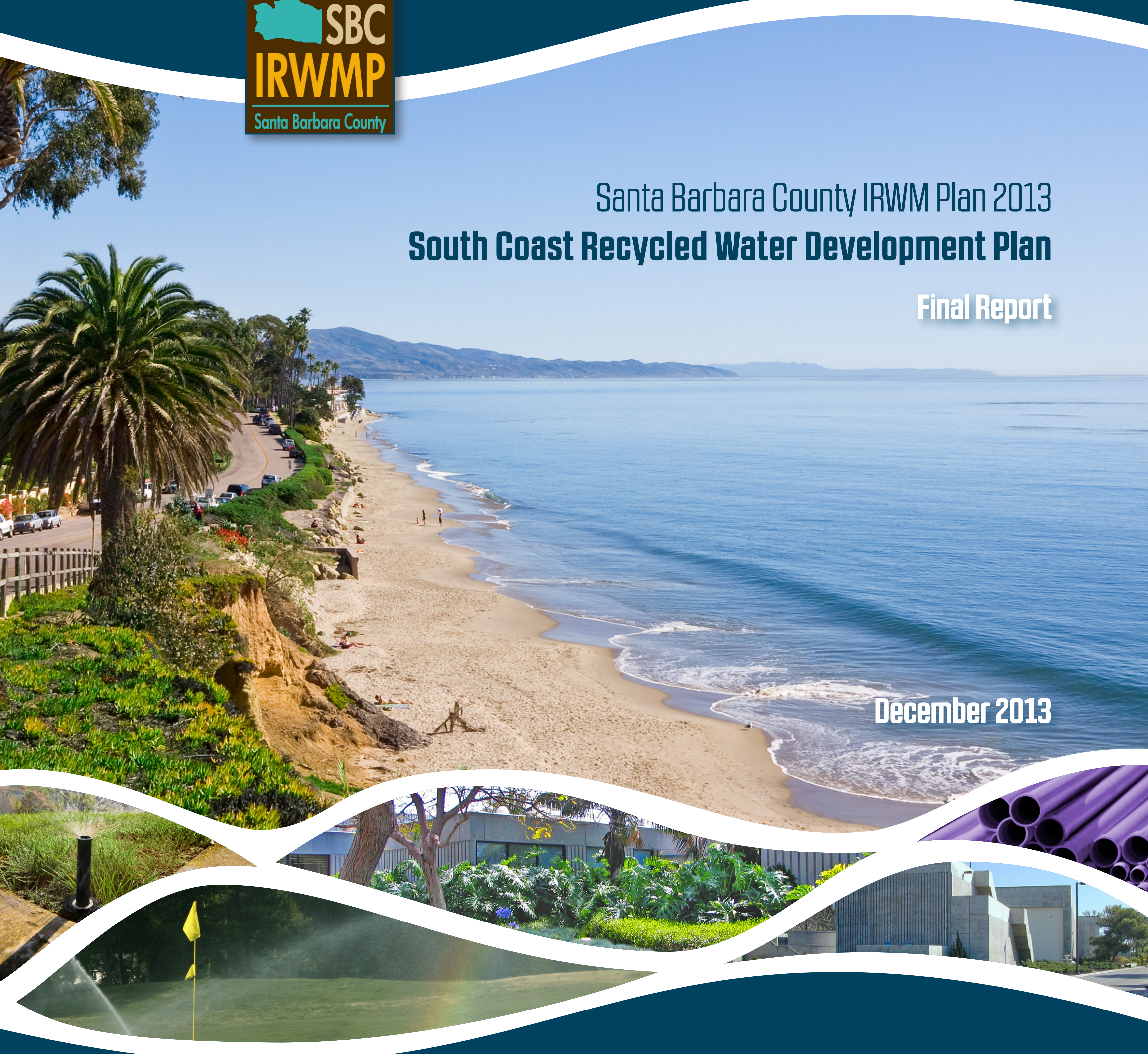


SBC IRWMP
Santa Barbara County

Santa Barbara County IRWM Plan 2013

South Coast Recycled Water Development Plan

Final Report

December 2013

Acknowledgements

The following agencies and team members participated in the development of this regional project report:

Agency Members:

Carpinteria Sanitary District
Craig Murray
Mike Mudugno

Carpinteria Valley Water District
Charles Hamilton
Bob McDonald

City of Santa Barbara
Rebecca Bjork
Theresa Lancy
Alison Jordan

County Water Agency
Bret Stewart
Matt Naftaly

Goleta Sanitary District
Kathleen Werner

Goleta Water District
Chris Rich
Brooke Welch

Goleta West Sanitary District
Mark Nation

Heal the Ocean
Hillary Hauser
James O. Hawkins

La Cumbre Water Company
Mike Alvarado

Montecito Sanitary District
Diane Gabriel

Montecito Water District
Tom Mosby

Regional Water Quality Control Board
Peter Meertens

Summerland Sanitary District
Jim McManus

Consulting Team Members:

RMC Water and Environment
Kathy Caldwell
Scott Lynch
Miluska Propersi
Grizelda Soto

Dudek
Jane Gray

Table of Contents

List of Tables

List of Figures

Appendices

List of Abbreviations

AFY	acre feet per year
ASR	aquifer storage and recovery
CCR	California Code of Regulations
CDPH	California Department of Public Health
CECs	constituents of emerging concern
CPC	California Plumbing Code
CSD	Carpinteria Sanitary District
CVWD	Carpinteria Valley Water District
CWC	California Water Code
DAC	Disadvantaged Communities
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ft	feet
GIS	Geographic Information System
gpm	gallons per minute
GSD	Goleta Sanitary District
Guidelines	EPA's Guidelines for Water Reuse
GWD	Goleta Water District
GWSD	Goleta West Sanitary District
hp	horsepower
IPR	Indirect Potable Reuse
IRWM	Integrated Regional Water Management

kWh/af	kilowatt-hours per acre-foot
LCMWC	La Cumbre Mutual Water Company
LF	linear feet
MF	microfiltration
MG	million gallons
mg/L	milligrams per liter
mgd	million gallons per day
MMD	maximum monthly demand
MSD	Montecito Sanitary District
MWD	Montecito Water District
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NPR	Non-potable reuse
NTU	Nephelometric Turbidity Units
NWRI	National Water Research Institute
O&M	operating and maintenance
plan	South Coast Recycled Water Development Plan
psi	pounds per square inch
RO	Reverse osmosis
RWQCB	Regional Water Quality Control Board
SB	City of Santa Barbara
Recycled Water Plan	South Coast Recycled Water Development Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
UV	ultraviolet light
USBR	United States Bureau of Reclamation
UWMP	Urban Water Master Plan
WDR	Waste Discharge Requirements
WRF	Water Reclamation Facility
WRR	water reuse requirements
WWTF	Wastewater Treatment Facility (for El Estero & Montecito)
WWTP	Wastewater Treatment Plant (For Goleta, Summerland and Carpinteria)

Executive Summary

Background

In 2010, Santa Barbara County Integrated Regional Water Management (IRWM) Region held a series of meetings to consider inclusion of focused studies in the Proposition 84 IRWM Planning Grant application. At a meeting of the Santa Barbara IRWM Cooperating Partners (the regional IRWM management group) and public stakeholders on August 19, 2010, several potential studies were considered in the IRWM Plan update. At that time, it was decided to include a South Coast Recycled Water Development Plan (Recycled Water Plan) as part of the IRWM Plan 2013 planning grant funding request to the Department of Water Resources (DWR). The Recycled Water Plan was originally conceived by the 2007 IRWM Plan. The funding request was granted by DWR and the Recycled Water Plan was approved as a part of the IRWM Plan 2013.

A focused stakeholder process was next established to support the development of the Recycled Water Plan. The plan's purpose is to identify technical, institutional, political, and social opportunities to advance the use of recycled water and address related constraints for implementation. The stakeholder planning goals are to increase regional supply, improve the quality of the water being discharged into the ocean, and increase the region's self-sufficiency by reducing dependency on imported water. The Recycled Water Plan Workgroup was organized to guide the planning process. The Workgroup members involved in this plan are listed below in **Table ES-1**.

Table ES-1: Recycled Water Plan Workgroup

Carpinteria Sanitary District	Heal the Ocean
Carpinteria Valley Water District	La Cumbre Mutual Water Company
City of Santa Barbara	Montecito Sanitary District
Goleta Sanitary District	Montecito Water District
Goleta Water District	Santa Barbara County Water Agency
Goleta West Sanitary District	Summerland Sanitary District

Plan Components

In the Recycled Water Plan, opportunities are identified to potentially restructure or integrate previously envisioned local projects and expand potential end uses to maximize regional objectives and potentially provide multiple benefits to multiple stakeholders. This plan identifies the opportunities and constraints of advancing recycled water generation and use in the south coast subregion and outlines the next steps to implementing potentially cost-effective, feasible projects as elements of the Region's water management portfolio. The scope of work for this plan consists of the following components:

- Initiate stakeholder process through IRWM Plan 2013 outreach process
- Conduct literature review of pertinent subregion systems and planning activities
- Summarize current and anticipated recycled water regulations and policies
- Describe existing recycled water treatment, wastewater treatment, storage, and delivery systems
- Identify potential customers and uses
- Identify treatment options to meet water quality needs
- Identify distribution system needs

- Identify potential near-term projects for implementation to meet expanded uses
- Identify constraints to the implementation of projects and next steps to address constraints and advance projects
- Coordination with Cooperating Partners on integration of the Recycled Water Plan into the IRWM Plan 2013

As part of the south coast subregion planning effort, the participating stakeholders decided to formulate two time frames - near-term and long-term. Near-term potential projects could be implemented over the next ten years, and the potential long-term projects could be implemented over the next 20 to 30 years.

Available Recycled Water Supplies

Table ES-2 shows near-term and long-term potential wastewater available to produce recycled water for future users at each wastewater plant in the plan area. Note that the maximum potentially available flow for future recycled water demands is based on the projected secondary wastewater flow minus the existing recycled water usage times a peaking factor (2.0) to account for maximum day demand. While the peaking factor may vary from system-to-system and year-to-year, a factor of 2.0 was deemed reasonable based on existing system and potential future recycled water users in the area.

Table ES-2: Potentially Available Recycled Water Supplies

Wastewater Treatment Plant	Projected Average Daily Secondary Wastewater Flow (MGD)		Existing Recycled Water (MGD)	Maximum Potentially Available for New Recycled Water Supply (MGD)[1]	
	Near-Term	Long-Term		Near-Term	Long Term
Carpinteria WWTP	1.6	1.6	--	1.6	1.6
El Estero WWTF[2]	8.0	8.5	0.76	6.48	6.98
Goleta WWTP	6.5	7.0	0.7	5.1	5.6
Montecito WWTF	1.0	1.0	--	1.0	1.0
Summerland WWTP	0.14	0.14	--	0.14	0.14
Total	**17.24**	**18.24**	**1.46**	**14.32**	**15.32**

Notes:

1. Maximum potentially available supplies based on projected secondary wastewater flow minus the existing recycled water usage times a peaking factor (2.0 typically) to account for maximum day demand. Peak hour demands are assumed to be met via diurnal storage facilities.
2. Amount of existing recycled water is the actual recycled wastewater being served due to the need for potable water blending.

Identification of Potential Recycled Water Demands

Potential recycled water demands were developed based on previous agency studies as well as updates provided by the participating agencies. Near- and long-term potential recycled water demands were identified based on specific agency criteria which took into consideration their local water and wastewater settings.

For the near-term, an estimated average annual demand of 67 AFY of new recycled water use is projected by the agencies. A potential of an additional 4,854 AFY of recycled water demand was also identified for the long-term planning horizon. Along with the existing recycled water demands, the total identified potential recycled water use in the subregion could reach 6,556 AFY. This does not include the potential agricultural users in the Goleta and Montecito areas. Carpinteria Valley Water District's potential long-term demand does include agriculture demand identified by the District during this plan.

Table ES-3 provides a summary of the existing and potential future demands for the near- and long-term planning periods. Only the City of Santa Barbara and Goleta Water District have included potential near-term demands.

Table ES-3: Existing and Potential Recycled Water Demand Summary by Agency

Agency	Average Annual Recycled Water Demand (AFY)				
	Existing	Potential Near-Term		Potential Long-Term	
		Additional Demand	Subtotal	Additional Demand	Total
Goleta WD	785	27	**812**	72	**884**
City of Santa Barbara[1]	850	40	**890**	266	**1,156**
La Cumbre MWC	--	--	**0**	130	**130**
Montecito WD	--	--	**--**	1,786	**1,786**
Carpinteria VWD	--	--	**--**	2,600	**2,600**
Totals	**1,635**	67	**1,702**	4,854	**6,556**

Notes:
1. Demand does not include approximately 300 AFY of internal plant use of recycled water.

Recycled Water Treatment Needs

A summary of recycled water regulations was conducted as part of this plan and outlines the many Federal, State, and local regulations that recycled water systems must meet. In California, the level of treatment required is primarily based on three conditions:

- Type of user as dictated in Title 22 and by the Department of Health and Safety
- Local groundwater basin requirements as dictated by the local RWQCB
- Specific end-user water quality needs

For this plan, the majority of the potential users are urban irrigation and commercial uses. Therefore, the typical processes that meet the Title 22 requirements are tertiary filtration and disinfection. **Table ES-4** provides a summary of the improvements needed at each of the plants in the plan area.

Recycled Water Distribution System Needs

Design criteria were developed to help identify the near- and long-term distribution improvements and to evaluate potential alternatives. Criteria for peaking of flows, pipeline sizing, storage, pumping facility were developed to help determine facility sizes and costs. Existing system improvements were also considered for the Goleta and Santa Barbara systems as near- and long-term system expansions would not be possible without addressing current needs. Potential near- and long-term projects were then created utilizing existing system capacities and the identified potential distribution systems.

Table ES-4: Existing Wastewater Treatment Plants and their Treatment

Wastewater Treatment Plant	Existing Treatment	Near-Term Needs	Long-Term Needs
Goleta WWTP	Tertiary	None	None
El Estero WWTF	Tertiary	Install MF/RO units in place of existing filters.	None
Montecito WWTF	Secondary	None planned	Expand to Tertiary treatment. If agriculture is served, MF/RO will also be needed
Summerland WWTP	Tertiary	Exploratory	Exploratory
Carpinteria WWTP	Secondary	None planned	Expand to tertiary treatment. If agriculture is served, RO will also be needed

Analysis Approach

The following steps were conducted to develop the potential recycled water projects and options:

- Identify potential customer for both near- and long-term
- Assess recycled water supply and treatment needs through 2030
- Establish planning criteria and distribution system needs

Using this information, potential recycled water projects and options were developed through a series of iterative steps that identified projects with the highest likelihood of implementation.

For the Goleta and Santa Barbara areas, near- and long-term projects and options were developed from each agency's most recent recycled water studies and refined based on discussions with the individual agencies. For the Montecito and Carpinteria areas, potential long-term projects and options were developed via a phased approach. The initial phased projects were developed to serve only potential users located near the WWTPs. Subsequent phases were extended out from the initial phase projects until all identified demands were included or the maximum available wastewater flow was fully allocated.

Table ES-5 presents a summary of the near- and long-term projects for each of the four areas within the south coast region. This table illustrates the order of magnitude of effort for implementing the various projects. Capital and unit costs vary greatly due to a variety of factors including local conditions, project scale, and rehab or expansion of existing systems versus completely new recycled water systems. Therefore, each agency will need to determine the benefits and costs of the potential projects to its own water resource needs and other circumstances, as comparison of projects between areas has limited value. **Figure ES-1** shows on overview of the existing and potential near- and long-term projects identified in this plan for the south coast region.

Benefits to the Region

As part of the IRWM Plan 2013, the County has a collective goal of serving 7,035 AFY of recycled water by 2035. Of that total, 2,293 AFY is expected to be recycled water from the south coast subregion. To reach this goal, the Goleta Water District plans to expand to 870 AFY from 785 AFY, and the City of Santa Barbara plans to expand to 1,423 AFY from 1,150 AFY. This target could be surpassed if the Montecito or Carpinteria areas are able to move forward with implementation of their potential reuse projects.

Table ES-5: Summary of Estimate Potential Project Costs[1] – All Areas

Project Area	Potential Demand (AFY)	Estimated Capital Costs	$/AF[2]
Near-Term Projects			
Goleta Area[3]	812	$3,749,000	$300
Santa Barbara Area[3]	891	$16,100,000	$1,300
Total Near-Term	**1,703**	**$19,849,000**	**$800**
Long-Term Projects			
Goleta Area	58	$8,758,000	$11,000
Santa Barbara Area (Includes SB-Option 1)	371	$6,510,000	$1,300
Montecito (Includes M-Option 2)	659	$17,535,000	$1,900
Carpinteria	811	$20,993,000	$1,900
Total Long-Term	**1,899**	**$53,796,000**	**$2,100**
Total (Near + Long-Term)	**3,602**	**$73,645,000**	**$1,500**

Notes:

1. Estimated costs include constructions costs and markups for implementation (planning, engineer, etc.) and contingencies. These costs are intended present order of magnitude level unit costs so that some level of prioritization of costs may be utilized by future project planning efforts.
2. $/AF is the capital unit costs and does not include any operations and maintenance costs.
3. Near-term projects demands also include existing system user demands.

Near- and long-term recycled water projects provide a variety of benefits to individual agencies, the south coast subregion of Santa Barbara County, and Santa Barbara County as a whole. Benefits can be identified by the performance measures and the objectives achieved by the projects. The Santa Barbara County IRWM Plan 2013 has identified eight regional objectives of which recycled water projects achieve five of those objectives.

Recycled water projects benefit the region by developing and maintaining a diversified mix of water resources, augmenting supplies by using recycled water for landscaping or other non-potable uses, improving wastewater quality, utilizing technology to manage waste in an economical and environmentally sustainable manner, reducing wastewater discharges into the ocean, maintaining and enhancing water and wastewater infrastructure efficiency and reliability, planning for and developing infrastructure for disadvantaged communities, and helping the region plan and adapt to climate change.

The Recycled Water Plan will assist in meeting the following IRWM Plan 2013 objectives:

- Protect, Conserve, and Augment Supplies
- Protect and Improve Water Quality
- Maintain and Enhance Water and Wastewater Infrastructure Efficiency and Reliability
- Plan for and Adapt to Climate Change
- Equitable distribution of benefits as measured by new planning or implementation projects, the volume of water recycled, and the number of new infrastructure improvements

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

N
0 0.5 1 2
Miles

Recycled Water System
- Existing
- Potential Near-Term
- Potential Long-Term

Water Agencies
- Carpinteria VWD
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Other Features
- US/State Highway
- City Boundary
- County Boundary
- Railroad
- WWTP

Potential Recycled Water Systems

Figure ES-1

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\

Findings: Constraints and Next Steps

Several potential projects were identified for both the near- and long-term opportunities. These projects range from ones that are expanding existing systems to projects that were developed on a more conceptual level for the long-term. The findings from this Study are a summary of the results of the literature review, regulatory review, potential project identification and cost estimates, and committee meetings.

Potential Constraints

During this planning process, several types of constraints to expanding recycled water use were discussed by the planning stakeholders. These constraints range from user specific concerns and specific project challenges to agency and regional constraints or challenges. The constraints to each project or agency can vary depending on a variety of factors. Listed below are the identified constraints to implementing the potential recycled water projects.

- **User Constraints**
  - Water quality can be a concern to users due to high Total Dissolved Solids (TDS) in the region's wastewater supplies.
  - Cost of conversion to recycled water from potable water can be a major challenge to some customers.
  - Customer viability can impact a projects revenue and long-term feasibility as customer can move, close their businesses, or change their water or water quality demands based on economic or other factors.
- **Project Challenges**
  - Construction of recycled water projects can result in a number of potential impacts to the community. These impacts must be considered as part of the planning, design, environmental documentation, system startup, and customer conversion processes.
  - Timing or phasing of projects need to be in sync with public and political support as well as financing availability.
  - Expansion of recycled water systems can be limited by the hydraulic capacity of existing facilities and customer demand usage patterns.
  - Recycled water use can be limited by available wastewater flows, especially in peak season demand periods.
  - Future regulations and the potential need to utilized future technologies can present a challenge to project implementation and create uncertainty in the decision-making process. Indirect potable reuse projects can face significant regulatory challenges and can take several years to address and implement.
- **Agency Challenges**
  - Substantial economic cost/benefit analyses should be performed when determining the feasibility of potential recycled water projects. Many recycled water projects have unique challenges, and therefore, it is important when evaluating the feasibility of recycled water projects that all the direct and secondary benefits be considered in comparison to the costs.
  - Financing of projects can be a major project implementation challenge, and many projects will need to plan ahead in conjunction with other capital improvement projects, address cost-sharing arrangements, and/or look for external funding sources.

  - Customers can have concerns over using recycled water due to the cost of conversion public health and safety, and the impacts of water quality on the applied use.
  - Recycled water systems have a relatively high lifecycle cost. Major improvements to the Goleta Water District's and the City of Santa Barbara's existing recycled water systems are necessary to allow for future expansions of these systems.
  - Water agencies must coordinate and establish agreements with the corresponding wastewater agency as all of the area's wastewater treatment plants must be upgraded to serve recycled water.
  - Public awareness programs, such as those conducted by the Goleta Water District and the City of Santa Barbara, are important aspects of recycled water planning and on-going operations that help to address potential concerns regarding public health and safety concerns, as well as recycled water qualities.
- **Regional Challenges**
  - Several potential projects involve multiple agencies and will required institutional agreements to be able to address cost and benefits concerns for each agency involved in the project.
  - The region has a significant agriculture sector that could use recycled water. However, there are water quality constraints that need to be addressed via additional treatment as well as addressing the cost difference between recycled water and current ground or untreated surface waters that the majority of the agricultural sector uses as water supply.
  - Implementation of many of the potential projects may require external funding, which could come from State or Federal sources.

Next Steps

The following summarizes the findings and recommended steps at both a regional and area (or agency) level and are based on the implementation needs of the identified potential projects and the constraints noted above.

- To support the decision-making process, the value of recycled water to the region as a whole, along with other conservation measures, needs to be more fully assessed by the water agencies on a regional basis in terms of supply reliability. The region relies heavily on imported water supplies, and recycled water can help to provide a more reliable water supply portfolio. As part of this assessment, the avoided costs that recycled water provides in terms of wastewater disposal and water supply costs need to be more fully identified and evaluated.
- For recycled water projects employing reverse osmosis treatment, the reduction in salts, nutrients, and other constituents of concern could provide benefits to the region, especially to groundwater basins. Such projects should be considered as possible management strategies in the development of the Salt/Nutrient Management Plans in the individual basins in the region.
- To expand recycled water use to more users, additional efforts may be needed to address customer recycled water quality needs, including golf courses, industrial/commercial users, and agricultural users.
- Agencies should consider a regional approach to pursuing project funding needs under the State of California's IRMW/Proposition 84 bonds, the State Water Resources Control Board (SWRCB) for recycled water planning studies, and the United States Bureau of Reclamation's (USBR) Title XVI program.

- Many of the identified projects will involve multiple agencies, and will therefore require institutional level agreements. Typically, these projects involve the local water purveyor and wastewater agency and are typically more straightforward arrangements. However, multiple water agencies have been identified for some potential projects, notably the City of Santa Barbara options to serve the La Cumbre County Club and the Santa Barbara Cemetery, which are both located outside the City of Santa Barbara's water service area. The underlying financial issues should be addressed early in the planning process.
- For the Carpinteria area, as well as other areas that may want to consider IPR, such projects typically take 10 or more years to fully implement from initial concept planning stages. In addition to the typical reuse project planning and design work, IPR projects also require extensive groundwater analysis, modeling, testing, treatment process pilot studies, a program to educate and address public concerns, and extensive discussions/negotiations with regulatory agencies.
- Many of the projects will require environmental documentation. Depending on the timing and overlap of the projects, multiple projects could be included in one environmental documentation effort, or a programmatic EIR/EIS could be developed.

Chapter 1 Introduction

1.1 Background

In 2010, the Santa Barbara County Integrated Regional Water Management (IRWM) Region held a series of meetings to consider inclusion of focused studies in the Proposition 84 IRWM Planning Grant application. A meeting of the Cooperating Partners (the regional IRWM management group) and public stakeholders on August 19, 2010, reviewed several potential studies to be included as components of the IRWM Plan 2013. The stakeholders determined that focus studies would be beneficial to the region, and that it would be beneficial to include a recycled water plan assessing overall supply and demand and opportunities and constraints for expanding use of recycled water.

A focused stakeholder process was next established to support the development of the Recycled Water Plan, which was originally conceived under the 2007 IRWM Plan. The plan's purpose is to identify technical, institutional, political, and social opportunities to advance the use of recycled water and address related constraints for implementation. Stakeholders look to recycled water to increase regional supply, improve the quality of the water being discharged into the ocean, and increase the region's self-sufficiency by reducing dependency on imported water. The Recycled Water Plan stakeholder process is a part of the larger outreach process of the IRWM Plan 2013.

The Recycled Water Plan process included Cooperating Partner agencies and organizations, other south coast water and wastewater agencies, and public stakeholders. The Santa Barbara County Water Agency participated in and provided lead agency administrative support for the Recycled Water Plan.

1.2 Plan Components

Building on recent and current recycled water planning activities in the south coast subregion, this Recycled Water Plan considers the findings of previous studies as well as current thinking and has facilitated discussion among the subregion's water retail and wastewater treatment agencies from a regional perspective. As recognized in the DWR IRWM Propositions 84 and 1E Guidelines, applying a regional approach to recycled water planning can lead to strategies that result in synergies and efficiencies in the utilization of financial and water resources. In this plan, opportunities are sought to potentially restructure or integrate previously envisioned local projects and expand potential end uses. This plan identifies the opportunities and constraints of advancing recycled water generation and use in the south coast subregion and outlines the next steps towards implementing potentially cost-effective, feasible projects as elements of the Region's water management portfolio.

The scope of work consists of the following components:

- Initiate stakeholder process through IRWM Plan 2013 outreach process
- Conduct literature review of pertinent subregion systems and planning activities
- Summarize current and anticipated recycled water regulations and policies
- Describe existing recycled water treatment, wastewater treatment, storage, and delivery systems
- Identify potential customers and uses
- Identify treatment options to meet water quality needs
- Identify distribution system needs
- Identify potential near-term projects for implementation to meet expanded uses
- Identify constraints to the implementation of projects and next steps to address constraints and advance projects

- Coordination with Cooperating Partners on integration of the plan with IRWM Plan 2013

1.3 Stakeholder Process

1.3.1 Initiation of Stakeholder Process

The IRWM Plan 2013 includes participation of two stakeholder groups - the Cooperating Partners and public stakeholders. Cooperating Partner stakeholders are members of the Cooperating Partners, which is the regional water management group for the Santa Barbara County IRWM program. Cooperating Partner stakeholders are representatives of governmental or non-profit organizations with an interest in or authority over water resources. Public stakeholders are stakeholders who have been identified as having a stake in the IRWM process and/or have shown an interest in being included in the IRWM Plan 2013 process.

A collaborative working relationship between Cooperating Partner and public stakeholders was established early in the planning process. Stakeholders worked together in August and September 2010 to write, with the assistance of consultants, the scope for the Recycled Water Plan that became part of the IRWM Plan 2013 planning grant application.

A conference call regarding south coast recycled water planning was held on Tuesday, August 31, 2010, with the goal of identifying and scoping elements to be included in the plan. Any interested stakeholders unable to attend the conference call were contacted separately by the consultants and updated on the meeting discussion and outcomes. Potential elements of the plan that were considered included a literature review of existing recycled water planning documents, analysis of regulations, identification of existing systems, potential urban and agricultural customers and uses, distribution systems to serve new customers, barriers including environmental, water quality, political, and social issues, and the most cost-efficient approach to expansion. Stakeholders contributed existing recycled water planning documents (UWMPs, recycled water master plans, feasibility studies, etc.) to assist consultants in the writing of the scope of work.

The scope of work was reviewed by Laura Peters, Sr. Engineer, Water Resources, IRWM Regional Planning Branch, Regional Partnerships Section, DWR, and formerly with the State Water Resources Control Board (SWRCB), Division of Financial Assistance, Recycled Water Program. Ms. Peters gave positive feedback and commented on topics that should be included in the scope of work because they are required by the State Board for SWRCB grants or low interest loans are included in the scope of work.

The Cooperating Partner stakeholders reviewed a draft and final scope of work outline in early September 2010. The Cooperating Partners involved in scoping the Recycled Water Plan in 2010 are listed below in **Table 1-1**.

Table 1-1: Recycled Water Plan Workgroup

Carpinteria Sanitary District	Heal the Ocean
Carpinteria Valley Water District	La Cumbre Mutual Water Company
City of Santa Barbara	Montecito Sanitary District
Goleta Sanitary District	Montecito Water District
Goleta Water District	Santa Barbara County Water Agency
Goleta West Sanitary District	Summerland Sanitary District

1.3.2 Stakeholder Outreach

The stakeholder process for the Recycled Water Plan was coordinated through the IRWM Plan 2013. In late 2011, public stakeholders were identified using the existing IRWM stakeholder contact list that had been frequently updated since the submittal of the original IRWM Plan in 2007. Stakeholder outreach in the region has been active due to organizing efforts centering on periodic grant applications, IRWM planning meetings, the DWR Regional Acceptance Process, as well as regular and on-going outreach. The Cooperating Partner stakeholders and public stakeholders were also asked to supplement the stakeholder lists with additional names of individuals and groups relevant to the process. The public announcements regarding the development of the IRWM Plan 2013 and the Recycled Water Plan have resulted in new public and Cooperating Partner stakeholders.

1.3.3 Workgroup Outreach and Organization

The IRWM Plan 2013 Kick-Off Meeting on December 7, 2011 was announced to and attended by all interested public stakeholders and Cooperating Partner stakeholders. The meeting was publicized in the local press and on the IRWM website. The intent to form the IRWM Plan 2013 South Coast Recycled Water Plan Workgroup was announced during this meeting. The workgroup was populated by stakeholders over the next month.

On January 19, 2012, the Recycled Water Plan Kick-Off meeting was held at the City of Santa Barbara Public Works offices at 619 Garden Street to organize a workgroup to guide the planning process. The Recycled Water Plan Workgroup, made up of representatives of south coast water and wastewater agencies, the County of Santa Barbara Water Agency, and Heal the Ocean, is listed in **Table 1-2**. The location of the water and wastewater agencies is shown in **Figures 1-1** and **1-2**, respectively. The workgroup was responsible for conducting regular meetings, providing input on task execution, and reviewing draft and final draft versions of the planning document.

The workgroup reports to the Cooperating Partners through the Cooperating Partners Steering Committee. The Cooperating Partners are represented by the County Water Agency (designated lead agency for the Prop 84 Santa Barbara County Region IRWM Plan 2013 [IRWM Plan 2013]). The Cooperating Partners are responsible for delivering a technically sound and updated IRWM Plan 2013 to DWR per the contract dated October 7, 2011.

Table 1-2: Recycled Water Plan Workgroup Members

Kathleen Werner	Goleta Sanitary District
Hillary Hauser	Heal the Ocean
James O. Hawkins	Heal the Ocean
Theresa Lancy	City of Santa Barbara
Rebecca Bjork	City of Santa Barbara
Alison Jordan	City of Santa Barbara
Craig Murray	Carpinteria Sanitary District
Mike Mudugno	Carpinteria Sanitary District
Chris Rich	Goleta Water District
Brooke Welch	Goleta Water District
Bob McDonald	Carpinteria Valley Water District
Charles Hamilton	Carpinteria Valley Water District
Mark Nation	Goleta West Sanitary District
Diane Gabriel	Montecito Sanitary District
Tom Mosby	Montecito Water District
Mike Alvarado	La Cumbre Water Company
Jim McManus	Summerland Sanitary District
Hilary Campbell	2nd District, Supervisor Janet Wolf
Bret Stewart	County Water Agency
Matt Naftaly	County Water Agency
Peter Meertens	RWQCB

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

N

0 0.5 1 2
Miles

Water Agencies

- Carpinteria VWD
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

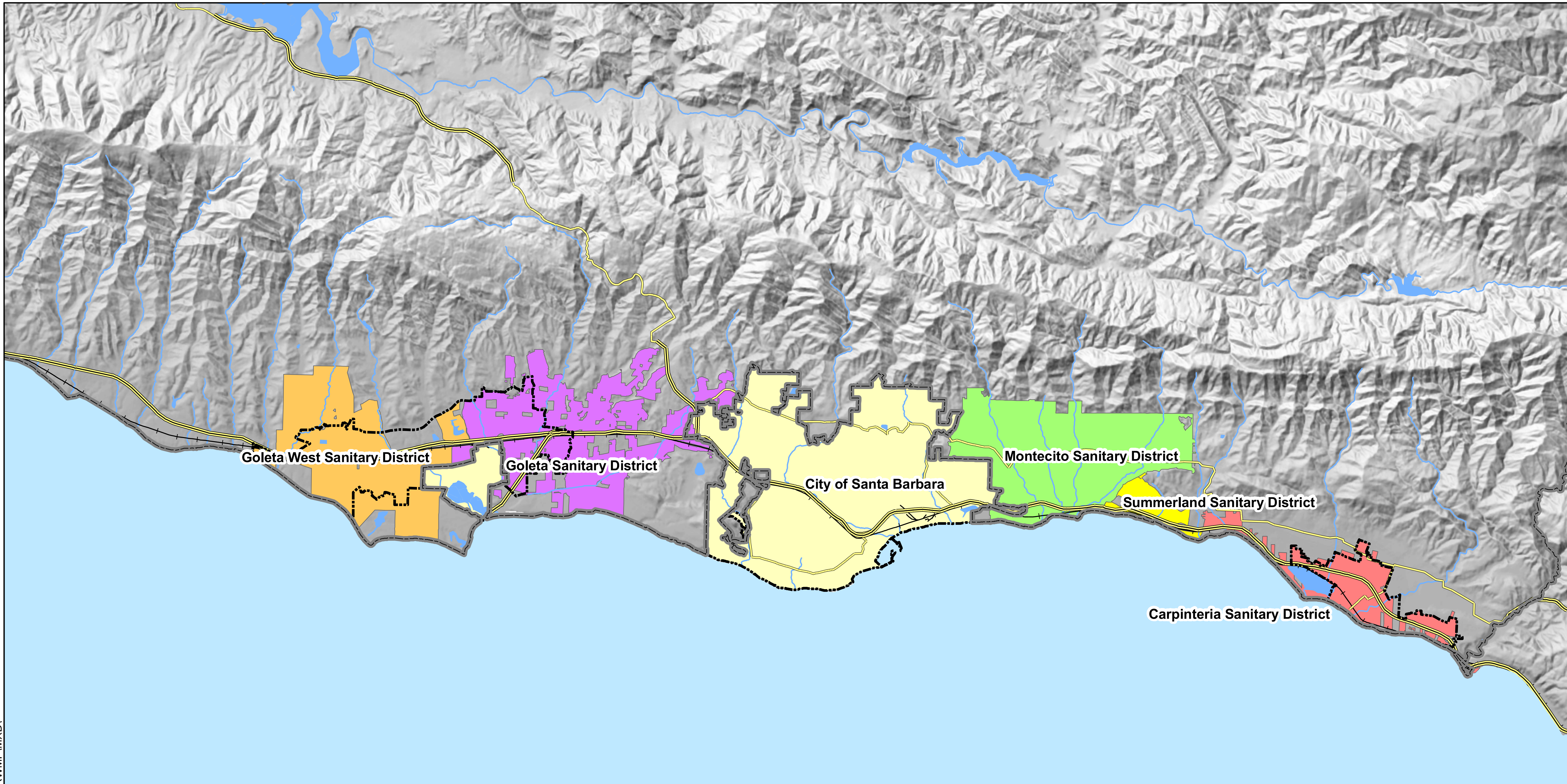
Other Features

- State Highway
- US Highway
- City Boundary
- County Boundary
- Railroad

Water Agencies

Figure 1-1

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

N

0 0.5 1 2
Miles

Wastewater Agencies
- Carpinteria Sanitary District
- City of Santa Barbara
- Goleta Sanitary District
- Goleta West Sanitary District
- Montecito Sanitary District

Other Features
- State Highway
- US Highway
- City Boundary
- County Boundary
- Railroad

Wastewater Agencies

Figure 1-2

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\

At the January 19, 2012 Kick-Off meeting, the scope of work and plan objectives were discussed. In addition, the workgroup participants agreed upon a set of guidelines that were crafted to make operations of the workgroup as open and fair as possible. The guidelines identify the team's formal authority, what it may do with and without permission, and with areas of shared responsibilities or areas in which team members are expected to initiate action to support others. Workgroup participants who are members of the Cooperating Partners were required to possess clear authority to represent agency or organization. Workgroup members also agreed to the following: provide expertise; provide requested information in a timely manner (adhering to project deadlines and schedule); participate in all meetings; attend IRWM Plan 2013 public meetings; to make decisions by consensus when possible and by a majority vote when full consensus was not possible; review and approve technical memorandums, and review the draft and final document.

Two public stakeholders who attended the January 19, 2012 meeting expressed their opinion that current water quality standards for recycled water were not adequate from a public health perspective and urged the workgroup to plan the issue. The Santa Barbara County Water Agency and project consultants advised that investigating this issue is not within the DWR approved scope of the project and that time and funding available limits any expansion of that scope. The stakeholders were urged to take the matter up with the appropriate State regulating agencies, which include the Department of Public Health and the State Water Resources Control Board. The Recycled Water Plan, however, includes information on the potential treatment options to remove constituents of emerging concern (CECs).

1.3.4 Public Stakeholder Outreach

Public stakeholders were welcome to attend all recycled water workgroup meetings but are not voting members. Time was made available at the end of every meeting for public comments. In accordance with the DWR approved scope of work, public stakeholders participated in general IRWM Plan 2013 public meetings and gave input on draft and final versions of the Recycled Water Plan.

Public input into the development of the IRWM Plan 2013 is outlined in the DWR approved "Work Plan: Appendix 2, Scope of Work: Santa Barbara County/South Coast Subregion, Recycled Water Development Plan" that is part of the Santa Barbara County IRWM Plan 2013 planning grant application and DWR - Santa Barbara County IRWM Plan 2013 contract. The scope of work provides as follows, "the public will be invited to attend the aforementioned meetings (workgroup meetings) to provide input on scoping. The public also will have the opportunity to comment on this plan when the Santa Barbara County IRWM Plan Update 2013 public meetings are held."

Chapter 2 Literature Review

As a first step toward developing the Recycled Water Plan, the Cooperating Partners supplied previous recycled water planning documents and project implementation information. During monthly progress meetings, the Cooperating Partners reviewed and discussed the existing system and facilities, previously studied projects, and current agency plans. Pertinent documents reviewed during the planning process included:

Carpinteria Sanitary District

- Wastewater Collection System Master Plan, April 2005

Carpinteria Valley Water District

- Water Reliabilities Strategies 2030, February 2006

City of Santa Barbara

- Water Supply Planning Study, August 2009

Goleta Water District and Goleta Sanitary District

- Reclaimed Water Project Study, January 1999

Goleta West Sanitary District

- Proposed New Wastewater Treatment Plant Site and Treatment Alternatives Evaluation, July 2004

Heal the Ocean

- Cost of Tertiary Wastewater Treatment for Southern Santa Barbara County, August 2001

Water Reclamation Research, September 2000

- California Ocean Wastewater Discharge Report and Inventory, March 2010

Montecito Water District and Montecito Sanitary District

- Water Reclamation Study, January 1991

Appendix A contains a complete list of the documents and data collected as part of the review effort. The following sections describe key points and summaries of each recycled water planning and project implementation efforts.

2.1 Carpinteria Sanitary District

Wastewater Collection System Master Plan, April 2005

The Wastewater Collection System Master Plan analyzed Carpinteria Sanitary District's (CSD) wastewater collection system for the planning period between 2004 and the ultimate build out of CSD's identified service area.

The Master Plan identified the following findings that are relevant to the plan:

- Within CSD's service area, the primary land use is residential, with limited commercial, industrial, public, and agricultural secondary land uses.
- There is a significant visitor population year-round, peaking in the summer months.
- The existing average wastewater flow at CSD's Wastewater Treatment Plant (WWTP) is 1.4 MGD, based on flow monitoring at the treatment plant. Flow rates have dropped measurably after

a peak in 1998. System flow appears to be a function of annual rainfall and the system is likely subject to significant infiltration and inflow.

- The existing WWTP has a permitted capacity of 2.5 MGD. Daily influent flows averaged 1.4 MGD in 2002, which represents 54% of permitted capacity. Average daily flows peaked in 1998 at 1.73 MGD, which is 69% of permitted capacity. State regulations typically require wastewater agencies to initiate expansion of treatment capacity when they reach 80% of their permitted capacity. Based on available information, the ultimate system flow, including flows from future development, is not expected to exceed the permitted capacity of the plant. Ultimate flows are also not expected to exceed the 80% threshold of 2.0 MGD.
- With year 2002 flows as a baseline, wastewater volumes are projected to ultimately increase to approximately 1.6 MGD. The ultimate buildout projections included annexation of several beach communities not currently served by CSD. However, it was noted that potential to vary from interim and ultimate flow projections is significant in a small community like Carpinteria. In addition, system flows have historically varied with annual rainfall totals.
- Significant variations in annual average daily flows have been observed. It is recommended that the District carefully monitor flows and flow trends at the WWTP. Controlling inflow and infiltration within the collection system may be critical to avoid a capacity expansion of the WWTP as flows trend upward.

2.2 Carpinteria Valley Water District

Water Reliabilities Strategies 2030, February 2006

Carpinteria Valley Water District (CVWD) Water Reliabilities Strategies for 2030 lists preliminary strategies to use existing water supplies and facilities more effectively and efficiently to meet future water needs during a prolonged drought.

CVWD relies on three main sources of water supply; local groundwater from the Carpinteria Groundwater Basin, surface water from Lake Cachuma in the Santa Ynez River watershed, and from the State Water Project delivered to Lake Cachuma. The CVWD service area comprises approximately 11,098 acres and provides agricultural water supply to approximately 3,883 acres of irrigated crops and orchards.

CVWD can use their water supplies more effectively and efficiently to meet the water needs of consumers during prolonged drought periods through 2030. Water strategies such as conjunctive use, water banking, water purchases, and carryover of excess water need to be implemented during wet and normal years to be prepared for severe droughts. These strategies can be evaluated and implemented singularly, in combinations, or can be supplemented as opportunities for partnership with other creative water agencies in the region arise. By using a combination of water reliability strategies, CVWD could increase drought water supply reliability and reduce overall water supply costs.

2.3 City of Santa Barbara

Water Supply Planning Study, August 2009

The Water Supply Planning Study assesses the City of Santa Barbara's (SB) existing water supply (imported water, groundwater, recycled water) and identifies opportunities to increase SB's reliability of these supplies. The study describes opportunities to increase recycled water at properties adjacent to the existing recycled water system and to expand the existing system to serve new areas.

SB currently provides approximately 850 acre-feet of recycled water per year from El Estero Wastewater Treatment Plant on a year-round basis. The study describes the City's existing recycled water system, including the recycled water supplies, demands, distribution system, and facilities as well as opportunities for expanding the City's existing recycled water system and the issues related to expanded use.

Recommendations on ordinances and development policies, expansion of the system, and treatment process improvements are further described in the study.

2.4 Goleta Water District and Goleta Sanitary District

Reclaimed Water Project Study, January 1999

The Goleta Water District (GWD) and Goleta Sanitary District (GSD) Reclaimed Water Project Study describes the existing water reclamation facilities, reclaimed water markets, and potential reclaimed water customers. A survey of potential reclaimed water markets was conducted to identify new markets nearby the existing reclaimed water distribution facilities. The survey took place between April and July 1999. A total of 28 potential reclaimed water customers were identified. The potential markets were comprised of approximately 136 irrigated acres with an estimated annual reclaimed water use of 282 acre-feet per year. Agriculture use of recycled water is extremely sensitive to water quality and therefore was not included as potential recycled water use.

2.5 Goleta West Sanitary District

Proposed New Wastewater Treatment Plant Site and Treatment Alternatives Evaluation, July 2004

The Goleta West Sanitary District (GWSD) considered the construction of a new WWTF to allow treatment of their wastewater independent from the GSD. The Proposed New Wastewater Treatment Plant Site and Treatment Alternatives Evaluation summarize the treatment alternatives in relation to specific sites defined in the GWSD WWTF Constraints Analysis. Plant configuration alternatives were conceptually developed based on site and treatment alternatives. Additionally these alternatives were compared on a cursory level based upon both economic and non-economic factors.

2.6 Heal the Ocean

Cost of Tertiary Wastewater Treatment for Southern Santa Barbara County, August 2001

The purpose of this study was to develop sufficient data for tertiary treatment to allow the Heal the Ocean group to present their idea to the public. The data is based on at least one conceptual set of improvements at each of the five wastewater-renovation plants capable of producing tertiary-level effluent. Using these conceptual improvements, capital and annual operating and maintenance (O&M) costs for each plant was developed. The capital and annual O&M costs can be reduced to typical monthly costs for a residential unit in the respective city or district.

Findings from the study include:

- There are five independent wastewater treatment plants that serve the greater SB area of southern SB County. These plants are owned by the Goleta Sanitary District, City of SB, and the Sanitary Districts of Carpinteria, Montecito, and Summerland.
- All five of these plants fully comply with the terms of their NPDES discharge permits and two plants have established water reclamation facilities including storage and distribution systems. One plant is treating to tertiary quality now but does not meet the full redundancy guidelines of the California Department of Public Health (CDPH).
- Four of the five plants provide full secondary treatment. The Goleta Sanitary District plant provides a combination of primary and secondary treatment to the outfall. Although in full compliance with their present discharge permit, this plant must be first upgraded to secondary treatment and then be upgraded to tertiary treatment.
- Three of the five plants have sufficient space available to upgrade to tertiary treatment. The other two must take special steps to accomplish the upgrade, such as convert existing plant to a new

process or simply build the next phase of construction early to increase the number of process units to enhance reliability.

- Sewer service charges vary dramatically among service areas. Some are based on a flat annual or monthly charge, and others are based on a flat service fee plus a charge based on water consumption.
- The increase in service charge that will be required for upgrading to tertiary is acceptable to the treatment authorities so long as the majority of the public they serve is convinced of the need and is fully prepared to support the additional cost.

Conclusions reached from the study include:

- The Goleta WWTP can be upgraded by expanding the processes presently in use at the plant. The major change proposed is that of equalizing storage after primary treatment in order to optimize the treatment train by reducing the impact of wet weather flow variations.
- The El Estero WWTP is extremely limited in available land. The conclusion to convert the disinfection process to ultraviolet light (UV) (which does not require a long contact time) and use the land made available for building the effluent filters. This requires a two-phase construction approach so that the land can be made available for demolition of the existing chlorine contact channels and the construction of filters. The existing filters can be used in conjunction with the new filters to meet the full plant design capacity.
- The Carpinteria WWTP also has an extremely small site in view of the future growth anticipated in the service area. Different approaches are presented that may be feasible, but the alternative chosen to develop for costing is to expand the present plant to provide process redundancy. With that issue solved, the tertiary process facilities can be added. These would consist of continuously back-washed filters and a new UV system for disinfection before releasing the water to the outfall. The existing chlorine contact channels would be demolished, thereby making that land available for other purposes.
- The Montecito WWTF is full secondary plan that can be upgraded with the addition of filters and expanded chlorine contact channels. The solids handling facilities appear to be undersized for the present solids load. The additional solids from the filter backwash water will increase the loading, hence a parallel thickener and an aerobic digester was included in the process train.
- The Summerland WWTP already produces a filtered effluent before discharge to the outfall. The redundancy of processes is the only issue of substance here. By adding a continuous backwash filter and re-arranging the direction of flow, this plant can be considered a tertiary plant with full redundancy.
- Each of the plants must also add the appropriate sensors and alarm systems in addition to major process units to comply with the reliability standards.
- Opinion of costs for proposed systems and their probable increase in operating and maintenance costs are presented in the study.

Water Reclamation Research, September 2000

The Water Reclamation Research is a research paper developed by master student, Ian Adams, from Bren School of Environmental Science and Management, University of Santa Barbara in 2000. The research paper describes each wastewater treatments step (Primary, Secondary, Tertiary, Disinfection and Advanced Treatment), defines reclaimed water and Heal the Ocean Assessment of Water Reclamation for Santa Barbara County research on the feasibility of upgrading all secondary treatment of wastewater to tertiary treatment while expanding the uses of reclaimed water within the County boundaries. The goals and objectives of the reclaimed water program in Santa Barbara are the same as Goleta Water District and Goleta Sanitary District Reclaimed Water Project Study (CDM, 1999).

California Ocean Wastewater Discharge Report and Inventory, March 2010

Heal the Ocean's main goal is to eliminate pollutants discharged into the ocean and that one way to reduce the pollutant loading is to understand the treatment plants that discharge into the ocean. The California Ocean Wastewater Discharge Report and Inventory consolidates information on the ocean outfalls and their associated wastewater plants.

The Report and Inventory provides a complete statewide overview of specific features of coastal wastewater treatment plants and their ocean outfalls, summarizing important pollutant issues, which pose a challenge to wastewater treatment and water reclamation and reuse and mapping/reporting on the spatial relationship between wastewater discharge locations and beaches adjacent to 303(d) listed impaired water bodies and other sensitive ocean ecosystems throughout California.

Recommendations from the Report and Inventory include:

- Improving and upgrading existing wastewater treatment plants
- Increasing the use of reclaimed water as a more economic alternative to potable water for non-potable uses
- Make public education and consumer awareness a priority
- Support and increase efforts to prevent pollution at source
- Revise legislation and regulation as soon as possible to overcome barriers to use
- Support and expand collaborative planning and research
- Provide government support and funding mechanisms
- Revise the reporting protocols of the SWRCB and attendant regional boards

The Report and Inventory helps provide a comparative perspective of current sewage treatment practices, shows where reporting of treatment plant data could be improved, helps to direct future research into controlling and eliminating human sources of ocean pollution, and assists efforts by various stakeholders, such as facility managers, policy makers, community leaders, and environmental groups to improve California's water quality and supply.

2.7 Montecito Water District and Montecito Sanitary District

Water Reclamation Study, January 1991

Montecito Water District (MWD)'s and Montecito Sanitary District (MSD)'s Water Reclamation Study investigated the alternatives available to provide recycled water in Montecito. The study examined treating MSD secondary flows to Title 22 for landscape and agricultural irrigation. The study describes the existing wastewater facilities and identifies the recycled water market. The study describes treatment alternatives as well as distribution alternatives, along with their costs.

Chapter 3 Regulations Summary

This chapter describes the pertinent Federal, State, and local recycled water regulations and policies that affect the planning of the south coast subregion of Santa Barbara County's recycled water system.

3.1 Federal

3.1.1 EPA Guidelines for Water Reuse (2012)

The U.S. Environmental Protection Agency (EPA) recently released an update of its Guidelines for Water Reuse (Guidelines), which provides information and guidelines on water recycling for the benefit of utilities and regulatory agencies, particularly in the U.S. The mission of the guidelines is "to advance the beneficial and efficient uses of high quality, locally produced, sustainable water sources for the betterment of society and the environment through advocacy, education and outreach, research, and membership."

The Guidelines cover water reclamation for nonpotable urban, industrial, and agricultural reuse, as well as augmentation of potable water supplies through indirect reuse. The Guidelines were first published in 1980. Because the number of reuse applications has expanded so significantly since publication of the previous version in 2004, the 2012 version modified the format and scope of case studies to provide examples of best practices and lessons learned. **Table 3-1** is summary provided in the Guidelines that outlines the contents of each section of the Guidelines. (EPA, 2004)

Table 3-1: Organization of EPA's 2012 Guidelines for Water Reuse

Chapter	Overview of Contents
Chapter 1–Introduction	Introduction section providing the background and objectives of the Guidelines
Chapter 2 – Planning and Management Considerations	EPA's Total Water Management approach to water resources planning is described as a framework within which water reuse is integrated into a holistic water management approach. The steps that should be considered in the planning stage as part of an integrated water resources plan are then presented, followed by an overview of key considerations for managing reclaimed water supplies. These discussions cover management of supplies as well as managed aquifer recharge, which has progressed substantially since publication of the previous guidelines.
Chapter 3 – Types of Reuse Applications	A discussion of reuse for agricultural, industrial, environmental, recreational, and potable supplies is presented. An expanded discussion of indirect potable reuse (IPR) and direct potable reuse is also provided with references to new research and literature. Urban reuse practices such as fire protection, landscape irrigation, and toilet flushing were described in great detail in the 2004 guidelines and are not repeated here; however, general information regarding planning and management of reclaimed water supplies and systems that include urban reuse is provided in Chapter 2.
Chapter 4 – State Regulatory Programs for Water Reuse	An overview of legal and institutional considerations for reuse is provided in this chapter. The chapter also gives an updated summary of existing state standards and regulations. At the end of this chapter are suggested minimum guidelines for water reuse in areas where such guidance or rules have not yet been established.

Table 3-1: Organization of EPA's 2012 Guidelines for Water Reuse

Chapter	Overview of Contents
Chapter 5 – Regional Variations in Water Reuse	This new chapter summarizes current water use in the United States and discusses expansion of water reuse nationally to meet water needs. The chapter discusses variations in regional drivers for water reuse, including population and land use, water usage by sector, water rates, and the states' regulatory contexts. Representative water reuse practices are described for each region, and U.S. water reuse case studies are introduced.
Chapter 6 – Treatment Technologies for Protecting Public and Environmental Health	This chapter provides an overview of the treatment objectives for reclaimed water and discusses the major treatment processes that are fundamental to production of reclaimed water. And, while this chapter is not intended to be a design manual or provide comprehensive information about wastewater treatment, which can be found in other industry references, an overview of these processes and citations for updated industry standards is provided.
Chapter 7 – Funding Water Reuse Systems	Assuring adequate funding for water reuse systems is similar to funding other water services. Because of increased interest in using reclaimed water as an alternate water source, this chapter provides a discussion of how to develop and operate a sustainable water system using sound financial decision-making processes that are tied to the system's strategic planning process.
Chapter 8 – Public Outreach, Participation, and Consultation	This chapter presents an outline of strategies for informing and involving the public in water reuse system planning and reclaimed water use and reflects a significant shift in thinking toward a higher level of public engagement since publication of the last guidelines. This chapter also describes some of the new social networking tools that can be tapped to aid with this process.
Chapter 9 – Global Experiences in Water Reuse	With significant input from United States Agency for International Development (USAID) and the International Water Management Institute (IWMI), the chapter on international reuse has been expanded to include a description of the growth of advanced reuse globally. In addition, this chapter provides information on principles for mitigating risks associated with the use of untreated or partially treated wastewater, enabling factors for expanding water reuse, and new case studies that can provide informed approaches to reuse in the U.S.
APPENDIX A	Federal and nonfederal agencies that fund research in water reuse
APPENDIX B	Inventory of water reuse research projects
APPENDIX C	State regulatory websites
APPENDIX D	Case studies on water reuse in the U.S.
APPENDIX E	Case studies on water reuse outside the U.S.
APPENDIX F	List of case studies that were included in the 2004 EPA Guidelines
APPENDIX G	Abbreviations for Units of Measure

In states where standards do not exist or are being revised or expanded, the Guidelines can assist in developing reuse programs and appropriate regulations. The Guidelines are also useful to consulting engineers and others involved in the evaluation, planning, design, operation, or management of water reclamation and reuse facilities. In addition, an extensive chapter on international reuse is included to provide background information and discussion of relevant water reuse issues for authorities in other countries where reuse is being planned, developed, and implemented. In the U.S., water reclamation and reuse standards are the responsibility of State agencies.

A copy of the 2012 Guidelines is included in **Appendix B.**

3.2 State

3.2.1 California Water Code, Division 7

The Porter-Cologne Water Quality Control Act established the California Water Code (CWC), Division 7 to regulate water quality. The CWC, Division 7 declares that "the people of the State have a primary interest in the conservation, control, and utilization of the water resources of the State, and that the quality of all the waters of the State shall be protected for use and enjoyment by the people of the State."

The Legislative policy further declares "that activities and factors which may affect the quality of the waters of the State shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible."

The intent of the CWC is to provide statewide program for the "control of the quality of all the waters of the state to protect the quality of waters in the state from degradation." The policy also establishes the statewide program for water quality control as being administered regionally, within a framework of statewide coordination and policy. The intent of this legislative act is that "the SWRCB and each regional board shall be the principal State agencies with primary responsibility for the coordination and control of water quality. The State Board and regional boards in exercising any power granted in this division shall conform to and implement the policies of this chapter and shall, at all times, coordinate their respective activities so as to achieve a unified and effective water quality control program in this State." (CWC, 2011)

3.2.2 California Code of Regulations, Title 22 for Non-Potable Reuse

The CDPH establishes criteria and guidelines for producing and using recycled water. These criteria are codified in the California Code of Regulations (CCR), Title 22, Division 4, Chapter 3 entitled "Water Recycling Criteria". Commonly referred to as Title 22 Criteria, the treatment and effluent quality requirements are dependent upon the proposed type of non-potable reuse (NPR). In addition to these requirements, Title 22 specifies reliability criteria to ensure protection of public health.

The SWRCB and its nine Regional Water Quality Control Boards (RWQCB) are responsible for enforcing these criteria. The south coast subregion recycled water facilities are under the jurisdiction of Regional Board No. 3, the Central Coast RWQCB.

According to Title 22, treatment and effluent quality requirements are dependent upon the proposed type of water reuse. In addition to these requirements, Title 22 specifies reliability criteria to ensure protection of public health.

Treatment, Water Quality and Reliability

In general, Title 22 requires that wastewater be treated using designated processes to achieve a specified level of quality. Higher quality effluents, such as disinfected tertiary recycled water or disinfected advanced treated recycled water, may be utilized for more types of reuse with fewer restrictions. Lesser quality effluents, such as disinfected secondary effluent or undisinfected secondary effluent, have restricted uses. One of the main factors determining use restrictions is the degree to which the public has exposure or access to areas where recycled water is used and the proximity of drinking water wells and food crops. Higher levels of treatment and quality requirements are described in this section.

Title 22 requires that wastewater be oxidized, which means that its organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen. Secondary treatment is necessary to produce oxidized and stabilized wastewater.

Moving beyond secondary treatment is tertiary treatment involving coagulation and media filtration or membrane filtration is required to meet Title 22 turbidity criteria measured in nephlometric turbidity units (NTU) for many types of reuse.

Title 22 (Section 60301.320) defines filtered wastewater as "an oxidized wastewater that meets the criteria in subsection (a) or (b):

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

(1) At a rate that does not exceed 5 gallons per minute per square foot of surface area in mono, dual or mixed media gravity, upflow or pressure filtration systems, or does not exceed 2 gallons per minute per square foot of surface area in traveling bridge automatic backwash filters [a rate that does not exceed 6 gallons per minute per square foot of surface area for cloth disc filters has been approved]; and

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

(A) An average of 2 NTU within a 24-hour period;

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

(C) 10 NTU at any time.

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

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

(2) 0.5 NTU at any time."

Following tertiary treatment, disinfection ensures that the recycled water is safe for NPR with unrestricted public contact. According to Title 22 (Section 60301.230), "disinfected, tertiary recycled water means a filtered and subsequently disinfected wastewater that meets the following criteria:

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

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

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

(b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN [most probable number] of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and

> the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters."

Where UV is used for disinfection, the UV system must comply with the "Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse" published by the National Water Research Institute (NWRI, 2003). For recycled water, these Guidelines specify minimum UV dose criteria for different upstream filtration technologies (media filtration, membrane filtration, and RO). The UV system must deliver, under worst operating conditions, a designated minimum UV dose at the maximum weekly flow and at the peak daily flow, as approved by CDPH for specific manufacturers and models of UV equipment.

Title 22 (Section 60320.5) specifies that other methods of treatment and their associated reliability features may be acceptable to CDPH if they are demonstrated as equivalent to the treatment methods and reliability features set forth in Title 22.

In addition to treatment and quality requirements, Title 22 contains reliability requirements and provisions for alarms to be included in the design of facilities. Title 22 (Articles 9 and 10) specify that the facilities must be designed to provide operational flexibility. Multiple treatment units capable of producing the required quality must be provided in the event that one unit is not in operation. In lieu of multiple units, alternative treatment processes, storage or disposal provisions may be provided for redundancy. Alarms are required to alert plant operators of power supply failure or failure of any treatment plant unit processes. In the event of a power supply failure, Title 22 requires the plant to provide either a standby power source or automatically actuated short-term or long-term storage or disposal provisions.

Recycled water quality sampling and analyses requirements are set forth in Title 22 (Article 6) to monitor treatment performance for compliance with total coliform bacteria limits and turbidity. The regulations also include requirements for operations personnel (Section 60325), maintenance (Section 60326), and reporting (Section 60329). Bypassing of treatment processes and/or discharge of inadequately treated effluent is not allowed (Section 60331).

To assure that recycled water facilities comply with the regulations, Title 22 (Section 60323) requires that an engineering report describing the proposed recycled water system and the means for the system complying with listed requirements be prepared and submitted to the RWQCB and CDPH for approval. The engineering report must be amended or resubmitted in the event that there are significant modifications to an existing project.

Uses of Recycled Water

Title 22 (Article 3) provides for many types of recycled water use. Table 3-2 summarizes the currently approved recycled water uses.

Table 3-2: Summary of Existing Allowable Recycled Water Uses

Allowable Title 22 Recycled Water Uses	Title 22 Section
Irrigation	
Food crops where recycled water contacts the edible portion of the crop, including all root crops	60304 (a) (1)
Parks and playgrounds	60304 (a) (2)
School yards	60304 (a) (3)
Residential landscaping	60304 (a) (4)
Unrestricted-access golf courses	60304 (a) (5)
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	60304 (a) (6)
Food crops, surface-irrigated, above-ground edible portion, and not contacted by	60304 (b)

Table 3-2: Summary of Existing Allowable Recycled Water Uses

Allowable Title 22 Recycled Water Uses	Title 22 Section
recycled water	
Cemeteries	60304 (c) (1)
Freeway landscaping	60304 (c) (2)
Restricted-access golf course	60304 (c) (3)
Ornamental nursery stock and sod farms with unrestricted public access	60304 (c) (4)
Pasture for milk animals for human consumption	60304 (c) (5)
Non-edible vegetation with access control to prevent use as park, playground or school yard	60304 (c) (6)
Orchards with no contact between edible portion and recycled water	60304 (d) (1)
Vineyards with no contact between edible portion and recycled water	60304 (d) (2)
Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest	60304 (d) (3)
Fodder and fiber crops and pasture for animals not producing milk for human consumption	60304 (d) (4)
Seed crops not eaten by humans	60304 (d) (5)
Food crops undergoing commercial pathogen-destroying processing before consumption by humans	60304 (d) (6)
Ornamental nursery stock and sod farms not irrigated less than 14 days before harvest, sale, or allowing public access	60304 (d) (7)
Supply for impoundment	
Non-restricted recreational impoundments	60305 (a)
Non-restricted recreational impoundments, with supplemental monitoring for pathogenic organisms in lieu of conventional treatment	60305 (b)
Restricted recreational impoundments and publicly accessible fish hatcheries	60305 (d)
Landscape impoundments without decorative fountains	60305 (e)
Supply for cooling or air conditioning	
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	60306 (a)
Industrial or commercial cooling or air conditioning not involving cooling tower, evaporative condenser, or spraying that creates a mist	60306 (b)
Other Uses	
Dual plumbing systems (flushing toilets and urinals)	60307 (a) (1)
Priming drain traps	60307 (a) (2)
Industrial process water that may contact workers	60307 (a) (3)
Structural fire fighting	60307 (a) (4)
Decorative fountains	60307 (a) (5)
Commercial laundries	60307 (a) (6)
Consolidation of backfill material around potable water pipelines	60307 (a) (7)
Artificial snow making for commercial outdoor uses	60307 (a) (8)
Commercial car washes, not heating the water, excluding the general public from washing process	60307 (a) (9)
Industrial boiler feed	60307 (b) (1)
Nonstructural fire fighting	60307 (b) (2)
Backfill consolidation around non-potable piping	60307 (b) (3)
Soil compaction	60307 (b) (4)
Mixing concrete	60307 (b) (5)
Dust control on road and streets	60307 (b) (6)

Table 3-2: Summary of Existing Allowable Recycled Water Uses

Allowable Title 22 Recycled Water Uses	Title 22 Section
Cleaning roads, sidewalks and outdoor work areas	60307 (b) (7)
Industrial process water that will not come into contact with workers	60307 (b) (8)
Flushing sanitary sewer	60307 (c)
Groundwater recharge	60320 (a)

As noted in this table, irrigation with recycled water is a common application. Depending on the level of treatment and quality, recycled water may be used to irrigate numerous different areas (Section 60304). For example, disinfected tertiary recycled water may be used to irrigate parks and school yards; whereas disinfected secondary effluent may be used to irrigate cemeteries and freeway landscaping, and undisinfected secondary effluent may be used to irrigate non-food-bearing trees and orchards where the recycled water does not come into contact with the edible crop. Disinfected tertiary water may be used in lieu of the lesser quality recycled waters for irrigation.

Disinfected tertiary effluent may be used for non-restricted recreational impoundments (Section 60305). Disinfected secondary or tertiary effluent may be used for restricted recreational impoundments and publically accessible impoundments at fish hatcheries.

Specifically, Title 22 (Section 60301.620) defines a non-restricted recreational impoundment as "an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities". With regard to use of recycled water for impoundments, Title 22 (Section 60305 states:

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

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

(1) During the first 12 months of operation and use the recycled water shall be sampled and analyzed monthly for Giardia, enteric viruses, and Cryptosporidium. Following the first 12 months of use, the recycled water shall be sampled and analyzed quarterly for Giardia, enteric viruses, and Cryptosporidium. The ongoing monitoring may be discontinued after the first two years of operation with the approval of the CDPH. This monitoring shall be in addition to the monitoring set forth in Section 60321.

(2) The samples shall be taken at a point following disinfection and prior to the point where the recycled water enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency.

(c) The total coliform bacteria concentrations in recycled water used for non-restricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall comply with the criteria specified in Section 60301.230 (b) for disinfected tertiary recycled water.

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

Title 22 (Section 60306) allows disinfected tertiary recycled water to be used for cooling purposes where mist may be created. If the application does not produce mist, then at least disinfected secondary effluent must be used.

Title 22 (Section 60307) includes provisions for many other types of reuse, as listed in **Table 3-2**. Disinfected tertiary effluent may be used for any of these NPR.

Title 22 (Section 60320) covers recycled water use for groundwater recharge of domestic water supply aquifers. Title 22 specifies that CDPH make recommendations to the RWQCB for groundwater recharge projects on a case-by-case basis. CDPH have published Draft Groundwater Recharge Criteria for indirect potable reuse.

Use Area Requirements

Under Title 22, a use area is an area of recycled water use with defined boundaries, which may contain one or more facilities where recycled water is used.

Title 22 (Section 60310) sets forth detailed use area requirements for irrigation in the vicinity of domestic water supply wells and strict limits on runoff, spray, and protection of drinking water fountains and food handling/eating areas, residences. Any connection between the recycled water and potable water systems, except as allowed under Title 17, are prohibited. Quick couplers that differ from hose bibs must be used in the recycled water piping system. Signs need to be posted to notify the public that recycled water is used at the site.

Specific requirements are contained in Title 22 (Article 5) for dual plumbed recycled water systems. Separate reports and tests are required for dual plumbed systems to demonstrate proper design, operation, and confirmation that cross-connections are not present.

3.2.3 California Code of Regulations, Title 17

Title 17, Division 1, Chapter 5 “Sanitation (Environmental)”, Group 4 “Drinking Water Supplies”, of the CCR (California, 2009), specifies that the water supplier must protect the public drinking water supply from contamination by implementation of a cross-connection control program. Title 17 (Group 4, Article 2) sets forth requirements for protection of the water system and specifies the minimum backflow prevention required on the potable water system for situations where there is potential for contamination to the potable water supply.

For recycled water, construction and location of backflow preventers is addressed in Title 17 as follows:

- An air-gap separation shall be at least double the diameter of the supply pipe, measured vertically from the flood rim of the receiving vessel to the supply pipe. The air-gap separation shall be located as close as practical to the user’s connection and all piping between the user’s connection and the receiving tank shall be entirely visible unless otherwise approved in writing by the water supplier and the health agency.
- A double check valve assembly shall conform to American Water Works Association standards and shall be located as close as practical to the user’s connection and shall be installed above grade, if possible, in a manner where it is readily accessible for testing and maintenance.
- A reduced pressure principle backflow prevention device shall conform to American Water Works Association standards and shall be located as close as practical to the user’s connection and shall be installed a minimum of 12 inches above grade and not more than 36 inches above grade from the bottom of the device and with a minimum of 12 inches side clearance.

An air-gap separation is defined as a physical break between the supply line and a receiving vessel. A double check valve assembly is an assembly of at least two independently acting check valves including tightly closing shut-off valves on each side of the check valve assembly and test cocks available for testing the water tightness of each check valve. A reduced pressure principle backflow preventer is a backflow prevention device incorporating not less than two check valves, an automatically operated differential relief valve located between the two check valves, a tightly closing shut-off valve on each side of the check valve assembly, and equipped with necessary test cocks for testing. Title 17 also requires that each water purveyor develop and implement its own comprehensive backflow prevention program for protecting the public water supply from contamination or pollution.

3.2.4 California Plumbing Code (2007)

The purpose of California Plumbing Code (CPC) is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, access to persons with disabilities, sanitation, adequate lighting and ventilation, and energy conservation; safety to life and property from fire and other hazards attributed to the built environment; and to provide safety to fire fighters and emergency responders during emergency operations.

The codes of practice attempt to minimize public risk by specifying technical standards of design, materials, workmanship and maintenance for plumbing systems. The main aims of the code are (CPC, 2010):

- To ensure that planners, administrators and plumbers develop the required competency to ensure that the codes are applied and upheld;
- That standards are set to ensure that plumbing assemblies, materials and technologies are safe and effective;
- To ensure that plumbing installations meet these standards;
- To ensure safety and effectiveness continuously through the proper maintenance of these installations.

3.2.5 California DPH

In addition to the Title 22 and Title 17 regulations previously described, CDPH has other documents related to recycled water production and use:

- Guidelines for the Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water (CDPH, 2001) – This report provides a framework to assist in developing a Title 22 Engineering Report that addresses the necessary elements of a proposed of modified recycled water project to facilitate regulatory review and approval.
- Treatment Technology Report for Recycled Water (CDPH, 2007) – This report provides reference information about treatment technologies meeting filtration performance and disinfection requirements for compliance with Title 22.
- Guidance Memo No. 2003-02: Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines (CDPH, 2003) – This memorandum provides separation criteria for design and installation of drinking water and non-potable (recycled water and sewers) pipelines to prevent contamination of the drinking water supply.
- Draft Regulation for Groundwater Recharge Reuse (November, 21, 2011) – These Draft Criteria reflect the lasting “current thinking on the regulation for replenishing groundwater with recycled municipal wastewater” by CDPH. These were released to the recycled water and environmental communities for input as part of a stakeholder process to update the existing Draft Criteria that was revised as recently as August 5, 2008. Input from the reuse and environmental community on the Draft Regulations has been sent to CDPH, which is expected to issue a formal notice of Draft Regulations to the public by the end of 2012 or early 2013. Appendix C contains copies of the November 11, 2011 Draft Regulation for Groundwater Recharge Reuse and presentations made by CDPH’s in December 2011 at public workshops.

3.2.6 SWRCB Recycled Water Policy

In February 2009, the SWRCB adopted Resolution 2009-0011 “Recycled Water Policy” (SWRCB, 2009a). This Recycled Water Policy sets uniform standards for how individual RWQCBs interpret and implement the Anti-Degradation Policy (SWRCB Resolution No. 68-16; SWRCB, 1968) for water recycling projects. Prior to this, water recycling projects were impacted by the differing actions of some RWQCBs based on application of the Anti-Degradation Policy. The RWQCB interpretations generally sought to prevent any change in groundwater quality, regardless of considerations around the provision to meet the “maximum benefit to the people of the State” as stated in the SWRCB Recycled Water Policy. For example, a RWQCB may have determined that any change in salinity was unacceptable, even though the change still allowed the groundwater to meet State water quality and health standards. To resolve these permitting discrepancies, the SWRCB adopted the Recycled Water Policy, which provides direction to the RWQCBs and includes key provisions that must be considered when planning and implementing recycled water projects:

- Mandate for recycled water use
- Salt/nutrient management plans
- Landscape irrigation projects’ control of incidental runoff and streamlined permitting
- Groundwater recharge
- Anti-degradation
- CECs (e.g., endocrine disrupters, personal care products or pharmaceuticals).

Mandate for Recycled Water Use

In the Recycled Water Policy, the SWRCB supports and encourages use of recycled water. Specific targets are mandated to increase recycled water use. The Recycled Water Policy requires agencies producing recycled water that is available for reuse and not being put to beneficial use to 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.

The SWRCB declared that 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. The SWRCB also acknowledged that it shares jurisdiction over the use of recycled water with the RWQCBs and CDPH and that other agencies, such as the California DWR and California Public Utilities Commission, are also involved in encouraging water reclamation.

Salt/Nutrient Management Plans

The Recycled Water Policy recognizes that some groundwater basins contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable 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, discharges of waste, irrigation using surface water, groundwater or recycled water, and water supply augmentation using surface or recycled water. The Recycled Water Policy determines that regulation of recycled water alone will not address these conditions.

The Recycled Water Policy calls for salts and nutrients from all sources to 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. According to the SWRCB, the most appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans by local water and wastewater agencies, rather than through imposing requirements solely on individual recycled water projects.

The Recycled Water Policy requires every groundwater basin/sub-basin in California to have a salt/nutrient management plan. Salt/nutrient management plans need to 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. Stormwater recharge must be included in the salt/nutrient management plans because stormwater is typically lower in nutrients and salts and can augment local water supplies. The plans must address all sources of salts and nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects. Other constituents may also be addressed if they adversely affect groundwater quality. The Recycled Water Policy requires salt/nutrient management plans to be completed and submitted to the RWQCB within five years (or seven years with an approved extension).

According to the Recycled Water Policy, each salt/nutrient management plan shall include:

- Monitoring network to provide a 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. The monitoring frequency must be determined in the salt/nutrient management plan and approved by the RWQCB.
- Annual monitoring of CECs consistent with recommendations by CDPH and consistent with any actions by the SWRCB.
- Water recycling and stormwater recharge/use goals and objectives.
- Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.
- Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.
- An anti-degradation analysis demonstrating that the projects included within the plan will collectively satisfy the requirements of the Anti-Degradation Policy, Resolution No. 68-16.
- The SWRCB requires each RWQCB, within one year of receipt of a proposed salt/nutrient management plan, to consider adopting 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/nutrient management plans required by the Recycled Water Policy.

Plans which are more protective than applicable standards in the Basin Plan may be developed. However, the RWQCBs may not modify Basin Plan water quality objectives without getting full approval in accordance with existing law. Areas that have already completed a RWQCB approved salt/nutrient management plan for a basin/sub-basin that is functionally equivalent to the Recycled Water Policy requirements are exempt.

In August 2009, the SWRCB issued a memorandum (SWRCB, 2009) to all of the RWQCBs to clarify their role in implementing the Recycled Water Policy. This memorandum describes specific actions for each RWQCB:

- Initiate and participate in the stakeholder process for development of salt/nutrient management plans
- Track and report development of salt/nutrient management plans
- Input groundwater data into GeoTracker (the SWRCB database)
- Incorporate incidental runoff provisions
- Streamline permitting of eligible recycled water irrigation projects
- Implement groundwater recharge reuse provisions
- Implement anti-degradation provisions
- Cooperate with water recycling mandates, stormwater reuse, and total maximum daily loads

Landscape Irrigation Projects

The Recycled Water Policy addresses two issues for landscape irrigation projects: 1) incidental runoff and 2) streamlining permitting. Under the Recycled Water Policy, control of incidental runoff must be addressed by landscape irrigation uses:

- Incidental runoff is defined as unintended small volumes of runoff from recycled water use areas, such as unintended minimal over-spray from sprinklers that leaves the use area. Intentional overflow or over-application due to design or negligence is not considered to the incidental runoff. The Recycled Water Policy states that incidental runoff may be regulated by Waste Discharge Requirement (WDR). Regardless of how incidental runoff may be regulated, landscape irrigation projects must include an operation and maintenance plan to detect leaks and stipulate correction measures within 72 hours of the runoff or prior to the release of 1,000 gallons of recycled water.
- Sprinklers at use sites must be properly designed.
- Irrigation must be discontinued during rain events.
- Recycled water impoundments, such as ponds, must be managed so as not to overflow and discharge recycled water, unless the discharge is caused by a storm event with a magnitude greater than 25-year frequency.

The SWRCB also requires that RWQCBs streamline processing permits for recycled water landscape irrigation projects. If the project has unusual or unique site conditions, then a RWQCB may require more detailed information about the landscape irrigation system. However, most landscape irrigation projects will be permitted under a general RWQCB order. Recycled water monitoring should be conducted as well as project specific monitoring to support the development and implementation of the salt/nutrient management plan. The Recycled Water Policy specifies criteria for eligibility for streamlined permitting:

- Compliance with Title 22 Water Recycling Criteria
- Application amounts and rates, which are appropriate for the landscape at the use site
- Compliance with the applicable salt/nutrient management plan
- Appropriate use of fertilizers that accounts for nutrients present in the recycled water

Groundwater Recharge Projects

The Recycled Water Policy includes provisions for recycled water groundwater recharge projects. Approved groundwater recharge projects must comply with regulations adopted by CDPH 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.).

The policy also requires that such projects implement a monitoring program for CECs and a monitoring program for CECs that is consistent with any actions by the State Board 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.

A RWQCB may also impose 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.

Anti-degradation

In 1968, the SWRCB adopted Resolution No. 68-16 "Statement of Policy with Respect to Maintaining High Water Quality in California". This Anti-Degradation Policy specifies:

1. "Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality water will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies."
2. "Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to ensure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

The Recycled Water Policy recognizes the SWRCB Resolution No. 68-16, Anti-Degradation Policy (SWRCB, 1968) that regulates waters to achieve the highest quality consistent with the maximum benefit to the people of the State. It requires that best practicable treatment or control of waste discharges be used to maintain the highest water quality consistent with the maximum benefit to the people of the State. Specific anti-degradation issues related to groundwater recharge are also addressed in the Policy.

Landscape irrigation with recycled water is a benefit, but this NPR can affect groundwater quality over time. The SWRCB's intent is to address such impacts with the salt/nutrient management plans. As such, the Recycled Water Policy states that landscape irrigation projects may be approved:

- Without an anti-degradation analysis, provided that the project is consistent with the salt/nutrient management plan and qualifies for permit streamlining
- By demonstrating through a salt/nutrient mass balance that the project uses less than 10 percent of the available assimilative capacity of the basin/sub-basin

Constituents of Emerging Concern (CEC)

The SWRCB Recycled Water Policy included a provision establishing a Science Advisory Panel to provide guidance for developing monitoring programs that assess potential CEC impacts to public health from various water recycling practices, including groundwater recharge with recycled water. The panel was formed in May 2009 and includes six national experts in the fields of chemistry, biochemistry, toxicology, epidemiology, risk assessment, and engineering. Panelists include:

- Dr. Paul Anderson, Human Health Toxicologist, Vice President and Technical Director, Risk Assessment AMEC Earth and Environment
- Dr. Nancy Denslow, Biochemist. Associate Professor Toxicology, Molecular Biology and Proteomics, University of Florida
- Dr. Jörg Drewes, Civil Engineer Familiar with the Design and Construction of Recycled Water Treatment Facilities, Environmental Science and Engineering Division, Colorado School of Mines
- Dr. Adam Olivieri, Epidemiologist/Risk Assessor, Vice President, EOA, Inc.
- Dr. Daniel Schlenk, Environmental Toxicologist, Department of Environmental Sciences, University of California, Riverside
- Dr. Shane Snyder, Analytical Chemist Familiar with the Design and Operation of Advanced Laboratory Methods for the Detection of Emerging Constituents, R&D Project Manager Applied Research and Development Center, Southern Nevada Water Authority

Draft recommendations were submitted to the SWRCB for public comment on April 15, 2010 and final recommendations were provided on June 25, 2010[1]. The Panel held four in-person meetings and

[1] http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/cec_monitoring_rpt.pdf

numerous conference calls over the last year. The meetings included the opportunity for stakeholder input in clarifying their charge, exchange of information, dialog with the Panel and consideration of public comments on the draft report. This report provides the results from the Panel's deliberations, including four products intended to assist the State in refining its recycled water policy:

- Product #1: A conceptual framework for determining which CECs to monitor
- Product #2: Application of the framework to identify a list of chemicals that should be monitored presently
- Product #3: A sampling design and approach for interpreting results from CEC monitoring programs
- Product #4: Priorities for future improvements in monitoring and interpretation of CEC data

On October 16, 2012, the SWRCB held a hearing to adopt the CEC monitoring requirements for recycled water. However, due to numerous last minute changes, the Board continued the hearing to a future date to be determined. Based on the current draft regulations, there are numerous requirements for the sampling and testing of CECs on IPR projects. However, for standard irrigation projects, the only proposed requirements are for the monitoring of surrogates at the treatment plant. The actual surrogates are to be determined on a project specific basis. See the SWRCB's website for the latest information: http://www.waterboards.ca.gov/. Final adoption of the CEC monitoring requirements is expected in 2013

3.2.7 SWRCB General Landscape Irrigation Permit

The SWRCB adopted Water Quality Order No. 2009-0006-DWQ "General Waste Discharge Requirements for Landscape Irrigation uses of Municipal Recycled Water" (General Permit) in July 2009 (SWRCB, 2009b). This General Permit is intended to streamline the regulatory process for landscape irrigation uses of recycled water. Some projects may be unique or site-specific and not be appropriate for permitting under the General Permit; however, the majority of recycled water irrigation of landscaping at parks, greenbelts, playgrounds, school yards, athletic fields, golf courses, cemeteries, residential common areas, commercial and industrial areas (except eating areas), and along freeways, highways, and streets will be eligible for coverage under the General Permit. Participation in the General Permit is optional; in other words, agencies are not required to apply for the General Permit, even if their projects meet the criteria, but instead, they may maintain their current water reuse requirements (WRR) and WDR.

Recycled water projects covered by the General Permit must meet the following:

- Disinfected tertiary effluent in accordance with Title 22 Criteria
- Distribution of recycled water in accordance with Title 22 Criteria and Title 17 backflow and prevention requirements
- Recycled water uses in accordance with Title 22 Criteria
- All applicable requirements of the Recycled Water Policy, including salt/nutrient management
- Manage chlorine usage to prevent discharge of chlorinated recycled water that would be toxic to aquatic life
- Best management practices to prevent unauthorized discharges of recycled water, control incidental runoff and prevent overflow of impoundment

Producers and distributors of recycled water may file applications to be covered under this General Permit by completing a Notice of Intent (NOI) form, Operation and Maintenance (O&M) Plan, and pay associated application fees. The General Permit contains requirements for disinfected tertiary recycled water production, management, distribution, and use that are the same as those in Title 22 Recycled Water Criteria. Prior to commencing recycled water irrigation, the Administrator must submit an O&M Plan to the SWRCB containing specific elements:

- Operations Plan for the recycled water use areas

- Irrigation Management Plan showing that recycled water will be applied at an agronomic rate for irrigation efficiency and to minimize application of salts
- Summary of the Title 22 Engineering Report approved by CDPH
- Rules and Regulations approved by CDPH governing the design and construction of recycled water use facilities and use of recycled water
- Copies of agreements between the responsible parties for producing, distributing, and using the recycled water
- Documentation on the Recycled Water Use Supervisor's training and responsibilities

When enrolled in the General Permit, if the Producers or Distributors are subject to general or individual WDRs or WRRs, the provisions of those permits for recycled water use are replaced by the requirements of the General Permit.

3.3 Local

3.3.1 Reclamation and Discharge Permits

Permits containing water recycling requirements are issued by the RWQCB in consultation with CDPH for specific reuse projects. In some cases, the water recycling permits are appended by the RWQCB to the waste discharge requirements of the facility's National Pollutant Discharge Elimination System (NPDES) permit. In the past, the RWQCB has issued permits with water recycling requirements to individual recycling facilities as well as individual users of recycled water. Now, the RWQCBs are issuing so-called "producer/user requirements" that regulate a single recycling facility and all of its users. Furthermore, in some cases a "master reclamation permit" is issued that applies to several reclamation facilities that are part of an interconnected regional system along with all of the users of that system.

Recycled water and discharge permits for treatment plants in the plan area are listed below in **Table 3-3**. The recycled water permit requirements for the existing Goleta and Santa Barbara recycled water system are shown in **Table 3-4**.

Table 3-3: Discharge Permits in the Region

Agency	Treatment Plant	Waste Discharge Permit No. (NPDES No. & Order No.)	Master Recycled Water Permit No.
Carpinteria SD	Carpinteria WWTP	CA 0047364	--
City of Santa Barbara	El Estero WWTF	CA 0048143 R3-2010-0011	97-44
Goleta SD	Goleta WWTP	CA 0048160 R3-2010-0012	91-03
Montecito SD	Montecito WWTF	CA 0047899	--
Summerland	Summerland WWTP	CA 0048054 R3-2008-0009	--

Table 3-4: Summary of Recycled Water Permit Requirements

Agency	Treatment Plant	BOD (mg/l)	Turbidity (NTU))	Susp. Solids (NTU)	Settleable Solids	TDS (mg/l)	Cadmium (mg/l)	Lead (mg/l)
Mean								
City of Santa Barbara	El Estero WWTF	-	2	10	-	-	-	-
Goleta SD	Goleta WWTP	10	2	10	-	-	-	-
Maximum								
City of Santa Barbara	El Estero WWTF	-	5	25	0.1	1,500	0.01	5.0
Goleta SD	Goleta WWTP	25	5	25	0.1	1,500	0.01	5.0

3.3.2 Groundwater Quality Objectives

Water quality objectives for surface and ground waters are adopted by the RWQCBs for specific basins. The objectives set to protect surface and groundwater quality can vary greatly from basin to basin are often based on the existing conditions of the basin or surface water body. See the discussion above related to the proposed changes in groundwater regulations by the CDPH related to the protection of human health.

At the local level, the RWQCB responsibility is the protection of the environment, and hence the variation from one region to another or even from one basin to another. These objectives often dictate additional recycled water quality requirements if being used for groundwater recharge or for surface water augmentation or discharges.

Specific objectives for the region's groundwater basins and surface water bodies were not considered in this plan since these potential recycled water uses were not being considered by the plan partners for near-term. For the long-term, potential groundwater recharge options were discussed and basin plan objectives should be considered more closely in future analyses.

Based on the 2011 Water Quality Control Plan for the Central Coastal Basin (2011 Basin Plan), certain water quality objectives have been established for selected ground waters. These objectives are intended to serve as a water quality baseline for evaluating water quality management in the basin. The median values for ground waters are shown in **Table 3-5**.

Table 3-5: South Coast Sub-Basin Median Ground Water Objectives, mg/l

Sub-Area	TDS	Chlorine (Cl)	Sulfate (SO_4)	Boron (B)	Sodium (Na)	Nitrogen (N)
Goleta	1,000	150	250	0.2	150	5
Santa Barbara	700	50	150	0.2	100	5
Carpinteria	700	100	150	0.2	100	7

Notes:

1. Objectives shown are median values based on data averages; objectives are based on preservation of existing quality or water quality enhancement believed attainable following control point sources.

Chapter 4 Existing Wastewater Treatment Plants and Recycled Water Systems

This chapter summarizes the existing wastewater treatment plants and recycled water systems in the plan area.

4.1 Existing Wastewater Treatment Plants

This section provides an overview of the existing wastewater treatment plants and potential recycled water supplies available to the region that are owned and operated by the agencies in the south coast region of the County of Santa Barbara. Each plant is discussed individually. The existing capacities and projected flows were provided by each agency.

4.1.1 Existing Capacities

Table 4-1 provides a summary of the existing secondary and tertiary capacities, along with average daily flows for each wastewater treatment plant. The existing capacities were provided by each agency.

Table 4-1: Existing Wastewater Treatment Plants Capacity and Flows

Wastewater Treatment Plant	Existing Condition (2012)			
	Treatment Capacity (MGD)		Average Daily Flow (MGD)	
	Secondary	Tertiary	Secondary	Tertiary
Carpinteria WWTP	2.5	--	1.4	--
El Estero WWTF	11.0	2.2	8.0	0.6
Goleta WWTP	4.0	3.0	4.0	1.1
Montecito WWTF	1.5	--	0.9	--
Summerland WWTP	0.3	0.3	0.14	0.14
Totals	19.3	5.5	14.44	1.84

4.1.2 Future Capacities

Table 4-2 provides a summary of the potential future secondary and tertiary capacities, along with average daily flows for each treatment plant. The projected flows were provided by each agency.

4.1.3 Summary of Existing Wastewater Treatment Plants

Goleta WWTP

Both the GWSD and the GSD provide wastewater collection to customers within the GWD service area. Wastewater from the GWSD and the GSD is treated at the Goleta WWTP. Recycled water service within Goleta began in 1994 in response to drought conditions of the early 1990s and the Wright suit settlement.

The Goleta WWTP has a secondary capacity of 4.0 MGD and a tertiary capacity of 3.0 MGD. Currently, an average of 1.1 MGD of recycled water is being produced. The GSD is currently constructing additional processes to increase the plant's secondary capacity to 9.0 MGD.

Table 4-2: Existing and Future Wastewater Capacities and Flows

Wastewater Treatment Plant	Near-Term (2022)				Long-Term			
	Treatment Capacity (MGD)		Average Daily Flow (MGD)		Treatment Capacity (MGD)		Average Daily Flow (MGD)	
	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary	Secondary	Tertiary
Carpinteria WWTP[1]	2.5	--	1.6	--	2.5	--	1.6	--
El Estero WWTF[2]	11.0	2.2	8.0	1.25	11.0	2.2	8.5	1.25
Goleta WWTP[3]	9.0	3.0	6.5	3.0	9.0	3.0	7.0	3.0
Montecito WWTF	1.5	--	1.0	--	1.5	--	1.0	--
Summerland WWTP	0.3	0.3	0.14	0.14	0.3	0.3	0.14	0.14
Totals	24.3	5.5	17.24	4.39	24.3	5.5	18.24	4.39

Notes:

1. Carpinteria Sanitary District Wastewater Collection System Master Plan, April 2005
2. 2011 average annual recycled water production; recycled water capacity is 1,400 acre-feet per year (2011 Long-term Water Supply Plan). During drought conditions, flows at the El Estero WWTF decreased from 9.5 MGD to 5.5 MGD. Therefore, it is assumed that only 5.5 MGD (1 MGD for in-plant uses and 4.5 MGD available for other uses) is the available average day flow for future reuse. The projected tertiary treatment capacities in the near- and long-term do not include the City's recently approved treatment upgrade project as that project included in the proposed projects list.
3. Per conversation with Goleta Sanitary District personal (6/19/2012), secondary treatment is currently being expanded to treat 9 MGD by 2014. Tertiary treatment capacity is dependent upon peak demand needs. If recycled water is needed, the tertiary treatment plant can treat up to 3.0 MGD of tertiary flow.

The Goleta WWTP produces secondary effluent, a portion of which is blended with primary effluent prior to ocean discharge. The rest of the flow is sent to the recycled water system. The recycled water system consists of flash mixing tanks, flocculation tanks, anthracite filters, and a chlorine contact tank. Following production, recycled water is placed in storage tanks. The tanks allow the treatment plant to operate at a steady efficient rate regardless of recycled water demand (GSD, 2011). The existing recycled water system can produce up to 3 MGD of tertiary effluent for recycling. However, the ability to fully utilize recycled water is limited by recycled water use patterns, which are typically condensed into a 12- rather than a 24-hour period, and is limited by recycled water delivery capacity and the end user demand for recycled water (GWD UWMP, 2010). Generally, demand is high during summer months, but lessens during winter months when large users such as irrigators reduce irrigation needs.

GSD has no current plans to expand the capacity of the tertiary processes. Expansion of tertiary facilities depends upon the need for expansion of GWD's recycled water demand and storage capabilities. Currently, there is 1.9 MGD of recycled water available for GWD potential customers. Although GSD has seen little-to-no increase in flows in the past ten years, projected flows are anticipated to increase 1% per year in the future.

Goleta West Sanitary District

Goleta West Sanitary District is not planning to construct a wastewater treatment plant. It is more cost effective to pay GSD for treatment and discharge of Goleta West Sanitary District's flows.

El Estero WWTF

The El Estero WWTF was constructed in 1979 with the recycled plant added in 1989 and is owned and operated by the City of Santa Barbara. The plant provides full secondary treatment and partial tertiary filter treatment, in conformance with Title 22 and consists of full secondary treatment followed by anthracite media filtration, and chlorination. The plant's tertiary capacity is 4.4 MGD. However, the disinfection processes currently limit the recycled water production to 2.2 MGD.

Influent has declined in recent years. The decline in wastewater flows is largely attributed to the success of infiltration and inflow reduction into the sewer and water conservation efforts. Average annual recycled water production flows are 0.6 MGD with a maximum monthly demand (MMD) of 1.5 MGD. To meet the City of Santa Barbara goal of no more than 300 mg/l of chloride during irrigation season, approximately 300 acre-feet per year (AFY) of potable water has historically been blended into the recycled water. More recently, however, turbidity in the recycled water has routinely exceeded the 2.0 NTU limit, which has required significantly more blending, up to 80% in recent years. This has greatly reduced the amount of recycled water being used from wastewater sources. In addition, the tertiary filters have confined space entry issues and corrosion has compromised the structural integrity of some facilities causing a process shutdown.

Currently, the El Estero WWTF filters are operated as a batch process. During the day, the plant fills both the Golf Course Reservoir and the El Estero Reservoir to their maximum levels. The filters are activated when the level in the El Estero Reservoir drops to ten feet (above the reservoir floor) and the filters are deactivated when the level in the reservoir rises to 20 feet (above the reservoir floor). Considering that the first six feet of the reservoir is required for contact time, the filters do not activate until about 3/4 of the reservoir's available 0.49 MG capacity is depleted (since useful range is between 22 and 6 feet of sidewater depth).

Based on current MMD, about 740,000 gallons is required for the Phase I system at night, and according to this value, the El Estero Reservoir will reach the 10 foot level after about four hours. The irrigation period begins at 9:00 PM, so the filters would activate at about 1:00 AM when the flow into the plant averages about 2.5 MGD. Considering that the irrigation period will last for an additional five hours, about 0.50 MG is available from the filters as additional supply.

About 290 AFY (260,000 gallons per day) of recycled water is also used at El Estero WWTF for plant processes such as spray and washwater. At full capacity, tertiary facilities must accommodate this additional process water flow. Ultimately, the effluent available from the tertiary facilities is reduced by 260,000 gallons per day since the tertiary filters and the chlorine contact basin must accommodate this internal demand.

Montecito WWTF

Montecito Sanitary District's (MSD) owns and operates Montecito wastewater treatment facility (WWTF) which has a secondary capacity of 1.5 MGD. Currently, secondary flows at the Montecito WWTF are averaging approximately 0.9 MGD. MSD and Montecito Water District (MWD) completed a water reclamation study in 1991 but have not implemented any reuse projects. Montecito is a small community, with little to no expected future growth.

The treatment plant provides secondary treatment and chemical disinfection of collected wastewater prior to discharge into the Pacific Ocean via a dedicated outfall pipe. Processed biosolids are composted and are reused as agricultural amendments.

Summerland WWTP

The Summerland Sanitary District operates and maintains a 0.3 MGD capacity tertiary treatment plant to biologically and chemically process wastewater. Effluent is discharged into the Pacific Ocean via a dedicated outfall. Although Summerland Sanitary District is interested in and exploring recycled water, no expansions are expected in the future and average day flows are expected to remain around 0.14 MGD.

Carpinteria WWTP

The Carpinteria WWTP has a secondary capacity of 2.5 MGD and is owned and operated by Carpinteria Sanitary District (CSD). The treatment plant provides secondary treatment and chemical disinfection of collected wastewater prior to discharge into the Pacific Ocean via a dedicated outfall pipe. Currently, the influent flow rate at the Carpinteria WWTP averages approximately 1.4 MGD.

CSD completed its Wastewater Collection System Master Plan in 2005. Wastewater volumes are projected to increase modestly to approximately 1.6 MGD. It should be noted that the potential to vary from interim to ultimate flow projections is significant in a small community like Carpinteria. A single high volume commercial or industrial discharger (e.g. food processing facility, commercial laundry, etc.) entering the area could skew the numbers dramatically. System flows have historically varied with annual rainfall totals. The plan was to go forward with the Master Plan (after drought).

4.2 Existing Recycled Water Systems

This section provides a brief overview of the existing recycled water systems in the south coast subregion by water agency. There are five water agencies in the south coast subregion, two of which currently serve recycled water customers in their service areas. La Cumbre Mutual Water Company, Montecito Water District, and Carpinteria Valley Water District currently do not have recycled water in their service area.

4.2.1 Goleta Water District Recycled Water System

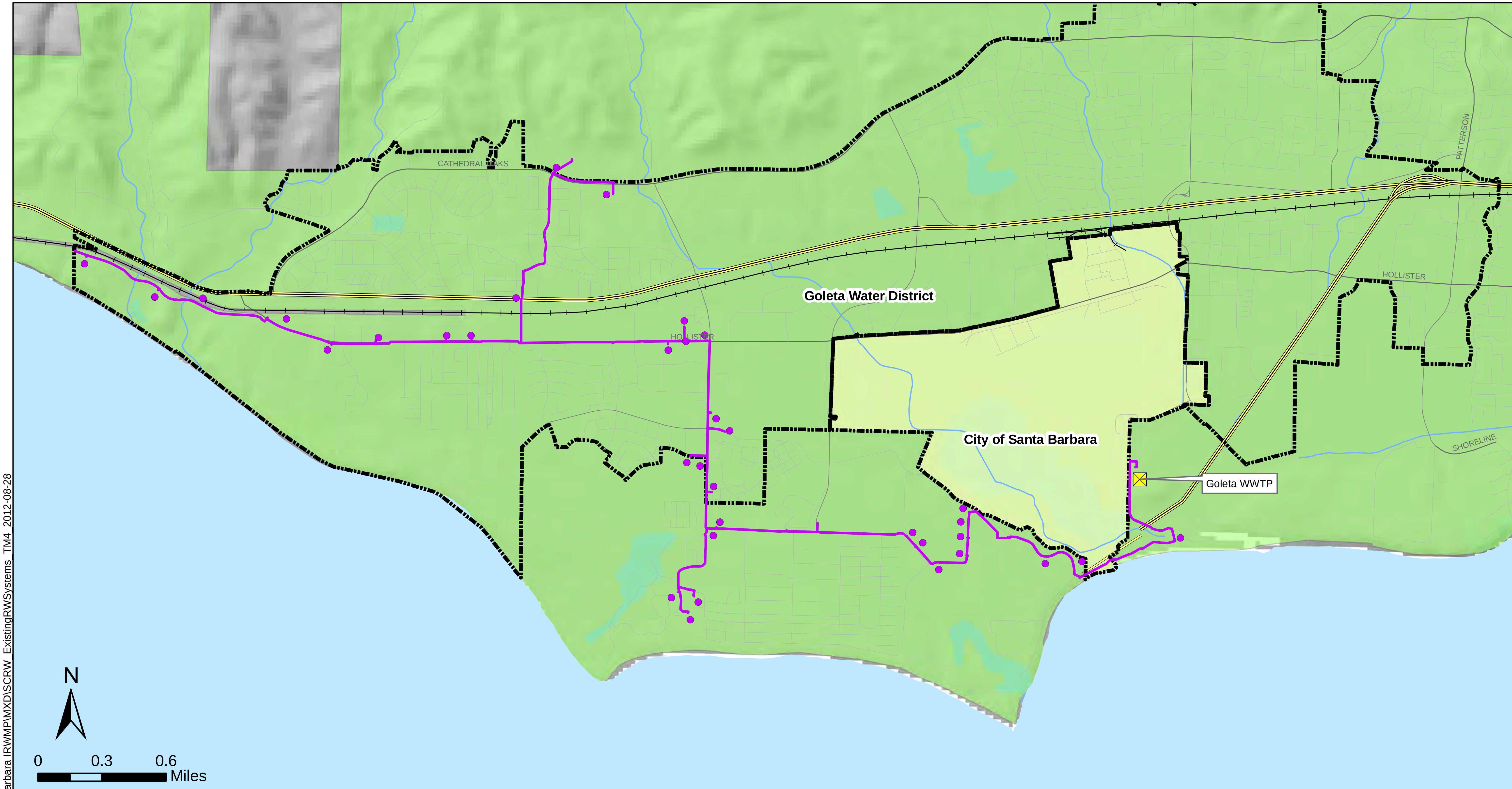
Recycled water service within Goleta began in 1994 in response to drought conditions of the early 1990s and the Wright Suit Settlement (1989). The 1989 Wright Suit Settlement served to adjudicate the groundwater resources of the Goleta North/Central Basin and assigned quantities of the basin's safe yield to various parties, including GWD and La Cumbre Mutual Water Company. The judgment also ordered GWD to bring the North/Central Basin into a state of hydrologic balance by 1998. GWD achieved compliance with this order in 1998 through the importation of State Water Project water and the development of other supplemental supplies. These supplemental supplies have offset the court-mandated reduction in pumping from the basin. Given that the basin has been adjudicated and pumping is controlled by the court, overdraft is not foreseeable in the North-Central Basin (2007 SB IRWM Plan).

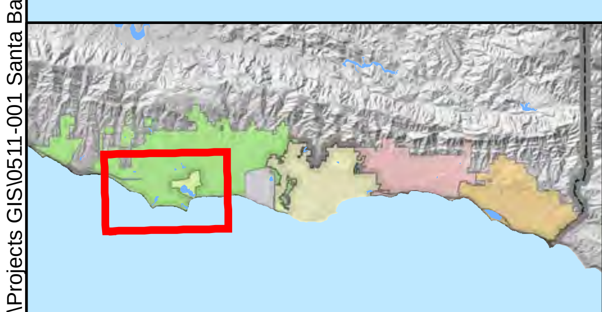
The recycled water system is a joint agency project between GWD, GSD, and the University of Santa Barbara. GWD owns and operates the distribution system and provides the funding for the operation, maintenance, and capital replacements and upgrades to the entire system, including the water reclamation treatment plant, which GSD owns and operates.

Recycled water is produced at the Goleta WWTP and is supplied through GWD's recycled water distribution system to over 30 sites in the area. Water is used for irrigation, commercial use, and indoor toilet uses. **Figure 4-1** shows GWD's existing recycled water system.

Some expansion of the current system is possible without upgrades of the existing treatment or distribution system. Major expansions to the system could require additional treatment, storage, and distribution facilities depending on the size and location of demands. Economic incentives are needed for customers to convert to recycled water due to higher regulations and the need for these customers to have dedicated operating personnel responsible for the onsite use of recycled water.

GWD's existing recycled water system has a high need for maintenance and replacement of pipes and facilities due to the age of the system and corrosive soil conditions. GWD has identified several projects that are necessary to maintain and upgrade their current system. These projects are discussed in detail in Chapter 7 - Distribution System Needs.





L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_TM4_ExistingRWSystems_2012-08-28

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Existing Recycled Water System: Goleta Water District

Figure 4-1

4.2.2 City of Santa Barbara Recycled Water System

The City of Santa Barbara has the most extensive recycled water system in the region. The City of Santa Barbara owns and operates the El Estero WWTF, which produces recycled water for local distribution. The City initiated planning for a water reclamation project in the early 1980's. Phase I was completed in 1989 and included the addition of tertiary treatment with carbon filtration and disinfection at the El Estero WWTF, a 600,000-gallon distribution reservoir and pumping station, and 5.1 miles of distribution main. Phase II was completed in 1992, adding an additional pump station, a 1.5 million gallon reservoir, and 8.3 miles of distribution main.

In total, the City's recycled water system includes 2.1 MG of reservoir storage, three pumping stations, and 13.4 miles of distribution main. The system now provides recycled water to 61 sites that serve 440 acres of landscaped area at parks, schools, golf courses, and other large landscaped areas. In addition, several public restrooms have been retrofitted to use recycled water for toilet flushing. Recycled water is provided at a price of 80% of the potable water irrigation rate as an incentive for using recycled water and to compensate for additional irrigation requirements associated with salt leaching. **Figure 4-2** shows the City's existing recycled water system.

The City system as currently configured has the capacity to treat and deliver approximately 1,400 AFY of recycled water. Current connected recycled water demand is approximately 800 AFY, plus approximately 300 AFY process water used at the wastewater treatment plant, leaving about 300 AFY of additional capacity available for additional recycled demands. As noted earlier, the actual amount of recycled wastewater that is served is greatly reduced because of the need to blend with potable water to meet water quality limits.

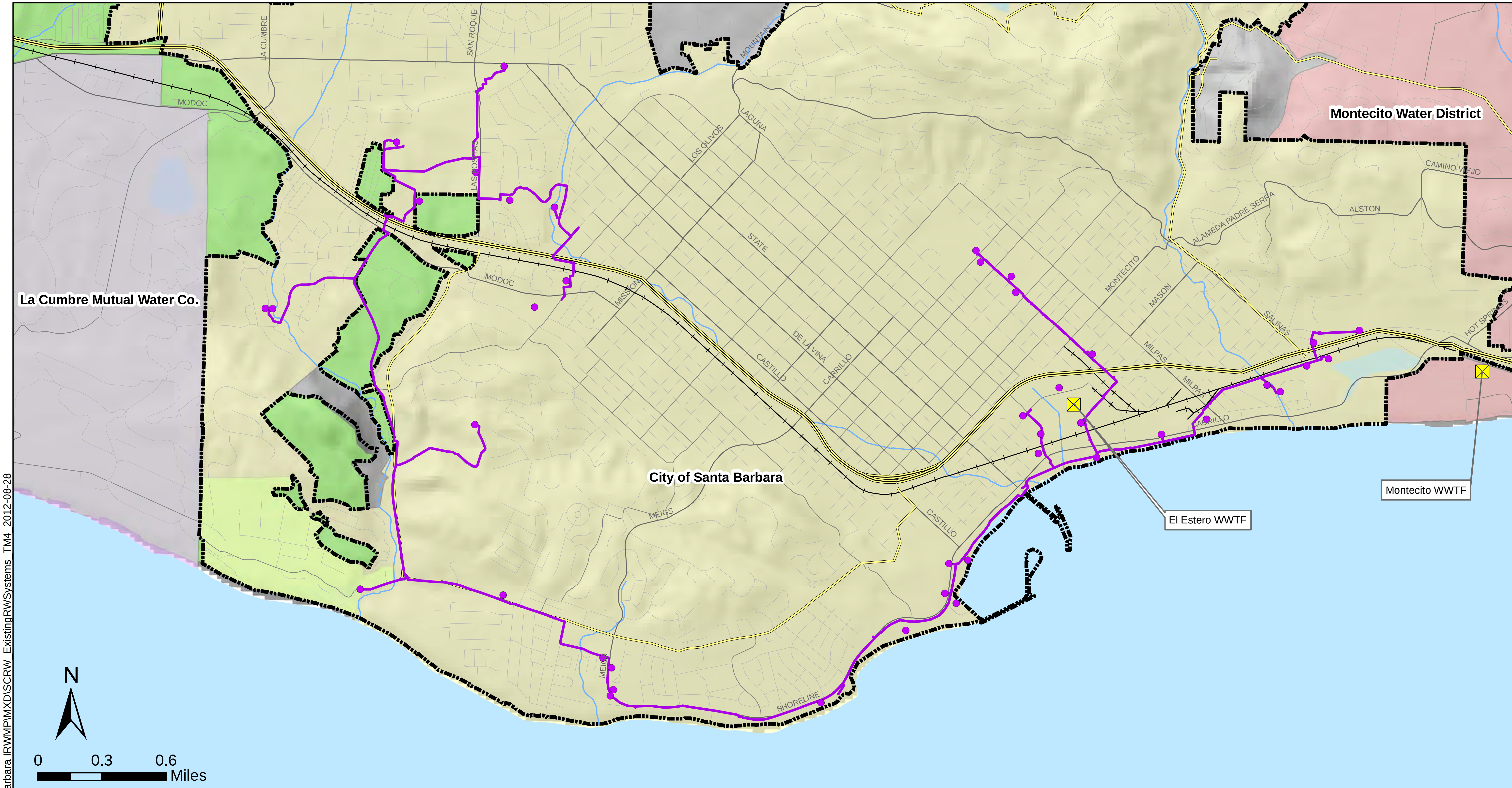
The recycled water system provides an important component of the City water supply, even with a partial potable water component needed for blending as discussed earlier. In addition, the fact that users are signed up and connected to the separate recycled water system provides increased flexibility in how the City balances the economic and water supply aspects of this source of water.

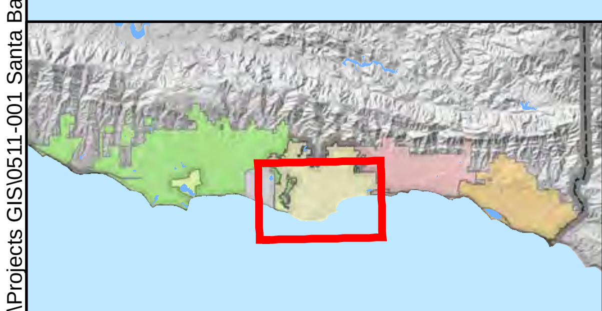
In 2009, the City completed its Water Supply Planning Study, and in 2011, the City completed its Long-Term Water Supply Plan. Through these efforts, the City concluded that recycled water is a relatively expensive source of water but a reliable way to extend potable water supplies, thereby deferring the expense of procuring additional potable supplies. Additionally, increased recycled water connections will allow flexibility in meeting regulatory demand management requirements, such as the statewide requirement to reduce gross daily per capita water consumption.

As part of the 2009 study, about 300 AFY of potential new users of recycled water were identified that could help maximize the use of the available recycled water at the El Estero WWTF. Some of these users are located adjacent to the existing system, such that the distribution costs are minimal. It is anticipated that the additional capacity will be met by maximizing uses within the current distribution system. However, as noted earlier the performance issues at the plant that are resulting in a high level of potable blending need to be addressed to make additional expansion more cost effective and to maximize the potable offset that recycled water use provides.

4.2.3 Montecito Water District

Although the Montecito Water District does not have an existing recycled water system, the District installed some purple pipe for irrigation lines as part of a Summerland Beautiful project in anticipation of serving recycled water in the future. These lines are located in various locations along Lillie Avenue and Ortega Hill Road. Such installations would reduce the cost of a future recycled water system.





Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Existing Recycled Water System	Other Features	Water Agencies
Customer	WWTP	Carpinteria Valley Water District
Pipeline	State Highway	City of Santa Barbara
	US Highway	Goleta Water District
	Railroad	La Cumbre Mutual Water Co.
	City Boundary	Montecito Water District

Existing Recycled Water System: City of Santa Barbara

Figure 4-2

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_ExistingRWSystems_TM4_2012-08-28

4.3 Potential Recycled Water Available

Table 4-3 shows near-term and long-term potential wastewater available for future recycled water users at each wastewater plant. Note that the maximum potentially available flow for future recycled water demands is based on the projected secondary wastewater flow minus the existing recycled water usage times a peaking factor (2.0) to account for maximum day demand. While the peaking factor may vary from system to system and year to year, a factor of 2.0 was deemed reasonable based on existing system and potential future recycled water users in the area.

Table 4-3: Potentially Available Recycled Water Supplies

Wastewater Treatment Plant	Projected Average Daily Secondary Wastewater Flow (MGD)		Existing Recycled Water (MGD)	Maximum Potentially Available for New Recycled Water Supply (MGD)[1]	
	Near-Term	Long-Term		Near-Term	Long Term
Carpinteria WWTP	1.6	1.6	--	1.6	1.6
El Estero WWTF[2]	8.0	8.5	0.76	6.48	6.98
Goleta WWTP	6.5	7.0	0.7	5.1	5.6
Montecito WWTF	1.0	1.0	--	1.0	1.0
Summerland WWTP	0.14	0.14	--	0.14	0.14
Total	**17.24**	**18.24**	**1.46**	**14.32**	**15.32**

Notes:

1. Maximum potentially available supplies based on projected secondary wastewater flow minus the existing recycled water usage times a peaking factor (2.0 typically) to account for maximum day demand. Peak hour demands are assumed to be met via diurnal storage facilities.
2. Amount of existing recycled water is the actual recycled wastewater being served due to the need for potable water blending.

Chapter 5 Potential Customers

This chapter identifies potential recycled water customers in the south coast subregion. Potential recycled water demands within the subregion mainly include recycled water use for irrigation at parks, agricultural uses, golf courses, highways and schools.

5.1 Demand Approach/Source

Potential recycled water demands were developed based on previous agency studies as well as updates provided by the participating agencies. Near- and long-term potential recycled water demands were identified based on specific agency criteria which took into consideration their local water and wastewater settings. The approach and source of data for each water agency is discussed below:

Goleta Water District (GWD) provided the specific potential recycled water customers and their demand estimates. Agricultural users in the Goleta area utilize groundwater and other water sources for irrigation, especially avocados. These uses could be replaced by recycled water but would require advanced treatment (microfiltration/reverse osmosis) due to high TDS levels. Any nurseries in the area could also utilize this advanced treated water if the TDS levels were reduced to meet their needs as well.

La Cumbre Mutual Water Company (LCMWC) provided meter records from 2008 through 2011 for their top two water users that could use recycled water. Based on the meter records, a percentage was used to determine the potential recycled water demand.

City of Santa Barbara (SB) potential recycled water customers were identified from the City's 2009 Water Supply Planning Study and were updated during the study workshops. Given the extensive work done on the market as part of the 2009 Water Supply Planning Study, this study used the work previously completed to the extent possible, with current updates from SB.

Montecito Water District (MWD) potential recycled water customers were obtained from the 1991 Water Reclamation Study. The demands in the study were calculated using AFY/acre assumptions for irrigation and agriculture area. The 1991 Study identified potential customers for both developed and undeveloped land. Since very little growth has occurred since the 1991 Study, the developed land customers and demand estimates were brought forward to this Study.

Carpinteria Valley Water District (CVWD) provided two sets of data to identify potential recycled water customers. CVWD provided potable meter records for urban customers within the City of Carpinteria. Specific customer types were identified (e.g. schools, parks, irrigation (urban), commercial, etc.) and a percentage was used to determine the potential recycled water demand. All potential customers with recycled water demand estimates greater than 2 AFY were carried forward for consideration. CVWD also provided landuse data on the agricultural uses, outside the City of Carpinteria, and an AFY/acre assumption for each crop type. Currently, agriculture land is supplied with groundwater and every two years, aerial photographs are taken of CVWD service area to update their groundwater use estimate based on current crop types. Once the AFY/acre assumption was calculated for the agriculture parcels, customers with 5 AFY or greater of recycled water demand were selected. Nurseries were not included due to the sensitivity of plants in using recycled water, which has a high TDS.

The County of Santa Barbara provided a land use parcel shape file for the entire south coast subregion. For this plan, large parcels of land with specific land use types (e.g. colleges, field crops, golf courses, irrigated farms, recreation, schools, etc.) that were near current recycled water systems were identified. During the workshops, the water agencies also helped to further refine the selected parcels that could be potential long-term customers. Many of the customers identified are agriculture users, which would require higher levels of water quality and would require a greater level of economic subsidy or other financial strategies due to their current reliance on cheaper water supplies.

Appendix D lists the assumptions used to calculate the potential recycled water demand estimate by each service area. A listing of the customers and potential demands is provided in **Appendix E**.

5.2 Existing Recycled Water Demands

Currently, only the City of Santa Barbara and Goleta Water District have existing recycled water customers.

5.2.1 Goleta Water District

Based on their 2010 Urban Water Management Plan, GWD currently serves 785 AFY of recycled water. GWD has a relatively steady base of recycled water customers. For the last decade, the amount of recycled water produced and delivered has remained relatively constant, with some variation due to rainfall. Currently GWD delivers recycled water for landscape irrigation uses as well as a minor amount for toilet flushing. In years where the Goleta area receives higher than normal rainfall, demand for recycled water is low (GWD UWMP, 2010). The Goleta area has a large agricultural market, a portion of which could potentially utilize recycled water. However, there are obstacles to using recycled water for agricultural irrigation. Avocados and citrus are the dominant crops in the Goleta area and these are sensitive to dissolved minerals found in recycled water. Avocados are extremely sensitive to total dissolved solids (TDS) requiring water with TDS of less than 800 mg/L. Currently the recycled water system produces water with TDS of approximately 1250 mg/l. To deliver recycled water to agriculture would require additional and perhaps costly advanced (microfiltration [MF] and reverse osmosis [RO]) treatment (UWMP, 2010).

5.2.2 City of Santa Barbara

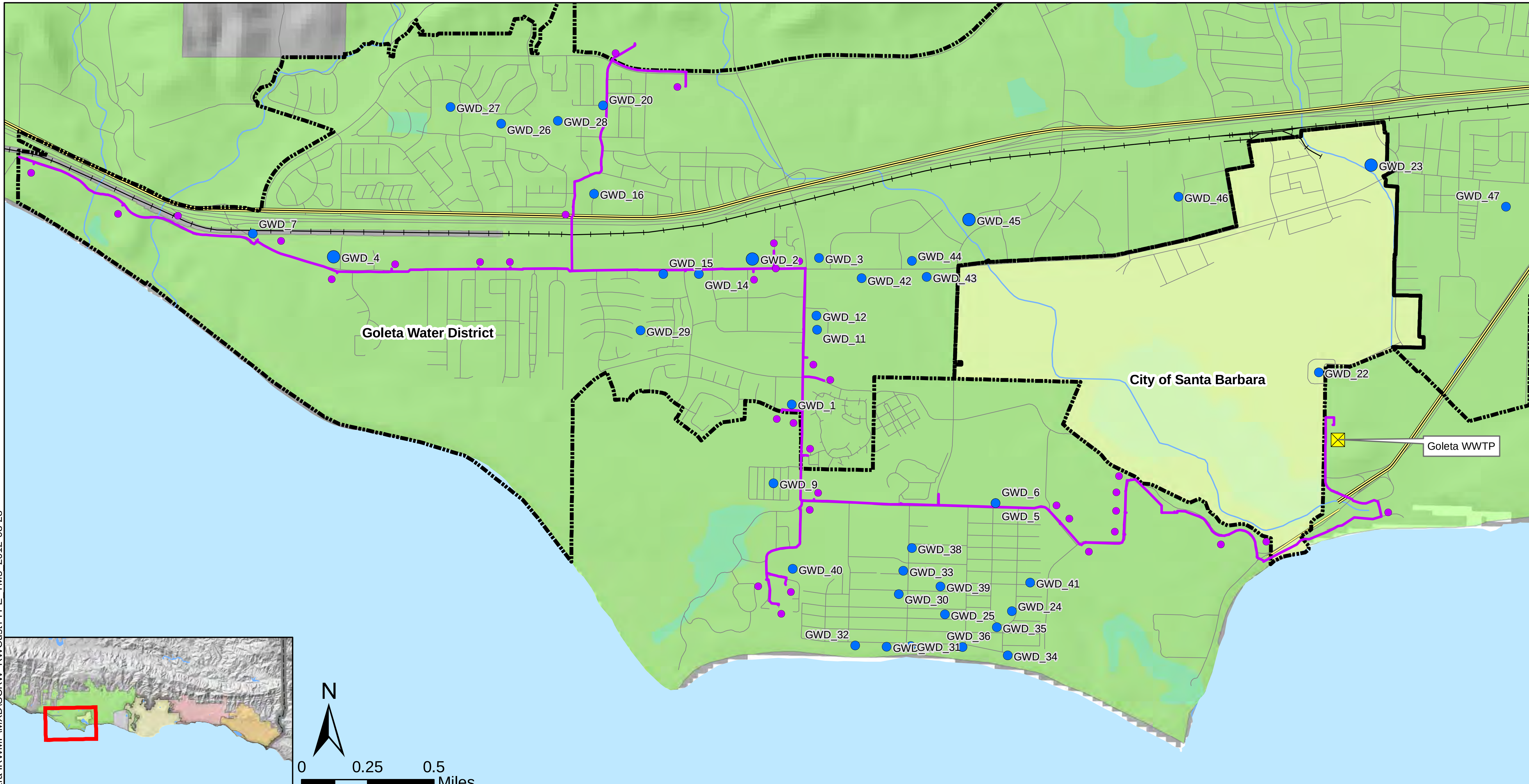
Based on its 2009 Water Supply Planning Study, the City of Santa Barbara serves recycled water to 62 recycled water sites. Most of these sites use recycled water for irrigation, with a small portion for toilet flushing at City of Santa Barbara's parks. Golf courses account for the largest portion of the City's recycled water demand. The average annual customer demand during a 5-year consumption history (2003 through 2007) was 847 AFY. About 290 AFY (260,000 gpd) of recycled water is also used at the El Estero WWTF for plant processes such as spray and washwater. This water is not included in the total recycled water used (WSPS, 2009).

5.3 Potential Recycled Water Demands

Potential recycled water customers were identified by each agency. Near-term customers were only identified for GWD and City of Santa Barbara. **Appendix E** lists both near-and long-term potential recycled water customers by water agency.

5.3.1 Goleta Water District

Potential recycled water demand for specific customers was provided by GWD. These demands are shown in **Figure 5-1**. As discussed above, County land use data was used to identify other potential customers, especially agriculture areas. **Figure 5-2** shows the parcels identified in the Goleta area. No demands were developed for these areas as their extent of water use and their potential for using recycled water is not known. For future studies, an estimate of recycled water use could be made based on the current groundwater allotment and/or actual agriculture irrigation water demand/usage. To serve recycled water to the agriculture users, a higher level of water quality would be necessary, including lower TDS levels than what the Goleta recycled water system is currently using. This would require a reverse osmosis system, which would increase the cost of producing recycled water. In addition, the cost of the recycled water would have to be subsidized or offset to these users as they currently rely on cheaper water sources. Therefore, these users were not further investigated nor included as the potential recycled water customers at this time. These potential users are included in this plan to show the extent of the potential



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_RWCustTYPE_TM5_2012-08-28

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Potential Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Type
- Urban Irrigation
- Agriculture
- Industrial/Commercial

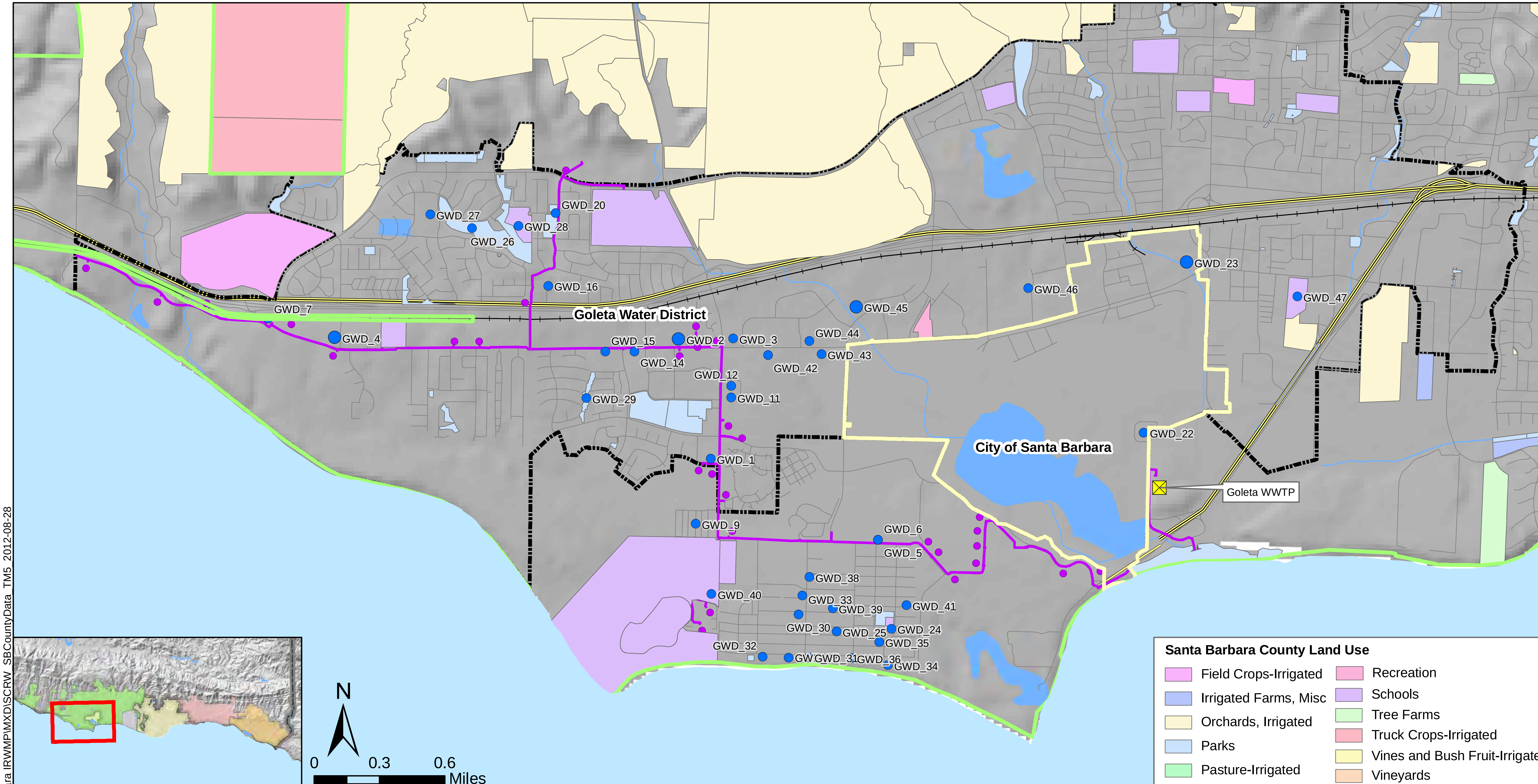
Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Recycled Water Customers: Goleta Area

Figure 5-1



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Recycled Water Customer

Demand (AFY)	Type
Less than 5	Urban Irrigation
5 to 20	Agriculture
20 to 50	Industrial/Commercial
Greater than 50	

Existing Recycled Water System

- Customer
- Pipeline

Other Features

- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- La Cumbre Mutual Water Co.
- Goleta Water District
- Montecito Water District

Potential Agriculture Customers: Goleta Area

Figure 5-2

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_SBCountyData_TM5_2012-08-28 long-term use of recycled water should the supply and cost of recycled water become more economically viable to such uses and/or if groundwater usage becomes restricted due to overuse.

Near-Term Potential Recycled Water Customers

Near-term potential recycled water customers were identified as potential irrigation customers located near the existing recycled water distribution system and that have expressed an interest to GWD in using recycled water. Connecting these customers requires less cost to convert to recycled water than customers requiring lateral pipelines. Seven potential near-term customers, with a total average annual demand of 27 AFY, were identified by GWD. These include the UCSB Sierra Madre Apartments, medians along El Colegio Road, and new developments currently being constructed along the recycled water distribution system. **Figure 5-3** shows the identified potential near-term recycled water customers in the Goleta area.

Long-Term Potential Recycled Water Customers

Long-term potential recycled water customers are located farther away from the existing recycled water distribution system and require more effort and higher costs to convert to recycled water. GWD provided two groups of long-term potential customers: 1) potential conversion to recycled water for landscape irrigation and 2) potential recycled water demand that would require infrastructure expansion.

The "landscape conversion potential properties" are potential properties adjacent to the existing recycled waterline that could convert their landscape irrigation from potable to recycled water. Discussions with the respective property owners have not been conducted by GWD. These customers include UCSB's Married Student Housing, Bella Vista Park and Santa Barbara Airport.

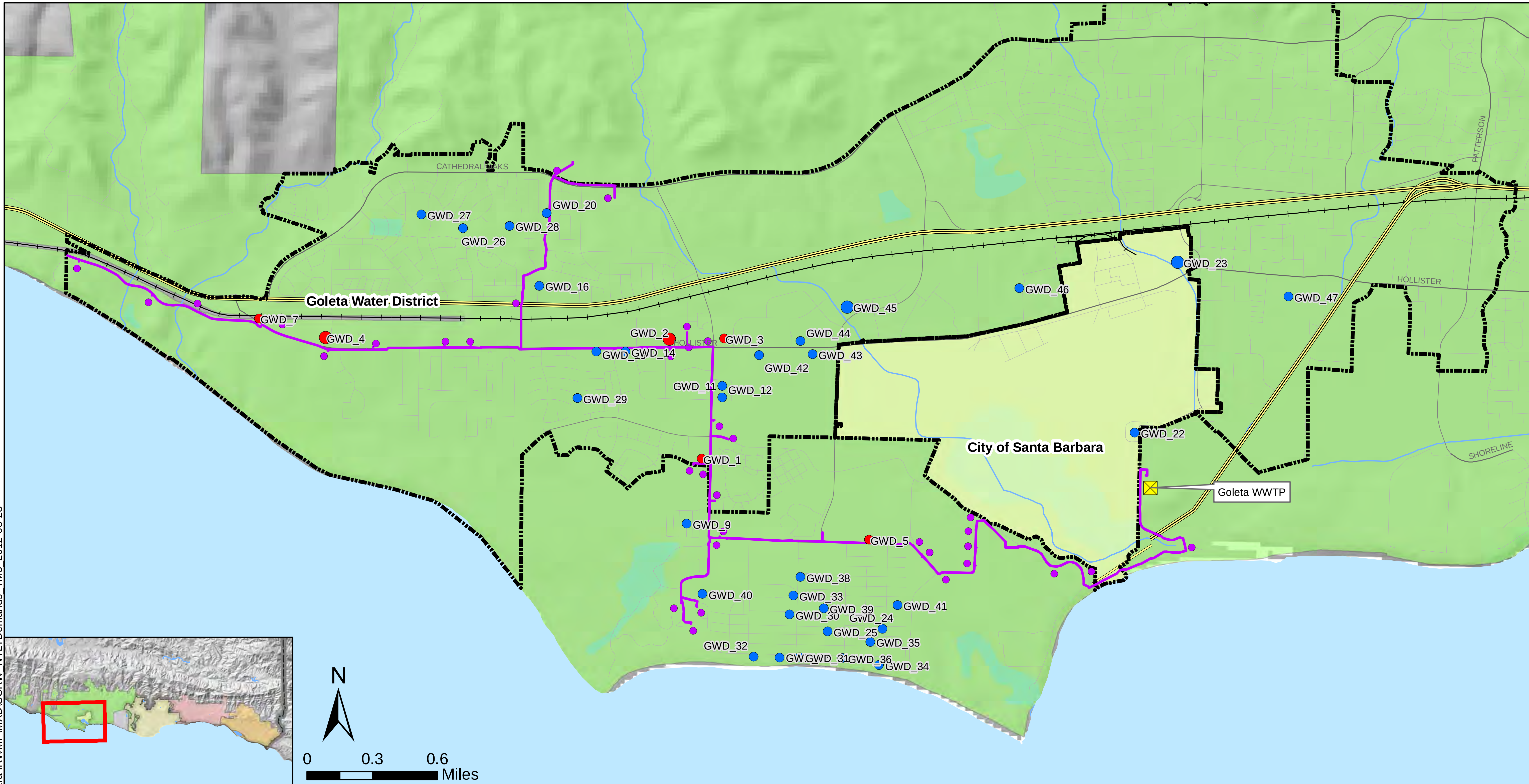
The "long-range, infrastructure expansion" potential customers are those that would require an extension from the existing recycled water distribution system or changes to the system. These customers include Twin Lakes Golf Course, and multiple parks and schools.

In total, 33 potential long-term customers, with a total demand of 73 AFY, were identified. The two types of potential long-term recycled water customers are differentiated in the Customer Table (**Appendix E**), but are grouped together in **Figure 5-3**.

As discussed above, the Goleta area has a large agricultural market, a portion of which could potentially utilize recycled water. However, there are obstacles to using recycled water for agricultural irrigation. Avocados and citrus are the dominant crops in the Goleta area and these are sensitive to dissolved minerals found in recycled water. Avocados are extremely sensitive to total dissolved solids (TDS) requiring water with TDS of less than 800 mg/L. Currently the recycled water system produces water with TDS of approximately 1250 mg/L. To deliver recycled water to agriculture would require additional and perhaps costly enhanced treatment (UWMP, 2010). Therefore, for this plan, these agricultural properties were not included as potential long-term recycled water customers.

5.3.2 La Cumbre Mutual Water Company

Two potential recycled water customers were identified in the LCMWC service area: La Cumbre Golf and Country Club and Laguna Blanca School Chase Field. Due to water quality issues and the institutional challenges of serving recycled water to LCMWD, these customers are considered potential long-term demands. Their total recycled water demand is 130 AFY, but demands may change due to the specific water quality needed at the golf courses. The two LCMWC customers are shown on the potential recycled water customers in the Santa Barbara area (**Figure 5-4)**. Based on a previous study conducted for the potable water system, the Country Club does have a lake on site that can be used for diurnal storage for the irrigation system. Use of recycled water would require additional research to confirm that such an arrangement could be made using recycled water. The advantage of using this lake for diurnal storage is that it could reduce or eliminate the need to provide diurnal storage on the City of Santa Barbara's recycled water system in connecting to this customer.



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_NTLTDemands_TM5_2012-08-28

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Potential Long-Term Recycled Water Customer

Demand (AFY)

- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Long-Term Recycled Water System

- Customer

Potential Near-Term Recycled Water System

- Customer

Existing Recycled Water System

- Customer
- Pipeline

Other Features

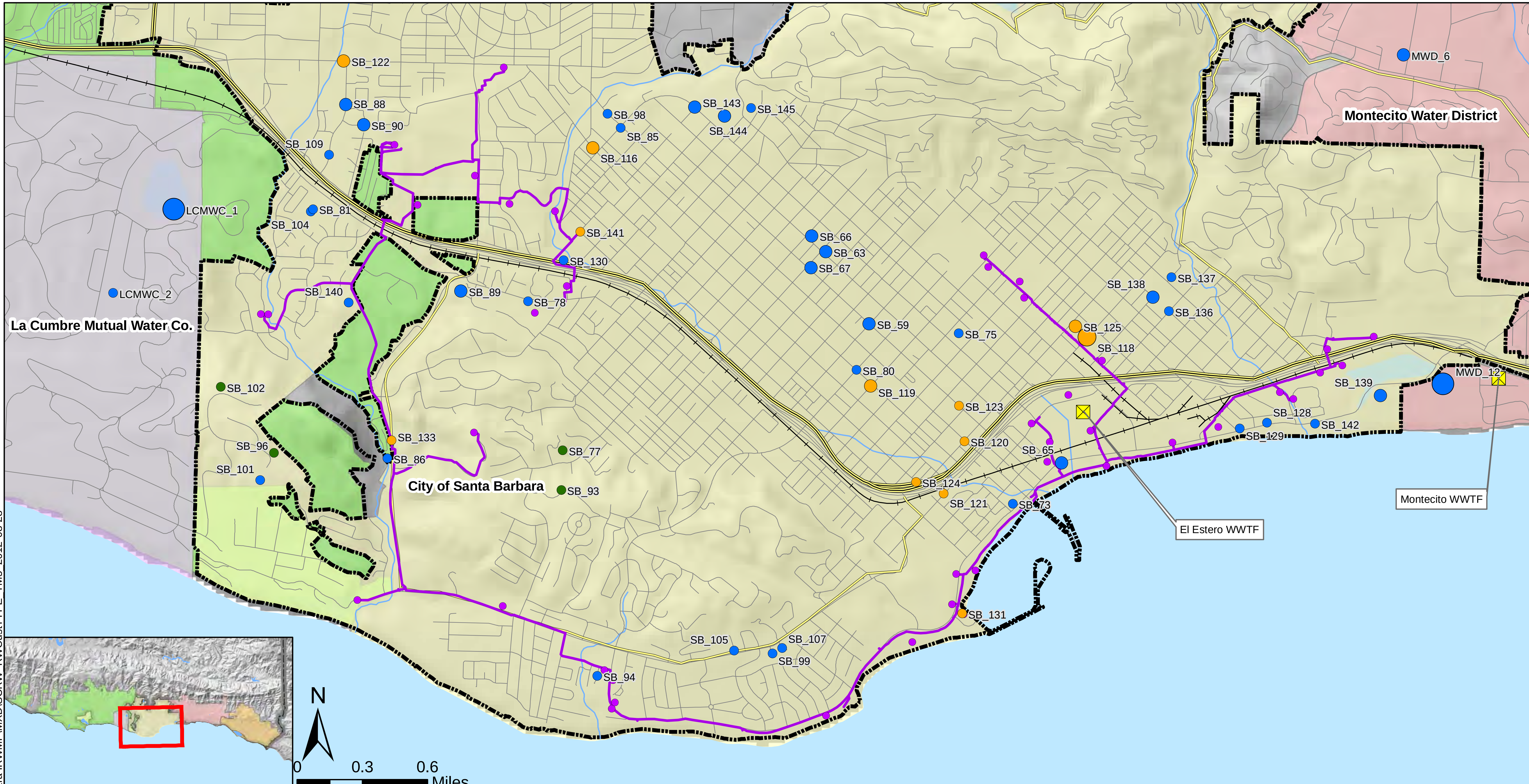
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Near-Term and Long-Term Recycled Water Customers: Goleta Area

Figure 5-3



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_RWCustTYPE_TM5_2012-08-28

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Type
- Urban Irrigation
- Agriculture
- Industrial/Commercial

Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Recycled Water Customers: Santa Barbara Area

Figure 5-4

5.3.3 City of Santa Barbara

Most of the potential recycled water customers were identified from the 2009 Water Supply Planning Study. During workshops, the City of Santa Barbara identified the time frame of each customer and provided additional potential recycled water customers. However, at present, the City's recycled water facility is not operational, and the City Council has approved the concept of replacing the filter plant with microfiltration process system. Partial reverse osmosis is also being considered. These upgrades are necessary for the City to be able to serve recycled water without potable water blending to its current users and to be able to serve both near- and long-term customers.

Near-Term Potential Recycled Water Customers

Most of the near-term potential recycled water customers are located adjacent to the existing recycled water distribution system and require little effort to convert to recycled water. Eleven potential near-term customers, with a total demand of 49 AFY, were identified. These include several homeowner associations, First Baptist Church, and Las Positas Tennis Courts. **Figure 5-5** shows the potential near-term recycled water customers in the Santa Barbara area.

Long-Term Potential Recycled Water Customers

Long-term customers are either farther from the distribution system or are commercial/industrial type users that may have water quality concerns that need to be addressed before being served. The water quality concerns may be addressed by the City's recent decision to upgrade the recycled water treatment to advanced (MF/RO) treatment levels. A total of 43 potential recycled water customers were identified with a total demand of 266 AFY. Most of the long-term potential customers were identified in the 2009 Water Supply Study, while the rest were identified by the City during this Study. **Figure 5-5** shows the potential near-term recycled water customers in the Santa Barbara area.

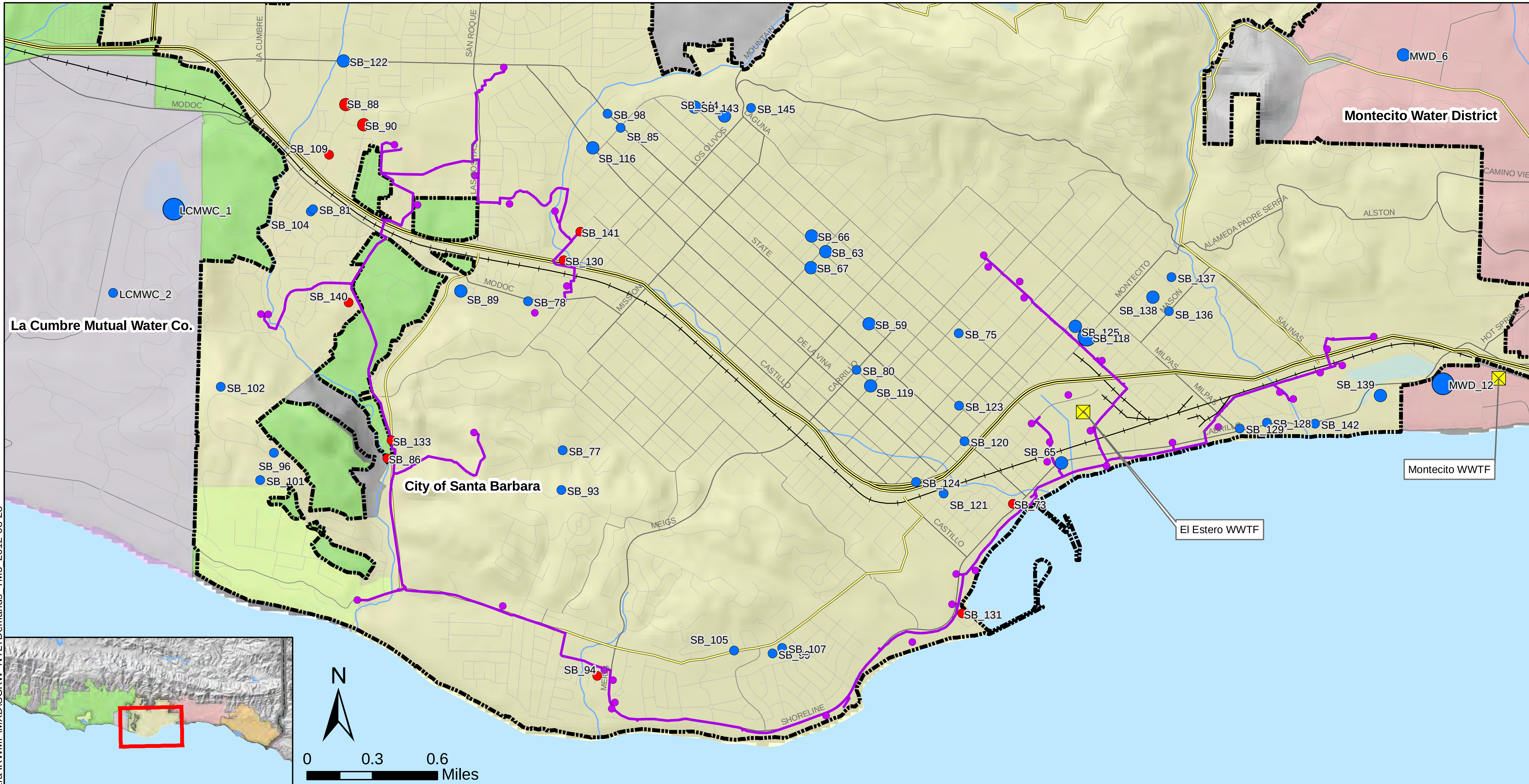
5.3.4 Montecito Water District

There has been very little growth in the MWD service area since MWD completed its 1991 Water Reclamation Study. Based on the 1991 Study, 18 of the 20 identified potential recycled water customers were carried over for use in this Study. The 18 customers, which are spread over the MWD area, have a total recycled water demand estimate of 1,786 AFY and include Caltrans irrigation areas, parks, schools and agricultural uses.

The 1991 Study identified two golf courses as two of the largest identified recycled water customers. These two courses, along with a third course in the MWD service area have drilled wells and now use groundwater to supply 90% of their water for the fairways and greens. For future studies, the amount of groundwater currently used for these golf courses could be determined and brought into the Potential Long-Term Total, especially in the event of groundwater conservation.

The largest potential recycled water customer is the Santa Barbara Cemetery, which is located very close to the Montecito WWTP. However, with MWD's new rate structure, the cemetery has also reduced its water usage. Other potential recycled water customers are agricultural uses and the above-mentioned golf courses. MWD service area is mainly residential (90% of the service area), which uses 80% of the potable water.

Figure 5-6 shows the identified potential recycled water users. Because of the high cost to produce and serve recycled water compared to MWD's current water supply costs, it is not feasible to serve recycled water in the MWD area in the near term. Therefore, the identified potential recycled water demands are considered only for the long-term.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Potential Long-Term Recycled Water Customer
Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Long-Term Recycled Water System
- Customer

Potential Near-Term Recycled Water System
- Customer

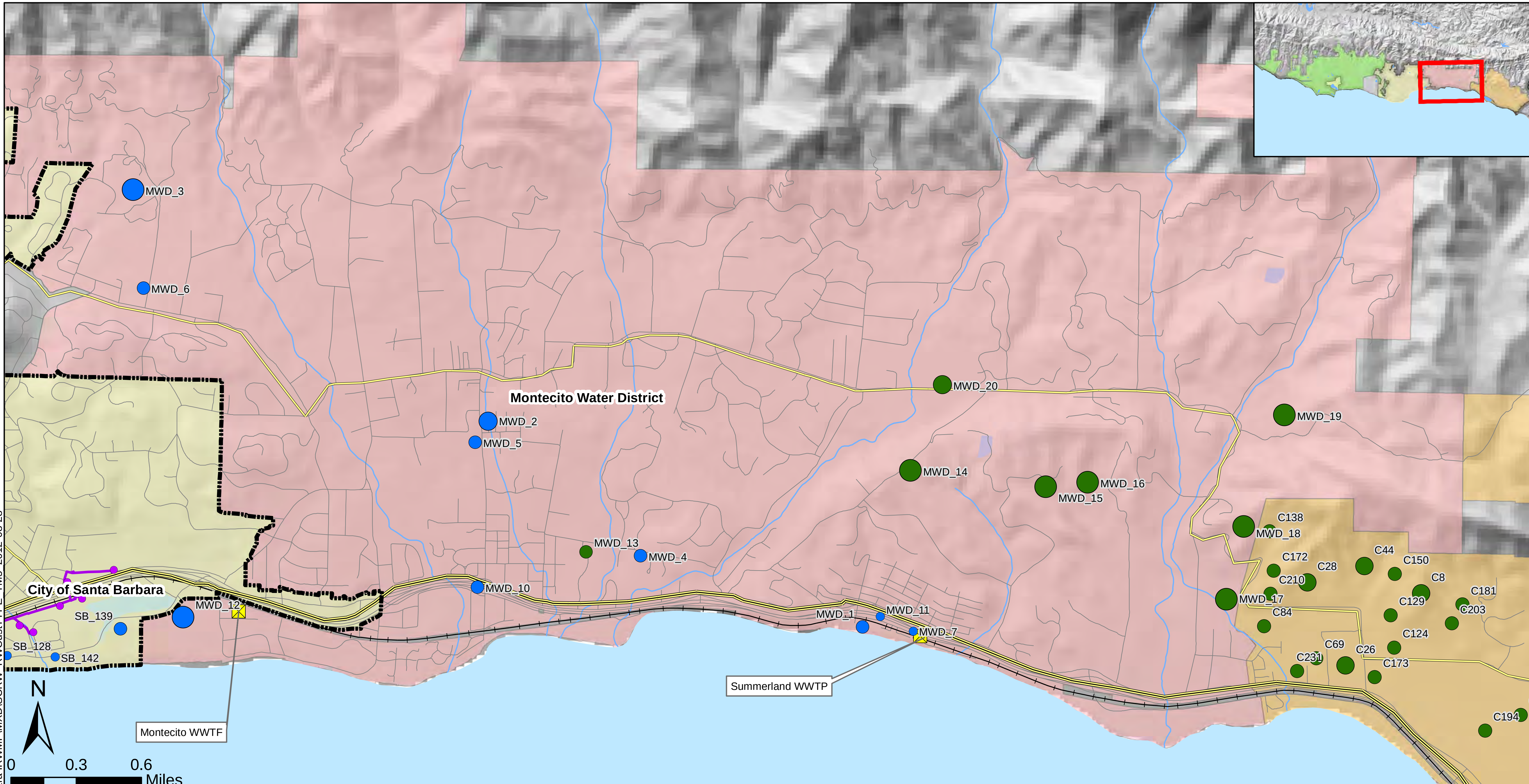
Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Near-Term and Long-Term Recycled Water Customers: Santa Barbara Area

Figure 5-5



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Type
- Urban Irrigation
- Agriculture
- Industrial/Commercial

Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Recycled Water Customers: Montecito Area

Figure 5-6

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_RWCustTYPE_TM5_2012-08-28

As discussed above, County land use data was used to identify other potential recycled water uses. As shown in **Figure 5-7**, a few other parcels that use water for orchards were identified in the MWD area. Water quality needs for these orchards are the same as for Goleta and Carpinteria, in that avocados and citrus are sensitive to dissolved minerals found in recycled water. To deliver recycled water to Montecito orchards and/or agriculture uses would require additional and perhaps costly advanced treatment (UWMP, 2010). The extent of their use and specific water quality needs was not further investigated, and therefore, these demands have not been included as potential demands in this plan.

5.3.5 Carpinteria Valley Water District

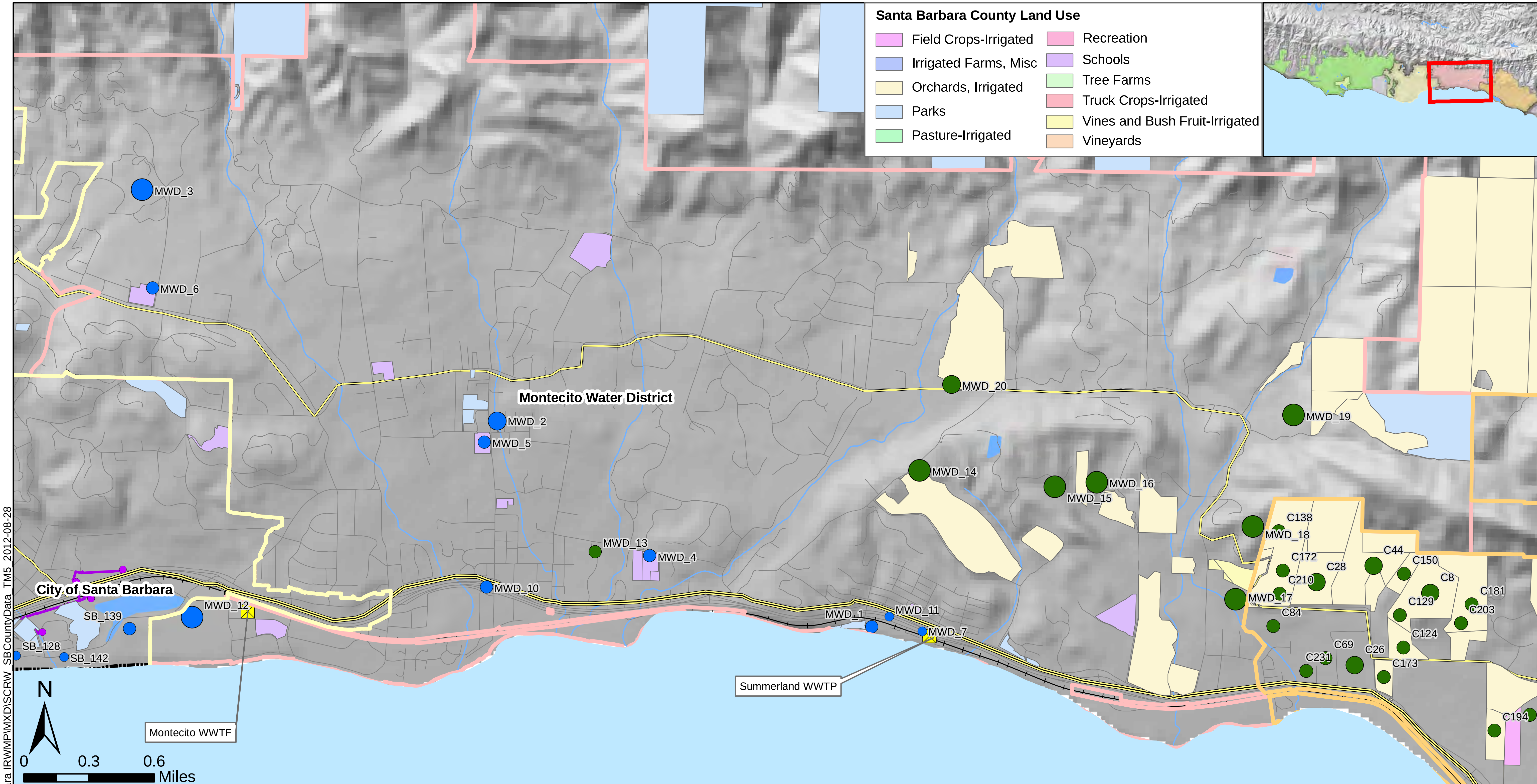
Based on the CVWD water meter records, 29 potential non-agricultural recycled water demands in the urban area of the City of Carpinteria were identified. The estimated average annual recycled water demand for these users is 142 AFY. Potential customers include hotels, parks, schools, and commercial property. **Figure 5-8** shows the identified demands in the Carpinteria area.

Based on the agriculture land use data compiled recently by CVWD, 188 agricultural properties were identified as having the potential to use recycled water. The estimated recycled water demand for these users was based on water use records and assumptions that CVWD updates regularly as part of its water supply estimates. The total estimated average annual recycled water demands for these customers is 2,485 AFY. The most common type of agricultural user identified was crop plants. Flower growers were not included due to their water quality needs. The potential recycled water users are shown in **Figure 5-8**.

CVWD has considered recycled water to meet future water demands. Acceptable uses of recycled water include irrigating crops, parks, and golf courses, as well as water needed for groundwater recharge. Because a large portion of CVWD's water supply comes from local wells, the cost-effectiveness of serving recycled water is not attractive in the near-term. In addition, most agricultural users have their own wells, so that the economics to serve these users would be difficult to meet if they were to be served recycled water, except if groundwater use becomes restricted. Therefore, all potential demands identified are considered only in the long-term for the Carpinteria area.

CVWD has been conducting studies of its groundwater basin over the past few years. There is a potential for increasing the recharge to the basin, via either surface recharge or direct injection. Based on current California regulations, indirect potable reuse (IPR) in this south coast subregion would likely require some or all of the recycled water to be treated through an RO membrane type process. While producing high quality water, such processes also produce a brine-concentrate flow that must be disposed. The most common and cost-effective disposal option for brine-concentrate flows is via ocean discharge. CVWD is also currently investigating the potential for seawater intrusion into the groundwater basin in an area at the west end of the City of Carpinteria. However, CVWD does not have any monitoring wells in this area, so that the extent of this potential problem is not currently known. Potential groundwater recharge areas and the approximate location of the potential seawater intrusion area are shown in **Figure 5-9**. No estimated recycled water demand has been developed for either type of use.

CVWD has also been involved in discussions regarding enhancement of steam flows and water quality in Carpinteria Creek to address recent concerns about aquatic life, specifically endangered steelhead trout. Two years ago a number of adult trout died in pools because of lack of water. The concept would be to provide water year round in periods of no rain, especially during the winter season when the trout enter the creek. Without adequate flows during this period, the trout cannot make it upstream to higher elevation, year-round pools where they can survive in the creek. Augmenting stream flows will also help surcharge the groundwater basin. Some of the major constraints to this stream augmentation project include, additional treatment needs, pipeline from the Carpinteria WWTP up the creek to at least Foothill Blvd., pumping needs, regulatory approvals, and the lack of a revenue source for such a project. There is no current timetable for this concept option.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Type
- Urban Irrigation
- Agriculture
- Industrial/Commercial

Existing Recycled Water System
- Customer
- Pipeline

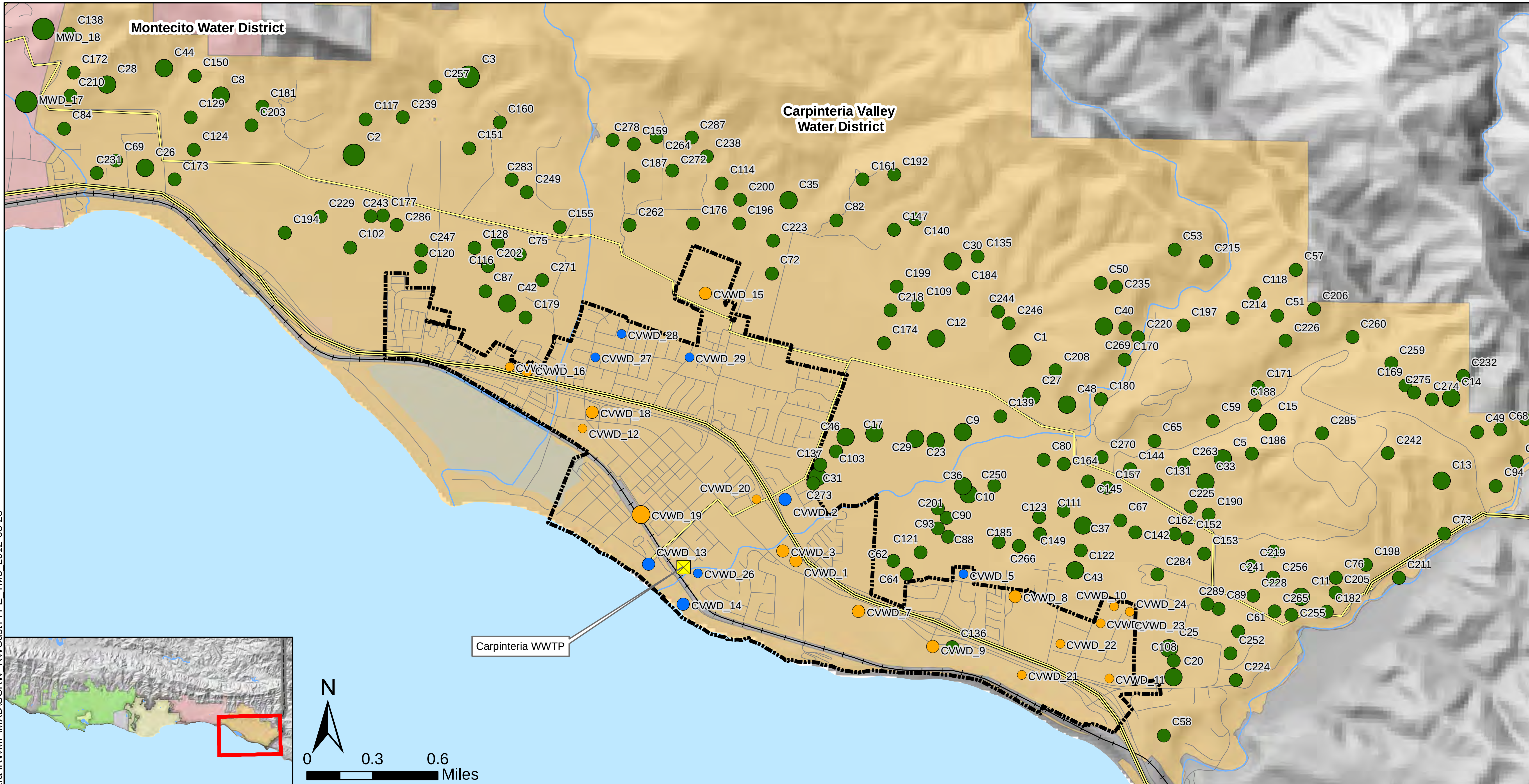
Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- La Cumbre Mutual Water Co.
- Goleta Water District
- Montecito Water District

Potential Agriculture Customers: Montecito Area

Figure 5-7

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_SBCountyData_TM5_2012-08-28



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Potential Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Type
- Urban Irrigation
- Agriculture
- Industrial/Commercial

Existing Recycled Water System
- Customer
- Pipeline

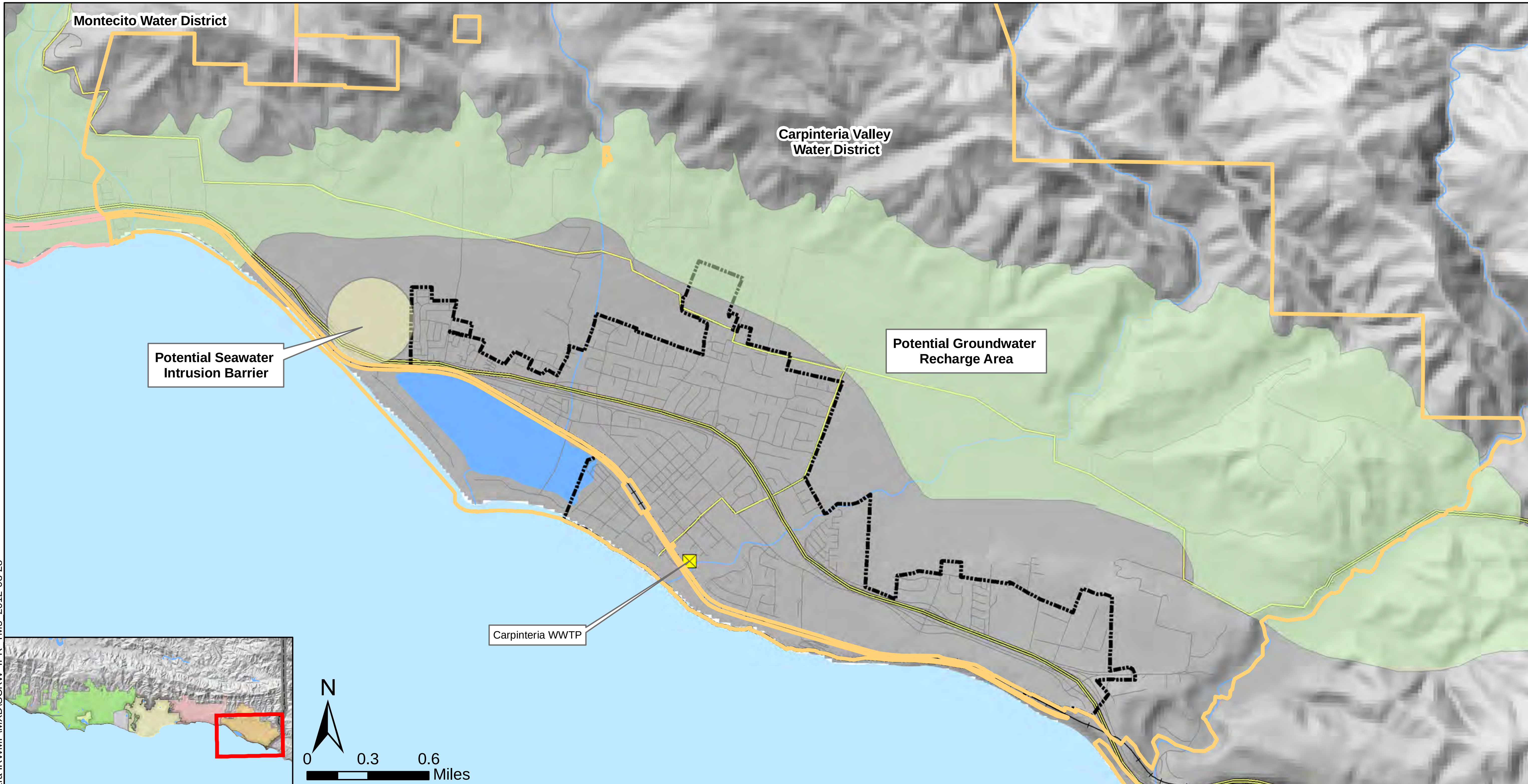
Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Recycled Water Customers: Carpinteria Area

Figure 5-8

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_RWCustTYPE_TM5_2012-08-28



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Potential Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Type
- Urban Irrigation
- Agriculture
- Industrial/Commercial

Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- La Cumbre Mutual Water Co.
- Goleta Water District
- Montecito Water District

Potential Indirect Potable Reuse Area: Carpinteria Area

Figure 5-9

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_IPR_TM5_2012-08-28

5.4 Summary of Potential Demand

For the near-term, an estimated average annual demand of 67 AFY of new recycled water use is projected by the agencies. A potential of an additional 4,854 AFY of recycled water demand was also identified for the long-term planning horizon. Along with the existing recycled water demands, the total identified potential recycled water use in the subregion could reach 6,556 AFY. This does not include the potential agricultural users in the Goleta and Montecito areas.

Table 5-1 provides a summary of the existing demands along with the potential demands for the near- and long-term planning periods. As shown in the table, only the City of Santa Barbara and Goleta Water District have included potential near-term demands. Carpinteria Valley Water District's potential long-term demands include agriculture demands as well.

Table 5-1: Existing and Potential Recycled Water Demand Summary by Agency

Agency	Average Annual Recycled Water Demand (AFY)				
	Existing	Potential Near-Term		Potential Long-Term	
		Additional Demand	Subtotal	Additional Demand	Total
Goleta WD	785	27	**812**	72	**884**
City of Santa Barbara[1]	850	40	**890**	266	**1,156**
La Cumbre MWC	--	--	**0**	130	**130**
Montecito WD	--	--	**--**	1,786	**1,786**
Carpinteria VWD	--	--	**--**	2,600	**2,600**
Totals	**1,635**	67	**1,702**	4,854	**6,556**

Notes:

1. Demand does not include approximately 300 AFY of internal plant use of recycled water.

Chapter 6 Wastewater Treatment Plant Needs

This chapter identifies the treatment needs to meet the water quality requirements needed to serve potential recycled water customers. Individual treatment costs are also discussed in this chapter.

6.1 Recycled Water Quality and Treatment Requirements

A summary of recycled water regulations was discussed previously and outlines the many Federal, State, and local regulations that recycled water systems must meet. In California, the level of treatment required is primarily based on three conditions:

- Type of user as dictated in Title 22 and by the Department of Health and Safety
- Local groundwater basin requirements as dictated by the local RWQCB
- Specific end-user water quality needs

For this plan, the majority of the potential users are urban irrigation and commercial uses. Therefore, the typical processes that meet the Title 22 requirements are tertiary filtration and disinfection. There are numerous filter types that are selected for a variety of reasons, including cost, influent water quality, effluent water quality needed, space, etc. Disinfection is typically done with chlorine via chlorine contact chambers. However, if space is limited, a UV disinfection system can also be utilized.

The RWQCB will typically impose reuse water quality standards that protect the underlying groundwater basin where the recycled water system will be utilized. Such restrictions are usually based on the current or ambient conditions of the groundwater basin. Numerous water quality requirements can be imposed depending on local conditions, but the most common parameter that reuse systems must contend with is Total Dissolved Solids (TDS). This is often because the groundwater used for municipal purposes experiences an increase in TDS once it is used and discharge back into the sewer/wastewater treatment plant system. This can also be the result of imported water having a higher TDS level than local groundwater basins. TDS restrictions are one of the most challenging for recycled water systems as the expenses are high to reduce the salt in the recycled water. Typically, this is done via an advance treatment system, which typically consists of microfiltration (MF) and reverse osmosis (RO) process. The capital costs for MF/RO systems are somewhat (10 to 30%) higher than the capital cost compared to standard filtration systems, but they tend to have much higher operating and maintenance costs due to the high energy requirements of the RO system and the need to periodically replace the membranes. Therefore, MF/RO processes are typically only employed when required by regulations or reduction of TDS is necessary.

One common problem to the south coast region is the high TDS levels seen in the wastewater flows. TDS in imported water from Lake Cachuma typically ranges from 500 to 600 mg/l. Groundwater TDS in the region is also fairly high with the Carpinteria basin ranging from 436 to 980 mg/l, Santa Barbara basin ranging from 400 mg/l to about 1,000 mg/l, Foothill basin ranging from 610 to 1,000 mg/l, and the Goleta Basin ranging from 170 mg/l to 1,400 mg/l in the North-Central sub-basin and approximately 800 mg/l in the West sub-basin. High TDS in groundwater can be both natural and can result from long-term irrigation practices by the agricultural community. TDS will also increase in sewer flows as a result of normal human water usage. Another major contributor to TDS levels in wastewater flows can stem from the use of water softeners in the community. The use of water softeners is quite prevalent in the region, and can be a major contributor to TDS levels in the wastewater supplies. The following wastewater TDS levels were reported by agencies:

- Goleta Sanitary District: 1,100 to 1,200 mg/l
- City of Santa Barbara: 1,350 mg/l (blended average of tertiary treated effluent)
- Carpinteria Sanitary District: 1,100 to 1,200 mg/l

These salinity levels can be a major impediment to recycled water usage as high TDS levels can impact the growth and quality of grass and plants (especially if above 1,000 to 1,200 mg/l), can inhibit use in some commercial applications, and can be highly infeasible for many agricultural uses. Typical solutions for addressing high salinity include the use of membrane treatment processes (typically MF/RO), blending with raw or potable water, and bans on salt exchange type water softeners.

As discussed previously, there are numerous opportunities to utilize recycled water in south coast areas where there are large agricultural users. However, many of the agricultural products grown require lower TDS levels than can be provided by standard filtration systems, and in the case of food crops, the elimination of pathogens is also required. CECs may also be a factor in the level of treatment needed to serve such users. The most common agricultural products in the region are avocados, citrus, and flowers. To serve such users recycled water would likely require some level of MF/RO treatment to reduce the TDS levels to acceptable customer levels and to address potential CECs.

As noted earlier, any IRP project would also require a MF/RO type process and would usually be accompanied by a UV and advanced oxidation processes. The amount of MF/RO as percentage of total reuse or recharge varies depending on a number of factors, including natural runoff/recharge, distance/travel time to the nearest production wells, soil aquifer treatment levels, TDS or other local groundwater quality requirements, and public perception.

6.2 Costs

Treatment costs for wastewater reuse are based on the capital costs necessary to bring each individual treatment plant to Title 22 water-quality standards. The required level of treatment varies for each plant because the cost is dependent on the required level of treatment for discharge, the existing level and capacity of treatment, and the projected quantity of flow for each treatment plant.

Upgrade from secondary to tertiary treatment typically involves the following improvements and the rough unit construction costs based on typical municipal system costs:

- Filtration ($1/gallon)
- Chlorine disinfection or UV ($1/gallon)
- Chemical handling ($0.10/gallon)
- Site work (10% of process [total of above] costs)
- Yard piping (10% of process costs)
- Electrical (20% of process costs)

The total unit construction cost for these improvements is therefore about $3.3 per gallon capacity. This unit construction cost will be used to estimate tertiary cost upgrades where recent costs information is not available. Construction costs for MF/RO processes tend to be higher than tertiary process. However, in most instances, installation of MF/RO processes does not require a tertiary filter. Unit construction costs for MF/RO are estimated to be $4.0 per gallon capacity. This unit cost includes the disinfection, chemical handling, site work, piping, and electrical components as well. For both unit costs, additional implementation (planning, engineering, etc.) and contingency costs will be applied as part of the total project cost estimates. However, O&M costs for MF/RO units tend to be much higher than tertiary process because of the need to replace membranes periodically and the higher energy and chemical needs.

6.3 Treatment Plant Improvement Needs

A summary of the existing south coast WWTPs and future treatment needed to serve recycled water is shown in **Table 6-1**. Each plant is discussed in more detail in the following sections.

Table 6-1: Existing Wastewater Treatment Plants and their Treatment

Wastewater Treatment Plant	Existing Treatment	Near-Term Needs	Long-Term Needs
Goleta WWTP	Tertiary	None	None
El Estero WWTF	Tertiary	Install MF/RO units in place of existing filters.	None
Montecito WWTF	Secondary	None planned	Expand to Tertiary treatment. If agriculture is served, MF/RO will also be needed
Summerland WWTP	Tertiary	Exploratory	Exploratory
Carpinteria WWTP	Secondary	None planned	Expand to tertiary treatment. If agriculture is served, RO will also be needed

As discussed in Chapter 3, treatment and effluent quality requirements are dependent upon the proposed type of water reuse. Tertiary treated recycled water can be used for landscape irrigation and cooling towers. Advanced treated recycled water, may be utilized for more types of reuse with fewer restrictions, such as food crops.

6.3.1 Goleta WWTP

The Goleta WWTP has a secondary capacity of 4.0 MGD and a tertiary capacity of 3.0 MGD. Currently 1.1 MGD of recycled water is being produced on average annually. GSD is currently expanding its secondary process system, but GSD does not have any plans to expand its tertiary process in the near-term. Expansion of the tertiary processes would depend on the GWD recycled water demand. As stated in Chapter 5, there is a potential recycled water demand of 1.9 MGD in the long-term (including existing demands), which could likely be served within the existing capacity of Goleta WWTP's current tertiary treatment levels during peak demand periods. Therefore, no further tertiary expansions are likely needed to meet the potential future reuse demands.

The existing recycled water system can produce up to 3 MGD of tertiary effluent for recycling. However, the ability to fully utilize recycled water is limited by recycled water use patterns, which are typically condensed into a 12- rather than a 24-hour period, and is limited by recycled water delivery and storage capacity and the end user demand for recycled water. Expansion of GWD's recycled water system is possible without further upgrades to the Goleta WWTP. However, a major expansion or increase in demand could require additional storage capacity at the plant or out in the system and additional treatment if demands exceeded 3 MGD.

Currently, TDS levels of the tertiary treatment are 1,200 milligrams per liter (mg/L). The high TDS level is mainly due to individual water softeners. The main water softener company, Rayne, previously discharged to the Goleta WWTP but currently discharges to surface water that ends up in the ocean. The RWQCB is planning to change their permit, and depending on the permit revision, GSD may have to reexamine the impact of any additional TDS.

In the Goleta area, there could be the potential to use recycled water for agricultural irrigation in the northern part of Goleta. To serve recycled water to these potential users, the salinity would need to be greatly reduced to meet agricultural water quality needs. The most common and cost effective approach would be to install MF/RO units to reduce the TDS levels. The use of MF/RO would also eliminate nearly all the pathogens and most of constituents of emerging concern. Given the demand location and size, storage capacity would also be needed. When the Goleta WWTP was built, space was reserved for future RO units and currently there are flanges in place for expansion. However, the high cost to treat, add additional distribution lines, and construct storage facilities would create a significantly higher cost for the recycled water that would need to be greatly subsidized to be equitable with current water costs, which are very low due to the use of groundwater and non-potable irrigation water in the area.

6.3.2 El Estero WWTF

The El Estero WWTF is owned and operated by the City of Santa Barbara and provides full secondary treatment and tertiary treatment for its recycled water flows, in conformance with Title 22. El Estero tertiary capacity is 4.4 MGD and recycled water production flows are 0.6 MGD on a year-round basis with a maximum month demand of 1.5 MGD. The disinfection system is currently limited to 2.2 MGD. However, at present the City's recycled water facility is not operational.

According to current regulations, recycled water produced by the City of Santa Barbara is suitable for industrial reuse, toilet flushing applications, and irrigation applications. Distributed recycled water consists of a blend of tertiary treated effluent with potable water to:

- Maintain chloride levels below 300 mg/L during the irrigation season
- Maintain TDS levels below 1,500 mg/L
- Maintain blended water turbidity at 2.0 NTU or less (Title 22)

The City of Santa Barbara's goal is to be able to deliver recycled water to its customers, without blending, for economic, regulatory and water supply reasons. Currently, tertiary effluent from El Estero WWTF is not able to meet its permit requirements without blending with potable water because of high turbidity and TDS level in the wastewater. A significant amount of the high TDS levels is due to the use of individual water softeners in the area. In addition, the plant currently has safety and access constraints, confined space entries issues, and corrosion, which has compromised structural integrity and caused process shutdown. The City of Santa Barbara is also concerned with high TDS, pathogens, and emerging contaminants. As part of the City's 2009 Study, several options for addressing these problems were initially identified. Subsequently, the City looked at several options ranging from rehabilitation of the existing filters to replacing the filters, including with MF. With the need to reduce TDS levels in the recycled water supply and to eliminate the blending of potable water, the City also looked at several demineralization options. Based on a 20-year life-cycle cost assessment of these options, the City concluded that replacing the existing filters with full MF and partial RO was the best approach, with the advantages of utilizing MF being:

- More reliability with variable effluent quality
- More effective removal of contaminants
- Easier to operate
- Allows subsequent technologies to be used (RO/UV)

Therefore, an upgrade to full MF and partial RO was recommended, and a $9.5 million project to upgrade the tertiary treatment (upgrading the tertiary filters) is currently in pre-design. Design will start in 2014 and construction is planned for 2016. The water quality goals for this project are to produce an effluent with TDS less than 1000 mg/L and chlorides less than 300 mg/L. This project would also eliminate pathogens and significantly reduce or eliminate nearly 100% of the CECs).

With the expansion and the tertiary upgrades, blending recycled water with potable water will no longer be needed. The City of Santa Barbara's current plan is to produce and use a total 1,400 AFY of recycled water by 2030. Of this total use, 1,100 AFY would serve existing and new recycled water customers and 300 AFY would be for internal plant use. The treatment capacity needs of the potential reuse projects identified in this plan should fit within the planned capacity of the upgraded treatment plant, such that no further treatment expansions will be needed.

6.3.3 Montecito WWTP

The Montecito WWTP has a secondary capacity of 1.5 MGD. Currently, Montecito WWTP secondary flow rate is averaging approximately 0.9 MGD. To produce recycled water, the Montecito WWTP would need to expand treatment beyond secondary to tertiary levels. This would require the addition of a filtration process, such as sand filters and a disinfection process, typically chlorination.

According to Metcalf & Eddy 2001 Report, Cost of Tertiary Wastewater Treatment for Southern Santa Barbara County, commissioned by Heal the Ocean, Santa Barbara, the addition of tertiary filters would generate extra solids and reduce aeration time due to the return flow. This could require the addition of a second aerobic digester and a dissolved air flotation solids thickener. Additional analysis is required to confirm these needs. The average daily flow at the Montecito WWTP is currently 0.9 MGD. To upgrade to tertiary levels, the estimated cost is $3M.

To serve recycled water to potential agricultural users, an MF/RO process or blending with potable water would be needed to reduce the TDS levels to acceptable water quality levels for the user. An MF/RO process would not likely require a tertiary filter, so the estimated cost for a 0.9 MGD MF/RO system is $3.6 M. While the capital costs for a MF/RO system are comparable to a tertiary filter, note that the operational and maintenance costs are substantially higher.

6.3.4 Summerland WWTP

The Summerland Sanitary District operates and maintains a 0.3 MGD tertiary treatment plant to biologically and chemically process wastewater. Wastewater treatment processes at the facility includes primary clarifier, activated sludge aeration basin, secondary clarifier, chlorination contact chamber, tertiary sand filter, and dechlorination basin. Effluent is discharged into the Pacific Ocean via a dedicated outfall and there are currently no recycled water customers. The sanitary district has made attempts to get grants for a recycled water feasibility study, so far without success, but the District’s board of Directors still entertains a goal of providing recycled water to the Montecito Water District. Summerland Sanitary District is also examining advanced treatment processes, such as RO, to effectively remove boron and ensure a usable recycled water supply.

Although the plant has a tertiary filtration unit, according to Heal the Ocean’s 2001 Metcalf & Eddy Report, some improvements are necessary to produce recycled water at required Title 22 levels. The plant currently has one filter, which is in line after the disinfection process. Title 22 standards require that the disinfection occur after the filters. In addition, to improve system reliability, a second filter is needed to be able to produce recycled water during backwash or maintenance periods. Along with those improvements, the 2001 Study also recommended the installation of a pre-manufactured continuous filtration unit and additional piping to re-route water from the existing secondary system to the filtration unit and then to the chlorination and de-chlorination systems. The average daily flow at the Summerland WWTP is currently 0.14 MGD. To upgrade to tertiary levels, the estimated cost is $500K.

6.3.5 Carpinteria WWTP

The Carpinteria WWTP has a secondary capacity of 2.5 MGD. Currently, the influent flow rate at the Carpinteria WWTP is averaging approximately 1.4 MGD. The treatment plant provides secondary treatment and chemical disinfection of collected wastewater prior to discharge into the Pacific Ocean via a dedicated outfall pipe.

To produce recycled water, the Carpinteria WWTP would need to add filtration and disinfection processes to meet Title 22 criteria. Adequate space at the facility is available to implement a recycled water project that could potentially scale up to provide tertiary treatment for the full volume of secondary effluent produced. A project of this magnitude may require the use of membrane technologies (in lieu of conventional gravity filtration) and/or the use of UV disinfection to achieve a site layout that fits within the existing plant footprint. A smaller scale project would allow for greater flexibility and would allow continued use of chemical disinfection with new or expanded chlorine contact tank capacity. If on-site recycled water storage is required for diurnal storage, a clearwell should also be considered in the site layout and consideration of available area within the plant for recycled water system improvements. The estimated cost for the tertiary and disinfection process improvements is $4.6M for the 1.4 MGD capacity system. The estimated cost for the tertiary and UV process improvements is $4.6 M for the 1.4 MGD capacity system.

To serve recycled water to potential agricultural users, an MF/RO demineralization process, or a potable water blending scheme, would be needed to reduce TDS levels to acceptable water quality levels for end users. A significant amount of the high TDS levels is due to the use of individual water softeners in the area. An MF/RO process would not likely require a tertiary filter, so the estimated cost for a 1.4 MGD MF/RO system is $5.6 M. While the capital costs for an MF/RO system are comparable to a tertiary filter, note that the operational and maintenance costs are substantially higher.

Agricultural users are currently pretreating their potable water before irrigating flowers and vegetables due to high TDS levels in the raw/potable water supplies. These users have agricultural crops that are sensitive to TDS. While serving recycled water to these users would entail higher treatment costs, one benefit to such a project would be the avoided costs that the users currently incur for pre-treating their current water supplies. Actual benefits were not quantified as it is not known how much pretreatment is currently being practiced nor what the user-end costs are.

Chapter 7 Distribution Needs

This chapter presents the conveyance, storage, and pumping needs to provide recycled water to potential customers. Distribution system needs are broken into three categories:

- **Existing system improvements**: previously identified upgrades needed for existing reuse systems
- **Near-term improvements**: improvements identified by agencies in previous studies or in this plan that are necessary for expansion of systems in the near-term planning period
- **Long-term improvements**: improvements identified primarily by this plan and through agency input or previous long-term studies that would create new recycled water systems or significantly expand existing system in the long-term planning horizon

7.1 Criteria

Design criteria were developed to help identify the near- and long-term distribution improvements and to evaluate potential alternatives. Criteria for peaking of flows, pipeline sizing, storage, pumping facility needs are summarized in **Table 7-1**.

Table 7-1: Facilities Development Criteria and Hydraulic Criteria

Item	Value	Units/Notes
Pipeline		
Max Pressure	200	psi (greater than 12-inch diameter)
Max Pressure	140	psi (12-inch diameter or less)
Min Pressure	40	psi
Existing Reuse System Pressures	60	psi (assumed if lateral branch is created)
Elevations are based on DEM shape file and from Google Earth		
Conveyance		
Design Flow		Peak hour conditions
Pressure class (minimum)		Schedule 150 (psi)
Diameters considered		6”, 8”, 12”, 16”, 20”, 24”
Max Velocity for Sizing:		5 ft / sec
C Coefficient for Headloss		130
Storage		
Diurnal storage based on storing the 24-hour peak day demand		
Pump Station & Customer Booster Pumps		
Pump Efficiency		75%
Design Flow		Peak hour conditions
Pump curves		Standard

7.2 Recycled Water Systems

When developing a recycled water system, it is also important that agencies plan for future costs to the system. In addition to regular O&M costs, recycled water systems will also require capital improvements to upkeep and invest in the recycled water system assets to ensure continued deliveries in the future. Similar to water and wastewater systems, these improvements need to be included in future capital improvement plans as part of an agency’s budget cycle process to ensure the system is functional and meeting customer needs. GWD and the City of Santa Barbara were early adopters of recycled water in this region and new technologies and practices as well as asset depreciation require continued reinvestment in their systems to maintain the existing systems and to allow for future expansions.

7.2.1 Goleta Area Recycled Water System

GWD has been serving recycled water since 1994. The recycled water production capacity is approximately 3,000 AFY. However, the ability to fully utilize recycled water is limited by recycled water use patterns, which are typically condensed into a 12- rather than a 24-hour period, and are driven by the irrigation season. While storage is available to address daily needs, storage is not available to address seasonal variability in irrigation demand. Currently GWD is delivering approximately 785 AFY.

Existing System Improvements

In recent years, the GWD recycled water distribution system has demonstrated the pace at which recycled water systems can depreciate. The GWD Infrastructure Improvement Plan has identified a number of projects to address these problems. These investments to improve the recycled water system are necessary to upkeep the system and ensure its reliability to customers. Additionally, GWD is currently identifying management strategies for coordinating customer use with timing techniques, in order to maximize the performance of existing systems. The increased use of SCADA controls are forecasted to assist in this process. GWD has identified the following upgrades to its recycled water system that are necessary to maintain the current system and are also needed for GWD to expand its system in the near-term to other users:

Recycled Waterline Relocation Project at Goleta Beach

This project will relocate approximately 800 feet of 18-inch diameter waterline to prevent damage resulting from ongoing beach erosion. This line conveys the majority of recycled water to the 19 large recycled water customers including UCSB, various golf courses, and other large landscaped areas. It will be relocated to a proposed Caltrans utility corridor adjacent to State Highway 217. Relocation is scheduled to begin in 2014 and will ensure continued service to the recycled water customers. The GWD estimated this project will cost $675,000.

One-Million Gallon Reservoir Project

Under this project, a one-million gallon (MG) recycled water reservoir will be constructed to provide storage and to reduce pumping costs associated with the distribution of recycled water. Currently, distribution of recycled water is dependent on sequential pump stations, which is inefficient and causes service interruptions when a malfunction occurs at one of the pump stations. Building a reservoir would assist in the distribution of recycled water and provide the system with continuous operations during power outages, preventive maintenance periods, and emergency failures of these station’s pumps.

GWD’s Infrastructure Improvement Plan identifies an underground or partially covered reservoir within its Ellwood 440 Zone that would tie into the existing recycled water system at Cathedral Oaks Road or potentially at the Glen Annie Golf Course. GWD has estimated this project to cost $2.5 million.

Recycled Water System Corrosion Protection and Pipeline Replacements

Due to corrosive soil conditions in the Goleta area and the fittings and bolts on many of the recycled waterline being poorly wrapped or not wrapped at all, GWD has experienced some leaks on its recycled water system. The recycled water system consists of approximately 51,000 feet of steel waterlines. These leaks cause service disruptions to the irrigation programs of parks, golf courses, shopping centers and the restrooms facilities of UCSB, the Post Office, and Goleta Beach State Park.

GWD is currently conducting a Corrosion Protection Study to evaluate the condition of the recycled waterlines and establish an organized program to address the corrosion problems. The potential project would implement a proactive program to repair or replace sections of GWD’s recycled waterline system before corrosion caused leaks or breaks in the recycled waterlines occur and thus prevent unplanned resource expenditures and interruptions to service. Initial GWD estimates is that the program will cost $10,000 per year over 10 years ($100,000 in total) to implement. The current study will provide an updated cost and is anticipated to be completed in FY 2013-14.

Recycled Booster Station Electrical Upgrades

GWD is currently upgrading the electrical system at the GSD's wastewater treatment plant. The project involves replacement of four Variable Frequency Drives and outdated support equipment with new technology and pump controllers. GWD's estimated cost for these upgrades is $474,000.

Near-Term Improvements

As part of this plan, six recycled water users located adjacent to the GWD's existing system have been identified by GWD as potential candidates for expansion in the near term. As shown in **Figure 7-1,** these users are along the existing recycled water mainlines. Therefore, the only improvements needed to connect these potential recycled water users are short lateral segments and any necessary onsite recycled water conversion work.

Long-Term Improvements

For GWD to further expand its system to larger users, GWD has identified the following system improvements. These are in addition to the distribution pipelines necessary to connect to the new users identified as potential long-term recycled water customers as show in **Figure 7-2**, Long-term distribution improvements identified include:

Hollister Booster Station Relocation Project

The existing Recycled Water Hollister Booster Pump Station is in an underground vault that experiences occasional flooding, which could damage the motors and electrical equipment. This project is needed to eliminate the potential for flooding and safety problems associated with the existing below-ground booster pumping station.

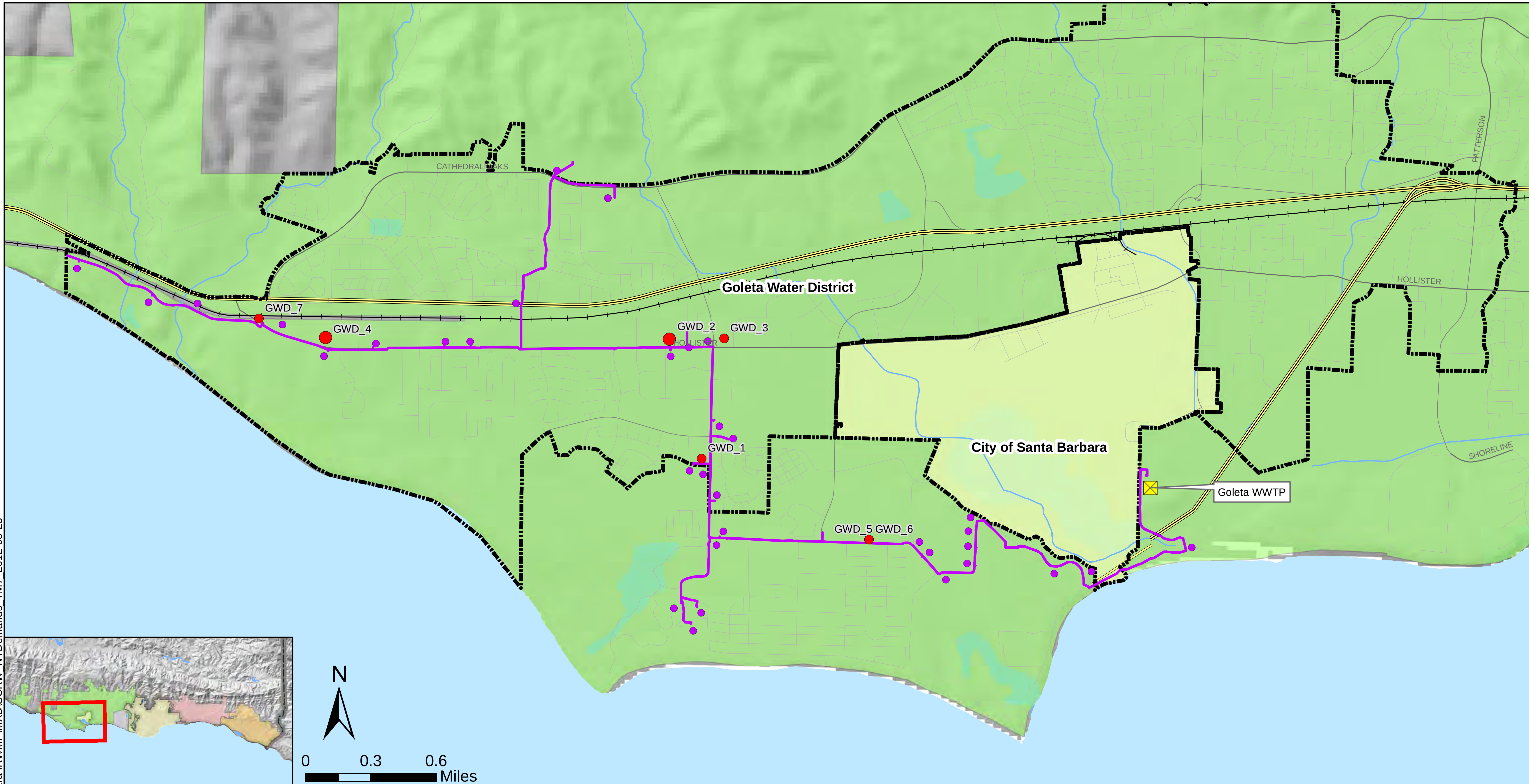
In addition, the Hollister Booster Pump Station is approximately 15 years old and has some poor design features. A new, above-ground booster pump station would be designed to be more efficient. Additionally, an above-ground pumping station would be safer and more easily accessible. The booster station will be redesigned for greater efficiency and to minimize operations and maintenance costs. All existing deteriorated pumping equipment, such as pumps, motors, and electrical equipment, would be replaced. The existing horizontal pump station would be replaced with a new vertical one. GWD estimates the cost of this project to be $2.5 million.

Pressure Regulating Vault Relocation at Glen Annie Golf Course

This project involves relocating the existing pressure-reducing vault from the Glen Annie Golf Course to a more accessible location. This valve is located on private property, which means that GWD operators need to coordinate with the golf course staff to gain access to the vault during emergencies. GWD has estimated that this project will cost about $175,000.

Cathedral Oaks Rd and Hwy 101 Overcrossing Project

This project would keep the District's recycled and potable waterlines in the roadway of the newly realigned section of Hollister Avenue in Goleta. The project would involve installation of approximately 500' of 12" PVC recycled waterline, replacing an older section of waterline that no longer aligns with the new roadway. The project will ensure waterline accessibility in any future maintenance or repair project. GWD has estimated that the recycled waterline relocation portion of the project will cost about $250,000.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Near-Term Recycled Water Customer Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Near-Term Recycled Water System
- Customer
- Pipeline

Existing Recycled Water System
- Customer
- Pipeline

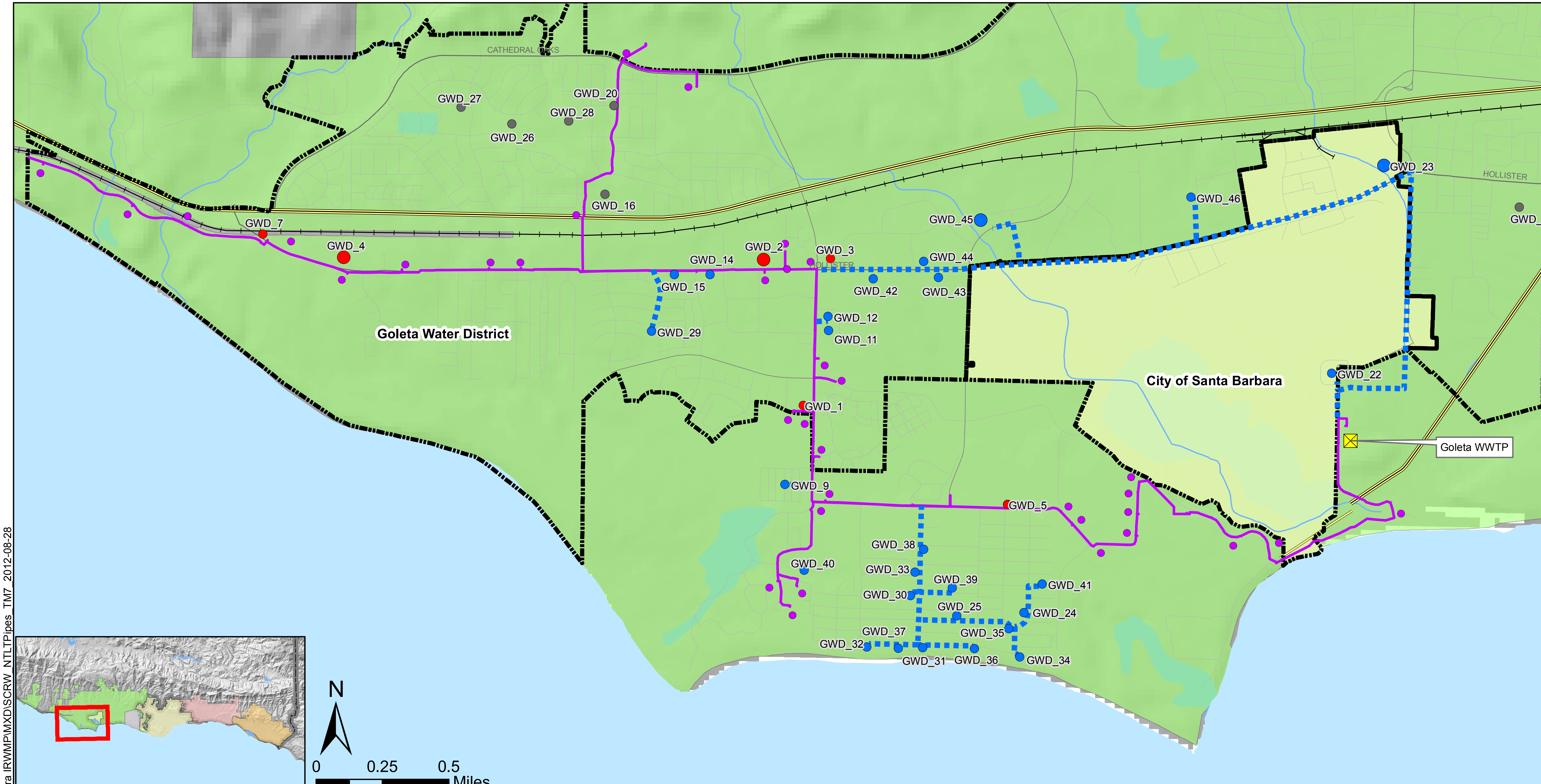
Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Near-Term Recycled Water System: Goleta Area

Figure 7-1

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_NTDemands_TM7 2012-08-28



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_NTLTPipes_TM7_2012-08-28

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Long-Term Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Long-Term Recycled Water System
- Customer
- Pipeline

Potential Near-Term Recycled Water System
- Customer
- Pipeline

Existing Recycled Water System
- Customer
- Pipeline

Not associated with Near- or Long-Term System
- Customer

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water System: Goleta Area

Figure 7-2

Pipelines

As shown in **Figure 7-2**, there are several potential long-term projects that would require pipeline extensions, with one project including the looping of the existing recycled water system. The larger project would install 20,600 feet of 6-inch diameter pipeline to loop the recycled water system and would significantly improve reliability of the entire system. The recycled waterline is currently configured in a linear fashion. If the recycled waterline breaks or needs repairs, recycled water could not be delivered to all customers downstream of the break. A looped system would allow recycled water to be supplied to customers from a different area of the distribution system.

Pumping

No new pump stations are needed to expand GWD's recycled water system with the proposed projects.

Storage

GWD has identified the need for a 1-MG recycled water reservoir. With this storage capacity, potential near- and long-term expansions would not likely require additional storage beyond this 1-MG storage capacity. The looping of the system proposed in the long-term would also provide benefits to meeting peak demands in certain parts of the system.

7.2.2 City of Santa Barbara Area Recycled Water System

The City of Santa Barbara owns and operates the El Estero WWTF, which has historically produced recycled water for local distribution. Most of the recycled water is used for urban irrigation. The system has the capacity to treat and deliver 1,400 AFY. The current demand is approximately 800 AFY, plus an additional 300 AFY of in-plant process water usage. Because of high turbidity levels in the recycled water, potable water has been blended into the recycled water to meet recycled water quality requirements. However, the plant is not currently operational.

Existing System Improvements

The City of Santa Barbara's recycled water distribution system was developed in two phases. Phase I was completed July 1989, and Phase II was completed May 1991. Combined, Phase I and Phase II consist of approximately 14 miles of distribution piping to recycled water uses. Pipe diameters range from 2inches to 18inches. The Phase II Service Area is divided into two pressure zones: the Phase II northern zone is located generally north of Highway 101 and the Phase II southern zone is located generally south of Highway 101.

Expansion of the system is limited by the tertiary filters, pumping capacity, and storage cycle limitations. With the previously discussed, recommended MF/RO system replacing the existing filters, the recycled water treatment plant's performance will improve and thus eliminating a bottleneck to recycled water production and impediments to future expansion. Blending of potable water will also no longer be necessary.

Below is a summary of the existing distribution system conditions based on the City's 2009 Water Supply Planning Study.

Distribution

According to the City's 2009 Water Supply Planning Study, the existing recycled water pipes have sufficient capacity to convey the existing demands without any system pressure limitations. The 2009 Report noted that the capacity in the existing pipelines is also adequate to convey the City's goal of serving up to 1,400 AFY of recycled water in the future. Additional projects should be evaluated via a hydraulic model to verify that their pressure and flow needs will be adequate and will not impact the existing system.

Pump Station Capacity

The amount of recycled water flow that could be supplied to the Phase I and Phase II zones is limited by the existing capacity of the three pump stations. The pump stations are sized to accommodate peak hour flows to customers during their respective distribution periods. The 2009 Study notes that the system's pumping capacity is 3.3 MGD, and no additional pumping was proposed for the projects identified in that Study. Future system expansions would need to be limited in size to stay within the existing pump station limitations or would require expansion of pumping and/or storage facilities to serve users further out into the system

Storage Capacity

Most of the demand on the City of Santa Barbara's recycled system occurs at night in a nine-hour window between the hours of 9 p.m. and 6 a.m. when the El Estero WWTF's flow often averages about 2.5 MGD. Consequently, supply is limited to storage in combination with the nightly plant flow during this time period. Storage is limited under the following three scenarios:

- Delivery to the overall system is limited to the amount of recycled water that can be stored during the day (2.0 MG) plus the amount of flow treated at night (0.5 MG), totaling 2.5 MG.
- Delivery to the Phase I zone is limited to the amount of flow that is stored in El Estero Reservoir plus the amount of flow coming from the filters at night. Under the worst case scenario, about 0.5 MG is available from the filters at night plus 0.5 MG stored during the day, providing a total of 1.0 MG without blending. If maximum month demand in the Phase I system exceeds 1.0 MGD, then additional reservoir capacity will be needed for Phase I.
- Delivery to the Phase II zone is limited to the amount of flow that can be stored in the reservoir located at the Santa Barbara Municipal Golf Club during the day, except to the extent that augmented flow can be provided from the Phase I area by the La Mesa Pump Station when it is in high head mode. If maximum month demand surpasses the 1.5 MGD capacity of the Golf Course Reservoir, additional storage capacity will be needed.

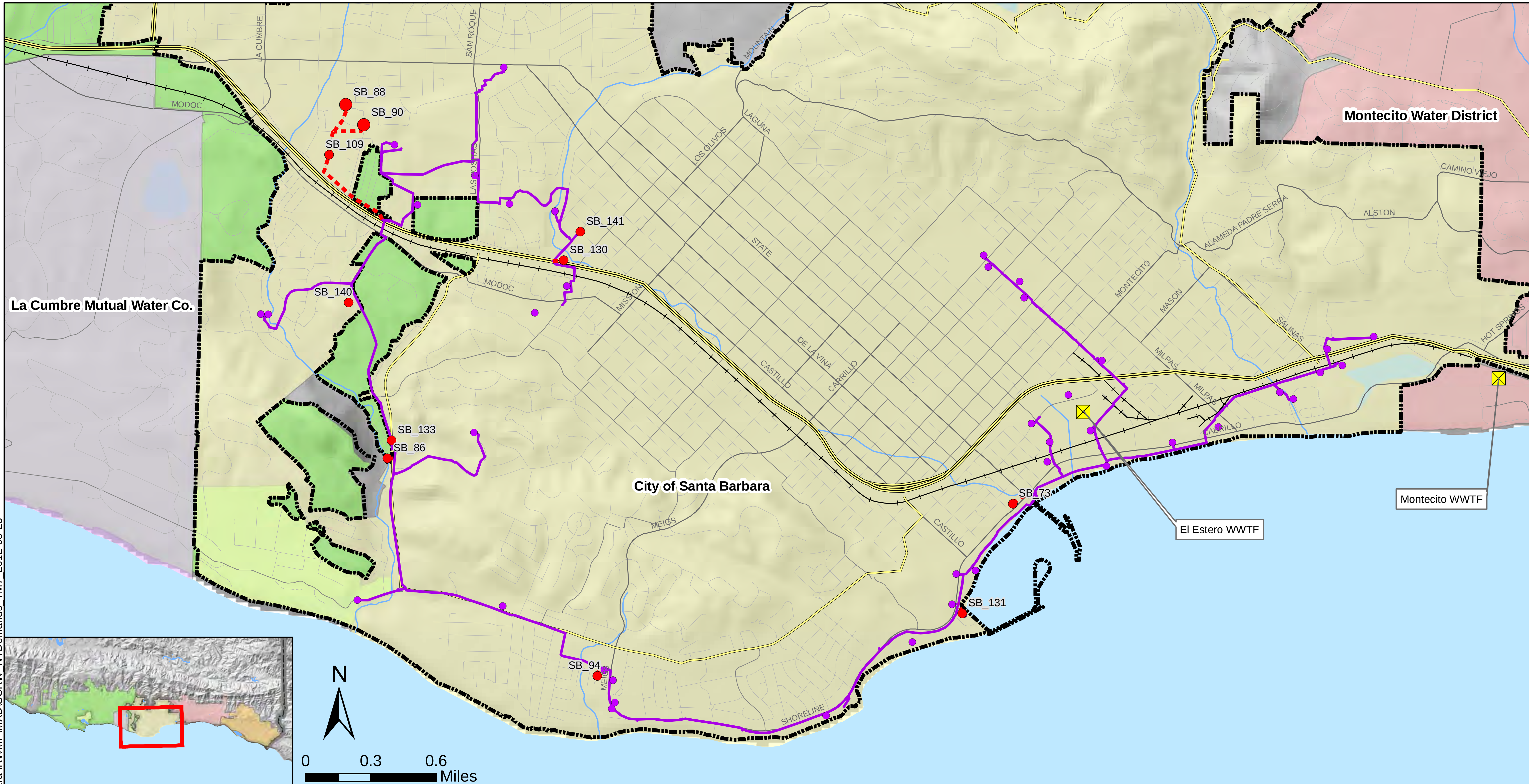
Based on the City's 2009 Study, some amount of additional reuse flow or customers can be added to the system without the need for additional pumping or storage capacities. The 2009 Study notes that the total existing storage is 2.5 MGD without blending and that the existing system only needs 1.8 MGD during maximum month demand conditions, which is equivalent to about 392 AFY of additional reuse. Approximately 300 AFY of new demand is being considered in this study, and therefore no additional storage should be needed in either the near- or long-term conditions.

Near-Term Improvements

Potential near- and long-term projects have been identified using the proposed projects from the City's 2009 Water Supply Planning Study as a basis. City of Santa Barbara staff has provided updates to the projects identified in the 2009 Study and have prioritized these potential projects for the purposes of this present Study. The potential near-term projects identified include existing recycled water customers that are expanding recycled water use to other parts of their site and the addition of new customers adjacent to the existing recycled water system. The following improvements are planned in the near-future:

Pipelines

As shown in **Figure 7-3,** there are seven near-term projects and six of them require short lateral pipeline extensions to connect to the near-term customers. These projects are estimated to require a total of 6,000 feet of 6-inch diameter pipeline to extend the existing recycled water system to these new users.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Near-Term Recycled Water Customer Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Near-Term Recycled Water System
- Customer
- Pipeline

Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Near-Term Recycled Water System: Santa Barbara Area

Figure 7-3

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_NTDemands_TM7 2012-08-28

Pumping

The potential near-term users are relatively small, and therefore, no additional pumping capacity will probably be needed. The system has some additional pumping capacity available before the system limit of 3.3 MGD is reached.

Storage

No additional storage is needed to meet the potential near-term demands. According to the La Cumbre Mutual Water Company, a previous study of the La Cumbre Golf and Country Club indicates that onsite ponds could be used for diurnal storage, thus potentially reducing the overall system's storage needs should the La Cumbre Golf and Country Club be connected to the system.

Long-Term Improvements

The following improvements are needed in the long-term. All long-term customers and pipeline extensions are shown in **Figure 7-4**.

Pipelines

There are several potential customers identified that would require pipeline extensions. This also includes one potential project that would loop the existing recycled water system. An estimated total of 41,400 feet of 6-inch diameter pipeline would be required to serve the identified users, with approximately 25,200 feet required for the looping of the central area. Looping the system would significantly improve the reliability of service to City of Santa Barbara's customers. As the existing recycled system is configured in a linear fashion, if a recycled waterline breaks or needs repair, all customers downstream from where service is interrupted would be out of recycled water. A looped system would allow recycled water to be supplied to most of the City's customers that are located west of the El Estero WWTF.

Pumping

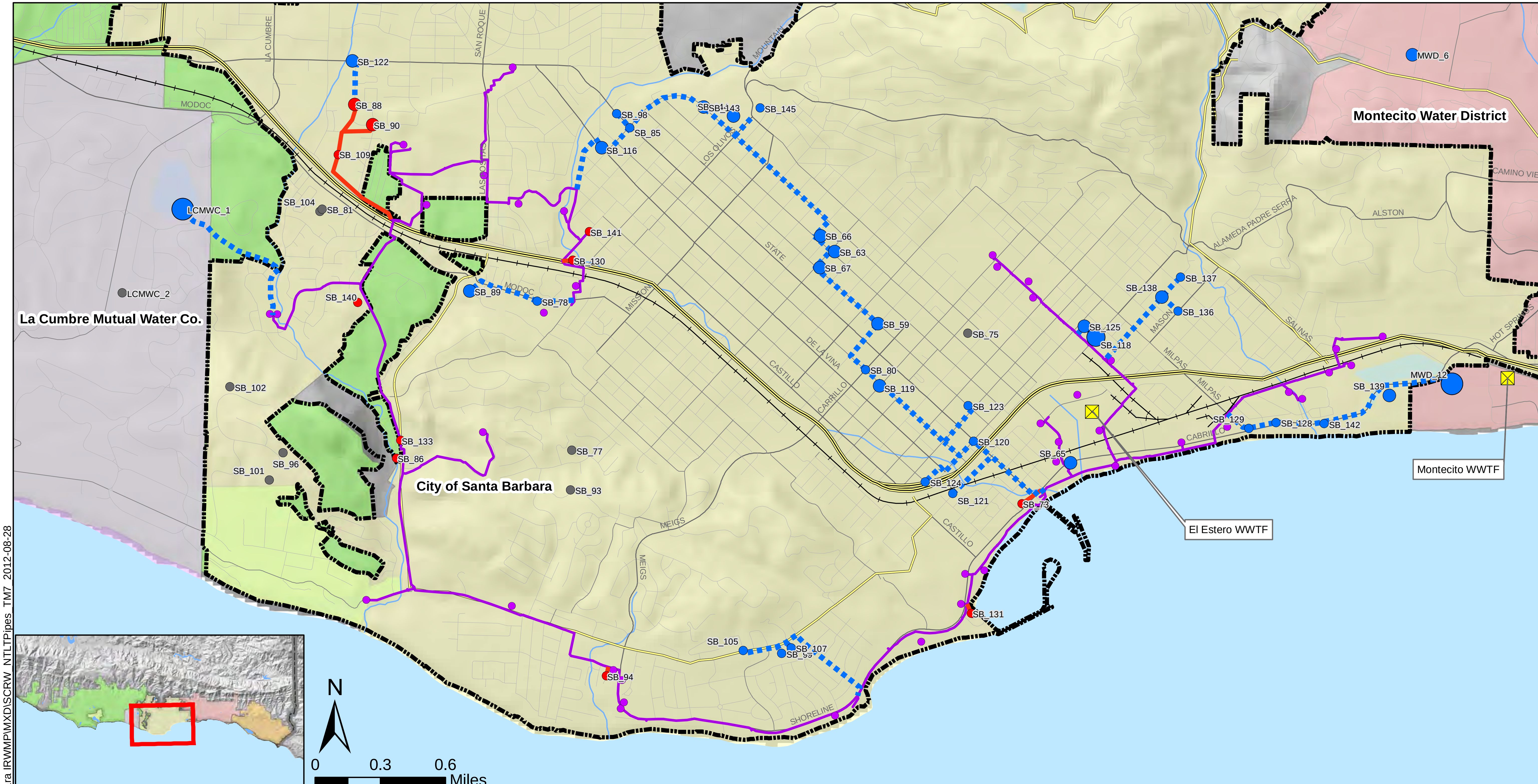
In the City's 2009 Study, the proposed projects required no additional pumping beyond the existing pump stations. However, some additional pumping may be required for the potential long-term users identified in this Study. One potential customer that may require additional pumping is Shifco (ID No. SB_105), as the elevation of this user is around 200 feet. This higher elevation appears to be above the hydraulic gradeline of the existing Phase 1 system, and therefore may require some additional pumping depending on the pressure of the main service line in this area, especially during peak demand periods. The second potential pumping need is the looped system, which has a change in elevation from about 40 feet to around 290 feet. Given the length and elevation change, it is possible that one or more booster stations will be needed as part of this loop. A more detailed hydraulic analysis would be necessary to determine the exact need for pumping for the long-term system. For purposes of this study, some pumping facility costs will be included in these projects costs.

Storage

As discussed above, no additional storage was identified in the City's 2009 Water Supply Planning study. Since the amount of system build-out is similar in this study, no additional storage was assumed to be needed under this Study.

7.2.3 Montecito Area Recycled Water System

MWD does not have any current plans to develop a recycled water system, and therefore, no near-term project has been identified. Only potential long-term options are identified. These options include serving water from Montecito WWTF and Summerland WWTP. Below is a summary of the distribution infrastructure needed for the proposed system as shown in **Figure 7-5**.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Potential Long-Term Recycled Water Customer

Demand (AFY)

- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Long-Term Recycled Water System

- Customer
- Pipeline

Potential Near-Term Recycled Water System

- Customer
- Pipeline

Existing Recycled Water System

- Customer
- Pipeline

Not associated with Near- or Long-Term System

- Customer

Other Features

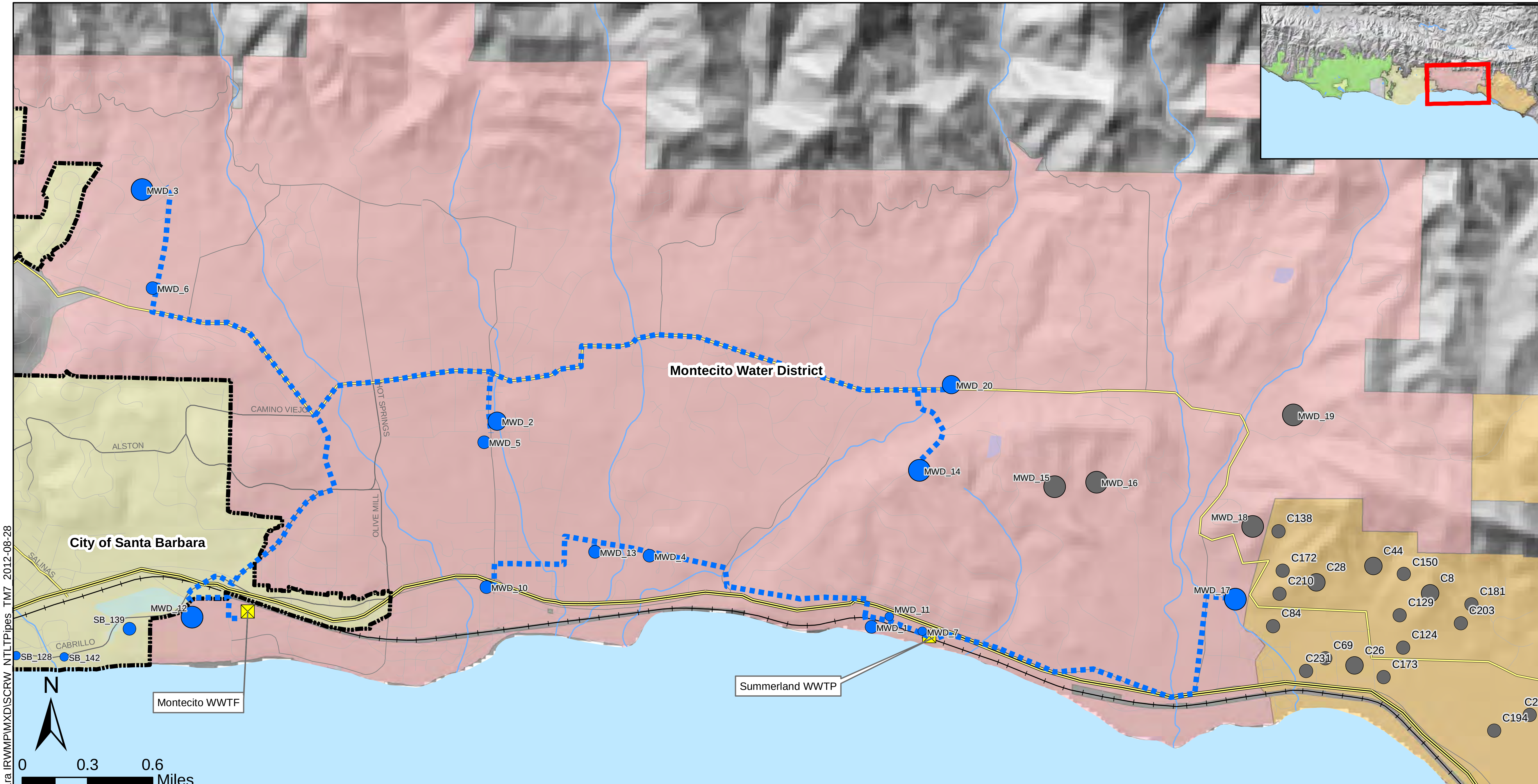
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water System: Santa Barbara Area

Figure 7-4



Santa Barbara County IRWMP South Coast Recycled Water Development Plan

RMC Water and Environment

Potential Long-Term Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Long-Term Recycled Water System
- Customer
- Pipeline

Potential Near-Term Recycled Water System
- Customer
- Pipeline

Existing Recycled Water System
- Customer
- Pipeline

Not associated with Near- or Long-Term System
- Customer

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water System: Montecito Area

Figure 7-5

Pipeline

Different options were developed for this area, including service from the Montecito WWTF to the Santa Barbara Cemetery and to several large users in the central and western portions of MWD's service area. Just over seven miles of pipeline would be required for installing service to these two potential customers

There are some potential customers near the Summerland WWTP that could use recycled water. A small pipeline extension would consist of 1,800 feet of 6-inch diameter pipe to serves these potential users. A recycled water pipeline currently exists along the main street of Summerland, Lillie Ave., and could be utilized as part of future recycled water system. There are two options to extend a recycled water system either west or east. The west expansion would consist of 11,500 feet of 6-inch diameter pipeline, and the east expansion would consist of 9,500 feet of 6-inch diameter pipeline.

Pumping

For the Montecito WWTF options, if only the Santa Barbara Cemetery were to be served, a 10-hp pump station would be needed. If the system were to be expanded to serve the agriculture customers in the northern and eastern areas as well, then a larger station would be needed at the Montecito WWTF as well as one or two booster stations.

For the Summerland WWTP options, if only the customers near Summerland WWTP are served, a 10-hp pump station would be needed. If the system were expanded to serve agriculture customers in the western or eastern areas, then an additional 10-hp pump station would be needed for either option.

Storage

If all of the Montecito WWTF options were to be implemented, an estimated 1.8-MG of storage capacity would be needed at the treatment plant or within the system to supply recycled water during peak hour conditions.

For the Summerland WWTP options, no storage is needed if recycled water is supplied only to customers near the plant. If the system were expanded either west or east, approximately 100,000 gallons of storage capacity would be needed at the WWTP or in the system itself.

7.2.4 Carpinteria Area Recycled Water System

The Carpinteria area does not have any current plans to develop a recycled water system, and therefore, no near-term project has been identified. Only potential long-term options are identified in this plan. **Figure 7-6** shows the proposed pipelines that would be needed to serve these users.

Pipeline

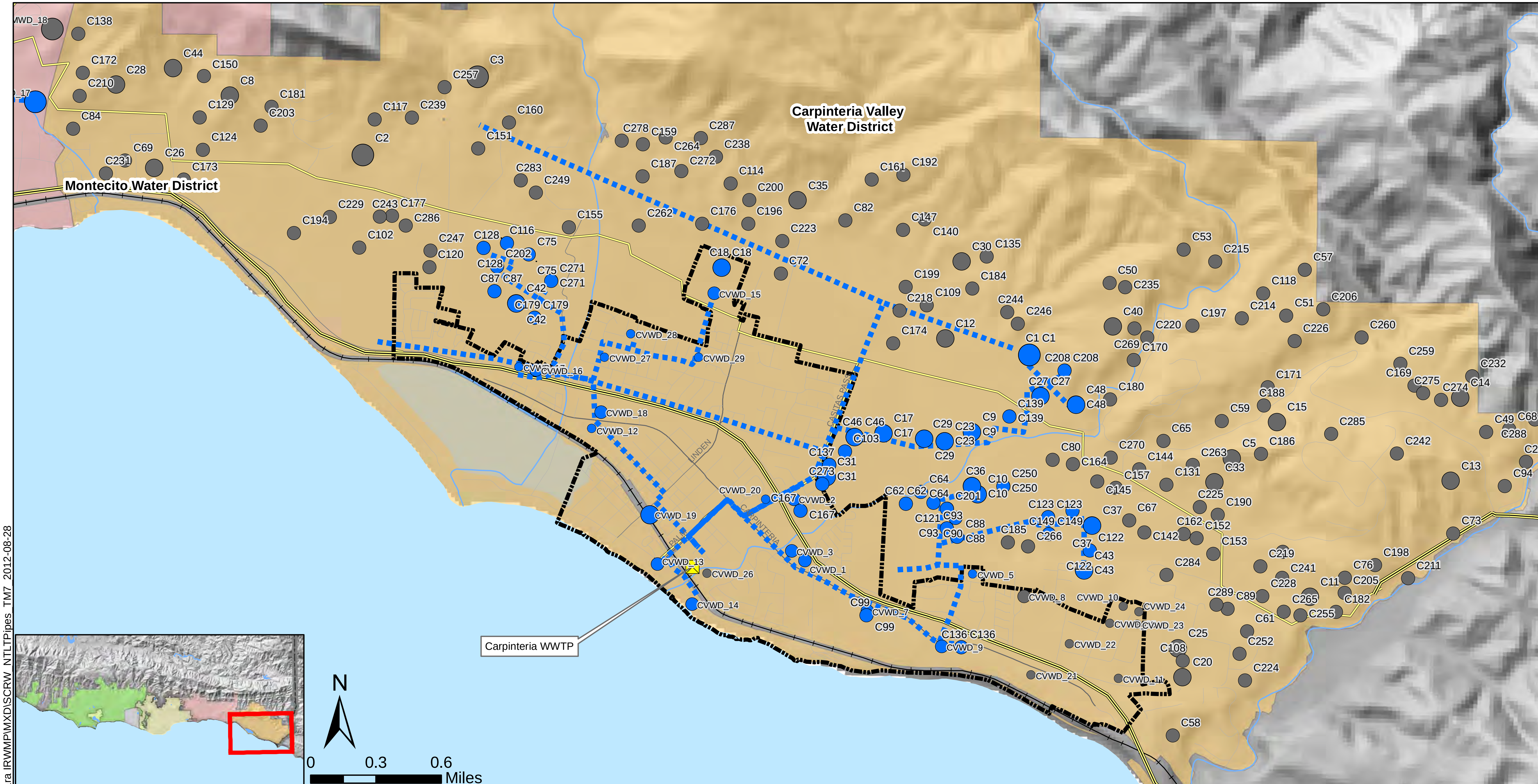
A total of 49,500 feet of pipeline would be needed to serve all selected demands as shown in **Figure 7-6**. The majority of the pipes would be 6- and 8-inches in diameter, with some 10-inch lines for the pipes stemming from the Carpinteria WWTP.

Pumping

A pump station would be needed at the Carpinteria WWTP, and the size of the pumps would vary based on the demand. If all the demands shown were included, then a 160-hp pump station would be needed. A booster station might be needed to the serve agriculture customers in the southeastern area. However, with increased pipe sizes (8" to 12") and depending on the pressure needs of the customers, this station might not be necessary. More detailed analysis would be needed to verify this, including examination of operational needs of potential customers.

Storage

An estimated 1.4 MG of storage capacity is needed at the treatment plant or within the system to supply recycled water during peak flow periods.



Santa Barbara County IRWMP
South Coast Recycled Water Development Plan

RMC Water and Environment

Potential Long-Term Recycled Water Customer

Demand (AFY)
- Less than 5
- 5 to 20
- 20 to 50
- Greater than 50

Potential Long-Term Recycled Water System
- Customer
- Pipeline

Potential Near-Term Recycled Water System
- Customer
- Pipeline

Existing Recycled Water System
- Customer
- Pipeline

Not associated with Near- or Long-Term System
- Customer

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water System: Carpinteria Area

Figure 7-6

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_NTLTPipes_TM7 2012-08-28

Chapter 8 Potential Projects

This chapter summarizes the development and analysis of potential recycled water projects in the south coast subregion and presents the potential near- and long-term projects. A few optional projects developed for the long-term are also discussed. Preliminary facility sizing and estimated project costs are also presented in this chapter.

8.1 Analysis Approach

This section explains the development of potential recycled water projects and options in the four areas of the south coast subregion. Options are projects that are either exclusive projects due to a limited amount of available wastewater flow or are projects with extenuating circumstances such that they are not included directly in the final the long-term projects list for the south coast subregion.

As part of the south coast subregion planning effort, the participating agencies decided to formulate two time frames, near-term and long-term. Near-term potential projects could be implemented over the next ten years, and the potential long-term projects could be implemented over the next 20 to 30 years.

The following steps were conducted to develop the potential recycled water projects and options:

- Potential Customer Identification
  - Potential recycled water demands were identified for both the near- and long-term planning periods (see **Chapter 5**)
- Supply Assessment and Needs
  - Available average daily flows (see **Chapter 3)** and treatment plant improvement needs (see **Chapter 6**).were determined for each WWTP by 2030
- Planning Criteria and Distribution Needs
  - Facilities development and hydraulic criteria were established across the plan area and distribution needs to serve potential demands were identified for each area (see **Chapter 7**)

Potential recycled water projects and options were developed through a series of iterative steps that identified projects with the highest likelihood of implementation.

- Pipeline alignments were delineated from existing recycled water pipelines and from the WWTPs along major corridors to serve potential customers.
- Alignments and lengths of pipelines were computed in ArcGIS.
- Pipeline and demand information was incorporated into a hydraulic spreadsheet to define the necessary facilities, including pipeline diameters, pump station sizes, and storage capacity needs. Elevations were obtained through Google Earth, which were used to determine pump station needs and sizes.
- Cost estimates were then developed for each of the potential projects and options.

Note that actual pipeline, pump, and storage sizing would be dependent on comprehensive hydraulic analyses and customer demand scheduling on a project basis. The pipeline, pump, and storage sizing as well as pipeline lengths in the following table and figures are for conceptual purposes only.

For the Goleta and Santa Barbara areas, near- and long-term projects and options were developed from each agency's most recent recycled water study and refined based on discussions with the individual agencies.

For the Montecito and Carpinteria areas, potential long-term projects and options were developed via a phased approach. The initial phased projects were developed to serve only potential users located near the

WWTPs. Subsequent phases were extended out from the initial phase projects until all identified demands were included or the maximum available wastewater flow was fully allocated.

8.2 Projects Summary

This section summarizes the customers and facilities for each potential recycled water project and option within the four areas: Goleta, Santa Barbara, Montecito/Summerland, and Carpinteria.

8.2.1 Goleta Area

A total of 12 potential recycled water projects were developed in the Goleta Area. Six potential projects were developed in both the near- and long-term planning period.

Summary of Projects

Figure 8-1 and **Figure 8-2** show the potential near- and long-term projects, respectively. **Table 8-1** shows a summary of the recycled water demands proposed for each potential project. **Table 8-2** shows a summary of the identified distribution system needs for each potential project. Individual projects are described following the tables.

Near-Term Projects

As shown in **Figure 8-1** six potential near-term projects were developed in the Goleta area. To implement the potential near-term projects, several system-wide improvements are first needed to maintain and upgrade GWD's current recycled water system. As discussed in Section 7.2.1, the following projects are necessary to expand the GWD system in near-term:

- Recycled Waterline Relocation Project at Goleta Beach
- Recycled Water 1-Million Gallon (MG) Reservoir
- Corrosion Protection and Pipeline Replacements
- Recycled Water Booster Station Electrical Upgrades at the Goleta WWTP

Projects G-1 through G-6

Projects G-1 through G-6 would provide recycled water to six potential customers (total of seven separate connection points) located along the existing recycled water system. These projects are planned to be implemented in conjunction with GWD's existing system improvements as previously discussed.

Long-Term Projects

As shown in **Figure 8-2**, six potential long-term projects were developed in the Goleta area. For implementation of potential long-term projects, two additional system-wide improvements are needed in the future as discussed in Section 7.2.1:

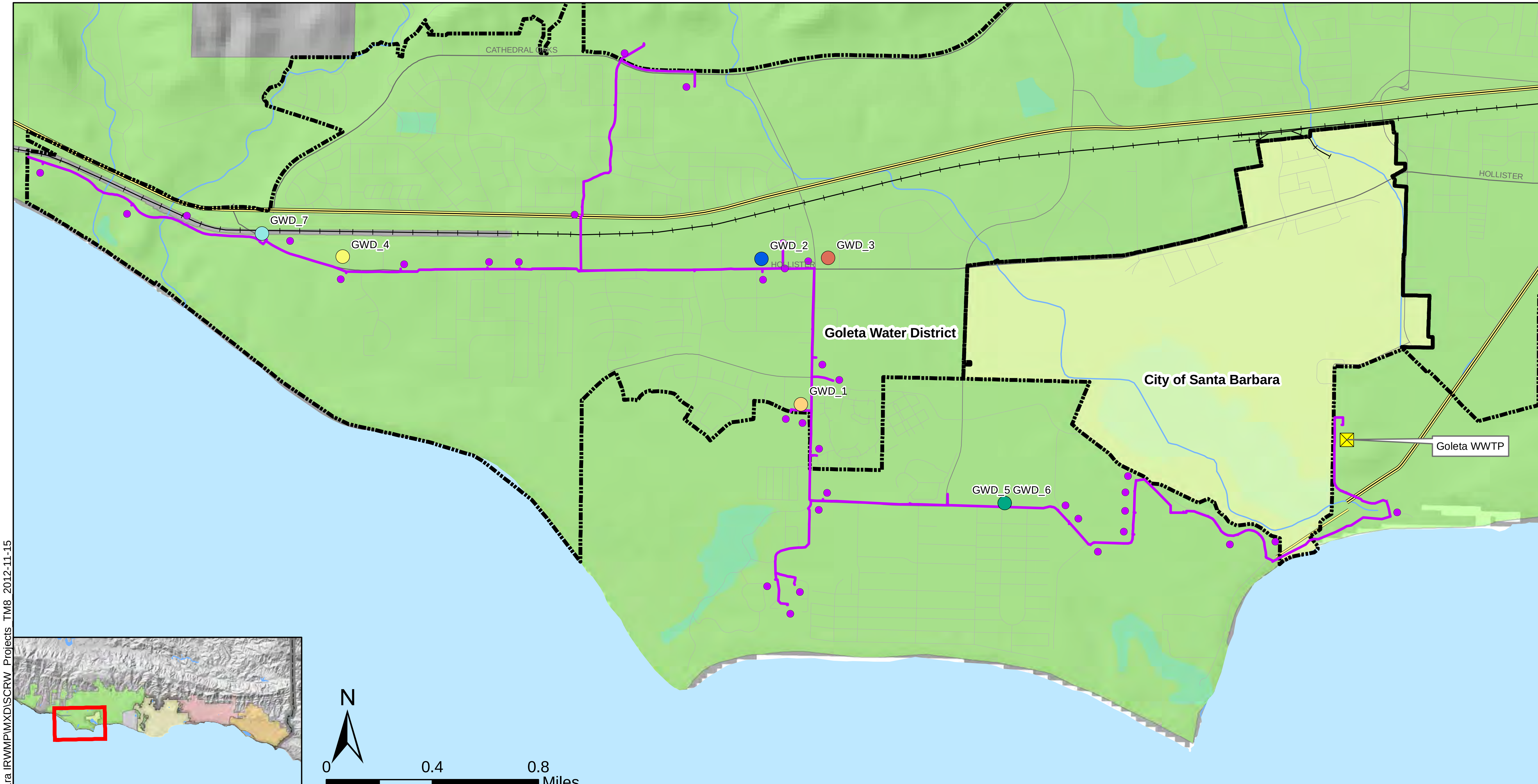
- Recycled Water Hollister Booster Station Relocation Project
- RW PR Vault Relocation at Glen Annie Golf Course

Project G-8

Project G-8 would provide recycled water to thirteen potential customers located in Isla Vista, south of the existing recycled water pipeline. The majority of these customers are small city parks.

Projects G-9 through G-12

Projects G-9 through G-12 would provide recycled water to six potential customers (seven connections) located near the existing recycled water pipeline. Individual lengths for these projects were provided by GWD as they have conducted more detailed evaluations of the conversion of these sites to recycled water.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Goleta Projects
- G-1
- G-2
- G-3
- G-4
- G-5
- G-6

Existing Recycled Water System
- Customer
- Pipeline

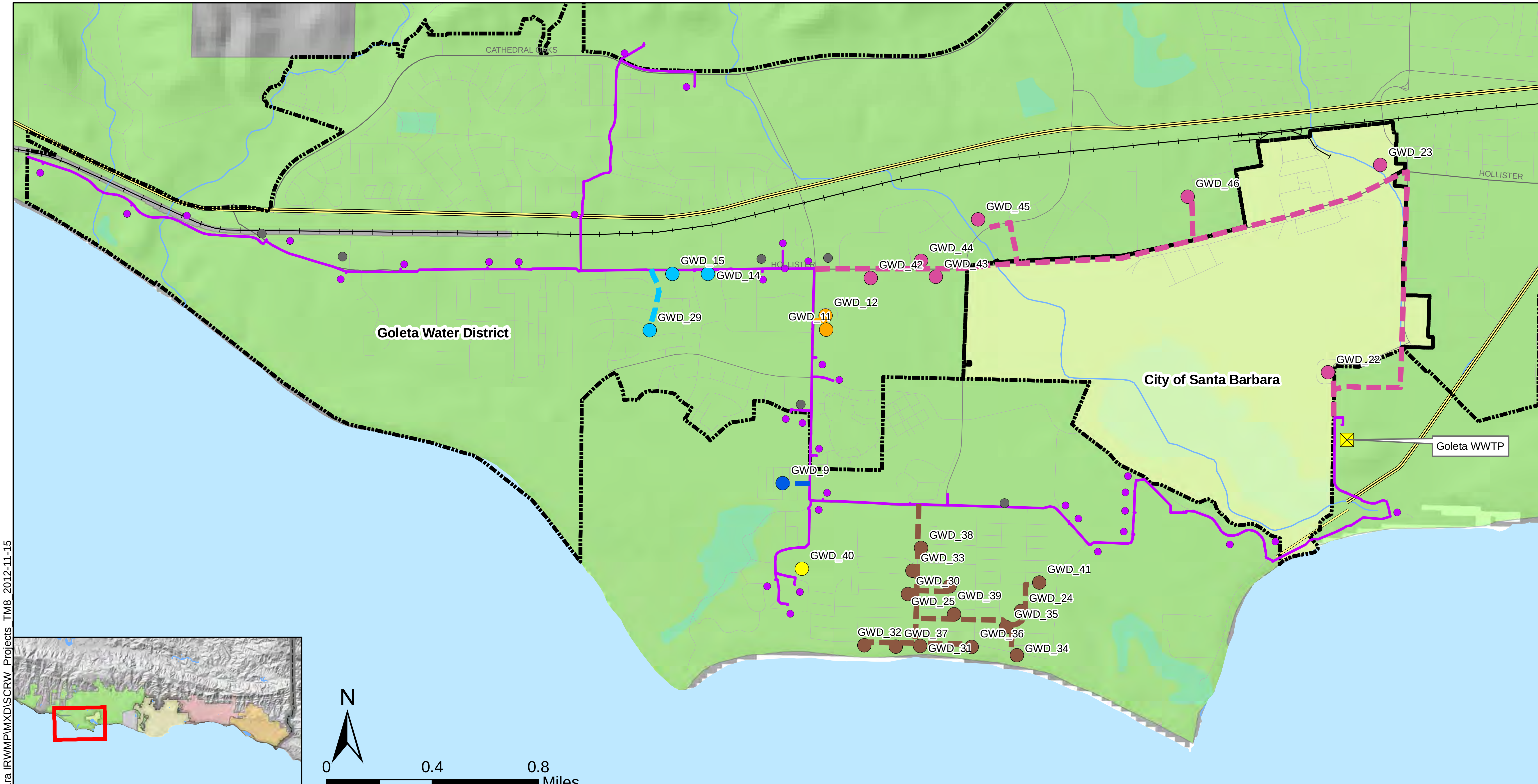
Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Near-Term Recycled Water Projects: Goleta Area

Figure 8-1

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Goleta Projects
- G-8
- G-9
- G-10
- G-11
- G-12
- G-13

Potential Near-Term Recycled Water System
- Customer
- Pipeline

Existing Recycled Water System
- Customer
- Pipeline

Other Features
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies
- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water Projects: Goleta Area

Figure 8-2

Table 8-1: Potential Demands by Project – Goleta Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
Near-Term Projects					
G-1	GWD_5	El Colegio RW Medians Phase 1	Urban Irrigation	0.2	**0.4**
	GWD_6	El Colegio RW Medians Phase 2	Urban Irrigation	0.2	
G-2	GWD_1	UCSB Sierra Madre Apartments	Urban Irrigation	0.5	**0.5**
G-3	GWD_3	Rincon Palms Hotel	Urban Irrigation	0.7	**0.7**
G-4	GWD_2	Westar Associates	Urban Irrigation	10.4	**10.4**
G-5	GWD_4	Haskell's Landing	Urban Irrigation	13.5	**13.5**
G-6	GWD_7	Caltrans US101 at Cathedral Oaks Road	Urban Irrigation	1.2	**1.2**
Total Near-Term Demands (AFY)					**26.7**
Long-Term Projects					
G-8	GWD_24	Anisq Oyo Park and Peoples' Park	Urban Irrigation	3.7	**11.5**
	GWD_25	Trigo-Pasado Park	Urban Irrigation	0.4	
	GWD_30	Sueno Orchard	Urban Irrigation	0.5	
	GWD_31	Window to the Sea Park	Urban Irrigation	0.3	
	GWD_32	Sea Lookout Park	Urban Irrigation	1.2	
	GWD_33	Estero Park	Urban Irrigation	1.2	
	GWD_34	Pelican Park	Urban Irrigation	0.5	
	GWD_35	Little Acorn Park	Urban Irrigation	0.7	
	GWD_36	Camino Pescadero Park	Urban Irrigation	0.2	
	GWD_37	Walter Capps Park	Urban Irrigation	0.9	
	GWD_38	Children's Park	Urban Irrigation	1.0	
	GWD_39	Sueno Park	Urban Irrigation	0.5	
	GWD_41	Pardall Gardens	Urban Irrigation	0.4	
G-9	GWD_40	Tierra de Fortuna Park	Urban Irrigation	0.4	**0.4**
G-10	GWD_9	Married Student Housing	Urban Irrigation	2.0	**2.0**
G-11	GWD_11	East side of Storke, N. of Santa Felicia	Urban Irrigation	0.5	**1.0**
	GWD_12	East side of Storke, N. of Santa Felicia	Urban Irrigation	0.5	
G-12	GWD_14	DMV Camino Real Shopping Center	Urban Irrigation	0.6	**4.9**
	GWD_15	Pacific Oaks/Davenport Rd.	Urban Irrigation	0.8	
	GWD_29	Gol Pk/greenbelt	Urban Irrigation	3.5	

Table 8-1: Potential Demands by Project – Goleta Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
G-13	GWD_22	Santa Barbara Airport	Urban Irrigation	0.5	**38.2**
	GWD_23	Twin Lakes Golf Course	Urban Irrigation	16.0	
	GWD_42	Hollister Business Park	Urban Irrigation	4.6	
	GWD_43	Cabrillo Bus. Park (includes Los Carneros and Hollister medians)	Urban Irrigation	3.0	
	GWD_44	Coromar Office Buildings	Urban Irrigation	1.5	
	GWD_45	Village at Los Carneros Housing Project	Urban Irrigation	10.0	
	GWD_46	Raytheon Offices	Urban Irrigation	2.6	
Total Long-Term Demands (AFY)					**58.0**
Total Near and Long-Term Demands (AFY)					**84.7**

Table 8-2: Identified Distribution Needs by Project - Goleta Area

Project No.	Pipeline		Pump Station		Storage Capacity Needed (MG)
	Diam. (in)	Length (ft)	No.	Size (hp)	
Near-Term Projects					
G-1 through G-6	-	-	-	-	-
Total Near-Term	**-**	**-**	**-**	**-**	**-**
Long-Term Projects					
G-8	6	9,400	-	-	-
G-9	6	570	-	-	-
G-10	6	40	-	-	-
G-11	6	150	-	-	-
G-12	6	4,000	-	-	-
G-13	12	20,600	-	-	-
Total Long-Term	**6-12**	**34,760**	**-**	**-**	**-**
Total (Near- + Long-Term)	**6-12**	**34,760**	**-**	**-**	**-**

Project G-13

Project G-13 would connect to seven potential customers and loop GWD's existing recycled water system around the Santa Barbara Airport. This would significantly improve reliability of service to GWD's customers. Project G-13 would require installing approximately 20,600 feet of a large diameter pipelines (estimated to be 12-inch for purposed of this study) from Goleta WWTP to the existing recycled water system connection at Hollister and Storke.

8.2.2 Santa Barbara

In the Santa Barbara area, seven potential near-term and eight potential long-term projects, as well as two long-term options, were developed. As discussed in Section 6.3.2, planned upgrades of the El Estero WWTF are necessary to bring the current recycled water production back on line and to provide recycled water supplies for future expansion in both the near- and long-term.

Summary of Projects

Figure 8-3 and **Figure 8-4** show the potential near- and long-term projects, respectively. **Table 8-3** shows a summary of the recycled water demands proposed for each potential project or option. **Table 8-4** shows a summary of the identified distribution system needs for each potential project or option. Individual projects are described following the tables.

Near-Term Projects

As shown in **Figure 8-3**, seven potential near-term projects were developed in the Santa Barbara area.

Projects SB-1 through SB-6

Projects SB-1 through SB-6 would provide recycled water to 11 potential customers located along the existing recycled water system. Most of these projects were developed in the City's 2009 Water Supply Planning Study and are mainly irrigation customers. No additional pipeline, pump stations, or storage is needed to serve these customers, as only onsite conversion from potable to recycled water is required at these locations.

Project SB-7

Project SB-7 would install 4,000 feet of 6-inch diameter pipeline to serve three irrigation customers. This project was also identified in the City's 2009 Water Supply Planning Study. However, connection to one user, Educated Car Wash, is included in the potential long-term Project, SB-13, as the City has concerns about being able to meet the customer's water quality needs. Once the upgrades at the El Estero WWTF are completed, the status of this potential project should be re-assessed.

Long-Term Projects

As shown in **Figure 8-4**, eight potential long-term projects were developed in the Santa Barbara area.

Project SB-8

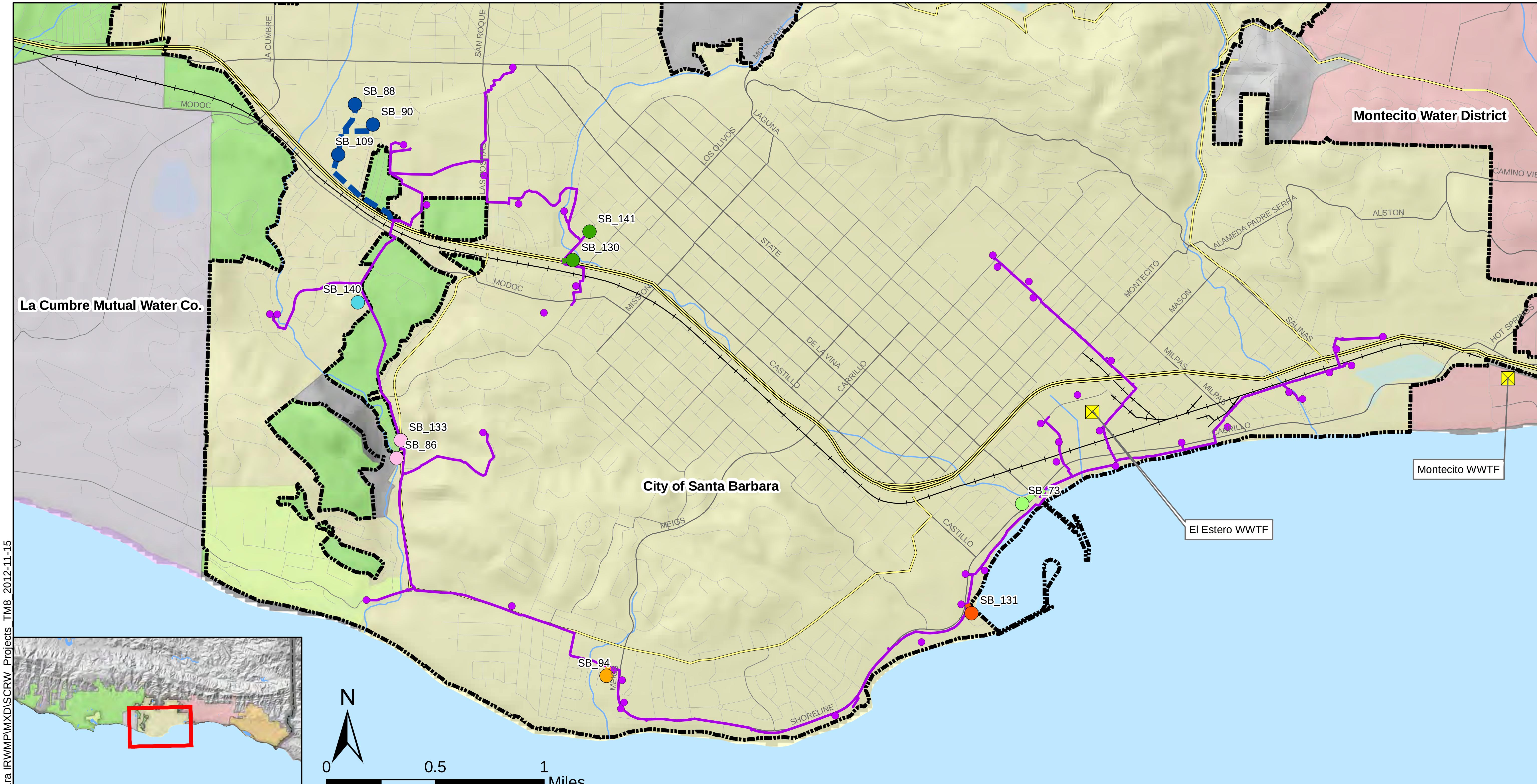
Project SB-8 would extend the City's existing system further east to connect to Clark Estate and three other customers along the beach area. The project would require installing approximately 4,300 feet of 6-inch diameter pipeline to serve the four identified irrigation customers.

Project SB-9

Project SB-9 would extend the City's existing system to connect to two parks and a school. The project would require installing approximately 3,200 feet of 6-inch diameter pipeline to serve the three identified irrigation customers.

Project SB-10

Project SB-10 would connect two commercial customers via short laterals from the existing system. Connection to industrial/commercial customers is a concern due to water quality at the El Estero WWTF. Upgrades at the plant may provide adequate water quality to meet these potential reuse customer needs. Their water quality needs should be re-assessed once the El Estero upgrades are completed.



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Santa Barbara Projects

- SB-1
- SB-2
- SB-3
- SB-4
- SB-5
- SB-6
- SB-7

Existing Recycled Water System

- Customer
- Pipeline

Other Features

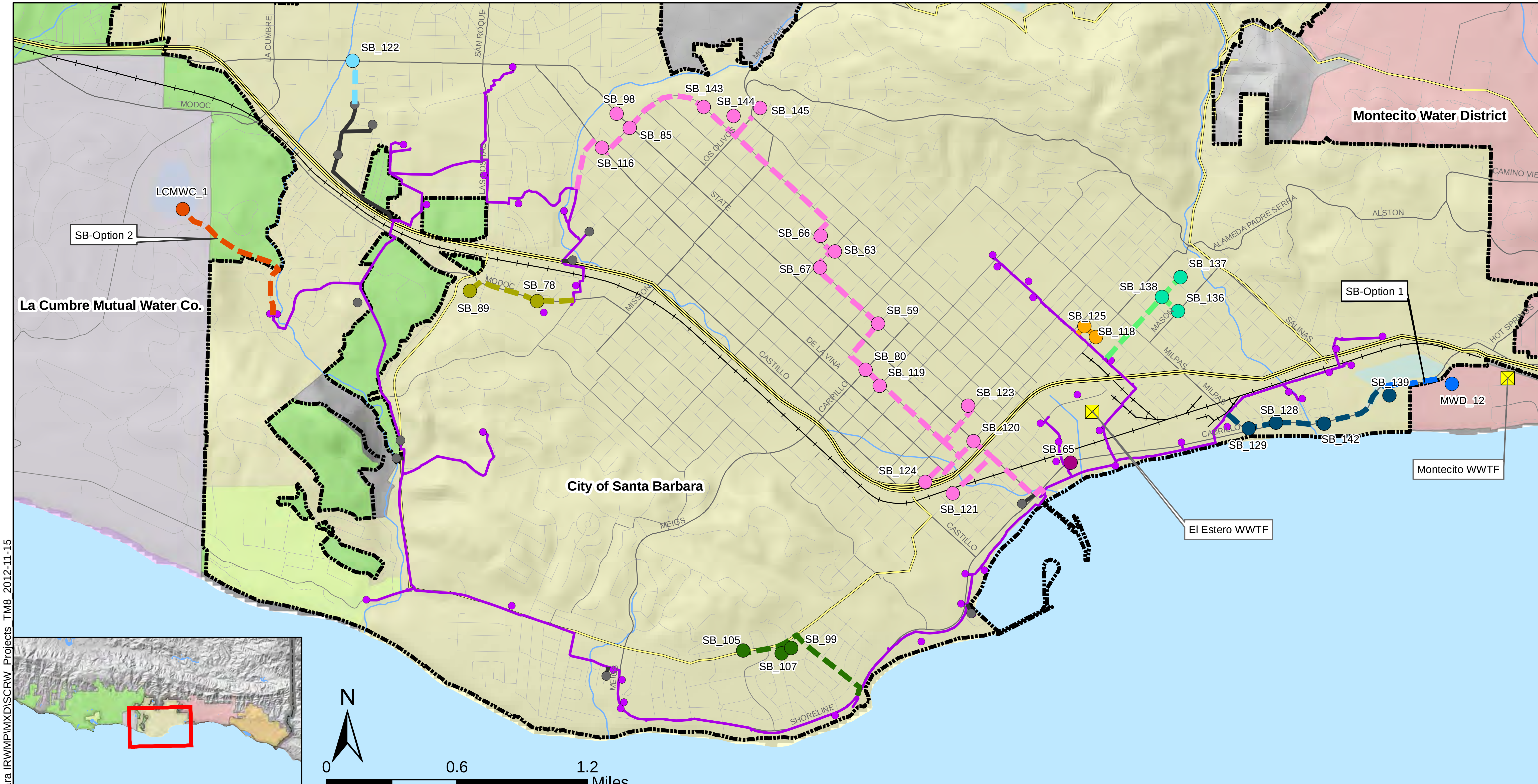
- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Near-Term Recycled Water Projects: Santa Barbara Area

Figure 8-3



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Santa Barbara Projects

- SB-8
- SB-9
- SB-10
- SB-11
- SB-12
- SB-13
- SB-14
- SB-15
- SB Option 1
- SB Option 2

Potential Near-Term Recycled Water System

- Customer
- Pipeline

Existing Recycled Water System

- Customer
- Pipeline

Other Features

- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water Projects: Santa Barbara Area

Figure 8-4

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15

Table 8-3: Potential Demands by Project – Santa Barbara Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
Near-Term Projects					
S-1	SB_73	Harbor View Inn	Urban Irrigation	2.2	**2.2**
S-2	SB_131	Marina Restrooms	Industrial/Commercial	1.9	**1.9**
S-3	SB_130	Elise Court Owners	Urban Irrigation	1.0	**4.0**
	SB_141	Cottage Hospital (Expansion to cooling towers)	Commercial	3.0	
S-4	SB_140	First Baptist Church	Urban Irrigation	4.0	**4.0**
S-5	SB_133	Las Positas Tennis Courts	Irrigation/Toilets	1.9	**6.4**
	SB_86	Stone Creek Owners Association[1]	Urban Irrigation	4.5	
S-6	SB_94	Reef Court Owners	Urban Irrigation	2.3	**2.3**
S-7	SB_109	Santa Barbara Auto Group	Urban Irrigation	3.4	**20.2**
	SB_88	Towbes Group Inc	Urban Irrigation	6.7	
	SB_90	Franciscan Villas Association	Urban Irrigation	10.1	
Total Near-Term Demand (AFY)					**41.0**
Long-Term Projects					
S-8	SB_128	Hotel Mar Monte	Urban Irrigation	0.8	**14.8**
	SB_129	Santa Barbara Inn	Urban Irrigation	1.5	
	SB_139	Clark Estate	Urban Irrigation	10.0	
	SB_142	East Beach	Urban Irrigation	2.5	
S-9	SB_136	Sunflower Park	Urban Irrigation	0.5	**14.7**
	SB_137	Eastside Neighborhood Park	Urban Irrigation	3.0	
	SB_138	Franklin Park & School	Urban Irrigation	11.2	
S-10	SB_118	MISSION LINEN SUPPLY	Industrial/Commercial	29.1	**41.4**
	SB_125	MISSION LINEN SUPPLY	Industrial/Commercial	12.3	

Table 8-3: Potential Demands by Project – Santa Barbara Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
S-11	SB_116	LAUNDERLAND	Industrial/Commercial	17.9	**116.0**
	SB_119	S B HAND CAR WASH	Industrial/Commercial	5.6	
	SB_120	ABLITT'S FINE CLEANERS	Industrial/Commercial	4.5	
	SB_121	FIESTA CAR WASH	Industrial/Commercial	3.4	
	SB_123	DALEE CAR BATH	Industrial/Commercial	4.5	
	SB_124	ST PAUL CLEANERS	Industrial/Commercial	3.4	
	SB_143	San Roque High School	Urban Irrigation	7.0	
	SB_144	SB Old Mission	Urban Irrigation	8.0	
	SB_145	Mission Rose Gardens	Urban Irrigation	4.5	
	SB_59	County of Santa Barbara	Urban Irrigation	11.2	
	SB_63	City of Santa Barbara	Urban Irrigation	12.3	
	SB_66	City of Santa Barbara	Urban Irrigation	10.1	
	SB_67	City of Santa Barbara	Urban Irrigation	12.3	
	SB_80	Ralphs Grocery	Urban Irrigation	3.4	
	SB_85	Villa Constance South	Urban Irrigation	3.4	
	SB_98	Villa Constance North	Urban Irrigation	4.5	
S-12	SB_78	Vista Madera Owners Association	Urban Irrigation	4.5	**10.1**
	SB_89	Las Positas Meadows HOA	Urban Irrigation	5.6	
S-13	SB_122	Educated Car Wash	Industrial/Commercial	9.0	**9.0**
S-14	SB_105	Shifco	Urban Irrigation	3.4	**11.3**
	SB_107	Vista Pacifica Home	Urban Irrigation	3.4	
	SB_99	Vista Pacifica Home	Urban Irrigation	4.5	
S-15	SB_65	Chase Palm Park (Expansion)	Urban Irrigation	14.6	**14.6**
Total Long-Term Demand (AFY)					**231.9**
Total Near- and Long-Term Demand (AFY)					**272.9**
Long-Term Options					
Opt. 1	MWD_12	Santa Barbara Cemetery	Urban Irrigation	139.0	**139.0**
Opt. 2	LCMWC_1	La Cumbre Golf and Country Club	Urban Irrigation	126.6	**126.6**
Total Long-Term Option Demand (AFY)					**265.6**
Total Near- and Long-Term and Option Demand (AFY)					**538.5**

Table 8-4: Identified Distribution Needs by Project – Santa Barbara Area

Project No.	Pipeline		Pump Station		Storage Capacity Needed (MG)
	Diam. (in)	Length (ft)	No.	Size (hp)	
Near-Term Projects					
SB-1 through SB-6	-	-	-	-	-
SB-7	6	4,400	-	-	-
Total Near-Term	**6**	**4,400**	**-**	**-**	**-**
Long-Term Projects					
SB-8	6	4,300	-	-	-
SB-9	6	3,200	-	-	-
SB-10	-	-	-	-	-
SB-11	6	25,200	1	20	-
SB-12	6	2,700	-	-	-
SB-13	6	1,200	-	-	-
SB-14	6	4,000	1	10	-
SB-15	-	-	-	-	-
Total Long-Term	**6**	**40,600**	**2**	**10, 20**	**-**
Total (Near + Long-Term)	**6**	**45,000**	**2**	**10, 20**	**-**
Long-Term Options					
SB-Option 1	6	1,500	-	-	-
SB-Option 2	6	4,000	-	-	-
Total (with Options)	**6**	**50,500**	**2**	**10, 20**	**-**

Project SB-11

Project SB-11 would install approximately 25,200 feet of 6-inch diameter pipeline to loop the existing recycled water system and thus, improving the reliability of service to the City's customers. This project would loop the system by installing pipelines through the center of Santa Barbara and connect to the existing system at Castillo Street and Alamar Avenue. Santa Barbara's Old Mission and other potential recycled water customers adjacent to the new line would be connected to the recycled water system.

Project SB-12

Project SB-12 would extend the City's existing system to connect to two irrigation customers. The project would require installing approximately 2,700 feet of 6-inch diameter pipeline.

Project SB-13

Project SB-13 is a proposed expansion of the near-term project SB-7 that would connect to the Educated Car Wash. The project would require installing approximately 1,200 feet of 6-inch diameter pipeline. Customer water quality needs will need to be considered in light of the proposed upgrades at the El Estero WWTF.

Project SB-14

Project SB-14 is a proposed extension of the City's existing system and would connect to three identified irrigation customers. The project would require installing approximately 4,000 feet of 6-inch diameter pipeline.

Project SB-15

Project SB-10 would expand the amount of recycled water being used at the City's Chase Palm Park. The park is currently using recycled water for its turf areas. The park has sensitive plants and once the recycled water processes at the El Estero WWTF are upgraded, the water quality may be adequate to serve recycled water to the entire Park's irrigation systems. The actual water quality needs should be re-assessed once the El Estero upgrades are completed.

Long-Term Project Options

SB-Option 1

Project SB-Option 1 would extend 1,500 feet of 6-inch diameter pipeline from Project SB-8 to connect to the Santa Barbara Cemetery. The Santa Barbara Cemetery is a MWD customer, and therefore, an agreement between the two agencies would be needed. MWD does not currently serve recycled water.

SB-Option 2

Project SB-Option 2 would extend the existing system to supply the La Cumbre Golf and Country Club. A pump station to the La Cumbre Golf and Country Club is not needed if the Club's existing pond can serve as diurnal storage for irrigation at the Club. As discussed in Section 7.2.2, the recycled water could be stored in the Club's existing water pond and be pumped from the pond for irrigation of the course during the night. Minimum pressure would be needed to fill the pond and is likely possible with the proposed system expansions in the near- and long-term. The La Cumbre Golf and Country Club currently receives water from the La Cumbre Mutual Water District by agreement with the GWD. Therefore an agreement between the three agencies would be necessary as part of the implementation of this project. The La Cumbre Mutual Water District does not serve recycled water. This option would require an extension of 4,000 feet of 6-inch diameter pipeline from the existing system.

8.2.3 Montecito Area

Three potential long-term projects were developed in the Montecito Area, two to be supplied from the Montecito WWTF and one from the Summerland WWTP. In addition, two potential options were developed from the Summerland WWTP. As discussed in Section 7.2.3, the potential reuse projects are dependent upon upgrades at the Montecito WWTF and the Summerland WWTP to produce Title 22 quality water. The Summerland Sanitary District is interested in implementing a recycled water project and has expressed interest in working with the MWD to further explore such opportunities.

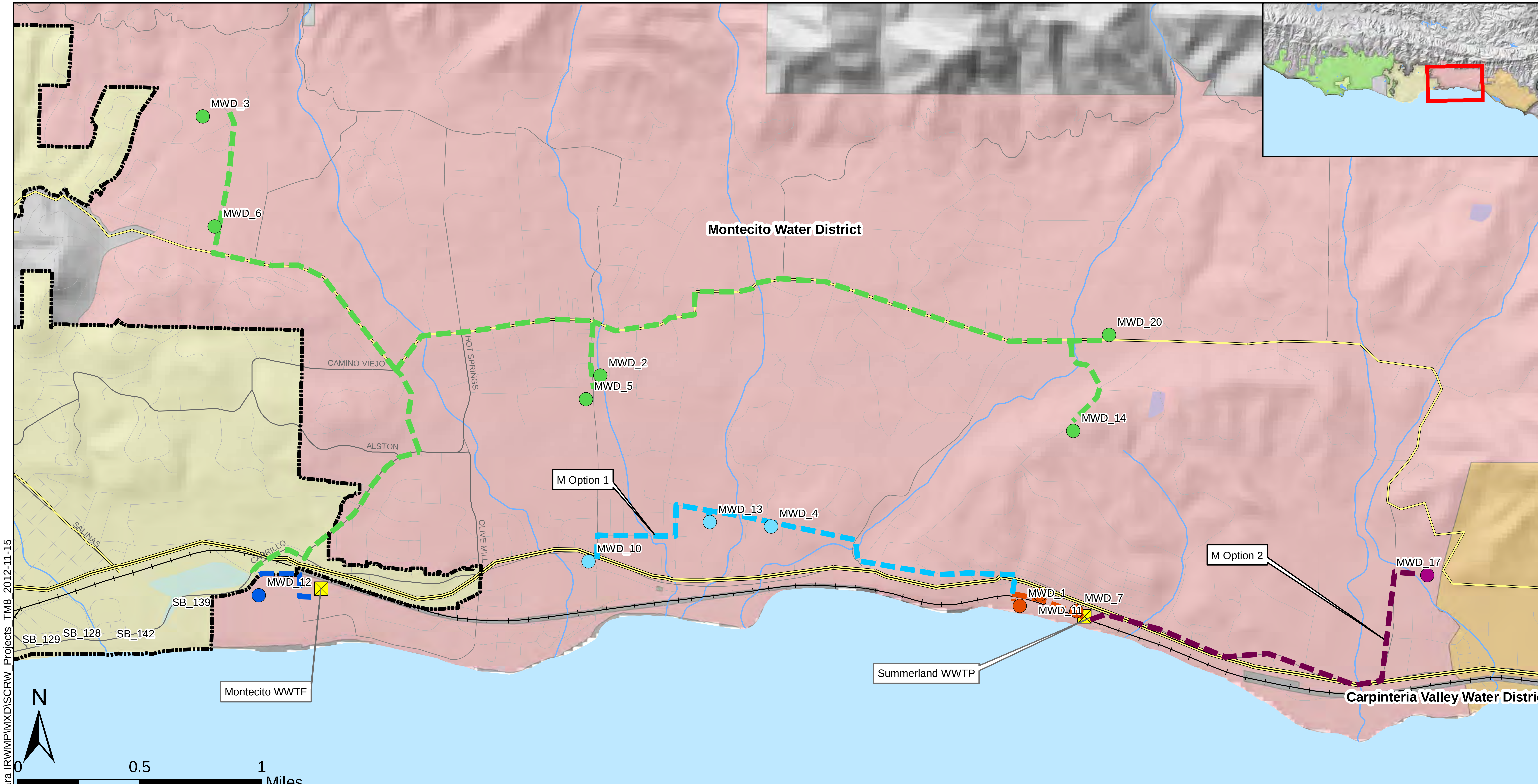
Summary of Projects

Figure 8-5 shows the potential long-term projects. **Table 8-5** shows a summary of the recycled water demands proposed for each potential project or option. **Table 8-6** shows a summary of the identified distribution system needs for each potential project or option. Individual projects are described following the tables.

Long-Term Projects

Project M-1

Project M-1 would be the first recycled water pipeline from the Montecito WWTF and would serve the Santa Barbara Cemetery with recycled water. The project would require installing approximately 1,700 feet of 8-inch diameter pipeline to serve the cemetery and a 100-hp pump station, assuming Project M-2 was implemented. If Project M-2 was not implemented, then the pipeline diameter and pump station could both be reduced in size to serve just the cemetery.



L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15

Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC Water and Environment

Montecito Projects

- M-1
- M-2
- M-3
- M Option 1
- M Option 2

Existing Recycled Water System

- Customer

Other Features

- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water Projects: Montecito Area

Figure 8-5

Table 8-5: Potential Demands by Project – Montecito Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
Long-Term Projects					
M-1	MWD_12	Santa Barbara Cemetery	Urban Irrigation	139	**139**
M-2	MWD_14	Agricultural Land	Agriculture	261	**449**
	MWD_2	Manning Park	Urban Irrigation	30	
	MWD_20	Agricultural Land	Agriculture	40	
	MWD_3	Westmont College	Urban Irrigation	100	
	MWD_5	Montecito Union School	Urban Irrigation	8	
	MWD_6	Cold Spring Elementary School	Urban Irrigation	10	
M-3	MWD_1	Lookout Park	Urban Irrigation	8	**15**
	MWD_11	Caltrans (Summerland)	Urban Irrigation	5	
	MWD_7	Summerland School	Urban Irrigation	2	
Total Long-Term Demand (AFY)					**603**
Long-Term Options					
Opt. 1	MWD_10	Caltrans (Montecito)	Urban Irrigation	9	**35**
	MWD_13	Lemons and Avocados	Agriculture	6	
	MWD_4	Crane County Day School	Urban Irrigation	20	
Opt. 2	MWD_17	Agricultural Land	Agriculture	56	**56**

Table 8-6: Identified Distribution Needs by Project – Montecito Area

Project No.	Pipeline		Pump Station		Storage Capacity Needed (MG)
	Diam. (in)	Length (ft)	No.	Size (hp)	
Long-Term Projects from Montecito WWTF					
M-1	8	1,700	1	100	1.0
M-2	6-8	35,400	0	0	0.0
Total Long-Term from Montecito WWTF	**6-8**	**37,100**	**1**	**100**	**1.0**
Long-Term Projects from Summerland WWTP					
M-3	6	1,800	1	10	0.0
Long-Term Options from Summerland WWTP					
M-Option 1	6	11,500	1	10	0.1
M-Option 2	6	9,500	1	10	0.1
Total Long-Term from Summerland WWTP (Including M-Option 2)	**6**	**11,300**	**2**	**10, 10**	**0.1**
Total Long-Term for Montecito Area (Including M-Option 2)	**6-8**	**48,400**	**3**	**10, 10, 100**	**1.2**

Project M-2

Project M-2 would extend recycled water system from the Santa Barbara Cemetery to serve six additional customers north of Highway 101. The project would require installing approximately 35,400 feet of 6 to 8-inch diameter pipeline. Project M-2 would also require two booster pump stations along the alignment. One 20 hp pump station would serve the eastern alignment and one 30 hp pump station would serve the northern alignment.

Project M-3

Project M-3 would provide recycled water from the Summerland WWTP to three customers near the plant. The project would require installing approximately 1,800 feet of 6-inch diameter pipeline and a 10 hp pump station to serve the these customers.

M-Option 1

Montecito Option 1 would extend from the Project M-3 pipeline to serve three customers in the western area. This optional project would require installing approximately 11,500 feet of 6-inch diameter pipeline and a 10 hp pump station to serve these customers.

M-Option 2

Montecito Option 2 would extend east from the Summerland WWTP to serve an agriculture customer. The option would require installing approximately 9,500 feet of 6-inch diameter pipeline and a 10 hp pump station.

8.2.4 Carpinteria Area

Three potential long-term projects were developed in the Carpinteria area. As discussed in Section 7.2.4, the potential reuse projects are dependent upon upgrades at the Carpinteria WWTP to produce Title 22 quality water. A potential option for an indirect potable reuse and/or seawater intrusion project(s) was also identified. Such a project would require upgrade of the treatment plant advanced levels as required by the California Department of Public Health.

Summary of Projects

Figure 8-6 shows the potential long-term projects, and **Figure 8-7** shows the Indirect Potable Reuse/Seawater Intrusion Project Option. **Table 8-7** shows a summary of the recycled water demands proposed for each potential project or option. **Table 8-8** shows a summary of the identified distribution system needs for each potential project or option. Individual projects are described following the tables.

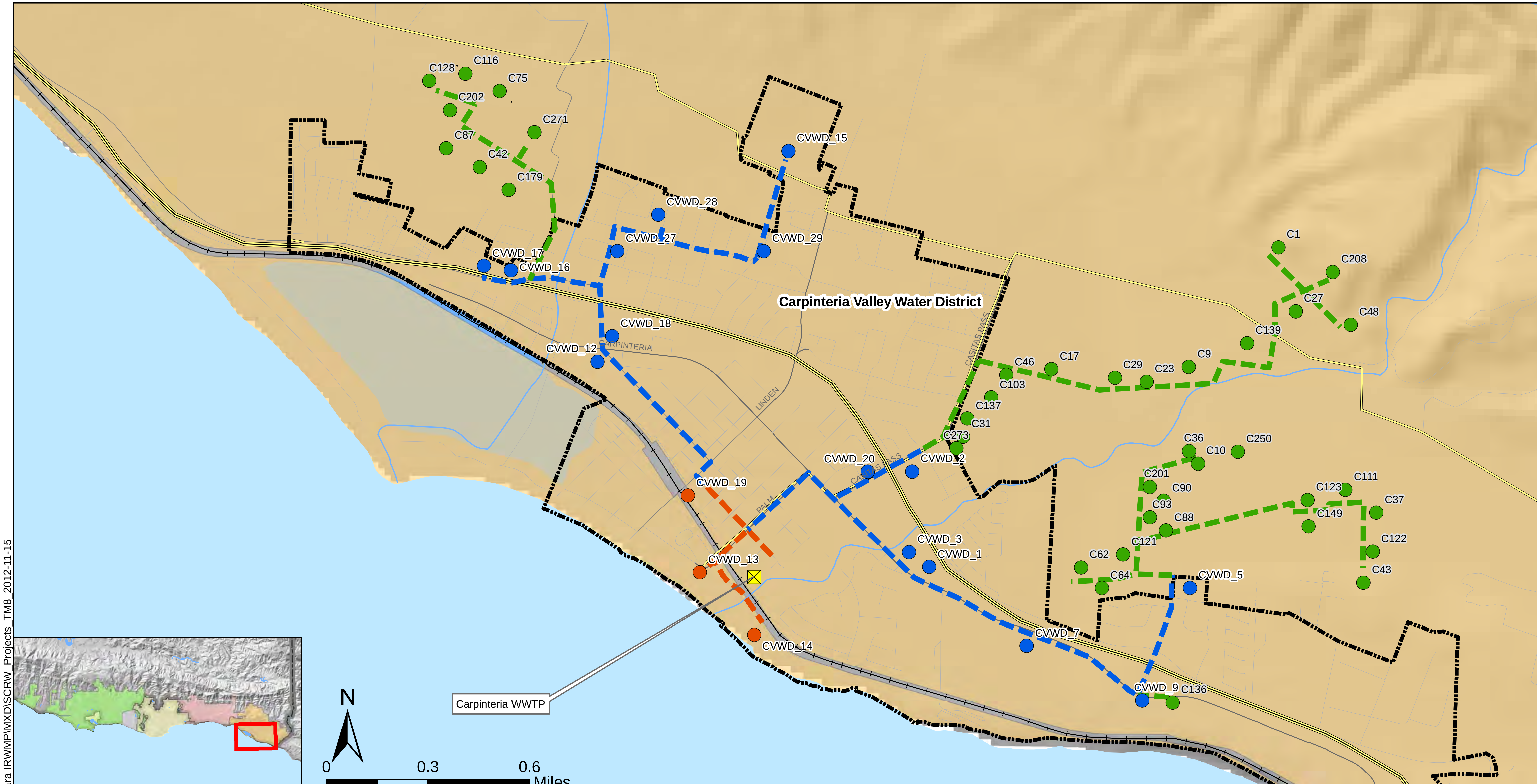
Long-Term Projects

Project C-1

Project C-1 would extend from the Carpinteria WWTP and serve three customers near the plant. The project would require installing approximately 3,600 feet of 10-inch diameter pipeline and a 150 hp pump station. These facilities are sized based on the implementation of the potential Projects C-2 and C-3. If Projects C-2 and C-3 were not implemented, then the Project C-1 facilities could be reduced in size.

Project C-2

Project C-2 would extend from Project C-1 and serve 15 customers located in the City of Carpinteria. The project would require installing approximately 21,900 feet of 6 to 8-inch diameter pipeline. Project C-2 is dependent on Project C-1 being constructed.



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Carpinteria Projects

- C-1
- C-2
- C-3

Existing Recycled Water System

- Customer
- Pipeline

Other Features

- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

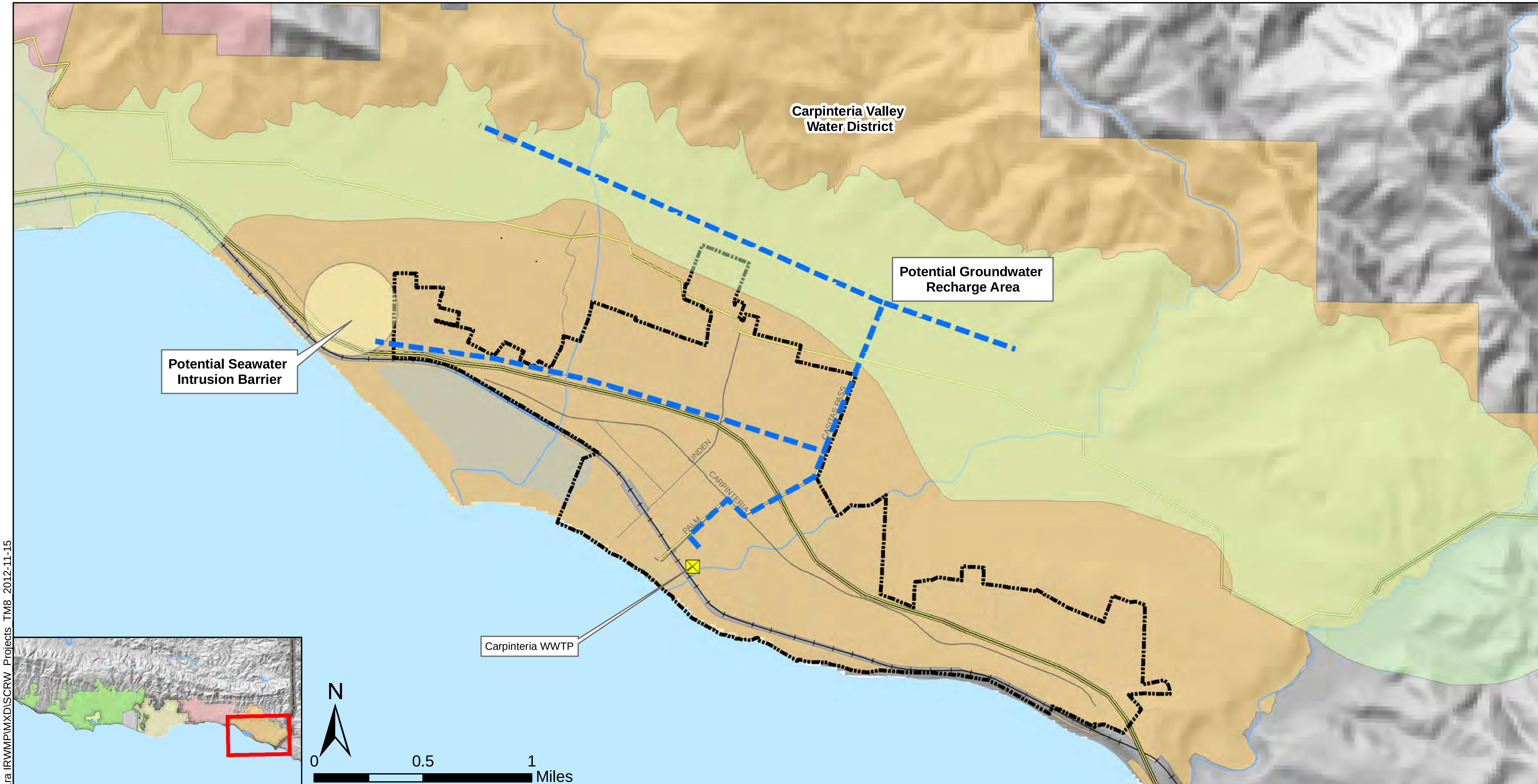
Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Recycled Water Projects: Carpinteria Area

Figure 8-6

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15



Santa Barbara County IRWMP
South Coast Recycled Water
Development Plan

RMC
Water and Environment

Carpinteria Project

Indirect Potable Reuse/Seawater Intrusion

Other Features

- WWTP
- State Highway
- US Highway
- Railroad
- City Boundary

Water Agencies

- Carpinteria Valley Water District
- City of Santa Barbara
- Goleta Water District
- La Cumbre Mutual Water Co.
- Montecito Water District

Potential Long-Term Indirect Potable Reuse Project: Carpinteria Area

Figure 8-7

L:\Projects GIS\0511-001 Santa Barbara IRWMP\MXD\SCRW_Projects_TM8_2012-11-15

Table 8-7: Potential Demands by Project – Carpinteria Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
Long-Term Projects					
C-1	CVWD_13	Recreational Open	Urban Irrigation	8	**40**
	CVWD_14	Park	Urban Irrigation	10	
	CVWD_19	Commercial	Industrial/Commercial	22	
C-2	CVWD_1	Hotel	Industrial/Commercial	8	**80**
	CVWD_12	School	Industrial/Commercial	4	
	CVWD_15	School	Industrial/Commercial	6	
	CVWD_16	Hotel	Industrial/Commercial	6	
	CVWD_17	Hotel	Industrial/Commercial	2	
	CVWD_18	Hotel	Industrial/Commercial	7	
	CVWD_2	Orchard, Irrigated	Urban Irrigation	6	
	CVWD_20	Commercial	Industrial/Commercial	2	
	CVWD_27	Parks	Urban Irrigation	2	
	CVWD_28	Parks	Urban Irrigation	2	
	CVWD_29	Recreational Open	Urban Irrigation	2	
	CVWD_3	Hotel	Industrial/Commercial	8	
	CVWD_5	Irrigated Farm	Urban Irrigation	5	
	CVWD_7	Commercial	Industrial/Commercial	14	
	CVWD_9	Industrial	Industrial/Commercial	6	
C-3	C1	Avocado	Agriculture	76	**691**
	C10	Avocado	Agriculture	34	
	C103	Avocado	Agriculture	14	
	C111	Avocado	Agriculture	13	
	C116	Avocado	Agriculture	13	
	C121	Avocado	Agriculture	12	
	C122	Avocado	Agriculture	12	
	C123	Avocado	Agriculture	12	
	C128	Avocado	Agriculture	12	
	C136	Park / Sports Field	Agriculture	11	
	C137	Avocado	Agriculture	11	
	C139	Avocado	Agriculture	11	
	C149	Avocado	Agriculture	10	
	C17	Avocado	Agriculture	30	
	C179	Avocado	Agriculture	8	
	C201	Avocado	Agriculture	7	
	C202	Avocado	Agriculture	7	
	C208	Horse Facilities / Pasture	Agriculture	7	

Table 8-7: Potential Demands by Project – Carpinteria Area

Project No.	Customer ID	Customer Name	Customer Type	Demand (AFY)	Total Demand (AFY)
	C23	Avocado	Agriculture	26	
	C250	Avocado	Agriculture	6	
	C27	Avocado	Agriculture	25	
	C271	Avocado	Agriculture	5	
	C273	Avocado	Agriculture	5	
	C29	Avocado	Agriculture	25	
	C31	Avocado	Agriculture	24	
	C36	Avocado	Agriculture	23	
	C37	Avocado	Agriculture	23	
	C42	Avocado	Agriculture	21	
	C43	Lemons	Agriculture	21	
	C46	Avocado	Agriculture	20	
	C48	Avocado	Agriculture	20	
	C62	Avocado	Agriculture	18	
	C64	Avocado	Agriculture	18	
	C75	Avocado	Agriculture	16	
	C87	Avocado	Agriculture	15	
	C88	Avocado	Agriculture	15	
	C9	Avocado	Agriculture	35	
	C90	Avocado	Agriculture	15	
	C93	Avocado	Agriculture	15	
Total Long-Term Demand (AFY)					**811**
Long-Term Options					
C-IPR	Potential Seawater Intrusion Barrier			Unk.	**1,523**[1]
	Potential Groundwater Recharge			Unk.	

Notes:

1. Actual demands for the Indirect Potable Reuse options are not known. Total demand shown is based on maximizing reuse from the average daily flow of the Carpinteria WWTP (1.6 MGD).

Table 8-8: Identified Distribution Needs by Project – Carpinteria Area

Project No.	Pipeline		Pump Station		Storage Capacity Needed (MG)
	Diam. (in)	Length (ft)	No.	Size (hp)	
Long-Term Projects					
C-1	10	3,600	1	150	1.4
C-2	6-8	21,900	0	0	0.0
C-3	6-8	24,000	0	0	0.0
Total Long-Term	**6-10**	**49,500**	**1**	**150**	**1.4**
Long-Term Option					
C-IPR[1]	10	34,200	1	100	0.0

Notes:

1. Project C-IPR includes two injection wells under pump station.

Project C-3

Project C-1 would extend from Project C-2 and proposes to serve 39 identified agricultural customers outside the City of Carpinteria. The project would require installing approximately 21,900 feet of 6 to 8-inch diameter pipeline. Project C-3 is dependent on Projects C-1 and C-2 being constructed. If the identified agricultural customers are served recycled water, then the Carpinteria WWTP would have to upgrade to MF/ RO treatment levels to reduce salinity levels to meet the potential agricultural customer's water quality needs.

Project Option - Indirect Potable Reuse/Seawater Intrusion

The Indirect Potable Reuse/Seawater Intrusion Project is an optional project that the CVWD is currently exploring. This option would consist of advanced treatment (MF/RO) to be able to provide recycled water for either a seawater intrusion barrier and/or for groundwater recharge. Seawater intrusion is suspected at the west end of the City of Carpinteria but needs to be confirmed with additional monitoring in the area. If seawater intrusion is occurring in the area threatening groundwater supplies, then a seawater intrusion barrier using recycled water would be an effective means of mitigation.

The groundwater recharge option could be accomplished by either surface spreading or by direct injection. The CVWD has been exploring several options for further utilizing the Carpinteria Groundwater Basin, including groundwater storage and banking, in-lieu recharge in conjunction with Lake Cachuma and SWP deliveries, and aquifer storage and recovery (ASR) systems. Recycled water could also be part of any one of these groundwater strategies. Increased use of the Carpinteria Basin would involve agriculture/growers and other possible stakeholders. More modeling is needed to better quantify how much the Carpinteria Basin could be used for all the stakeholders and to test various groundwater management plans. According to its 2010 Urban Water Management Plan, the District plans to formally evaluate groundwater banking in the Carpinteria Basin in future. Additional hydrogeologic studies are necessary to determine the best options and methods, including how recycled water could be part of the District's future groundwater strategies.

As part of this plan, a conceptual project (see **Figure 8-7**) was developed that would provide advanced treated recycled water to both the potential seawater intrusion barrier and the groundwater recharge projects. Such a project would require installing approximately 34,200 feet of 6-inch diameter pipeline, injection wells for the seawater intrusion barrier, and either on-site improvement for surface spreading groundwater recharge facilities or injection wells. For this conceptual project, the entire secondary flow (1.6 MGD) from the Carpinteria WWTP was assumed to be available. Assuming a combined recovery rate of 85% for the MF/RO process, this would yield an average of 1,523 AFY of advanced treated recycled water. While producing high quality water, MF/RO processes also produce a brine-concentrate stream, which would require disposal to the ocean via the Carpinteria WWTP's existing ocean outfall. A separate or amended ocean discharge permit would be required for such a project. Additional groundwater studies and evaluations of the seawater intrusion and groundwater recharge options are needed to further advance these conceptual projects. Such studies would include determining how much recycled water could be used, the facilities required, hydrogeologic constraints, injection/spreading facility needs, and other infrastructure needs.

Streamflow Augmentation of Carpinteria Creek

As discussed in **Chapter 5**, recent concerns related to water flows and water quality impacting steelhead trout have been discussed. The option of treating and conveying recycled water from the Carpinteria WWTP has been considered at a conceptual level only. No further analysis of this conceptual project was developed under this plan as there are several challenges related to implementing such a project, including regulatory and cost/benefits that need to be further explored.

8.3 Cost Criteria

This section describes the cost estimating basis and assumptions used to develop order of magnitude cost estimates of the potential projects and options developed in the south coast subregion.

8.3.1 Cost Estimate Class

The cost estimates shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, are prepared for guidance in project evaluation and implementation and used information available at the time of this plan. The final costs of the projects and resulting feasibility analyses will depend on a variety of factors, including but not limited to, actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personal, engineering, and construction phases. Therefore, the final project costs will vary from the estimates developed in this document. Because of these factors, project feasibility, benefit cost/ratios, alternative evaluations, project risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure project evaluation and adequate funding.

Unit costs presented in this plan are generally order of magnitude. Based on the American National Standards Institute Standard Z94.0, an order-of-magnitude estimate is made without detailed engineering data.

8.3.2 Cost Contingencies and Factors

Implementation Factors

Cost factors are included to try to capture all of the anticipated capital costs associated with the implementation of the project. While these costs can vary greatly from project to project and from component to component, it is most common to assume a standard factor on the estimated construction costs across all projects and project types when analyzing alternatives and project options. In addition, it is necessary to allow for many uncertainties associated with conceptual level project definitions by applying appropriate contingencies. The following defines the typical efforts and factors for these additional services and contingencies:

- Planning, environmental documentation, and permits
- Engineering services (pre-construction)
- Engineering services during construction
- Construction management and inspection
- Legal and administrative services

- Field detail allowance
- Market adjustment factors

Due to the variability in project types, a wide range of costs is likely to exist. In addition, the services may vary from project to project depending on a variety of factors, including project complexity and need. Estimation of implementation costs could vary from as low as 25 percent of the estimated project construction cost to as high as 85 percent. For this plan, a factor of 25 percent of the estimated project construction costs is used to account for these additional services.

Project Contingency

Project or program contingencies are defined as unknown or unforeseen costs. In general, higher contingencies should be applied to projects of high risk or with significant unknown or uncertain conditions. Such unknown and risk conditions for construction cost estimates could include project scope, level of project definition, occurrence of groundwater and associated dewatering uncertainties, unknown soil conditions, unknown utility conflicts, etc. For planning studies, typical project contingencies can range between 20 and 50 percent for construction cost estimates. As most of the project costs involve pipelines, which tend to have less variability in costs and uncertainties than other types of infrastructure, for this plan, an additional 30 percent for contingencies is applied to the construction and implementation cost estimates based on order of magnitude level estimates. Because of the uncertainty in need and high variability in cost from one area to another, no land acquisition costs have been included in these estimates. Land acquisition needs are typically considered in a more detailed study of specific projects.

8.3.3 Unit Costs and Assumptions

For this plan, unit costs were developed for the most common facility improvement needs for recycled water projects as shown in **Table 8-9**. Unit costs were developed based on local information provided by the involved agencies or taken from recent southern California recycled water studies completed by RMC.

Treatment

As noted previously, treatment costs for several facilities were either provided by agencies or based on previous reports. Where no specific facility information was provided or no recent information was available, unit costs for upgrading from secondary to tertiary or to advanced treatment were used.

Pipelines

The GWD provided capital costs for 6” ($150/LF) and 12” ($180/LF) recycled water pipelines, which include the cost of materials, labor, planning/implementation, and contingencies. GWD unit costs were used for all projects in the south coast subregion.

Unit construction costs for pipelines were also provided in the City of Santa Barbara’s 2009 Water Supply Study. These costs were for 2 to 8-inch diameter pipelines. GWD’s pipeline costs were also used for the Santa Barbara projects and options since GWD’s cost information was more recent and slightly more conservative than the City’s 2009 Study.

A peaking factor of 2.0 was applied to all users (except the IPR option) to account for system wide peaking flow needs.

Pump Stations

A unit cost of $6,500 per horsepower (hp) based on peak flow was used to estimate pump station costs. This is based on RMC estimates from recent recycled water facilities plans.

Storage

A unit cost of $2 per gallon based on peak flow demand was used to estimate storage costs. Storage capacity needs for new projects was estimated as being the total volume of the maximum day demand for all users in each area where no previous storage capacity information was available. This is based on RMC estimates from recent recycled water facilities plan.

Table 8-9: Capital Projects Unit Costs[1]

Item	Unit Cost	Units/Notes
Treatment		
Title 22 (Tertiary and Disinfection)	$5.40	per gallon (capacity)
Advanced (MF/RO and Disinfection)	$6.50	per gallon (capacity)
Pipelines		
6-inch diameter	$150	per LF
8-inch diameter	$160	per LF
12-inch diameter	$180	per LF
Pump Stations	$6,500	hp (based on peak flow)
Storage	$2	per gallon
Injection Well	$1 M	per well
Project Financing		
Interest Rate	6.0%	
Payback Period	30	Years

Notes:

1. Capital costs include estimated costs for construction, implementation (planning, engineering, permitting, etc.) and contingency (30%). No land acquisition costs are included in these estimates.

Injection Well Costs

A unit cost of $1 million per injection well was assumed. For recharge via surfacing spreading, $500,000 was assumed to account for potential on-site improvement needs. These costs could vary greatly depending on the type of recharge needing, actual well depths, onsite improvement needs, etc. As noted above, no land acquisitions costs were included with the injection well cost estimates.

8.4 Estimated Project Costs

Estimated costs for each potential project and option are shown in **Table 8-10** through **8-14** below. These tables illustrate the order of magnitude of effort for implementing the various projects. Capital and unit costs vary greatly due to a variety of factors including local conditions, project scale, and rehab or expansion of existing systems versus completely new recycled water systems. Therefore, each agency will need to determine the benefits and costs of the potential projects to its own water resource needs and other circumstances, as comparison of projects between areas has limited value

Table 8-10: Summary of Estimated Potential Project Costs[1] – Goleta Area

Project No.	Potential Demand (AFY)	Facility Capital Costs				Estimated Capital Costs	$/AF[2]
		Treatment	Pipeline	Pumping	Storage		
Near-Term Projects							
Existing System Improvements	785[3]	-	$775,000[4]	$474,000[5]	$2,500,000[6]	$3,749,000	N/A
G-1 through G-6	26	-	-	-	-	-	N/A
Total Near-Term	**812**	**-**	**$775,000**	**$474,000**	**$2,500,000**	**$3,749,000**	**$300**
Long-Term Projects							
Overall System Improvements	N/A	-	-	$2,925,000[7]	-	$2,925,000	N/A
G-8	11.5	-	$1,410,000	-	-	$1,410,000	$8,900
G-9	0.4	-	$86,000	-	-	$86,000	$15,600
G-10	2.0	-	$6,000	-	-	$6,000	$200
G-11	1.0	-	$23,0000	-	-	$23,000	$1,700
G-12	4.9	-	$600,000	-	-	$600,000	$8,900
G-13	38.2	-	$3,708,000	-	-	$3,708,000	$7,100
Total Long-Term	**58**	**-**	**$5,833,000**	**$2,925,000**	**-**	**$8,758,000**	**$11,000**
Total (Near + Long-Term)	**870**	**-**	**$6,608,000**	**$3,399,000**	**$2,500,000**	**$12,507,000**	**$1,000**

Notes:

1. Estimated costs include constructions costs and markups for implementation (planning, engineer, etc.) and contingencies.
2. $/AF is the capital unit costs and does not include any operations and maintenance costs.
3. Annual demand for the existing system improvements is based on GWD's current recycled water demands.
4. Includes the Recycled Waterline Relocation Project at Goleta Beach and the Corrosion Protection and Pipeline Replacement Project.
5. Includes the Recycled Water Booster Station Electrical Upgrades at the Goleta WWTP.
6. Includes the 1 Million Gallon Water Reservoir Project.
7. Includes Recycled Water Hollister Booster Station Relocation Project, Recycled Water Pressure Reducing Vault Relocation at Glen Annie Golf Course, and Cathedral Oaks Road / Highway 101 Overcrossing Project.

Table 8-11: Summary of Estimated Potential Project Costs[1] – Santa Barbara Area

Project No.	Potential Demand (AFY)	Facility Capital Costs				Estimated Capital Costs	$/AF[2]
		Treatment	Pipeline	Pumping	Storage		
Near-Term Projects							
Existing System Improvements	850[3]	$15,440,000[4]	-	-	-	$15,440,000	$1,300
SB-1 through SB-6	21	-	-	-	-	-	-
SB-7	20	-	$660,000	-	-	$660,000	$2,400
Total Near-Term	**891**	**$15,440,000**	**$660,000**	**-**	**-**	**$16,100,000**	**$1,300**
Long-Term Projects							
SB-8	15	-	$645,000	-	-	$645,000	$3,100
SB-9	15	-	$480,000	-	-	$480,000	$2,300
SB-10	41	-	-	-	-	-	-
SB-11	116	-	$3,780,000	$130,000	-	$3,910,000	$2,400
SB-12	10	-	$405,000	-	-	$405,000	$2,900
SB-13	9	-	$180,000	-	-	$180,000	$1,500
SB-14	11	-	$600,000	$65,000	-	$665,000	$4,400
SB-15	15	-	-	-	-	-	-
Total Long-Term	**232**	**-**	**$6,090,000**	**$195,000**	**-**	**$6,285,000**	**$2,000**
Total (Near + Long-Term)	**1,123**	**$15,440,000**	**$6,750,000**	**$195,000**	**-**	**$22,385,000**	**$1,400**
Long-Term Options							
SB-Option 1	139	-	$225,000	-	-	$225,000	$100
SB-Option 2	127	-	$600,000	-	-	$600,000	$300
Total Long-Term Options	**266**	**-**	**$825,000**	**-**	**-**	**$825,000**	**$200**
Total (Near + Long-Term + Options)	**1,389**	**$15,440,000**	**$7,575,000**	**$195,000**	**-**	**$23,210,000**	**$1,200**

Notes:

1. Estimated costs include constructions costs and markups for implementation (planning, engineer, etc.) and contingencies.
2. $/AF is the capital unit costs and does not include any operations and maintenance costs.
3. Annual demand includes the City's current recycled water user demands but does not include 300 AFY of internal plant process water demand.
4. Includes the process upgrades at the El Estero WWTF

Table 8-12: Summary of Estimated Potential Project Costs[1] – Montecito Area

Project No.	Potential Demand (AFY)	Facility Capital Costs				Estimated Capital Costs	$/AF[2]
		Treatment	Pipeline	Pumping	Storage		
Long-Term Projects							
M-1	139	$1,340,000[3]	$272,000	$650,000	$2,100,000	$4,362,000	$2,300
M-2	449	$4,330,000[4]	$5,583,000	$325,000	-	$10,238,000	$1,700
Total Long-Term from Montecito WWTF	**587**	**$5,670,000**	**$5,855,000**	**$975,000**	**$2,100,000**	**$14,600,000**	**$1,800**
M-3	15	$910,000[5]	$270,000	$65,000	-	$1,245,000	$6,000
Total Long-Term from Summerland WWTP	**15**	**$910,000**	**$270,000**	**$65,000**	**-**	**$1,245,000**	**$6,000**
Long-Term Options							
M-Option 1	35	-	$1,725,000	$65,000	$200,000	$1,990,000	$4,100
M-Option 2	56	-	$1,425,000	$65,000	$200,000	$1,690,000	$2,200
Total from Summerland WWTP (Long-Term + Option 2)[6]	**71**	**$910,000**	**$1,695,000**	**$130,000**	**$200,000**	**$2,935,000**	**$3,000**
Total Long-Term for Montecito Area	**659**	**$6,580,000**	**$7,550,000**	**$1,105,000**	**$2,300,000**	**$17,535,000**	**$1,900**

Notes:

1. Estimated costs include constructions costs and markups for implementation (planning, engineer, etc.) and contingencies.
2. $/AF is the capital unit costs and does not include any operations and maintenance costs.
3. Estimated cost to upgrade treatment plant to serve tertiary treated recycled water
4. Estimated cost to upgrade treatment plant to serve advanced treated recycled water
5. Estimated cost to upgrade treatment plant to serve tertiary treated recycled water for 70 AFY
6. M-Option 1 and M-Option 2 are mutually exclusive. M-Option 2 was chosen since it had a lower unit cost.

Table 8-13: Summary of Estimated Potential Project Costs[1] – Carpinteria Area

Project No.	Potential Demand (AFY)	Facility Capital Costs				Estimated Capital Costs	$/AF[2]
		Treatment	Pipeline	Pumping	Storage		
Long-Term Projects							
C-1	40	$390,000[3]	$612,000	$975,000	$2,900,000	$4,877,000	$8,900
C-2	80	$770,000[3]	$3,396,000	-	-	$4,166,000	$3,800
C-3	691	$8,250,000[4]	$3,700,000	-	-	$11,940,000	$1,300
Total Long-Term	**811**	**$9,410,000[4]**	**$7,708,000**	**$975,000**	**$2,900,000**	**$20,993,000**	**$1,900**
Long-Term Options							
C-IPR[5]	1,523	$10,400,000	$5,814,000	$650,000	-	**$18,864,000**	**$900**

Notes:

1. Estimated costs include constructions costs and markups for implementation (planning, engineer, etc.) and contingencies. These costs are intended present order of magnitude level unit costs so that some level of prioritization of costs may be utilized by future project planning efforts.
2. $/AF is the capital unit costs and does not include any operations and maintenance costs.
3. Estimated cost to upgrade treatment plant to serve tertiary treated recycled water
4. Estimated cost to upgrade treatment plant to serve advanced treated recycled water
5. Estimated cost includes two injection wells for seawater intrusion and on-site improvements for groundwater recharge facilities

Table 8-14: Summary of Estimated Potential Project Costs[1] – All Areas

Project Area	Potential Demand (AFY)	Facility Capital Costs				Estimated Capital Costs	$/AF[2]
		Treatment	Pipeline	Pumping	Storage		
Near-Term Projects							
Goleta Area[3]	812	-	$775,000	$474,000	$2,500,000	$3,749,000	$300
Santa Barbara Area[3]	891	$15,440,000	$660,000	$0	-	$16,100,000	$1,300
Total Near-Term	**1,703**	**$15,440,000**	**$1,435,000**	**$474,000**	**$2,500,000**	**$19,849,000**	**$800**
Long-Term Projects							
Goleta Area	58	-	$5,833,000	$2,925,000	-	$8,758,000	$11,000
Santa Barbara Area (Includes SB-Option 1)	371	-	$6,315,000	$195,000	-	$6,510,000	$1,300
Montecito (Includes M-Option 2)	659	$6,580,000	$7,550,000	$1,105,000	$2,300,000	$17,535,000	$1,900
Carpinteria	811	$9,410,000	$7,708,000	$975,000	$2,900,000	$20,993,000	$1,900
Total Long-Term	**1,899**	**$15,990,000**	**$27,406,000**	**$5,200,000**	**$5,200,000**	**$53,796,000**	**$2,100**
Total (Near + Long-Term)	**3,602**	**$31,430,000**	**$28,841,000**	**$5,674,000**	**$7,700,000**	**$73,645,000**	**$1,500**

Notes:

1. Estimated costs include constructions costs and markups for implementation (planning, engineer, etc.) and contingencies.
2. $/AF is the capital unit costs and does not include any operations and maintenance costs.
3. Near-term project demands also include existing system user demands but do not include 300 AFY of internal plant process water demand.

8.5 How Projects Benefit the Region (Regional Summary)

As part of the Santa Barbara Integrated Regional Water Management Plan 2013 (IRWM Plan 2013), the region has a collective goal of serving an average of 7,035 AFY by 2035. Of that total, 2,293 AFY is expected to be recycled water from the south coast subregion. To reach this goal, Goleta plans to expand to 870 AFY from its current use of 785 AFY and the City of Santa Barbara plans to expand from 1,150 AFY to 1,423 AFY, including 300 AFY of internal plant process water demand. This target could be surpassed if the Montecito or Carpinteria areas are able to move forward with implementation of their potential reuse projects.

Recycled water projects provide a variety of benefits to individual agencies, the south coast subregion of Santa Barbara County, and Santa Barbara County as a whole. Benefits can be identified by the performance measures and the objectives achieved by the projects. The Santa Barbara County IRWM Plan 2013 has identified eight regional objectives of which recycled water projects achieve five of those objectives. These benefits are identified to illustrate some of the considerations that would be part of a complete benefit-cost analysis for decision-making purposes by each agency when considering a project.

Recycled water projects benefit the region by developing and maintaining a diversified mix of water resources, augmenting supplies by using recycled water for landscaping or other non-potable uses, improving wastewater quality, utilizing technology to manage waste in an economical and environmentally sustainable manner, reducing wastewater discharges into the ocean, maintaining and enhancing water and wastewater infrastructure efficiency and reliability, planning for and developing infrastructure for disadvantaged communities, and helping the region plan and adapt to climate change. **Table 8-15** below indicates which objectives from the IRWM Plan 2013 and their applicable performance measures each project achieves.

The potential IRWMP objectives and their applicable performance measures that can be achieved by the proposed recycled water projects include the following:

- Protect, Conserve, and Augment Supplies
  - Reuse wastewater as measured by the volume of new water (acre-feet per year)
  - Create/rehabilitate facilities that augment water supply as measured by the number of facilities impacted by the project
- Protect and Improve Water Quality
  - Meet water quality objectives in Basin Plan
  - Reduce salt/nutrient loading to the basin
  - Reduce wastewater discharged to the ocean (or streams) as measured volume of water reused (acre-feet per year)
- Maintain and Enhance Water and Wastewater Infrastructure Efficiency and Reliability
  - Implement reliability improvements to customers within water and wastewater agency service areas as measured by the number of customers impacted by the improvements and the number of new infrastructure improvements
- Plan for and Adapt to Climate Change
  - Achieve previously listed objectives, along with other regional objectives such as increasing groundwater storage, conserving, preserving, protecting, and restoring habitat, conserving water, and restoring surface storage in order to address climate change.
- Equitable distribution of benefits as measured by new planning or implementation projects, the volume of water recycled, and the number of new infrastructure improvements
  - Support planning and increased recycled water use in Disadvantaged Communities (DACs)

Table 8-15: IRWM Objectives and Performance Measures by Project

Project Area and No.	IRWMP Objectives							
	Protect, Conserve, and Augment Supplies		Protect and Improve Water Quality			Maintain and Enhance Water and Wastewater Infrastructure Efficiency and Reliability	Plan for and Adapt to Climate Change	Ensure Equitable Distribution of Benefits
	Performance Measures							
	Reuse Waste-water	Create/Rehab Facilities that Augment Water Supply	Meet Water Quality Objectives in Basin Plan	Reduce Salt/Nutrient Loading to the Basin	Reduce Wastewater Discharged to the Ocean	Implement Reliability Improvements	TBD	Support Planning and Increased Recycled Water use in DACs
Goleta Area								
Near-term								
Exist. Sys. Improvements	✓	✓	✓		✓	✓	✓	
G-1	✓	✓	✓		✓	✓	✓	
G-2	✓	✓	✓		✓	✓	✓	
G-3	✓	✓	✓		✓	✓	✓	
G-4	✓	✓	✓		✓	✓	✓	
G-5	✓	✓	✓		✓	✓	✓	
G-6	✓	✓	✓		✓	✓	✓	
G-7	✓	✓	✓		✓	✓	✓	
Long-term								
G-8	✓	✓	✓		✓	✓	✓	✓
G-9	✓	✓	✓		✓	✓	✓	✓
G-10	✓	✓	✓		✓	✓	✓	
G-11	✓	✓	✓		✓	✓	✓	
G-12	✓	✓	✓		✓	✓	✓	
G-13	✓	✓	✓		✓	✓	✓	✓ (partial)

Table 8-15: IRWM Objectives and Performance Measures by Project

Project Area and No.	IRWMP Objectives							
	Protect, Conserve, and Augment Supplies		Protect and Improve Water Quality			Maintain and Enhance Water and Wastewater Infrastructure Efficiency and Reliability	Plan for and Adapt to Climate Change	Ensure Equitable Distribution of Benefits
	Performance Measures							
	Reuse Waste-water	Create/Rehab Facilities that Augment Water Supply	Meet Water Quality Objectives in Basin Plan	Reduce Salt/Nutrient Loading to the Basin	Reduce Wastewater Discharged to the Ocean	Implement Reliability Improvements	TBD	Support Planning and Increased Recycled Water use in DACs
Santa Barbara Area								
Near-term								
Exist. Sys. Improvements	✓	✓	✓	✓	✓	✓	✓	
SB-1	✓	✓	✓		✓	✓	✓	
SB-2	✓	✓	✓		✓	✓	✓	
SB-3	✓	✓	✓		✓	✓	✓	
SB-4	✓	✓	✓		✓	✓	✓	
SB-5	✓	✓	✓		✓	✓	✓	
SB-6	✓	✓	✓		✓	✓	✓	
SB-7	✓	✓	✓		✓	✓	✓	
Long-term								
SB-8	✓	✓	✓		✓	✓	✓	
SB-9	✓	✓	✓		✓	✓	✓	
SB-10	✓	✓	✓		✓	✓	✓	
SB-11	✓	✓	✓		✓	✓	✓	✓
SB-12	✓	✓	✓		✓	✓	✓	
SB-13	✓	✓	✓		✓	✓	✓	
SB-14	✓	✓	✓		✓	✓	✓	
SB-15	✓	✓	✓		✓	✓	✓	✓
SB-Option 1	✓	✓	✓		✓	✓	✓	
SB-Option 2	✓	✓	✓		✓	✓	✓	

Table 8-15: IRWM Objectives and Performance Measures by Project

Project Area and No.	IRWMP Objectives							
	Protect, Conserve, and Augment Supplies		Protect and Improve Water Quality			Maintain and Enhance Water and Wastewater Infrastructure Efficiency and Reliability	Plan for and Adapt to Climate Change	Ensure Equitable Distribution of Benefits
	Performance Measures							
	Reuse Waste-water	Create/Rehab Facilities that Augment Water Supply	Meet Water Quality Objectives in Basin Plan	Reduce Salt/Nutrient Loading to the Basin	Reduce Wastewater Discharged to the Ocean	Implement Reliability Improvements	TBD	Support Planning and Increased Recycled Water use in DACs
Montecito Area								
M-1	✓	✓	✓		✓	✓	✓	
M-2	✓	✓	✓		✓	✓	✓	
M-3	✓	✓	✓		✓	✓	✓	✓
M-Option 1	✓	✓	✓		✓	✓	✓	
M-Option 2	✓	✓	✓		✓	✓	✓	
Carpinteria Area								
C-1	✓	✓	✓		✓	✓	✓	✓
C-2	✓	✓	✓		✓	✓	✓	
C-3	✓	✓	✓		✓	✓	✓	
C-IPR	✓	✓	✓	✓	✓	✓	✓	

Chapter 9 Findings: Constraints and Next Steps

This chapter summarizes the potential constraints to implementing recycled water projects in the South Coast Region and findings or recommendations on the next steps for implementing the identified potential projects. These findings are a summary of the results of the literature review, regulatory review, potential project identification and cost estimates, and committee meetings.

9.1 Potential Constraints

Several potential projects were identified for both the near- and long-term opportunities. These projects range from ones that are expanding existing systems to projects that were developed on a more conceptual level for the long-term. The potential projects include more traditional reuse projects, such as urban irrigation uses, as well as those that could serve agricultural demands or that would involve Indirect Potable Reuse (IPR).

Several types of constraints were discussed by the workgroup. These constraints range from user specific concerns and specific project challenges to agency and regional constraints or challenges. The constraints to each project or agency can vary depending on a variety of factors. Listed below are the identified constraints to implementing the potential recycled water projects.

9.1.1 User Constraints

- **User end water quality constraints**: Irrigation and some industrial/commercial customers face water quality challenges regarding the use of recycled water. The high Total Dissolved Solids (TDS) in the region's wastewater supplies are of particular concern, as high TDS levels can impact the growth and health of grass and landscaping plants and even limit the types of plants that can utilize recycled water. In addition, the high TDS levels are a major constraint to being able to serve recycled water to many of the agricultural users in the region. Major crops in the region include avocados, citrus, and flowers, all of which require lower limits on TDS than what is in the current recycled water levels. Other water quality parameters, such as boron, can also impact crop growth. All recycled water uses need to be considered on a project-by-project basis.
    - **Golf Courses:** During the planning process, several agencies expressed concerns about the ability of golf courses to use high TDS recycled water, which can often buildup in the soil. For many golf courses, this problem is often limited to the greens but not the fairway turf. Several strategies utilized by other agencies/courses for addressing this problem include:
        - Separate the irrigation systems between the greens and fairways
        - Modify the turf type
        - Use additional water (including potable) to periodically leach the greens
        - Install a gypsum injector in-place downstream of backflow preventer or a de-ionizer system to address sodium concerns
- **Conversion Costs**: To use recycled water, customers typically must convert a portion of their potable system to recycled water. The cost of conversion can be a major challenge to some customers depending on the extent of conversion and customer financing options. Most agencies provide some level of financial support either directly or as part of the recycled water bill. In addition, the time it takes to implement and permit such conversions can be a challenge to customers who do not have adequate staff to implement such changes. Support

by agencies for conversions can vary greatly, but some level of financial and logistical support is necessary depending on the customer type and situation.

- **Long-Term Customer Viability**: One concern agencies have when planning recycled water systems is the sustainability of potential users. Industrial/commercial users can move locations or close their business with little notice. They can also change their processes, water demand, and/or time of operation. Urban irrigation users can also change their usage based on the cost of water and drought conditions. Lastly, major water users, such as agriculture and even golf courses, can be subject to future development. Such future developments may have some level of demand for recycled water, but it is often less than the current user's demand it is replacing. Planning a recycled water system must take such future changes into account, but in many cases, the risk of serving these customers falls completely on the agency. Coordinating with city planners and providing backup options for potential lost customers could mitigate such risks.

9.1.2 Project Challenges

- **Community Impacts:** Construction of recycled water projects can result in a number of potential impacts to the community. These can stem from the construction of pipelines, pump stations, storage tanks, water reclamation plants or expansions, and onsite user conversions to recycled water. Construction impacts can include closure or disruption to streets and traffic, temporary closure or access limitations to public facilities (i.e. parks, golf courses, etc.), temporary access limitations to businesses, diversion or disruption of wastewater flows and/or process at WWTPs. Some projects may also require rights-of-way or property acquisitions, which can change or limit the future use of such properties. System start up and conversion of users can also create logistical challenges that can impact the potential reuse customers. These impacts must be considered as part of the planning, design, environmental documentation, system startup, and customer conversion processes.

- **Timing/Phasing:** Implementation of recycled water projects presents many challenges, including the timing and phasing of a project. Public and political support, along with financing availability, are major concerns for implementing recycled water projects. Agencies must be prepared to move quickly when there is support for implementation of such projects. To capitalize on the timing, agencies must have already established plans for implementing their projects such that the environmental documentation and design phases can be started as soon as financing and public support are in place. Phasing of projects is one way to reduce the scope of a project so that portions of the project can be implemented quickly. However, the cost/benefits of building only part of a system must also be considered.

- **System Hydraulics:** Many of the existing and potential projects identified in the region have customers who will use water during nighttime hours. This practice requires agencies to address the problems of high peak demand that can require storage and pumping facilities. The infrastructure needs and cost of meeting peak demands is a constant challenge for many recycled water systems. Reducing peak demand use could reduce the size or even eliminate some infrastructure needs and therefore reduce the overall capital costs. Options for addressing these problems include user-end onsite storage and peak demand management measures.

- **Wastewater flows:** For many agencies in the region, the potential peak season demand exceeds the projected average daily wastewater flows. Therefore, some potential projects may be limited in their ability to expand beyond the projects identified in this plan. Although there are several communities on septic systems in the region, their small flows would contribute minimally if added to the wastewater flows of most plants. Supplementing a recycled water system with non-potable groundwater or raw surface waters is one way to further extend recycled water systems and could utilize wastewater flows beyond the average day flow levels.

- **Regulatory:** For most of the potential projects, the regulatory statutes (Title 22) are relatively straightforward to address. However, future regulations and the potential need to utilized future technologies can present a challenge to project implementation and create uncertainty in the decision-making process. For IPR projects, the regulatory challenges can be significant and would require several years to address. As discussed in Chapter 3, this includes the State Water Resources Control Board's recent requirements for monitoring of constituents of emerging concern (CECs) as part of the permitting requirements for IPR projects.

9.1.3 Agency Challenges

- **Feasibility of Projects:** Substantial economic cost/benefit analyses should be performed when determining the feasibility of potential recycled water projects. Many recycled water projects have unique challenges, including cases with high capital costs relative to the potential demand being served or high capital costs for initial phases. Therefore, it is important when evaluating the feasibility of recycled water projects that all the direct and secondary benefits be considered in comparison to the costs. The benefits of recycled water include local water supply reliability, reduced dependence on unreliable imported water supplies, drought-proof water supplies (both at agency and customer benefit levels), and avoided wastewater discharge costs.

- **Financing of Projects:** An agency's ability to finance the capital expenditures of a recycled water project can be a major challenge. Cost-sharing arrangements with other agencies could be used to help agencies with limited financing capacity. In addition, external funding sources at State and Federal levels could assist with the financing of projects. Once potential projects have been identified and are ready for implementation, it is critical that agencies determine the financing vehicle(s) to be used and whether external funding is necessary.

- **Health Concerns over Recycled Water Quality:** Although the potential projects meet the State's current and known future regulatory requirements, there were still some concerns raised during the planning process of this study that focused on the potential occurrence of pathogens and constituents of emerging concern (CECs) in recycled water. Additional concerns were raised over the potential spread of antibiotic resistance bacteria through recycled water. Current State regulations regarding the treatment and disinfection of recycled water are designed to eliminate all bacteria as well as the smaller viruses and pathogens that occur in wastewater. While additional treatment is not likely to have any additional benefits in addressing these concerns, micro-, ultra-, or nanofiltration and/or reserve osmosis treatment processes could also be utilized to reduce the bacterial and pathogens in the recycled water prior to final disinfection.

  The State regulations are designed to meet public health safety requirements based on type of use. If State regulations were to change, then existing and potential future projects would likely be required to meet any new regulations, including any additional treatment requirements. Recycled water has been widely used in the cities of Santa Barbara (22 years) and Goleta (19 years), and both systems meet current State requirements. In general, the public in these areas have not expressed concerns over the public health and safety of the recycled water. In addition to ongoing public awareness programs, both agencies have conducted education campaigns to support the implementation of their on-going projects. Public education and awareness campaigns are an important part of the implementation process for recycled water projects and should be conducted early in the planning phases. If recycled water expands to other areas or to different use types, such as agriculture or IPR, a more regional public awareness and education program could also be considered as regional efforts may provide more collective support than individual agency efforts.

- **Customer Acceptance**: While most customers are typically willing to convert to recycled water because of economic incentives, drought-proof supply benefits, and/or the environmental benefits, some customers may resist. Reasons for such concerns include the cost of conversion (as discussed above), concern over public health, and the impacts of water quality on the applied use. As discussed elsewhere, the costs and water quality concerns can typically be mitigate by the agency. In addition, a city or agency can adopt a mandatory use policy that further defines the policies regarding the use of recycled water and potential consequences for non-compliance. This is supported by California law under the California's Porter-Cologne Water Quality Control Act (Section 13551), which states that potable water shall not be used if recycled water is made available and is considered a "reasonable beneficial use" in lieu of potable water. Many agencies have already adopted such language and will use such policies as a last resort with customers who refuse to convert or hook up to recycled water systems when they are made available.
- **Existing System Conditions and Improvements:** As discussed previously, both the Goleta Water District and the City of Santa Barbara have existing recycled water systems needing major improvements. It is essential that these improvements be made to restore their existing systems and to allow for future expansions. Recycled water systems have relatively high lifecycle costs, and similar to water and wastewater systems, agencies must plan for regular maintenance and capital improvements of their recycled water systems to ensure that they can function continuously. These improvements need to be included in future capital improvement plans as part of an agency's budget cycle process to ensure the system is functional and meeting customer needs. As more users are added to a system, it becomes more critical that such systems are well maintained and operated effectively to ensure customer satisfaction. A reliable system will also increase public acceptance to recycled water.

9.1.4 Regional Challenges

- **Institutional:** All the region's treatment plants discharge to the ocean wastewater that does not meet Title 22 recycled water treatment levels. Therefore, implementation of new recycled water projects must include treatment improvements to meet Title 22 and any customer-level water quality needs. As only water retail agencies can typically recoup these costs through the sale of recycled water, the water agencies must coordinate and establish agreements with the corresponding wastewater agency, which typically take the lead the wastewater treatment improvement needs and subsequent O&M. Such agreements must take into account the entire benefit/costs of the project to ensure that all parties' economic and financial needs are addressed. These include both capital and maintenance O&M costs. Potential projects needing advanced treatment will have higher capital and operation and maintenance costs compared to tertiary treatment levels and will produce a brine-concentrate stream that requires disposal. Brine-concentrate disposal is typically done via an ocean outfall and requires a separate or revised wastewater discharge permit by the wastewater agency. In some cases, a wastewater agency may have substantial drivers or interest in implementing a recycled water project, while the corresponding water agency remains uninterested. In these cases, the wastewater agency can take a lead role in the implementation of such a project, but agreements with the water agency must developed early in the planning process to account for revenue and other impacts to the water agency.

In addition, multiple water agencies have been identified for some potential projects, notably the City of Santa Barbara options to serve the La Cumbre County Club and the Santa Barbara Cemetery, which are both located outside the City of Santa Barbara's water service area. A variety of options can be used to address such issues, but all require that the project participants work together to identify and address the potential issues and to ensure that there is political and community support behind the effort to implement such projects. Where new agreements are necessary, agencies should address not only the short-term project, but where practical, address the long-term project as well.

- **Large Agricultural Demands:** The region has a significant agriculture sector, and as discussed earlier, there are some significant water quality constraints that need to be addressed in order to serve recycled water to these users. In addition, most of the agricultural demands use low cost groundwater or untreated surface waters (local and imported). Therefore, the financial challenges of implementing a recycled water system to serve these users would need to be ameliorated. Subsidizing the cost of a recycled water supply in agricultural areas is common for some water agencies, but the high cost to treat and deliver such water makes it especially challenging in this region. One potential benefit to serving recycled water to the agricultural users would be the value of groundwater or surface water that might be made available to a water agency in exchange for the recycled water should be considered. There is also value in drought-proof water supplies to agriculture users, the water agency, and the entire region, and this benefit should be considered when assessing the overall feasibility of such projects. In addition to most of the region's agricultural users, the two large golf courses in the Montecito area are currently using groundwater to meet over 90% of their water demands. The economic and logistical constraints of serving these customers must be addressed if recycled water is to be utilized by these customers.
- **External Funding**: The region does not currently have any external funding mechanisms in place. Implementation of many of the potential projects may require external funding, which could come from State or Federal sources.

9.2 Next Steps

The following summarizes the findings and recommended steps at both a regional and area (or agency) level and are based on the implementation needs of the identified potential projects and the constraints noted above.

- **Assessment of Regional Water Value**: To supplement local water supplies, the region relies on the State Water Project (SWP), which has become increasingly less reliable over the years due to periodic drought conditions and recent cutbacks in deliveries for environmental needs. One of the goals of the region is to not be fully dependent on the SWP and to improve the region's supply reliability. Implementation of a recycled water project by one agency does provide regional benefit in terms of supply reliability. The economic value of the identified potential reuse projects should be considered in context of the benefits it provides to the individual agency as well as the regional community. Sustained drought conditions could be greatly mitigated by maximizing the reuse potential in the region. Many agencies are required to meet the State's 20% conservation level by 2020, and recycled water can be a component towards meeting those requirements.

  To support the decision-making process, the value of recycled water to the region as a whole, along with other conservation measures, needs to be more fully assessed by the water agencies on a regional basis. The benefit-cost comparison of recycled water on a regional level should be compared with other options, including increased conservation and additional or alternative water supplies such as seawater desalination. Increased use of recycled water could allow some agencies to reduce their imported water demand during some years. Such a surplus could be banked in groundwater basins or sold to other agencies on the SWP system, which could be used to help finance recycled water, conservation, or other local water supply projects. Lastly, the value of offsetting groundwater use with recycled water for golf courses and agricultural users that use well water should be evaluated. A comprehensive analysis of water supply reliabilities along with the costs and benefits of the potential recycled water projects should be conducted to assess the full value of the potential projects to agencies and to the region.

One of the economic benefits of recycled water is the avoided costs in terms of wastewater disposal and water supplies. As part of such a regional assessment, the avoided costs from implementing recycled water projects needs to be more fully identified and evaluated. Avoided costs and benefits can be at the user, agency, and regional level.

- Avoided costs and benefits at the agency and regional level include:
  - Avoided wastewater treatment Operational and Maintenance (O&M) costs
  - Avoided wastewater ocean discharge/disposal O&M costs
  - Avoided future wastewater treatment capital improvement projects
  - Deferral or avoidance additional water supply projects to meet future demands
  - Avoided loss of water usage revenues during drought or other usage cut-back periods
  - Avoided loss of economic activity/tax on businesses impacted by drought or usage cut-back
  - Lower water system distribution treatment and O&M costs
  - Reduced water system distribution system storage needs/costs
  - Environmental benefits
  - Water quality improvement benefits
  - Meeting regulatory requirements such as Basin Plan Objectives and Salt-Nutrient Management Plans
  - Meeting future climate change conditions and supply reliability needs
- Avoided costs and benefits at the customer level include:
  - Recycled water price discounts
  - Avoided loss or cut-back of water usage during drought or other usage cut-back periods
  - Avoided economic losses to businesses, such as industrial/commercial and agriculture users
  - Water quality improvements, including potentially more consistent water quality

- **Groundwater Quality Improvements**: For recycled water projects employing reverse osmosis treatment, the reduction in salts, nutrients, and other constituents of concern could provide benefits to the region, especially to groundwater basins. Such projects should be considered as possible management strategies in the development of the Salt/Nutrient Management Plans in the individual basins in the region. These projects would include both IPR and irrigation projects where reduced TDS is required to meet basin plan objectives.
- **Meeting Customer Recycled Water Quality Needs**: This recommendation addresses both regional and project-level concerns of several water-quality related constraints identified in this plan. Recommendations include:
  - **Golf Courses:** As discussed above, there are several options for dealing with water quality concerns at golf courses. These can be addressed individually, but discussions on a regional basis could also be beneficial in sharing information and ideas. Another effective approach is to have existing recycled water customers share their positive experiences and ideas with potential new customers.

- **Industrial/Commercial Customers:** Water quality concerns by industrial and commercial customers tend to be unique to each industry. Where similar types of customers exist in the region, collaboration by agencies could be beneficial. In addition, the WateReuse Association has an Industrial Customer Committee that can provide assistance and contacts to other recycled water agencies that have similar customers and can provide information on how specific issues have been addressed in other reuse systems.
- **Agricultural Users:** As noted above, recycled water with high TDS or other constituents can be a major constraint to potential agricultural recycled water users. Potential projects involving agricultural users will need more thorough assessments of the exact needs or limits of the different agricultural products and an evaluation of how to best meet these needs. Not all agriculture customers may be suited to use recycled water, so identifying the best opportunities is significant to developing feasible projects. In addition, the long-term sustainability of the agricultural products is important to ensure that recycled water systems are not built and then abandoned because of changes in agricultural business and market conditions. Having existing customers share their positive experience and ideas is also effective in helping to addressing concerns with potential new customers.

- **External Funding**: The high capital cost of many of the potential projects may necessitate the need for external funding. Currently, the State of California has funding available via the IRMW/Proposition 84 bonds as well as up to $75,000 from the State Water Resources Control Board (SWRCB) for recycled water planning studies. At the Federal level, the most common funding source is the United States Bureau of Reclamation's (USBR) Title XVI program. To be eligible for funds under this program, an agency must first be given Congressional Authorization. Once authorized, a project(s) will then need to have funds appropriated. This can occur via a direct Congressional Act or can be secured via the USBR's current WaterSMART (Sustain and Manage America's Resources for Tomorrow) grant program, which releases funds on a regular competitive basis. Appropriations under the Title XVI program can provide up to $20 million to a project or group of projects within a region. If the South Coast agencies wish to pursue and implement potential reuse projects, it is recommended that they consider starting the lobbying and planning process to become authorized under Title XVI.
- **Institutional Issues**: Several institutional issues were identified for some potential projects. As noted above, these should be addressed early in the planning process. Specifically noted projects include:
  - **La Cumbre Golf and Country Club.** The Goleta Water District (GWD), the City of Santa Barbara, and the La Cumbre Mutual Water District would need to reach agreement on service delivery arrangements, cost-sharing, revenue, and management protocol if such a project were to move forward to consideration.
  - **Santa Barbara Cemetery.** The Santa Barbara Cemetery is a customer of the Montecito Water District (MWD), which is not currently planning to implement any recycled water projects. Optional projects include serving this user from either the City of Santa Barbara or MWD. As the City's existing recycled water system is in close proximity to the Cemetery, it may be more feasible for the City to serve this customer. However, cost and water sales revenues would need to be worked out between the two agencies.
- **Indirect Potable Reuse**: For the Carpinteria area, as well as other areas that may want to consider IPR, such projects typically take 10 or more years to fully implement from initial concept planning stages. In addition to the typical reuse project planning and design work, IPR projects also require extensive groundwater analysis, modeling, testing, treatment process pilot studies, and a program to educate and address public concerns. Finally, such projects require

lengthy negotiations with the regulatory agencies, namely the California Department of Public Health (CDPH) and the Regional Water Quality Control Board (RWQCB).

- **Environmental documentation**: Many of the projects will require environmental documentation. Depending on the timing and overlap, multiple projects could be included in one environmental documentation effort or a programmatic EIR/EIS could be developed. It is recommended that the agencies most ready to proceed in the near term consider their individual needs and assess if a common effort would be advantageous. If Federal funding is sought on a regional basis, then a regional programmatic EIS may be necessary as part of the funding requirements under Title XVI or other Federal programs.

Chapter 10 References

Carpinteria Sanitary District

- (CSD,2005) Wastewater Collection System Master Plan, April 2005

Carpinteria Valley Water District

- (CVWD, 2006) Water Reliabilities Strategies 2030, February 2006

City of Santa Barbara

- (Carollo, 2009) Water Supply Planning Study, August 2009

Goleta Water District and Goleta Sanitary District

- (CDM, 1999) Reclaimed Water Project Study, January 1999

Goleta West Sanitary District

- (GWSD, 2004) Proposed New Wastewater Treatment Plant Site and Treatment Alternatives Evaluation, July 2004

Heal the Ocean

- (Metcalf-Eddy, 2001) Cost of Tertiary Wastewater Treatment for Southern Santa Barbara County, August 2001
- (HTO, 2000) Water Reclamation Research, September 2000
- (HTP, 2010) California Ocean Wastewater Discharge Report and Inventory, March 2010

Montecito Water District and Montecito Sanitary District

- (CH2M HILL, 1991) Water Reclamation Study, January 1991