Recycled Water Management Plan
For the
Los Osos Wastewater Project

Prepared for:

CALIFORNIA COASTAL COMMISSION

Submitted by:

San Luis Obispo County
Public Works Department

1050 Osos Street, Room 207
San Luis Obispo, CA 93408
p (805) 781-5252 f (805) 781-1229

THIS PAGE INTENTIONALLY LEFT BLANK

County of San Luis Obispo

RECYCLED WATER MANAGEMENT PLAN

For the
Los Osos Wastewater Project
May 2012

Board of Supervisors

District 1: Frank R. Mecham

District 2: Bruce S. Gibson

District 3: Adam Hill

District 4: Paul Teixeira

District 5: James R. Patterson

County of San Luis Obispo Public Works Staff

Director: Paavo Ogren

Deputy Director: Dave Flynn

LOWWP Project Manager: John Waddell

Environmental Programs Manager: Mark Hutchinson

Prepared By:

Kari Wagner, P.E. 66026
Senior Civil Engineer
Wallace Group

REGISTERED PROFESSIONAL ENGINEER
KARI E. WAGNER
66026
CIVIL
STATE OF CALIFORNIA

WALLACE GROUP®

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

SECTION 1: LOS OSOS BASIN RECYCLED WATER MANAGEMENT PLAN (Special Condition No. 5)

Coastal Development Permit A-3-SLO-09-055/069 (Los Osos Wastewater Project)

Special Condition No. 5 of the Coastal Development Permit (CDP) requires the preparation of a Basin Recycled Water Management Plan, herein abbreviated as the RWMP. The RWMP will be prepared in coordination with the overall Basin Plan, currently being prepared in coordination with the ISJ Working Group, which includes the Los Osos Water Purveyors (Los Osos Community Services District, Golden State Water Company, and S&T Mutual Water Company) and the County of San Luis Obispo under the jurisdiction of the Court. (Note: In this RWMP, the term "Basin Plan" refers to the plan being prepared by the ISJ Working Group, and does not refer to a specific element of the RWMP specified in the CDP.)

1.1 Historical Context

The community of Los Osos is an unincorporated community situated about mid-way on the coastline of San Luis Obispo County, south of the Morro Bay National Estuary and State Marine Reserve. The population of the community is approximately 15,000 residents. The community's permanent population grew steadily during the 1970's and into the mid-1980's with the absence of a central wastewater collection and treatment system. Sanitation needs to this day, continue to be met primarily through individual septic systems with septic pits, leach fields and similar methods.

Drinking water is obtained by means of well extraction from the Los Osos groundwater basin, a multi-level aquifer underlying the Los Osos community. The basin is comprised of an upper and a lower aquifer separated by an impermeable layer of clay, which thereby restricts the vertical movement of groundwater.

The Regional Water Quality Control Board – Central Coast Region (Regional Water Board), Region 3, determined in 1983 that the nitrate contamination in excess of the State standards had occurred in the groundwater basin (upper aquifer) at least partially due to the use of the septic systems throughout the community. Therefore, in January 1988, the State Water Resources Control Board approved an amendment to the Water Quality Control Plan, Central Coast Basin. The amendment contained the discharge moratorium established by the Regional Water Board for a portion of the Los Osos area known as the "Prohibition Zone." By prohibiting

discharge from additional individual and community sewage disposal systems, the moratorium effectively halted new construction or major expansions of existing development until the water pollution problem was dealt with.

Since the establishment of the Prohibition Zone, there have been many attempts to rectify the situation through construction of a wastewater project by both the County of San Luis Obispo and the Los Osos Community Services District (LOCSD), which was formed in 1998. After the recall of the LOCSD board members and suspension of the construction of the wastewater project in 2005, special legislation was authored and passed under Assembly Bill 2701 (Blakeslee), to authorize transfer of wastewater authority from the LOCSD to the County of San Luis Obispo. AB 2701 was passed unanimously by the California State legislature and signed into law by Governor Arnold Schwarzenegger. It became effective on January 1, 2007.

Following a successful Proposition 218 vote in 2007, the County completed a co-equal environmental review process of various project options. The project Draft EIR was released in November 2008 and the Final EIR was adopted by the County Board of Supervisors on September 29, 2009. In June 2010, the Coastal Commission approved (Permit No. A-3-SLO-09-055/069) the County's Project with various conditions including the development of a Recycled Water Management Plan. The approved Los Osos Wastewater Project (LOWWP) will utilize a gravity wastewater collection system with raw wastewater being collected at the mid-town pump station and conveyed to the treatment plant located at the Giacomazzi Site. The Giacomazzi Site is a 38.2-acre parcel located north of Los Osos Valley Road and west of Clark Valley Road. The County will design, construct, and operate the treatment plant so that all collected wastewater will undergo tertiary treatment and be reused within the Los Osos Groundwater Basin.

1.2 Groundwater Basin Management

The Los Osos Community is served by three water purveyors: Los Osos Community Services District (LOCSD), Golden State Water Company (GSWC), and S&T Mutual Water Company (S&T). LOCSD and GSWC provide water service to roughly half of the community each, while S&T serves a small residential area with a population of just over 500 persons. Each of the water purveyors receives 100% of their water supply sources from groundwater wells within the Los Osos Groundwater Basin. The purveyor wells generally pump from one of two productive groundwater zones – a lower and an upper aquifer. The upper aquifer is only usable in limited areas due to nitrate contamination, while the lower aquifer is partially compromised from sea water intrusion. While evidence of sea water intrusion has been noted for the last 25 years in the lower aquifer, it was comprehensively quantified and documented for the first time in 2005 in a Sea Water Intrusion Assessment developed by LOCSD and funded by the Department of Water Resources.

On February 13, 2004, LOCSD initiated an adjudication process by filing litigation that ultimately involved Southern California Water Company (now Golden State Water Company), S&T Mutual Water Company, and the County of San Luis Obispo. According to the Complaint, paragraph 1,

LOCSD brought the action "for the purposes of protecting the valuable resources of the [Basin], protecting its own rights and interests with respect to the Basin, and to facilitate efforts to cooperatively manage the Basin."

On August 4, 2008, the Court approved an Interlocutory Stipulated Judgment (ISJ) between LOCSD, GSWC, S&T, and the County of San Luis Obispo (County). The ISJ established that the Parties would form a Working Group for the purpose of undertaking technical studies regarding water resources of the Basin and adopting a Basin Plan.

The ISJ Working Group has been meeting monthly since December 2007 to discuss and implement plans and programs, and work cooperatively for the betterment of the Basin. The Parties intend to implement a Basin Plan that recognizes the continuing local and state imperative to increase the productivity and efficiency of the water use in the Basin, addresses the need to service the Los Osos community, and ensures the health of the Basin by establishing a clear pathway to returning the Basin to environmentally sustainable levels of extraction. It is the County's intent to prepare the RWMP required under Special Condition No. 5 in a manner consistent with the Basin Plan under preparation by the ISJ Working Group.

1.3 Purpose and Goals of the LOWWP and the Recycled Water Management Plan

The following governing mission statement for the Los Osos Wastewater Project was developed to guide the overall County effort:

> *To evaluate and develop a wastewater treatment system for Los Osos, in cooperation with the community water purveyors, to solve the Level III water resource shortage and groundwater pollution, in an environmentally sustainable and cost effective manner, while respecting community preferences and promoting participatory government, and addressing individual affordability challenges to the greatest extent possible.*

Consistent with the County's Mission Statement, the purpose of the RWMP is to develop a comprehensive water resources management plan that includes water recycling and conservation to maximize the long term health and sustainability of ground and surface waters and related resources, combined with a dynamic monitoring, reporting, and adaptive management program that is designed to respond to changes in the system, over time.

Based on these goals, the following four elements will be included in the RWMP:

- Recycled Water Reuse Program
- Water Conservation Program
- Monitoring Program
- Reporting and Adaptive Management Program

The following sections provide a summary of the critical elements of each of the programs.

1.3.1 Recycled Water Reuse Program

The purpose of the Recycled Water Reuse Program is to identify the quantity of recycled water available at start-up and at build out. In addition, the Program will outline the intended uses that will provide the groundwater basin with the highest level of benefit and the various regulations pertaining to proper treatment and reuse of recycled water.

The Los Osos Wastewater Project

The County will design, construct, finance, own and operate a centralized wastewater collection system and treatment plant to serve those areas of Los Osos located within the LOWWP Service Area. Based on current water production records from the three water purveyors, current indoor water use within the Service Area is approximately 1.1 mgd. With water conservation prior to startup of the wastewater treatment plant, the indoor water use will drop to an estimated 0.7 mgd. Based on the Water Conservation Program that will be pursued by the County and the Water Purveyors, the average indoor water consumption within the Service Area will be reduced to less than 50 gallons per capita per day. At build out, the indoor water use within the Service Area is estimated to be less than 1.0 mgd.

Disposal and Reuse Sites

A portion of the treated effluent will be percolated to the Basin via leach fields to be installed on the Broderson site, thus providing a beneficial water supply to the groundwater basin. The Broderson site is a 80-acre parcel located south of Highland Drive in Los Osos. The leach fields will be constructed on approximately 8 acres of the site; the remainder of the site would be placed in permanent open space and added to the greenbelt surrounding the Los Osos Community. Up to 448 acre feet per year (AFY) of effluent will be discharged at Broderson's 8-acre leach fields. Discharge can occur during wet and dry weather.

The County will utilize the existing Bayridge Estates leach fields, which will no longer be needed as leach fields once the LOWWP is on-line, to percolate approximately 33 AFY of treated effluent. This site provides additional disposal capacity and also mitigates potential impacts to Willow Creek.

The primary objective for recycled water use is to mitigate sea water intrusion by offsetting current pumping and production from the groundwater basin. Therefore, the County's highest priority for delivery is to provide recycled water that will offset current production within the urban area over the groundwater basin.

The largest consumers of potable water for the Water Purveyors are the schools. There are four schools within the LOCSD and GSWC service areas and none in the S&T service area. The schools include: Los Osos Middle School, Monarch Grove Elementary School, Baywood Elementary School, and Sunnyside Elementary School. Based on water usage data (year 2011), the schools will utilize the following estimated amounts of recycled water for landscape irrigation:

- Los Osos Middle School – 30 AFY
- Monarch Grove Elementary School – 10 AFY
- Baywood Elementary School – 9 AFY
- Sunnyside Elementary School – 7 AFY

In addition, the LOCSD currently provides potable water supply to the community park. The community park will offset an estimated 2 AFY of potable water demand for landscape irrigation.

Sea Pines Golf Course, located on Morro Bay at the northwestern edge of the community, currently receives approximately 20 acre feet of recycled water from the Monarch Grove Wastewater Treatment Plant and approximately 80 acre-feet of water from on-site upper aquifer wells. If the Monarch Grove subdivision is connected to the LOWWP, their wastewater treatment plant will no longer be used, and it is proposed to serve Sea Pines Golf Course with recycled water from the LOWWP at a 1:1 blend with well water. The remaining water would continue to be provided by existing well supplies. Sea Pines Golf Course could utilize an estimated 40 AFY of LOWWP recycled water.

The Los Osos Valley Cemetery is located on Los Osos Valley Road, adjacent to the proposed treatment plant site. The Cemetery currently pumps potable water from its own private on-site well, which draws from the agricultural area overlying the Creek Valley Aquifer. The County could supply the Cemetery with recycled water, which would offset approximately 50 AFY of potable water use, thus decreasing the demand on the basin. Recycled water supplied to the Cemetery will provide similar benefits to the Basin as the agriculture reuse.

In order to identify users for agricultural irrigation with recycled water, the County completed an outreach program to all agricultural properties overlying the groundwater basin. The Coastal San Luis Resource Conservation District (RCD) assisted the County by coordinating this effort. As a result, the County has completed program participation agreements with the six property owners who expressed interest in receiving recycled water. The properties represent an estimated 100 acres of arable land. The County is now negotiating delivery schedule agreements with the property owners for reuse of an estimated 195 AFY of recycled water.

Due to variations in seasonal deliveries, the County will have on-site storage ponds that will hold up to 50 acre-feet of water to allow flexibility of deliveries to the above mentioned delivery sites.

Permitting

The County will obtain permits through both the Regional Water Board and the California Department of Public Health to ensure that the Recycled Water Facilities meet all Title 17 and Title 22 requirements. The County will be required to closely monitor the recycled water and provide annual reports to the Regional Water Board.

1.3.2 Water Conservation Program

The benefits of improved urban water use efficiency are the same for Los Osos as in other communities. In order to avoid the need for imported water or other water supply actions, the Los Osos community, in coordination with the County and Water Purveyors, must aggressively improve its water use efficiency now and into the future.

Aggressive water conservation will be required in order to balance the Basin, halt seawater intrusion, and meet CDP conditions requiring the Service Area to meet 50 gallons per capita per day of indoor water use. This section discusses new water technologies and practices that will be employed by the County within the Service Area to achieve the aggressive conservation levels (50 gpcd indoor use) that will be required in Los Osos to ensure the long-term reliability and quality of the community's water supply.

The County through the ISJ Working Group retained Maddaus Water Management (Maddaus) in 2010 to conduct an analysis of potential efficiency improvements on urban water use in Los Osos. An Administrative Review Draft of the 2011 Water Demand Analysis and Water Conservation Evaluation was released on April 5, 2011. The goals of the analysis were to:

1. Create a water demand forecast for the years 2010 to 2035 under certain assumptions.
2. Project the costs and water savings of selected conservation measures for the years 2010 to 2035.
3. Develop a set of conservation programs.
4. Determine when and what combination of the proposed conservation measures would meet the residential indoor water use target of 50 gallons per person per day.

The Coastal Development Permit approved by the California Coastal Commission in June 2010 imposed some water conservation requirements on the County in connection with approval of the LOWWP. CDP conditions require the County to implement a water conservation program, in consultation with the Los Osos Water Purveyors, within the Service Area for the Los Osos community. The County is required to provide 5 million dollars of funding towards the water conservation program. Through discussions with the Water Purveyors, Program "D" from Maddaus' water conservation report was chosen to optimize the use of the public funds to meet the goals in addition to the existing ordinances already adopted by the County of San Luis Obispo. Table 1-1 lists the water conservation measures that will be implemented by the County in the Service Area as part of the Los Osos Wastewater Project.

Table 1-1
Summary of County of San Luis Obispo Proposed Conservation Measures

Measure ID	Measure Name	Description
Category 1: Residential		
1A	Subsidize Partial Community Retrofit, Residential	Subsidize the replacement of designated fixtures before residential properties connect to the LOWWP. Included in the retrofit would be inefficient toilets, showerheads, and faucets.
1B	Residential Clothes Washer Rebate	Residential property owners would be eligible to receive a rebate on a new high efficiency clothes washer.
1C	Toilet Retrofit on Resale or Name Change on Water Account	Require a certificate of compliance be submitted to the County that verifies a plumber has inspected the property and determined that High Efficiency Toilets were in place or were installed at the time of sale of any residential property, before close of escrow.
Category 2: Commercial & Institutional		
2A	Subsidize Partial Community Retrofit, Commercial	Subsidize the replacement of designated fixtures before commercial properties connect to the LOWWP. Included in the retrofit would be inefficient toilets, showerheads, and faucets.
2B	Replace Restaurant Spray Nozzles	Provide free installation of 1.6 gpm or lower flow spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.
2C	School Building Retrofit	A retrofit program in which schools receive grants to replace inefficient fixtures.
2D	Commercial High Efficiency Clothes Washer Rebate	Commercial property owners would be eligible to receive a rebate on a new high efficiency clothes washer.
Category 3: Educational & Outreach		
3A	Residential Water Surveys	Conventional indoor and outdoor water surveys for existing single- and multi-family residential customers.
3B	Commercial, Industrial and Institutional Surveys	Conventional indoor and outdoor water survey for commercial customers.
3C	Public Information Program	Public education would be used to raise awareness of conservation measures available to customers.
3D	Media Campaign	Design and run a media campaign, e.g., “20 Gallon Challenge”.

Table 1-1, Continued Summary of County of San Luis Obispo Proposed Conservation Measures		
Category 4: New Development		
4A	Efficient Dishwashers	Modify the Building Code to require efficient dishwashers meeting water efficiency standards.
4B	High Efficiency Clothes Washers	Ensure that an efficient clothes washer was installed before new home or multi-family residential building occupancy.
4C	Hot Water on Demand/Structured Plumbing	Developers to equip new homes or buildings with efficient hot water on demand systems such as structured plumbing systems.
4D	Plumbing for Future Grey Water Use	Drain lines in new single-family homes to be plumbed for future installation of grey water systems.
4E	New Landscape and Irrigation Requirements	Enforce current County Landscape Design Standards for Water Conservation. Those standards specify that development projects subject to design review must be landscaped according to xeriscape principles, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers.
4F	Smart Irrigation Controllers and Rain Sensors	Developers for all properties of greater than two residential units and all commercial development to provide the latest state of the art SMART irrigation controllers and rain sensors.
4G	Multi Family Submetering on New Accounts	Metering of individual units in new multi-family, condos, townhouses, mobile-home parks and business centers with less than four stories and with water heaters in the units.
4H	Efficient Fixtures in Commercial, Industrial, and Institutional Buildings	High efficiency commercial equipment such as ice machines, food steamers and conductivity controllers to be installed in commercial buildings.

Based on Maddaus' report, Figure 1-1 and Table 1-2 show the indoor water use projections for the proposed conservation program. The graph and table show projections for demand with and without the plumbing code and with Program "D" conservation, through 2035. The County will generally be implementing Program "D" as described in the Maddaus' report, which is the most cost effective and comprehensive approach that meets the 50 gpcd requirement.

The County is currently preparing a detailed implementation plan that will specify the annual program schedule and budget and set specific targets, rebates and funding amounts for each conservation measure. It is anticipated that the rebate and funding levels will be more generous than proposed in Maddaus' report and may result in reaching the indoor use requirement of 50 gpcd sooner than shown in Figure 1-1.

The current indoor residential water use is estimated at 70 gallons per capita per day. This is based on the historical water use and population data from years 2006 through 2008.

Program "D" is anticipated to meet the 50 gpcd target in year 2019. Additional water conservation measures that will be implemented by the County will allow the County to meet the 50 gpcd sooner than 2019. In Year 2020, based on a population of 16,192 persons within the urban reserve line area, the water conservation program is estimated to reduce indoor consumption by approximately 363 AFY. At build-out, the indoor per capita demand will be an estimated 47 gpcd, which will equate to a savings of 505 AFY.

Figure 1-1. Per Capita Residential Indoor Water Use

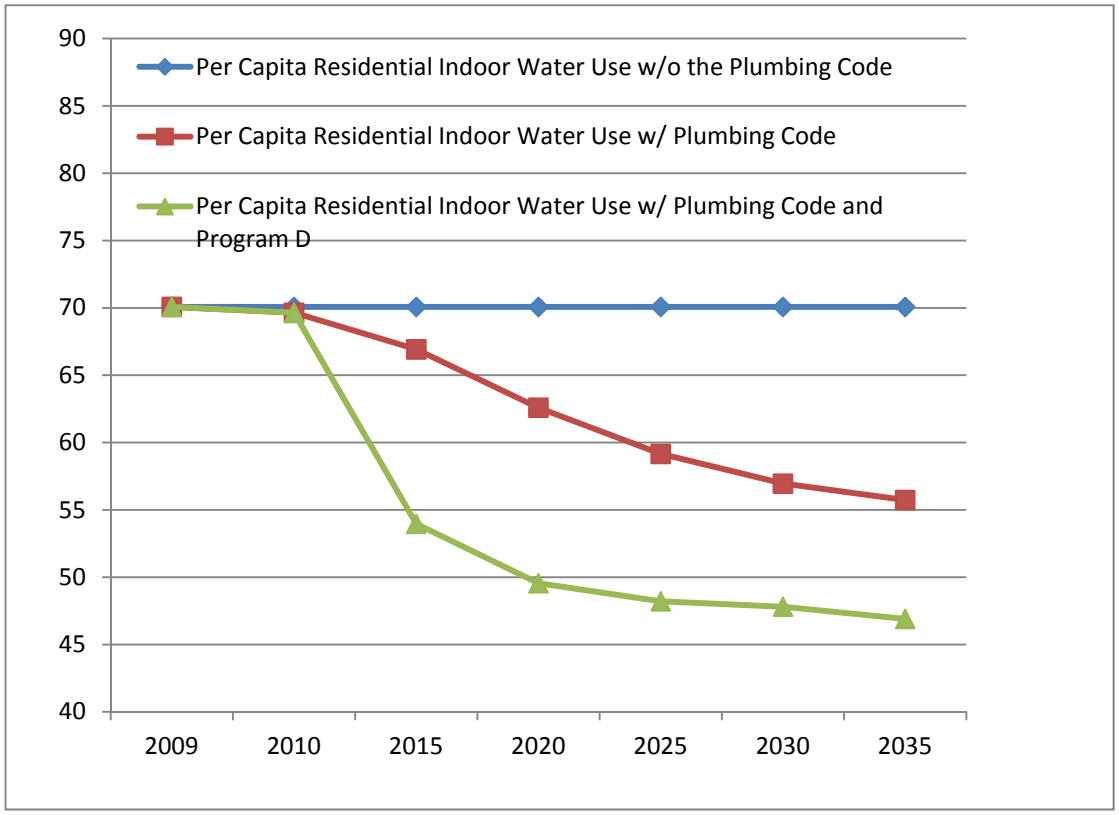


Table 1-2. Per Capita Residential Indoor Water Use with Conservation Savings Projections (gpcd)

	2009	2010	2015	2020	2025	2030	2035
Without the Plumbing Code	70	70	70	70	70	70	70
With the Plumbing Code	70	70	67	63	59	57	56
With the Plumbing Code and Program D	70	70	54	50	48	48	47

1.3.3 Monitoring Program

The Monitoring Program for the Los Osos Wastewater Project is broken into two separate programs: Groundwater Monitoring and Environmental Monitoring. Both programs are required to meet the objectives of Special Condition 5c.

The purpose of the groundwater monitoring program for the LOWWP is to collect and organize groundwater data on a regular basis for use in management of the Basin in accordance with Monitoring and Reporting Program for the Los Osos Wastewater Recycling Facility Waste Discharge Requirements. The program will utilize on-going monitoring efforts by the County Department of Public Works and the Water Purveyors, expand the scope of monitoring where needed, and organize the data to improve access, reporting and data analysis efficiency.

Groundwater monitoring is essential for addressing many issues related to groundwater resources in the Basin, including determination of the sustainable yield of the Basin, seawater intrusion, salt loading and associated nitrate contamination, flooding/day lighting and future dynamic changes to the Basin resulting from the Los Osos Wastewater Project. The groundwater monitoring program will provide on-going data for evaluating these issues.

The goal of the Environmental Monitoring Program (EMP) is to identify any changes in wetland and riparian habitat areas and habitat values potentially related to decommissioning of the septic systems throughout the community of Los Osos, and to provide remedial actions as necessary to address any such changes. This goal will be accomplished through regular monitoring, data analysis, and adaptive management for the life of the project.

Implementation of the LOWWP EMP will:

- Establish baseline conditions for wetland and riparian resources;
- Ensure annual monitoring and trend analysis of wetland and riparian habitat areas;
- Provide adaptive management measures for remedial action; and
- Maintain the current function and values of wetland and riparian habitats.

Groundwater Monitoring Program

The groundwater monitoring program for the Recycled Water Management Plan for the Los Osos Wastewater Project will provide significant overlap with monitoring requirements of groundwater management plans adopted pursuant to state law, the Basin Plan prepared by the ISJ Working Group, with the CASGEM, and with the SWRCB Recycled Water Policy. The program pursuant to the Basin Plan, however, is intended to be the primary groundwater monitoring program for the Basin, and other groundwater monitoring efforts undertaken by the County and other Parties will meet any additional requirements as well as be made consistent with the Basin Plan to the extent possible.

The County's groundwater monitoring requirements meet the requirements set forth in the LOWWP's Waste Discharge Requirements (WDR) issued by the Regional Water Board. The WDR establishes the wells to be tested and the parameters of the testing. The County will be

required to submit monthly reports to the Regional Water Board by the first day of the second calendar month following the sampling month. All reports shall summarize monitoring data, noncompliance, reason for noncompliance, corrective action, disposal area monitoring, and any other significant events relating to compliance with the WDR.

In addition, the County is required to submit an annual report by January 30th of each year. The monitoring reports shall include tabulated monitoring results and a narrative description of analytical results (general mineral constituents, including all forms of nitrogen, depth to groundwater, and groundwater flow direction) and water quality trends (changes in water quality, impacts from sea water intrusion). The County will also provide contour maps, which include: a) groundwater elevations and flow direction, b) TDS concentrations, and c) nitrate as N concentrations. In addition, the County will submit analytical results for water quality data collected from water purveyor wells in the Basin.

Environmental Monitoring Program

Construction of the LOWWP will decommission existing septic systems, thereby removing localized groundwater discharge sources that are spread relatively evenly throughout the community. Following construction of the LOWWP, discharges of tertiary treated water to the upper aquifer will occur at two primary locations (Broderson and Bayridge Estates). The quantity of discharge may require adjustment to ensure adequate groundwater levels are maintained throughout the community. Septic system decommissioning will likely result in temporary localized lowering of groundwater levels as neighborhoods are connected to the collection system; however, these effects will be offset to some extent by the discharge that will be occurring at the Broderson and Bayridge Estates sites. Established wetland and riparian vegetation is expected to react slowly to these initial changes in hydrology or water quality, and the monitoring program will attempt to distinguish project-related changes in the amount and composition of wetlands from those resulting from natural factors.

Over the long term, the RWMP is designed to stabilize groundwater levels and, as they stabilize, changes and trends in wetland habitat area and composition may be observed during monitoring under the EMP. The most likely effect will involve changes in vegetative composition in reaction to increased or decreased salt content in the groundwater. If the recycled water program results in reduced fresh water seepage from septage flows, Bay fringe wetlands could transition towards more salt-tolerant species, and willow fringe areas closest to the Bay may decrease. An increase in fresh water seepage would have the opposite effect. In either case, vegetated areas along the Bay fringe will remain inundated at current levels, since tidal activity and water levels in the Bay will not change as a result of the LOWWP. As a result, the extent of Bay fringe wetlands will not likely change following LOWWP implementation, although the mix of fresh, brackish, and salt water vegetation could be altered.

The CDP requires establishment of Interim and Long-term success criteria for ground and surface water and related resources. For this EMP, the Interim period is considered to be the time between the start of decommissioning to full implementation of the recycled water

infrastructure. The Long-term period is considered to be the remaining years that the project is in operation following implementation.

The EMP includes overall Interim and Long-term success criteria for the monitoring areas. Success of the Basin with regard to continuance of existing wetland resource function and value will be determined through analysis of monitoring data and comparison with the baseline conditions documented in Baseline Assessment Report, which will be prepared upon approval of the Recycled Water Management Plan. When a significant deviance from baseline conditions is noted at a site or as a combined total of site conditions, previous weather patterns or other outside influences must be examined, and a determination made regarding whether non-project related factors are contributing to the monitoring results.

Six sites have been identified as primary monitoring locations to provide quantitative data to document the effects of LOWWP implementation on wetland resources (refer to Figure 4-1 and Table 4-3). Four secondary monitoring locations have also been identified to provide additional qualitative monitoring data on wetland resources in the area. These primary and secondary monitoring locations consist of surface water features identified by the 2009 LOWWP EIR hydrologic analysis as at least partially supported by groundwater discharge from the Los Osos Basin, and as an indication of existing shallow groundwater conditions in the east and west groundwater basins. The primary sites will provide quantitative monitoring information on western basin bayfront wetlands and on eastern basin Willow Creek wetland and riparian areas. The secondary sites will provide additional qualitative information and photo reference data for use in assessing overall habitat conditions and trend analysis over the life of the project.

All monitoring sites are in the vicinity of existing groundwater monitoring well locations, and data and trends documented during annual monitoring efforts can be correlated with available monitoring well information.

1.3.4 Reporting and Adaptive Management Program

The purpose of the Reporting and Adaptive Management Program is to provide the final “check and balance” for the Recycled Water Management Program to ensure that the overall objectives of the groundwater basin are being met. Evaluating the groundwater basin on an annual basis allows the County to:

- Evaluate the trends of the groundwater basin
- Identify any voids in the collected data
- Report the data analysis to the various interested parties (Department of Water Resources, Regional Water Board, Coastal Commission)
- Modify the Recycled Water Management Plan based on the current conditions and visible trends of the groundwater basin
- Modify procedures to utilize current best management practices
- Modify pumping, treatment and/or disposal procedures if groundwater basin trends are showing signs of degradation of water quality, including increased levels of contamination and/or increased levels of seawater intrusion

A groundwater monitoring report will be prepared on an annual basis. The report will be prepared by the County for submission to the Coastal Commission Executive Director, in cooperation with the Water Purveyors, and other Parties. The Annual Report will be prepared for each calendar year, January 1 through December 31, for each year that the LOWWP operates. The annual report will be submitted no later than December 31st following the year of monitoring. The Annual Report will include an evaluation of the Recycled Water Reuse Program, Water Conservation Program, and the Monitoring Program.

The Recycled Water Reuse Program Annual Report will include the following:

- Infrastructure Summary Including Recommended Improvements
- Wastewater Treatment Plant Water Quality Summary
- Monthly Delivery Summary
- Program Changes Implemented in Prior Year
- Proposed Changes to the Program for the Upcoming Year
- Agricultural Reuse Outreach Process
- Amendments to Reuse Contracts

The Water Conservation Annual Report will include the following:

- Water Purveyor Production and Consumption Summary
- Status of Conservation Measure Implementation
- Program Changes Implemented in Prior Year
- Actual Program Savings Compared to Projected Savings
- Recommended Program Adjustments or Additional Data Needs
- Estimated Water Savings

The Monitoring Program Annual Report will include the following:

- Groundwater Monitoring Results
- Summary of Seawater Intrusion Status
- Environmental Monitoring Report
- Program Changes Implemented in Prior Year
- Recommended Program Adjustments or Additional Data Needs

The Adaptive Management Program is established to provide guidance on the overall effectiveness of the Recycled Water Management Program, the Water Conservation Program, and the Monitoring Program and to provide a tool on how to modify the programs to better meet the overall Basin objectives. The Adaptive Management Program is to ask and answer the following questions:

- Are all Programs reaching targeted objectives? If yes, are there any factors that might change the Programs from continuing to reach targeted objectives? If no, why are the Programs not reaching targeted objectives?

- What changes need to be made to reach the targeted objectives?
- What is the schedule for getting the Programs back on target to reaching objectives?

SECTION 2: RECYCLED WATER REUSE PROGRAM

As reflected in County condition 97, the Recycled Water Reuse Program shall ensure that all tertiary treated recycled water is disposed of in locations within the Los Osos Groundwater Basin that will maximize its ability to meet Basin Plan objectives, where the highest priority for reuse shall be replacing existing potable water use with recycled water use where feasible and appropriate, including with respect to both urban and agricultural reuse. The Reuse Program may include recycled water application at the Broderson leach field (not to exceed 448 afy on an average annual basis) and at the Bayridge leach field (approximately 33 afy of the amount shown to be necessary for maintaining Willow Creek and downstream resources in their pre-project state or better), but it shall prioritize beneficial reuse through (a) developing and installing recycled water connections and entering into delivery/use agreements with urban and agricultural property owners as much as possible, and (b) developing and installing other recycled water delivery systems, in both cases with a priority for locations where such beneficial reuse will go the furthest toward meeting Basin Plan goals (Special Condition 5a).

2.1 Introduction

The County is currently planning the Los Osos Wastewater Project (LOWWP), by which the County will design, construct, finance, own and operate a centralized wastewater collection system and treatment plant to serve those areas of Los Osos located within the Prohibition Zone. All wastewater will undergo tertiary treatment at the wastewater treatment plant. This water will be returned to the Basin and will be used as a supply source to offset potable water use within the groundwater basin.

2.2 Purpose and Objectives

The purpose of the Recycled Water Reuse Program is to identify the quantity of recycled water available at start-up and at build out. In addition, the Program will outline the intended uses that will provide the groundwater basin with the highest level of benefit and the various regulations pertaining to proper treatment and reuse of recycled water.

2.3 Recycled Water Regulations and Policies

Recycled water in California is regulated by local, county, and State agencies; the primary State agencies regulating recycled water use are the California Department of Public Health (CDPH) and the California Regional Water Quality Control Boards (Regional Water Board).

2.3.1 State of California Recycled Water Policy

The State of California adopted a State-Wide Recycled Water Policy in February 2009. This policy sets forth the following goals for recycled water usage:

- Increase the use of recycled water over 2002 levels by at least one million AFY by 2020 and by at least two million AFY by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

The purpose of the policy is to promote and encourage recycled water projects throughout the State. These recycled water use goals will be facilitated by streamlining State permitting processes and timelines with the Regional Water Board and CDPH, particularly for those landscape reuse projects that meet Title 22 requirements and health standards and guidelines set forth by CDPH.

Specific mandates are set forth in the policy, allowing State and Regional Water Boards to exercise full authority granted to them by the Legislature. These mandates include:

- The increased use of recycled water in California by 200,000 AFY by 2020 and by an additional 300,000 AFY by 2030.
- Agencies producing recycled water suitable for beneficial reuse, but not utilizing such water, shall make the recycled water available to water purveyors for reuse on reasonable terms and conditions.

The policy asserts the water industry and environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund recycled water projects. However, at this time, no grant funds are available.

2.3.2 Title 22 Requirements and Approved Uses

CDPH establishes water quality standards and treatment reliability criteria for water recycling under Title 22, Division 4, of the California Code of Regulations (Title 22), and in Title 17, Division 1, Chapter 5, Group 4, Article 1, Sections 7583-7605. Requirements for recycled water use in California, not described in Title 22, are considered and approved by CDPH on a case-by-case basis.

Title 22 sets bacteriological water quality standards on the basis of the expected degree of public contact with recycled water. For water reuse applications with a high potential for the public to come in contact with the recycled water, Title 22 requires disinfected tertiary treatment.

For applications with lower potential for public contact, Title 22 requires three levels of secondary treatment, basically differing by the amount of disinfection required. In addition to establishing recycled water quality standards, Title 22 specifies the reliability and redundancy for each recycled water treatment and use operation. Title 17 provides protection against cross-connections between potable water systems and recycled water systems.

The effluent from the Los Osos Wastewater Project will be disinfected tertiary recycled water. The term "disinfected tertiary recycled water" means filtered and subsequently disinfected wastewater that has been disinfected by chlorine disinfection process or a process proven to inactivate and/or remove 99.9 percent of certain bacteria in the wastewater. "Disinfected secondary-2.2 recycled water" means recycled water that has been oxidized and disinfected so that the median coliform bacteria in the effluent does not exceed a most probable number (MPN) of 2.2 per 100 milliliters. "Disinfected secondary-23 recycled water" means recycled water that has been oxidized and disinfected so that the median coliform bacteria in the effluent does not exceed an MPN of 23 per 100 milliliters. "Undisinfected secondary recycled water" means oxidized wastewater. Table 2-1 provides a summary of the various allowable uses of recycled water given the different levels of treatment, defined by Title 22 regulations. This list is not an extensive list of all uses.

The approvals and permits for the LOWWP provide that all treated effluent must be reused or disposed of in one of the following ways:

- Returned to the groundwater Basin through percolation at the Broderson site as described in the Environmental Impact Report;
- Provided to existing urban irrigation uses within the community;
- Provided to agricultural irrigation uses within the Basin; or
- Percolated at existing the Bayridge Estates leach field to mitigate potential impacts to Willow Creek.

2.3.3 Implementation and Regulatory Authority

The nine California Regional Water Quality Control Boards oversee and permit the use of recycled water in California under the authority of the Porter Cologne Water Quality Act of 1969. The Regional Water Board adopts permits for recycled water use which are consistent with CDPH water recycling criteria. Locally, San Luis Obispo County is regulated by the Central Coast Region, Region 3, Regional Water Board office located in San Luis Obispo.

The County will prepare an Engineer's Report that is required to be submitted to both the Regional Water Board and CDPH as a part of the recycled water permitting process. This report will include details of the production, distribution, and use of recycled water. Additional report(s) may be required when future recycled water users connect to an existing system. The County will follow the CDPH guidelines for the preparation of this report. The guidelines for the Engineer's Report may include some or all of the following (this is not a comprehensive list):

- Identification of the recycled water producer, distributor, and user(s), and any

Table 2-1. Allowed Recycled Water Uses

	Treatment Levels			
	Disinfected Tertiary Recycled Water	Disinfected Secondary-2.2 Recycled Water	Disinfected Secondary-23 Recycled Water	Undisinfected Secondary Recycled Water
Food crops where recycled water contacts the edible portion of the crop, including all root crops	Allowed	Not allowed	Not allowed	Not allowed
Parks and playgrounds	Allowed	Not allowed	Not allowed	Not allowed
School yards	Allowed	Not allowed	Not allowed	Not allowed
Residential landscaping	Allowed	Not allowed	Not allowed	Not allowed
Unrestricted access golf courses	Allowed	Not allowed	Not allowed	Not allowed
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	Allowed	Not allowed	Not allowed	Not allowed
Food crops where edible portion is produced above ground and not contacted by recycled water	Allowed	Allowed	Not allowed	Not allowed
Cemeteries	Allowed	Allowed	Allowed	Not allowed
Freeway landscaping	Allowed	Allowed	Allowed	Not allowed
Restricted access golf courses	Allowed	Allowed	Allowed	Not allowed
Ornamental nursery stock and sod farms	Allowed	Allowed	Allowed	Not allowed
Pasture for milk animals	Allowed	Allowed	Allowed	Not allowed
Nonedible vegetation with access control to prevent use as a park, playground or school yard	Allowed	Allowed	Allowed	Not allowed
Orchards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Vineyards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest	Allowed	Allowed	Allowed	Allowed

Fodder crops (e.g. alfalfa) and fiber crops (e.g. cotton)	Allowed	Allowed	Allowed	Allowed
Seed crops not eaten by humans	Allowed	Allowed	Allowed	Allowed
Food crops that undergo commercial pathogen-destroying processing before consumption by humans	Allowed	Allowed	Allowed	Allowed
Ornamental nursery stock, sod farms not irrigated less than 14 days before harvest	Allowed	Allowed	Allowed	Allowed
Groundwater recharge	Allowed under special case-by-case permits by RWQCBs			
Flushing toilets and urinals	Allowed	Not allowed	Not allowed	Not allowed
Priming drain traps	Allowed	Not allowed	Not allowed	Not allowed
Industrial process water that may contact workers	Allowed	Not allowed	Not allowed	Not allowed
Structural fire fighting	Allowed	Not allowed	Not allowed	Not allowed
Decorative fountains	Allowed	Not allowed	Not allowed	Not allowed
Commercial laundries	Allowed	Not allowed	Not allowed	Not allowed
Consolidation of backfill material around potable water pipelines	Allowed	Not allowed	Not allowed	Not allowed
Artificial snow making for commercial outdoor uses	Allowed	Not allowed	Not allowed	Not allowed
Commercial car washes	Allowed	Not allowed	Not allowed	Not allowed
Industrial boiler feed	Allowed	Allowed	Allowed	Not allowed
Nonstructural fire fighting	Allowed	Allowed	Allowed	Not allowed
Backfill consolidation around nonpotable piping	Allowed	Allowed	Allowed	Not allowed
Soil compaction	Allowed	Allowed	Allowed	Not allowed
Mixing concrete	Allowed	Allowed	Allowed	Not allowed
Dust control on roads and streets	Allowed	Allowed	Allowed	Not allowed
Cleaning roads, sidewalks and outdoor work areas	Allowed	Allowed	Allowed	Not allowed
Flushing sanitary sewers	Allowed	Allowed	Allowed	Allowed

- agreements between the entities
- Description of the raw wastewater and treatment process, and monitoring and reporting
- Supplemental water supply and contingency plan
- Plans and details of the recycled water transmission system
- Recycled water user site plans, including irrigation piping (purple pipe and other means of delineating recycled water system), surface drainage, signage plan, use area inspection, employee training, and other features required for use of recycled water

2.3.4 Pipeline Separation Criteria

Required separation of recycled water pipelines from potable water pipelines is included in Title 22. Per the County's Basis of Design Report, prepared by CDM, the design engineers for the LOWWP, recycled water mains will be treated as sewer mains when considering their separation from potable water.

Required separation of recycled water mains from sanitary sewer pipelines is not included in Title 22, and at the time of this report it is not specifically defined by CDPH. Per the County's Basis of Design Report, prepared by CDM, the design engineers for the LOWWP, recycled water mains will be treated as potable water mains when considering their separation from sewers.

2.4 Recycled Water Quality Requirements

The wastewater stream that will be treated by the Los Osos Wastewater Treatment Plant will be from primarily residential land uses with a small component of commercial. There will be no significant sources of major industrial waste or processing water treated by the facility.

2.4.1 Water Quality Parameters

The chemical make-up of water used for irrigation purposes is important in ensuring maintenance of the quality of landscaping or crops being irrigated. Key water quality parameters from an agronomic standpoint are described in this section.

Sodium, Sodium Adsorption Ratio (SAR), and Adjusted SAR (aSAR)

Sodium is not an essential plant nutrient, yet it is always present in irrigation water and it can become the most important single constituent in the water if it exceeds tolerable concentrations. Acceptable levels of sodium are judged in proportion to divalent cations, principally calcium and magnesium in the water. The criteria commonly used to determine the potential effect of this critical element are sodium adsorption ratio (SAR) and adjusted SAR. Adjusted SAR accounts for the presence of carbonates and bicarbonates in the irrigation water, because of their tendency to precipitate calcium from the solution, aggravating the effect of sodium. The most widely accepted method of adjusting SAR is the Cax method, wherein the ratio of bicarbonate to calcium is used to determine the adjustment factor. Long-term use of irrigation water with high SAR can result in gradual elevation of soil solution SAR and deleterious effects on soil structure, leading to progressively reduced soil permeability, water-logging, and anaerobic (oxygen deficient) conditions in the root zone.

Calcium

Calcium is essential for all plant life. It is almost always available in abundance in the soil, as far as plant nutrition requirements are concerned. However, calcium also plays another important role in the soil solution. It can balance the adverse impacts of sodium on soil physical structure and the soil's ability to transport water. Native soils in California are generally rich in calcium compounds.

Chloride

Chloride is also essential to plant life, but sufficient in extremely low concentrations. This element is almost never deficient in the environment. Excessive concentrations of chloride (beyond 140 mg/L) can be harmful due to toxicity to the plant tissues.

Dissolved Solids, Specific Conductance

Total dissolved solids (TDS) is a direct measure of salinity in the irrigation water. An indirect index of salinity is the electrical conductance (EC, inverse of electrical resistance) of the water sample. Elevated TDS concentrations of irrigation water can cause deleterious effects to plant growth and to soil conditions and characteristics.

Boron

Boron is an essential nutrient for plant germination and growth. However, beyond a narrow band of concentrations (0.1 to 5 mg/L), it becomes toxic to plant life. Boron is not highly mobile and cannot be easily flushed out of the root zone; however, boron can be taken up by the plant roots to the leaf tips. Thus, for turf grasses, where frequent mowing generally occurs, removal of boron can be effective.

2.4.2 Irrigation Water Quality Guidelines and Summary

Recommended water quality criteria for general irrigation use is presented in Table 2-2. Actual effluent quality for the Los Osos Wastewater Treatment Plant is not available since the plant is not operational at this time. This table expresses the degree of restriction of recycled water based on sodium absorption ratio in conjunction with salinity (EC).

Table 2-2. Water Quality Summary			
Parameter	Degree of Restriction on Use		
	None	Slight to Moderate	Severe
Boron, mg/L	<0.7	0.7-1.0	>3.0
Chloride, mg/L	<140	140-350	>350
TDS, mg/L	<450	450-2,000	>2,000
EC, mmhos/cm	<0.7	0.7-3.0	>3.0
EC, mmhos/cm, with SAR 3-6	>1.2	1.2-0.3	<0.3

2.4.3 Recycled Water Quality Requirements

The Regional Water Board issued Waste Discharge Requirement (WDR) Order No. R3-2011-0001, which regulates the discharge of treated wastewater from the Los Osos Wastewater Treatment Plant. This WDR Permit stipulates the water quality parameters and other general permit requirements for the protection of water quality and public health. Table 2-3 provides the effluent water limits and the recycled water quality requirements.

Table 2-3. WDR Effluent and Recycled Water Limits			
Constituents	Unit	Monthly Average (30-day)	Sample Maximum
Effluent Limits to Leachfields			
Settleable Solids	mL/L	0.1	0.5
BOD, 5-day	mg/L	60	100
Suspended Solids	mg/L	60	100
Total Nitrogen (as N)	mg/L	7	10
Recycled Water Limits			
BOD, 5-day	mg/L	30	90
Suspended Solids	mg/L	30	90
pH	s.u.	6.5 – 8.4	
mL/L – milliliters per liter mg/L – milligrams per liter			

The Los Osos Wastewater Treatment Plant shall provide Disinfected Tertiary Recycled Water as defined at Section 60301.230 of Title 22 of the California Code of Regulations, which 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 demonstrated to inactivate and/or remove 99.999 percent of the plaque-forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.

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

2.5 Availability of Recycled Water Supply

2.5.1 Supply at Start Up

The County will design, construct, finance, own and operate a centralized wastewater collection system and treatment plant to serve those areas of Los Osos located within the Prohibition Zone. Based on current water production records from the three water purveyors, current indoor water use within the Prohibition Zone is approximately 1.1 mgd. With water conservation prior to startup of the wastewater treatment plant, the indoor water use will drop to approximately 0.7 mgd.

2.5.2 Build Out Supply Availability

The County and the Water Purveyors are implementing an extensive and aggressive water conservation program (See Section 3). Based on the Water Conservation Program that will be pursued by the County and the Water Purveyors, the indoor water consumption within the Prohibition Zone will be reduced to just below 50 gallons per capita per day. At build out, the indoor water use within the Prohibition Zone is estimated to be less than 1.0 mgd.

2.5.3 Seasonal Availability

The Los Osos Community is primarily a residential community with a small commercial zone to provide day-to-day services to the local residents. Tourism is not prevalent in the Los Osos community. Based on these conditions, the indoor water use will not have a large fluctuation throughout the year. Therefore, approximately 0.7 mgd of recycled water is anticipated to be available year round.

2.6 Projected Basin Benefits and Recycled Water Use Options

The County is required by the CDP to bring recycled water back into the basin for disposal and reuse. The County will be distributing the recycled water through percolation and irrigation in the urban and agricultural areas. Reuse must be prioritized to benefit community water resources and mitigate sea water intrusion. The various options are described in more detail below.

2.6.1 Effluent Recycled Water Percolation

Broderson Site: A portion of the recycled water will be percolated to the Basin via leach fields to be installed on the Broderson site, thus providing a beneficial water supply to the Basin. The Broderson site is a 80-acre parcel located south of Highland Drive in Los Osos. The site slopes down to the north from a maximum elevation of 340 feet above mean sea level (msl) to approximately 200 feet above msl along its northern boundary. The site is currently undeveloped and largely covered with scrub vegetation in its lower half with the upper half occupied by chaparral type vegetation that includes stands of Morro Manzanita. A 2000 hydrogeological study of the site recommended a wastewater disposal rate of 800,000 gallons per day (896 AFY). The study concluded that "daylighting will not occur at this disposal rate between Highland Drive and Los Osos Valley Road due to mounding or lateral movement of perched water along the shallowest perching horizon." Wastewater particles will take at least 1 year to migrate offsite, and 14 years to reach the bay in the upper aquifer. Movement from the site to the Rosina well would take at least 16 years, of which an estimated 11 years is spent moving through a regionally confining clay layer into the lower aquifer.

The leach fields will be constructed on approximately 8 acres of the site; the remainder of the site would be placed in permanent open space and added to the greenbelt surrounding the Los Osos Community. Up to 448 acre feet per year (AFY) of effluent will be discharged at Broderson's 8-acre leach fields. Discharge can occur during wet and dry weather. This discharge is expected to mitigate 99 AFY of seawater intrusion. Five vadose zone monitoring wells will be installed to monitor groundwater quality.

Bayridge Estates Leach Field: The County will utilize the existing Bayridge Estates leach fields, which will no longer be needed as a leach field once the LOWWP is on-line, to percolate approximately 33 AFY of treated effluent. This site provides additional disposal capacity and also mitigates potential impacts to Willow Creek.

2.6.2 Irrigation to Replace Potable Urban Purveyor Water Demand

Schools (Los Osos Middle School, Monarch Grove Elementary, Baywood Elementary, Sunnyside Elementary): The largest consumers of potable water for the Water Purveyors are the schools. There are four schools within the LOCSD and GSWC service areas and none in the S&T service area. The schools include: Los Osos Middle School, Monarch Grove Elementary School, Baywood Elementary School, and Sunnyside Elementary School. The schools will utilize the following estimated amounts of recycled water for landscape irrigation:

- Los Osos Middle School – 30 AFY
- Monarch Grove Elementary School – 10 AFY
- Baywood Elementary School – 9 AFY
- Sunnyside Elementary School – 7 AFY

Community Park: The LOCSD currently provides water supply to the community park. The community park will offset an estimated 5 AFY of potable water demand for landscape irrigation.

The San Luis Coastal Unified School District and the County Parks Department have agreed to receive recycled water for irrigation. The agreements for recycled water use will be completed before final design.

Potential for other urban users: The planned recycled water distribution system included in the approved project description provides a backbone for future infrastructure that can serve the larger community. The planned pipelines will initially supply the major, most cost-effective and beneficial, users and are adjacent to hundreds of potential users, in either existing or future subdivisions. Both existing and future development will have the ability to connect to the system and further reduce the community's reliance on potable groundwater.

Recycled water lines are not allowed in the same trench as sanitary sewer lines, per California Department of Public Health (CDPH) regulations. Adding a recycled water system, with the proper setback requirements, to serve large areas of residential users would greatly increase the project footprint and add millions of dollars to project costs, which are not in the budget or funding approvals nor covered by existing EIR or project permits.

Residential Users: Residential users on a voluntary basis can connect to the recycled water mains as feasible. Such connections shall be subject to health and water quality regulations, environmental review and permits.

2.6.3 Other Irrigation Reuse

Irrigated Agriculture: The primary objective for recycled water is to offset current pumping and production from the Basin in order to mitigate sea water intrusion. The active agriculture lands within the groundwater basin are high users to the groundwater basin. Therefore, the County's highest priority for agricultural reuse is for delivery to farmers that will offset current production within the Basin. If there is insufficient demand from farmers willing to offset current pumping, the County will then look to other agriculture users within the Basin that could utilize the recycled water to intensify the crop production on their fields or irrigate additional acreage. More discussion regarding irrigation of agriculture land is provided in Section 2.8.

Sea Pines Golf Course: Sea Pines Golf Course, located on Morro Bay at the northwestern edge of the community, currently receives approximately 20 acre feet of recycled water from the Monarch Grove Wastewater Treatment Plant and approximately 80 acre-feet of water from on-site upper aquifer wells. If the Monarch Grove subdivision is connected to the LOWWP, their wastewater treatment plant will no longer be used, and it is proposed to serve Sea Pines Golf Course with recycled water from the LOWWP at a 1:1 blend with well water. The remaining

water would continue to be provided by existing well supplies. Sea Pines Golf Course could utilize an estimated 40 AFY of LOWWP recycled water.

Cemetery: The Los Osos Valley Cemetery is located on Los Osos Valley Road, adjacent to the proposed treatment plant site. The Cemetery currently pumps potable water from its own private on-site well, which draws from the agricultural area overlying the Creek Valley Aquifer. The County could supply the Cemetery with recycled water, which would offset approximately 50 AFY of potable water use, thus decreasing the demand on the basin. Recycled water supplied to the Cemetery will provide similar benefits to the Basin as the agriculture reuse.

2.7 Infrastructure Needs

2.7.1 Seasonal Delivery Schedule

The effluent flows to each of the reuse sites will not be constant. Recycled water demands from urban and agricultural reuse sites will be maximized during the irrigation season with peak reuse flows in the late summer. There will be little or no reuse between December and February. During this period, it is likely that most of the winter flows will be delivered to the leachfields or stored in ponds at the wastewater treatment plant, which can hold up to 50 acre-ft of recycled water.

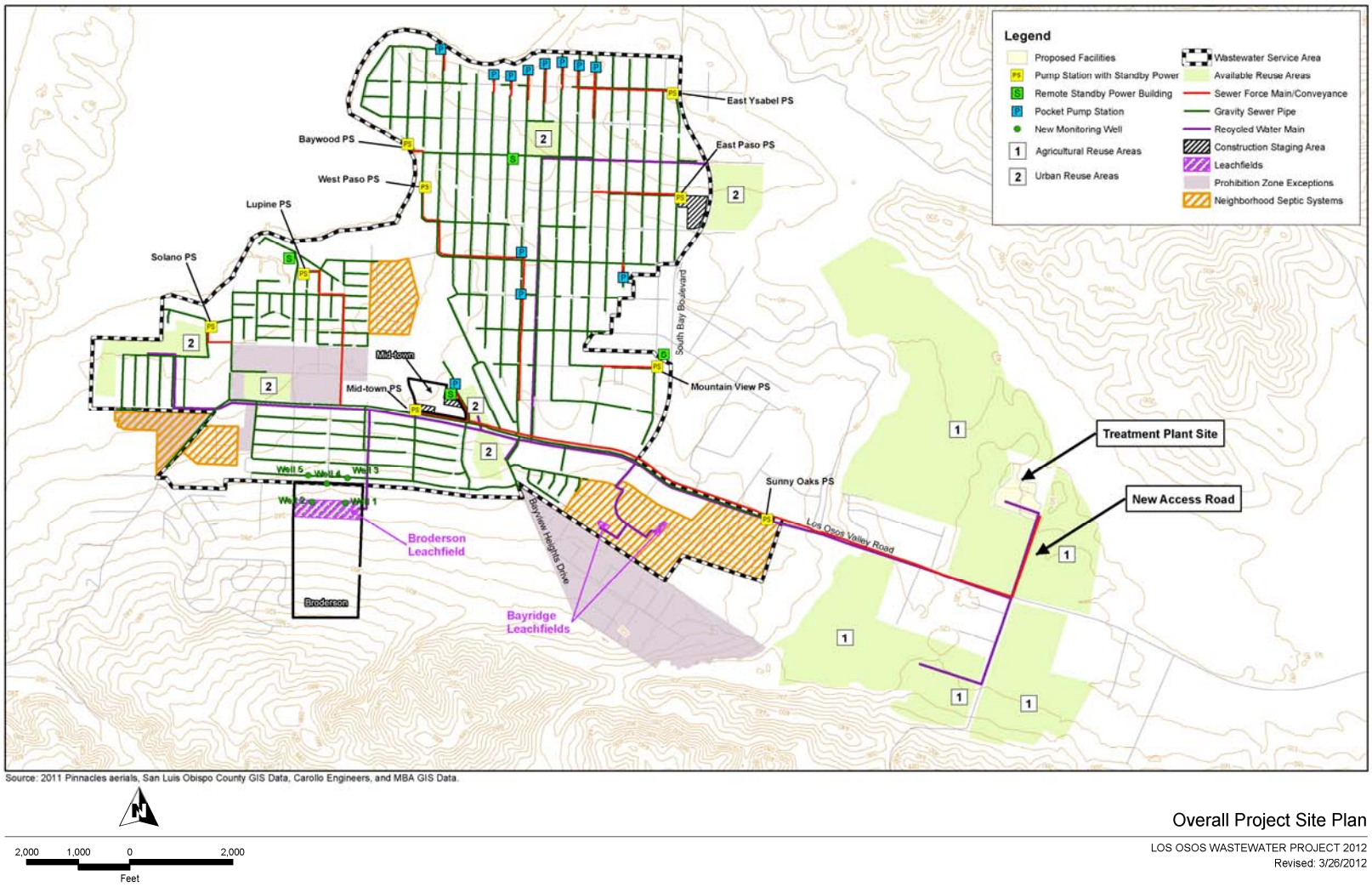
2.7.2 Conveyance System

The recycled water conveyance system to the effluent reuse sites will be designed to accommodate seasonal fluctuations in demand in anticipation of peak irrigation demands of summer, while conveyance systems to leachfields will need to anticipate maximum design flows during the winter months.

A recycled water pump station at the treatment plant will provide adequate pressure to deliver water throughout the conveyance system. Booster pumps may be needed at irrigation sites near the ends of the conveyance route. Main line and branch lines will be sized for velocities at 5 to 7 feet per second at peak flow. The County's Recycled Water engineering report will provide more detailed information regarding system delivery pressure, schedule, demand requirements, etc.

As shown in Figure 2-1, the recycled water main will be routed south from the treatment plant site to Los Osos Valley Road, a major roadway through the town of Los Osos. A connection point from the recycled water main will be available to deliver recycled water to the cemetery. A branch will be constructed to serve Clark Valley Road agricultural reuse customers south of Los Osos Valley Road. Another connection point on Los Osos Valley Road will be provided for future agricultural reuse customers to both the north and south. The pipeline will continue west along Los Osos Valley Road with branches to the leachfields to the south and a branch to the south on 10th Street to serve reuse sites at Baywood Elementary and Los Osos Middle School. The pipeline will terminate on the west side of town at the Sea Pines Golf Course.

Figure 2-1. Overall Project Site Plan



Approximately 35,000 feet of pipeline are is required to supply recycled water to the various reuse sites.

2.7.3 Storage

Storage ponds will be available to accommodate excess winter flows that cannot be delivered to any of the reuse facilities and to meet peak summer demand. This is estimated to be 50 AF initially and up to 150 AF at build-out. At least two parallel storage ponds whose combined volumes equal the total required storage volume are planned. This redundancy ensures that at least one pond can be emptied for maintenance in the summer if the ponds are not completely drained in a year. Ponds will be lined to prevent percolation and the banks protected from erosion. The maximum feasible depth below grade is approximately 15 feet. The freeboard required for any pond would be approximately 4 feet to comply with seismic codes. The footprint required for one 50 AF capacity pond is approximately 5.5 acres.

After storage for several months, the effluent will need to be screened or filtered before being sent for reuse/disposal to reduce algae that could cause clogging. The ponds will be emptied as the ability to accept effluent increases at the urban and agricultural reuse site in the spring and summer. The storage ponds should be nearly empty in the fall.

2.7.4 On-site Infrastructure Improvement Requirements

Urban reuse sites with existing landscape irrigation systems would be retrofitted to allow recycled water to be the primary water source and potable water as a backup source on an emergency basis. Appropriate cross connection control measures, including a reduced pressure back-flow preventer on the potable water service line, would be used. The connection to either water source would be configured with an approved air gap that uses a removable fitting, but does not break head at the connection.

2.8 Structured Selection Process for Initial Agriculture Reuse

2.8.1 Process Purpose and Objectives

The County of San Luis Obispo has an objective to return all water from the LOWWP back to the Los Osos Groundwater Basin for beneficial reuse. The County will have between 100 and 200 AFY of recycled water available that is in excess of the planned leachfield percolation or urban reuse. This amount will be used for agricultural irrigation and will meet the required 10% recycled water for agriculture reuse. The County's objective is to prioritize the agriculture reuse deliveries as it relates to the overall benefits to the groundwater basin and the mitigation of sea water intrusion.

2.8.2 Priority Matrix and Ranking Criteria

The agriculture reuse properties will be ranked based on a priority matrix that is structured as follows:

1. Properties within the Los Osos Groundwater Basin which will offset existing pumping of the groundwater basin by using recycled water. (sea water intrusion mitigation factor = 0.1)
2. Properties within the Los Osos Groundwater Basin which will use recycled water in addition to existing pumping of the groundwater basin. (sea water intrusion mitigation factor = 0.0)

2.8.3 Grower Outreach and Public Information

The County, in conjunction with the Coastal San Luis RCD, has completed their formal outreach program to inform the growers about the project, schedule, water quality, and costs of recycled water and to answer questions and to develop grower interest. The County has conducted information sessions for the growers and has discussed the project one-on-one with many growers and property owners. Six agricultural owners/growers have signed program participation agreements that were approved on October 25, 2011 by the County Board of Supervisors. These properties provide an estimated 100 acres of agricultural land that will potentially irrigate with 195 AFY of recycled water, and be adequate to meet the reuse requirements for the project.

Outreach will continue throughout the project, before and after the initial agreements have been obtained, to ensure that the growers' needs are addressed and to identify new recycled water users that will provide a greater basin benefit or subscribe to deliveries of future capacity.

2.8.4 Draft and Final Reuse Agreements

The County's outreach program for agricultural reuse of the available start-up flows concluded with the program participation agreements that were approved on October 25, 2011. This action identified the owners/growers that are interested in accepting recycled water from the project at start-up. The County will now develop delivery agreements with the growers that will establish the schedule, quantity, operational factors, and contract duration. It is anticipated that the delivery agreements with the growers will be for approximately 5 to 10 years, in order for growers to recoup their costs for infrastructure investments required to irrigate with recycled water. During this period, the County will continue to outreach to other property owners in the basin for the next round of delivery agreements, after the first term is completed, or to subscribe to flows from new development.

Pricing for the recycled water will be based on negotiations with the property owners who have signed the program participation agreements. Since all existing agriculture production is attained through private well production, the pricing of recycled water will most likely vary significantly. Growers with sufficient well production may only desire to purchase water at discount rates, but those properties with limited well production will be willing to pay higher rates.

2.8.5 Crisis Management Plan (Food Safety)

The County of San Luis Obispo will work with the growers to develop a Crisis Management Plan. The Crisis Management Plan will incorporate standard operating procedures for delivery

and testing and the steps that will be implemented if a food safety issue were to occur. A crisis may include, but not limited to failed water quality tests, damage to recycled water infrastructure that would preclude the ability to deliver recycled water to the customers, or to an outbreak of a food related illness, whether or not it is related to the recycled water quality.

2.8.6 Summary of Adaptive Management Principles for Future Agricultural Reuse

The County of San Luis Obispo will evaluate the recycled water usage annually to determine its efficiency and effectiveness in meeting the goals of the recycled water program. See Section 5.0 for more information regarding adaptive management principles.

2.9 Agency Oversight and Permitting

2.9.1 California Department of Public Health

The California Department of Public Health (CDPH) will permit the recycled water system. CDPH will require the County to submit an Engineer's Report prior to the issuance of the Recycled Water Permit. CDPH will review and approve the conveyance system for the recycled water system as well as the connections to each end user.

2.9.2 Regional Water Quality Control Board

The California Regional Water Quality Control Board, Central Coast Region (Region 3), issued Waste Discharge Requirement (WDR) Order No. R3-2011-0001, which regulates the discharge of treated wastewater from the Los Osos Wastewater Treatment Plant. This WDR Permit stipulate water quality parameters and other general permit requirements for the protection of water quality and public health.

2.10 Implementation Schedule and Phasing

Construction of the LOWWP is expected to commence by mid-2012 and be completed in late-2014. During the construction period, the County will work with each of the participating users, identifying the upgrades that the users will be required to complete and evaluating their needs to convert their systems with the intention for the users to receive recycled water in 2015, following completion of the project and conversion of the private homeowners from septic to the community collection system.

During the initial year of project operations, flows to the system will be limited, as private homeowners gradually abandon their septic systems and connect to the project. There will also be an initial start-up and commissioning period for the new treatment facility, in order to document the ability to reliable produce recycle water that meets State standards for irrigation reuse. During the start-up period, the majority of the recycled water flows will be delivered to the leach fields at Broderson and Bayridge Estates and irrigation uses will be gradually increased.

SECTION 3: WATER CONSERVATION PROGRAM

The Water Conservation Program required by the County project, which limits indoor water use to no more than 50 gallons per person per day on average within the Basin, shall be incorporated into the Recycled Water Management Plan. The Program shall be designed to help Basin residents to reduce their potable water use as much as possible through measures including but not limited to retrofit and installation of low water use fixtures, and grey water systems. The Program shall include enforceable mechanisms designed to achieve its identified goals, including the 50 gallons per person per day target, and shall include provisions for use of the $5 million committed by the Permittee to initiate water conservation measures pursuant to the Basin Plan as soon as possible following CDP approval. The Permittee shall coordinate with water purveyors to the maximum extent feasible to integrate this conservation program with purveyor implemented outdoor water use reduction measures (Special Condition 5b).

3.1 Introduction

Significant actions are required in order to halt seawater intrusion and establish sustainable utilization of the Basin for the future. The benefits of maintaining sustainable use of the Basin will be enjoyed by all residents of Los Osos and others who rely upon groundwater from the Basin.

Efficient use of water resources is mandated by the California Constitution, Article X, Section 2, and California Water Code Section 100. Efficiency is especially necessary in the Service Area because of the stress on water resources of the Basin, as demonstrated by the occurrence of seawater intrusion. In order to utilize the water resources of the Basin in a sustainable manner and provide the Los Osos community with a reliable long-term water supply all water usage within the Basin Plan Area must meet the highest standards for water use efficiency.

Higher water efficiency in the Service Area will decrease the amount of groundwater pumping required to meet the water demands of residences and businesses in Los Osos, thus allowing for better management of pumping in the Basin in order to eliminate seawater intrusion. Because water efficiency improvements will be funded by the project and be a condition of connection to the project for property owners, it will be highly effective throughout the Service Area.

As recognized by many water resource experts and responsible agencies, improved efficiency and increased conservation in many circumstances are the cheapest, easiest and least

destructive ways to meet water needs in a constrained environment. In addition, water efficiency improvements have collateral benefits, such as reducing energy demands and decreasing the amount of wastewater generated. This last reason is an important point of nexus for the aggressive conservation requirements in the CDP for the project.

3.2 Purpose and Objectives

The benefits of improved urban water use efficiency are the same for Los Osos as in other communities. In order to avoid the need for imported water or other water supply actions, the Los Osos community, in coordination with the County and Water Purveyors, must aggressively improve its water use efficiency now and into the future.

Aggressive water conservation will be required in order to balance the Basin, halt seawater intrusion, and meet CDP conditions requiring the Service Area to meet 50 gallons per capita per day of indoor water use. The objectives established in this section are for Los Osos to be a leading California and global community for urban water use efficiency. To that end, this section discusses new water technologies and practices that will be employed by the County within the Prohibition Zone to achieve the aggressive conservation levels (50 gpcd indoor use) that will be required in Los Osos to ensure the long-term reliability and quality of the community's water supply.

The Water Purveyors will also incorporate these new water conservation measures and practices in the areas outside the Service Area, and will also incorporate outdoor water conservation technologies and practices throughout the Los Osos community to further reduce the overall demand within the Los Osos Groundwater Basin. These additional water efficiency measures are discussed in detail in the draft 2011 Water Demand Analysis and Water Conservation Evaluation prepared by the County and Water Purveyors through the ISJ Working Group.

3.3 Water Demand Analysis

The County and Water Purveyors retained Maddaus Water Management (Maddaus) in 2010 to conduct an analysis of potential efficiency improvements on urban water use in Los Osos. An Administrative Review Draft of the 2011 Water Demand Analysis and Water Conservation Evaluation was released on April 5, 2011. The goals of the analysis were the following:

1. Create a water demand forecast for the years 2010 to 2035 under certain assumptions.
2. Project the costs and water savings of selected conservation measures for the years 2010 to 2035.
3. Develop a set of conservation programs.
4. Determine when and what combination of the proposed conservation measures would meet the residential indoor water use target of 50 gallons per person per day.

From this analysis, the County of San Luis Obispo has chosen a conservation program that meets the requirements of CDP conditions. The Administrative Review Draft of the 2011 Water Demand Analysis and Water Conservation Evaluation can be found on the County's website at:

http://www.slocounty.ca.gov/Assets/PW/LOWWP/document+library/DemandandConservationReport.pdf

3.3.1 Population Assumptions and Projections

Maddaus completed the water conservation analysis for the years 2010 to 2035 under two scenarios for future development in the Basin Area.

The No Further Development Scenario assumes there is no future urban development in Los Osos beyond that which exists in 2010. The purpose of this scenario is to determine the impact of water efficiency improvements on water use at current levels of development. This is particularly important in light of the growth moratorium that has limited further urban development in Los Osos since 1988. Policies of the County, California Coastal Commission and Regional Water Quality Control Board will not allow future development to occur until seawater intrusion has been halted, and the Basin is being managed on a sustainable basis. Thus, the occurrence of any future development in Los Osos is conditioned upon the successful implementation of the Basin Plan, including water use efficiency improvements. Because there will be no further development in Los Osos prior to the successful implementation of this Basin Plan and the construction of the wastewater collection system and treatment plant, it is appropriate to analyze future water demands under the *No Further Development Scenario*.

The Draft Estero Area Plan Development Scenario assumes that future development in Los Osos follows the projections made in the Draft Update Estero Area Plan (Estero Plan) from 2005. Those projections anticipate the population within the URL increasing by roughly 35 percent through 2035. Although the Draft Update was not approved by the Coastal Commission based on water supply concerns, those concerns are being addressed in the Basin Plan. The projected level of development and population in the official 1988 Estero Plan is widely considered to be unrealistic and likely to be revised downward as part of the next Estero Plan update and Los Osos Habitat Conservation Plan (HCP) effort. The 2005 Draft Update Estero Plan was based on a parcel-by-parcel evaluation of potential development in Los Osos, and represents the most reasonable full build-out scenario available to the Water Purveyors for use in the Basin Plan.

The No Further Development Scenario and Draft Estero Area Plan Development Scenario represent low and high marks for future water demands. Actual future development within the URL may fall somewhere between those two scenarios. Projected population under the two scenarios is listed in Table 3-1.

Table 3-1. Los Osos URL Population Projections (2010-2035)						
	2010	**2015**	**2020**	**2025**	**2030**	**2035**
No Further Development Scenario	14,452	14,459	14,466	14,474	14,481	14,488
Estero Area Plan Development Scenario	14,452	14,452	16,192	18,142	19,627	19,627

Source: Maddaus Report, at 17.

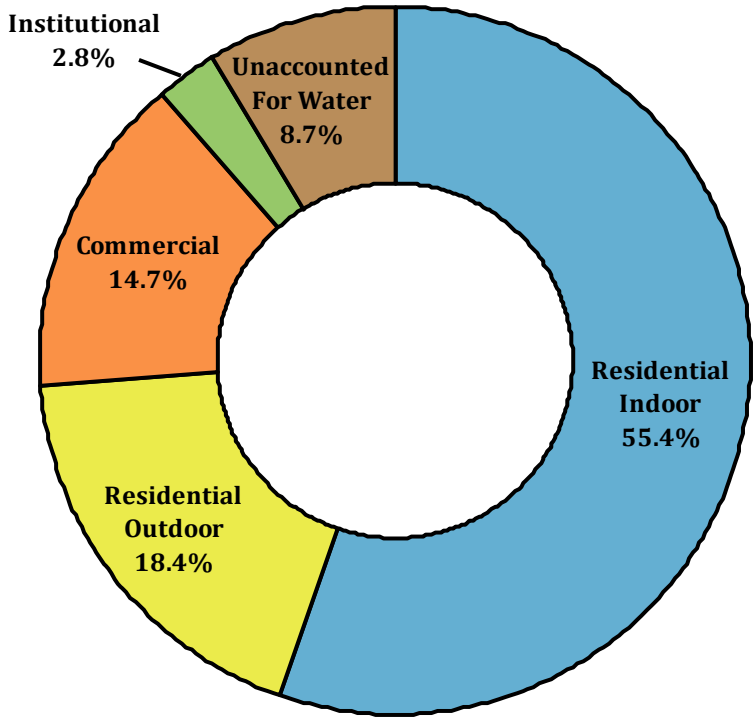
3.3.2 Total Water Demand by Customer Type and Existing Per Capita Demand

As noted previously, the Los Osos community is served by three water purveyors: Los Osos Community Services District, Golden State Water Company and S&T Mutual Water Company. The three primary water users within LOCSD and GSWC are residential, commercial and institutional. S&T MWC only provides water service to residential customers. Maddaus obtained the historical records of water use from each of the three water purveyors to determine the total water demand by customer type and the existing per capita demand. This data was inputted into their Decision Support System Model (DSS Model) to evaluate the water conservation measures.

The current total percentage of the water use for these combined customer classes is presented in Figure 3-1. Residential water use is the largest use at 74% with indoor water use totaling 55% of total water use. As the community grows, the percentages referenced below are expected to remain roughly the same, though they are dependent on the types and mix of commercial activities present in the community at any given time.

Table 3-2 and Table 3-3 provide a summary of the existing water use for the Los Osos community within the Urban Reserve Line. As noted in Table 3-3, the current indoor per capita water use is estimated at 70 gpcd.

Figure 3-1. Distribution of Urban Water Uses in Los Osos



Source: Maddaus Report, at 19, 21.

Table 3-2. Base Year Average and Indoor Percentages by Customer Type

Reference Year	Residential		Commercial		Institutional	
	Average, gpd/a	Indoor	Average, gpd/a	Indoor	Average, gpd/a	Indoor
2009	243	75%	1,012	67%	5,748	30%
	Includes single family, multi-family		Includes Commercial, Retail, Fire, & Irrigation		Includes Schools and Other	

Table 3-3. Water Use By Customer Type						
Category	**Average Number of Accounts**	**Average Water Use (gpd/a)**	**Average Water Use (mgd)**	**% of Total Water Use**	**Total Water Use (gpcd)**	**Indoor Water Use (gpcd)**
Residential	5,574	243	1.354	80.77%	94	70
Commercial	267	1,012	0.271	16.14%		
Institutional	9	5,748	0.052	3.09%		
Total	5,581		1.676	100%		

3.3.3 Future Total Water Demand without Water Conservation

Maddaus initially analyzed the projected water demands of the Los Osos community under the No Further Development Scenario and Estero Area Plan Development Scenario, without implementation of any water use efficiency improvements. However, because certain plumbing improvements are required by the state Plumbing Code, CalGreen building standards and other existing legal mandates, there will be some reduction in urban water use in the Los Osos community even without any actions under the County's Recycled Water Management Plan and the Basin Plan. These legal mandates are expected to reduce urban water use in Los Osos by 12 percent over the next 25 years under the No Further Development Scenario, and by 19 percent under the Estero Area Plan Development Scenario. Maddaus analyzed all future water demands with and without implementation of current legal mandates.

Based on Maddaus' report, Figure 3-2 and Table 3-4 show the annual potable water demand projections for the No Further Development Scenario. Figure 3-3 and Table 3-5 show the annual potable water demand projections for the Estero Area Plan Development Scenario. All of the graphs show projections for demand with and without the plumbing code through 2035 without any conservation.

Figure 3-2. Water Demand Projections without Conservation (No Population Growth)

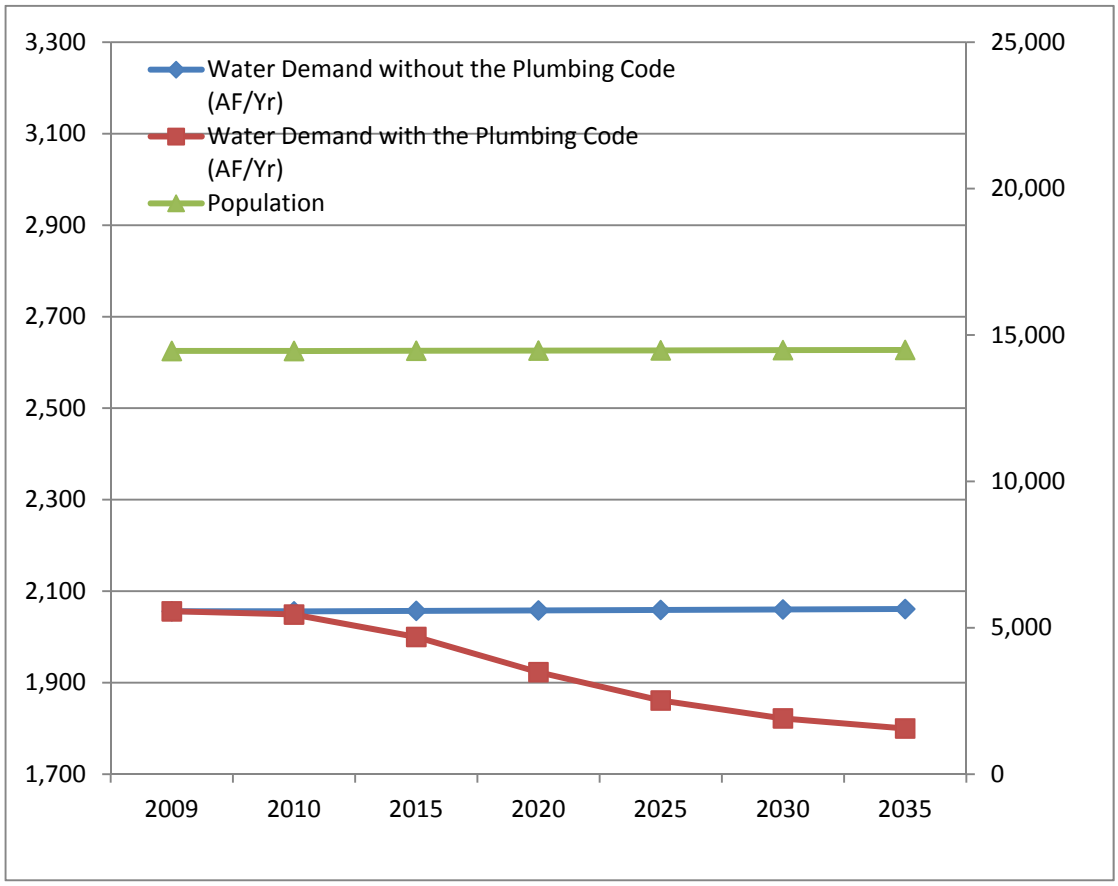


Table 3-4. Water Demand Projections without Conservation (No Population Growth)

	2009	2010	2015	2020	2025	2030	2035
Water Demand w/o Plumbing Code (AF/Yr)	2,056	2,056	2,057	2,058	2,059	2,060	2,061
Water Demand w/ the Plumbing Code (AF/Yr)	2,056	2,049	2,000	1,923	1,861	1,822	1,800
Population	14,452	14,452	14,459	14,466	14,474	14,481	14,488

Figure 3-3. Water Demand Projections without Conservation (Estimated Population Growth)

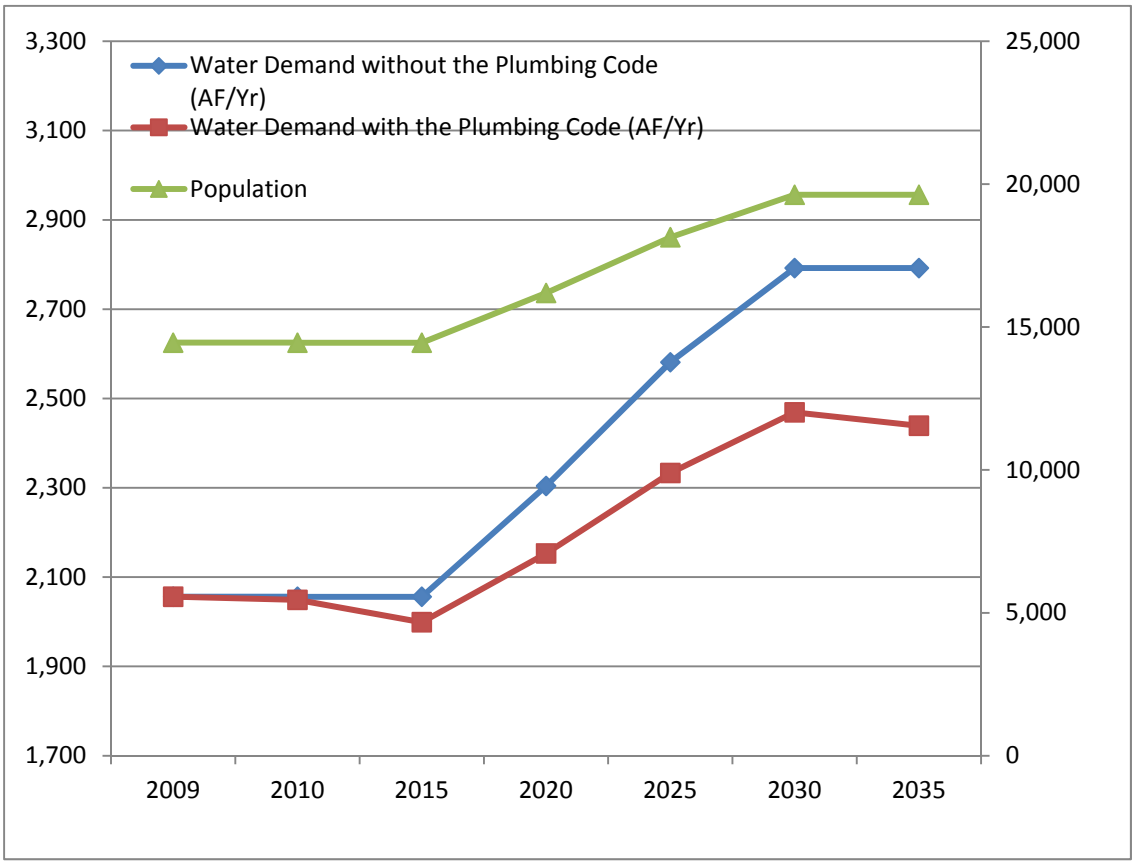


Table 3-5. Water Demand Projections without Conservation (Estimated Population Growth)

	2009	2010	2015	2020	2025	2030	2035
Water Demand w/o Plumbing Code (AF/Yr)	2,056	2,056	2,056	2,304	2,581	2,792	2,792
Water Demand w/ Plumbing Code (AF/Yr)	2,056	2,049	1,999	2,153	2,333	2,469	2,439
Population	14,452	14,452	14,452	16,192	18,142	19,627	19,627

3.4 Screening and Selection of Conservation Measures

Maddaus, working with the County and Water Purveyors through the ISJ Working Group, reviewed water uses in the Los Osos URL and developed and evaluated a number of indoor and outdoor water efficiency improvement measures that could potentially be applied to the community. This section will discuss each of the proposed measures. The County of San Luis Obispo, as part of the LOWWP and the requirements established in the CDP, will implement water conservation measures for indoor water use within the Service Area.

3.4.1 Screening Criteria and Purveyor Input

In November 2010, the County and Water Purveyors met with Maddaus and screened an initial list of 60 measures (indoor and outdoor) based on the following criteria:

- **Technology/Market Maturity** – Refers to whether the technology needed to implement the conservation measure is commercially available and supported by the local service industry. A measure was scored low if the technology was not commercially available or high if the technology was widely available in the service area. A device may be screened out if it is not yet commercially available in the region.
- **Service Area Match** – Refers to whether the measure or related technology is appropriate for the area's climate, building stock or lifestyle. For example, promoting xeriscape gardens for multi-family or commercial sites may not be appropriate where water use analysis indicates little outdoor irrigation. Thus, a measure scored low if it was not well suited for the area's characteristics and could not save water. A measure scored high if it was well suited for the area and could save water.
- **Customer Acceptance/Equity** – Refers to whether retail customers within the community would be willing to implement and accept the conservation measures. For example, would retail customers attend homeowner irrigation classes and implement lessons learned from these classes? If not, then the water savings associated with this measure would not be achieved, and a measure with this characteristic would score low. This criterion also refers to retail customer equity, i.e., whether one category of retail customers receives the benefit while another pays the costs without receiving benefits. Retail customer acceptance may be based on convenience, economics, perceived fairness and aesthetics.

Each measure was discussed and ranked based on these three criteria. Measures with low scores were eliminated from further consideration, while those with high scores passed into the next evaluation phase (cost-effectiveness analysis by Maddaus).

3.4.2 Measures Selected for Economic Analysis

The initial screening phase reduced the measures to be evaluated from 60 measures down to 31 measures. Some of these measures would be applied to existing development and some would be limited to new development because an existing home was deemed to not be easily retrofitted. Each of the measures applicable to existing development is described below. **A (**) designation following the title notes measures the County will be implementing.**

- **High Efficiency Toilet Rebate.** Provide a $100 rebate or voucher for installation of a High Efficiency Toilet (HET) to residential or commercial customers. HETs are defined as any toilet flushing at an average of 1.28 gallons per flush or less, including dual flush toilets. The rebate amount would reflect the incremental purchase cost between an Ultra Low Flow Toilet (ULFT) and a HET. This measure would incentivize the purchase of HETs when customers replace toilets on a normal replacement schedule. More aggressive toilet replacement would occur as part of the Toilet Retrofit on Sale/Account Change, Fixture Replacement by Deadline, Subsidized Community Retrofit (Partial) and Subsidized Community Retrofit (Full) measures set forth below.
- **Toilet Retrofit on Sale/Account Change**.** Require a certificate of compliance be submitted to the County that verifies a plumber has inspected the property and determined that HETs were in place or were installed at the time of sale of any residential property, before close of escrow. Coordinate with California law SB 407 (2009), but require fixture upgrades rather than notifying new owner of the presence of inefficient fixtures. This measure would replace less efficient toilets with HETs when a house is sold, or when rental property lessees change, if the water bill is paid directly by lessees. It would result in a more aggressive toilet replacement schedule than the High Efficiency Toilet Rebate program, but a less aggressive schedule than the Fixture Replacement by Deadline, Subsidized Community Retrofit (Partial) and Subsidized Community Retrofit (Full) measures set forth below.
- **Fixture Replacement by Deadline.** The County would pass an ordinance requiring owners of residential and commercial properties to bring fixtures up to efficient standards by a fixed date at their own expense. The deadline could be the date residences and businesses are required to connect to the Los Osos Wastewater Project, since toilet replacement is already required as a condition for connection pursuant to the Los Osos Wastewater Project. This measure would primarily affect those properties that lie outside the Prohibition Zone. This measure would result in replacement of inefficient toilets on a more aggressive schedule than the High Efficiency Toilet Rebate or Toilet Retrofit on Sale/Account Change measures. It differs from the Subsidized Community Retrofit (Partial) and Subsidized Community Retrofit (Full) measures set forth below, in that this measure does not include any subsidy to residential or commercial property owners.
- **Subsidized Community Retrofit (Partial)**.** This measure would subsidize the replacement of designated fixtures before residential and commercial properties connect to the Los Osos Wastewater Project. Included in the retrofit would be inefficient toilets (flushing with more than 1.6 gallons), showerheads using more than 2.0 gpm and faucets using more than 1.5 gpm. The subsidy would cover the cost of fixtures and some installation labor.
- **Subsidized Community Retrofit (Full).** This measure would add washing machines to the list of fixtures replaced in the Subsidized Community Retrofit (Partial) measure. Washing machines using less than 20 gallons per load would be provided. The subsidy would cover the cost of the washing machines, in addition to other fixtures.

- **Retrofit Kit Distribution.** Provide owners of pre-1992 homes with retrofit kits that contain easy-to-install low flow showerheads, faucet aerators and toilet tank retrofit devices.
- **Residential Clothes Washer Rebate**.** Residential property owners would be eligible to receive approximately a $150 rebate on a new high efficiency clothes washer. The rebates would remain consistent with relevant state and federal regulations on clothes washers and would only apply to the best available technology. This measure would be less aggressive than the Subsidized Community Retrofit (Full) within the Prohibition Zone, because it would offer a smaller subsidy for replacement of inefficient clothes washers. If both measures were adopted, this measure would apply primarily outside the Service Area.
- **Commercial Clothes Washer Rebate**.** This measure would provide a rebate for the installation of high efficiency washers in the two coin-operated laundromats in Los Osos, which have 30 machines each. Rebate amounts would reflect the incremental purchase cost.
- **Residential Water Survey**.** Conventional indoor and outdoor water surveys for existing single- and multi-family residential customers. Normally homeowners with high water use are targeted and are provided a customized report on how to save water in their home.
- **Restaurant Spray Nozzle Replacement**.** This measure would provide free installation of 1.6 gpm or lower flow spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.
- **School Building Retrofit**.** Fund a school retrofit program patterned after The Metropolitan Water District of Southern California, in which schools receive grants to replace inefficient fixtures and upgrade irrigation systems.
- **Commercial Water Survey**.** The top commercial customers would be offered a free water survey that would evaluate ways for the business to save water and money. The commercial surveys would be for commercial accounts such as restaurants, stores and schools that use significant amounts of water.
- **Grey Water Retrofit.** This measure would provide a rebate (up to $1,000) to assist a certain percentage of single-family homeowners per year to install grey water systems.
- **Cisterns/Rain Catchment.** This measure would provide a $100 rebate to assist a certain percentage of single-family homeowners per year with installation of rain barrels or cisterns.
- **Rain Sensors Rebate.** This measure would provide a free rain sensor shut-off device for existing irrigation controllers for residential property owners.
- **Rotating Sprinkler Nozzle Rebate.** This measure would provide rebates for rotating spray nozzle for existing sprinkler irrigation systems for residential or CII properties.
- **Water Waste Ordinance.** Under this measure, the County would adopt or modify existing ordinances or regulations to prohibit the waste of water, which is defined as gutter flooding and failure to repair leaks in a timely manner.

- **Turf Removal.** This measure would provide a 50¢ per square foot incentive for turf removal for residential and commercial properties. The replacement of irrigated vegetation with xeriscape or synthetic turf may significantly reduce outdoor watering needs.
- **Efficient Outdoor Use Education Program.** Under this measure, the responsible party would offer, organize and sponsor a series of educational workshops or other means of educating homeowners in efficient landscaping and irrigation principles. The program would utilize guest speakers, xeriscape demonstration gardens and incentives, such as distribution of nursery plant coupons. The program would be focused on residential properties, but could be useful to commercial properties as well.
- **Public Information Program**.** Public education would be used to raise awareness of conservation measures available to customers. The program would continue existing efforts, including school programs, poster contests, speakers to community groups, conservation hotline, website, video loan, radio and television time and printed educational material such as water bill inserts. The responsible parties could also consider increasing current efforts, possibly adding cell phone apps, Facebook and an interactive kiosk with view screen. This program would continue indefinitely.
- **Media Campaign**.** This measure would design and run a media campaign, e.g., "20 Gallon Challenge". The 20 Gallon Challenge is a media campaign run recently in Southern California whose message is a call for residents and businesses to reduce water use on average by 20 gallons per person per day. The responsible parties would determine appropriate media campaign messages with marketing study/focus groups.
- **S&T Service Meters.** This measure would install meters on all service accounts in the S&T water service area. Metering of water usage has been demonstrated to raise awareness of water use and lead to lower levels of consumption. All customers in the S&T water service area are residential properties.
- **S&T Conservation Pricing.** The goal of this measure is to change the current water rate structure of S&T to reduce discretionary water use. For example, with a single family inclining block rate structure, the number of tiers, volume in each tier, or water rates within each tier could be changed so that more customers are encouraged to conserve. This may require a water rate study and would apply in the S&T service area only because LOCSD and GSWC already have adopted conservation rates.

Each of the measures that would potentially be applied to new development is described below.

- **High Efficiency Clothes Washer Requirement**.** Under this measure, the County Planning and Building Department would ensure that an efficient clothes washer was installed before new home or multi-family residential building occupancy. The Water Purveyors would impose conditions of water service that include efficiency standards for washing machines.
- **High Efficiency Dishwasher Requirement**.** Under this measure, the County would modify the Building Code to require efficient dishwashers meeting water efficiency standards.

- **Hot Water on Demand**.** This measure would require developers to equip new homes or buildings with efficient hot water on demand systems such as structured plumbing systems. These systems use a pump placed under the sink to recycle water sitting in the hot water pipes to the water heater. This measure may also require developers to move the water heater into the center of the house and/or reduce hot water waiting times by having an on-demand pump on a recirculation line.
- **Grey Water Plumbing**.** Require that the drain lines in new single-family homes be plumbed for future installation of grey water systems.
- **Efficient Fixtures Requirement**.** This measure would revise the County Building Code requirements for new commercial buildings to require high efficiency commercial equipment such as ice machines, food steamers and conductivity controllers.
- **Landscape and Irrigation Standards**.** This measure would enforce current County Landscape Design Standards for Water Conservation. Those standards specify that development projects subject to design review must be landscaped according to xeriscape principles, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers.
- **Smart Irrigation Controllers and Rain Sensors**.** This measure would require developers for all properties of greater than two residential units and all commercial development to provide the latest state of the art SMART irrigation controllers and rain sensors. These SMART controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly.
- **Multi-Family Submetering**.** This measure would require the metering of individual units in new multi-family, condos, townhouses, mobile-home parks and business centers with less than four stories and with water heater in the units.

3.4.3 Cost Benefit Analysis

The determination of economic feasibility of water conservation programs depends on comparing the costs of the programs to the benefits provided. The benefit-cost analysis was performed using Maddaus' DSS Model, which calculates water savings at the end-use level. For example, the DSS Model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. Then a present value analysis using constant 2009 dollars and a real discount rate of 3% is applied to discount costs and benefits to the start year. From this analysis, benefit-cost ratios of each measure are computed.

When measures are put together in programs, the model is set up to avoid double counting water savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between multiple measures.

Economic analysis can be performed from several different perspectives, based on which party is affected. For planning water conservation programs for utilities, the perspectives most commonly used for benefit-cost analyses include the utility and the community. The utility benefit-cost analysis is based on the benefits and costs to the water provider. The community

benefit-cost analysis includes the utility's benefits and costs combined with the customer's benefits and costs. These include customer energy and other capital or operating cost benefits plus costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages for this analysis. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving and supplying water. Second, because revenue shifts are treated as transfer payments, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. Because it is the water provider's role in developing a conservation plan that is paramount in this study, the utility's perspective was primarily used to evaluate elements of the plan.

The community perspective is defined to include the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in conservation programs are considered, as well as the benefits received in terms of reduced energy bills (from water heating costs) and wastewater savings, among others. Other factors external to the utility, such as environmental effects and climate change, are not included in the benefit-cost analysis. Because these external factors are often difficult to quantify and are not necessarily under the control of the utility, they are therefore frequently excluded from economic analyses, including this one.

Costs were determined for each of the measures based on industry knowledge, past experience and data provided by the water agencies and contractors. Costs may include incentive costs (usually determined on a per-participant basis), fixed costs (such as marketing), variable costs (such as the costs to staff the measures and to obtain and maintain equipment) and a one-time set-up cost. The setup cost is for measure design by staff or consultants, any required pilot testing and preparation of materials that will be used in marketing the measure. Measure costs were estimated for 25 years, (each year between 2009 and 2035). Costs were spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations.

The unit costs vary according to the type of account and implementation method being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multi-family account, and for a rebate versus a direct installation implementation method. Typically water utilities have found that there are increased costs associated with achieving higher market saturation, such as more surveys per year. Appendix A, in the Maddaus Report shows the unit costs used in the study. The model calculates the annual costs based on the number of participants each year. The general formulas for calculating annual costs are:

Annual Utility Cost = Annual market saturation * total accounts in category * utility unit cost per account * (1+administration and marketing markup)

Annual Customer Cost = Annual number of participants * retail customer unit cost

Annual Community Cost = Annual utility cost + annual customer cost

3.4.4 Development of Conservation Programs

Maddaus completed a comparison of each of the measures and then developed five alternative programs: Conservation Program A, B, C, D, and E. The five programs were designed to illustrate a range of various measure combinations and resulting water savings. Some measures were not used in a program because they either were not cost effective or duplicated other measures and were less attractive.

3.4.5 Indoor Water Conservation Program (County Programs as Part of LOWWP)

The Coastal Development Permit approved by the California Coastal Commission in June 2010 imposed some water conservation requirements on the County in connection with approval of the LOWWP. Conditions of the permit require the County to implement a water conservation program, in consultation with the Los Osos Water Purveyors, within the Service Area for the Los Osos community. The County is required to provide 5 million dollars of funding towards the water conservation program. Through discussions with the Water Purveyors, Program D from Maddaus' water conservation report was chosen to optimize the use of the public funds to meet the goals in addition to the existing ordinances already adopted by the County of San Luis Obispo Board of Supervisors. Table 3-6 lists the water conservation measures that will be implemented by the County in the Service Area as part of the LOWWP.

3.4.6 Purveyor Water Conservation Programs (ISJ Working Group Programs)

The Water Purveyors are working conjunctively with the County of San Luis Obispo in the development of water conservation programs within the Los Osos Urban Reserve Line. Each Water Purveyor is governed by different laws and regulations and are therefore, adopting or approving the water conservation measures in a different manner.

Water conservation will not be limited to just the Service Area. Within the Water Purveyor's boundaries there are pockets that are not included in the Service Area. In addition, there are properties that are on private wells that are within the Urban Reserve Line, but outside the existing Water Purveyor service boundaries. The County of San Luis Obispo, the Water Purveyors, and the community at large will be supporting water conservation measures.

Table 3-7 provides a summary of the proposed water conservation measures and the entity that will be implementing the water conservation measures.

Table 3-6
Summary of County of San Luis Obispo Proposed Conservation Measures

Measure ID	Measure Name	Description
Category 1: Residential		
1A	Subsidize Partial Community Retrofit, Residential	Subsidize the replacement of designated fixtures before residential properties connect to the LOWWP. Included in the retrofit would be inefficient toilets, showerheads, and faucets.
1B	Residential Clothes Washer Rebate	Residential property owners would be eligible to receive a rebate on a new high efficiency clothes washer.
1C	Toilet Retrofit on Resale or Name Change on Water Account	Require a certificate of compliance be submitted to the County that verifies a plumber has inspected the property and determined that High Efficiency Toilets were in place or were installed at the time of sale of any residential property, before close of escrow.
Category 2: Commercial & Institutional		
2A	Subsidize Partial Community Retrofit, Commercial	Subsidize the replacement of designated fixtures before commercial properties connect to the LOWWP. Included in the retrofit would be inefficient toilets, showerheads, and faucets.
2B	Replace Restaurant Spray Nozzles	Provide free installation of 1.6 gpm or lower flow spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.
2C	School Building Retrofit	A retrofit program in which schools receive grants to replace inefficient fixtures and upgrade irrigation systems.
2D	Commercial High Efficiency Clothes Washer Rebate	Commercial property owners would be eligible to receive a rebate on a new high efficiency clothes washer.
Category 3: Educational & Outreach		
3A	Residential Water Surveys	Conventional indoor and outdoor water surveys for existing single- and multi-family residential customers.
3B	Commercial, Industrial and Institutional Surveys	Conventional indoor and outdoor water survey for commercial customers.
3C	Public Information Program	Public education would be used to raise awareness of conservation measures available to customers.
3D	Media Campaign	Design and run a media campaign, e.g., “20 Gallon Challenge”.

Table 3-6, Continued Summary of County of San Luis Obispo Proposed Conservation Measures		
Category 4: New Development		
4A	Efficient Dishwashers	Modify the Building Code to require efficient dishwashers meeting water efficiency standards.
4B	High Efficiency Clothes Washers	Ensure that an efficient clothes washer was installed before new home or multi-family residential building occupancy.
4C	Hot Water on Demand/Structured Plumbing	Developers to equip new homes or buildings with efficient hot water on demand systems such as structured plumbing systems.
4D	Plumbing for Future Grey Water Use	Drain lines in new single-family homes to be plumbed for future installation of grey water systems.
4E	New Landscape and Irrigation Requirements	Enforce current County Landscape Design Standards for Water Conservation. Those standards specify that development projects subject to design review must be landscaped according to xeriscape principles, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers.
4F	Smart Irrigation Controllers and Rain Sensors	Developers for all properties of greater than two residential units and all commercial development to provide the latest state of the art SMART irrigation controllers and rain sensors.
4G	Multi Family Submetering on New Accounts	Metering of individual units in new multi-family, condos, townhouses, mobile-home parks and business centers with less than four stories and with water heaters in the units.
4H	Efficient Fixtures in Commercial, Industrial, and Institutional Buildings	High efficiency commercial equipment such as ice machines, food steamers and conductivity controllers to be installed in commercial buildings.

Table 3-7. Implementing Entities for Water Conservation Measures					
	County	GSWC	LOCSD	S&T	Citizens
High Efficiency Toilet Rebate		●	●		●
Toilet Retrofit on Re-sale/Account Change	●	●	●		●
Subsidized Community Retrofit (Partial)	●				●
Retrofit Kit Distribution		●	●		●
Residential Clothes Washer Rebate	●	●	●		●
Commercial Clothes Washer Rebate	●				
Residential Water Survey	●	●	●	●	●
Restaurant Spray Nozzle Replacement	●				●
School Building Retrofit	●		●		
Commercial Water Survey	●	●	●	●	●
Greywater Retrofit					●
Cisterns/Rain Catchment					●
Rain Sensors Rebate		●	●	●	●
Turf Removal					●
Public Information Program	●	●	●	●	
Media Campaign	●	●	●	●	
S&T Service Meters				●	
S&T Conservation Pricing				●	
High Efficiency Clothes Washer Requirements (New Development)	●				
High Efficiency Dishwasher Requirements (New Development)	●				
Hot Water On Demand (New Development)	●				
Greywater Plumbing (New Development)	●				
Efficient Fixtures Requirements (New Development)	●				
Landscape and Irrigation Standards (New Development)	●				
Smart Irrigation Controllers and Rain Sensors (New Development)	●				
Multi-Family Submetering (New Development)	●				
Subsidized Community Retrofit (Full)	Not being implemented				
Fixture Replacement by Deadline					
Rotating Sprinkler Nozzle Rebate					
Prohibit Water Waste					
Efficient Outdoor Use Education Program					

3.4.7 Future Total Water Demand with Water Conservation

Maddaus evaluated the water demand within the Los Osos community under several water conservation scenarios for both the No Further Development Scenario and the Draft Estero Area Plan Development Scenario. Note, if the community grows under the Draft Estero Area Plan Development Scenario, it is expected that the distribution of urban water uses will remain roughly the same, though it is somewhat dependent on the types and mix of commercial activities present in the community at any given time.

Based on Maddaus' report, Figure 3-4 and Table 3-8 show the annual potable water demand projections for the No Further Development Scenario. Figure 3-5 and Table 3-9 show the annual potable water demand projections for the Draft Estero Area Plan Development Scenario. All of the graphs show projections for demand with and without the plumbing code through 2035 with Program "D" conservation. The County will be implementing Program "D" as described in the Maddaus' report, which is the most cost effective and comprehensive approach that meets the 50 gpcd requirement.

Figure 3-4. Water Demand Projections with Conservation

(No Population Growth)

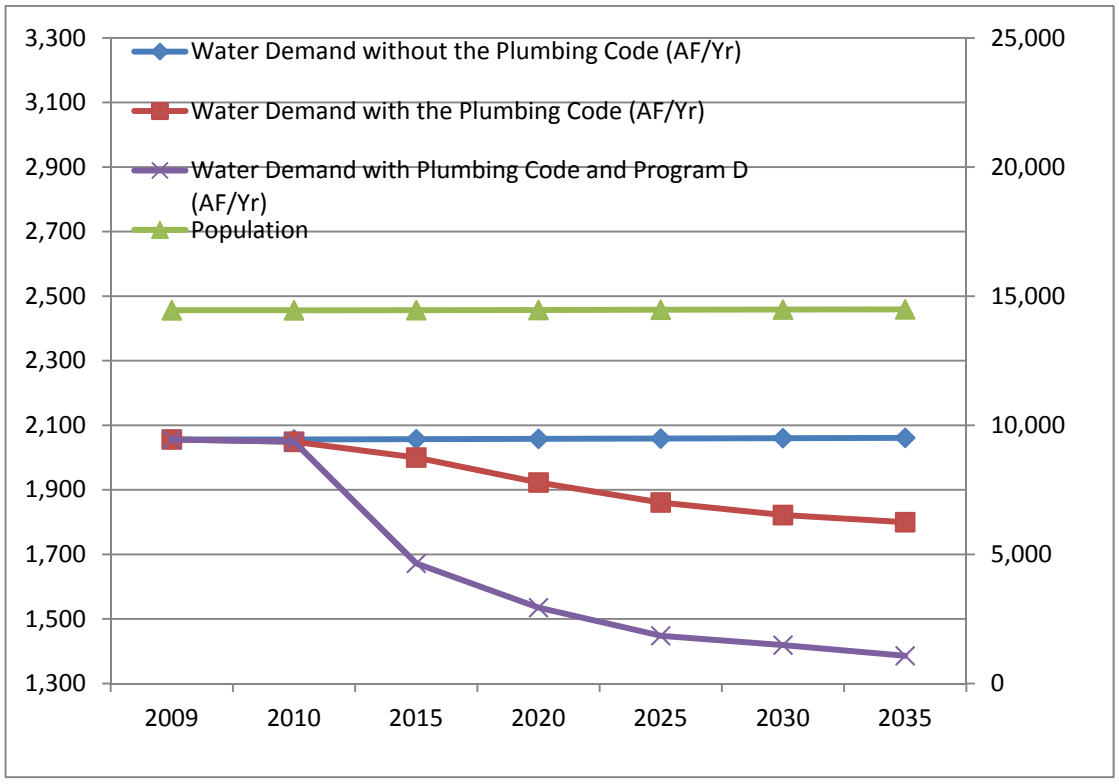


Table 3-8. Water Demand Projections with Conservation (No Population Growth)							
	2009	2010	2015	2020	2025	2030	2035
Water Demand w/o Plumbing Code (AF/Yr)	2,056	2,056	2,057	2,058	2,059	2,060	2,061
Water Demand w/ Plumbing Code (AF/Yr)	2,056	2,049	2,000	1,923	1,861	1,822	1,800
Water Demand w/ Plumbing Code and Program D (AF/Yr)	2,056	2,049	1,672	1,535	1,448	1,419	1,386
Population	14,452	14,452	14,459	14,466	14,474	14,481	14,488

Figure 3-5. Water Demand Projections with Conservation (Estimated Population Growth)

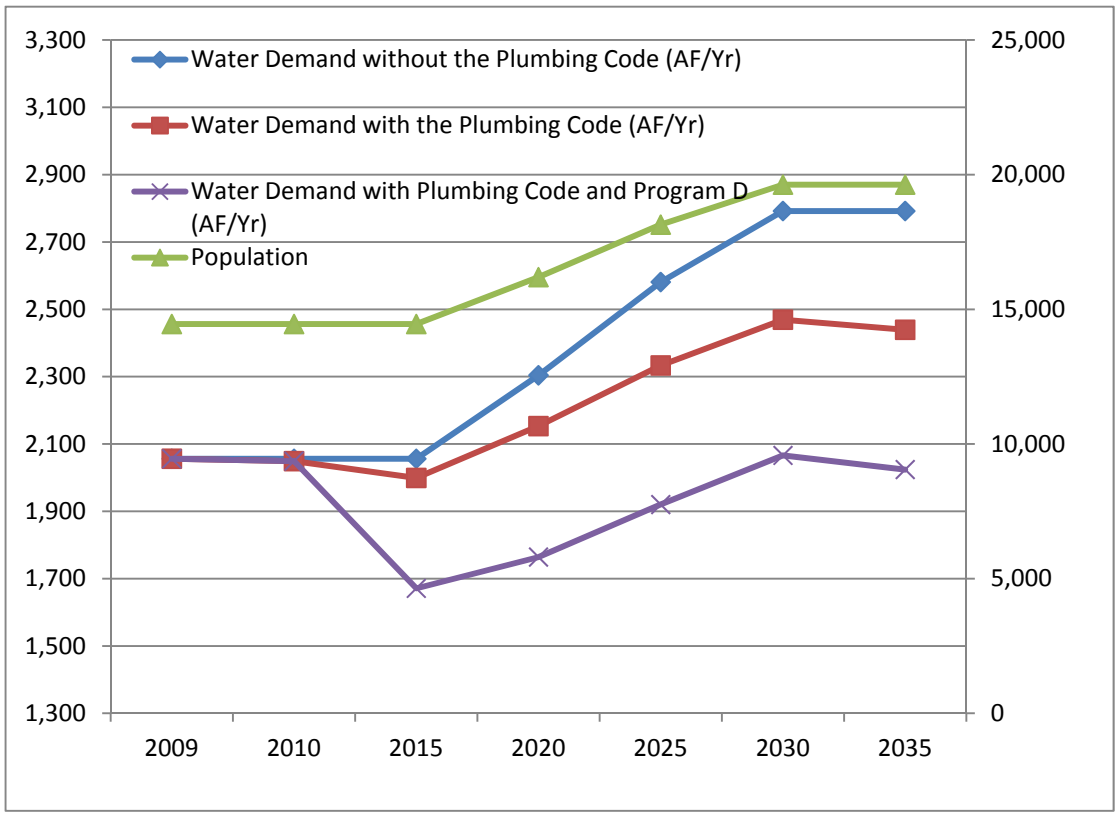


Table 3-9. Water Demand Projections with Conservation (Estimated Population Growth)							
	2009	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Water Demand w/o Plumbing Code (AF/Yr)	2,056	2,056	2,056	2,304	2,581	2,792	2,792
Water Demand w/ Plumbing Code (AF/Yr)	2,056	2,049	1,999	2,153	2,333	2,469	2,439
Water Demand w/ Plumbing Code and Program D (AF/Yr)	2,056	2,049	1,671	1,764	1,920	2,066	2,024
Population	14,452	14,452	14,452	16,192	18,142	19,627	19,627

3.5 Indoor Water Conservation and Per Capita Demand

The current indoor residential water use is estimated at 70 gallons per capita per day. This is based on the historical water use and population data from years 2006 through 2008. Program "D" is anticipated to meet the 50 gpcd target in year 2019.

In Year 2020, based on a population of 16,192 persons within the urban reserve line area, the water conservation program is estimated to reduce indoor consumption by more than 363 AFY. At build-out, the indoor per capita demand will be an estimated 47 gpcd, which will equate to an indoor savings of 505 AFY. The anticipated overall water conservation savings at build-out for indoor and outdoor, within the urban reserve line area is estimated at 768 AFY.

3.5.1 Indoor Water Conservation Implementation

The County is currently preparing a detailed implementation schedule that will specify the annual program schedule and budget and set specific rebate and funding amounts for each conservation measure. The County intends to implement the water conservation program and implementation schedule immediately following concurrence of the Recycled Water Management Plan from the Coastal Commission. In accordance with the CDP requirements, the LOWWP will fund up to $5 million in water conservation measures to meet the goal of 50 gpcd.

Of the $5 million required, it is anticipated that not all of this amount will be expended for capital costs during the construction phase of the project. Based on current estimates, it is likely that the up-front costs for retrofits and rebates necessary to reduce indoor consumption to under 50 gpcd will be significantly less than $5 million and that the remaining budget will be reserved for ongoing rebate and education programs in the initial years of operation of the project, in order to

maintain or improve on the water efficiencies already achieved. Based on Maddaus' report, Figure 3-6 and Table 3-10 show the per capita indoor water use projections for the proposed conservation program. Table 3-11 presents cost estimates and related water savings estimated in Maddaus' report. The implementation schedule currently being prepared will establish the specific rebate amounts and program budget. It is anticipated that the rebate and funding levels will be more generous than proposed in Maddaus' report, in order to reach or exceed the indoor use requirement of 50 gpcd sooner than shown in Figure 3-6.

Figure 3-6. Per Capita Residential Indoor Water Use

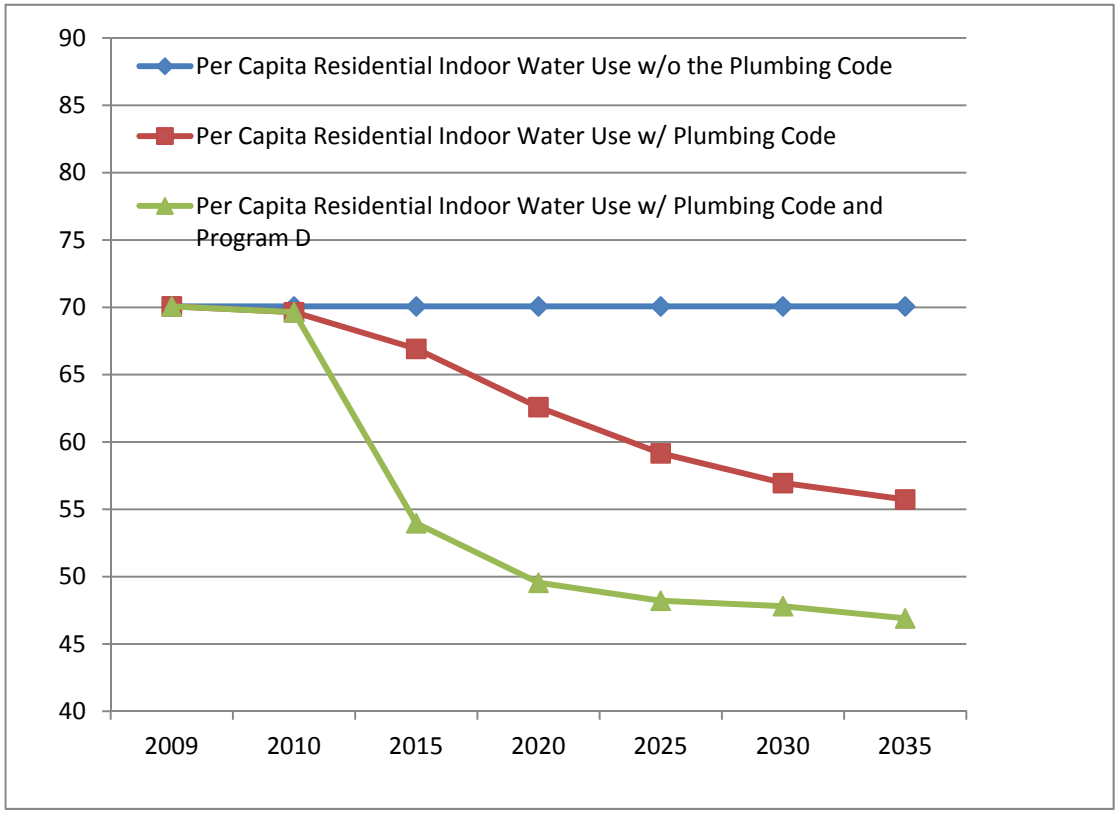


Table 3-10. Per Capita Residential Indoor Water Use with Conservation Savings Projections (gpcd)

	2009	2010	2015	2020	2025	2030	2035
Without the Plumbing Code	70	70	70	70	70	70	70
With the Plumbing Code	70	70	67	63	59	57	56
With the Plumbing Code and Program D	70	70	54	50	48	48	47

Table 3-11. Conservation Measure Costs and Water Savings				
Measure ID and Name		Present Value of Water Utility Costs ($)	Water Savings in Year 2035 (AFY)	Cost of Savings per 25-year Volume ($/AF)
1A & 2A	Subsidize Partial Community Retrofit	1,941,505	131	511
1B	Residential Clothes Washer Rebate	215,339	12	618
1C	Toilet Retrofit on Resale or Name Change on Water Account	31,804	60	22
2B	Replace Restaurant Spray Nozzles	6,023	4	49
2C	School Building Retrofit	22,971	4	200
2D	Commercial High Efficiency Clothes Washer Rebate	27,046	6	153
3A	Residential Water Surveys	447,310	23	818
3B	Commercial, Industrial and Institutional Surveys	45,170	19	87
3C	Public Information Program	303,216	6	153
3D	Media Campaign: Such as the Twenty Gallon Challenge	30,685	0	37
4A	New Development Residential Require Efficient Dishwashers	37,774	3	767
4B	New Development Residential Require High Efficiency Clothes Washers	14,453	8	76
4C	New Development Require Hot Water on Demand/Structured Plumbing	38,632	12	187
4D	New Development Require Plumbing for Future Grey Water Use	33,997	5	388
4E	New Development Require New Landscape and Irrigation Requirements	32,798	17	111
4F	New Development Require Smart Irrigation Controllers and Rain Sensors	40,547	14	161
4G	New Development Require Multi Family Submetering on New Accounts	4,592	8	34
4H	New Development Require Efficient Fixtures in Com, Ind, and Inst. Buildings	1,420	12	7
	Total	**3,275,282**	**344**	

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 4: MONITORING PROGRAM

The Monitoring Program shall be designed to quantitatively and qualitatively assess the effectiveness of the Basin Plan over time to ensure its objectives are achieved, and shall include: a baseline physical and ecological assessment of ground and surface water and related resources to be monitored; measureable goals and interim and long-term success criteria for those resources, including at a minimum clear criteria that demonstrate that the health and sustainability of Plan area resources are steadily improving over time, including with respect to seawater intrusion; monitoring locations and data types (e.g., groundwater levels and quality; wetland, stream, creek, riparian, and march plant and animal abundance, hydrology, and water quality; etc.) and a schedule for proposed monitoring activities. The Monitoring program shall also include measures to clearly document the manner in which recycled water is being reused and water is being conserved pursuant to the Recycled Water Reuse and Water Conservation Programs (Special Condition 5c).

4.1 Introduction

The Monitoring Program for the Los Osos Wastewater Project is broken into two separate programs: Groundwater Monitoring and Environmental Monitoring. Both programs are required to meet the objectives of Special Condition 5c and are described in more detail below.

A comprehensive groundwater monitoring program is being developed by the County and Water Purveyors through the ISJ Working Group to organize data collection on groundwater resources in the Basin in the development of the Basin Plan. (Note: In this RWMP, the term "Basin Plan" refers to the plan being prepared by the ISJ Working Group, and does not refer to a specific element of the RWMP specified in the CDP.) The information that will be collected under the program includes groundwater levels, water quality and production data. The groundwater monitoring program will provide the County, Water Purveyors, and private basin water users with continuously updated information on groundwater resources in the Basin.

The County's groundwater Monitoring Program for the purposes of the RWMP for the LOWWP is a key component of the monitoring program being developed by the ISJ Working Group and is necessary to achieve the water resources goals for the Basin, including prevention of seawater intrusion and establishing long-term environmentally and economically sustainable and beneficial use of the Basin. The RWMP Monitoring Program will provide significant overlap with several regulatory requirements, including: the future Basin Plan, prepared by the ISJ Working Group; the statute regarding adoption by local agencies of groundwater management plans; the California Statewide Groundwater Elevation Monitoring Program (CASGEM); and the

SWRCB's salt and nutrient monitoring guidelines as adopted in the State Recycled Water Policy.

This Environmental Monitoring Program (EMP) has also been prepared for the LOWWP, and is discussed in Section 4.7. The intent of the EMP is to quantitatively and qualitatively identify changes in wetland, stream, creek, riparian, and marsh plant and animal abundance following implementation of the LOWWP. Implementation and monitoring of the EMP will be conducted by the County as part of the overall RWMP Monitoring Program.

4.2 Purpose and Objectives

The purpose of the groundwater Monitoring Program for the LOWWP is to collect and organize groundwater data on a regular basis for use in management of the Basin in accordance with Monitoring and Reporting Program for the Los Osos Wastewater Recycling Facility Waste Discharge Requirements. The program will utilize on-going monitoring efforts by the County Department of Public Works and the Water Purveyors, expand the scope of monitoring where needed, and organize the data to improve access, reporting and data analysis efficiency.

Groundwater monitoring is essential for addressing many issues related to groundwater resources in the Basin, including determination of the sustainable yield of the Basin, seawater intrusion, salt loading and associated nitrate contamination, flooding/daylighting and future dynamic changes to the Basin resulting from the Los Osos Wastewater Project. The groundwater monitoring program will provide on-going data for evaluating these issues. The basic groundwater Monitoring Program objectives are as follows:

Objective 1: Monitor long-term groundwater level trends in a network of wells for three monitoring groups within the Basin: First Water; Upper Aquifer; and Lower Aquifer.[1]

Objective 2: Monitor seasonal fluctuations and long-term water quality trends at selected wells in each of the three monitoring groups listed in Objective 1.

Objective 3: Compile hydrologic data pertinent to Basin management, including groundwater production from the two principal water supply aquifers (Upper Aquifer and Lower Aquifer), wastewater disposal and recycled water use, local precipitation data and County stream gage records for Los Osos Creek.

Objective 4: Organize historical and on-going water production, water level and water quality monitoring data into three comprehensive databases, facilitating access and analysis.

[1] For definition of these groups, see Section 4.4.

Objective 5: Collect data sufficient to evaluate the effectiveness of Basin management strategies. Such strategies are based on certain predictions derived from use of a basin model, prepared by Cleath-Harris Geologists, Inc. It will be crucial for long-term management to test the predicted effect of various strategies on Basin resources against actual data collected as part of this groundwater monitoring program. Such data can be used to confirm and calibrate management actions.

The goal of the EMP is to identify any changes in wetland and riparian habitat areas and habitat values potentially related to decommissioning of the septic systems throughout the community of Los Osos, and to provide remedial actions as necessary to address any such changes. This goal will be accomplished through regular monitoring, data analysis, and adaptive management for the life of the project.

Implementation of the LOWWP EMP will:

- Establish baseline conditions for wetland and riparian resources;
- Ensure annual monitoring and trend analysis of wetland and riparian habitat areas;
- Provide adaptive management measures for remedial action; and,
- Maintain the current function and values of wetland and riparian habitats.

4.3 Coordination with Other Monitoring Programs

The groundwater Monitoring Program for the RWMP for the LOWWP will provide significant overlap with monitoring requirements of groundwater management plans adopted pursuant to state law, the future Basin Plan being prepared by the ISJ Working Group, with the CASGEM, and with the SWRCB Recycled Water Policy. The program managed pursuant to the future Basin Plan, however, is intended to be the primary groundwater monitoring program for the Basin, and other groundwater monitoring efforts undertaken by the County and other Parties will meet any additional requirements as well as be made consistent with the Basin Plan to the extent possible.

4.3.1 Recycled Water Management Plan

The California Coastal Commission has directed the County to prepare a Recycled Water Management Plan, which includes a Monitoring Program, as a condition of approval for the LOWWP. The Monitoring Program required in the RWMP has significant overlap with the data that is planned to be collected for the future Basin Plan, with some key differences. The Basin Plan objectives are to collect and organize groundwater level, quality and production data, along with future wastewater disposal/recycled water use data, but does not provide for collecting ecological monitoring data. The RWMP Monitoring Program will likely rely heavily on the future Basin Plan as a source of data for annual reports, as well as baseline assessment, establishing success criteria, and ensuring its objectives are achieved. The RWMP Monitoring Program will also need to be supplemented with other types of resource monitoring, as described in Section 4.7 “Environmental Monitoring Program.” As the ownership and operations entity for the

LOWWP, the County will be responsible for collection, compilation and reporting of any data to meet the Coastal Commission requirements.

4.3.2 Groundwater Management Plans

California law authorizes certain types of local agencies to develop, adopt and implement groundwater management plans. The law was originally adopted in Assembly Bill 3030 (1992) and was significantly amended in Senate Bill 1938 (2002). The Basin Plan that is being developed by the ISJ Working Group will meet the intent of the groundwater management plan statute. Additionally, the law contains groundwater monitoring requirements that are helpful in designing a program for the Basin.

The act requires any public agency seeking state funds administered through DWR for the construction of groundwater projects or groundwater quality projects to prepare and implement a groundwater management plan with certain specified components. Requirements include establishing basin management objectives, preparing a plan to involve other local agencies in a cooperative planning effort and adopting monitoring protocols that promote efficient and effective groundwater management. The requirements apply to agencies that have already adopted groundwater management plans as well as agencies that do not overlie groundwater basins identified in Bulletin 118 and its updates.

As part of any groundwater management plan, the law requires local agencies to adopt monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface waters that directly affect groundwater levels or quality or are caused by groundwater pumping in the basin. The monitoring protocols must be designed to generate information that promotes efficient and effective groundwater management.

The groundwater monitoring program planned for the future Basin Plan will be conducted in conjunction with the RWMP Monitoring Program and meets the intent of these monitoring protocols by collecting, compiling and organizing water level, surface flow and water quality data for efficient and effective groundwater management. Subsidence has not been identified as a potential problem in the Basin and is not part of the groundwater monitoring program. Surface water quality monitoring will be a part of the RWMP Monitoring Program. The primary surface waters to be monitored in the basin are Los Osos Creek, Willow Creek, and bay-front wetlands.

4.3.3 Senate Bill X7 6

In 2009, the California Legislature passed SBX7 6, which established for the first time in California, collaboration between local monitoring parties and the Department of Water Resources (DWR) to collect groundwater elevations statewide and that this information be made available to the public. This legislation led to DWR's formation of the California Statewide Groundwater Elevation Monitoring Program (CASGEM).

SBX7 6 provides that:

- Local parties, called "Monitoring Entities," may assume responsibility for monitoring and reporting groundwater elevations.
- DWR will work cooperatively with local Monitoring Entities to achieve monitoring programs that demonstrate seasonal and long-term trends in groundwater elevations.
- DWR will accept and review prospective Monitoring Entity submittals, then determine the designated Monitoring Entity for each groundwater basin, notify the Monitoring Entity and make that information available to the public.
- DWR will perform groundwater elevation monitoring in basins where no local party has agreed to perform the monitoring functions.
- If local parties do not volunteer to perform the groundwater monitoring functions, and DWR assumes those functions, then those parties become ineligible for water grants or loans from the state.

The major deadlines for CASGEM are:

- On or before January 1, 2011: Parties seeking to become Monitoring Entities were required to notify DWR. The County and Water Purveyors, through the ISJ Working Group have sought recognition by DWR as the Monitoring Entity for the Basin, until the finalization of the Basin Plan and the formal establishment of the Watermaster, at which time it is anticipated that the Watermaster will assume the duties of the Monitoring Entity.
- On or before January 1, 2012: Monitoring Entities must begin reporting seasonal groundwater elevation measurements. The County and Water Purveyors, through the ISJ Working Group plans to implement a groundwater monitoring program in order to meet this deadline.
- On or before January 1 of each year after, Monitoring Entities must report seasonal groundwater elevation measurements.

The data needs of the CASGEM program will be met by the groundwater monitoring program. DWR field log sheets or equivalent forms will be used in the program, and water level data from eligible wells will be made available for CASGEM program use.

4.3.4 Salt and Nutrient Management Plans

In February 2009, the State Water Board adopted a Recycled Water Policy to encourage the safe use of recycled water and storm water in California. The policy includes a requirement that a salt and nutrient management plan be prepared for each groundwater basin in the state. Salts and nutrients from all sources are 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. By 2014, interested parties are required to prepare salt and nutrient management plans and submit them to the applicable Regional Water Board for the basin. These implementation plans are to be developed by local water and wastewater entities, together with local salt/nutrient contributing stakeholders. The final plans will be adopted by the Regional Water Board as amendments to the region's water quality plans.

One of the components of salt and nutrient management plans is a basin-wide monitoring plan. The Recycled Water Policy specifies that such monitoring plans should include the following:

- An appropriate network of monitoring locations adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients and other constituents of concern as identified in the salt and nutrient management plan are consistent with applicable water quality objectives.
- The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
- The preferred approach to monitoring plan development is to collect samples from existing wells, if feasible, as long as existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.
- The monitoring plan must identify those stakeholders responsible for conducting, compiling and reporting the monitoring data. The data must be reported to the Regional Water Board at least once every three years.
- A provision for annual monitoring of Emerging Constituents/Constituents of Emerging Concern (CECs) is also required in salt and nutrient management plans. The State Water Board assembled a panel of experts to provide recommendations and guide future action relating to CECs. These experts produced a final report to the State Water Board in June 2010.

The data needs of the salt and nutrient management plan monitoring program will be met by the groundwater monitoring program planned in the future Basin Plan. The program will include salt, nutrient and initial CECs monitoring that cover critical areas of the Basin. The groundwater monitoring element of the future Basin Plan will be submitted by the ISJ Working Groups to the Regional Water Board for peer review and approval, and any required modifications will be made through amendment of the Basin Plan.

4.3.5 Additional Monitoring Programs

There are many other historical, existing or proposed monitoring programs within the Morro Bay watershed and the Basin region. These programs are summarized below for reference.

- San Luis Obispo County Water Level Monitoring Program: the County Department of Public Works monitors water levels in approximately 100 wells located in the Los Osos Groundwater Basin. Of these approximate 100 wells, approximately 50 wells are active. The wells included in the water level monitoring program include water purveyor wells, private individual wells, and County/State owned wells.
- Los Osos Nitrate Monitoring Program: this program operated from 1982 through 1998 under County staff, was reorganized in 2002 for the LOCSD wastewater project. LOCSD stopped the nitrate monitoring in October 2006. Prior to its termination in 2006, the program consisted of quarterly water level and water quality monitoring at 25 shallow

groundwater wells across the Basin. Water quality parameters included all forms of nitrogen, along with minerals.

- Purveyor Supply Well Monitoring
- Morro Bay National Estuary Program/Friends of the Estuary Monitoring
- United States Environmental Protection Agency (USEPA) Nation Monitoring Program
- Regional Water Board Ambient Monitoring
- Regional Water Board Storm Water Runoff Monitoring
- Regional Water Board Total Maximum Daily Load Monitoring (Future)
- Los Osos Habitat Conservation Plan Monitoring (Future)

The groundwater Monitoring Program for the RWMP will incorporate data collected in these other monitoring programs to the extent useful and feasible.

4.4 Monitoring Groups

For the purpose of monitoring data organization, the Basin has been divided into three vertically discrete groups: First Water, Upper Aquifer Water and Lower Aquifer Water. The Basin is further separated into three areas: Dunes and Bay, Urban Area (combined Western and Central) and Eastern Area. A brief discussion of these groups and their relationship between areas is presented below, and illustrated by the geologic map in Figure 4-1, the north-south cross-section in Figure 4-2, and the west-east cross-section in Figure 4-3.

4.4.1 First Water

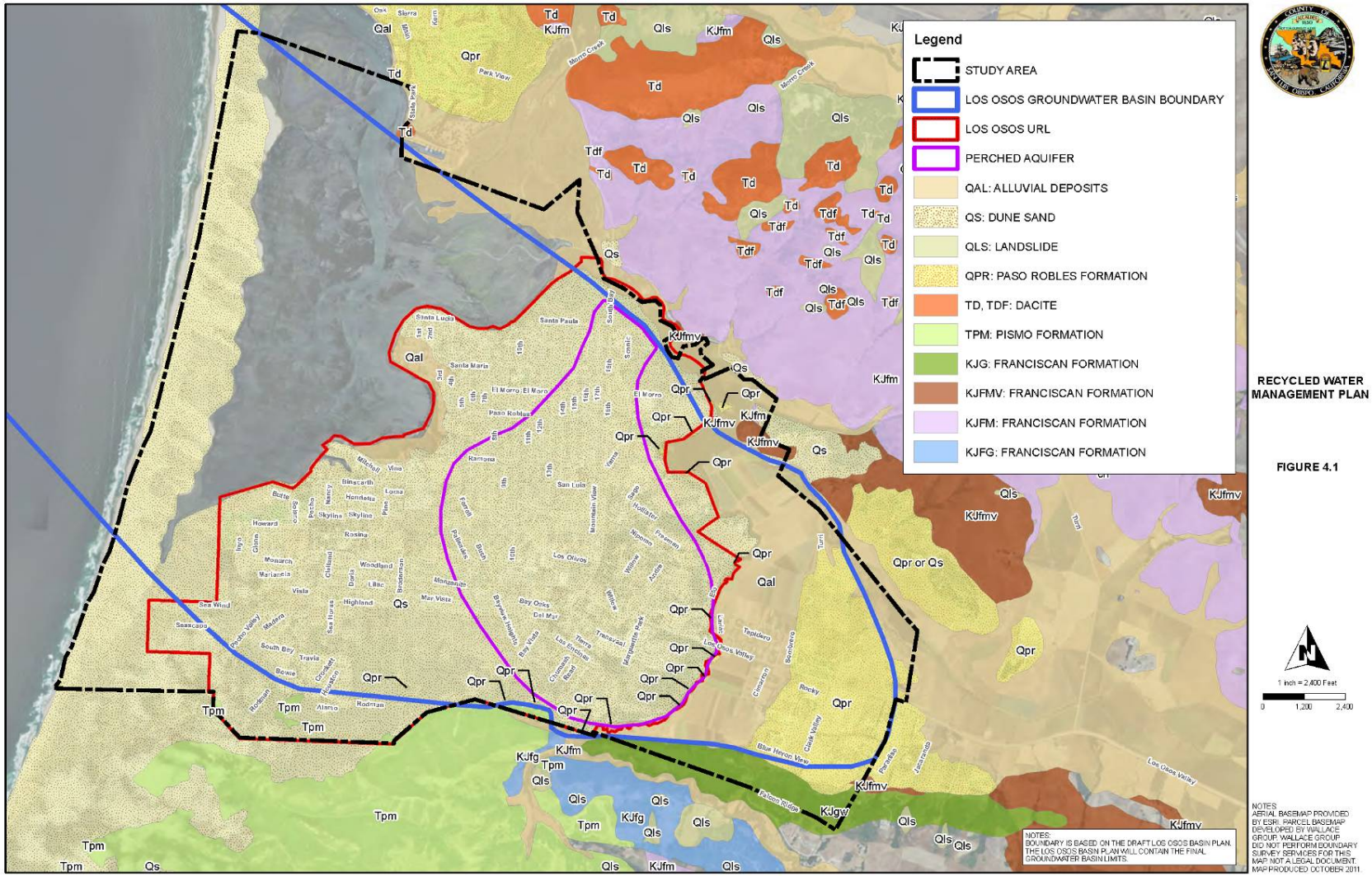
The First Water group refers to the shallowest groundwater zones and includes the alluvial aquifer, perched aquifer (Zones A and B) and the top portion of the upper aquifer (Zone C) where not overlain by the alluvial/perched aquifers or tidal flats. This group will be routinely monitored as part of the wastewater discharge permit for the Los Osos Wastewater Project and was the primary focus of two historical monitoring programs, the 1982-1998 County monitoring program and the 2002-2006 LOCSD nitrate monitoring program.

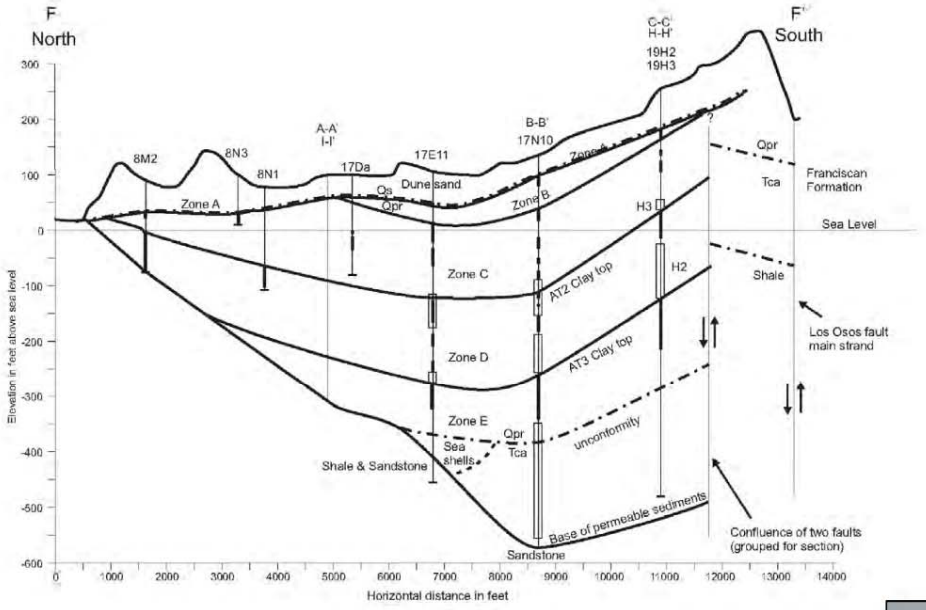
First Water is the interface where percolating waters, including precipitation and return flows from irrigation and wastewater, mix with Basin waters. Where First Water rises to the surface, it also impacts drainage and is associated with flooding issues in low-lying areas. First Water extends across the Basin, and may be present in dune sands, Paso Robles Formation deposits or Los Osos Creek alluvium. In downtown Los Osos, First Water is semi-perched above shallow clay horizons.

4.4.2 Upper Aquifer

The Upper Aquifer refers to the non-perched water supply aquifer (Zone C) above the regional aquitard. As noted above, the top portion of the upper aquifer may also be considered First Water in certain Basin areas, as shown on Figure 4-2.

Historically, the Upper Aquifer was the main water supply for the community, and is still the main source of water for private domestic wells outside of the Urban Reserve Line. As part of


Legend
STUDY AREA
LOS OSOS GROUNDWATER BASIN BOUNDARY
LOS OSOS URL
PERCHED AQUIFER
QAL: ALLUVIAL DEPOSITS
QS: DUNE SAND
QLS: LANDSLIDE
QPR: PASO ROBLES FORMATION
TD, TDF: DACITE
TPM: PISMO FORMATION
KJG: FRANCISCAN FORMATION
KJFMV: FRANCISCAN FORMATION
KJFM: FRANCISCAN FORMATION
KJFG: FRANCISCAN FORMATION
RECYCLED WATER MANAGEMENT PLAN
FIGURE 4.1
1 inch = 2,400 Feet
0 1,200 2,400
NOTES:
BOUNDARY IS BASED ON THE DRAFT LOS OSOS BASIN PLAN. THE LOS OSOS BASIN PLAN WILL CONTAIN THE FINAL GROUNDWATER BASIN LIMITS.
NOTES
AERIAL BASEMAP PROVIDED BY ESRI. PARCEL BASEMAP DEVELOPED BY WALLACE GROUP. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED OCTOBER 2011

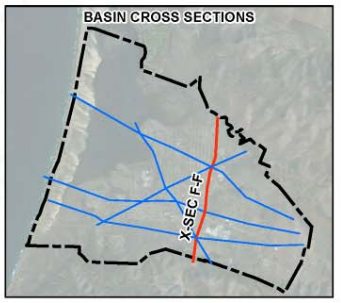


Aquifer Zones:
Zone A - Perched Aquifer
Zone B - Transitional Aquifer
Zone C - Upper Aquifer
Zone D - Lower Aquifer (shallow)
Zone E - Lower Aquifer (deep)

Well data point
19H2 Well ID
Clay layer
Well screen

Formation:
Qa - alluvium
Qs - dune sand
Qpr - Paso Robles Formation
Tca - Careaga Formation

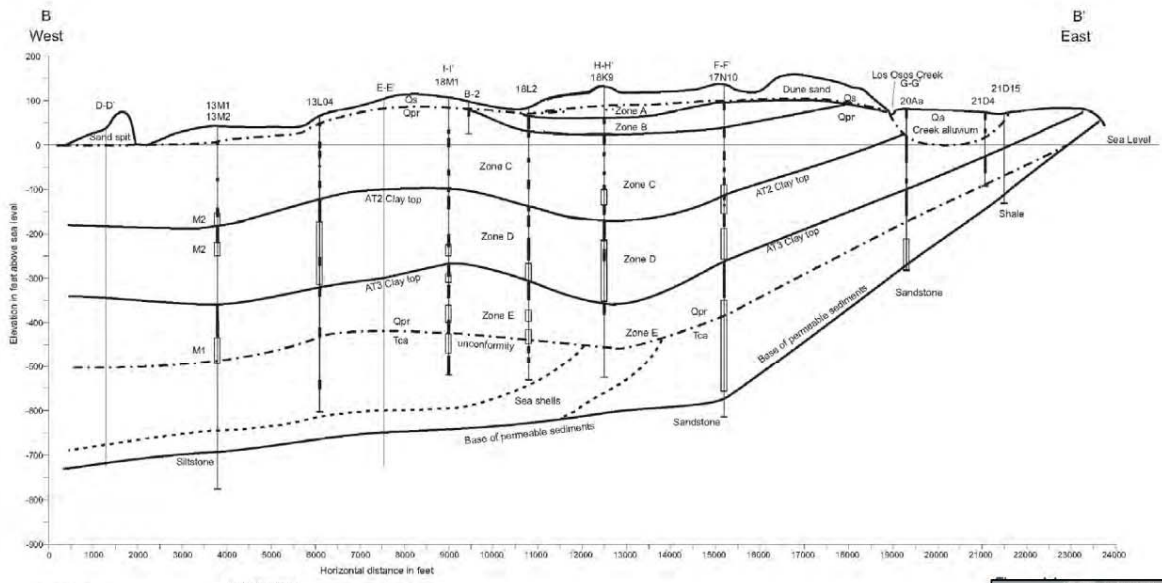
NOTES:
INFORMATION SHOWN IS BASED ON THE DRAFT LOS OSOS BASIN PLAN. THE FINAL VERSION WILL BE INCLUDED IN THE LOS OSOS BASIN PLAN.



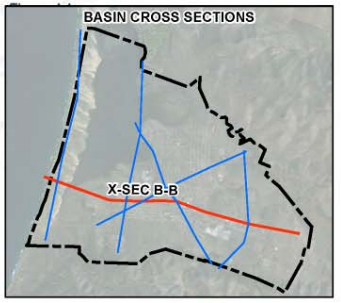
NOTES:
AERIAL BASEMAP PROVIDED BY ESRI. PARCEL BASEMAP DEVELOPED BY WALLACE GROUP. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED OCTOBER 2011.

RECYCLED WATER MANAGEMENT PLAN

FIGURE 4.2



NOTES:
INFORMATION SHOWN IS BASED ON THE DRAFT LOS OSOS BASIN PLAN. THE FINAL VERSION WILL BE INCLUDED IN THE LOS OSOS BASIN PLAN.



NOTES:
AERIAL BASEMAP PROVIDED BY ESRI. PARCEL BASEMAP DEVELOPED BY WALLACE GROUP. WALLACE GROUP DID NOT PERFORM BOUNDARY SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT. MAP PRODUCED OCTOBER 2011.

RECYCLED WATER MANAGEMENT PLAN

FIGURE 4.3

the Basin Plan, a significant increase in Upper Aquifer production is planned for the future; monitoring the Upper Aquifer is important to both the Water Purveyors and other water users.

4.4.3 Lower Aquifer

The Lower Aquifer refers to water bearing zones below the regional aquitard. There are both Paso Robles Formation and Careaga Formation deposits in the Lower Aquifer. The base of the Lower Aquifer is claystone and sandstone bedrock of the Pismo and Franciscan Formations, although the effective base of fresh water lies above bedrock at the western edge of the basin. The rising axis of the regional syncline is interpreted to cause the regional aquitard to crop out along the west banks of Los Osos Creek, and brings the Lower Aquifer in contact with the Los Osos Creek alluvium. As shown on Figures 4-2 and 4-3, there are two generalized aquifer zones within the Lower Aquifer: Zone D lies between a regional aquitard and a deeper aquitard, and Zone E is below the deeper aquitard.

Lower Aquifer Zone D is currently the main water supply for the community. Seawater intrusion has been advancing at increasing rates over time, and a significant reduction in Lower Aquifer production in the Western Urban Area is necessary to halt seawater intrusion. The groundwater monitoring program continues Lower Aquifer monitoring across the Basin, with an expanded scope that focuses on seawater intrusion monitoring.

4.5 Data Collection

Groundwater level and quality monitoring in the Basin has historically been performed by the Water Purveyors and the County and to a lesser degree by permitted waste dischargers, consultants and state agencies. Production data is collected by the Water Purveyors, while private domestic and agricultural irrigation production has not been metered, but has been estimated from land use data. There have been many historical monitoring programs and studies in groundwater in the Basin, which can contribute data to the groundwater monitoring program. Existing databases of groundwater level, quality or production include:

- EPA Storet database (water quality)
- SWRCB/USGS GAMA database (water quality)
- DWR Water Data Library (water levels)
- County well information system (water levels, elevation and well construction information)
- County and Water Purveyor groundwater production databases
- County and Water Purveyor water quality databases
- CHG Aquachem database (water quality)

Groundwater resources data currently being collected by the County and Water Purveyors have been incorporated into the groundwater monitoring program. Additional monitoring requirements identified in this program would be performed under the RWMP Monitoring Program.

The discussion below establishes the groundwater Monitoring Program for the LOWWP based on the Monitoring and Reporting Program Order Number R3-2011-0001 issued by the Regional Water Board for the LOWWP, in conjunction with the waste discharge requirements. Figure 4-4 provides a visual of the locations of the wells identified in the following sections and the groundwater contour levels as of October 2006. Additional environmental monitoring is required for the LOWWP, which is discussed in more detail in Section 4.7.

4.5.1 Semiannual Groundwater Monitoring

The County will be required to conduct semiannual groundwater monitoring at the following well sites:

- 13G
- 13H
- 13L5
- 13Q1
- 17E9
- 17F4
- 17N4
- 18E1
- 18J6
- 18L3
- 18L4
- 18N1
- 18R1
- 24A

The semiannual groundwater monitoring will be required to be analyzed in accordance to Table 4-1. In addition, Well No. 18R1 shall be sampled for Total Coliform (MPN/100 mL) on a semiannual basis. The results of the semiannual testing shall be provided in the monthly report closest to the date of testing as well as in the annual report.

Table 4-1. Semiannual Groundwater Monitoring

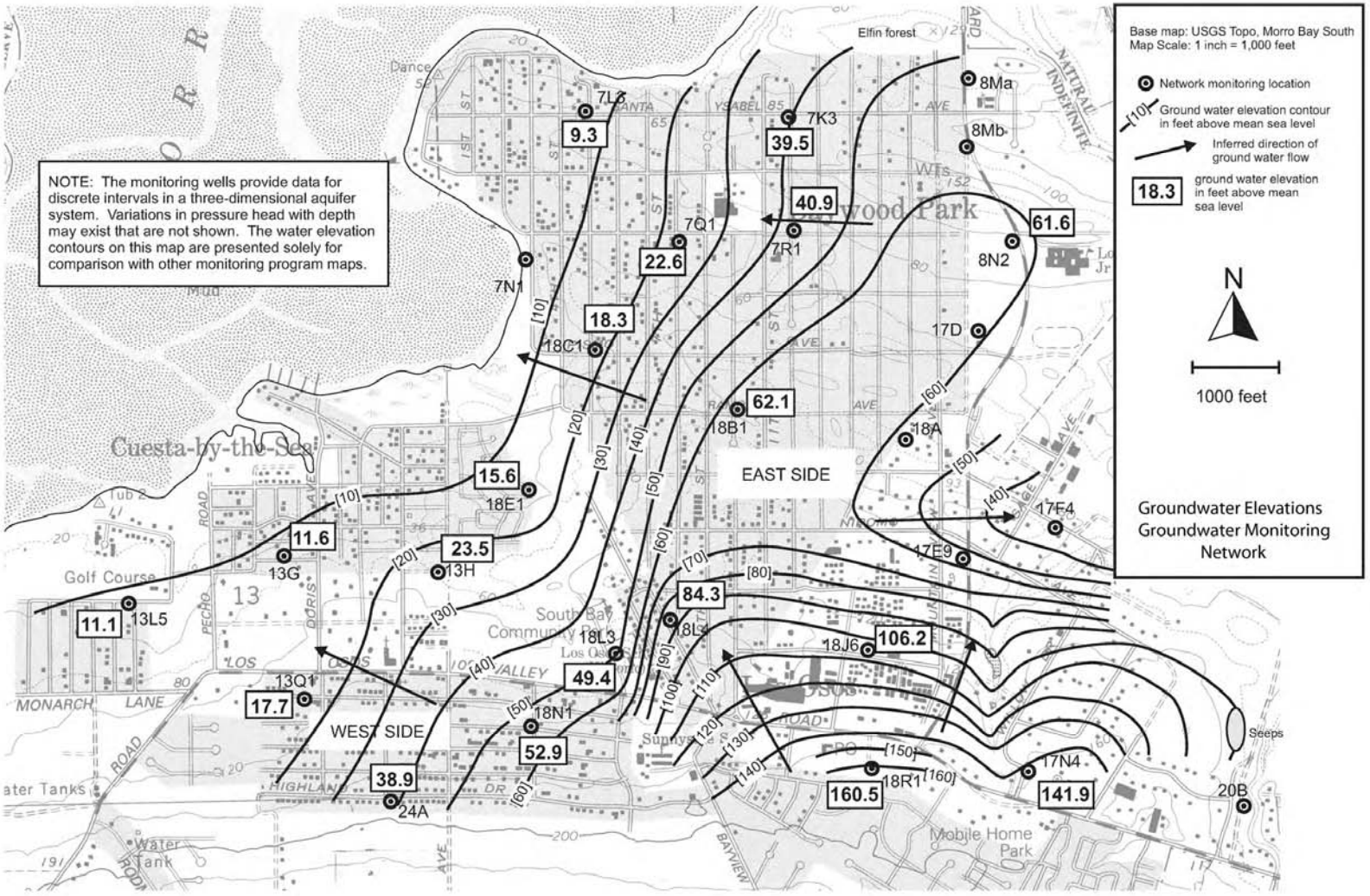
Constituent	Units	Type of Sample
Depth to Groundwater	Feet	Measure
Total Dissolved Solids	Mg/l	Grab
pH	s.u.	Grab
Total Nitrogen (as N) (all forms identified)	Mg/L	Grab
Sodium	Mg/L	Grab
Chloride	Mg/L	Grab
Sulfate	Mg/L	Grab
Boron	Mg/L	Grab

Mg/L – milligrams per liter
s.u. – standard unit

4.5.2 Annual Groundwater Monitoring

In addition to the wells noted above, the County will be required to conduct annual groundwater monitoring for priority pollutants and total organic carbon at Well Numbers 24A and 18R1. The annual results shall be reported in the annual summary report.

Figure 4-4. Groundwater Monitoring Elevations and Monitoring Network



Excerpt for Cleath & Assoc., Los Osos Nitrate Monitoring Program, Groundwater Monitoring, Oct. 2006, Figure 1

4.5.3 Biennial Groundwater Monitoring

The County will be required to conduct biennial (every two years) groundwater monitoring at the following well sites:

- 7K3
- 7L3
- 7N1
- 7Q1
- 7R1
- 8N2
- 8Ma
- 8Mb
- 17D
- 18A
- 18B1
- 18C1

The semiannual groundwater monitoring will be required to be analyzed in accordance to Table 4-2. The results of the biennial testing shall be provided in the annual report.

Table 4-2. Biennial Groundwater Monitoring

Constituent	Units	Type of Sample
Depth to Groundwater	Feet	Measure
Total Dissolved Solids	Mg/l	Grab
pH	s.u.	Grab
Total Nitrogen (as N) (all forms identified)	Mg/L	Grab
Sodium	Mg/L	Grab
Chloride	Mg/L	Grab
Sulfate	Mg/L	Grab
Boron	Mg/L	Grab

Mg/L – milligrams per liter
s.u. – standard unit

4.5.4 Reporting Requirements

The County will be required to submit monthly reports to the Regional Water Board by the first day of the second calendar month following the sampling month. All reports shall summarize monitoring data, noncompliance, reason for noncompliance, corrective action, disposal area monitoring, and any other significant events relating to compliance with the waste discharge requirement. Results of the semiannual and annual groundwater monitoring will be included in the appropriate monthly report.

In addition, the County is required to submit an annual report to the Regional Water Board by January 30th of each year. The monitoring reports shall include tabulated monitoring results and a narrative description of analytical results (general mineral constituents, including all forms of nitrogen, depth to groundwater, and groundwater flow direction) and water quality trends (changes in water quality, impacts from sea water intrusion). The County shall also provide contour maps, which include: a) groundwater elevations and flow direction, b) TDS concentrations, and c) nitrate as N concentrations. In addition, the County shall submit analytical results for water quality data collected from water purveyor wells in the Basin.

4.5.5 Additional Hydrologic Data

Precipitation and stream flow data will be gathered from available sources for inclusion in the groundwater monitoring program. This information is useful for evaluating the Basin status and planning for potential drought conditions.

Precipitation data is currently available from private stations, and from a County gage at the former Los Osos landfill. Historically, precipitation was recorded at the LOCSD maintenance yard (8th Street) and at the Los Osos fire station (9th Street). Daily precipitation from the County-maintained gage will be included in the groundwater monitoring program, and the Parties will consider re-establishing a precipitation gage at either the maintenance yard or the fire station if it appears that currently monitored stations are not sufficient for purposes of measuring inputs to the Basin.

Stream flow on Los Osos Creek is monitored by a County gage at the Los Osos Valley Road Bridge. Daily stream flow data from this stream gage will be included in the groundwater

4.6 Monitoring Procedures

Groundwater level measurement and sampling procedures are summarized below. These procedures do not necessarily address all aspects of monitoring for all potential field situations, and may be modified to suit site conditions or equipment limitations. Documentation of field activities should note any unusual conditions or changes in protocol. Experienced personnel are recommended to provide reliable results.

4.6.1 Elevation Datum

The original County survey for monitored wells was based on an elevation datum (NAVD 1929) that is no longer in use. The current vertical datum is NAVD 1988, which can vary by a few feet from the old datum. Several wells were re-surveyed in 2003 for the LOCSD Nitrate Monitoring Program, and the sand spit wells were re-surveyed in 2005 for the sea water intrusion study. There are still many wells that have not been re-surveyed, with only approximate elevations available under NAVD 1988. During the first year of the program, an inventory of wells requiring re-survey would be compiled, and a licensed land surveyor retained to establish reference points at each well.

4.6.2 Water Level Monitoring

Groundwater level monitoring typically uses an electric sounder or steel tape. The monitoring technician should have a record of any prior levels at the well for reference. If the well is equipped and in use, depending on the type of well, monitoring should take place following an appropriate period of water level recovery. Coordination with the well owner or operator is recommended where appropriate. The DWR Groundwater Elevation Monitoring Guidelines contain a detailed description of the various water level monitoring procedures, many of which apply to the groundwater Monitoring Program.

4.6.3 Pressure Transducer Operation

A pressure transducer allows for automatic water level data collection between regular monitoring events. These devices are placed below water in a well and record changes in pressure that occur in response to changes in the height of the water column above the transducer. Either vented or non-vented transducers are available from manufacturers. Direct read cables are also available that allow data to be downloaded without removing the transducer from the well. Transducers in the groundwater Monitoring Program would be programmed for 24-hour measurement intervals.

4.7 Environmental Monitoring Program

As noted previously, the Environmental Monitoring Program (EMP) has been prepared for the LOWWP. The Coastal Development Permit Conditions require preparation of an EMP to quantitatively and qualitatively identify changes in wetland, stream, creek, riparian, and marsh plant and animal abundance following implementation of the Basin Plan.

4.7.1 Potential Effects to Wetland Habitats from Project Implementation

Construction of the LOWWP will decommission existing septic systems, thereby removing localized groundwater discharge sources that are spread relatively evenly throughout the community. Following construction of the LOWWP, discharges of tertiary treated water to the upper aquifer will occur at two primary locations (Broderson and Bayridge Estates). The quantity of discharge will require adjustment to ensure adequate groundwater levels are maintained throughout the community. Septic system decommissioning will likely result in temporary localized lowering of groundwater levels as neighborhoods are connected to the collection system; however, these effects will be offset to some extent by the discharge that will be occurring at the Broderson and Bayridge Estates sites. Established wetland and riparian vegetation is expected to react slowly to these initial changes in hydrology or water quality, and the monitoring program will attempt to distinguish project-related changes in the amount and composition of wetlands from those resulting from natural factors.

Over the long term, the RWMP is designed to stabilize groundwater levels and, as they stabilize, changes and trends in wetland habitat area and composition may be observed during monitoring under the EMP. The most likely effect will involve changes in vegetative composition in reaction to increased or decreased salt content in the groundwater. If the recycled water program results in reduced fresh water seepage from septage flows, Bay fringe wetlands could transition towards more salt-tolerant species, and willow fringe areas closest to the Bay may decrease. An increase in fresh water seepage would have the opposite effect. In either case, vegetated areas along the Bay fringe will remain inundated at current levels, since tidal activity and water levels in the Bay will not change as a result of the LOWWP. As a result, the extent of Bay fringe wetlands will not likely change following LOWWP implementation, although the mix of fresh, brackish, and salt water vegetation could be altered.

4.7.2 Success Criteria

The CDP requires establishment of Interim and Long-term success criteria for ground and surface water and related resources. For this EMP, the Interim period is considered to be the time between the start of decommissioning to full implementation of the recycled water infrastructure. The Long-term period is considered to be the remaining years that the project is in operation following implementation.

This EMP is intended to document changes in resource conditions; no planting, maintenance, or other direct actions that would affect the habitat conditions present at the monitoring sites are proposed. As a result, the only measurement standard available is the amount of deviance from baseline assessment conditions as documented during annual monitoring efforts at the 10 monitoring sites shown on Figure 4.5. A significant deviance from baseline conditions would consist of a change in wetland habitat area greater than 10%.

Total success would consist of no discernable changes in wetland size or vegetative composition over the life of the project; however, gradual changes in vegetative composition are expected to result from establishment of long-term “new normal” site conditions that include drier or wetter soils, or an increase or decrease in groundwater salinity. Since wetland habitats are dynamic natural systems, any such long-term changes identified during annual monitoring efforts could be the direct result of project activities, or could be wholly or partially caused by other factors, such as normal fluctuations in yearly average temperatures and rainfall amounts received, introduction of a new invasive plant species, or new water well installation.

An observed change from wetland to upland habitat would constitute a significant negative result, while the reverse situation of increasing wetland area might also have negative effects on surrounding habitats. Changes in wetland habitat types (i.e., from freshwater to saltwater marsh), may not necessarily be a negative result, and would depend on analysis of the specific conditions. All such changes greater than 10% over baseline conditions will trigger analysis and potential remedial action, including mitigation for wetland losses.

The EMP includes overall Interim and Long-term success criteria for the monitoring areas identified on Figure 4-5. Success of the Basin with regard to continuance of existing wetland resource function and value will be determined through analysis of monitoring data and comparison with the baseline conditions documented in Baseline Assessment Report, which will be prepared upon approval of the Recycled Water Management Plan. When a significant deviance (a change in wetland habitat area greater than 10%) from baseline conditions is noted at a site or as a combined total of site conditions, previous weather patterns or other outside influences must be examined, and a determination made regarding whether non-project related factors are contributing to the monitoring results. All such changes greater than 10% over baseline conditions will trigger analysis and potential remedial action (e.g. if success criteria are not met) including mitigation for wetland losses (as a 4:1 ratio).

Figure 4-5. Proposed Monitoring Locations

Interim Success Criteria

The Interim period constitutes the approximate two-year decommissioning and recycled water implementation period, and is expected to be too short to document gradual changes in resource conditions. Any vegetative changes occurring in monitored areas during or immediately following septic decommissioning will be the result of a rapid and significant change in groundwater levels resulting in drier or wetter soil conditions, or a rapid increase or decrease in groundwater salinity. The result could be a loss of wetland habitat area or changes in vegetative composition of wetland habitats. These changes would be likely related to the decommissioning process, but could also be influenced by abnormal weather conditions during the Interim period. Interim period success criteria are as follows:

- Wetland and riparian areas monitored under this EMP will maintain baseline groundwater and/or surface water conditions as measured by the continued presence of wetland/riparian plant species.
- Wetland and riparian areas monitored under this EMP will continue to meet the California Coastal Commission one-parameter definition of wetland habitat and will exhibit evidence of native plant recruitment and wildlife usage, as documented during annual monitoring visits that include performance of a formal wetland delineation.

These criteria are based on maintenance of groundwater depth and salinity levels at or near baseline conditions during decommissioning, such that rapid changes in vegetative composition do not occur. If vegetative loss or change is noted during Interim period monitoring visits, remedial actions will be taken to address the problem. Evidence of wildlife usage shall be determined through visual or auditory observance of wildlife, or observance of “sign” such as nests, feathers, scat, burrows, animal trails, prey remains, etc., during annual monitoring visits.

Long-term Success Criteria

The Long-term period consists of the years that the project is in operation following implementation. Over this period, gradual changes in groundwater levels or gradual changes in salinity levels are expected to be recorded by the groundwater monitoring program, and could result in gradual vegetational changes that could be documented by monitoring conducted under this EMP. Expected changes would consist of loss of wetland habitat or a shift in vegetative composition of wetland habitats. It is less likely that groundwater levels will rise to a point that would cause wetland habitats to increase in size, and riparian areas containing deep-rooted plants such as willows would likely not be affected by a minor decrease in groundwater levels.

The success criteria for the Long-term monitoring effort consist of the following requirements:

- Species composition, percent cover, and wetland/riparian acreage as documented at each site during annual monitoring efforts will remain within 10% of the baseline conditions over the life of the project (after allowance for annual weather variations).

- Wetland and riparian areas monitored under this EMP will maintain baseline groundwater and/or surface water conditions as measured by the continued presence of wetland/riparian plant species.
- Wetland and riparian areas monitored under this EMP will continue to meet the California Coastal Commission one-parameter definition of wetland habitat, and will exhibit evidence of native plant recruitment and wildlife usage, as documented during annual monitoring visits that include performance of a formal wetland delineation.

Evidence of wildlife usage shall be determined through visual or auditory observance of wildlife, or observance of "sign" such as nests, feathers, scat, burrows, animal trails, prey remains, etc., during monitoring visits. Achievement of the long-term success criteria will indicate that water re-use inputs are at levels sufficient to maintain current hydrologic conditions and support existing wetland habitats with little overall change in plant composition or habitat type other than normal fluctuations resulting from weather. Conversely, a documented failure to meet the criteria would be considered a significant event requiring adaptive management analysis and immediate remedial actions.

Baseline Data Collection

To provide valid comparisons, baseline data must be collected prior to start of septic tank decommissioning and at the same time of year that the annual monitoring effort will be conducted. Baseline data collection will occur in March/April 2013 and annual monitoring shall be conducted in March/April of each subsequent monitoring year.

4.7.3 Monitoring Locations

Six sites have been identified as primary monitoring locations to provide quantitative data to document the effects of LOWWP implementation on wetland resources (refer to Figure 4-5 and Table 4-3). Four secondary monitoring locations have also been identified to provide additional qualitative monitoring data on wetland resources in the area. These primary and secondary monitoring locations consist of surface water features identified by the 2009 LOWWP EIR hydrologic analysis as at least partially supported by groundwater discharge from the Los Osos Basin, and as an indication of existing shallow groundwater conditions in the east and west groundwater basins. The primary sites will provide quantitative monitoring information on western basin bayfront wetlands and on eastern basin Willow Creek wetland and riparian areas. The secondary sites will provide additional qualitative information and photo reference data for use in assessing overall habitat conditions and trend analysis over the life of the project.

All monitoring sites are in the vicinity of existing groundwater monitoring well locations, and data and trends documented during annual monitoring efforts can be correlated with available monitoring well information.

Table 4-3. LOWWP EMP Monitoring Locations

Monitoring Location*	Habitat Type	Monitoring Practice	Monitoring Frequency	Monitoring Well Correlation**
Primary Monitoring Sites				
1) Pecho Marsh at Solano St/Butte Drive	tidal/saltwater marsh	Wetland Delineation and Aerial Photo Analysis	Annual	FW2, UA3
2) Sweet Springs Marsh at Broderson Avenue	tidal/saltwater marsh	Wetland Delineation and Aerial Photo Analysis	Annual	FW1
3) 3rd Street Marsh at Pismo Avenue	freshwater stream/marsh	Wetland Delineation and Aerial Photo Analysis	Annual	FW12, UA5
4) Baywood Marsh at 7th Street	bayfringe willow wetland	Wetland Delineation and Aerial Photo Analysis	Annual	FW8, FW9
5) Willow Creek tributary at LOVR and Los Olivos Avenue	freshwater riparian	Wetland Delineation and Aerial Photo Analysis	Annual	LA20, FW19
6) Willow Creek at Nipomo Avenue	freshwater stream	Wetland Delineation and Aerial Photo Analysis	Annual	FW23
Secondary Monitoring Sites				
7) Pasadena Coastal Access	tidal/saltwater marsh	Wetland Delineation and Aerial Photo Analysis	Annual	LA11
8) Ferrell Avenue Seep	freshwater willow wetland	Wetland Delineation and Aerial Photo Analysis	Annual	FW14
9) Doris Avenue Marsh	tidal/brackish water marsh	Wetland Delineation and Aerial Photo Analysis	Annual	FW1
10) Willow Road Marsh	freshwater marsh	Wetland Delineation and Aerial Photo Analysis	Annual	FW23

*Locations are mapped on Figure 4-5.

**Monitoring well designations: FW=First Water, UA=Upper Aquifer, LA=Lower Aquifer.

4.7.4 Monitoring Methods

The County will conduct annual monitoring of the primary and secondary sites per the schedule presented in this EMP for the life of the project. Monitoring shall follow the methods and practices below. These methods shall also be used during baseline data collection efforts to ensure that data comparisons are valid. The scheduled monitoring program will provide qualitative and quantitative data for use in determining the success of the water reuse efforts in sustaining existing wetland and riparian habitats in the project area, based on the relationship between observed site conditions and the established success criteria.

Monitoring efforts will utilize several methods designed to match the habitat conditions, access restrictions, and type of monitoring data desired. Quantitative data collected will be suitable for statistical analysis, in case such analysis is warranted. The ten monitoring locations are shown in Figure 4-4 and monitoring methods and practices for each site are discussed in detail below.

4.7.5 Monitoring at Primary and Secondary Sites

Conditions at the primary and secondary monitoring sites will be documented through performance of formal wetland delineations, mapping of accessible wetland boundaries/riparian canopy driplines using a Trimble® Pathfinder Pro XR Global Positioning System (GPS) unit rated to sub-meter accuracy, photo point establishment, and aerial photo analysis. Use of vegetative transects can be added where appropriate if additional plant composition information is desired. Permanent photo points will be established at each site to assist in tracking the success of the EMP, and to provide representative photo documentation in annual monitoring reports. Ground view photos will be taken from the photo points during each annual monitoring visit. As they become available, the latest County aerial photographs will be analyzed to quantify changes in areas of wetland habitat at each site. Annual monitoring will include visually examining accessible wetland areas and noting general habitat conditions, habitat transition areas, vegetative conditions, tidal influence, and recent disturbance. Assessment observations will be recorded on the General Monitoring Observations form (refer to Appendix B) for incorporation in annual reports.

Wetland Delineation

Formal wetland delineations including sample plot monitoring conducted per the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (Arid West Supplement) (USACE 2008) wetland delineation methodology will be used to document conditions at each site. Wetland delineation shall include establishment of sample plot locations to document conditions in each monitoring area; a total of two to four plots at each location are considered sufficient. Sample plot monitoring will include vegetative analysis over a 30-foot radius, examination of soil conditions to a depth of 20 inches, and recordation of hydrology indicators. The standard USACE Wetland Determination Data Form - Arid West Region (refer to Appendix A) will be used to record sample plot monitoring results. Accessible wetland boundaries will be mapped using GPS data collectors. In addition to delineation data, the monitor will collect general notes and photographs of site conditions using the General Monitoring Observations form (refer to Appendix B).

Vegetative Transect Analysis

In addition to wetland delineation, vegetative transect analysis based on the Point Intercept Method as described in Appendix C, and in the USACE 2008 Arid West Supplement may be used to document conditions at bayfront marsh / willow wetland areas (Sites 1, 2, and 4) if additional information is needed. These three sites are expected to retain saturated soil conditions throughout the decommissioning and subsequent water reuse process due to their proximity to the Morro Bay estuary. However, the composition and boundaries of fresh, brackish and salt water vegetation could change in these areas due to fluctuations in salinity levels. Point Intercept data collection and analysis in these areas would document any changes in vegetation cover, composition, and frequency of occurrence. These attributes could then be analyzed to identify any emerging trends.

Point intercept data would be collected along established transects. Transects would begin at a permanently marked point located within the wetland boundary and extend 100 to 300 feet in the specified bearing. To facilitate identification of a receding wetland boundary and ensure sufficient samples of wetland vegetation, the transect start and end points should be located within the wetland boundaries and as close to the wetland boundaries, as feasible. This would minimize the amount of upland vegetation within the sample area and cover the range of wetland habitats between the start and end points. General view photos of each transect would be taken at the base stake towards the end stake, and at the end stake towards the base stake. Standardized data sheets, and detailed instructions for transect data collection, calculations, and analysis are provided in Appendix C.

Primary Sites

Site 1: Pecho Marsh

Annual monitoring at Pecho Marsh will consist of a formal wetland delineation and mapping of accessible wetland boundaries. If additional information on plant composition is desired, the Vegetative Transect method could be applicable to this site. If used to supplement wetland delineation monitoring, the transect would traverse willow woodland, brackish water marsh, and salt marsh habitats, beginning at the landward edge of the willow canopy side near the corner of Butte Drive and Solano Avenue, and extending due north to the end point.

Site 2: Sweet Springs Marsh

Annual monitoring at Sweet Springs Marsh will consist of a formal wetland delineation and mapping of accessible wetland boundaries. If additional information on plant composition is desired, the Vegetative Transect method could be applicable to this site. If used to supplement wetland delineation monitoring, the transect would traverse annual grassland, brackish water marsh, and salt marsh habitats, beginning at the landward side near the boardwalk at the end of Broderson Avenue, and extending along a bearing of 335 degrees to the end point.

Site 3: 3rd Street Marsh

Annual monitoring at 3rd Street Marsh will consist of a formal wetland delineation and mapping of accessible wetland boundaries. Three sample plots will be established along the channel

between 3rd and 4th Streets. One plot will be located close to the private property boundary near 4th Street, one will be located on the channel bank in the middle of the block, and one will be located west of the 3rd Street/Pismo Avenue intersection. Photo points will consist of each sample plot location, with photos taken facing south from Pismo Avenue. An additional photo shall be taken from the intersection of 3rd Street and Pismo Avenue, looking east along the channel.

Site 4: Baywood Marsh

Annual monitoring at Baywood Marsh will consist of a formal wetland delineation and mapping of accessible wetland boundaries. If additional information on plant composition is desired, the Vegetative Transect method could also be used at this site. If used to supplement wetland delineation monitoring, the transect would traverse annual grassland, willow woodland, and salt marsh habitats, beginning in the undeveloped portion of the 7th Street right-of-way, and extending due north to the end point.

Site 5: Willow Creek Tributary

Annual monitoring at the Willow Creek Tributary will consist of a formal wetland delineation and mapping of accessible wetland boundaries. Three sample plots will be established along the channel on South Bay Boulevard, south of Los Olivos Avenue. One plot will be located close to the private property boundary, as is feasible, one will be located on the channel bank in the middle of the site, and one will be located opposite the Los Olivos Avenue intersection. Photo points will consist of each sample plot location, with photos taken facing east from South Bay Boulevard. An additional photo shall be taken from the intersection of South Bay Boulevard and Los Olivos Avenue, looking south along the channel.

Site 6: Willow Creek

Annual monitoring at Willow Creek will consist of a formal wetland delineation and mapping of accessible wetland boundaries. Four sample plots will be established across the channel, along the southern edge of the Nipomo Avenue right-of-way. Plots will be located on both banks of the channel; one will be located on the channel bank in the middle of the site, and one will be located opposite the Los Olivos Avenue intersection. Photo points will consist of each sample plot location, with photos taken facing east from South Bay Boulevard. An additional photo shall be taken from the intersection of South Bay Boulevard and Los Olivos Avenue, looking south along the channel.

Secondary Sites

Site 7: Doris Avenue Marsh

Accessible portions of the Doris Avenue Marsh will be delineated, vegetative boundaries will be mapped using GPS data recorders, and Arid West data forms and the General Monitoring Form will be completed to record existing conditions. The latest County aerial photo data for the site will be analyzed, and the area of wetland vegetation will be quantified in square feet. Photo point locations will be established where Donna Avenue ends at the upper part of the wetland area, and at the culvert under Doris Avenue.

Site 8: Ferrell Avenue Seep

Accessible portions of the Ferrell Avenue Seep will be delineated, vegetative boundaries will be mapped using GPS data recorders, and Arid West data forms and the General Monitoring Form will be completed to record existing conditions. The latest County aerial photo data for the site will be analyzed, and the area of wetland vegetation will be quantified in square feet. Photo point locations will be established on the north, west, and south sides of the site.

Site 9: Pasadena Coastal Access

Accessible portions of the Pasadena Coastal Access will be delineated, vegetative boundaries will be mapped using GPS data recorders, and Arid West data forms and the General Monitoring Form will be completed to record existing conditions. The latest County aerial photo data for the site will be analyzed, and the area of wetland vegetation will be quantified in square feet. Photo point locations will be established on the small hill above and to the north of the parking area and from Pasadena Drive.

Site 10: Willow Road Marsh

Accessible portions of the Willow Road Marsh will be delineated, vegetative boundaries will be mapped using GPS data recorders, and Arid West data forms and the General Monitoring Form will be completed to record existing conditions. The latest County aerial photo data for the site will be analyzed, and the area of wetland vegetation will be quantified in square feet. Photo point locations will be established on Willow Road, looking north and south.

4.8 Program Implementation

Implementation of the County's Groundwater Monitoring Program will be coordinated by the County with the Water Purveyors and private well owners. Basic tasks are outlined as follows:

- Perform wellhead surveys to establish reference point elevations and locations as needed. A licensed land surveyor would be required.
- Establish well monitoring protocols.
- Adopt a set of procedures for recording groundwater elevations and sampling for water quality.
- Assign water quality and level monitoring responsibilities to each stakeholders. This may consist of supplementing the existing County semi-annual water level monitoring program with monitoring by local Purveyor staff.
- Contact private well owners to request permission for participation in the groundwater elevation and water quality portions of the groundwater monitoring program (including future CASGEM program and salt and nutrient management plan monitoring program). A final list of monitoring locations will be prepared following this task.
- Assign data compilation, organization and reporting duties.
- Perform all monitoring and sampling for the Environmental Monitoring Program.

4.8.1 Program Phasing

The groundwater monitoring program will be completed in three phases: Historical, Start-up, and Maintenance.

Historical: The County will work with the Water Purveyors to obtain records of the historical data regarding each of the wells to be used for the groundwater monitoring program. This data will be compiled prior to the start-up of the LOWWP.

Start-up: Prior to start-up, the County will conduct monitoring for those components within the groundwater monitoring program that does not have historical data available, but is required to establish a baseline for the impacts that the LOWWP may have on the environment. The County will also complete the Baseline Assessment of current conditions of wetlands and riparian areas that are designated to be monitored.

Maintenance: The County, Water Purveyors, and others will conduct the on-going monitoring required in the RWMP Groundwater Monitoring Program and other programs. The monitoring is conducted at various times throughout the year, based on the need of the entity that is being monitored. The County will conduct the on-going monitoring required in the Environmental Monitoring Program. All monitoring activities will be reported annually (See Section 5).

4.9 Summary

The Groundwater Monitoring Program and the Environmental Monitoring Program will be critical elements to determining the overall impact the LOWWP will have on the groundwater basin and the environment. The Groundwater Monitoring Program will be completed as a requirement of the County's Waste Discharge Requirements, issued by the Regional Water Board. This effort will also be conducted in conjunction with the Water Purveyors for the future Basin Plan which is being prepared by the ISJ Working Group. The Groundwater Monitoring Program will include semiannual, annual and biennial testing for water level and water quality at pre-determined well locations, identified in Section 4.5. The results of this monitoring effort will be provided to the Regional Water Board in the County's monthly and annual reports. The results will also be provided in the County's annual RWMP Report, further described in Section 5 of this report.

The Environmental Monitoring Program will have two key timeframes to understanding the impacts of the LOWWP. This includes the Interim and the Long–Term periods. The County will complete a Baseline Assessment prior to decommissioning of any septic systems at 10 pre-determined locations to understand the current conditions of the community's wetlands and environmentally sensitive areas. As the septic systems are removed, the monitoring program will continue to evaluate the interim impacts of decentralized groundwater discharge to a centralized groundwater discharge. Once the project is fully operational, the County will continue to monitor the proposed 10 sites for on-going impacts and provide annual updates in the RWMP Report. The report will identify areas that are being impacted by the LOWWP or potentially from other outside factors and provide recommendation to mitigate the impacts through action steps identified in the adaptive management plan (Section 5.0).

SECTION 5: REPORTING AND ADAPTIVE MANAGEMENT PROGRAM

Annual reports (two copies) documenting implementation and effectiveness of the Basin Plan shall be submitted to the Executive Director for review and approval by December 31st of each year that the project operates. Each report shall include all monitoring data (including documenting all recycled water reuse for the proceeding year, all water conservation efforts and effects, and all resource changes identified), shall describe the progress towards achieving the success criteria of the plan, and shall make recommendations, if any, on changes necessary to better meet Basin Plan objectives and achieve success. On the latter, the annual reports shall be premised upon the concept of adaptive management that responds to information developed and effects better understood over time in association with the project, and is intended to all for project changes covered by this CDP, unless the Executive Director determines that a CDP amendment is necessary, through the annual report approval process provided that such changes result in better resource protection and better means to achieve Basin Plan objectives over the long-term. Changes, including identified remediation steps, shall be completed per the timetable identified in any approved annual report, or within 30 days of report approval where no such timetable is specified (Special Condition 5d).

5.1 Introduction

Management of the groundwater basin will be essential to its long term sustainability to provide the community of Los Osos with a reliable and safe drinking water source and to ensure the continued viability of wetlands and other sensitive resource areas. Monitoring the groundwater basin over time as it continues to change due to modifications in pumping and reuse will provide the County, the Water Purveyors and other interested parties the ability to make adjustments to the management of the Basin.

5.2 Purpose and Objectives

The purpose of the Reporting and Adaptive Management Program is to provide the final "check and balance" for the Recycled Water Management Program to ensure that the overall objectives of the groundwater basin are being met. Evaluating the groundwater basin on an annual basis allows the County to:

- Evaluate the trends of the groundwater basin
- Identify any voids in the collected data
- Report the data analysis to the various interested parties (Department of Water Resources, Regional Water Board, Coastal Commission)
- Modify the Recycled Water Management Plan based on the current conditions and visible trends of the groundwater basin
- Modify procedures to utilize current best management practices
- Modify pumping, treatment and/or reuse procedures if groundwater basin trends are showing signs of degradation of water quality, including increased levels of contamination and/or increased levels of seawater intrusion

5.3 Annual Report Administration

5.3.1 Submittal Date and Schedule

A groundwater monitoring report will be prepared on an annual basis. The report will be prepared by the County for submission to the Coastal Commission Executive Director, in cooperation with the Water Purveyors and other interested parties. The Annual Report will be prepared for each calendar year, January 1 through December 31, for each year that the LOWWP operates. Two copies of the annual report will be submitted no later than December 31st following the year of monitoring. (i.e. The annual report for 2015 will be submitted no later than December 31st, 2016.) The County will be either preparing or participating in the preparation of at least two other related annual reports. The first is the annual report for the Regional Water Board. This report will include all requirements set forth in the LOWWP's Waste Discharge Requirements. This annual report is due no later than January 30th following the reporting year. The second report will be an annual report to be prepared under the Basin Plan that is being developed by the ISJ Working Group. This annual report will provide data on the groundwater monitoring and status of the basin water quality and supply. Each report will provide similar data and therefore will be completed concurrently and cooperatively.

The following is the proposed schedule for the annual reporting:

- January 1st through December 31st of Monitoring Year: Conduct on-going groundwater and environmental monitoring, per the Monitoring Program. Compile data into electronic database per Section 5.3.2 as monitoring results are obtained throughout the year.
- November 1st of Monitoring Year through January 31st of Reporting Year: Evaluate data and provide analysis of trends, comparisons, etc to historical data. Provide technical memorandum discussing findings of the analysis. County to submit Annual Report by January 30th to the Regional Water Board.
- January 31st through March 1st of Reporting Year: Evaluate the findings and determine if the findings are representative of the current conditions, are showing trends that may unfavorably impact the Basin, and/or are meeting the objectives of the Recycled Water

Management Plan. Participate in preparing the annual report required in the future Basin Plan.

- March 1st through May 31st of Reporting Year: Preparation of the Draft and Draft-Final Recycled Water Management Plan Annual Report.
- June of Reporting Year: Bring Annual Report to Board of Supervisors for approval.
- On or Before August 1st of Reporting Year: Submit Annual Report to Executive Director of Coastal Commission. Annual Report must be submitted no later than December 31st.

5.3.2 Electronic Database Management

Historical water level and water quality data for groundwater monitoring program wells and Baseline Assessment data for wetland areas will be consolidated into electronic databases. These databases will be based on Microsoft Access/Excel platforms, which will have the ability to be linked or imported into a Geographic Information System (GIS) in the future. The updated electronic databases can be transmitted directly to an agency or used to generate data reports. The groundwater monitoring program databases can be organized to facilitate data reporting for the Recycled Water Management Plan for the Los Osos Wastewater Project, the future Basin Plan, the CASGEM program, and the Salt and Nutrient Management Plan.

5.3.3 Approval and Stakeholder Feedback Process

The Annual Report will be completed by the County, in coordination with the Water Purveyors and other interested parties during the collection of the data and the preparation of the Annual Report. Upon receipt of the data, the County and Water Purveyors will evaluate the data and provide an analysis of the data. This analysis will be shared and reviewed by all parties prior to the completion of the Annual Report.

County staff will need approval from the Board of Supervisors prior to submitting the Annual Report to the Coastal Commission. The approximate date of the Board of Supervisors meeting will be June of each Reporting Year. The Annual Report will be posted for public review and comment prior to the Board of Supervisors hearing.

5.3.4 Staffing and Responsibility Matrix

The environmental and groundwater monitoring and annual report preparation will be conducted by County staff and/or hired consultant(s). The LOWWP staff within the County Public Works Department will be responsible for the oversight, schedule, and completion of the environmental and groundwater monitoring, data management, analysis, and preparation of the Annual Report. Table 5-1 provides a summary of the responsibilities of the various stakeholders.

Table 5-1 Annual Report Responsibility Matrix	
	Responsibility
Executive Director, Coastal Commission	Review and approve Annual Report
County of San Luis Obispo, Board of Supervisors	Approve and submit Annual Report to the Coastal Commission
Director of Public Works	Recommend final approval of the Annual Report
Los Osos Wastewater Project Staff	Prepare Annual Report and coordinate with Water Purveyors
Water Purveyors	Assist in preparation of the Annual Report, review and comment on Draft Annual Report
Outside Consultants	Provide technical assistance in the preparation of the Annual Report
Public	Review and comment on the Annual Report

5.4 Annual Report Content

The Annual Report will include an evaluation of the Recycled Water Reuse Program, Water Conservation Program, and the Monitoring Program. Two copies of the annual report shall be submitted to the Executive Director of the California Coastal Commission no later than December 31st following the monitoring year.

5.4.1 Recycled Water Reuse Program

The Recycled Water Reuse Program section of the Annual Report will include the following:

- **Infrastructure Summary Including Recommended Improvements:** The report will provide a summary of the recycled water infrastructure. The summary will provide, in tabular form, a list of the equipment, date of installation, and current condition. The report will also include a summary of any recommendations for future upgrades to the recycled water infrastructure.
- **Wastewater Treatment Plant Water Quality Summary:** The report will provide a summary of the monthly water quality results from the effluent at the Wastewater Treatment Plant. The summary will be provided in tabular form. In addition, a summary of any violations, reason for violations, and actions taken to bring the recycled water back into compliance shall be included. Water Quality results from the groundwater monitoring will be included in Section 5.4.3.
- **Monthly Delivery Summary:** The report will provide a summary of the contracted delivery schedule and actual delivery schedule for all recycled water users. The summary will be provided by month in tabular form.
- **Program Changes Implemented in Prior Year:** The report will evaluate any changes to the treatment operations, distribution system, delivery methods or schedule, or any other facilities related to the recycled water program that were implemented during the year. The report will also discuss the reasons for the change and the impacts the change has made to the program. The report will provide copies of executed contracts,

schematics or drawings of the changes made, or any other relative information that provides back up for the changes that were implemented.

- **Proposed Changes to the Program for the Upcoming Year:** The report will recommend any proposed changes scheduled for the upcoming year using the adaptive management measures identified in Section 5.5. The report will include a description of the change, drawings or schematics (if available), budget or estimated costs, and any other relative information for the proposed change. Any recommended changes to the Program shall be implemented per the timetable identified in the approved annual report, or within 30 day of the report approval where no such timetable is specified.
- **Agricultural Reuse Outreach Process:** The report will discuss the current agricultural reuse solicitation process, changes to the process, and options to obtain users that will provide increased benefits to the overall basin objective.
- **Amendments to Contracts:** The report will provide a copy of new or amended contracts to the recycled water reuse program. The report will also identify any contracts that may be cancelled.

5.4.2 Water Conservation Program

The Water Conservation Program section of the Annual Report will include the following:

- **Water Purveyor Production and Consumption Summary:** The report will provide, in tabular form, a monthly summary from each Water Purveyor of the following:
  - Production Data for each well
  - Consumption Data, by customer type
  - Number of active accounts
- **Status of Conservation Measure Implementation:** The report will discuss the conservation measures currently implemented by the County, the Water Purveyors, and Private Properties. The report will provide the following:
  - A description of the conservation measure
  - Who is the responsible party
  - Cost to implement the project (if available)
  - Cost spent to date to implement the project
  - Total estimated water savings from conservation measure
  - Estimated water savings to date from conservation measure
  - Estimated percentage of completion to date
  - Description of any modifications to the conservation measure
- **Program Changes Implemented in Prior Year:** The report will discuss any changes made to the Water Conservation Program. The report will also discuss the reasons for the change and the impacts the change has made to the program. The report will provide copies of executed contracts, schematics or drawings of the changes made, or any other relative information that provides back up for the changes that were implemented.
- **Actual Program Savings Compared to Projected Savings:** The report will provide a comparison of the actual water savings due to the implemented water conservation

measures, as compared to the projected water savings. The report will provide a discussion on the reasons for not reaching, reaching, or exceeding the projected water savings.

- **Recommended Program Adjustments or Additional Data Needs:** The report will provide a discussion on recommended program adjustments to enhance the program using the adaptive management measures identified in Section 5.5. This may include, but not limited to implementation of new measures, additional public outreach, better data management, etc. Any recommended changes to the Program shall be implemented per the timetable identified in the approved annual report, or within 30 day of the report approval where no such timetable is specified.
- **Projected Water Demand at Build-out and Estimated Water Savings:** Based on the conservation measures implemented and proposed, the report will provide a discussion on the projected water demand at build-out, with and without the water conservation measures.

5.4.3 Monitoring Program

The Monitoring Program section of the Annual Report will include the following:

- **Groundwater Monitoring Results:** The report will include a summary of the groundwater monitoring results, by well. Depending on the well type, the report may include the following:
    - A map of the wells tested
    - A summary of each well and its testing parameters. The summary, in tabular form, will include historical record data (maximum, minimum, average), current test results, and maximum contaminant level (MCL, if applicable) and any notes or observations.
    - Graphical trends of water quality results such as nitrate levels or chlorides in key well locations.
- **Summary of Seawater Intrusion Status:** The report will provide a discussion on the current status of seawater intrusion and the efforts being taken to reduce the impact. This discussion may include, but not limited to graphical or tabular data depicting the current seawater intrusion front as compared to historical records, discussion of current projects that will impact seawater intrusion, and current operational and management changes that were implemented to help reduce seawater intrusion.
- **Environmental Monitoring Report:** Data obtained during quantitative and qualitative monitoring observations will be documented in the annual report. Photo documentation will be included in all annual reports. Each annual report will summarize site conditions, monitoring practices, and results documented during the monitoring visit, and will compare recently collected data with the baseline conditions and with data presented in previous annual reports. Evaluation of monitoring results and previous data will expose any patterns or trends in vegetative condition, and will identify areas and actions needed.

Each report will present a conclusion of achievement or failure to meet the success criteria based on the observed conditions and data evaluation. If a failure to meet the criteria, or if a negative trend in wetland habitat size or diversity that could lead to a failure is identified during annual monitoring, recommendations to rectify the situation shall be included in the annual report, along with a timetable for implementation of the recommended measures.

- **Program Changes Implemented in Prior Year:** The report will discuss any changes made to the Monitoring Program. The report will also discuss the reasons for the change and the impacts the change has made to the program. The report will provide copies of executed contracts, schematics or drawings of the changes made, or any other relative information that provides back up for the changes that were implemented.
- **Recommended Program Adjustments or Additional Data Needs:** The report will provide a discussion on recommended program adjustments to enhance the program using the adaptive management measures identified in Section 5.5. This may include, but not limited to additional data needs or program modifications that will provide better data to evaluate the effectiveness of the monitoring program. Any recommended changes to the Program shall be implemented per the timetable identified in the approved annual report, or within 30 day of the report approval where no such timetable is specified.

5.5 Adaptive Management

Adaptive Management is used to provide guidance on the overall effectiveness of the Recycled Water Management Program, the Water Conservation Program, and the Monitoring Program and to provide a tool with which to modify the programs to better meet the overall Basin objectives. The Adaptive Management process is to ask and answer the following questions:

- Are all Programs reaching targeted objectives? If yes, are there any factors that might change the Programs from continuing to reach targeted objectives? If no, why are the Programs not reaching targeted objectives?
- What changes need to be made to reach the targeted objectives?
- What is the schedule for getting the Programs back on target to reaching objectives?

Each program of the RWMP will contain an Adaptive Management analysis which will include the following:

- Evaluation of recent changes made in prior years
- Summary of recommendations and projected benefits
- Project cost impact of program changes
- Anticipated implementation schedule
- Documentation and public information

If negative trends or subsequent failure to meet the success criteria occur, such trends are expected to occur slowly over several years, and will likely take equal or more time to reverse. Identified problem areas will be addressed through the Adaptive Management analysis to identify suitable remedial action.

For example, if an annual monitoring report indicates that one or more of the EMP monitoring sites is not achieving the success criteria, the County will analyze the situation, determine the reasons for the deficiencies, and take remedial actions as necessary. The analysis will allow identification of suitable measures and methods tailored to the specific site conditions that will reverse negative trends and restore wetland habitat characteristics to levels that meet the success criteria. Since any negative trends will be related to changes in groundwater levels or salinity, such measures could include the following actions:

- Adjusting harvest well quantities to raise or lower groundwater levels;
- Artificial watering of wetland areas by water truck or fire hydrant;
- Redirection of road or storm drain runoff to nearby wetland areas;
- Removing sediment deposits in wetland areas to allow ponding to occur; and,
- Removal of non-native or invasive vegetation.

All monitoring sites that receive remedial actions to correct negative trends shall be monitored twice a year until the site achieves compliance with the long-term success criteria.

Appendix A:
Arid West Data Form

THIS PAGE INTENTIONALLY LEFT BLANK

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: _____ City/County: _____ Sampling Date: _____

Applicant/Owner: _____ State: _____ Sampling Point: _____

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ____ Hydric Soil Present? Yes ____ No ____ Wetland Hydrology Present? Yes ____ No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ____

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): _____

Water Table Present? Yes ____ No ____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): _____

Wetland Hydrology Present? Yes ____ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B:

General Monitoring Observations Form

THIS PAGE INTENTIONALLY LEFT BLANK

GENERAL MONITORING OBSERVATIONS

Project Name: LOWWP Environmental Monitoring Program
Site: **Date:** **Monitor(s):**

OBSERVATIONS AND NOTES
1. Is there any evidence of physical disturbance? (tree trimming, brush removal, fire, mowing, tilling, etc.)
2. Are there noticeable changes in vegetation cover or density based on comparison with the previous year's photographs of the monitoring site?
3. Does the site hydrology appear to be consistent with the observations made the previous year?
4. General notes on site conditions.

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix C:

Vegetative Transects Monitoring – Point Interceptor Method

THIS PAGE INTENTIONALLY LEFT BLANK

Methods for Point Intercept Data Collection, Calculation, and Analysis

This Appendix provides direction for conducting the data collection, calculations, and analysis to be employed at Monitoring Sites 1, 2, and 4. Natural resource professionals have published, field verified, and refined these procedures over the last sixty years, and a simplified version of the Point Intercept methodology is included in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Arid West Supplement). The following methodology has been paraphrased from *Sampling Vegetation Attributes*, an interagency technical reference that was published in 1996 by the Cooperative Extension Service, U.S. Department of Agriculture, Natural Resource Conservation Service, Grazing Land Technology Institute, and U.S. Department of the Interior.

Collection of Cover Data

The monitor will utilize a long pin or rod to collect point intercept data in low growing habitats (salt marsh) and a story pole in habitats with a canopy that exceeds three feet (willows). When using a story pole, it is important to keep the pole plumb; this can be facilitated by the use of a level. Utilizing the pin or story pole, plant occurrence data will be collected at one foot intervals along the transect line. Each species that contacts the pin or story pole will be recorded as a "hit." Hits will be recorded in three layers, basal/ground level, foliar level 1, and foliar level 2. The heights of the layers are specified on the data sheet. If a species hits the pin more than once at a point, that species will only be recorded once at that point. All individuals hit shall be recorded to the species level on the provided data sheet.

At each observation point, identify the ground level or basal hit with the point of the pin and record the data by dot count tally by category and/or plant species code in the appropriate section of the Cover Data form. If there is a vegetation canopy layer, lower the pin through the vegetation until a basal or ground level hit is determined. Record the basal or ground level hit and any subsequent vegetation layers that intersect the pin.

(1) Ground-level or basal hits

(a) Ground-level hits (excluding basal vegetation hits) will fall into four cover categories. The four categories are:

L - Litter

B - Bare ground

G - Gravel (particle sizes between 1/12 inch and 10 inches)

S - Stone (greater than 10 inches)

(b) Record the ground-level hits by dot count tally by ground-level cover category in the Ground-Level Cover section of the form, except where there are ground-level and, basal or canopy cover hit combinations. In this situation, use the Basal and Canopy/Foliar Cover section of the form.

(c) Basal hits on live vegetation are identified by species (includes mosses and lichens more than 1/16 inch thick). To count as a basal hit on live vegetation, the plant crown at or below a l-inch height above the ground MUST be intercepted by the pin.

(d) Enter the appropriate plant species code in the Basal or Ground-Level Column in the Basal and Canopy/Foliar Cover section of the form.

(e) Enter a dot count tally for each basal hit on a species in the Dot Count Column in the Basal and Canopy/Foliar Cover section of the form when the plant species code is first entered on the form. Enter an additional dot count tally each time there is a basal hit on that species, except where there are basal and canopy/foliar cover hit combinations.

(2) Ground-level or basal and canopy/foliar cover hit combinations

(a) Identify the ground-level or basal hit, as well as any canopy cover hit(s) below 3 feet in height, intercepted at each point by the pin. For canopy cover above 3 feet, use a story pole.

(b) Enter the appropriate ground-level cover category code and/or plant species code for each level of hit (up to four levels) in the appropriate columns in the Basal and Canopy/Foliar Cover section of the form.

(c) Enter a dot count tally for each ground-level or basal and canopy/foliar cover hit combination when it is first entered on the form and each time this same combination is encountered on the transect.

Calculations

Calculate the percent cover for each cover category by dividing the number of hits for each category by the total number of hits for all categories, including hits on vegetation.

a. Ground Cover: Ground cover is determined by dividing the total number of hits for all categories except bare ground by the total number of hits (including bare ground).

b. Canopy/Foliar Cover: Canopy/Foliar cover is determined by dividing the total number of hits on vegetation (includes all basal and canopy/foliar hits) by the total number of hits.

c. Basal Cover: Basal cover is determined by dividing the number of basal hits by the total number of hits.

Data Analysis

Since points along permanent transects will be monitored on an annual basis, the obtained data can be statistically analyzed to document change between two years. If deemed necessary, a paired t-test can be implemented to document change between two specific years.

POINT INTERCEPT DATA SHEET

Project Name: LOWWP Environmental Monitoring Program
Site: **Date:** **Monitor(s):**
Base Coordinates: **Number of Points**
End Coordinates:

GROUND LEVEL COVER

Category	**B** Bare Ground	**L** Litter	**G** Gravel (2mm-10″)	**S** Stone (>10″)	Vegetation	Total
Dot Count						
Total Hits						
% Cover						

BASAL AND CANOPY/FOLIAR COVER

Basal/Ground Level 0″ – 1″	Level 1 1″ – 3′	Level 2 >3′	Dot Count	Total
			Total	

Project Name: LOWWP Environmental Monitoring Program
Site: **Date:** **Monitor(s):**
Base Coordinates: **Number of Points**
End Coordinates:

OTHER OBSERVATIONS AND NOTES
1. Is there any evidence of physical disturbance? (tree trimming, brush removal, fire, mowing, tilling, etc.)
2. Are the transect base and end stakes in place? If not, were they replaced? If replaced, provide updated coordinates here.
3. Does the site hydrology appear to be consistent with the observations made the previous year?
4. Other notes on site conditions that will provide an explanation for changes in vegetative structure.