorba Linda Country Club, and OC-36 data. A 5% factor was added to account for the effects of climate change.
2. Total max day demand assumes a seasonal peaking factor of 2.1.
3. Peak hour irrigation demand assumes 8 hour night irrigation for landscape irrigation applications.
4. Assume that no additional water storage was required for the portion of water using for recharged; water storage requirement therefore is same as Alternative 2C.
5. Satellite WRP residual solids 4,580 lbs/day BOD and 8,730 lbs/day TSS.
6. Recycled/non-potable water pump station and transmission mains east of the satellite WRP sized to meet peak hour irrigation demands and recycled/non-potable water pump station and transmission mains west of the satellite WRP sized to meet average annual day demands due to Aera Energy pipeline size constraints.
7. Wastewater diversion sized to meet peak hour demands.
8. Treatment facilities sized to meet Alternative 3 average day demands while accommodating peak hour flows to account for diurnal variations (6.2 mgd).
9. Cost estimates assume that Fee Ana site is available and a site is available at Black Gold Golf Course for storage reservoir.
10. Partial flow NF/RO treatment for TDS removal operated at 80% NF/RO recovery.
11. Product water TDS goal to match existing potable water quality (615 mg/L). Raw wastewater TDS 965 mg/L.
12. MBR treatment train operated at 90% capacity.
13. Richfield sub-trunk is tributary to the SARI line.
14. Yorba Linda Country Club retires its current onsite wells.
15. OCWD agrees to use the extra capacity to recharge Anaheim Lake.

Alternative 3- TEES Criteria

	Description	Rating
Technical Performance	Reliability of Supply	+
Economic Performance	Prudent Financial and Resource Management	-
Environmental Performance	Public Safety and Environmental Responsibility	-
Social Performance	Public Perception and Acceptance	+

+: Positive Performance, -: Average Performance, x: Poor Performance

Figure 4-6 shows the general location of this alternative.



N

Not to Scale

LEGEND

- Proposed Satellite WRP
- P-X — Potential Park Non-Potable Water Customer
- S-X — Potential School Non-Potable Water Customer
- GC-X — Potential Golf Course Non-Potable Water Customer
- Proposed Raw Wastewater Transmission Main
- Proposed Recycled Water Transmission Main
- Existing Aera Energy Wastewater Line
- Recycled Water Storage

MALCOM PIRNIE

YORBA LINDA WATER DISTRICT

WATER RECYCLING FACILITIES PLANNING STUDY

ALTERNATIVE 3 SATELLITE WATER RECLAMATION PLANT
(INTERAGENCY PROJECT WITH OCWD)

MALCOM PIRNIE, INC.

Revised SEPT 2011

FIG 4-6

Table 4-7: Interagency Project with Orange County Water District (OCWD)

Cost Criteria	Notes	Cost
CONSTRUCTION COST ($)[1]		**$45,000,000**
Recycled Water Transmission	4-inch to 14-inch, approx. 9 miles	$5,810,000
Aera Energy Pipeline	Purchase and rehabilitation	$500,000
Satellite WRP	4.2 mgd	$31,000,000
NF/RO Treatment	1.35 mgd	$2,700,000
Recycled Water Pump Stations	1-3,000 gpm; 1-1,200gpm	$1,340,000
Alternative 2B Water Reservoirs	1,200,000 gallons	$1,800,000
Alternative 2A Reservoir	920,000 gallons	$1,380,000
Onsite Facilities	29 connections	$875,000
CAPITAL COST ($)[2]		**$58,500,000**
LAND COST ($)[3]	1 acre	**$1,000,000**
CAPITAL RECOVERY COST ($/year)[4,11]		**$3,470,000**
OPERATION & MAINTENANCE COST ($/year)		**$450,000**
Non-potable water transmission		$30,000
Power		$187,000
Satellite WRP		$2,370,000
Equivalent O&M Cost[10]		(2,140,000)
ANNUAL COST ($/year)[5]		**$3,920,000**
PROJECT YIELD (AFY)[6]		**3,853**
PROJECT UTILIZATION FACTOR[7]		**90%**
OPERATING YIELD (AFY)[8]		**3,468**
PROJECT UNIT COST ($/AFY)[9]		**$880**

[1]CURRENT ESTIMATED COSTS AT MID-POINT OF CONSTRUCTION; EXCLUDES ESCALATION. COST ESTIMATES ARE BASED UPON AVAILABLE EXISTING STUDIES, RECENT PROJECTS WITH SIMILAR COMPONENTS, MANUFACTURER'S BUDGET ESTIMATES , STANDARD CONSTRUCTION COST ESTIMATING MANUALS AND ENGINEERING JUDGEMENT.

[2]CONSTRUCTION COST PLUS 30% FOR PLANNING, ENGINEERING AND CONSTRUCTION CONTINGENCIES.

[3]$1.0 MILLION PER ACRE.

[4]6% BOND RATE, 30 YEAR BOND LIFE.

[5]CAPITAL RECOVERY PLUS O&M.

[6]PROJECTED YIELD/SUPPLY AT FULL CAPACITY.

[7]90% FOR ONLINE FACILITIES.

[8]PROJECT YIELD X PROJECT UTILIZATION FACTOR.

[9]ANNUAL COST ÷ OPERATING YIELD. INCLUDES $250/AF METROPOLITAN REBATE.

[10]INCLUDES REDUCTION IN O&M COSTS BY $2.14M TO ACCOUNT FOR LOWER OCSD CLASS 1 PERMIT CHARGES.

[11]INCLUDES REDUCTION IN CAPITAL RECOVERY COSTS BY $850,000 TO ACCOUNT FOR LOWER OCSD CAPITAL FACILITIES CHARGES.

Tables 4-8 and 4-9 summarize the results of the economics and ratings for each of the alternatives.

Table 4-8: Summary of Alternative Economics

Alternative		Capacity	Total /Est. Const. Cost	Total P+Eng+Constr Cost	Total/Est. Capital Cost	Project Unit Cost	Unit Capital Cost
No.	Description	(AFY)	($M)	($M)	($M)	($/AFY)	($/gal)
1	Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)	94	1.3	0.39	$1.69	$2,110	$20.1
2A	Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)	480	13.0	3.9	$17	$2,690	39.4
2B	Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)	617	13.6	4.1	$18	$2,400	32.1
2C	Satellite Water Reclamation Plant (Combined Project)	1,097	22.5	6.8	$29	$1,800	29.9
3	Satellite Water Reclamation Plant (Interagency Project with OCWD)	3,853	45.0	13.5	$59	$880	17.0

Based on economic analysis, although Alternative 3 will result in the largest upfront capital costs, it has the lowest project unit cost. The significant reduction in the project unit cost is mainly due to the large treatment capacity and the reduction in capital recovery cost. The exact amount of reduction will need to be discussed with OCSD and OCWD.

Furthermore, the capital cost for this project will be shared by OCWD according to the amount of recharge flow to be used by OCWD. The details in the cost sharing will have to work out between the two agencies at the time of the project.

Table 4-9: Detailed Ratings of Alternatives

Alternative Number	Recycled/Non-Potable Supply Alternatives	Numerical Scores (a)			
		Technical Performance	Economic Performance	Environmental Performance	Social Performance
1	Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)	+	-	-	+
2A	Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)	+	-	-	+
2B	Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)	+	-	-	+
2C	Satellite Water Reclamation Plant (Combined Project)	+	-	-	+
3	Satellite Water Reclamation Plant (Interagency Project with OCWD)	+	-	-	+

+: Positive Performance
-: Average Performance
X: Poor Performance
Alternatives evaluated by Malcolm Pirnie, Inc. staff.

5. Summary and Findings

This section summarizes the key findings and implications for the proposed Water Recycling Facilities program.

5.1. Summary

5.1.1. Potential Recycled Water Market

Based on the demand analysis, the existing non-potable water demands within the District's service area are approximately 1,580 AFY. This includes total average demands of 475 AFY by the Parks, 900 AFY by the Golf Courses and 201 AFY by the schools.

5.1.2. Potential Non-Potable Water Sources

Two potential non-potable water sources were identified in the study: (1) GWRS water and (2) water from a new satellite water reclamation facility.

Diversion of the recycled water from the GWRS pipeline to provide recycled water for use in the District's service area was analyzed and four turnouts of the GWRS pipeline were identified. However, none of the existing turnouts are in the District's service area. Furthermore, due to the given capacity constraints of GWRS water for uses other than groundwater replenishment and the potential non-potable water applications in Anaheim and Placentia, GWRS water was not considered further as one of the non-potable water sources for this study.

As a result, the satellite water reclamation facility was given further consideration as a potential recycled water source. The facility would divert wastewater from the sewer collection system upstream of the regional water reclamation plant for treatment in addition to using the same wastewater collection system to dispose of any residuals from the recycled water treatment processes. Based on the District's sewer flow monitoring data, it was determined that a recycled water treatment facility would be feasible.

5.2. Supply Alternatives Development and Evaluation

Based on a review of the irrigation demands and potential recycled/non-potable water sources, three primary supply alternatives were developed and evaluated. They are listed as followed:

- Alternative 1: Regional Brackish Groundwater Treatment (On-site at Yorba Regional Park)

- Alternative 2: Satellite Water Reclamation Plant

    a. Alternative 2A: Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)

    b. Alternative 2B: Satellite Water Reclamation Plant (Aera Energy Wastewater Line)

    c. Alternative 2C: Satellite Water Reclamation Plant (Combined Project)

- Alternative 3: Interagency Project with Orange County Water District (OCWD)

Below is a summary of the economic analyses and each option's respective information. The costs presented are for each project independently. Alternative 3 will result in the highest capital cost ($59M); however, due to the large capacity and the reduction in capital recovery cost, it has the lowest project unit cost ($880/AFY). Treated imported water costs are expected to exceed this rate by 2015.

Table 5-1: Summary of Alternative Economics

Alternative		Capacity	Total /Est. Const. Cost	Total/Est. Capital Cost	Project Unit Cost	Unit Capital Cost
No.	Description	(AFY)	($M)	($M)	($/AFY)	($/gal)
1	Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)	94	1.3	$1.69	$2,110	$20.1
2A	Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)	480	13.0	$17	$2,690	39.4
2B	Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)	617	13.6	$18	$2,400	32.1
2C	Satellite Water Reclamation Plant (Combined Project)	1,097	22.5	$29	$1,800	29.9
3	Satellite Water Reclamation Plant (Interagency Project with OCWD)	3,853	45.0	$59	$880	17.0

5.3. Findings

Given that most of the alternatives developed contain project areas that can be easily connected, it is recommended that the non-potable/recycled water alternatives be ordered and implemented in four phases, based upon the interests of the different potential customers and the degree of coordination with the different agencies, which will be required to ensure a successful program. The four phases are described in the subsequent paragraphs.

5.3.1. Phase 1: Satellite Water Reclamation Plant- 0.5 mgd

Phase 1 of the project would include construction of the WRP as described in Alternative 2A. One of the major reasons to implement this alternative first is that the Yorba Linda Country Club (YLCC) currently shows the highest level of interest in this project. The

YLCC would be the major customer for this portion of the project. Currently, the golf club owns a pair of private wells which help to meet the majority of its irrigation demands. The age and condition of these wells are unknown and there is a possibility that the golf club will retire these private wells and utilize the non-potable water supply developed by the time this project is considered. The following briefly describes what this project will entail:

1. All piping and hydraulic requirement would be sized to the combined product flow of 1.2 mgd

2. Raw water intake line.

3. The structure of water reclamation plant and the RO treatment plant will be sized for the 1097 AFY demand as described in Alternative 2C for future build out; however, modular items such as membranes for both the MBR and the RO will be sized for the initial Alternative 2A demand (480 AFY) only.

4. East distribution system which includes pipeline, pump station and diurnal reservoir

5. The project would enable service to the Yorba Linda Country Club as well as services to neighborhood parks and schools.

6. The costs include capital and O&M costs.

5.3.2. Phase 2: Satellite Water Reclamation Plant- 1.2 mgd (product)

The second phase of the project is to complete the other half of the District recycle water project as described in Alternative 2C by increasing the treatment capacity of the WRP to 1.2 mgd (product water). This portion of the build out is identical to the stand-alone project for Alternative 2B. For this portion of the project, there is a strong interest expressed by one of the potential customers. As mentioned earlier, the Black Gold Golf Club is currently using untreated imported water from MWD to meet the majority of its irrigation demand. The following briefly describes what this project would entail:

1. Increasing the WRP treatment processes to provide 1.2 mgd of projected non-potable water demand.

2. Addition of the West distribution system, which includes a distribution pipeline, pump station, and diurnal reservoir.

3. Rehabilitation of the existing oil pipeline.

4. The project would enable service to the Black Gold Golf Club, and to adjacent parks.

5.3.3. Phase 3: Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)

Should there be enough interest and additional need requested by the District's irrigation users along the southeastern service area, the District would then implement the project as described in Alternative 1. The following briefly describes what this project would entail:

1. Addition of a new well field to produce approximately 2,100 gpm of regional source of non-potable water.

2. The project would add new non-potable water transmission mains to serve Eastside Community Park, Saint Francis of Assisi School and Jean Woodward Park.

5.3.4. Phase 4: Alternative 3-Satellite Water Reclamation Plant (Interagency Project with OCWD)

Finally, this phase of the project would serve as a completion of Alternative 3, to increase the WRP to a total treatment capacity of 4.2 mgd. Since a portion of Alternative 3 was covered in Phases 1 and 2 of the project implementation, Phase 4 only contains the incremental costs to achieve full build out. The additional treated flow (approximately 2.5 mgd) would be diverted and be treated by OCWD and recharged into Anaheim Lake. It is intended that this portion of the project be completed last to allow time for all the interagency agreements and coordination to take place. The following briefly describes what this project would entail:

1. Increasing the WRP treatment processes to provide a total of 3.7 mgd capacity

2. Additional wastewater intake line to be connected near the P1-8 monitoring location.

3. Construction of a new 12-inch distribution line to be used for recharge to Anaheim Lake

5.4. Implementation

It is concluded that all four of the alternatives would be feasible and beneficial to the District and therefore are recommended to be included in the recycled water program. The implementation of the alternatives is based on the degree of interest from potential users and the degree of coordination required by each of the alternatives. Table 5-2 summarizes the recycled water costs for the recommended portfolio.

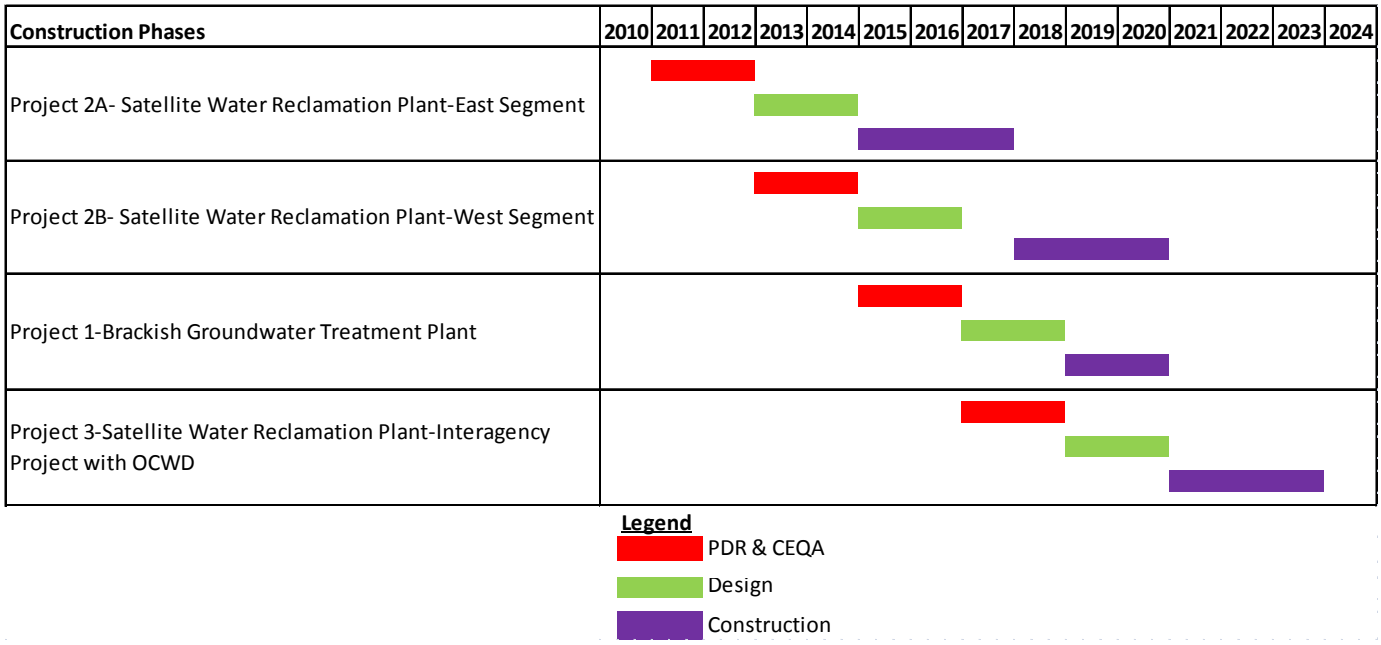
Table 5-2: Recycled Water Program Costs

Program Phasing	Alternative		Capacity (AFY)		Capital Cost ($M)		Annual Costs ($M)[a]	
	No.	Description	Project	Program[b]	Project	Program[b]	Project	Program[b]
1	2A	Satellite Water Reclamation Plant (Yorba Linda Reservoir Site)	480	480	$16.90	$16.9	$1.27	$1.27
2	2B	Satellite Water Reclamation Plant (Aera Energy Wastewater Disposal Line)	617	1,097	$12.2	$29.1	$0.74	$2.01
3	1	Regional Brackish Groundwater Treatment (On-Site at Yorba Regional Park)	94	1,191	$1.69	$30.8	$0.20	$2.21
4	3	Satellite Water Reclamation Plant (Interagency Project with OCWD)	2,756	3,947	$29.2	$60.0	$1.90	$4.11

Notes: a. Annual Costs included annualized capital costs and Annual O&M Costs; b. Cumulative value for the program

Figure 5-1 shows an estimated project schedule for construction of each of the program phases. A more detailed project schedule will be determined once the phasing of the projects has been finalized in the future.

Figure 5-1: Yorba Linda Water District Recycled Water Program- Implementation Schedule



5.4.1. Finance Plan

The water supply the District needs to produce and deliver to its customers for both potable and non-potable use is estimated to be 18,800 AFY. If the District chooses to continue with its current operation without including a recycled water program, the costs for this water will be approximately $12.7M per year.

As shown in Section 4, the Citywide Water Recycling Facilities Plan requires extensive capital expenditures. However, the resultant benefits can result in a creative financing program. Potential sources of financial support to reduce the District's local share include Federal USBR grants, State grants and loans, SAWPA grants, and MWDSC rebates.

The financing plan is shown in Table 5-3. With the recommended projects, the District will replace approximately 1,200 of potable water supply with recycled water in the next 10 years. The table indicates that a water rate increase of 25% (above the expected costs if the same demands were supplied by potable water) over 10 years would be required to implement these projects.

Table 5-3: Yorba Linda Water District Recycled Water Program - Financing Plan

Alternative		Supply (AFY)	Annual Cost ($M/yr)	Capital Cost ($M)
No	**Description / Designation**			
2A	Satellite Water Reclamation Plant – East Segment	480	1.27	16.9
2B	Satellite Water Reclamation Plant – West Segment	620	1.47	17.7
1	Regional Brackish Groundwater Treatment Plant (Yorba Regional Park)	100	0.20	1.69
Recycled Water Delivery & Administration Costs (b)		1,200	1.06	-
SUBTOTAL - PORTFOLIO		1,200	4.0	36.3
Current Water Program				
Supply Costs		17,600 (a)	5.91 (c)	-
Delivery & Administration Costs		17,600 (a)	5.98	-
SUBTOTAL – CURRENT PROGRAM		17,600	11.9	-
TOTAL – PROJECTED PROGRAM		18,800	15.9 (d)	-

(a) Assumed produced and delivered water

(b) Estimated at 36% of portfolio costs, based on District financial data

(c) Includes reduction in potable water cost program replaced by recycled water deliveries

(d) Equates to 25% overall water rate increase over 10 years

5.5. Rules and Regulations for Recycled Water

A recycled water system differs from the potable water system in that additional safety measures are required to protect workers and customers from the potential health hazards associated with the ingestion of recycled water. The District would be responsible for operating and maintaining a satellite water reclamation facility, over 9 miles of recycled water pipeline and recycled water pump stations. In order to maintain safe operations, it is important to comply with all rules and regulations governing recycled water use including, but not limited to, the following:

- Protect the potable water supply from the occurrence of a cross-connection between the potable and the recycled water system.
- As recycled water users, maintain safe handling, usage and application of recycled water.

- As a recycled water purveyor, maintain proper oversight of non-City users to ensure proper handling, usage and application by the user.

This section will expand upon rules and regulations associated with recycled water use.

Identification of Buried Recycled Water Pipelines

New buried recycled water piping (mains and laterals) should be colored purple (Pantone Color #512) with the continuous wording "RECYCLED WATER-DO NOT DRINK" printed on the opposite sides of the pipe. The pipe should be laid with the wording facing upwards. An alternative is to identify all new buried recycled water lines with continuous lettering on three-inch (3") minimum width, purple-marking tape (Pantone Color #512) with one-inch black or white contrasting lettering bearing the continuous wording "RECYCLED WATER-DO NOT DRINK." This tape should run continuously on top of all piping and must be attached to piping with plastic tape banded around the marking tape and the pipe every five feet on center. Marking tape should extend to all valve boxes and/or vaults and exposed piping.

Identification of Existing Buried Recycled Water Pipelines

Existing buried piping that would be converted to recycled water use does not need to be marked unless the piping becomes exposed, such as during installation of new pipeline or maintenance of existing pipe. The exposed section should be marked as indicated for new piping.

Identification of Above-Grade Recycled Water Pipelines

All above-grade recycled water pipelines, whether new or existing, should be labeled with the words "RECYCLED WATER-DO NOT DRINK" and color-coded purple (Pantone Color #512). An alternative is to identify the above-grade recycled water pipeline with purple identification tape (Pantone Color #512) that includes the labeling "RECYCLED WATER-DO NOT DRINK". The purple identification tape should be adhesive, permanent, and resistant to environmental conditions. Purple bands (Pantone Color #512) could also be painted around the circumference of the pipe at 10-ft intervals for color coding. Purple PVC is not an acceptable alternative for color-coding above-ground pipelines because the purple color will fade over time when exposed to sunlight.

Identification of Valves

New and existing valves should be installed in a marked valve box with a recycled water identification tag on the valve operator, or if the valve operator is too deep to reach, at the top of the valve box extension. The tag should be weatherproof (including a plastic or plastic-coated tag), purple background (Pantone Color #512), and bear the words

"Recycled Water-DO NOT DRINK" and "AGUA RECICLADA-NO SE BEBA" in black letters.

Identification of Valve Boxes

Valve boxes should be colored purple (Pantone Color #512) and marked to distinguish from potable and wastewater valve boxes. In accordance with CDPH requirements, valve boxes should have an advisory label or "nameplate" permanently molded into or affixed onto the lid with rivets, bolts, or similar. Labels should be constructed of a purple weatherproof material (Pantone Color #512) with the wording "RECYCLED WATER" permanently stamped or molded into the label.

Identification of Blow-off Assemblies

All of the blow-off assemblies should be tagged with a recycled water identification tag. The tag should be weatherproof (including a plastic or plastic-coated tag), purple background (Pantone Color #512), and bear the words "Recycled Water-DO NOT DRINK" and "AGUA RECICLADA-NO SE BEBA" in black letters.

Identification of Water Meters and Meter Boxes

All of the water meters should be tagged with a recycled water identification tag. The tag should be weatherproof (including a plastic or plastic-coated tag), purple background (Pantone Color #512), and bear the words "Recycled Water-DO NOT DRINK" and "AGUA RECICLADA-NO SE BEBA" in black letters.

Identification of Pumps and Pumping Appurtenances

All pumps and pump control valves should be tagged with a recycled water identification tag. The tag should be weatherproof (including a plastic or plastic-coated tag), purple background (Pantone Color #512), and bear the words "Recycled Water-DO NOT DRINK" and "AGUA RECICLADA-NO SE BEBA" in black letters. All pumps and pumping appurtenances should be painted purple (Pantone Color #512).

Sealing Water

If potable water is used as seal water for a non-potable water pump, backflow prevention should be exercised in protecting potable water supply. Proper drainage of the packing sealing water should be provided.

Signage

For a fenced pump station area, at least one sign should be posted. In accordance with CDPH requirements, signs should have purple background (Pantone color #512), with ½" black or white letters bearing the words "RECYCLED WATER-DO NOT DRINK" or

"CAUTION: RECLAIMED WATER-DO NOT DRINK". The prescribed wording should also be translated and posted in Spanish ("AGUA RECICLADA-NO SE BEBA") and any other appropriate languages. Signs should be posted in a visible and accessible manner. These signs should be conspicuous, no smaller than 4" by 8" in dimension, and show an international symbol for non-potable water.

5.5.1. Backflow Prevention Devices

The backflow prevention assembly should be located as close as practical to the downstream side of every potable water meter.

5.5.1.1. Type of Backflow Protection Devices Required

Backflow protection devices are required on all potable water service connections that are located within recycled water use areas. In accordance with CDPH regulations, the type of backflow protection devices required is specified in Table 5-4 and Table 5-5. The type of backflow protection device required depends upon the degree of hazard. Table 5-4 delineates backflow protection devices required by existing CDPH regulations.

Table 5-4: Type of Backflow Protection Required (Existing Regulations)

Degree of Hazard	Minimum Type of Backflow Prevention
Recycled Water	
(1) Premises where public water system (PWS) is used to supplement the recycled water supply.	Air Gap Separation
(2) Premises where recycled water is used, other than as allowed in paragraph (3), and there is no interconnection with the potable water system.	Reduced Pressure Principle Backflow Prevention Device
(3) Residences using recycled water for landscape irrigation as part of an approved dual plumbed use area unless the recycled water supplier obtains approval of the local public water supplier, or the Department if the water supplier is also the supplier of the recycled water, to utilize an alternative backflow protection plan that includes an annual inspection and annual shutdown test of the recycled water and potable water systems	Double Check Valve Assembly

Source: Existing CDPH Regulations

Table 5-5 delineates backflow protection devices specified in draft CDPH regulations.

Table 5-5: Type of Backflow Protection Required (Draft Regulations)

Hazard	Required Level of Protection
Recycled Water	
(A) Recycled Water supply that is	
1. Interconnected to a piping system that contains water received from a PWS	Air Gap Separation
2. Not interconnected to a piping system that contains water received from a PWS	Reduced Pressure Principle
(B) Recycled water supply used only for landscape irrigation in an approved dual-plumbed use area which is used for	
1. Individually owned residential units	Double Check Valve
2. Sites other than individually owned residential units	Reduced Pressure Principle

Source: Draft CDPH Regulations

In accordance with CDPH regulations, the following backflow protection devices are required for each situation involving recycled water sites specified in Table 5-6.

Table 5-6: Required Backflow Prevention Devices Required at Potable Connections at Recycled Water Use Areas

Situation	Type of Backflow Prevention Assembly Device Required
Temporary Potable Connection To Recycled Water System (Recycled Water System Supplied By Potable Water System Temporarily)	Reduced Pressure Principle Device At Potable Connection
Dual-Plumbed Sites (Use Areas Supplied By Separate Recycled Water System and Potable Water System)	Reduced Pressure Principle Device At Potable Connection
Converting Potable Water System to Recycled Water System (Terminating potable service & initiating recycled service)	Air Gap Separation At Potable Connection Initially; Reduced Pressure Principle Device Installed In Future After Conversion
Converting Recycled Water System to Potable Water System (Terminating recycled service & initiating potable service)	Appropriate Device Depending Upon Degree of Hazard

5.5.1.2. Identification of Recycled Water Backflow Prevention Devices

Backflow prevention devices should be tagged with a Recycled Water Identification tag. The tag should be weatherproof (including a plastic or plastic-coated tag), purple

background (Pantone Color #512), and bear the words “Recycled Water-DO NOT DRINK” and “AGUA RECICLADA-NO SE BEBA” in black letters.

5.5.2. Recycled Water Operator Certification

Wastewater treatment plant classification and operator certification requirements have been developed to ensure proper operation of both wastewater and water recycling treatment plants. The SWRQB identifies five classes of recycled water treatment plants. These five classes are summarized in Table 5-7.

Table 5-7: Classification of Wastewater and Water Recycling Treatment Plants

Class	Treatment Process	Design Flow (mgd)
I	Pond	All
	Primary	≤ 1.0
II	Primary	1.0 - 5.0
	Biofiltration	≤ 1.0
	Extended Aeration	All
III	Primary	5.0 - 20.0
	Biofiltration	1.0 - 10.0
	Activated Sludge	≤ 5.0
	Tertiary	≤ 1.0
IV	Primary	> 20.0
	Biofiltration	10.0 - 30.0
	Activated Sludge	5.0 - 20.0
	Tertiary	1.0 - 10.0
V	Biofiltration	> 30.0
	Activated Sludge	> 20.0
	Tertiary	> 10.0

Table 5-8 shows the level of operator certification required depends upon the classification of the water recycling facility.

Table 5-8: Grades of Operator Certification

Role	Operator Certification
Chief Plant Operator	Possess a valid operator certification of a grade at least equivalent to the class of plant operated.
Supervisors and Shift Supervisors	• In Class II, III and IV plant, possess valid operator certificates no more than 1 grade lower than the class of plant operated.
	• In Class V plants, shift supervisors shall possess at least valid Grade III certificates and supervisors shall possess at least Grade IV certificates.
Operators	• Every operator shall possess at least a valid Grade I certification or a valid operator-in-training certificate.
	• In a Class IV or Class V plant, 50% of the operators shall possess at least valid Grade II certificates or valid operator-in-training certificates at the Grade II or higher level.

Based upon the recycled/non-potable water supply alternatives developed in Section 4, the largest water recycling treatment plant being considered as a part of this study is a Class IV (tertiary 1.0 – 10.0 mgd). Please refer to Appendix D for additional information regarding the specific requirements at each grade of operator certification.

5.5.3. California's Recycled Water Policy

As California is facing an unprecedented water crisis and working toward creating a more sustainable water supply, this project will permit the District to free up potable water supply that is currently used for landscaping. Producers and Distributors of recycled water for landscape irrigation uses are eligible to apply for the State Board's General Permit. Specific uses of recycled water considered "landscape irrigation" projects are shown in Table 5-9.

Table 5-9: Specified Uses of Recycled Water Considered "Landscape Irrigation" Projects

Specified Uses of Recycled Water	
i	Parks, greenbelts, and playgrounds
ii	School yards
iii	Athletic fields
iv	Golf courses
iv	Cemeteries
vi	Residential landscaping, common areas
vii	Commercial landscaping, except eating areas
viii	Industrial landscaping, except eating areas
ix	Freeway, highway, and street landscaping

Since the primary uses covered under this project falls under at least three (and potentially more) of the uses listed in Table 5-9, this project is eligible for coverage under the General Permit. Furthermore, the District should only be required to apply for the State Resource Board's General Permit, to comply with the Water Code and the Title 22 requirements.

California adopted Recycled Water Policy in 2008, which was developed with the intent to provide guidance to the RWQCB and proponents of recycled water projects in order to promote collaboration and cooperation to streamline the recycled water permitting process. This section will provide information regarding California's new recycled water policy and how it affects the permitting process. The entire recycled water policy and the general permit requirements are provided in Appendix E.

The new guidelines specifically address the following:

- Public Health and Safety Impacts are "Beneficial" or "Not Significant" if recycled water is used in accordance with this Policy.
- Water Quality Impacts are "Beneficial" or "Not Significant" if recycled water is used in accordance with this Policy.

The Policy also moves away from individual permits requiring the preparation of Salt and Nutrient management plans; instead addressing through locally developed regional or sub-regional salt and nutrient plan. Participating in a regional salt and nutrient management plan could be done in parallel to moving forward with the recycled water project (accelerating the permitting process). Project specific groundwater monitoring

should no longer be required since this is expected to be addressed in the regional salt and nutrient management plan.

The policy also sets forth criteria for streamlined, general irrigation permitting if the following criteria are met:

- Produce and distribute recycled water in compliance with Title 22
- Recycled water irrigation at agronomic rates
- Monitoring nutrient levels in recycled water
- Monitoring for CECs on annual basis and priority pollutants on a twice annual basis.

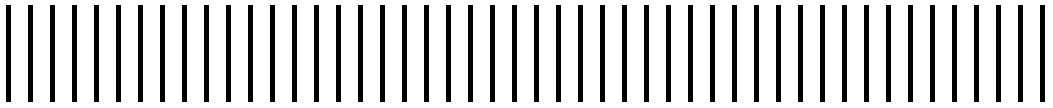
The incidental runoff reporting requirements is 1,000 gallons and may be regulated by waste discharge requirements or municipal separate storm water system permits as long as the following criteria are met:

- Detection correction occurs within 72 hours
- Sprinklers are properly designed and operated
- Irrigation doesn't occur during rainfall events
- Recycled water ponds are properly managed

Yorba Linda Water District

Water Recycling Facilities Planning Study

Appendix A: 2010 Yorba Linda Water District Water Quality Report



6808001

MALCOLM PIRNIE

What are Water Quality Standards?

Drinking water standards established by the U.S. EPA and CDPH set limits for substances that may affect consumer health or aesthetic qualities of drinking water. The chart in this report shows the following types of water quality standards.

- **Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.
- **Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.
- **Secondary MCLs** are set to protect the odor, taste, and appearance of drinking water.
- **Primary Drinking Water Standard:** MCLs for contaminants that affect health along with their monitoring and reporting requirements and water treatment requirements.
- **Regulatory Action Level (AL):** The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements that a water system must follow.

How are Contaminants Measured?

The District samples and tests it water sources throughout the year. Contaminants are measured in:

- Parts per million (ppm) or milligrams per liter (mg/l)
- Parts per billion (ppb) or micrograms per liter (µg/l)
- Parts per trillion (ppt) or nanograms per liter (ng/l)

Parts per million:	Parts per billion:	Parts per trillion:
1 second in 12 days	1 second in 32 years	10 drops in a Rose Bowl-sized pool
1 penny in $10,000	1 penny in $10 million	1-second in 32,000 years
1 inch in 16 miles	1 inch in 16,000 miles	1 inch in 16 million miles

What is a Water Quality Goal?

In addition to mandatory water quality standards, U.S. EPA and CDPH have set voluntary water quality goals for some contaminants. Water quality goals are often set at such low levels that they are not achievable in practice and are not directly measurable. Nevertheless, these goals provide useful guidance and directions for water management practices. The chart in this report includes three types of water quality goals:

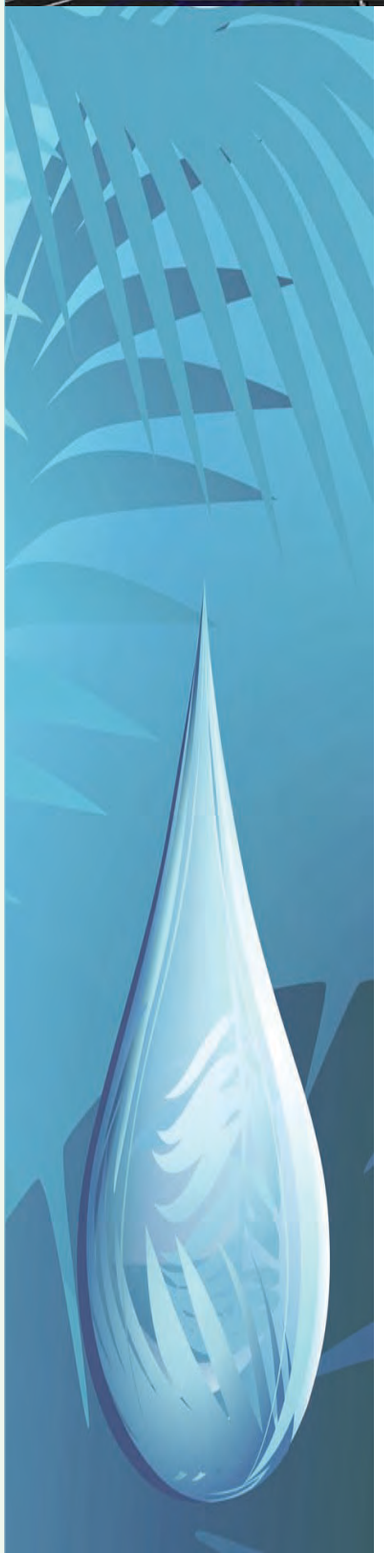
- Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by U.S. EPA.
- Maximum Residual Disinfectant Level Goal (MRDLG): The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by U.S. EPA.
- Public Health Goals (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency – Office of Environmental Health Hazard Assessment.

Imported Water Assessment

In December 2002, Metropolitan Water District of Southern California (MWD) completed a source water assessment of its Colorado River and State Water Project supplies. Colorado River supplies are considered to be most vulnerable to contamination by recreational uses, urban/storm water runoff, industrial runoff, increasing urbanization in the watershed and wastewater contamination. State Water Project supplies are considered to be most vulnerable to urban/storm water runoff, and wildlife, agriculture, recreation and wastewater contamination. A copy of the assessment can be obtained by contacting MWD by phone at 213.217.6850

Groundwater Assessment

The District completed an assessment of its Wells No. 1, 5, 7, 10, and 12 in January 1999. The wells are considered most vulnerable to contaminants produced by the following activities: gas stations; dry cleaners; metal plating/finishing/fabricating plants; plastic/synthetic producers; underground injection of commercial/industrial discharges; underground storage tanks; agricultural drainage; fertilization, pesticide and herbicide application; automobile-body and repair shops; and chemical/petroleum processing/storage.



Yorba Linda Water District

Our mission is to provide reliable, high quality water and sewer services in an environmentally responsible manner at the most economical cost to our customers.

Printed on recycled paper

Yorba Linda Water District

2010 Water Quality Report

Your 2010 Water Quality Report

Since 1990, California public water utilities have been providing annual Water Quality Reports to their customers. This year's report also known as the "Consumer Confidence Report," covers water quality testing from January to December 2009.

The Yorba Linda Water District's annual Water Quality Report is prepared in compliance with the regulations called for in the 1996 reauthorization of the Safe Drinking Water Act (SDWA). The reauthorization charged the United States Environmental Protection Agency (USEPA) with updating and strengthening the tap water regulatory program.

USEPA and the California Department of Public Health (CDPH) are the agencies responsible for establishing water quality standards. To ensure that your tap water is safe to drink, USEPA and CDPH prescribe regulations that limit the amount of certain contaminants in water provided by water systems.

The State and Federal governments require that this annual water quality report be sent to every customer to insure that you are informed of the quality of your water. The District is committed to safeguarding its water supply and, as in years past, the water delivered to your home meets the standards required by the state and federal regulatory agencies.

In 2009, we conducted over 23,000 analyses to ensure that your water is clean and safe to drink. We are proud to report that our water system has never violated any water quality standard from both the State and Federal drinking water regulations. In some cases, the District goes beyond what is required by providing additional monitoring for contaminants that may have health risks.

We encourage you to read this report and to contact us with any questions you may have.

What You Need to Know about Your Water, and How it May Affect You

Water System Information

Yorba Linda Water District is an independent special district that provides water and sewer service to most of the City of Yorba Linda and to portions of Anaheim, Brea, Placentia and unincorporated Orange County. For more information about the District or your water service, please call Management Analyst Cindy Botts, at 714.701.3024 or Water Quality Engineer Derek Nguyen at 714.701.3115.

The Yorba Linda Water District Board of Directors' regularly scheduled meetings are held on the second and fourth Thursday of each month at 8:30 a.m. in the District boardroom located at 1717 E. Miraloma Avenue, Placentia, California 92870

Sources of Supply

The District's water supply is a blend of groundwater from our own wells and water imported from Northern California and the Colorado River by the Metropolitan Water District of Southern California (MWD). The source water for our wells is a natural aquifer that is replenished with water from the Santa Ana River, local rainfall and imported water. Managed by the Orange County Water District, the groundwater basin is approximately 350 square miles in area and lies beneath most of northern and central Orange County. The Yorba Linda Water District and more than 20 cities and retail water districts pump from the groundwater basin to provide water to homes and businesses. Your water source depends on where you live or work within the boundaries of our community. To find out which water source is provided to your home or business, please visit the Water Quality Division of the District's website: http://www.ylwd.com/quality/index-quality.html

Local Groundwater

The District obtains approximately half of its water supplies from wells located within the District. The District's groundwater sources include: Well No. 1, Well No. 5, Well No. 7, Well No. 10, Well No. 12, Well No. 18 and Well No. 19, which are located within Placentia city limits; and Well No. 11 and Well No. 15, which are located within Anaheim city limits

Imported Water

The District obtains the remainder of the water from local wholesaler Municipal Water District of Orange County (MWDOC). MWDOC obtains water from regional supplier Metropolitan Water District of Southern California (MWD). MWD obtains water from northern California via the California Aqueduct, and from the Colorado River via the Colorado River Aqueduct. MWD owns and operates the Robert B. Diemer water treatment plant located just north of western Yorba Linda where the water is treated to meet drinking water standards.

Basic Information about Drinking Water Contaminants

The sources of drinking water (both public tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and groundwater. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. Water also picks up substances resulting from the presence of animals or from human activity.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.

To learn more about the potential health effects of contaminants listed in this report, call the EPA's Safe Drinking Water Hotline at 1-800-426-4791 or by accessing the EPA's internet web site at www.epa.gov/safewater

Contaminants That May Be Present In Source Water:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife. Cryptosporidium is a microscopic organism that when ingested can cause diarrhea, fever, and other gastrointestinal maladies. The organism comes from animal and/or human waste and may be found in surface (imported) water. A standard treatment process that includes sedimentation, filtration, and disinfection can eliminate cryptosporidium contamination.
- Pesticides and herbicides that may come from a variety of sources such as agriculture, urban storm water runoff and residential uses.
- Inorganic contaminants, such as salts and metals that can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Organic chemical contaminants, including synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application and septic systems.
- Radioactive contaminants that can be naturally occurring or be the result of oil and gas production and mining activities.

Radon Advisory

Radon is a radioactive gas that you cannot see, taste, or smell. It is found throughout the world. Radon can move through the ground and into homes through cracks and holes in the foundation. Radon can build up to high levels in all types of homes. Radon can also get into indoor air when released from tap water from showering, washing dishes, and other household activities. Compared to radon entering the homes through soil, radon entering the home through tap water will, in most cases, be a minor source of radon in indoor air. Radon is a known human carcinogen. Breathing air containing radon can lead to lung cancer. Drinking water containing radon may also cause increased risk of stomach cancer.

If you are concerned about radon, test the air in your home. Testing is inexpensive and easy. You may want to consider modification to your home if the level of radon in your air is 4 picoCuries per liter of air (pCi/L) or higher. There are simple ways to fix a radon problem that are not too costly. For additional information, you can call the EPA's Radon Hotline (800-SOS-Radon).

The EPA proposed MCL for radon is 300 pCi/L. The proposal will provide flexibility to the states on how to limit exposure to radon by allowing states to focus efforts on the greatest radon risks-those in indoor air-while also reducing the risks from radon in drinking water. The states' option for radon compliance is as follows:

First Option: States can choose to develop enhanced state programs to address the health risks from radon in indoor air. These programs are known as Multimedia Mitigation (MMM) Programs. Individual water systems reduce radon levels in drinking water to 4,000 pCi/L or lower. EPA is encouraging states to adopt this option because it is the most cost effective way to achieve the greatest radon risk reduction.

Second Option: If a state chooses not to develop an MMM program, individual water systems in that state would be required to either reduce radon in their system's drinking water to 300 pCi/L or develop individual local MMM programs and reduce levels in drinking water to 4,000 pCi/L.

Fluoride

The District does not add fluoride to its groundwater supplies. Naturally occurring fluoride is present in the aquifer, but not at a level that provides dental health benefits.

In 1995, the California Legislature passed a bill mandating that all large water agencies fluoridate their supplies, but only if the state or "somebody" provided the agencies with the funds to do so. To date, the state has not come up with the funds to implement fluoridation.

MWD commenced fluoridation of the drinking water it supplies to Southern California in November of 2007. The District purchases approximately half of its water from MWD. Because of MWD's decision and the District's dual sources of water (groundwater and import), YLWD is faced with a situation where some of its customers will receive water fluoridated by MWD, some will receive non-fluoridated water, and some will receive a blend of fluoridated and non-fluoridated water.

If you wish to know the approximate level of fluoride in your tap water, or specific water service area, please call Derek Nguyen, Water Quality Engineer, at 714.701.3115. Additional information about the fluoridation of drinking water can be found through the following sources:

- U.S, Centers for Disease Control and Prevention, 1-888-CDC-2306
  www.cdc.gov/Oralhealth/factsheet/fl-background.html
- American Dental Association
  www.ada.org/public/topics/fluoride/fluor-links.html
- American Water Works Association www.awwa.org

Special Risk Populations

Some individuals may be more vulnerable to the effects of possible contaminants in drinking water than the general population. Persons who are undergoing chemotherapy, persons who have undergone organ transplants, some elderly persons, infants, persons infected with HIV/AIDS, or persons with other immune system disorders can be particularly at risk. These persons should seek advice from their health care providers about drinking water. The USEPA/Center for Disease Control guidelines on appropriate means to lessen the risks of infection by cryptosporidium or other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Vulnerability assessments of potential sources of contamination for Wells 11 and 15 were completed in April 2003. These groundwater sources are considered most vulnerable to the following activities not associated with detected contaminants: chemical/petroleum processing/storage; metal plating/finishing/fabricating; and plastics/synthetics production.

A vulnerability assessment of potential sources of contamination for Well 19 and Well 18 were completed in May 2004 and September 2005, respectively. The groundwater sources are considered most vulnerable to the following activities not associated with detected contaminants: gas stations; dry cleaners; metal plating/finishing/fabricating plants; plastic/synthetic producers; underground injection of commercial/industrial discharges; underground storage tanks; agricultural drainage; fertilization, pesticide and herbicide application; automobile-body and repair shops; sewer collection systems; food processing, and chemical/petroleum processing/storage.

A copy of the complete assessment is available at Department Public of Health District Office at 605 West Santa Ana Blvd., Building 28, Room 325, Santa Ana, CA 92701. You may contact CDPH Sanitary Engineer Minliang Shih at 714.547.0430.

Measurements

In order to ensure that tap water is safe to drink, EPA and CDPH prescribe regulations that limit the amount of certain contaminants in water provided by public water systems.

The tables below list all the drinking water contaminants that the District detected during the 2009 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done for the period January 1 through December 31, 2009. The CDPH requires monitoring for certain contaminants less often than every year because the concentrations of these contaminants are not expected to vary significantly from year to year. Thus, some of the data, though representative of current water quality, is more than one year old. The District contracts with state certified, independent laboratories to perform most of the District's water quality testing.

2009 YORBA LINDA WATER DISTRICT Groundwater Quality

Chemical	MCL	PHG (MCLG)	YLWD Average Groundwater	Range of Detections	Most Recent Sampling Date	MCL Violations?	Typical Source of Contaminant
Radiologicals							
Gross Alpha (pCi/L)	15	0	8.3	5.95 - 13.0	2009	No	Erosion of natural deposits
Uranium (pCi/L)	20	0.43	7.6	4.59 - 12.0	2009	No	Erosion of natural deposits
Total Radon 222 (pCi/L)	NS	n/a	459.0	424.0 – 491.0	2009	No	"see note related to radon"
Total Radium 228 (pCi/L)	5	0.019	0.1	0.14 – 2.31	2009	No	Erosion of natural deposits
Organic Chemicals							
Chloroform	NS	n/a	0.1	ND – 1.0	2009	No	Chlorination of water
Inorganic Chemicals							
Arsenic (ppb)	10	0.004	3.7	1.6 – 11.0	2009	No	Erosion of natural deposits
Fluoride (ppm)	2	1	0.4	0.34 – 0.53	2009	No	Erosion of natural deposits
Nitrate as NO_3 (ppm)	45	45	12.3	8.97 – 15.8	2009	No	Fertilizers, Septic Tanks
Nitrate+Nitrite as N (ppm)	10	10	2.8	0.1 – 2.03	2009	No	Fertilizers, Septic Tanks
Secondary Standards							
Color (units)	15	n/a	1.2	ND-0.4	2009	No	Natural Organic Materials
Chloride (ppm)	500*	n/a	106.2	102.0 – 112.0	2009	No	Erosion of natural deposits
Manganese (ppb)	50	n/a	11.9	ND – 113.0	2009	No	Erosion of natural deposits
Specific Conductance (µmho/cm)	1600*	n/a	1014.5	984.0 – 1060.0	2009	No	Erosion of natural deposits
Sulfate (ppm)	500*	n/a	137.2	125.0 – 149.0	2009	No	Erosion of natural deposits
Total Dissolved Solids (ppm)	1000*	n/a	615.8	588.0 – 652.0	2009	No	Erosion of natural deposits
Turbidity (ntu)	5*	n/a	0.2	ND – 0.4	2009	No	Erosion of natural deposits
Odor (TON)	3*	n/a	ND	ND < 1	2009	No	Natural Organic Materials
Zinc (ppm)	5*	n/a	11.8	ND – 161.0	2009	No	Erosion of natural deposits
Unregulated Contaminants Requiring Monitoring							
Alkalinity, total (ppm as CaCO3)	n/r	n/a	215.6	202.0 – 238.0	2009	No	Erosion of natural deposits
Bicarbonate (as HCO3) (ppm)	n/r	n/a	262.8	247.0 – 290.0	2009	No	Erosion of natural deposits
Boron (ppb)	NL = 1000	n/a	0.3	0.23 – 0.28	2009	No	Erosion of natural deposits
Calcium (ppm)	n/r	n/a	95.4	84.1 – 112.0	2009	No	Erosion of natural deposits
Hardness, total (grains/gal)	n/r	n/a	18.8	16.96 – 21.52	2009	No	Erosion of natural deposits
Hardness, total (ppm as $CaCO_3$)	n/r	n/a	321.9	290. – 368.0	2009	No	Erosion of natural deposits
Total Organic Carbon (ppm)	n/r	n/a	1.1	0.77 – 1.82	2009	No	Natural Organic Materials
Magnesium (ppm)	n/r	n/a	20.4	18.1 – 22.9	2009	No	Erosion of natural deposits
pH (pH units)	n/r	n/a	7.4	7.1 – 8.1	2009	No	Erosion of natural deposits
Bromide (ppm)	n/r	n/a	0.2	0.14 – 0.26	2009	No	Erosion of natural deposits
Potassium (ppm)	n/r	n/a	5.2	3.9 – 8.2	2009	No	Erosion of natural deposits
Sodium (ppm)	n/r	n/a	90.7	81.0 – 98.6	2009	No	Erosion of natural deposits
Vanadium (ppb)	50	n/a	4.6	3.4 – 8.2	2009	No	Erosion of natural deposits

ABBREVIATIONS:

*ppb = parts-per-billion; ppm = parts-per-million; pCi/L = picocuries per liter; ntu = nephelometric turbidity units; ND = not detected; n/a = not applicable; n/r = not regulated; < = average less than detection limit for reporting purposes; MCL = Maximum Contaminant Level; MCLG = federal MCL Goal; PHG = California Public Health Goal; TON = Threshold Odor Number; *Contaminant is regulated by a secondary standard to maintain aesthetic qualities (taste, odor, color).*

2009 YORBA LINDA WATER DISTRICT Distribution System Water Quality

Disinfection-by-Products	MCL (MRDL/MRDLG)	Average Amount	Range of Detections	MCL Violations?	Typical Source of Contaminant
Chlorine Residual (ppm)	(4 / 4)	1.3	1.0 – 1.5	No	Disinfectant Added for Treatment
Haloacetic Acids (ppb)	60	10.4	3.5 – 22.9	No	By products of Chlorine Disinfection
Total Trihalomethanes (ppb)	80	35.8	16.4 – 64.2	No	By products of Chlorine Disinfection
Aesthetic Quality					
Color (units)	15*	1.2	ND – 5.0	No	Erosion of natural deposits
Turbidity (ntu)	5*	0.2	ND – 0.4	No	Erosion of natural deposits
Odor (TON)	3*	ND	ND - 1	No	Erosion of natural deposits
Microbiological					
Total Coliform (non-fecal coliform)	5%	ND	ND - .66%	No	Naturally present in environment

ABBREVIATIONS AND FOOTNOTES:

*12 locations in the distribution system are tested quarterly for total Trihalomethanes and Haloacetic acids; 37 locations are tested monthly for color, odor and turbidity. MRDL = Maximum Residual Disinfectant Level; ND = not detected; MRDLG = Maximum Residual Disinfectant Level Goal; ntu = nephelometric turbidity units; *Contaminant is regulated by a secondary standard to maintain aesthetic qualities (taste, odor, color).*

2009 Lead and Copper Action Levels at Residential Taps

Chemical	Action Level (AL)	Health Goal	90th Percentile Value	Sites Exceeding NL Sample	AL Violation?	Typical Source of Contaminant
Lead (ppb)	15	2	6	None	No	Internal corrosion of plumbing system, discharge from industrial manufacturers, erosion of natural deposits.
Copper (ppm)	1.3	0.17	0.21	None	No	Internal corrosion of plumbing system, discharge from industrial manufacturers, erosion of natural deposits.

NOTE:

Every three years, at least 37 residences are tested for lead and copper at-the-tap. The most recent set of samples were collected in 2009. Lead was detected in 2 samples; none exceeded the Action Level. Copper was detected in 37 samples; none exceeded the Action Level. The regulatory action level is the concentration at which, if exceeded in more than ten percent of homes tested, triggers treatment or other requirements that a water system must follow. The Yorba Linda Water District complied with the lead and copper action levels

2009 METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
Treated Surface Water

Chemical	MCL	PHG or (MCLG)	Average Amount	Range of Detections	MCL Violation?	Typical Source of Contaminant
Radiological – Tested in 2009						
Alpha Radiation (pCi/L)	15	(0)	5.6	3.8 – 9.3	No	Erosion of natural deposits
Beta Radiation (pCi/L)	50	(0)	4.3	ND – 6.4	No	Decay of natural and man-made deposits
Uranium (pCi/L)	20	0.42	3.3	2.9 – 3.7	No	Erosion of natural deposits
Disinfection-By-Products						
Total Trihalomethanes (ppb)	80	n/a	43	26 - 56	No	By-product of drinking water chlorination
Haloacetic Acids (ppb)	60	n/a	10	7.3 - 12	No	By-product of drinking water chlorination
Total Chlorine Residual (ppm)	4	4	2.4	1.5 – 3.0	No	Drinking water disinfectant added for treatment
Inorganic Chemicals – Tested in 2009						
Aluminum (ppb)	1000	600	170	100 - 230	No	Residual from water treatment process
Arsenic (ppb)	10	0.004	2.3	ND – 2.6	No	Erosion of natural deposits, glass and electronic wastes
Barium (ppb)	1000	2000	130	120 - 140	No	Erosion of natural deposits, oil and metal refineries discharge
Fluoride (ppm)	2	1	0.8	0.7 – 0.9	No	Water additive for dental benefits
Nitrate as Nitrogen (ppm)	10	10	0.4	ND – 0.4	No	Fertilizers, septic tank or natural deposits
Secondary Standards* - Tested in 2009						
Aluminum (ppb)	200	600	170	100 -230	No	Residue from water treatment process, natural deposits
Chloride (ppm)	500	n/a	97	89 - 99	No	Natural deposits, seawater influence
Color (units)	15	n/a	2	1 - 2	No	Naturally-occurring organic materials
Odor Threshold (TON)	3	n/a	2	2	No	Naturally-occurring organic materials
Specific Conductance (µS/cm)	1600	n/a	1000	880 -1100	No	Substances form ions in water, seawater influence
Sulfate (ppm)	500	n/a	240	190 - 250	No	Natural deposits, industrial wastes
Total Dissolved Solids (ppm)	1000	n/a	610	530 - 640	No	Natural deposits, seawater influence
Turbidity (NTU)	5	n/a	0.04	0.04 – 0.05	No	Soil runoff
Unregulated Chemicals – Tested in 2009						
Alkalinity (ppm)	n/a	n/a	120	98 – 120	No	Natural deposits
Boron (ppb)	NL = 1000	n/a	130	120 - 140	No	Natural deposits, industrial wastes
Calcium (ppm)	n/a	n/a	68	56 - 75	No	Natural deposits
Chlorate (ppb)	NL = 800	n/a	66	ND - 79	No	By-product of drinking water chlorination, industrial processes
Chromium VI (ppb)	n/a	n/a	0.12	0.04 – 0.11	No	Industrial waste discharge, natural deposits
Corrosivity (AI)	n/a	n/a	12.2	12.0 – 12.3	No	Elemental balance in water, affected by temperature, other factors
Hardness (ppm)	n/a	n/a	280	240 - 300	No	Municipal and industrial waste discharges
Magnesium (ppm)	n/a	n/a	27	23 - 29	No	Natural deposits
pH (pH Units)	n/a	n/a	8.3	8.1 – 8.6	No	Hydrogen Ion Concentration
Potassium (ppm)	n/a	n/a	4.8	4.3 – 5.1	No	Natural deposits
Sodium (ppm)	n/a	n/a	98	86 - 100	No	Natural deposits
Total Organic Carbon (ppm)	n/a	n/a	2.3	2.0 – 2.6	No	Man-made and natural deposits
Vanadium (ppb)	NL = 50	n/a	3.1	ND – 3.4	No	Naturally-occurring, industrial discharge

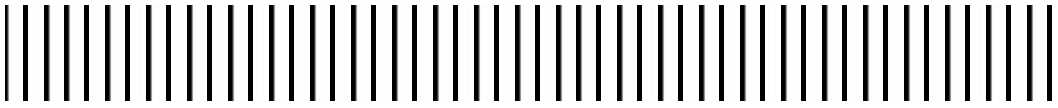
ABBREVIATIONS:

AI = aggressive index; AL = action level; MCL = maximum contaminant level; MCLG = maximum contaminant level goal; n/a = not applicable; ND = not detected; NL = notification level; NTU = nephelometric turbidity units; NL = Notification Level; pCi/L = picocuries per liter; PHG = Public Health Goal; ppb = parts per billion or micrograms per liter (µg/L); ppm = parts per million or milligrams per liter (mg/L); ppt = parts per trillion or nanograms per liter (ng/L); µS/cm = microSiemen per centimeter or micromho per centimeter (µmho/cm)

Yorba Linda Water District

Water Recycling Facilities Planning Study

Appendix B: Stakeholder Meetings Minutes



6808001

MALCOLM PIRNIE

Meeting Minutes
Yorba Linda Water District
Recycled Water Market Assurances – Yorba Linda Country Club

Project:	Yorba Linda Water District-Recycling Facilities Planning Study
Attendees:	Yorba Linda Water District: Derek Nguyen Yorba Linda Country Club: Tim Wren Malcolm Pirnie/ARCADIS: Bill Everest, Susanna Li
Meeting Date:	January 14, 2011
Location:	Yorba Linda Country Club 19400 E. Mountain View Ave. Yorba Linda, CA 92886

Introduction:
A meeting was held at the Yorba Linda Country Club (YLCC) on January 14, 2011 to introduce the alternatives and sub-alternatives being developed as a part of the Yorba Linda Water District-Recycling Facilities Planning Study with the Golf Course Superintendent for the Yorba Linda Golf Course. The meeting minutes from the discussion are included herein.

Meeting Minutes:

1. **Introduction**

The group introduced each other and discussed in general the purpose for the meeting

- Derek Nguyen from the District explained that the Board of Directors for the Yorba Linda Water District would like to develop a recycled water portfolio, which is currently lacking in the District program.

- Derek also explained that the District is obtaining State funding for this project and has just received approval for the draft report. He explained to Tim W. of the YLCC that part of the requirements in receiving the State funding is to hold a public meeting to inform and educate the residents and public about the project.

- Tim Wren gave a general description of the facility. He explained that the golf course has two wells; however, they have recently abandoned the older well (drilled in 1956). The second well (drilled in 1981) has been providing 250 gpm of water. The golf course is considering of putting in a new well to supplement the water demand.

- There is an uncovered water reservoir onsite to provide a steady water supply for irrigation. The golf course also has a temporary line with the District for emergency purposes.

- Tim mentioned that last year, YLCC paid about $150K for their well water. They also have to pay a replenishment fee.

2. Summary of Alternatives and Sub-Alternatives

The group discussed the alternatives and sub-alternatives identified in the Yorba Linda Water District-Recycling Facilities Draft Planning Study that had the potential to meet YLCC recycled non-potable water demands; mainly Alternative 2A.

- YLCC confirmed they are interested and open to using reclaimed water at their facility; but pointed out there might be challenges to receiving the support of residents in the area.

- Tim stated that the YLCC irrigation demands ranged only between 250 to 390 AFY, as opposed to the 703 AFY that was estimated in the draft study.

Project Action Items:

- ***Malcolm Pirnie/ARCADIS-US to revise study to reflect demands provided by YLCC.***

3. Retrofitting Requirements

The Group then discussed that one of the next steps for this project is to evaluate the potential retrofitting requirements for the facility.

- Bill Everest discussed there will be a need in change of operation once it's converted over to recycled water; mainly it needs to be irrigated at night, to avoid public contact with the recycled water. Tim mentioned that this might be limited by the 1,500 gpm pump station.

- Bill also explained that the District will include the costs for any necessary onsite infrastructure retrofitting into the overall project costs, to accommodate for the conversion. Bill asked Tim if there are any as-built drawings available that shows the irrigation piping and distribution system. Bill explained that in most cases that the golf course would just use the existing irrigation system for the recycled water; and then build a new potable water distribution line to where it is needed on the course.

Project Action Items:

- ***Yorba Linda Golf Club to obtain copies of as-built drawings and to send them to Malcolm Pirnie/ARCADIS-US.***

- ***Malcolm Pirnie/ARCADIS-US will increase the retrofit budget to accommodate for a new pump station and new distribution pipe***

4. Water Quality

The group also discussed the water quality of the recycled water and how it might impact the operation.

- Bill mentioned that the District will try to match the quality of the recycled water with the current water quality to minimize the impacts on the turf. Bill pointed out there will likely be nutrients in the recycled water that might help to cut down on the amount of fertilizer used.

Project Action Items:

- ***Yorba Linda Country Club to gather water quality data and send them to Malcolm Pirnie/ ARCADIS-US.***

5. Letter of Intent

The Group discussed the DRAFT Letter of Intent that would be requested of the Yorba Linda Golf Club. Tim said he will need to get approval before signing a document such as this.

Project Action Items:

- ***Yorba Linda Golf Club to review letter of intent with their board and provide any feedback regarding the draft.***

Meeting Minutes
Yorba Linda Water District
Recycled Water Market Assurances
Placentia/Yorba Linda Unified School District

Project:	Yorba Linda Water District-Recycling Facilities Planning Study
Attendees:	Yorba Linda Water District: Derek Nguyen Placentia-Yorba Linda Unified School District: Mike McAdam, Mike Bailey, Bob Cable, Doug, Malcolm Pirnie/ARCADIS: Katie Porter, Susanna Li
Meeting Date:	January 20, 2011
Location:	Placentia/Yorba Linda Unified School District 1301 E. Orangethorpe Ave. Placentia, CA 92886

Introduction:
A meeting was held at the Placentia/Yorba Linda Unified School District (PYL_USD) on January 20, 2011 to introduce the alternatives and sub-alternatives being developed as a part of the Yorba Linda Water District (YLWD)-Recycling Facilities Planning Study with the school district. The meeting minutes from the discussion are included herein.

Meeting Minutes:

1. **Introduction**

The group introduced each other and discussed in general the purpose for the meeting

- Bob Cable, the Director of Purchasing, gave an opening introduction and explained how the interest to convert to recycled water came about for the school district. Mike McAdam read a news article about the Ontario-Montclair School District (OMSD) switching over to recycled water for two of the schools. They saw the savings OMSD was getting from using reclaimed water and wanted to look into a similar project for the PYL_USD.

- Mike M. passed out the news article and related information he has gathered on the OMSD project to the attendees.

- Derek Nguyen explained that the Yorba Linda Water District Board of Directors would like to develop a recycled water portfolio, which is currently lacking in the District program.

- Derek explained that the project will not only provide cost savings to the customer but also provide a good environmental stewardship for the district such as helping to ease the potable water demand and saving the groundwater supply. Derek mentioned that the District is currently charging customers $2.52 per unit (100 cu ft or 748 gallons) of water.

- Derek also explained that the District is obtaining State funding for this project and has just received approval for the draft report. He explained to the school district that part of

the requirement in receiving State funding is to hold a public meeting to inform and educated the residents and public about the project.

2. Summary of Alternatives and Sub-Alternatives

The group discussed the alternatives and sub-alternatives identified in the Yorba Linda Water District-Recycling Facilities Draft Planning Study that had the potential to serve some of the schools; mainly Alternative 2.

- PYL_USD confirmed they are interested and open to using reclaimed water at their schools; but pointed out they need to get a better idea on the magnitude of the savings and the different type of funding/grants opportunities that can help to fund the project.

- PYL_USD noted that there are more schools than those currently identified in the draft study that are in the vicinity of the proposed project area. Mike M. provided a list of schools for the district with addresses.

Project Action Items:

- ***Malcolm Pirnie/ARCADIS-US along with the water district will review the list of schools and update the lists of applicable schools to the projects and revise the demand and project costs, if necessary.***

3. Retrofitting Requirements

The group then discussed that one of the next steps for this project is to evaluate the potential retrofitting requirements for the facility. There were discussions on who would be responsible and how to finance the onsite retrofits.

- Bob mentioned that financing could be through self funding by using the school's savings. Mike Bailey would also like to explore other funding options in case self funding isn't feasible.

- Mike B. explained that the school board is interested in "green" projects. However he cautioned that because the payback on the capital costs has been so slow (e.g. the solar panel project), that the board has held back on other CIPs.

- Mike B. also explained that there might be money coming into the City from redevelopment income but this will likely be 10 years out. The City's budget will be flat for the next five years. The City's bond money will be gone in 2 to 3 years. He asked if there is grant money for this type of project.

- Doug asked how the onsite retrofits are being done. Derek answered that the school district has an option of using their own contractors or most often times, the water district will include as part of the project to have contractors also perform the retrofits. The school district will then pay the water district for the portion of the costs that are pertaining to the onsite retrofit only.

- Doug asked if the project team has a good idea how much money the project will cost or what the cost savings will be. Katie Porter explained that while we have numbers from other projects, due to the economies of scale and the individual nature of each project, it's hard to give a good representative number at this point. It is important that the project

team get a good sense of the customer base to design the treatment facility to match the expected demand. This in turn will allow the team to develop better cost projections.

4. Water Quality

The group also discussed briefly the water quality of the recycled water and how it might impact the operation.

- Mike B. asked about the current public perception of the water quality of recycled water. Katie answered that while there are still some negative perceptions out there, it has gained more acceptance. Derek stressed that there has never been any issues/problems since the start of use of recycled water at any facility and the degree of treatment is very stringent to ensure public safety.

- Doug mentioned that the school district has artificial turf and the schools water them 10 minutes before the students go out to the field. He asks if that will be problem to handle that. The group discussed that for that case, the school might have to switch to use potable water.

5. Letter of Intent

The Group discussed the DRAFT Letter of Intent that would be requested of the PYL_USD.

- Mike B. mentioned that before the school district can sign off on the letter, they probably need to present to the Board what the savings will be and what type of funding will be available to support the project.

Project Action Items:

- ***The YLWD and the Malcolm Pirnie/ ARCADIS-US team will try to provide the school district the information they requested to present to the school board.***

- ***PYL_USD will review the letter of intent with their board and provide any feedback regarding the draft.***

Meeting Minutes
Yorba Linda Water District
Recycled Water Market Assurances – Black Gold Golf Club

Project:	Yorba Linda Water District-Recycling Facilities Planning Study
Attendees:	Yorba Linda Water District: Derek Nguyen Black Gold Golf Club: Scott Heyn, Bill Houlihan City of Yorba Linda: Bill Calkins, Brad Skeene Malcolm Pirnie/ARCADIS: Bill Everest, Katie Porter, Susanna Li
Meeting Date:	January 26, 2011
Location:	Black Gold Golf Club 1 Black Gold Dr. Yorba Linda, CA 92886

Introduction:
A meeting was held at the Black Gold Golf Club (BGGC) on January 26, 2011 to introduce the alternatives and sub-alternatives being developed as a part of the Yorba Linda Water District-Recycling Facilities Planning Study with the City of Yorba Linda and the BGGC. The meeting minutes from the discussion are included herein.

Meeting Minutes:

1. **Introduction**

The group introduced each other and discussed in general the purpose for the meeting

- Derek Nguyen gave an overview of the project and explained that the Board of Directors for the Yorba Linda Water District would like to develop a recycled water portfolio, which is currently lacking in the District program.

- Derek also explained that the District is obtaining State funding for this study and has just received approval for the draft report. Part of the requirement for the state grant is to determine the customer base for this project. He explained that the District is currently talking to potential large users and later on will try to include the smaller users.

- Bill Calkins asked if potential sites have been identified for the treatment plant and also asked which area it would serve. He also asked how the project is being paid for.

- Derek explained the two potential site locations and that the project will serve the City of Yorba Linda as well as parts of Placentia and Anaheim. He also explained that the costs to put in infrastructure up to the meter will be the District's responsibility and anything onsite will be from end-users.

- Bill C. voiced concerns about the public acceptance for this type of project.

- Bill Everest explained that the City of Anaheim is doing a similar type project and public acceptance has come a long way.

2. Summary of Alternatives and Sub-Alternatives

The group discussed the alternatives and sub-alternatives identified in the Yorba Linda Water District-Recycling Facilities Draft Planning Study that had the potential to meet BGGC recycled non-potable water demands; mainly Alternative 2B.

- Katie Porter went over the handouts and provided descriptions of the different alternatives.
- Bill Houlihan noted that the demand data shown in the draft study seems to correlate with the golf club irrigation demand. Currently, the golf club uses untreated Metropolitan water. There is a holding pond up on the hill.
- Scott Heyn mentioned that the BGCC is undergoing a major renovation of the golf turf, replacing it with a sturdier type turf which requires less water demand.
- Bill H. explained that due to the clay soil on the golf course, water tends to pond and therefore irrigation has to be done throughout the day to minimize standing water on the golf course. This would become an issue with recycled water since most of irrigation will have to be done at night, to minimize public contact.
- This raised a concern with Bill C. as he explained that BGGC is watched closely and is highly sensitive. He stressed that whatever is being done to the golf course has to be done correctly and assure the highest of quality.
- Bill C. asked what level of cost saving the City can expect from the project. Susanna Li replied that it is normal to see about 10 to 20% of discounted rate based on the experience of other water districts.
- Scott pointed out that the cost savings would not be as high for BGCC as they are currently paying for untreated water.

3. Water Quality

The group also discussed the water quality of the recycled water and how it might impact the operation.

- Scott mentioned he is mostly concerned with what the recycled water would do to the greens on the course as the grass is highly sensitive. He is worried about the salt content in the recycled water.
- Bill E. mentioned that the District will have to match the quality of the recycled water with the current water quality to minimize the impacts on the turf. Bill noted that there will likely be nutrients in the recycled water that might help to cut down on the amount of fertilizer used.
- Bill H. mentioned that the added nutrients might not necessary be a good thing and will need to see the balance of all the constituents.

- Bill C. voiced his concerns on the impact to the golf course and would like to get a list of golf courses in the area that use reclaimed water.

Project Action Items:

- ***Malcolm Pirnie/ARCADIS will put together a list of golf courses and provide to the City for review.***

4. Retrofitting Requirements

The group then discussed that one of the next steps for this project is to evaluate the potential retrofitting requirements for the facility.

- Derek explained that in most cases that the golf course would just use the existing irrigation system for the recycled water; and then build a new potable water distribution line to where it is needed on the course.

- Bill H. mentioned that retrofits should not be a big concern, and would have to color any exposed equipment purple.

- The design team mentioned that the project will bring consistent water quality and reliable water supply to the golf course unlike the current water service.

- Bill H. mentioned that the water service only gets interrupted if Metropolitan shuts down the plant completely; otherwise the interruption is minimal as BGGC receives the water before it is sent to the treatment plant.

5. Letter of Interest

The Group discussed the draft Letter of Interest that would be requested of the Black Gold Golf Club.

.

- Bill C. mentioned that due diligence for this project is paramount to ensure the golf club will be able to provide the same quality of service to the members of the golf club.

- Bill C. also mentioned that he would not be the person to sign such a letter of interest and the District will need to contact the City Manager to be involved, as he will be the responsible party to sign such a letter. Derek said he and his office will contact the City manager for a separate meeting.

- BGGC confirmed they are cautiously interested and open to using reclaimed water at their facility; but noted there needs to be economic incentives for it to even be considered.

- Bill E. mentioned that a package can be put together that lists the last 20 to 30 years of experiences from golf courses that have been converted to reclaimed water.

Project Action Items:

- ***YLWD to contact City of Yorba Linda City Manager to set up meeting to discuss the project and the letter of interest.***

- ***Malcolm Pirnie/ARCADIS will put together a package along with the list of golf courses and their respective experiences on the use of reclaimed water.***

MINUTES OF THE
YORBA LINDA WATER DISTRICT
BOARD OF DIRECTORS REGULAR MEETING
May 12, 2011

---

1. **CALL TO ORDER**

The May 12, 2011 regular meeting of the Yorba Linda Water District Board of Directors was called to order by President Beverage at 6:30 p.m. The meeting was held at the District's Administrative Office at 1717 E Miraloma Ave, Placentia CA 92870.

2. **PLEDGE OF ALLEGIANCE**

3. **ROLL CALL**

DIRECTORS PRESENT
Michael J. Beverage, President
Ric Collett
Robert R. Kiley
Gary T. Melton

STAFF PRESENT
Ken Vecchiarelli, General Manager
Lee Cory, Operations Manager
Steve Conklin, Engineering Manager
Stephen Parker, Finance Manager
Damon Micalizzi, Public Info Officer
Anthony Manzano, Sr Project Manager
Derek Nguyen, Water Quality Engineer
Annie Alexander, Executive Secretary

DIRECTORS ABSENT
Phil Hawkins, Vice President

OTHER VISITORS
Brett Barbre, Director, Municipal Water District of Orange County
Dan Payne, Partner, Kidman, Behrens & Tague
Michael Hurley, Principal Water Resources Manager, Malcolm Pirnie, Inc.
Mark Schock, Resident

4. **ADDITIONS/DELETIONS TO THE AGENDA**

None.

5. **PUBLIC COMMENTS**

Director Barbre provided the Board with an overview of the current water supply situation and reported that MWD would be selling surplus water at the replenishment rate through MWDOC. OCWD has stated their interest and intent to purchase some of the 118,000 acre feet of water available through the end of the calendar year. Director Barbre then responded to questions from the Board regarding the proposed merger of MWDOC and OCWD.

6. PUBLIC HEARING

6.1. Public Hearing for the 2010 Update of the Urban Water Management Plan

6.2. (Item Nos. 6.2.A. and 6.2.B were taken out of order.)

B. Secretary Provides Proof of Public Hearing Notification, Correspondence and/or Petitions
Mr. Vecchiarelli reported that a notice regarding the public hearing had been published in the OC Register on April 28, 2011 and May 5, 2011.

A. President Opens Public Hearing
President Beverage opened the public hearing at 6:37 p.m.

C. Testimony Beginning with Report by Engineering Manager
Mr. Conklin introduced Michael Hurley who provided the Board with a PowerPoint presentation regarding the update of the District's Urban Water Management Plan performed by Malcolm Pirnie. This included an overview of the major elements of the plan, new requirements and associated recommendations. Mr. Hurley then responded to questions from the Board regarding the projected 6.4% demand increase and 20% by 2020 statewide reduction.

President Beverage reported that the plan had been reviewed by the Planning-Engineering-Operations Committee in great detail. Mr. Conklin stated that staff concurred with Malcolm Pirnie's findings and recommendations.

D. Testimony from Public
President Beverage opened the meeting for public testimony at 6:57 p.m. No members of the public in attendance addressed the Board at this time.

E. President Closes Public Hearing
President Beverage closed the public hearing at 6:58 p.m.

F. Discussion
No further discussion took place.

On a motion by Director Collett, seconded by Director Melton, the Board voted 4-0 on a Roll Call to adopt Resolution No. 11-07 for the 2010 Update of the Urban Water Management Plan, and direct staff to submit a final draft copy to the Department of Water Resources and other agencies by June 12, 2011.

Mr. Hurley left the meeting at this time.

7. **CONSENT CALENDAR**

On a motion by Director Kiley, seconded by Director Collett, the Board voted 4-0 to approve the Consent Calendar.

7.1. Minutes of the Board of Directors Special Meeting Held April 20, 2011

Recommendation: That the Board of Directors approve the minutes as presented.

7.2. Minutes of the Board of Directors Regular Meeting Held April 27, 2011

Recommendation: That the Board of Directors approve the minutes as presented.

7.3. Payments of Bills, Refunds, and Wire Transfers

Recommendation: That the Board of Directors ratify and authorize disbursements in the amount of $1,039,894.07.

7.4. Progress Payment No. 1 for Construction of Water Quality Mixer for Hidden Hills Reservoir

Recommendation: That the Board of Directors approve Progress Payment No. 1 in the net amount of $32,512.50 to Process Solutions, Inc. for the installation of a Tank Shark Water Management System at the Hidden Hills Reservoir, Job No. 2010-25.

7.5. Progress Payment No. 2 for Construction of the Emergency Pumpout Facilities and Anaheim Interconnection Project

Recommendation: That the Board of Directors approve Progress Payment No. 2 in the net amount of $149,319.00 to GCI Construction, Inc. for construction of the Emergency Pumpout Facilities and Anaheim Interconnection Project, Job Nos. 200903 & 200906.

7.6. Final Progress Payment for Construction of the Vista Del Verde Valve Replacement Project Phases II & III

Recommendation: That the Board of Directors approve the Final Progress Payment in the net amount of $130,176.56 to Stephen Doreck Equipment Rentals, Inc. for construction of the Vista Del Verde Valve Replacement Project Phases II & III, Job No. 200908.

7.7. Construction Contract for 2010 Waterline Replacement Project Phase I – Plumosa Drive

Recommendation: That the Board of Directors award the Contract for Construction of the 2010 Waterline Replacement Project Phase 1 – Plumosa Drive for $568,000 to Kana Pipeline, Inc.

7.8. Material Testing Services for the Ohio Street/Oriente Drive and Plumosa Drive Pipeline Projects

Recommendation: That the Board of Directors authorize execution of a Professional Services Agreement with Leighton Consulting, Inc. for a fee not to exceed $43,798, to provide material testing services for the Ohio/Oriente Street and Plumosa Street Pipeline Projects.

7.9. Draft 2011 Water Quality Report

Recommendation: That the Board of Directors approve the 2011 Water Quality Report and authorize staff to print and distribute copies of this report to each customer receiving the District's water.

7.10. Financial Statements for the Period Ending March 2011

Recommendation: That the Board of Directors receive and file the Financial Statements for the Period Ending March 2011.

7.11 Investment Report for the Period Ending March 31, 2011

Recommendation: That the Board of Directors receive and file the Investment Report for the Period Ending March 31, 2011.

8. ACTION CALENDAR

8.1. Adopting a Public Investment Policy

Mr. Parker explained that the California Government Code required every legislative body of a local agency to review its investment policy on an annual basis. As such, staff reviewed the policy and has recommended no changes. The Finance-Accounting Committee also reviewed the policy and suggested that even though there were no revisions, it still be presented to the Board for readoption.

On a motion by Director Collett, seconded by Director Kiley, the Board voted 4-0 on a Roll Call to adopt Resolution No. 11-08 Setting Forth a Public Funds Investment Policy and rescinding Resolution No. 10-03.

Director Barbre left the meeting at this time.

9. DISCUSSION ITEMS

9.1. Water Recycling Facilities Planning Study Draft Report
Mr. Conklin explained that the study was being half funded by the State Water Resources Control Board who is requiring that the draft report be presented in a meeting for public comment. Mr. Conklin then introduced Derek Nguyen who provided the Board with a PowerPoint presentation regarding the preliminary results of the study including the project background, potential sites for a treatment facility, and project alternatives with estimated costs. Mr. Nguyen concluded his report and stated that staff did not have a recommendation at this time.

Director Collett commented that the draft report had been reviewed by the Planning-Engineering-Operations Committee but that the costs of the various alternatives were quite expensive. Director Beverage suggested that the Yorba Linda Lakebed be removed from the report as a possible project location for political reasons. Mr. Vecchiarelli responded that the proposed site location near the lake bed was actually downstream and south of the dam and was slated for future development. Mr. Vecchiarelli and Mr. Conklin then responded to questions from the Board regarding the status of a water recycling project in Anaheim and staff's plans for the results of the study.

No members of the public in attendance addressed the Board regarding this report.

10. REPORTS, INFORMATION ITEMS AND COMMENTS

10.1. President's Report
President Beverage asked if any of the Directors were registered for the OC Water Summit. Directors Hawkins, Kiley and Melton all plan to attend this event.

10.2. Directors' Reports
Director Collett reported that he would not be available to attend meetings May 18-21 and June 23-25, 2011.

- MWDOC Board and Member Agency Elected Officials' Forum – April 28, 2011 (Beverage/Melton)
  Directors Beverage and Melton both reported on their attendance at this event. Director Beverage commented on his observations of the various MWDOC representatives. Director Melton stated that he was grateful that the District had Director Barbre as its MWDOC representative and that he thought Director Beverage's comments during the forum were excellent.

Messrs. Manzano and Nguyen left the meeting at this time.

10.3. General Manager's Report

- SDLGI Advanced Studies Seminar – April 28-29, 2011
  Mr. Vecchiarelli reported on his attendance at the seminar and commented on one of the speakers' presentations regarding focusing on benefiting customers of local agencies through the use of strategic planning.

10.4. General Counsel's Report
Mr. Payne stated that he was attending the meeting in place of Art Kidman and that he had nothing to report.

10.5. Future Agenda Items and Staff Tasks
None.

11. COMMITTEE REPORTS

11.1. Executive-Administrative-Organizational Committee
(Beverage/Hawkins)

Meeting scheduled May 18, 2011 at 4:00 p.m.

11.2. Finance-Accounting Committee
(Collett/Kiley)

Minutes of the meeting held May 9, 2011 were provided at the meeting. Directors Collett and Kiley attended. Matters discussed during the meeting were as follows: Independent Audit Services Contract; March 2011 Budget to Actual Results; Investment Report Through March 31, 2011; Draft Budget Overview, Draft Reserve Policy; FY 2011/12 Budget Calendar Update; and March 2011 Debt Service Ratio.

Meeting scheduled June 13, 2011 at 4:00 p.m.

11.3. Personnel-Risk Management Committee
(Kiley/Beverage)

Minutes of the meeting held May 10, 2011 were provided at the meeting. Directors Kiley and Beverage attended. Matters discussed during the meeting were as follows: Claim Filed by Schuler Engineering Corporation; Status of Recruitments and Authorized/Budgeted Positions; and Status of Human Resources and Risk Management Activities.

Meeting scheduled June 14, 2011 at 4:00 p.m.

11.4. Planning-Engineering-Operations Committee
(Melton/Collett)

Minutes of the meeting held May 5, 2011 were provided in the agenda packet. Directors Melton and Collett attended. Matters discussed during the meeting were as follows: Construction Contract for 2010 Waterline Replacement Project Phase I – Plumosa Dr.; Material Testing Services for the Ohio Street/Oriente Drive and Plumose Drive Pipeline Tests; Water Recycling Facilities Planning Study Draft Report; 2010 Update of the Urban Water Management Plan; Review of Operations-Sewer Section Budget for FY 2011/12 p Monthly Groundwater Production and Purchased Import Water Report; Monthly Preventative Maintenance Program Report; Groundwater Producers Meeting Report; and Status Report on Capital Projects in Progress.

Director Melton suggested that it might be helpful for the entire Board to receive copies of the status report on capital projects.

Meeting scheduled June 2, 2011 at 4:00 p.m.

11.5. Public Affairs-Communications-Technology Committee
(Hawkins/Melton)

Meeting scheduled May 23, 2011 at 4:00 p.m.

11.6. MWDOC/OCWD Ad Hoc Committee
(Beverage/Hawkins)

Meeting scheduled May 24, 2011 at 4:00 p.m.

11.7. Citizens Advisory Committee
(Beverage)

Meeting scheduled May 23, 2011 at 8:30 a.m.

12. INTERGOVERNMENTAL MEETINGS

12.1. YL Planning Commission – April 27, 2011 (Collett)
Director Collett attended and commented on an application for a second story addition which was discussed during the meeting.

(Item No. 12.6. was taken out of order.)

12.6. YL Planning Commission – May 11, 2011 (Collett)
Director Collett attended and reported that two applications for second story additions and a CEQA document were discussed during the meeting.

12.2. YL City Council – May 3, 2011 (Melton)
Director Melton attended and mentioned a dispute regarding comments made by a Councilmember which was discussed during the meeting. Director Melton reported that he also attended the Yorba Linda Community Faire which went very well. He then commended two staff members who helped provide water for the event. Director Beverage stated that a letter of appreciation had been sent to each of the employees thanking them for their efforts.

12.3. MWDOC/MWD Workshop – May 4, 2011 (Melton)
Director Melton attended and commented on the need for a long term plan for the Delta, snow pack and rainfall totals in California and Colorado, and proposed legislation which were discussed during the meeting.

12.4. OCWD Board – May 4, 2011 (Kiley)
Director Kiley attended and commented on the proposed consolidation of MWDOC and OCWD which was discussed during the meeting.

12.5. WACO – May 6, 2011 (Kiley/Melton)
Directors Kiley and Melton attended and commented on a presentation by a group called CA Forward which was provided at the meeting.

13. BOARD OF DIRECTORS ACTIVITY CALENDAR

13.1. Meetings from May 13, 2011 – June 30, 2011
The Board reviewed the listed meetings and made no changes.

14. CONFERENCES AND SEMINARS

14.1. SDLGI Administration Seminar – June 9-11, 2011

No Directors expressed interest in attending this seminar.

Director Collett stated that he would not be able to attend the Board of Directors meeting on June 23, 2011 due to a previous engagement.

15. ADJOURNMENT

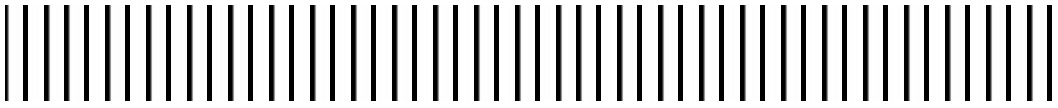
15.1. The meeting was adjourned at 7:55 p.m. The next regular meeting of the Board of Directors will be held May 26, 2011 at 8:30 a.m.

Kenneth R. Vecchiarelli
Board Secretary

Yorba Linda Water District

Water Recycling Facilities Planning Study

Appendix C: Sample Letter of Intent



6808001

MALCOLM PIRNIE

DRAFT

_____, 2011

Potential Customer___
_____
_____

Attention: Mr. _____, Manager of Operations

Subject: Water Recycling Planning and Feasibility Study
Intent for Use of Non-Potable Water

Gentlemen:

_____has held discussions with the staff of the Yorba Linda Water District (the District) on the potential use of non-potable water on some of our sites. As a result of these meetings and a review of the Yorba Linda County Water District's engineering reports, we find that it would be beneficial for us to utilize non-potable water.

This letter is to indicate our intent to enter into an agreement for the purchase of non-potable water and to clarify and define the quantity, quality, reliability, scheduling, delivery and other conditions of service expected from the Yorba Linda Water District, and to present our understanding of other local agency requirements for use of non-potable water.

Quantity

We presently anticipate the requirement of _____ acre-feet per year (AFY) of non-potable water at the following sites:

1. _____- _____AFY

2._____ - _____AFY

3. _____ - _____AFY

4. _____ - _____AFY

5. _____ - _____AFY

Quality

We understand that the Project non-potable water would come from one water source, recycled wastewater, and that the water quality from the recycled wastewater will comply with the applicable standards for the proposed uses of the Orange County Health Department and the Regional Water Quality Control Board (San Diego Region). Based upon your discussions to date with the State of California Department of Health Services, we understand that the proposed non-potable water will conform to the California Administrative Code, Title 22, Division 4, Chapter 3, Article 4, Paragraph 60313(b). The non-potable water will be supplied by facilities to be constructed as described in the facilities plan dated _____by Malcolm Pirnie/Arcadis-US., Inc.

Reliability

We understand non-potable water will be supplied on a potentially interruptible basis, based upon availability from the individual source. We understand that, depending upon State Health Department approval, Yorba Linda Water District is making provisions for backup delivery of potable water through the non-potable water system, which will increase reliability of the system.

Scheduling of Delivery

We understand that the non-potable water system is scheduled to be operational by _____ _____. It is our intention to connect to the system in _____.

Price

Based upon our discussions to date, we understand that Yorba Linda Water District will adopt a pricing structure for non-potable water at a rate not to exceed percent maximum of the equivalent potable water rate.

Delivery

Based on our discussions, it is our understanding that a mutually acceptable point of delivery of non-potable water to our sites will be established.

Retrofitting Facilities

We believe that the following retrofitting items will be required in order to have delivery of non-potable water:

1. ¾" meter -_____ each
2. Backflow prevention device - _____each
3. Pipeline - _____each

The estimated cost of this work is $_____ and we plan to fund this cost from the following source:

_____

It is understood that this letter of intent does not constitute a final commitment to purchase non-potable water until such time as a definitive agreement upon mutually acceptable terms and conditions is executed between ourselves and the Yorba Linda Water District.

Please notify us if any of the terms or conditions described herein is changed.

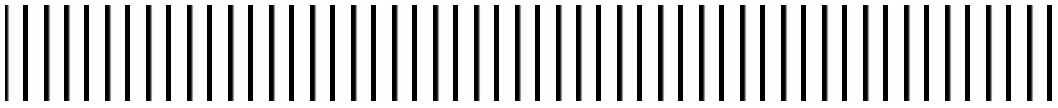
Very truly yours,

Potential Customer

Yorba Linda Water District

Water Recycling Facilities Planning Study

Appendix D: Operator Certification



6808001

MALCOLM PIRNIE

California Environmental Protection Agency
State Water Resources Control Board

Wastewater Operator Certification Information

Cal/EPA

September 2001

What is Operator Certification?

To ensure that wastewater treatment plants in California are properly operated and maintained, the Legislature established the Wastewater Treatment Plant Classification and Operator Certification Program. This law requires every person employed in the operation of a public wastewater treatment plant to have a valid operator certificate. In addition, private plants that are regulated by the Public Utilities Commission (PUC) must have certified operators. The certification level or grade necessary for a specific job is determined by wastewater treatment plant classification criteria. The Office of Operator Certification (OOC) in the Division of Clean Water Programs of the SWRCB is responsible for testing applicants and issuing certifications. The Division also establishes the classification of each wastewater treatment plant.

There are five levels of operator certification. To receive a certificate, a person must meet the minimum experience and education requirements and pass a written test. Any person may take a test by submitting an application form with the appropriate fees and verification of the educational requirements. Complete applications must be postmarked by the published final filing date. These dates are listed on Page 2, Question 6 of this booklet. A person then has time after passing the test to document the experience requirement before receiving their certificate. The amount of experience needed depends on the grade level of the certificate. However, the examination results are valid for four years.

The law establishing the Certificate Program is found in Sections 13625-13633, Chapter 9, Division 7, of the Water Code. Regulations, which implement this law, are found in Sections 3670-3719.19, Chapter 26, Title 23, California Code of Regulations. Copies of the law and regulations can be requested from the OOC.

How to Reach Us

Office of Operator Certification
Division of Clean Water Programs
State Water Resources Control Board
PO Box 944212
Sacramento, CA 94244-2120
www.swrcb.ca.gov/cwphome/opcert
(916) 341-5819

Most frequently asked questions (and answers)

1. How can I get certified?

There are three major things that you must do to get certified. **Number 1** - You must take courses in wastewater treatment plant operations. The number and difficulty depend on the certificate grade you want. **Number 2 –** You must pass a written test. Wastewater treatment plant operator certification tests are given twice each year, once in early April and once in early October. Tests for all five grades are given at the same time at several locations throughout the state. To take a test, you must show that you meet the minimum educational requirements and submit a fee and application. **Number 3 –** You must meet experience requirements and submit a fee and an application for a certificate. Your experience must be in the operation of a wastewater treatment plant with a valid operator certificate or operator-in training certificate. You may submit your application for a certificate up to four years after you pass the written exam.

2. How can I get a job as a wastewater treatment plant operator?
To work in a public wastewater treatment plant or a private wastewater treatment plant regulated by the PUC, you **must** have a valid wastewater treatment plant operator certificate or an operator-in-training certificate. See Question 1 for details. **If you have no experience as an operator, you must get an Operator-in-Training Certificate.** See Question 4 on how to do that. The owners of the plant do the hiring of operators, usually a city, county or special district. You need to contact them to see if there are any jobs available. Other potential sources of job listings are local newspapers and local section of the California Water Environment Association.

3. What is the Office of Operator Certification (OOC)?
The OOC administers the Wastewater Treatment Plant Operator Certification Program to provide certificates for operators. The OOC conducts the tests required by the regulations, including developing the test questions, processing applications, printing and mailing the certificates, mailing out renewal notices, and processing renewal applications. Along with these major duties, OOC does other work including answering questions, updating regulations, investigating violations of the law and regulations by certified operators, and classifying wastewater treatment plants.

4. How much supervision does an OIT need?
The regulations require that an operator-in training (OIT) be under the direct supervision of an operator with a certificate of equal or higher grade. Direct supervision means the oversight and inspection of the OIT's work by the supervisor without an intervening person. An OIT cannot work as the only operator at a plant during swing, late night or weekend shifts. The OIT must have ready access to the supervising operator, so that if the OIT has any doubt about what to do they can ask. On the other hand, the supervising operator need not be the shift supervisor. The regulations only require a certified operator of equal or higher grade. Common sense indicates a well-experienced operator would be the best mentor for an OIT.

5. Where can I get wastewater treatment plant operator training?
Many State University campuses and Community Colleges offer training. There are also nonprofit organizations and for-profit organizations that also offer training. Please be aware that the law only allows us to recognize training given by colleges and universities and by professional associations or other nonprofit private or public agencies as meeting the educational requirements for certification.

6. When are applications due for examinations?
Our regulations list the examination application final filing dates. They are February 1 for tests given in April and August 1 for tests given in October. Your complete application package, including fee, must be postmarked no later than the final filing date. Our regulations allow for no exceptions. On the other hand, you may submit your application as early as you like.

7. Do you need a certificate to work at a plant?
The law requires you to have a certificate to work as an operator at a publicly owned wastewater treatment plant or a privately owned plant regulated by the PUC. You do not need a certificate to work as something other than an operator at a wastewater treatment plant, (e.g., a laboratory technician). You do not need a certificate to work as an operator at a privately owned plant not regulated by the PUC. An example is an industrial wastewater treatment plant owned by a private industry.

8. When is the next test?
Tests are given in April and October each year. Tests for all grades are given each time. The following dates have been set:

October 6, 2001	April 6, 2002
October 5, 2002	April 5, 2003
October 4, 2003	

Examinations begin at 9:00 a.m. on the scheduled date. Examinees must show the notice card and photo identification. No books, notes, or references are allowed at the examination site. Hand calculators may be used. Alphanumeric and programmable calculators are not allowed.

9. How long are certificates valid?
Certificates must be renewed every two years. OOC will send you a renewal notice. You must submit an application for renewal and a fee. It must be postmarked before the expiration date. You will receive a new certificate about 30 days later. Renewal is very important. It is illegal to work as an operator with an expired certificate. If you move, please give us your new address so you will receive a renewal notice. Whether or not you receive a renewal notice, **it is your responsibility to submit your application for renewal before the expiration date.** You do not have to take the examination again.

Remember – there is **no** grace period for an expired certificate. Once it expires, it is no longer valid and you cannot work as an operator.

10. What is the difference between drinking water and wastewater treatment plant operator certification?
Drinking water operator certification is separate from wastewater operator certification. Drinking water treatment plant operator certification is required to work as an operator in a treatment plant that produces water for human consumption in homes and businesses. Wastewater treatment plant operator certification is required to work as an operator

in a treatment plant that receives and treats wastewater from homes and businesses. The Department of Health Services administers the water treatment plant operator certification program. They take applications, give tests and issue certificates on applicants who meet their requirements. The drinking water treatment plant operator certification program may be reached at:

Department of Health Services
Office of Drinking Water
Certification Unit
P.O. Box 942732
Sacramento, CA 94234-7320
(916) 327-1140

Roles and responsibilities of certified operators

When you become a certified operator, you take on certain responsibilities of a profession. As a certified operator, you must use reasonable care and judgement in the operation of your plant. You must not commit fraud or deception in the operation of your plant. You must not allow uncertified operators or operators without the proper grade of certificate to operate your plant. You must not willfully or negligently violate, or cause or allow the violation, of your plant's waste discharge requirements issued by the Regional Water Quality Control Board.

There are five grades of certification. Grade I is the easiest to obtain, requiring the least difficult examination. Each succeeding grade requires more education, experience and knowledge regarding treatment processes up to and including that level; therefore, each higher grade has an increasingly more difficult examination.

Likewise, the responsibility and the role an operator takes changes with each grade. The largest and most complex plants are required to have a Chief Plant Operator with at least a Grade V certificate, shift supervisors a minimum of Grade III certificate and at least half of the operators must have a Grade II certificate or higher. On the other hand, a small plant that consists of a pond needs operators with only a Grade I certificate.

Operators holding OIT certificates have the same general responsibilities as operators with regular certificates. However, an OIT may not be a Chief Plant Operator. Additionally, a certified operator at the same or higher grade must directly supervise OITs.

For more information on roles and responsibilities of Chief Plant Operators and OITs, please see the next two sections.

Chief plant operators

The Chief Plant Operator has a unique position among certified operators. Not only does the Chief Plant Operator have management and supervisory responsibilities at the plant, but also additional responsibilities regarding operator certification.

The job of Chief Plant Operator is defined by regulation (Section 3671(h), Title 23, California code of Regulations) as "a supervisor who is certified as an operator and who is responsible as an operator and who is responsible for the overall operation of a wastewater treatment plant." This places responsibility for the overall operation of a plant and the achievement of the goals of the certification program on the Chief Plant Operator. Because of the importance of this job, the regulations require that agencies keep the OOC informed of who is their Chief Plant Operator. If an operator is employed at a wastewater treatment plant, the Chief Plant Operator must sign applications for examination and for certificates. The Chief Plant Operator must also sign all applications for OIT certificates. In signing these applications, the Chief Plant Operator is verifying that the information about present employment is true and correct.

$ $ $ $ $ $ $ $ $ $ $ $

OPERATOR AND OPERATOR-IN-TRAINING FEES

Grade	Examination[1]	Certificate[2]	Renewal[3]
I	$ 50	50	50
II	60	70	70
III	115	90	90
IV	145	100	100
V	145	100	100

1. This fee includes both application and examination.
2. The fees for an OIT certificate are the same as an operator certificate.
3. The fees for renewal of an OIT certificate are the same as an operator certificate.

Operators-in-Training

It is illegal to operate a public, or private wastewater treatment plant regulated by the PUC, without a valid certificate. If it takes experience to get a certificate, how can someone without a certificate get experience? The answer is the operator-in training (OIT) certificate. The OIT certificate is a valid **temporary** certificate that allows someone to get experience as an operator.

The regulations define OIT as "any person who operates a wastewater treatment plant under the direct supervision of a certified operator while gaining experience to qualify for an operator certificate."

An OIT can hold any job at a plant for which they are qualified, except as Chief Plant Operator. OITs must be directly supervised by a certified operator at the same grade as the OIT or higher. The OIT has the same responsibilities under the operator certification regulations as a certified operator.

OIT certificates are issued at Grades I through V. You may apply for a Grade I OIT without having passed the test or meeting the education requirements for a Grade I certificate. You need only have a job as a plant operator. OIT certificates are valid for two years. You must gain the required education and pass a wastewater exam during these two years. At the end of the two-year period, if you have passed a wastewater exam, but do not yet have sufficient experience for a regular certificate, your OIT may be renewed once for two more years. However, if you do not pass the examination within the two years, your OIT certificate will not be renewed.

If you apply for an OIT certificate at Grades II through V, you must have passed the test for the grade, met the education requirements and be able to meet the experience requirements within four years after you passed the test. Grades II through V OIT certificates are valid for two years and may be renewed once for up to two more years. However, you still only have four years after you pass the test to get the required experience for that grade.

Applications for OIT certificates must be signed by the Chief Plant Operator. OIT certificates are issued for a specific job at a specific treatment plant. If you change jobs while an OIT, you need to apply for a new certificate.

"Reciprocity"

The word describes an agreement between two parties. With the certification program, it means that California's operator certification program is recognized by another state as being equivalent to theirs and that California recognizes that state's program as equivalent to ours. It does **not** mean that you may work in California under a certificate issued by another state. You still need a valid California operator's certificate. However, what is does mean is that you may qualify for a California certificate without having to pass the test, and may use experience gained while holding another state's certificate.

California has reciprocity with all states except Florida and Michigan. We do have limitations on reciprocity with other states:

1. Only Grade I and II operator certificates may be granted through reciprocity.

2. For a state to have reciprocity with California, its experience and education requirements must be comparable to California's and it must grant reciprocal privileges to California certificate holders.

3. You must have passed a written test comparable to California's at the appropriate level within the last four years.

To get a Grade I or II certificate through reciprocity, you must complete an application and submit it along with the appropriate fee to the OOC.

Plant Classifications

The Water Code gives the OOC responsibility for classifying all publicly owned wastewater treatment plants and private plants regulated by the PUC. Agencies may not "class" their own plants nor can the Regional Boards assign the designations.

The OOC asks that the CPO complete a "Wastewater Treatment Plant Class Data Form". Copies of the form may be requested by contacting the OOC. That form along with an organization chart, flow diagram of the plant, job descriptions for all personnel classifications and duty rosters must be submitted to the OOC. Once the OOC reviews the information, the CPO will be sent a letter indicating the classification and appropriate operator grades. However, the OOC does not specify how many operators must be employed at each grade.

Class	Process	Design Flow (MGD)
I	Pond	All
	Primary	1.0 or less
II	Primary	>1.0 through 5.0
	Biofiltration	1.0 or <
	Extended Aeration	All
III	Primary	>5.0 through 20.0
	Biofiltration	>1.0 through 10.0
	Activated Sludge	5.0 or <
	Tertiary	1.0 or <
IV	Primary	>20.0
	Biofiltration	>10.0 through 30.0
	Activated Sludge	>5.0 through 20.0
	Tertiary	>1.0 through 10.0

V	Biofiltration	>30.0
	Activated Sludge	>20.0
	Tertiary	>10.0

Reporting Requirements

Agencies must report the following to the OOC within 30 calendar days of occurrence:

1. A plant begins operation or changes the design flow or treatment process

2. The person designated as CPO changes

3. Final disciplinary action is taken which results in suspension, demotion or discharge of a certified operator or OIT if the disciplinary action is the result of the commission of any of the acts which are grounds for discipline in Section 3710, Title 23, of the California Code of Regulations.

Contract Operators

Effective August 27, 1994, any person or firm that contracts to operate a public or private wastewater treatment plant must be registered with the OOC. In addition, all operators employed by a contract operator must be certified by the OOC. If you currently operate a public or private treatment plant regulated by PUC, under contract and are not registered, you are in violation of Section 3719, Title 23, California Code of Regulations. You should register immediately. If you plan to operate a public or private treatment plant regulated by PUC under contract in the near future, you must be registered before you start operations.

Registration is done by submitting an application and fee to the OOC. Applications and instructions can be obtained by calling OOC. OOC has 30 days after receipt of an application to either issue a registration or tell the applicant why their application is deficient. Registration must be renewed annually. The renewal application must be postmarked no later than 30 days prior to the registration expiration date.

The responsibilities of a contract operator under the contract operator regulations are similar to those of a certified operator

Experience counts . . .

Applicants may be credited with one year of experience if they have had **two or more years of full-time experience in the operation of a water treatment plant** regulated by the California Department of Health Services or by a governmental agency in another state. To receive this credit, applicants must meet the following criteria:

1. Experience was obtained while in possession of a valid water treatment plant operator certificate,

2. The water treatment plant where the experience was gained uses two or more of the following processes: coagulation, sedimentation, aeration, filtration, oxidation, or disinfection, and

3. At the time of the application for wastewater certification, the applicant has had one year of experience in the operation of a wastewater treatment plant.

Educational Opportunities

University of California and State Universities

1. All universities offer bachelor of science degrees in engineering or scientific disciplines applicable to wastewater treatment plant operations.

2. The University of California Extension frequently offers courses related to wastewater treatment plant operation. For instance, U.C. Davis Extension offers courses leading to a certificate in environmental hazard management. U.C. Davis Extension may be contacted at (800) 752-0881 or (916) 757-8777. There are extension offices at other campuses.

3. Some State Universities offer evening courses related to wastewater treatment plant operations.

4. California State University, Sacramento, through its Office of Water Programs, offers home study courses in wastewater treatment plant operations and related areas. Contact them at (916) 278-6142 or www.owp.csu.edu for more information.

Community Colleges

Many Community Colleges offer daytime and evening classes. Examples of some colleges are:

College of the Sequoias	(559) 730-3777
Columbia	(209) 588-5100
Citrus	(626) 914-8821
Hartnell	(831) 755-6875
Imperial Valley	(760) 355-6290
L.A. Trade	(213) 744-9087
Mesa	(619) 627-2803
Mt. San Antonio	(909) 594-5611

Palomar	(760) 744-1150
Orange Coast	(714) 432-0202
Santiago Canyon	(714) 564-4545
Sacramento City	(916) 558-2491
San Bernardino	(909) 888-6511
Santa Barbara	(805) 965-0581
Santa Rosa	(707) 527-4603
Shasta College	(530) 225-4660
Solano College	(707) 864-7155
Ventura College	(805) 654-6452

Non-Profit Organizations

The California Water Environment Association is a professional organization for individuals involved in the design and operation of wastewater treatment plants. The Association also offers courses in wastewater treatment plant operations and related fields. Contact the Association at (510) 382-7800 or www.cwea.org for more information.

Other Courses

There are other organizations, both public and private, that offer training in wastewater treatment plant operations and related fields. However, please be aware that our regulations allow us to only count training taken through colleges and universities, public agencies and nonprofit organizations as satisfying the education requirements for certification.

Suggested reading to prepare for testing

Following is a list of references, which may be useful to applicants preparing to take a certification test. Each reference is subject to revision and the current version should be used. Other references covering similar subjects may be used at the applicant's discretion. The SWRCB does not endorse specific reference materials.

Grades I and II

1. "Operation of Wastewater Treatment Plants, Volumes I and II," Kenneth Kerri, Office of Water Programs, California State University, 6000 J Street, Sacramento, CA 95819-6025

2. Title 23, California Code of Regulations, Division 3, Chapter 26, Section 3670, et seq., "Wastewater Treatment Plant Classification, Operator Certification, and Contract Operator Registration Regulations," SWRCB, OOC, P.O. Box 944212. Sacramento, CA 94244-2120

Grades III

1. Both listed above.

2. "Advanced Waste Treatment," Kenneth Kerri, Office of Water Programs, California State University, 6000 J Street, Sacramento, CA 95819-6025

3. "Pretreatment Facility Inspection," Kenneth Kerri, address listed above.

4. Water Environment Federation Manual of Practice Wythe Street, Alexandria, VA 23314-1994

No. 1, "Safety and Health in Wastewater Systems"
No. OM-9, "Activated Sludge"
No. 11, "Operation of Municipal Wastewater Treatment Plants"

5. Title 8, California Code of Regulations, Division 1, Chapter 4, Article 108, "Confined Spaces", and Section 3203, "Injury and Illness Prevention Program," Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, CA 94142

6. Title 22, California Code of Regulations, Division 4, Chapter 3, "Reclamation Criteria," Environmental Management Branch, Department of Health Services, P.O. Box 942732, Sacramento, CA 94234-7320

Grades IV and V

1. All of the above.

2. "Wastewater Engineering," Metcalf and Eddy, Inc., McGraw Hill Book Company, 1221 Avenue of the Americas, New York, NY 10020.

3. "Industrial Wastewater Treatment", Kenneth Kerri, Office of Water Programs, California State University, 6000 J Street, Sacramento, CA 95819-6025

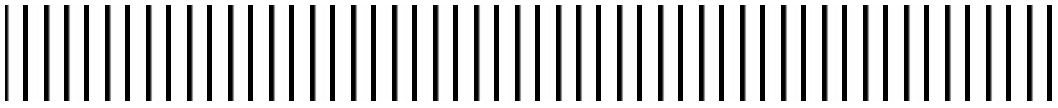
4. Water Environment Federation Manual of Practice No. SM-4, "Plant Managers' Handbook", 610 Wythe Street, Alexandria, VA 23314-1994

REQUIREMENTS BY GRADE			
Grade I			
Path 1	6 educational points	and	1 year performing duties of operator
Grade II			
Path 1	High School or equivalent and 6 educational points	and	2 years performing duties of operator
Path 2			1 1/2 years as Grade I
Grade III			
Path 1	Associate degree or 60 college semester units including 15 semester units of basic science courses	and	2 years performing duties of operator
Path 2	High School or equivalent and 16 educational points	and	4 years performing duties of operator
Path 3			3 years as Grade II
Grade IV			
Path 1	Bachelor's degree with a major related to wastewater treatment including 30 semester units of basic science courses	and	2 years performing duties of operator
Path 2	Associate degree or 60 college semester units including 15 semester units of basic science courses	and	4 years performing duties of operator
Path 3	High School or equivalent and 32 educational points	and	6 years performing duties of operator
Path 4			4 years as Grade III
Grade V			
Path 1	Valid license as a civil or chemical engineer issued by the California Board of Registration for Professional Engineers and Land Surveyors	and	4 years performing duties of operator
Path 2	Bachelor's degree with a major related to wastewater treatment including 30 semester units of basic science courses	and	5 years performing duties of operator
Path 3	Associate degree or 60 college semester units including 15 semester units of basic science courses	and	6 years performing duties of operator
Path 4	High School or equivalent and 48 educational points	and	10 years performing duties of operator
Path 5			6 years as Grade IV

Yorba Linda Water District

Water Recycling Facilities Planning Study

Appendix E: California's Recycled Water Policy and General Permit Requirements



6808001

MALCOLM PIRNIE

Recycled Water Policy

1. *Preamble*

California is facing an unprecedented water crisis.

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

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

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

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

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to

develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

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

2. *Purpose of the Policy*

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

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

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

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

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

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

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is

sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6. *Salt/Nutrient Management Plans*

a. *Introduction.*

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

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

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

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

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

also assists in implementing Resolution No. 2008-30, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

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

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

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

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

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

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

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

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable,

cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

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

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

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

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

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

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

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

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

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

7. *Landscape Irrigation Projects*

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

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

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

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

b. *Streamlined Permitting*

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

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

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

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

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

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

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

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

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

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

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

8. *Recycled Water Groundwater Recharge Projects*

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

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

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

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

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

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

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

9. *Antidegradation*

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

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

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

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

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

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

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

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

10. *Emerging Constituents/Chemicals of Emerging Concern*

a. *General Provisions*

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

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

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

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

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

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

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

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

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

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

11. *Incentives for the Use of Recycled Water*

a. *Funding*

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

b. *Stormwater*

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

c. TMDLs

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

STATE WATER RESOURCES CONTROL BOARD
WATER QUALITY ORDER NO. 2009-0006-DWQ

GENERAL WASTE DISCHARGE REQUIREMENTS FOR LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

(GENERAL PERMIT)

The State Water Resources Control Board (State Water Board) finds that**:**

1. The California Legislature has declared its intent to promote the use of recycled water. Recycled water[1,2] is a valuable resource and significant component of California's water supply. When used in compliance with the Recycled Water Policy,[3] California Code of Regulations (CCR) Title 22, and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. This General Permit is intended to satisfy the requirements of California Water Code (Water Code) section 13552.5 and is for Producers and Distributors[4] of recycled water for landscape irrigation uses. This General Permit is intended to streamline the regulatory process for such uses of recycled water but may not be appropriate for all scenarios due to unique site-specific characteristics and conditions. For this General Permit, "recycled water" is limited to disinfected tertiary recycled water produced by a public entity at a municipal wastewater treatment plant (WWTP), as defined in Water Code section 13625(b)(1) and section 13625(b)(2). This General Permit is not applicable for the use of water produced from the treatment of other non-municipal wastewaters (e.g., oil field production, food processing, storm water, etc.) at other types of treatment facilities (e.g., industrial wastewater treatment plants). Pursuant to Water Code section 13552.5(e)(1), persons who are covered under this General Permit are not required to remain subject to the applicable provisions of existing waste discharge requirements or water reclamation requirements.

3. Landscape irrigation with recycled water is a viable strategy to reduce potable water demand and to reduce the volume of water wasted after a single use. Specified uses of recycled water considered "landscape irrigation" projects include any of the following:

    i. Parks, greenbelts, and playgrounds;
    ii. School yards;
    iii. Athletic fields;
    iv. Golf courses;
    v. Cemeteries;

---

[1] *Recycled Water*: Water which, as a result of treatment of municipal wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource (Water Code section 13050).
[2] The terms "recycled water" and "reclaimed water" have the same meaning (Water Code section 26).
[3] The Recycled Water Policy was adopted on February 3, 2009 under State Water Board Resolution No. 2009-0011.
[4] Throughout this General Permit, refer to Attachment A for definitions.

vi. Residential landscaping, common areas;[5]
vii. Commercial landscaping, except eating areas;
viii. Industrial landscaping, except eating areas; and
ix. Freeway, highway, and street landscaping.

4. Recycled water projects eligible for coverage under this General Permit shall meet the following treatment and use standards:

    a. The Producer shall, being a public entity, produce disinfected tertiary recycled water, as defined in CCR Title 22, sections 60301.230 and 60301.320, at a municipal wastewater treatment plant; and
    b. The Distributors shall comply with the applicable uniform statewide reclamation criteria established pursuant to CWC section 13521 (i.e., CCR Title 22 section 60301 et. seq., hereafter "Title 22 Requirements").
    c. The Producer and Distributor shall ensure that Users comply with the applicable uniform statewide reclamation criteria established pursuant to Title 22 Requirements.
    d. The Producers and Distributor shall satisfy all applicable requirements of the Recycled Water Policy.

5. The use of recycled water for landscape irrigation has characteristics which can create water quality and public health problems if improperly treated and managed. It is necessary to establish requirements for landscape irrigation uses of recycled water that ensure protection of water resources and public health. (e.g., pathogenic organisms, salinity and other waste constituents, and potential for unauthorized discharges).

6. This General Permit establishes requirements to manage recycled water for landscape irrigation uses in a manner that is protective of public health and the environment. The State Water Board will exercise its authority to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws. The beneficial use of recycled water for landscape irrigation under this General Permit is environmentally sound and preferable to non-beneficial disposal and waste of water. This General Permit builds on extensive work that has already been done by the Water Boards, the California Department of Public Health (CDPH), the 2003 Recycled Water Task Force and many others.

7. This General Permit is applicable to Use Areas where recycled water is used or conveyed for landscape irrigation and is not intended to regulate the treatment of municipal wastewater. Compliance with this General Permit does not relieve Producers or Distributors from the obligation to comply with applicable waste discharge requirements for discharges from wastewater treatment plants other than landscape irrigation uses of recycled water authorized pursuant to this General Permit.

[5] Individually owned residences are not eligible for coverage under this General Permit. The Regional Water Boards will address individually owned residences on a case-by-case basis.

8. To obtain coverage under this General Permit, either a Producer or a Distributor shall submit a complete Notice of Intent (NOI) form (Attachment B), Operations & Maintenance Plan, and appropriate application fee to the State Water Board. Either a Producer or a Distributor shall declare responsibility for the administration of the recycled water program authorized pursuant to this General Permit (hereafter Administrator). A duly authorized representative for each entity involved in the production and distribution of recycled water shall each sign the NOI form as appropriate. The Producer and Distributor may be the same entity. Administrators who submit a complete application package, meet the eligibility criteria of this General Permit, and following the conclusion of a thirty (30) day public review period, will typically be authorized to distribute recycled water for landscape irrigation uses.

9. The application fee shall be equal to the annual fee, pursuant to Water Code section 13260. Fee amounts are specified in Section 2200, Chapter 9, Division 3, Title 23, CCR. The Administrator shall be billed for an annual fee equal to the application fee until coverage under the General Permit has been terminated.

10. The Regional Water Quality Control Boards (Regional Water Boards) have evaluated groundwater and surface waters within their jurisdictions for their maximum potential beneficial uses.[6] Some of those use categories are identified in Attachment A. Beneficial uses for specific water bodies can be found in the applicable Water Quality Control Plan (Basin Plan) where the recycled water is used. Basin plans establish water quality objectives to protect the specific designated beneficial uses that may include numerical objectives and / or narrative objectives for chemical constituents in and toxicity of groundwater. Basin Plans establish procedures to quantify the maximum permissible concentrations of constituents for groundwaters designated as municipal, agricultural, and other beneficial uses.

PATHOGENIC ORGANISMS

11. To protect public health, this General Permit employs a minimum treatment standard of disinfected tertiary recycled water, as well as exposure control measures including minimum setback distances, signage, method of application, and use restrictions.

12. To protect public health from risks associated with potential cross-connection and subsequent contamination of potable water systems, California Health and Safety Code (HSC) section 116555 requires that a public water system shall ensure that the system will not be subject to backflow under normal operating conditions. HSC Section 116800 et. seq. authorizes local health officers to maintain a program for the control of cross-connections by water users where public exposure to drinking water contaminated by backflow may occur. Cross-connection programs shall be

[6] Water Code section 13050(f)

conducted in accordance with backflow prevention regulations adopted by CDPH and may require water users to comply with all orders, instructions, regulations, and notices from the local health officer with respect to the installation, testing, and maintenance of backflow prevention devices.

SALINITY & NUTRIENTS

13. The source of salts and nutrients is attributed to water soluble inorganic and organic constituents in imported water, soil leached by irrigation, animal wastes, fertilizers and other soil amendments, municipal use, industrial wastewaters, and oil field wastewaters. These salt sources, all contributors to salinity increases, should be managed in a manner consistent with the Recycled Water Policy, specifically paragraphs 6 and 9(d).

14. Several approaches can be used to manage concerns over salt accumulations in groundwater. In the absence of treatment or a plan to remove accumulated salinity, another viable approach is to manage the rate of degradation by minimizing the salt loads to the groundwater basin. Salinity loads contributed by the reuse of municipal wastewater can be reduced by either precluding anthropogenic derived salts from introduction into the wastewater collection systems (e.g., source control or pretreatment of wastes) or treatment of salts at the wastewater plant (i.e., removal of salts), or both. Another viable option is a salt/nutrient management plan for a groundwater basin. The State Water Board has addressed the topic of salt management, as it concerns recycled water, in the Recycled Water Policy.

15. The agricultural beneficial use of groundwater tends to be the most vulnerable beneficial use to salinity accumulation. This loss of the agricultural beneficial use is not immediate. Control of salinity accumulation is a major part of several Basin Plans, and will be the topic of the salt/nutrient management plans required by the Recycled Water Policy. In general, salt loads reaching a groundwater body must be reduced. Storage of salt in the soil through increased irrigation efficiency is a good practice, but is not a permanent solution.

16. In Water Quality Order No. 2000-07,[7] the State Water Board determined that a Producer cannot shift responsibility for discharged salt to the User. This General Permit requires the Producer to produce recycled water that meets the quality standards of this General Permit and associated waste discharge requirement order(s) for the wastewater treatment plant(s).

17. In the absence of detailed hydrological data, it is the responsibility of both the project proponent and the California Water Boards to exercise sound and reasoned judgment in evaluating the case-specific effects of proposed projects and the available factual data for each project. This General Permit attempts to accomplish the balancing of factors necessary to evaluate most projects in the absence of case-specific information. In doing so, this General Permit also establishes a basic

[7] San Luis Obispo Golf & Country Club, Central Coast Region, State Board WQO No. 2000-07, p 10-12

regulatory strategy to manage the salinity of most recycled water used for landscape irrigation. If, after review of the available factual data, the Executive Director determines that the case-specific effects of a proposed project are inconsistent with the requirements of this General Permit and the Recycled Water Policy (i.e., "unusual circumstances" as used in the Recycled Water Policy), the project is not eligible for coverage under this General Permit.

CHLORINE

18. Some Producers and Distributors chlorinate recycled water delivered and stored for reuse to prevent regrowth of pathogens and growth of organisms that could cause odor nuisance and operational difficulties in the reclamation system. Chlorine is toxic to fish and other aquatic life even at low concentrations.

EMERGING CONSTITUENTS/CHEMICALS OF EMERGING CONCERN (CECs)

19. A need exists to increase understanding of CECs that may be present in recycled water used for landscape irrigation. The many evolving issues associated with "emerging contaminants" are presently the subject of a number of studies, including a major study being undertaken by the National Water Research Institute, the Metropolitan Water District of Southern California, and the Orange County Water District (hereafter Study), estimated to be completed in 2009.

20. Many water supply agencies, at their own expense, are developing and implementing voluntary studies based on the best available science intended to better characterize the presence, extent, distribution and persistence of certain unregulated constituents in water supplies. The State Water Board supports these voluntary efforts.

21. As required by the Recycled Water Policy, the State Water Board is convening a CEC advisory panel to provide recommendations on CEC monitoring and other topics. The State Water Board has consulted with CDPH, the primary state agency responsible for the protection of public health and the regulation of drinking water standards, in convening the CEC advisory panel. In accordance with the Recycled Water Policy, this General Permit does not specify CEC monitoring requirements. After the State Water Board takes action on the recommendations of the CEC advisory panel, this General Permit will be reviewed for any needed revisions.

22. The constituents that are the subject of studies subject to the scrutiny of CDPH, the United States Environmental Protection Agency, and the United States Geological Survey, will in all likelihood change over time as their relative importance or unimportance to human health and the environment becomes better known.

UNAUTHORIZED DISCHARGES OF RECYCLED WATER

23. At some Use Areas, recycled water is discharged into landscape irrigation storage ponds (hereafter "impoundments") that function as storage for irrigation and may also serve an aesthetic purpose. Some impoundments were originally designed and constructed to collect storm water runoff from surrounding areas and allowed to overflow excess water into nearby drainage ways and creeks. Recycled water used for irrigation of golf courses, parks, or other open spaces and landscaped areas may occur in areas containing numerous hills and sloped areas that could promote runoff unless closely managed during irrigation. In some cases, various chemicals (e.g., copper sulfate, acrolein, etc.) may be added to impoundments for weed, algae, and vector control.

24. When Best Management Practices (BMPs) are implemented, conditions causing runoff, ponding, and windblown spray (drift) are minimized to a negligible amount, and in some cases, eliminated. Attachment C of this General Permit includes a list of BMPs, including specific requirements of the Recycled Water Policy.

25. The control of incidental runoff and compliance with regulatory instruments, including National Pollutant Discharge Elimination System (NPDES) permits, is addressed in paragraph 7(a) of the Recycled Water Policy. This General Permit is in conformance with these requirements.

MASTER RECLAMATION PERMITS

26. CWC section 13523.1 authorizes each Regional Water Board, after consulting with CDPH, to issue a master reclamation permit to a Producer or Distributor, or both, of recycled water, in lieu of issuing waste discharge requirements or water recycling requirements.

27. In some cases, especially for municipal wastewater discharges via an ocean outfall, the NPDES permit for the Producer's facility does not include requirements necessary to ensure the protection of beneficial uses of groundwater resources (e.g., agricultural supply, municipal supply). In order to facilitate the use of recycled water, Regional Water Boards adopt master reclamation permits that implement the Title 22 Requirements and consider potential impacts to the beneficial uses of groundwater. Thereby, some master reclamation permits prescribe discharge limitations necessary to ensure the protection of beneficial uses of groundwater resources not otherwise included in a Producer's NPDES permit.

28. A benefit of master reclamation permits is that individual recycled water users are not required to seek individual authorization from a regional water board, thereby avoiding additional regulatory burdens and costs. Administrators that operate pursuant to a master reclamation permit shall be allowed to retain coverage under the master reclamation permit. Alternatively, an Administrator may request coverage under this General Permit.

REGULATORY CONSIDERATIONS

29. The discharges authorized by this General Permit are limited to the discharge of disinfected tertiary recycled water (as defined CCR Title 22, sections 60301.230 and 60301.320) produced by a public entity at a municipal wastewater treatment plant. Such wastewater treatment plants will generally maintain the same or similar wastewater treatment operations, involve the treatment of the same or similar types of waste, and require the same or similar treatment standards.

30. Water Code Section 13267(b)(1) states the following:

> *In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports*

31. Water Code Section 13267(c), in part, states the following:

> *In conducting an investigation pursuant to subdivision (a), the regional board may inspect the facilities of any person to ascertain whether the purposes of this division are being met and waste discharge requirements are being complied with.*

32. Water Code Section 13267(f) states the following:

> *The state board may carry out the authority granted to a regional board pursuant to [Water Code section 13267] if, after consulting with the regional board, the state board determines that it will not duplicate the efforts of the regional board.*

33. The information required by this General Permit is necessary to determine compliance with this General Permit and to ensure compliance with the Water Code and the Title 22 Requirements. Improper use or discharge of recycled water represents a threat to the quality of waters of the state and to human health and the environment. A completed NOI form identifies the entities responsible for ensuring proper production, distribution, and/or use of recycled water in accordance with this General Permit.

34. The information required by this General Permit will not duplicate the efforts of the regional board.

35. In 1977, the State Water Board adopted Resolution No. 77-1, titled "Policy with Respect to Water Reclamation in California" (Resolution No. 77-1). Resolution No. 77-1, in part, encourages the use of recycled water in the state.

36. A 1996 Memorandum of Agreement (MOA) between CDPH and the State Water Board on behalf of itself and the Regional Water Boards regarding the use of recycled water allocates primary areas of responsibility and authority between these agencies. The MOA provides methods and mechanisms necessary to ensure ongoing and continuous future coordination of activities relative to the use of recycled water in California. This General Permit includes requirements consistent with the MOA.

37. In 1968, the State Water Board adopted Resolution No. 68-16 (hereafter the "Antidegradation Policy") which requires that the authorization to discharge waste maintain high quality waters of the State until it is demonstrated that any change in quality is consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in water quality policies (i.e., will not result in exceedances of water quality objectives).

38. Degradation of groundwater by constituents in recycled water after effective source control, treatment, and control may be determined consistent with maximum benefit to the people of California. This determination is based on considerations of reasonableness under the circumstances of the recycled water use. Factors to be considered include:

    a. Past, present, and probable beneficial uses of the receiving water (as specified in the applicable basin plan;
    b. Economic and social costs, tangible and intangible, of the recycled water usage compared to the benefits;
    c. Environmental aspects of the recycled water usage; and
    d. Implementation of feasible alternative treatment or control methods.

39. This General Permit establishes terms and conditions of discharge to ensure that the discharge does not unreasonably affect present and anticipated beneficial uses of groundwater and surface water for the following reasons:

    a. Recycled water will be applied at agronomic rates reflecting the seasonal hydraulic and nutrient requirements of the Use Area;
    b. The Producer is responsible for ensuring that recycled water meets the quality standards of the General Permit and associated waste discharge requirement order(s) for the municipal WWTP(s); and
    c. Discharge to surface waters, unless otherwise authorized by an NPDES permit, is prohibited.

40. Degradation of groundwater by some of the typical waste constituents released with discharges from a municipal WWTP after effective source control, treatment, and use control is consistent with maximum benefit to the people of the State. Economic prosperity of State communities and associated industries is of maximum benefit to the people of the State, and therefore sufficient reason to allow limited groundwater degradation, provided that terms of the applicable Water Quality Control Plan and the Recycled Water Policy are met.

41. To comply with this General Permit, Producers and Distributors, must implement (and ensure Users implement) the following treatment and control measures necessary to avoid pollution or nuisance and maintain the highest water quality consistent with the maximum benefit to the people of the state:

    a. Implement treatment and use standards necessary to produce disinfected tertiary recycled water and implement the applicable Title 22 Requirements;
    b. Apply recycled water at agronomic rates;
    c. Identify and implement best management practices;
    d. Develop, maintain, and implement an Operation & Maintenance Plan; and
    e. Employ trained personnel (e.g., Recycled Water Use Supervisor)

CALIFORNIA ENVIRONMENTAL QUALITY ACT

42. To mitigate or avoid environmental effects on water quality, this General Permit:

    a. Requires application of recycled water at reasonable agronomic rates considering soil, climate, and nutrient demand;
    b. Requires areas irrigated with recycled water be managed to prevent nuisance conditions or breeding of mosquitoes; and
    c. Establishes a Monitoring and Reporting Program, which includes inspections and regular maintenance of areas irrigated with recycled water.

43. On July 7, 2009, in accordance with California Environmental Quality Act (CEQA),[8] the State Water Board, acting as the lead agency, adopted Resolution No. 2009-0059 which certified a Mitigated Negative Declaration for this project and determined that the project would have no significant effect on the environment.

44. The State Water Board has notified all known interested agencies and persons of its intent to prescribe general waste discharge requirements for landscape irrigation uses of recycled water and has provided all known interested agencies and persons with an opportunity for a public hearing and an opportunity to submit comments.

45. The State Water Board has consulted with and considered comments from the regional water quality control boards, groundwater management agencies and water replenishment districts with statutory authority to manage groundwater pursuant to their principal act, CDPH, and other interested parties.

[8] Public Resources Code, Section 21000, et seq.

46. The State Water Board, in a public meeting on July 7, 2009, heard and considered all comments pertaining to this General Permit.

IT IS HEREBY ORDERED that all Producers and Distributors of recycled water, or combinations thereof, that file a complete application package declaring their intention to be regulated under provisions of this General Permit, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The use of recycled water pursuant to this General Permit is prohibited unless the Administrator has submitted a complete Notice of Intent (NOI) form, Operation & Maintenance Plan, and application fee and has received confirmation of enrollment under this General Permit.

2. The use of recycled water in a manner different than described in the Operation & Maintenance Plan is prohibited.

3. The use of recycled water, pursuant to this General Permit, for individually owned residences other than as described in Finding No. 3 is prohibited.

4. In conformance with Title 22 Requirements, recycled water shall not be used for direct human consumption or for the processing of food or drink intended for human consumption.

5. The use of recycled water for uses other than landscape irrigation uses is prohibited.

6. The use of recycled water on water-saturated or frozen ground or during periods of precipitation such that runoff is induced, is prohibited.

7. The direct or indirect discharge from use areas of recycled water to surface waters, either perennial or ephemeral, including wetlands, vernal pools, etc. is prohibited, unless otherwise authorized by an NPDES permit.

8. The application of recycled water within fifty (50) feet of a domestic well, and impoundment of recycled water within one hundred (100) feet of a domestic well, unless approved by CDPH, is prohibited.

9. Use or installation of hose bibbs in areas accessible by the public on any irrigation system presently operating or designed to operate with recycled water, regardless of construction or identification, is prohibited.

10. Use of any equipment or facilities that have been used to convey recycled water (e.g., tanks, temporary piping or valves, and portable pumps) also used for potable water supply conveyance, is prohibited.

11. The discharge or use of recycled water in a manner that causes or contributes to an exceedance of an applicable water quality objective is prohibited.

12. The use of recycled water for landscape irrigation shall not cause or threaten to cause pollution or nuisance as defined in Water Code section 13050.

B. SPECIFICATIONS

1. Recycled water shall be managed in conformance with the applicable regulations contained in the Title 22 Requirements.

2. All recycled water provided to Users pursuant to this General Permit, shall be treated in and managed in conformance with all applicable provisions of the Recycled Water Policy.

Disinfected Tertiary Recycled Water Criteria

3. The Producer or Distributor shall collectively provide all Users disinfected tertiary recycled water that meets the standards for *disinfected tertiary recycled water* as described in CCR Title 22, sections 60301.230 and 60301.320.

Recycled Water Application

4. Application of recycled water to the Use Area shall be at reasonable agronomic rates and shall consider soil, climate, and nutrient demand. Application rates shall ensure that a nuisance is not created. Degradation of groundwater, considering soil, climate, and nutrient demand, shall be minimized consistent with applicable provisions of the Recycled Water Policy.

5. The seasonal nutritive loading of the Use Area including the nutritive value of organic and chemical fertilizers and of the recycled water, shall not exceed the nutritive demand of the landscape.

6. Use Areas that are spray irrigated and allow public access shall be irrigated during periods of minimal use. Consideration shall be given to allow maximum drying time prior to subsequent public use.

Recycled Water Utilities, Equipment, Signage, and Use Areas

7. All newly installed or any accessible reclamation equipment, pumps, piping, valves, and outlets shall be appropriately marked to differentiate them from potable facilities. All newly installed or any accessible reclamation distribution system piping shall be purple or adequately identified with purple tape, tags, or stickers per Section 116815(a) of the California Health and Safety Code.

8. 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. Supplementing recycled water with potable water shall not be allowed except as approved by CDPH.

9. A 4-foot horizontal and 1-foot vertical separation[9] shall be maintained between all new pipelines transporting recycled water and those transporting domestic water, unless approved by CDPH. Domestic water pipelines shall be configured above recycled water pipelines, unless approved by CDPH.

10. All recycled water valves, outlets, and quick couplers should be of a type or secured in a manner that only permits operation by authorized personnel.

11. The main shutoff valve of the recycled water meter shall be tagged with a recycled water warning sign. The valve shall be equipped with an appropriate locking device to prevent unauthorized operation of the valve.

12. Except where CDPH has approved alternative signage and wording or an educational program pursuant to Title 22 Requirements, (1) 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 four inches high by eight inches wide that include the following wording “RECYCLED WATER-DO NOT DRINK”, and (2) each sign shall display an international symbol similar to that shown in Attachment D.

13. Spray, mist, or runoff of recycled water shall not enter dwellings, designated outdoor eating areas, or food handling facilities. Drinking water fountains shall be protected against contact with recycled water spray, mist or runoff.

14. Recycled water shall be managed to minimize contact with workers.

15. Best Management Practices (BMPs) shall be developed and implemented to achieve a safe and efficient irrigation system. At a minimum, the Administrator shall implement and ensure that all other Producers,

[9] As measured from the nearest outside edge of the respective pipelines.

Distributors, and Users associated with each respective NOI implement the Required BMPs identified in Attachment C (I.A. – I.D.) and consider implementing other BMPs as appropriate.

16. Recycled water shall not be allowed to escape from the Use Area by overspray, mist or by surface flow except in minor amounts such as that associated with BMPs for good irrigation practices.

17. Areas irrigated with recycled water shall be managed to prevent ponding and conditions conducive to the proliferation of mosquitoes and other vectors, and to avoid creation of a public nuisance or health hazard. The following practices shall be implemented, at a minimum:

    a. Irrigation water must infiltrate completely within a 48-hour period.
    b. Ditches receiving irrigation runoff, not serving as wildlife habitat, shall be maintained free of emergent, marginal, and floating vegetation.
    c. Low-pressure and unpressurized pipelines and ditches that may be accessible to mosquitoes shall not be used to store recycled water.

18. The Producer or Distributor shall discontinue delivery of recycled water during any period in which either has reason to believe that the requirements for use as specified herein or the requirements of CDPH are not being met. The delivery of recycled water shall not resume until all conditions have been corrected.

C. PROVISIONS

1. A duly authorized representative for each Producer and Distributor shall each sign the completed NOI form (Attachment B). Enforcement actions for violations of this General Permit may be taken against all responsible entities for violations of any part of this General Permit. However, in general, responsibilities for Producers and Distributors are as follows:

    a. Producers shall be responsible for ensuring that recycled water meets the quality standards of this General Permit and any associated waste discharge requirement order(s) for the WWTP(s).
    b. Distributors shall be responsible for the operation and maintenance of transport facilities and associated appurtenances necessary to convey and distribute the recycled water from the point of production to the point of use with all applicable Title 22 requirements.
    c. The Producer and Distributor shall be responsible for the application and use of recycled water in the respective Use Areas and for associated operations and maintenance in accordance with all applicable Title 22 requirements and this General Permit. The Producer and Distributor are also responsible for ensuring that Users maintain the minimum land application acreage and impoundment

capacity to comply with the terms and conditions of this General Permit.

2. The Administrator shall comply with Monitoring and Reporting Program No. 2009-0006-DWQ and revisions thereto, as specified by the Executive Director.

3. CDPH may identify in its recommendations with respect to the proposed recycled water use any conditions upon which its approval of a proposed project is based. "Conditions of approval" submitted as part of CDPH's recommendations will be incorporated into a Notice of Applicability for the proposed recycled water use project.

4. The Administrator shall require each User to designate a Recycled Water Use Supervisor for each Use Area, respectively. The Recycled Water Use Supervisor shall be responsible for the recycled water system within the Use Area. Specific responsibilities of the Recycled Water Use Supervisor, at a minimum, shall include the following:

    a. Proper installation, operation and maintenance of irrigation systems;
    b. Control of on-site piping to prevent any cross-connections with potable water supplies;
    c. Development of and implementation of a set of procedures to verify on an ongoing basis that cross-connections have not occurred between potable water supplies and recycled water supplies;
    d. Routine inspection and maintenance of backflow prevention devices installed to protect potable water supplies, consistent with section 7605 of Title 17, California Code of Regulations; and
    e. General responsibilities to ensure compliance with this General Permit and continuous implementation of any Best Management Practices identified as necessary to prevent potential hazards to public health and to protect the environment.

5. Prior to commencing irrigation with recycled water, the Administrator shall submit an Operations and Maintenance Plan (O&M Plan) to the State Water Board. An O&M Plan shall contain the following elements:

    a. An Operations Plan. A detailed operations plan for the Use Areas including methods and procedures for implementation of regulations regarding recycled water use and maintenance of equipment and emergency backup systems to maintain compliance with the conditions of this General Permit and CDPH requirements (i.e., identification of BMPs implemented to achieve and maintain compliance).
    b. An Irrigation Management Plan. The Irrigation Management Plan shall include measures to ensure the use of recycled water occurs at an agronomic rate while employing practices to ensure irrigation

efficiency necessary to minimize application of salinity constituents (by mass) to Recycled Water Use Areas. The Irrigation Management Plan shall be applicable for each Recycled Water Use Area served and shall account for the following:

i. Soil characteristics;
ii. Recycled water characteristics (nutrients, including nitrogen and phosphorous content; specific ion toxicity, including chloride, boron, sodium, bicarbonate; and other parameters);
iii. General requirements of the major plant species being irrigated (e.g., seasonal demand, climate, nutrient requirements);
iv. Climatic conditions (e.g., precipitation, evapotranspiration rate, wind);
v. Other supplemental nutrient additions (e.g., chemical fertilizers) generally used within the Use Area; and
vi. Management of impoundments used to store or collect recycled water.

Where conditions 5.b.i. thru 5.b.vi vary substantially across a service area, the Irrigation Management Plan shall also include sub-basin irrigation management plans that ensure the use of recycled water occurs at an agronomic rate while employing practices to ensure irrigation efficiency necessary to minimize application of salinity constituents (by mass).

c. A summary of the applicable approved Title 22 Engineering Report submitted to CDPH. The summary of the Title 22 Engineering Report shall address the following:
   i. Method(s) of wastewater treatment and manner for achieving disinfected tertiary recycled water;
   ii. Method(s) to be used to assure that the installation and operation of the recycled system will not result in cross-connections between the recycled water and potable water piping systems.
   iii. Any recommendations or “conditions of approval” provided by CDPH;
   iv. Copy of any approval letter(s) prepared by CDPH[10].

   Administrators may provide a copy of the complete approved Title 22 Engineering Report in lieu of a summary. The Title 22 Engineering Report shall be available upon request for review and inspection.

d. A copy of the Producer’s or Distributor’s established rules and/or regulations as approved by CDPH for Producers, Distributors and Users governing the design and construction of recycled water use facilities and the use of recycled water in accordance with the criteria established in the Title 22 Requirements and this Permit.

[10] Formerly, the California Department of Health Services

e. A copy of the written (and signed) agreement between the respective parties responsible for the producing, distributing, and using the recycled water.

f. Recycled Water Use Supervisor responsibilities and training.

i. Documentation of or examples from a training program including periodic education, for Recycled Water Use Supervisors. At a minimum, such training programs shall include the following elements:

(1) The safe and efficient operation and maintenance of recycled water use facilities.

(2) Prevention of runoff from Recycled Water Use Areas.

(3) Matching irrigation rates to the water requirements of the landscape, and not applying when the soil is saturated.[11].

(4) Means for ensuring recycled water and other supplemental nutrients (including fertilizers) are used pursuant to the Irrigation Management Plan (i.e., at agronomic rates[12])

(5) Prevention of cross-connections with potable water systems

ii. A copy of an example duty statement for the Recycled Water Use Supervisor responsible for the Use Area.

iii. Verification that the Recycled Water Use Supervisor has attended training regarding the safe and efficient operation and maintenance of recycled water use facilities.

6. Producers and Distributors shall maintain and comply with the O&M Plan, and all portions thereof including the Irrigation Management Plan submitted pursuant to this General Permit and the applicable Title 22 Engineering Report.

7. Amendments to the approved Title 22 Engineering Report as well as a description of new use sites shall be submitted to the appropriate public health authority for approval in advance of connection. The Administrator shall include in the annual report submitted to the State Water Board copies of approval letter(s) prepared by CDPH regarding (1) such amendments to the Title 22 Engineering Report and (2) a description of new sites.

8. The Administrator shall ensure that all Users comply with the O&M Plan, and all relevant portions thereof including the Irrigation Management Plan submitted pursuant to this General Permit and the applicable approved Title 22 Engineering Report. To demonstrate compliance with this Provision, the Administrator may develop a pamphlet, brochure, or other educational materials, that convey the key operational elements (e.g., prevention of cross-connections, how to adjust fertilization rates, impoundment management practices, etc.) of the O&M Plan to the Recycled Water Use

[11] Accounting for soil saturation conditions
[12] Including accounting for fertilizers

Supervisor. The Administrator shall also ensure compliance with any applicable Salt and Nutrient Management Plans.

9. The Administrator shall ensure that periodic inspections are conducted of the Use Areas they supply at a frequency approved by CDPH (but no less than annually), including an adaptive approach to address Use Areas with a record of compliance concerns. The Administrator shall also establish procedures to monitor and assure compliance with conditions of this General Permit. The Administrator shall also ensure that regular inspections occur to assure cross-connections with potable water systems are not made and air-gap devices are installed and operable.

10. The Producer and Distributor shall keep a copy of the O&M Plan and this General Permit, including its Monitoring and Reporting Program, and attachments in a location where they can be easily referenced by operating personnel. Key operating personnel, including the Recycled Water Use Supervisor, shall be familiar with its contents.

11. The Producer and Distributor shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed to achieve compliance with the conditions of this General Permit.

12. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code[13]. To demonstrate compliance with sections 415 and 3065 of Title 16, CCR, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.

13. All storm water discharges, including conditionally authorized or exempted non-storm water discharges, from recycled water use areas must comply with the lawful requirements of municipalities, counties, drainage districts, and/or other local agencies, regarding discharges of storm water to Municipal Separate Storm Sewer Systems (MS4s) under their jurisdiction.

14. It is the responsibility of the Producer and Distributor to make inquiry and to obtain any local, state, and federal governmental agency permits or authorizations prior to the distribution and use of recycled water for landscape irrigation.

[13] sections 6735, 7835, and 7835.1

15. Coverage under this General Permit is not transferable. The Administrator shall notify the Executive Director in writing at least thirty (30) days in advance of change in ownership related to the Administrator, other Distributors, or Producers authorized to use recycled water pursuant to this General Permit. The Administrator shall use the Notice of Termination (NOT) form in Attachment E to satisfy this provision.

16. The Administrator shall require Users to notify the Administrator in writing within thirty (30) days of any changes to Recycled Water Use Supervisor personnel or changes to contact information for the Recycled Water Use Supervisor.

17. Upon enrollment in this General Permit, if the Producers or Distributors are subject to general or individual waste discharge requirements or water reclamation requirements, the provisions of such requirements are null and void to the extent that the recycled water use is regulated by this General Permit.

18. The State Water Board will review this General Permit periodically and will revise requirements when necessary. Specifically, monitoring requirements could be revised to include CEC monitoring, if the State Water Board finds such monitoring to be necessary and appropriate, based on recommendations from the CEC Advisory Panel. Furthermore, the State Water Board would modify this General Permit if a regulatory or statutory change occurs that affects the application of the General Permit, or as necessary to ensure protection of beneficial uses. This General Permit may also be modified, rescinded and reissued, for cause. The Executive Director may also terminate coverage under this General Permit for cause. The Executive Director is hereby authorized to revise the Monitoring and Reporting Program and Attachments B, C, D, E, and F of this General Permit. Causes for modification or termination of coverage include, but are not limited to, changes to statutes, the promulgation of new regulations, adoption of new policy, modification to water quality control plans, Regional Water Board finding of “unusual circumstances” per the Recycled Water Policy, or other changes determined necessary to protect beneficial uses of waters of the state.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on July 7, 2009.

AYE: Chairman Charles R. Hoppin
Vice Chair Frances Spivy-Weber
Board Member Arthur G. Baggett, Jr.
Board Member Tam M. Doduc

NAY: None

ABSENT: None

ABSTAIN: None

Jeanine Townsend
Clerk to the Board

STATE WATER RESOURCES CONTROL BOARD
MONITORING AND REPORTING PROGRAM NO. 2009-0006-DWQ
GENERAL PERMIT FOR
LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

This Monitoring and Reporting Program (MRP) is issued pursuant to California Water Code section 13267(f). All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each sample shall be recorded on the sample chain of custody form. All analyses shall be performed in accordance with the latest edition of *Guidelines Establishing Test Procedures for Analysis of Pollutants*, promulgated by the United States Environmental Protection Agency (U.S. EPA) or other procedures approved by the Executive Director. In reporting monitoring data, the Administrator shall indicate whether any analysis was performed using a method not in conformance with U.S. EPA's Guidelines.

RECYCLED WATER PRODUCTION AND USE

For basins where the Regional Water Board has adopted a Salt and Nutrient Management Plan, compliance with any monitoring and reporting requirements of the Salt and Nutrient Management Plan is to be used in lieu of the monitoring schedule below.

Recycled water quality characteristics, based on data included in the monthly reports provided by the Producer to the Regional Water Board, shall be used in calculations to ascertain loading rates. For basins where a Regional Water Quality Control Board has not adopted a Salt and Nutrient Management Plan, the Administrator shall monitor recycled water production, distribution, and use within its service area for each respective basin / sub-basin (Attachment F) for the following parameters:

Parameter	Units	Sample Type	Frequency	
			Sampling	Reporting
Volume of recycled water[1, 2]	acre-feet	Varies	Monthly[3]	Annual
Total number of use areas / basin[4]	--	Observation	Annual	Annual
Total area of application	Acres	Observation	Monthly	Annual
Nitrogen application rate[5, 6]	lbs/acre/month	Calculated	Monthly	Annual
Salinity application rate[7]	lbs/acre/month	Varies[1]	Monthly	Annual

1 Estimation of the volume of recycled water shall not include other potable or non-potable "make-up" water also used to irrigate landscape, if any.

2 May be estimated based on daily percentage of recycled water supplied via a non-potable water supply system.

3 May be estimated based on available data (e.g., meters read every other month or quarterly)

4 This parameter represents the total number of use areas within the Administrator's service area with each respective basin / sub-basin.

5 Nitrogen application rate shall consider nutrients contained in the recycled water, based on monthly analytical data provided by the Producer to the Regional Water Board.

6 Nitrogen concentrations shall be calculated and reported "as N." For example, nitrate-nitrogen = 27 mg/L of (as NO_3) shall be converted and reported as nitrate-nitrogen = 6 mg/L (as N).

7 Salinity application rate shall be calculated using the applied volume of recycled, actual application area, the most recent results for the concentration of total dissolved solids in the recycled water.

Each month, the Administrator shall also verify that the recycled water has been filtered and disinfected consistent with criteria for disinfected tertiary recycled water. Based on monthly compliance data provided by the Producer to the Regional Water Board, the Administrator shall track turbidity[1] and disinfection[2,3] parameters. Exceedances of turbidity or disinfection standards[4] shall be documented and explained.

Each Producer and Distributor shall retain records of all monitoring information including all calibration and maintenance records, copies of all reports required by this General Permit, and records of all data used to complete the application for this General Permit. Records shall be maintained for a minimum of three years from the date of the sampling, measurement, or report. This period may be extended during the course of any unresolved investigation or litigation regarding the recycled water operation or when requested by the Executive Director.

The Administrator shall also ensure that Producers report priority pollutants to the Regional Water Board semiannually, in accordance with paragraph 7(b)(4) of the Recycled Water Policy.

ADMINISTRATOR REPORTING

By the 15 of April of each year, the Administrator shall compile information for each basin/sub-basin within its service area consistent with the format identified in Attachment F and submit the compilation to the State Water Board. The compilation shall also contain the following items:

1. A summary and discussion of the compliance record for the reporting period. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with this General Permit; and
2. A description of the measures employed by the Administrator during the reporting period to conduct periodic inspections of the Use Areas. The description shall include the following elements: date of inspections, description of any violations identified during the reporting period including any indications of unauthorized cross-connections, and all actions taken or planned for correcting violations, such as operation or facility modifications.

   The periodic inspection shall also include an evaluation verifying that the application of recycled water to the Use Area occurs at reasonable agronomic rates. The agronomic rate evaluation shall consider all applied nutrients from all sources (directly applied and as contained in the recycled water) the seasonal nutrient demand for the specific plants being grown; soil; and climate. If the agronomic rate evaluation determines that

[1] Nephelometric Turbidity Units (NTU)
[2] For chlorine disinfection processes, use the product of total chlorine residual and modal contact time measured at the same point, CT (mg/L-min)
[3] For other disinfection processes, the Administrator shall report using appropriate applicable standards (e.g., minimum ultra violet dose or ozone CT)
[4] Title 22, Sections 60301.320, 60301.230 (a), and 60301.230 (b)

exceedances of the agronomic rate may be occurring, the Administrator shall implement corrective actions to ensure recycled water use occurs at reasonable agronomic rates.

If the Administrator has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory.

3. A description of approved amendments to the Title 22 Engineering Report, if any.

   - A description of new use sites approved by CDPH. The description shall include information necessary for the CDPH to evaluate new use sites pursuant to the Title 22 Requirements. Examples of necessary information may include location of backflow prevention devices, drinking fountains, groundwater wells, et cetera.
   - Copies of approval letter(s) prepared by CDPH regarding such amendments to the Title 22 Engineering Report.

All reports submitted in response to this General Permit shall comply with the signatory requirements. Monitoring data and/or discussions submitted concerning wastewater treatment plant performance must also be signed and certified by the chief plant operator.

The Administrator shall implement the above monitoring program on the first day of the month following the issuance of the Notice of Applicability. Annual monitoring reports shall be submitted to the State Water Board. Additional information regarding the appropriate place to submit annual reports will be available on-line at the State Water Board's website[5].

SPILL REPORTING

1. The Administrator shall ensure the Producer or Distributor reports any noncompliance that may endanger human health or the environment. The Producer or Distributor shall immediately report orally, or electronically if available, information of the noncompliance as soon as (1) the Producer or Distributor has knowledge of the discharge, (2) notification is possible, and (3) notification can be provided without substantially impeding cleanup or other emergency measures, to the appropriate Regional Water Board office[6].

   A written report shall also be provided to the State Water Board within five (5) business days of the time the Producer or Distributor becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance.

2. The unauthorized discharge of 50,000 gallons or more of "disinfected tertiary recycled water" shall be reported as described in Spill Reporting No. 1. The unauthorized discharge of 1,000 gallons or more of "disinfected tertiary recycled water" shall be reported to the appropriate Regional Water Board office as soon as possible, but no later then seventy-two (72) hours after becoming aware of the unauthorized discharge.

[5] http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/landscape_irrigation_general_permit.shtml
[6] http://www.waterboards.ca.gov/waterboards_map.shtml

SIGNATORY REQUIREMENTS

All application reports or information to be submitted to the State Water Board shall be signed and certified by a duly authorized representative as follows:

1. For a corporation – by a principal executive officer or at least the level of vice president.
2. For a partnership or sole proprietorship – by a general partner or the proprietor, respectively.
3. For a municipality, state, federal, or other public agency – by either a principal executive officer or ranking elected official.

A duly authorized representative of a person may sign documents if:

a. The authorization is made in writing by a person described in Signatory Requirements paragraphs 1, 2, or 3.
b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
c. The written authorization is submitted to the Executive Director.

Any person signing a document pursuant to this MRP shall make the following certification:

> *I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.*

ATTACHMENT A - DEFINITIONS

WATER QUALITY ORDER NO. 2009-0006-DWQ

GENERAL PERMIT FOR LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

Within this General Permit, the following terms are defined as follows:

a. Administrator: Either a Producer or Distributor designated to administer a recycled water program necessary to fulfill the requirements of this General Permit.

b. Agronomic Rate: The rate of application of recycled water to plants that is necessary to satisfy the plants' watering and nutritional requirements, considering supplemental water (e.g., precipitation) and supplemental nutrients (e.g., fertilizers), while preventing or strictly minimizing the amount of nutrients that pass beyond the plants' root zone.

c. Basin: See *Groundwater Basin*

d. Beneficial Uses: Uses of the waters of the state that may be protected against quality degradation. Uses include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

e. California Department of Public Health (CDPH): The primary State agency responsible for protection of public health and the regulation of drinking water. The Legislature has defined several specific regulatory responsibilities of CDPH related directly or indirectly to recycled water use activities including establishment of statewide water reclamation criteria advising Regional Water Boards in the drafting of water reclamation requirements; review and approval of certain proposed water reclamation projects; abatement of contamination resulting from use of reclaimed water where public health is seriously threatened; and control of cross-connections between potable and nonpotable water systems.

f. Disinfected Tertiary Recycled Water: Filtered and subsequently disinfected wastewater that meets the criteria defined in CCR Title 22, sections 60301.230 and 60301.320

g. Distributor: Any combination, either in whole or in part, of a *Recycled Water Wholesaler, Recycled Water Supplier, or Recycled Water Retailer*.

h. Drift: The water that escapes to the atmosphere as water droplets from a cooling system (Title 22, section 60301.240)

i. Emerging Constituents/Chemicals of Emerging Concern (CECs): Any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and/or human health effects. In some cases, release of emerging chemical or microbial contaminants to the environment has likely occurred for a long time, but may not have been recognized until new detection methods were developed. In other cases, synthesis of new chemicals or changes in use and disposal of existing chemicals can create new sources of CECs. Chemicals that have been known to be discharged at given concentrations for which protective objectives have not been established may also be identified as CECs.

j. Engineering Report: The report filed with CDPH to produce or supply recycled water for direct reuse. The report shall clearly indicate the means for compliance with the Title 22 Requirements. (Title 22 section 60323)

k. Groundwater Basin (basin). Groundwater resources delineated by either the California Department of Water Resources, a Water Quality Control Plan, special act, or court order.

l. Hose Bibb: A faucet or similar device to which a common garden hose can be readily attached (Title 22 section 60301.400)

m. Incidental Runoff: Unintended small amounts (volume) of runoff from recycled water use areas, such as over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence.

n. Irrigation Management Plan: All applied nutrients from all sources (directly applied and as contained in the recycled water) and the agronomic application rate and seasonal need for the specific plants being grown to assure that nutrients are not applied beyond the vegetative uptake rate and discharged into the environment.

o. Producer: See *Recycled Water Producer.*

p. Recycled Water: Water which, as a result of treatment of municipal wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource. "Recycled water" and "reclaimed water" have the same meaning.[1]

[1] California Water Code section 26

q. Recycled Water Producer (Producer): Any public entity that produces recycled water. This includes public entities that further treat or enhance the quality of recycled water supplied by wastewater treatment facilities.

r. Recycled Water Retailer (Distributor): As defined in Water Code section 13575(7), any retail water supplier in whose service area is located the property to which a customer requests the delivery of recycled water services.

s. Recycled Water Supplier (Distributor)*:* As defined in Water Code section 13575(6), any local entity, including a public agency, city, county, or private water company, that provides retail water service.

t. Recycled Water Use Area (Use Area): An area where recycled water is to be used pursuant to this General Permit which is defined by its boundaries or project area (e.g. a golf course, residential neighborhood, school yard, park, etc.) so as to be consistent with Title 22 section 60301.920.

u. Recycled Water User (User): A person or entity that uses recycled water.

v. Recycled Water Wholesaler (Distributor): As defined in Water Code section 13575(5), any public entity that distributes recycled water to retail water suppliers and which has constructed, or is constructing, a recycled water distribution system.

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

x. Unauthorized Discharge: (Water Code section 13529.2) Discharge of recycled water, without regard to intent or negligence, not authorized by waste discharge requirements issued pursuant to Water Code sections 13260-13274 (e.g., RWD, WDRs, waiver, etc.), 13523 (i.e., WRRs), or 13523.1 (i.e., Master Reclamation Permit).

y. User: See *Recycled Water User*.

z. Water Quality Objectives: The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

aa. Water Recycling Criteria: Uniform statewide recycling criteria established in California Code of Regulations Title 22 by CDPH for each varying type of use of recycled water where the use involves the protection of public health (Water Code section 13521).

ATTACHMENT B - NOTICE OF INTENT (NOI)

FOR COVERAGE PURSUANT TO WATER QUALITY ORDER NO. 2009-0006–DWQ

GENERAL PERMIT FOR LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

I. Distributor (Required)[1]:

Agency / Organization / Name:			
Facility, if any:			
Conveyance Role (Check all that apply): ☐ Recycled Water Retailer ☐ Recycled Water Supplier ☐ Recycled Water Wholesaler	Distributor declares responsibility for administering program necessary to fulfill the requirements of this General Permit: ☐ Yes ☐ No		
Description of Recycled Water Conveyance Role:			
Existing Water Reclamation Requirements (if any):	Do you request to rescind the identified existing WRRs? ☐Yes ☐ No		
Mailing Address:			
City:	County:	State:	Zip:
Phone Number:	Fax Number:		
Contact Person:	E-Mail:		

II. Producer (Required)[1]:

Agency / Organization:			
Facility:			
Producer declares responsibility for administering program necessary to fulfill the requirements of this General Permit: ☐ Yes ☐ No			
Order Number:	WDID:	Treatment: ☐Disinfected Tertiary[2] ☐ Advanced[3]	
Existing Water Reclamation Requirements (if any):	Do you request to rescind the identified existing WRRs? ☐Yes ☐ No		
Mailing Address:			
City:	County:	State:	Zip:
Phone Number:	Fax Number:		
Contact Person:	E-Mail:		

[1] Attach multiple sheets if necessary; only one administrator of this General Permit is allowed per NOI.
[2] As defined in California Code of Regulations Title 22, sections 60301.230 and 60301.320
[3] Achieves “disinfected tertiary” quality and includes additional treatment.

III. Billing Address (Required):

Agency / Organization / Name:			
Mailing Address:			
City:	County:	State:	Zip:
Phone Number:		Fax Number:	
Contact Person:		E-Mail:	

IV. Salt and Nutrient Management Plans (required)

For projects where Salt and Nutrient Management Plan is in effect.

Salt and Nutrient Management Plan, approved by a Regional Water Board?

☐ Yes

☐ No; check one of the two boxes below:

☐ Under development, estimated completion date: I am actively participating in this development effort.

☐ No organized effort to develop a Salt and Nutrient Management Plan for the basin exists at this time. I will actively participate in the development of a Salt and Nutrient Management Plan when the effort commences.

For projects where Salt and Nutrient Management Plan is **not** in effect.

Antidegradation analysis completed consistent with Recycled Water Policy Paragraph 9d.(2)? ☐ Yes ☐ No

V. Certification (Required):

I hereby agree to meet and follow the requirements set forth in Water Quality Order No. 2009-0006-DWQ. I also agree to adhere to the Operation & Maintenance Plan, submitted herewith, and to ensure the proper use of recycled water for landscape applications. I also agree that, where an applicable Salt and Nutrient Management Plan is adopted by a Regional Water Board, I will ensure full compliance by all producers and distributors under this permit to any monitoring and reporting elements therein. Upon approval of coverage under the General Permit I will assume responsibility for administering an appropriate program necessary to fulfill the requirements of Water Quality Order No. 2009-0006-DWQ. I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

I.	Signature of Administrator:	Title:
	Printed or Typed Name:	Date:

I hereby agree to meet and follow the requirements set forth in Water Quality Order No. 2009-0006-DWQ. I also agree to adhere to the Operation & Maintenance Plan, submitted herewith, and to ensure the proper use of recycled water for landscape applications. I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.		
I.	Signature of Distributor[4,5]:	Title:
	Printed or Typed Name:	Date:
II.	Signature of Producer6:	Title:
	Printed or Typed Name:	Date:

[4] For additional distributors other than the Administrative Distributor.
[5] Attach multiple sheets if necessary.
[6] Attach multiple sheets if necessary.

ATTACHMENT C

BEST MANAGEMENT PRACTICES (BMPs)

WATER QUALITY ORDER NO. 2009-0006-DWQ

GENERAL PERMIT FOR
LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

This menu of potential Best Management Practices (BMPs) identifies some practices for the management of the production, distribution, and use of recycled water that, in addition to requirements in law[1], will help ensure the safe and efficient use of recycled water. Many of these BMPs are also intended to minimize or eliminate conditions that cause runoff, ponding, and windblown spray (drift). Recycled Water Specification B.15 requires the Administrator to implement and ensure that all other Producers, Distributors, and Users associated with each respective NOI implement the Required BMPs identified in Section I and to consider implementing other BMPs (Sections II – IV) as appropriate for a Recycled Water Use Area.

I. REQUIRED BMPs

A. Implementation of operations and management plan that provides for detection of leaks, and correction either within 72 hours of learning of a leak, or prior to the release of 1,000 gallons.
B. Proper design and operation of sprinkler heads.
C. Refraining from application during precipitation events.
D. Management of any impoundment such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater. In the event of an unauthorized discharge, the Executive Officer of the appropriate Regional Water Board shall be notified, as described in Provision C.16.

II. OTHER POTENTIAL BMPs: GENERAL OPERATIONAL CONTROLS

A. The Recycled Water Use Supervisor attends regular training regarding the safe and efficient operation and maintenance of recycled water use facilities.
B. The Recycled Water Use Supervisor ensures that all recycled water facilities are maintained, operated and repaired at all times in a manner that does not cause illness or injury to any person and in a manner that does not cause damage or injury to the real or personal property of any person or entity.
C. Where feasible, different piping materials are used to assist in water system identification.

[1] Water Code, Health and Safety Code, California Code of Regulations, etc.

III. OTHER POTENTIAL BMPs: WORKER/PUBLIC PROTECTION

A. Workers, residents, and the public are made aware of the potential health risks associated with contact or ingestion of recycled water, and are educated about proper hygienic practices to protect themselves and their families.
B. Workers are provided with the appropriate safety equipment and clothing during prolonged contact with recycled water.
C. Potable drinking water is provided for workers.
D. Toilet and washing facilities are provided.
E. Precautions are taken to avoid contact of recycled water with food and food is not allowed into areas that are still wet with recycled water.
F. A first aid kit is available on site, to prevent the contact of cuts and other injuries with recycled water.

IV. OTHER POTENTIAL BMPs: EFFICIENT IRRIGATION

Hardware:

A. All irrigation systems have the appropriate equipment/hardware for the application.
B. Irrigation system installed according to the design.
C. Irrigation system is designed to provide as much flexibility as possible for the operation of the irrigation system.
D. All sprinkler heads are uniform in brand, model and nozzle size. Where different arcs are needed at the same station, matched precipitation rates by changing nozzles.
E. Sprinkler heads placed per manufacturer's recommendations and based on measured spacing between sprinkler heads.
F. Where lower precipitation rates are required, such as on slopes, reduced nozzle size and spray angle per manufacturer's recommendations.
G. Installed booster pumps to increase pressure where needed.
H. Installed pressure reducers to decrease pressure where needed.
I. Pipes sized to convey water in the quantity required by the system.
J. Check valves installed either in-line or built into the sprinkler head assembly to minimize low head drainage after the valve has closed.
K. Automatic flow control devices installed that shut down a system if a break or other similar high flow/low pressure situation develops during irrigation.
L. Use centralized control systems or controllers that measure or can be programmed to use evaporation rates, or systems that use controls such as moisture sensors.

Maintenance:

M. Routinely adjust sprinkler heads so they achieve 80% head to head coverage throughout their intended arc. There are no obstructions that would interfere with the free rotation and smooth operation of any sprinkler, (e.g., trees, tall grass, shrubs, signs, etc.). The system is routinely tested so adjustments can be made.
N. Routinely adjust valves or pressure regulators so that the systems are operating at the pressure required by the sprinkler heads or emitters. Routinely test pressures periodically with a pressure gauge to maintain appropriate pressure levels.
O. Routinely test the accuracy of time clocks and recalibrate or repair as necessary.

P. Repair or replace broken risers, sprinklers, valves, etc. as soon as they are discovered; replace with appropriate make and model of equipment to maintain uniformity through out the system.
Q. Routinely check backflow devices, pumps, etc. for leaks and repair or replace as necessary.
R. Routinely clean screens and backwash filters to keep systems operating optimally.

Management:
S. Determined the optimum duration and frequency for irrigation cycles considering evapotranspiration, soil type, plant varieties being irrigated, climatic conditions, and any other factors affecting optimum irrigation efficiencies.
T. Irrigation with recycled water only occurs during periods of minimal public use of the Use Area with consideration given to allow an adequate dry-out time before the Use Area will be used by the public.
U. The frequency of respective irrigation cycles is only as often as necessary to meet the water requirements of the landscape. This is determined by measuring the amount of moisture remaining in the root zone reservoir between irrigation cycles. Moisture levels in the root zone is measured and optimized via the use of tensiometers, gypsum blocks, soil probes, the “feel method”, an on-site weather station, and or the California Irrigation Management Information System (CIMIS) to estimate soil moisture levels. These methods are reviewed, inspected, and maintained regularly to ensure accuracy and reliability.
V. Use automatic rain shut-off devices to reduce irrigation if significant rainfall occurs.
W. Use multiple rain shut-off devices to reduce ponding if precipitation rate is higher than the infiltration rate of the soil.
X. Majority of irrigation occurs in the evening or early morning to avoid the heat and/or windy parts of the day.
Y. Irrigated areas grouped into zones of similar water use.
Z. As needed, aerate the soil to improve infiltration of air and water into the soil.
AA. Perform good horticultural practices; fertilization, mowing, de-thatching, aeration, and pest control, as necessary to create the best growing environment for landscape vegetation.
BB. Provided infiltration areas at the lowest elevation of the Use Area.
CC. Installed storm drain inlet valves or plugs to contain accidental discharges during dry weather
DD. Implemented low impact development practices to minimize runoff that contains recycled water.
EE. Employ water budgeting using evapotranspiration data from CIMIS or an on-site weather station and crop coefficients from Water Use Classification of Landscape Species (WUCOLS)
FF. Dedicated landscape water meters for monitoring of water budget and leak detection.
GG. Conformance to local or the State Water Efficient Landscape Ordinance.
HH. Education of residents, customers and employees regarding the importance of efficient water use.
II. Each site supervisor has been provided a conductivity tester as a tool to help them determine the difference between recycled water and potable water.

ATTACHMENT D

RECYCLED WATER USE SIGNAGE

FOR

WATER QUALITY ORDER NO. 2009-0006-DWQ

GENERAL PERMIT FOR
LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

ATTACHMENT E - NOTICE OF TERMINATION

OF COVERAGE PURSUANT TO WATER QUALITY ORDER NO. 2009-0006-DWQ

GENERAL PERMIT FOR LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

I. Reason for Termination (Required):

☐Cessation of Recycled Water Use ☐Recycled Water not treated to required standards ☐Change of Ownership ☐ Other: _____
Notice of Applicability Order No. 2009-0006-DWQ WDID: _____ Date Issued: _____

II. Producer (Required)[1]:

Agency / Organization / Name:	
Facility:	
Order Number:	Facility WDID:

III. Distributor (Required)[2]:

Agency / Organization / Name:
Facility:

IV. Certification (Required)[3]:

I certify under penalty of law that all authorizations for uses of recycled water, have been eliminated or that I am no longer the Producer or Distributor of recycled water as defined in the Notice of Applicability identified in Section I. I understand that by submitting this Notice of Termination I am no longer authorized to produce or distribute recycled water pursuant to the Notice of Applicability identified in Section I. I also understand that submittal of this Notice of Termination does not release any of the subject entities from liability for any violations of, Water Quality Order No. 2009-0006-DWQ or the California Water Code, or the California Code of Regulations.

I.	Signature of Producer :	Title:
	Printed or Typed Name:	Date:
II.	Signature of Distributor :	Title:
	Printed or Typed Name:	Date:

[1] Attach multiple sheets if necessary.
[2] Attach multiple sheets if necessary.
[3] Attach multiple sheets if necessary.

ATTACHMENT F – BASIN/SUB-BASIN
ANNUAL REPORTING FORMAT

WATER QUALITY ORDER NO. 2009-0006-DWQ

GENERAL PERMIT FOR
LANDSCAPE IRRIGATION USES OF MUNICIPAL RECYCLED WATER

I. Administrator:

Agency / Organization:				
Facility:				
Landscape Irrigation General Permit Number:		Landscape Irrigation General Permit WDID:		
Mailing Address:				
City:	County:	State :	Zip:	Phone Number:
Contact Person:		E-Mail:		
Any CDPH Approved Amendments to the Title 22 Engineering Report? ☐Yes ☐ No				

II. Recycled Water Distributor Information[1]:

Agency / Organization:				
Facility:				
Landscape Irrigation General Permit Number:		Landscape Irrigation General Permit WDID:		
Distributor Recycled Water Conveyance Role (Check all that apply): ☐ Recycled Water Retailer ☐ Recycled Water Wholesaler ☐ Recycled Water Supplier				
Description of Recycled Water Conveyance Role:				
Mailing Address:				
City:	County:	State :	Zip:	Phone Number:
Contact Person:		E-Mail:		

[1] Attach multiple sheets if necessary.

ATTACHMENT F – BASIN/SUB-BASIN
ANNUAL REPORTING FORMAT
WATER QUALITY ORDER NO. 2009-0006-DWQ

III. Recycled Water Producer Information[2]:

Agency / Organization:			
Facility:			
WDRs Order Number[3]:		Additional Order Numbers[4]:	
Mailing Address:			
City:	County:	State:	Zip:
Phone Number:		Fax Number:	
Contact Person:		E-Mail:	

IV. Use Area Information:

Name:		
Street (Including address, if any):		
Nearest Cross Street(s):	County:	
Latitude/Longitude (From Center): _____ Deg _____ Min _____Sec North _____ Deg _____ Min _____Sec West Method of data collection: _____.		
Type(s) of Landscape Irrigation (Check all that apply): ☐ Park, Greenbelt, or Playground ☐ School Yard ☐ Athletic Field ☐ Residential Landscaping, Common Area ☐ Commercial Landscaping, Common Area ☐ Golf Course ☐ Industrial Landscaping, Common Area ☐ Freeway, Highway, and Street Landscaping ☐ Cemetery		
Basin / Sub-basin No., if any[2] .	Basin / Sub-basin name, if any[2] .	
Beneficial Uses of Groundwater within Basin / Sub-basin. (Select all that apply)[2] ☐ Agricultural Supply (AGR) ☐ Industrial Service Supply (IND)….. ☐ Water Contact Recreation (REC I) ☐ Aquaculture (AQUA)…… ☐ Municipal Supply (MUN) ☐ Wildlife Habitat (WLD) ☐ Industrial Process Supply (PRO) ☐ Noncontact Water Recreation (REC II) ☐ Other		

[2] Attach multiple sheets if necessary.
[3] Waste Discharge Requirements (WDRs) Order number for the order that authorizes discharge from the Producer's wastewater treatment plant (e.g., an order number for an NPDES Permit)
[4] Other WDRs order numbers for the wastewater treatment plant, enforcement orders, water reclamation requirements, etc.

ATTACHMENT F – BASIN/SUB-BASIN
ANNUAL REPORTING FORMAT
WATER QUALITY ORDER NO. 2009-0006-DWQ

V. Recycled Water Use Supervisor:

Agency / Organization / Name:			
Mailing Address:			
City:	County:	State:	Zip
Phone Number:	Fax Number:		
Contact Person:	E-Mail:		
Date of most recent training / certification as Recycled Water Use Supervisor:	Training / certification provided by:		

VI. Annual Recycled Water Report for the Basin / Sub-basin

Month	Volume of Recycled Water (Ac-ft.)	Total Number of Use Areas / basin	Area of Application (Acres)	Nitrogen Application Rate (lbs/Acre/Month)	Salinity Application Rate (lbs/Acre/Month)
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Annual Average[1]:					
Total:					

[1] Mean average value for the calendar year.

ATTACHMENT F – BASIN/SUB-BASIN
ANNUAL REPORTING FORMAT
WATER QUALITY ORDER NO. 2009-0006-DWQ

OTHER DOCUMENTATION

Describe approved amendments to the approved Title 22 Engineering Report. Include copies of approval letter(s) prepared by CDPH regarding such amendments to the Title 22 Engineering Report if any.
Provide a description of new use sites approved by CDPH. The description shall include information necessary for the CDPH to evaluate new use sites pursuant to the Title 22 Requirements. Examples of necessary information may include location of backflow prevention devices, drinking fountains, groundwater wells, et cetera.
Describe the nature, extent, and cause of any exceedances of turbidity or disinfection standards, if any. Discuss corrective actions taken or planned to resolve the exceedances of turbidity or disinfection standards

PERIODIC INSPECTION OF RECYCLED WATER USE AREA

Cross-connection Prevention

Recycled Water Use Area Name	Date of Inspection(s) for cross-connection prevention:	Description of violations identified, if any:	Actions taken or planned for correcting violations:

Agronomic Rate Evaluation

Average Agronomic Demand (lbs/acre/year)	Average Nitrogen application (lbs/acre/year)

Corrective actions taken to ensure recycled water use occurs at reasonable agronomic rates

Yorba Linda Water District

Water Recycling Facilities Planning Study

Appendix F: Preliminary Storage Analysis

6808001

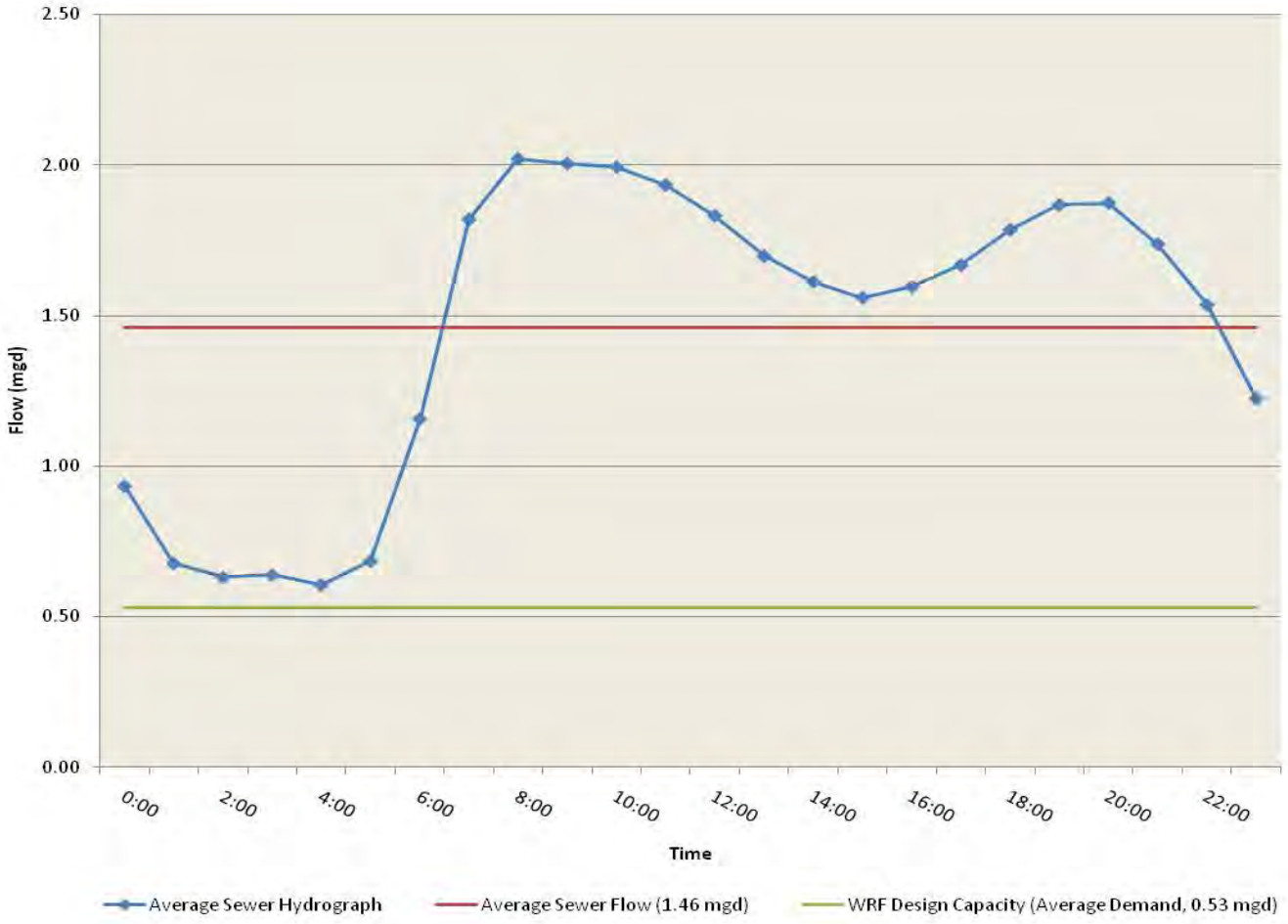
MALCOLM PIRNIE

Preliminary Storage Analysis

To determine the recycled water storage requirements, consideration of the inflow and outflow parameters is necessary. Figures 1 and 2 summarize the sewer flow monitoring data for the two manholes that were picked in Section 3 as the potential source of the inflow for the reclamation facility. The graphs show the average of the data that was collected during January 29, 2010 to April 14, 2010.

Figure F-1: WRP Influent in Comparison to the Sewer Diurnal Hydrograph (P1-8)

Figure F-2: WRP Influent in Comparison to the Sewer Diurnal Hydrograph (P2-1)



Based upon the sewer diurnal hydrographs, sufficient flow is available for the first phase of the water reclamation plant at either sewer main location alone.

Recycled water demands served by the water reclamation facility are mainly for irrigation purposes at the various city parks, golf courses, and schools. The irrigation peak hour demands would most likely fall between 9 pm and 5 am. The rationale in sizing the storage was based on the peak hour demand. It was sized for the 8 hour duration to accommodate for the peak hour irrigation demand. It was also assumed that there were existing water storage facilities at the parks, golf courses, and schools which could also be used to provide storage for the recycled water. Finally, it was assumed the reclamation facility would be able to temporarily ramp up production for the peak hour duration to satisfy the irrigation demands.

A more detailed water storage analysis will be conducted later in the design phase when the recycled demands are confirmed with the different customers.