CITY OF EL PASO DE ROBLES

"The Pass of the Oaks"

December 6, 2007

Harley Davis
Department of Water Resources
Division of Planning and Local Assistance
P.O. Box 942836
Sacramento, CA 94236-0001

Subject: Local Groundwater Assistance Grant Application Program for the Paso Robles Regional Groundwater Management Plan

Dear Mr. Davis,

The attached grant application is submitted by the City of El Paso de Robles in hopes of securing funds for the development of the Paso Robles Regional Groundwater Management Plan. The proposed management plan would encompass the Paso Robles Groundwater Subarea, which is part of the Salinas Valley Groundwater Basin, as defined by the Department of Water Resources. Historically, groundwater supplied all regional agricultural and municipal water needs. The Paso Robles Groundwater Basin is now showing signs of stress (declining water levels and localized quality deterioration) such that demand is approaching sustainable yield. Those signs of stress caused the City to take action.

Since 2000, the City, along with the San Luis Obispo County Flood Control and Water Conservation District and other local agencies, has taken steps to investigate, monitor, and actively manage the Paso Robles Groundwater Basin. Over that time, the City studied the status of the Basin and found that overdraft is foreseeable (estimated within 5 years). In many ways, the Paso Robles Groundwater Basin is in an ideal position to benefit from management programs and could be a showcase of successful management. Funding this project would greatly enhance the Basin and support resource management in a manner that will improve long-term water supply reliability.

This proposed management plan is consistent with the groundwater management activities identified in the Proposal Solicitation Package. The regional nature of this plan includes the water purveyors, agricultural and other private entities, and agencies with water management authority within the Plan Area, and will build upon their existing efforts toward public outreach and stakeholder involvement and the development of basin management objectives identified in SB 1938. The proposed management plan includes the enhancement of a groundwater monitoring plan using the existing production wells.

In closing, much has been done to understand the behavior of the Paso Robles Groundwater Basin and the impact of human activities on that behavior. Following through on the proposed management plan presents the opportunity to make well-informed decisions regarding projects and programs aimed at sustaining the balance of use-to-yield. The timing of this grant opportunity could not have come at a better time for this basin.

Please feel free to call me at (805) 237-3861 if you have any questions or wish to discuss any issues presented in this application.

Sincerely,

Doug Monn
Director of Public Works

Enc.

- ☑ Appendix A Applicant Information
  - ☑ A.1 Project Information
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- ☑ Appendix B Detailed Description Information
  - ☑ B.1 GWMP and Related Programs
    - ☑ Copy of Existing or Draft GWMP (included with the Application as Supporting Documentation)
    - ☑ Shape Files of GWMP area
  - ☑ B.2 Public Outreach and Community Support for the Proposed Project
  - ☑ B.3 Technical Adequacy of Work to be Performed, including
    - ☑ Detailed Work Plan
    - ☑ Budget
    - ☑ Schedule
    - ☑ Other Technical Parts of the Proposal
  - ☑ B.4 Use of Information Gained from the Proposal
- ☑ Supporting documentation, as necessary, including a list of items provided

A.1. Project Information

Application Information	
Proposal Title Paso Robles Regional Groundwater Management Plan	
Amount of Grant Requested $242,440	
Total Project Cost $311,640	Total Cost Share (if any) $69,200
Name of Agency City of El Paso de Robles	
Tax ID Number 95-6000760	
Day-to-Day Contact Christine M. Halley, PE	
Address 1000 Spring Street, Paso Robles, California 93446	
Telephone Number (805) 305-0159	Fax Number (805) 237-3904
E-mail address cmhalley@tjcross.com	
Duration of Project 18 months	
Counties of Proposed Project Location San Luis Obispo County; Monterey County	
GWMP Related	
Date Groundwater Management Plan Adopted, if any November 8, 2005 (Paso Robles Groundwater Basin Agreement)	
Pursuant to Water Code Section This is a cooperative agreement, not pursuant to any specific Water Code Section	
Or other legal Authority (Please identify) San Luis Obispo County Flood Control and Water Conservation District, City of El Paso de Robles, County of San Luis Obispo, and private land owners	
GIS shape file of the area managed under the approved or proposed GWMP PasoRobles_RGMPArea.shp	

Map Projection of GIS Shape File of GWMP Area UTM Zone 10	Datum of GIS Shape File of GWMP Area NAD 27
Data Source of GIS Shape File of GWMP Area DWR Bulletin 118, (modified in Paso Robles Groundwater Basin Study, 2002)	Units of GIS Shape File of GWMP Area meters
Specific Project Location	
Representative Project Coordinates: Latitude (North) 35.69000 N	Representative Project Coordinates: Longitude (West) 120.55282 W
GIS shape file of the proposed project(s) PasoRobles_RGMPArea.shp	
Map Projection of GIS Shape File of the Proposed Project UTM Zone 10	Datum of GIS Shape File of the Proposed Project NAD 27
Data Source of GIS Shape File of Project Area DWR Bulletin 118, (modified in Paso Robles Groundwater Basin Study, 2002)	Units of GIS Shape File of Project Area meters
Bulletin 118-03 Hydrologic Region of Project (HR)* Central Coast	Project Groundwater Budget Type (see page 110 in Bulletin 118-03 for explanation)* Type A
Bulletin 118-03 Basin/Subbasin Number of Project* 3-4.06	Bulletin 118-03 Basin/Subbasin Name of Project* Salinas Valley Groundwater Basin, Paso Robles Area Subbasin

A.2. Application Tracking Information

1. Name, title, address, telephone number, fax number, and e-mail address of the person of the applicant's governing body (such as mayor, supervisor, board president, or chairman) authorized by the Agency's resolution to file the application and enter into an agreement with DWR:

Name	Phone	Fax
Frank Mecham	(805) 237-3888	(805) 237-4032
Title	**E-mail**	
Mayor	council@prcity.com	
Address		
1000 Spring Street		
City		**Zip**
Paso Robles		93446

2. Name, title, address, telephone number, fax number, and e-mail address of the person to be designated as the Applicant's Grant Manager:

Name	Phone	Fax
Katie DiSimone	(805) 237-3861	(805) 237-3904
Title	**E-mail**	
Utilities Manager	kdisimone@prcity.com	
Address		
1000 Spring Street		
City		**Zip**
Paso Robles		93446

3. Name, title, address, telephone number, fax number, and e-mail address of the person to be designated as the Applicant's Day-to-Day Project Contact:

Name	Phone	Fax
Christine Halley, PE	(805) 305-0159	(805) 237-3904
Title	**E-mail**	
Water & Utilities Consultant	cmhalley@tjcross.com	
Address		
1000 Spring Street		
City		**Zip**
Paso Robles		93446

4. State Senate and Assembly District numbers for project area:

State Senate District Number
15
State Assembly District Number
22;23

A.3. Narrative Description of Proposal

Proposal Description

The City of Paso Robles is leading this effort to develop a regional groundwater management plan (GMP) for the Paso Robles Groundwater Basin (Basin) that meets the requirements of SB 1938. This GMP will consolidate the previous efforts undertaken by the agencies and stakeholders in the Basin, including the San Luis Obispo County Flood Control and Water Conservation District and local water purveyors. One of these efforts includes the Paso Robles Agreement (2005), which documented the initial efforts to formalize groundwater management in the Basin. As part of the project, the existing groundwater monitoring program in the Basin will be developed consistent with the requirements of SB 1938. Existing and future groundwater demands in the Basin will be updated in conjunction with the County Planning Department to support the Resource Capacity Study and the Conservation Element of the General Plan update. The GMP will also prepare a sampling and analysis plan to refine the current groundwater monitoring program and produce the 2009 groundwater conditions report.

A.4. Authorizing Resolution

A resolution adopted by City of Paso Robles on December 18, 2007, directs the City Manager to file an application and enter into an agreement for a grant. A copy of the draft resolution follows this page. A copy of the adopted resolution signed by the Mayor of the City of Paso Robles, Frank R. Mecham, will be sent to DWR following the December 18, 2007, Board of Directors meeting.

RESOLUTION NO. 07-

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PASO ROBLES
TO APPLY TO THE CALIFORNIA DEPARTMENT OF WATER RESOURCES TO OBTAIN
A LOCAL GROUNDWATER ASSISTANCE GRANT
FOR THE
PASO ROBLES GROUNDWATER BASIN
MANAGEMENT AND MONITORING PROGRAM

WHEREAS, the State of California has established an Local Groundwater Assistance grant program pursuant to the Local Groundwater Management Assistance Act of 2000 (California Water Code Section 10795 et seq.) (Also known as Assembly Bill 303); and

WHEREAS, the Director of Public Works is especially suited to ensure that grant application materials related to groundwater projects are prepared in a complete, efficient, and adequate manner; and

WHEREAS, the Director of Public Works has the authority to ensure that projects are carried out in full compliance with the applicable permits and agreements;

THEREFORE, BE IT RESOLVED AS FOLLOWS:

SECTION 1 that the City Council of the City of El Paso de Robles orders that application be made to the California Department of Water Resources to obtain a Local Groundwater Assistance Grant pursuant to the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Water Code Section 79560 et seq.), and to enter into an agreement to receive a grant for the Paso Robles Groundwater Basin Management and Monitoring Program.

SECTION 2 that the Director of Public Works of the City of El Paso de Robles is hereby authorized and directed to prepare the necessary data, make investigations, execute, and file such application and execute a grant agreement with California Department of Water Resources.

PASSED AND ADOPTED by the City Council of the City of Paso Robles this 18th day of December 2007 by the following votes:

AYES:
NOES:
ABSTAIN:
ABSENT:

Frank R. Mecham, Mayor

ATTEST:

Deborah D. Robinson, Deputy City Clerk

A.5. Applicant Authority

Address each of following questions regarding the applicant's authority to enter into a funding agreement. Appendix 2 provides an example of DWR's funding agreement. The response to each question must include a citation of statutory authority or other reference.

1. Does the applicant have the legal authority to enter into a funding agreement with the State of California?

   Yes. The City of Paso Robles was incorporated as a general law city in 1889.

2. What is the statutory authority under which the applicant was formed and is authorized to operate?

   California Constitution, Article 11, Section 9 provides as follows:

   (a) A municipal corporation may establish purchase, and operate public works to furnish its inhabitants with light, water, power, heat, transportation, or means of communication. It may furnish those services outside its boundaries, except within another municipal corporation which furnishes the same service and does not consent.

   (b) Persons or corporations may establish and operate works for supplying those services upon conditions and under regulations that the city may prescribe under its organic law.

   Government Code Section 37112 provides that:

   In addition to other powers, a [city's] *legislative body may perform all acts necessary or proper to carry out the provisions of this title.*

3. Is the applicant required to hold an election before entering into a funding agreement with the State?

   No

4. Will the funding agreement between the applicant and the State of California be subject to review and/or approval by other government agencies?

   No

5. If yes to 4, identify all such agencies.

   N/A

6. Describe any pending litigation that may impact the financial condition of the applicant or the applicant's ability to complete the proposal. If none is pending, so state.

   There is no pending litigation that may impact the City's ability to complete the proposal.

A.6. Urban Water Management Planning Act Compliance

The City of Paso Robles adopted its latest Urban Water Management Plan in 2000 and has prepared an updated draft Urban Water Management Plan dated September 2007. One City Council discussion of the updated UWMP has already taken place, thus the City is in the process of adopting the updated UWMP and is on schedule to do so in the spring of 2008. While the City of Paso Robles is not in compliance with the UWMPA at the time of this grant application submittal, it is on track to be in compliance by the award date of the grant. A copy of the draft 2007 UWMP is included in Attachment 6 of this grant application.

B.1 Groundwater Management Plan

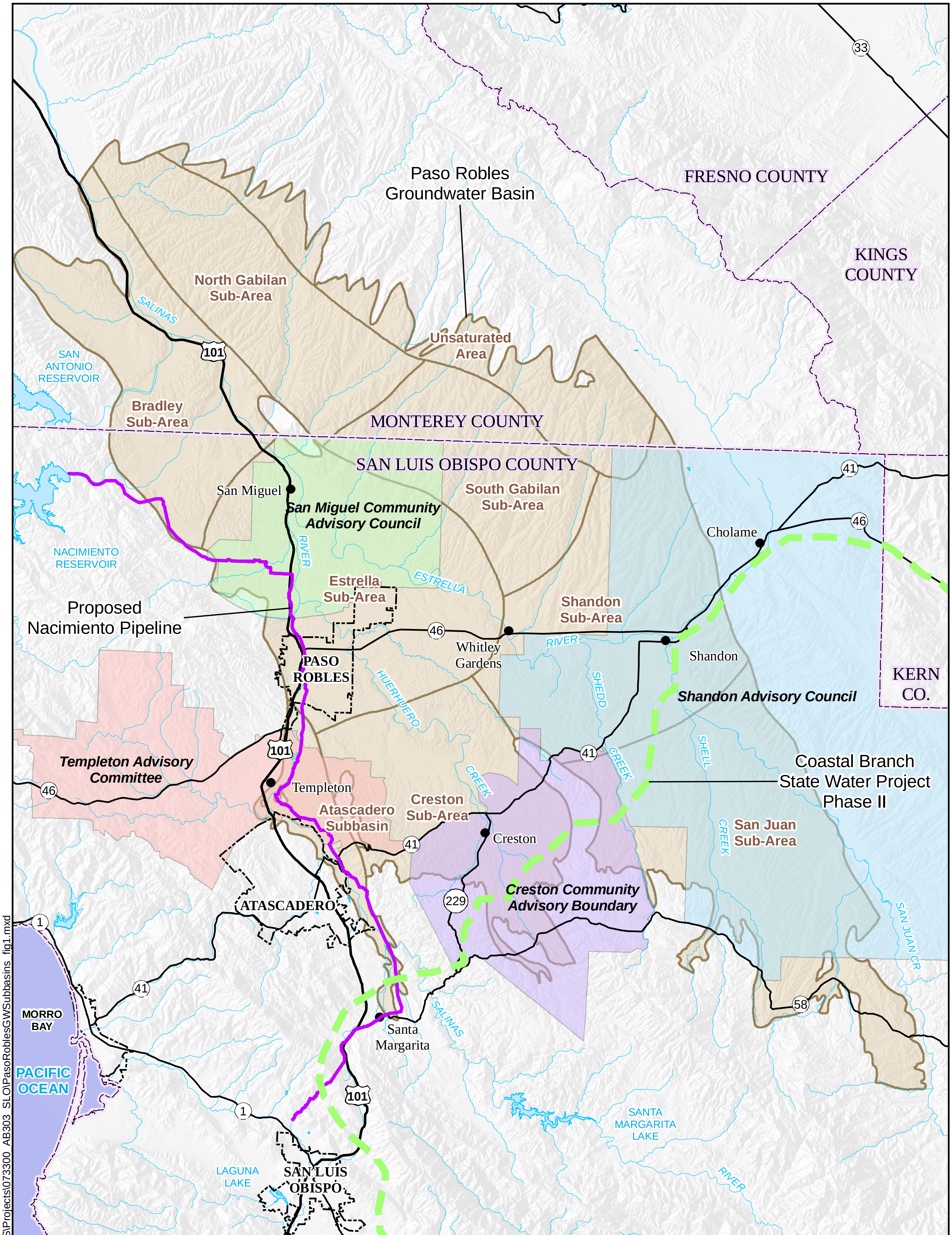
Project Overview

The Paso Robles Groundwater Basin (Basin), which is located in northern San Luis Obispo County (County) and southern Monterey County, was described in the 1958 California Department of Water Resources (DWR) Bulletin 18, *San Luis Obispo County Investigation*. As part of the efforts to map the groundwater basins in the State of California (State) presented in Bulletin 118, DWR identified the Paso Robles Area Groundwater Subbasin of the Salinas Valley Groundwater Basin and designated it as Basin Number 3-4.06. The Basin boundary was later updated in the Paso Robles Groundwater Basin Study (2002), which is included as Attachment 1 to this application.

The Basin supplies water for 29 percent of the County's population and an estimated 40 percent of the agricultural production of the County. The municipal and industrial (M&I), domestic, and agricultural demands in the Basin currently rely exclusively on groundwater. The M&I water demands include the cities of Paso Robles and Atascadero, the communities of Templeton, Shandon, Creston, and San Miguel, and the small community system in Whitley Gardens. Individual domestic groundwater users and isolated subdivisions are located throughout the Basin, often in the more rural areas dispersed among the agricultural areas. Agricultural water users constitute an estimated 70 percent of the pumpage in the Basin and are concentrated on the alluvial valleys of the streams and rivers and along the Highway 46 corridor. Figure 1 shows the locations of the purveyor boundaries.

Based on a recent (2007) monitoring report, the Basin is currently not in overdraft, but some areas are experiencing declining groundwater levels. Should demand patterns remain consistent, basin pumpage is expected to approach sustainable yield in the next five years.

Over the past decade, the San Luis Obispo County Flood Control and Water Conservation District (District) and the City of Paso Robles (City) have worked with other pumpers in the Basin to begin a more organized approach to groundwater management. The master water plan was completed in 1998, followed by a sustainable yield evaluation and model development of the Basin. The City followed through on the key findings of those studies by securing a 4,000 acre-feet-per-year entitlement in the Nacimiento Water Project and adopting an integrated water management plan addressing such topics as recycled wastewater and water conservation. As part of this project, the City will continue these efforts, in conjunction with the District and other interested parties and stakeholders, to prepare and adopt a regional groundwater management plan (Plan or GMP) that will develop a common understanding of the groundwater issues and management opportunities in the Basin and establish support projects such as conjunctive use, recycled wastewater, and exploration of demand management, which will improve groundwater management.



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Paso Robles Groundwater Basin Regional Groundwater Management Plan	3 1.5 0 3 Miles	PASO ROBLES GROUNDWATER BASIN
City of Paso Robles San Luis Obispo County, California		DECEMBER 2007 FIGURE 1

The goal of the Plan is to (1) provide the framework for improved groundwater management, (2) maintain groundwater levels, and (3) protect groundwater quality to ensure the long-term groundwater supply reliability in the Basin.

The Plan will build upon prior efforts to address groundwater management issues in the Basin and identify and introduce projects addressing these issues. Currently, most of the focus of groundwater management in the Basin is centered in the Estrella subarea along the Highway 46 corridor because the area, which serves both agricultural and urban water users, is experiencing lower groundwater levels as a result of increased groundwater pumping. Along with that focus is the countywide investment of $178 million in the Nacimiento Water Project, which will offset Basin pumping along the Salinas River corridor by more than 6,000 acre-feet annually.

Consistent with the other projects that have been recently completed in the Basin, the development of the Plan will utilize an extensive public outreach and stakeholder involvement process to invite and encourage participation by urban and agricultural water users as well as by stakeholders and interested parties. This approach will facilitate the cooperative development of the Plan to ensure that all parities are comfortable with the Plan and that it satisfies the requirements of AB 3030 and SB 1938.

One key component in the Plan is the development of Basin Management Objectives (BMOs) to establish local targets for groundwater levels, groundwater quality, and land subsidence. The BMOs will be tracked by monitoring groundwater levels and quality in the Basin to determine the type and magnitude of the local groundwater issue and identify potential projects and management activities to address these issues. In addition, the monitoring will be used to monitor the impacts of management activities. For example, the BMOs can be used to document the need for additional water supplies, to help identify individual projects to provide for future water supply reliability in the Basin, or to identify other steps that would correlate to the long-term sustainability of this important water supply.

The BMOs will be developed to incorporate the existing efforts of the Resource Management System (RMS). The Resource Management Task Force was created in the 1980s by the San Luis Obispo County Board of Supervisors (Board) at the recommendation of the Board's Growth Management Advisory Committee to provide annual evolutions of information of use to the Board.

The RMS provides this function under the County's General Plan Framework for Planning, and serves as an information tool that estimates the capacity levels and allows decision makers to identify problems in the resources areas of water supply, sewage disposal, schools, roads, parks, and air quality. The RMS uses three levels of severity from Level of Severity I (least severe) to Level of Severity III (most severe) to identify potential and progressively more immediate resource deficiencies.

The Levels of Severity for water supply are summarized below:

- **RMS Level of Severity I –** When projected water demand over the next nine years equals or exceeds the estimated dependable supply.

- **RMS Level of Severity II –** When projected water demand over the next seven years equals or exceeds the estimated dependable supply.

- **RMS Level of Severity III –** When existing water demand equals or exceeds the dependable supply.

The County has declared a Level of Severity I for the Basin.

Projects are currently being identified and evaluated to address water supply issues in the Basin. Two of these projects include the Nacimiento Water Project (currently under construction), which will deliver surface water to local municipal users to reduce local groundwater pumping, and water banking opportunities using the County's 20,000 acre-feet per year of unused State Water Project (SWP) Table A supply (currently under investigation). Additional monitoring and groundwater management is needed in the Basin to determine the need, management, and operations of projects like these.

The City and the District have completed key studies in the past 10 years that have advanced the understanding of the Basin and allowed pumpers to make strategic public works decisions regarding water supply. The time has come to identify specific actions that can contribute to the long-term sustainability of the Basin. Preparation of the proposed Plan will accomplish this goal.

Project Description

The recently completed San Luis Obispo County Integrated Regional Water Management Plan (IRWM Plan) provides groundwater monitoring and management objectives (included in Attachment 5) throughout the County. The Basin is one of the five major subbasins in the County. As part of the Paso Robles Groundwater Basin Study completed in 2002, the Basin was further divided into subareas based upon water quality, source of recharge, groundwater movement, and basin depth. The Basin does not have an SB 1938-compliant groundwater management plan, and one needs to be developed for the following reasons:

- The Basin is the sole source of water supply for a major portion of the County and the southern portion of Monterey County and is particularly critical to the region's healthy agribusiness.

- There is considerable concern about potential overdraft conditions throughout the Basin. This led to the preparation and adoption of the Paso Robles Basin Agreement (Agreement) in 2005, which includes some of the municipal and agricultural lands, but also recognizes that there is not a formal groundwater management plan in place.

- While the Basin in total is not considered to be in a state of overdraft, the Estrella Subarea is experiencing groundwater level declines and has been identified by the RMS at a Level of Severity I.

- Pumpage throughout the Basin is projected to reach sustainable yield within five years, as evidenced by sharp localized groundwater level declines in some areas.

- The current groundwater monitoring program in the subbasin needs to be updated to support the long-term collection, management, analysis, and presentation of data to stakeholders to improve the understanding of the groundwater setting in the Basin and to support groundwater management activities.

- Existing studies such as the City of Paso Robles' *Water Resources Plan Integration and Capital Improvement Program* and the District's *Water Banking Feasibility Study* have identified the need for additional groundwater management opportunities and projects, such as conjunctive use projects, to improve water supply reliability.

- The Plan will foster regional coordination to allow this group to be competitive with other regional planning entities in the pursuit of grants to fund the planning and implementation of groundwater management projects.

- Increasing levels of total dissolved solids point to a trend in return flow management that must be reversed to preserve water quality.

- This is a basin whose health and yield can be sustained through well-planned management.

Current Groundwater Management Activities

Since 1998, the local agencies have worked in cooperation to complete several projects to support the technical investigations and improve groundwater management in the Basin. These efforts, listed below, demonstrate the interest, support, and continuing commitment of the individual agencies, stakeholders, and interested parties in protecting the Basin's groundwater resources.

- Master County Water Plan (1998)

- Paso Robles Groundwater Basin Study (2002)

- Monitoring Program Evaluation (2003)

- Paso Robles Groundwater Basin Study Phase II –Numerical Model Development, Calibration, and Application (2005)

- Paso Robles Groundwater Basin Agreement (2005)

- San Luis Obispo County Integrated Regional Water Management Plan (2005)
- City of Paso Robles Urban Water Management Plan (2007)
- Water Resources Plan Integration and Capital Improvement Program (2007)
- Annual Report on the Paso Robles Groundwater Basin (2007)
- Paso Robles Groundwater Basin Water Banking Feasibility Study (2007)

Each of these groundwater management activities is described below.

Master County Water Plan (1998)

This update of the master County water plan evaluated 12 distinct "Water Planning Areas" throughout the County, tabulating water demand and published yields of developed water sources for each area. The result of this effort was an overall inventory of how demand matched supply throughout the County, noting priorities for development of supply projects and guidance for the pace of building permit issuance. This proved to be the foundation document that pointed to the need to further study the County's largest water supply – the Paso Robles Groundwater Basin.

Paso Robles Groundwater Basin Study (2002)

In 2002, the Paso Robles Groundwater Basin Study (Basin Study) investigated the hydrogeologic conditions and quantified the water supply capability of the Basin by defining the lateral and vertical extent of the aquifer, groundwater flow and movement, and current water quality conditions. The Basin Study identified the subareas within the Basin and local hydrogeologic settings based upon water quality, source of recharge, groundwater movement, and basin depth.

The Basin Study estimated the volume of groundwater storage along with basin inflows and outflows. These values were used to compile a hydrologic budget (water balance) and establish a perennial yield for the Basin of 94,000 acre-feet per year. Demand at the time was estimated at 82,600 acre-feet per year and is predominantly agricultural demand. The author recommended the development of a numerical groundwater model (described below) to evaluate future hydraulic conditions.

The Executive Summary and table of contents of the Basin Study are included in Attachment 1. An electronic copy of the entire report is included on the CD found on the inside cover of this application.

Monitoring Program Evaluation (2003)

The County has been monitoring groundwater levels for more than 40 years in the Basin. The Monitoring Program Evaluation was completed to evaluate the efficiency and effectiveness of the County's Monitoring Program for wells located in the Basin. Based on the final report of the 154 wells in the program, County Public Works employees monitor 99 wells, and 55 wells were monitored by local municipal water company employees (who forward the data to the County's Public Works Department for inclusion in the monitoring program database. The report provides several recommendations for improving the monitoring program.

A copy of the Monitoring Program Evaluation report is included in Attachment 2. An electronic copy of the report is included on the CD found on the inside cover of this application.

Paso Robles Groundwater Basin Study Phase II – Numerical Model Development, Calibration, and Application (2005)

In 2005, a numerical groundwater flow model was developed as a quantitative tool to evaluate future hydraulic conditions of the Basin. The model was used to refine uncertainties in the hydrologic budget and evaluate the Basin's response to current and future water demands with and without supplemental water, including areas of declining water levels. In 2007, the model was used in the Water Banking Feasibility Study (described below) to evaluate potential recharge and water banking projects and identify management practices that could be employed to optimize water use.

The Executive Summary of the Phase II Study is included in Attachment 3. An electronic copy of the entire report is included on the CD found on the inside cover of this application.

Paso Robles Groundwater Basin Agreement (2005)

The Agreement was entered into on August 19, 2005, by the District, selected landowners who have organized as the Paso Robles Imperiled Overlying Rights (PRIOR) group, and the City of Paso Robles and the County Service Area No. 16 (collectively referred to as Municipal Users) to avoid potential litigation regarding groundwater conditions. The Agreement requires the public agencies to declare the Basin to be in a state of overdraft, when appropriate, allowing overlying landowners sufficient time to react to such a declaration. In the Agreement, the District serves as the technical advisor to both the Landowners and Municipal Users.

The Agreement recognizes the need for monitoring and appropriate management of the existing Basin supplies and also recognizes that bringing additional water resources to the Basin could delay or avoid entirely the Basin becoming overdrafted in the future. The Agreement also recognizes signatories' desire to preserve their respective groundwater rights, notwithstanding implementation of any management measures, thereby providing the framework for cooperation among the Landowners and Municipal Users to develop a groundwater management plan.

A copy of the Paso Robles Groundwater Basin Agreement is included in Attachment 4. An electronic copy of the entire report is included on the CD found on the inside cover of this application.

San Luis Obispo County Integrated Regional Water Management Plan (2007)

The District, in cooperation with the Water Resources Advisory Committee (WRAC), prepared the County's IRWM Plan to align water resources management planning efforts for achieving sustainable water resources Countywide with the State planning efforts through 2030. The IRWM Plan was used to support the County's planning and implementation of grant applications. The IRWM Plan integrates 19 different water management strategies that have or will have a role in protecting the region's water supply reliability, water quality, ecosystems, groundwater, and flood management historically or in the future. The integration of these strategies resulted in a list of action items (projects, programs, and studies) needed to implement the IRWM Plan. District staff and the WRAC Integrated Regional Water Management Subcommittee prioritized the action items. The IRWM Plan was adopted in December 2005 and updated in July 2007.

The IRWM Plan identified the following groundwater monitoring and management objectives that are intended to ensure the region's groundwater resources remain suitable for continued use.

- Continue monitoring and reporting programs for groundwater basins in the region
- Evaluate and consider groundwater banking programs
- Protect and improve groundwater quality from point and non-point sources of pollution
- Conduct public education and outreach regarding groundwater protection
- Identify areas of known or expected conflicts and target stakeholders on specific actions that they should take to help protect groundwater basin quality and supply
- Recharge groundwater with high-quality water

The groundwater management objectives and strategies presented for the County in the IRWM Plan will be used to guide the development of the Groundwater Management Plan for the Basin.

A copy of the Executive Summary of the IRWM Plan and the Groundwater Monitoring and Management Objectives (Section C5) and Data Management (Section J) are included in Attachment 5. An electronic copy of the San Luis Obispo County IRWMP is included on the CD found on the inside cover of this application.

City of Paso Robles Urban Water Management Plan (2007)

The Urban Water Management Plan (UWMP) supported the IRWM Plan by describing the City's current and future water demands, identifying current water supply sources, and assessing supply reliability for the City. The UWMP describes the City's reliance on groundwater and its support of efforts to avoid overdraft by developing additional sources.

These sources include water conservation, surface water from Lake Nacimiento, and the use of recycled water for irrigation. The Plan identifies beneficial impacts to groundwater quality through the use of these sources.

A copy of the Draft City of Paso Robles UWMP is included in Attachment 6. An electronic copy of the draft UWMP is included on the CD found on the inside cover of this application.

Water Resources Plan Integration and Capital Improvement Program (2007)

The City prepared the integrated plan at the conclusion of eight significant water resource reports prepared on the City's behalf. The integrated plan is a sequencing of the recommended actions from the eight individual plans, accompanied by a capital improvement program to provide funding. This document captures the City's overall water resource goals and identifies a self-sustaining water resource portfolio for the City, along with steps necessary to build that portfolio. As a result of the integrated plan, the City secured entitlement to 4,000 acre-feet per year from the Nacimiento Water Project in 2004, embarked on design of a 7-million-gallon-per-day water treatment plant in 2007, developed a private well policy in 2007, and is poised to upgrade the City's wastewater treatment plant and more closely evaluate recycled water.

A copy of the Water Resources Plan Integration and Capital Improvement Program is included in Attachment 7. An electronic copy of the report is included on the CD found on the inside cover of this application.

Annual Report on the Paso Robles Groundwater Basin (2007)

The Annual Report on the Paso Robles Groundwater Basin (Annual Report) was prepared in 2007 to continue to monitor and evaluate groundwater conditions in order to delay or avoid Basin overdraft. The Annual Report provides an update of the rainfall, groundwater levels and storage, and groundwater management planning for the 1997 to 2006 period that has taken place since the completion of the Basin Study (Phase I Report) in 2002, which included the 1981 to 1997 period.

During the 1997 to 2006 period, groundwater storage declined by about 29,800 acre-feet (about 3,300 acre-feet per year). Recommendations from the Annual Report include continuing the cooperative efforts to improve groundwater level monitoring and updating the groundwater pumping estimates from the Phase I report.

A copy of the Draft Annual Report is included in Attachment 8. An electronic copy of the draft report is included on the CD found on the inside cover of this application.

Paso Robles Groundwater Basin Water Banking Feasibility Study (2007)

The Paso Robles Groundwater Basin Water Banking Feasibility Study (Feasibility Study) was identified as an "A1" priority project in the IRWM Plan and was undertaken by the District to determine the feasibility of banking available SWP supplies in order to improve the overall water supply reliability in the County. This investigation is important to the region because it evaluates opportunities to more fully utilize the District's 20,000 acre-feet per year SWP supply, which could improve local groundwater conditions, increase dry-year water supplies, improve local groundwater quality, provide greater flexibility in groundwater management, and reduce the dependence on imported water supplies in below normal years.

The primary purpose of the Feasibility Study was to determine the technical feasibility of a recharge or water banking project in the Basin. The technical feasibility was based on the local hydrogeologic suitability and engineering feasibility. Additional groundwater management and operational considerations as well as environmental and permitting issues were also identified. Three potential recharge areas were evaluated separately for both recharge and water banking alternatives. Two of the areas may provide opportunities for recharge or water banking operations. Some of the groundwater management related recommendations for this project included:

- Preparing a groundwater management plan to provide a framework for managing the Basin and establishing BMOs.
- Continue the District's annual groundwater monitoring plan to track changes in groundwater levels and quality.
- Installing dedicated monitoring wells, as needed, to fill data gaps.

A copy of the Draft Water Banking Feasibility Study is included in Attachment 9. An electronic copy of the draft report is included on the CD found on the inside cover of this application.

B.1.1. Proposed Groundwater Management Plan

The proposed Plan will focus on the Basin in northern San Luis Obispo County and southern Monterey County by including the urban, agricultural, and industrial water users in the Basin; water management agencies such as the District, the City, communities of Templeton, Atascadero, Creston, Whitley Gardens and Shandon (County Service Area No. 16), the WRAC, North County Water Forum; and the general public.

The County has a long, positive relationship with its numerous advisory bodies, several of which focus on water issues. The WRAC is a good example of an established, active committee whose primary focus is regional water issues. Continued cooperation among the water users and stakeholders in the development of the Plan will facilitate improved groundwater management and the implementation of projects to improve long-term water supply reliability in the Plan Area. In addition, regional cooperation will make the group more competitive with other regional groups in the pursuit of funding opportunities for groundwater management projects, including conjunctive use projects.

Based on the studies to date, the status of the Basin and the foreseeable overdraft has been established. This Basin is in an ideal position to benefit from management programs and could be a showcase of successful management. Funding this project would greatly enhance groundwater management opportunities in the Basin and enable local water users to manage their resources in a manner that will improve their long-term water supply reliability.

B.1.2. Purpose, Goals, and Map

Purpose

The purposes of this project include:

- Build upon the existing organization of local water purveyors, agricultural interests, and stakeholders to develop a regional understanding of the groundwater setting and groundwater management opportunities in the Basin.
- Formulate groundwater management components to reflect the available information that emphasize the groundwater information and management aspects within the Basin.
- Identify projects and programs that can be implemented to improve long-term water supply reliability in the Basin.
- Establish a regional approach to groundwater management that is accepted in the Basin and recognized by other local, State, and federal agencies and that can be used successfully to pursue grant funding to implement projects that support improved groundwater management.

Goals

The project goals include:

- Alert stakeholders to the state of the Basin and the opportunity to keep this Basin in balance and avoid heading into the projected state of overdraft.
- Complete and adopt the Plan, particularly the BMOs.
- Expand the existing groundwater monitoring program and annual reporting format for the Plan Area.
- Complete a land and water use analysis within the Basin for existing and expected future conditions to evaluate the impacts of land use (and the associated water use) on long-term water supply reliability in the Basin.
- Incorporate the results of the land and water use analysis for the Basin into the Countywide planning efforts scheduled for 2008-2009, including the ongoing County Resource Capacity Study and Conservation Element Update of the General

Plan which are led by the Planning Department, and Countywide Master Water Plan, which will be led by the Public Works Department.

Map

The Plan Area for this project includes the entire Paso Robles Groundwater Basin as shown on Figure 2. The Basin boundary was identified by DWR in Bulletin 118 and modified in the Paso Robles Groundwater Basin Study in 2002.

B.1.3. Implementation

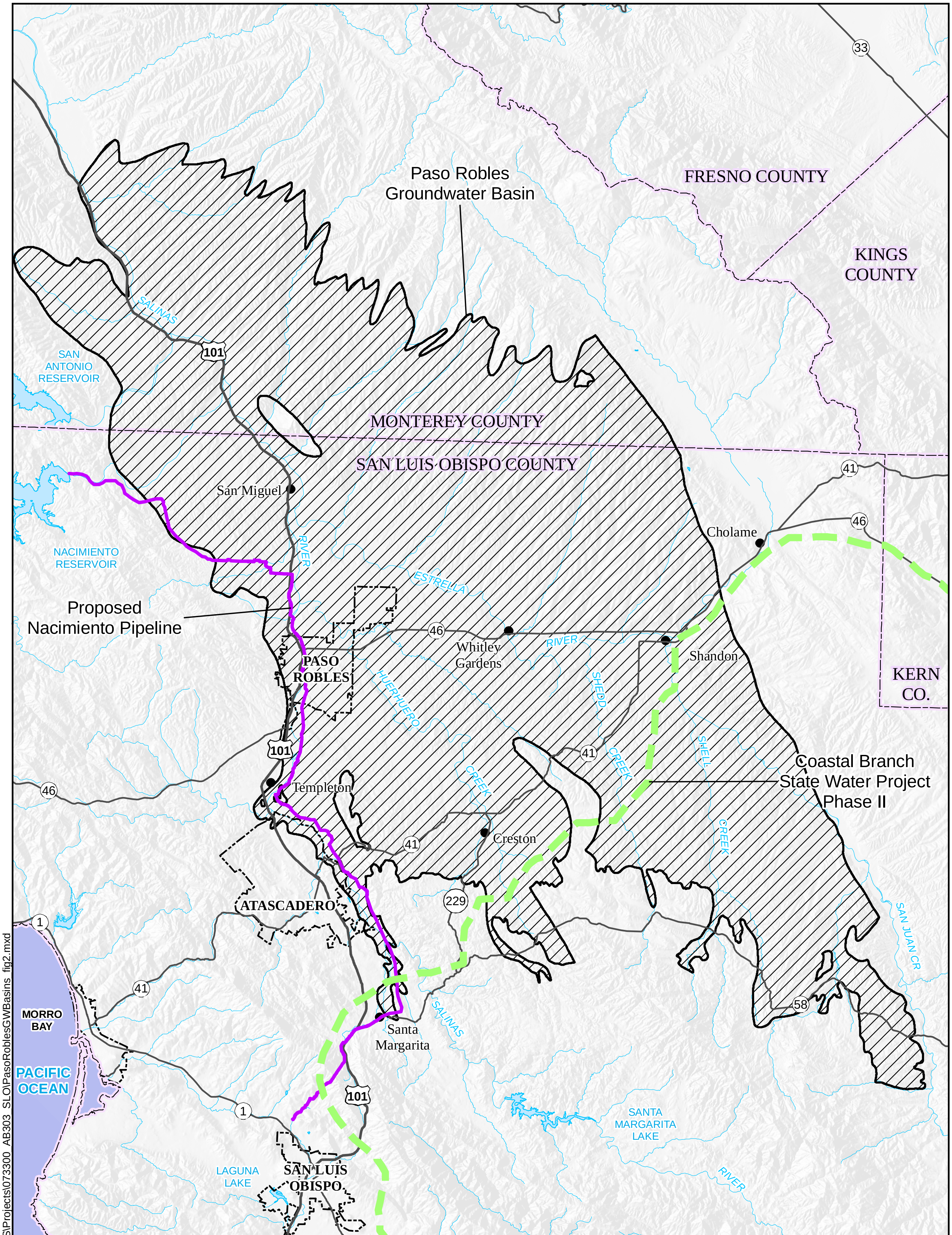
Scheduled Implementation of Groundwater Management Plan Development

A schedule for implementation of the technical analysis and the development and implementation of the Plan is presented in Section B.3.4 of this application. The general project schedule is presented below:

- **June 2008 –** Prepare Notice of Intent to develop the Plan.
- **June 2008 through December 2009 –** Implement Public Outreach and Stakeholder Involvement process.
- **July 2008 to January 2009 –** Develop technical information on groundwater management issues and develop interim BMOs.
- **August 2008 through April 2009 –** Coordinate with the County's Planning Department to complete land and water use analysis for existing and expected future conditions in the Basin.
- **October 2008 through December 2009 –** Expand upon the existing groundwater monitoring plan and prepare the 2009 Annual Report. This includes monitoring water levels in the spring (March) and fall (September) of 2009.
- **December 2008 through November 2009** - Perform internal technical review and QA/QC on technical deliverables.
- **January 2009 through December 2009 –** Complete draft and final Plan
- **December 2009 –** Adopt the SB 1938-compliant Plan.

Major Accomplishments

The formation of the RMS in the 1980s as part of the County's General Plan Framework provided a method to inform the Board about potential problems of land use planning decisions on various resources areas (including water supply). This approach supports the idea of proactive long-term planning in order to manage the impacts on water supply.



Paso Robles Groundwater Basin Regional Groundwater Management Plan	4 2 0 4 Miles	REGIONAL GROUNDWATER MANAGEMENT PLAN AREA
City of Paso Robles San Luis Obispo County, California		DECEMBER 2007 FIGURE 2

10-Dec-07 S:\GIS\Projects\073300 AB303 SLO\PasoRoblesGWBasins_fig2.mxd

Applying this approach to the Basin has resulted in numerous accomplishments in the Basin since 2000. Some of these, described in Section B.1, include:

- Master County Water Plan (1998)
- Paso Robles Groundwater Basin Study (2002)
- Basin Monitoring Program Evaluation (2003)
- Paso Robles Groundwater Basin Study Phase II –Numerical Model Development, Calibration, and Application (2005)
- Paso Robles Groundwater Basin Agreement (2005)
- San Luis Obispo County Integrated Regional Water Management Plan (2005)
- Water Resources Plan Integration and Capital Improvement Program (2007)
- Annual Report on the Paso Robles Groundwater Basin (2007)
- Paso Robles Groundwater Basin Water Banking Feasibility Study (2007)

Much has been done to understand the behavior of the Basin and the impact of human activities on that behavior. Following through on the proposed Plan presents the opportunity to make well-informed decisions to sustain the balance of use to yield. These accomplishments provide the foundation of the existing information in the Basin and support the continued data and information development in the Basin during the preparation of the groundwater management plan and future groundwater management efforts.

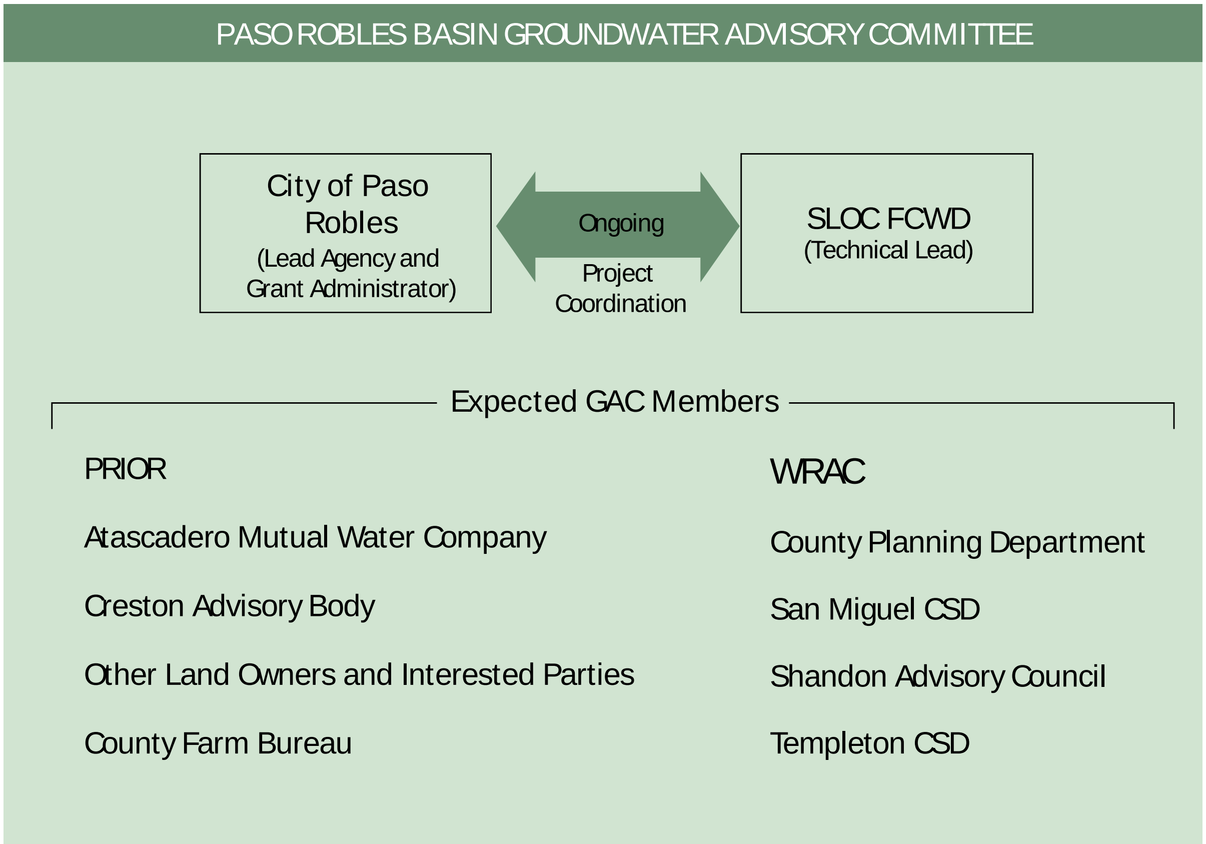
The major accomplishments of the proposed Plan include:

- Identification of steps that can keep the Basin in balance over the long-term.
- Adoption of the SB 1938-compliant regional groundwater management plan.
- Development of a regional groundwater monitoring plan and annual reporting format.
- Documentation of existing and expected future land and water use conditions in the Basin to estimate the impacts on the groundwater and estimate the benefits of potential groundwater management actions.

B.1.4. Public Process and Cooperation

The Plan will be developed through an open and public process to provide local groundwater users, water purveyors, stakeholders, and interested parties the opportunity to participate. Figure 3 presents the organization chart for the development of the Plan.

Figure 3: Organization Chart for Development of Paso Robles Regional GMP



Public Process

The Plan will be developed based on input from local water purveyors, water management agencies, and interested stakeholders. The City is the lead agency, both for submitting this grant application and providing contract administration. The preparation of the Plan will follow the approach that has been successful in the Basin, which includes utilizing the resources of the County staff from the District to lead the technical analysis. The process to develop the Plan will include:

- Inviting and encouraging public participation in the development of the Plan
- Conducting workshops for interested parties.
- Forming the Paso Robles Basin Groundwater Advisory Committee (Paso Robles Basin GAC) of interested parties and stakeholders. The North County Water Forum will be used as the starting point for the formation of the Paso Robles Basin GAC.
- Holding regularly scheduled meetings of the Paso Robles Basin GAC, to guide the development of the Plan and to provide information to other stakeholders and interested parties about the progress being made. .

- Publishing notices of Board meetings in the local newspaper at which action will be taken on the development of the Plan; the notice of intent to develop the Plan; notice of the availability of the draft Plan; and notice of adoption of the final Plan.

- Providing meeting agendas and minutes as well as other announcements regarding the Plan on the City's and District's websites and distributing this information at the meetings.

- Coordinating with local, State, and federal agencies.

City of Paso Robles as Lead Agency

As described previously, groundwater management in the Basin is shared among various public entities and stakeholders. The City will be the lead agency for purposes of submission and administration of this grant. As one of the lead agencies involved in groundwater management in the Basin, the City has continually participated in groundwater management activities and will continue to coordinate with the District and other stakeholders and interested parties as the Plan is being developed.

Earlier this year, the Paso Robles City Council adopted the *Water Resources Plan Integration*, reinforcing its declared water supply goals and charting a course for sustainable water supply for its citizens. The City recognizes that forward-thinking water resource planning is a key component of the health of the community and, as such, has taken a leadership role in regional water resource issues. Examples of such City activities are as follows:

- Mayor Mecham serves as vice-chairman of the Nacimiento Project Commission, a body dedicated to supplementing local groundwater supplies.

- The City is evaluating the merits of a wastewater recycling program as a means of offsetting Basin pumping and possibly recharging the Basin as opposed to continued river discharge.

- The City participates in the WRAC and on the Paso Robles Groundwater Basin Committee.

- The City plays a key role in regular dialogue with overlying landowners regarding regional water issues.

- The City was active in the North County Water Forum during the years that it regularly convened.

- The City adopted the framework for a water conservation program in an effort to better manage its own demand on the Basin.

San Luis Obispo County Flood Control and Water Conservation District

The District was established by the State Legislature in 1945 with the passage of the "San Luis Obispo County Flood Control and Water Conservation District Act." The District is governed by a Board of Supervisors (Board); its boundaries are co-terminus with the County; and its board members and staff are the same as those that act separately on behalf of the County. The proposed groundwater management plan and the grant application were discussed with the Board on December 4, 2007. The Board voted unanimously to support the program and endorse this application.

- The District lead the preparation and adoption of the San Luis Obispo County IRWM Plan, which provided a strategic plan for sustainable water resources to meet the human and environmental needs in the County. In this role, the District provides a broader vision of the importance of groundwater management to the Basin and the County.

- The District participates in the WRAC, North County Water Forum, and the Paso Robles Groundwater Basin Committee.

- The District plays a key role in regular dialogue with overlying landowners regarding regional water issues and coordinates with the County Planning Department on land use related issues.

- The District has led many of the technical studies recently completed in the Basin, including the Paso Robles Groundwater Basin Study (Phases I and II), Paso Robles Groundwater Monitoring Program Evaluation, and the Paso Robles Groundwater Basin Water Banking Feasibility Study.

Local and Regional Cooperation

There is additional local and regional support for this project from organizations and groups that have been involved in water resources and land use planning in the region, and from local landowners as described below.

- **Water Resources Advisory Committee** - The WRAC is an appointed advisory body made up of citizens and governmental representatives, including elected officials who advise the District's Board on water resources projects and policies in the region. The WRAC has 29 members representing 24 local agencies and organizations or associations. Each incorporated city, water-serving independent special districts, resources conversation districts, private water agencies, State agencies, and agricultural and environmental entities within the District are invited to participate in the WRAC. The proposed groundwater management plan and the grant application were discussed with the WRAC on December 5, 2007. The WRAC voted unanimously to support the program and endorse this application.

- **San Luis Obispo County Department of Planning and Building (Planning Department) –** The Planning Department recognizes the value of incorporating BMOs in the Paso Robles Basin to the County's RMS. Additionally, the Planning Department is encouraged by the opportunity to work proactively during the development of the GMP. The preparation of this grant application was discussed with staff, and the support of the Planning Department is documented in the letter of support dated December 7, 2007.

- **PRIOR Landowners -** The PRIOR landowners include the individual landowners that have signed the Paso Robles Groundwater Basin Agreement and are members of the Paso Robles Groundwater Basin Committee. Their support for this application is documented in the attached letter dated December 7, 2007.

- **Monterey County Water Resources Agency –** The northern portion of the Basin extends into Monterey County and is located within the jurisdiction of the Monterey County Water Resources Agency (MCWRA). The Basin Study included the portion of the Basin that extended into Monterey County. Local geologic conditions near the county line and their impact on the regional groundwater system were not fully addressed during the Basin Study.

  Since then, the MCWRA, the District, and other water management entities on the Central Coast have continued to work together to address local water resources management issues. Through the Integrated Regional Water Management Planning (IRWMP) process, the Central Coast area entities have met and agreed to its Statement of Principles, which established a coherent approach to benefit all planning subareas by coordinating water resources management activities to meet the long-term interests. This project looks to benefit from this Statement of Principles to cooperatively work with MCWRA to revisit these issues.

Dispute Resolution Process

The project schedule includes six public meetings of the Paso Robles Basin GAC that will be used to invite public participation and address any disputes that may arise during the development of the Plan. In addition, City Council presentations and three briefings to the WRAC are scheduled. This process of local (within the Basin) and Countywide (at the WRAC) meetings and briefings has been successfully used in the projects described in Section B.1 and is incorporated into the scope of work in Task 2 (Public Outreach and Stakeholder Involvement) described in Section B.3.2.

B.1.5. Groundwater Management

This project will improve groundwater management in the Basin by:

- Establishing a regional Plan, with the necessary stakeholder and public involvement.

- Identifying the groundwater issues within the Basin.
- Developing BMOs to support the RMS at the level of detail based upon the available data as determined by the Paso Robles Basin GAC.
- Completing and adopting the Plan, which will address all of the groundwater management components identified in the California Water Code associated with AB 3030 and SB 1938.
- Developing an implementation plan to guide groundwater management activities into the future, including supporting the County's IRWMP efforts.

B.1.6. Monitoring Protocols

The District has long recognized the value in collecting and using data to support effective efforts for water resources planning, water use management, drought protection, and water rights dispute resolution. Section J, Data Management, of the San Luis Obispo County IRWM Plan (included in Attachment 5) presents the County's approach to data management and data dissemination.

In the Paso Robles Basin, the District has been monitoring groundwater levels for over 40 years. The current groundwater monitoring program consists of nearly 145 wells, which are monitored every April and October by District staff (99 wells) or by local agencies (56 wells), with results reported to the District. The District has been cooperating with the State in providing data to the Groundwater Ambient Monitoring and Assessment (GAMA) program for the Basin.

The Monitoring Program Evaluation (Attachment 2) describes the existing monitoring program in the Basin and makes specific recommendations to improve the program's efficiency and effectiveness. The recommendations include the evaluation of wells for elimination from the program, identification of gaps in the monitoring network, and planning for additional wells in areas of concern or that have expected high groundwater use.

The existing groundwater monitoring protocols will be reviewed and updated as needed as part of the Sampling and Analysis Plan (in Task 5 of the Work Plan), based in part upon the information about the existing monitoring program. This includes a review of how wells are selected for inclusion in the monitoring program, identification of data gaps, data collection, QA/QC procedures, and dissemination of information. Data collected for this program will be compatible with the formats and requirements for submission to DWR for the GAMA program.

B.2 Public Outreach and Community Support for the Proposed Project

Numerous agencies and groups were contacted regarding this grant application and preparation of a regional groundwater mangement plan. The success of the public outreach to support this project and grant application is demonstrated by the number of letters of support included at the end of this section.

B.2.1. Public Outreach

The purpose of this Plan is to develop a management strategy that will preserve groundwater resources and ensure its availability to meet current and future water needs. The regional nature of the proposed project requires coordinated and regular communication among the water purveyors, water management agencies, and other stakeholders in the Basin.

The project was presented to the WRAC at its December 5, 2007, meeting; the WRAC unanimously approved to support and actively participate in this Project. A copy of the letter of support is included in Section B.2.2.

The 24 members of the WRAC include all the major water purveyors, interested parties throughout the County, other agencies, and interested stakeholders. The letter of unanimous support demonstrates the regional understanding of the importance and need for this project. The member agencies of the WRAC are listed below:

- Atascadero Mutual Water Company
- San Luis Obispo County Flood Control and Water Conservation District (District Staff)
- Atascadero Mutual Water Company
- Cal Cities Water
- California Men's Colony
- Cambria CSD
- Camp San Luis Obispo
- City of Arroyo Grande
- City of Atascadero
- City of Grover Beach
- City of Morro Bay
- City of Paso Robles
- City of Pismo Beach
- City of San Luis Obispo
- County Farm Bureau
- Cuesta Community College
- County Board of Supervisors District 1

- County Board of Supervisors District 2
- County Board of Supervisors District 3
- County Board of Supervisors District 4
- County Board of Supervisors District 5
- Environmental at Large
- Heritage Ranch CSD
- Nacimiento Regional Water Management Advisory Committee
- Los Osos CSD
- Nippomo CSD
- Oceano CSD
- San Luis Coastal RCD
- Templeton CSD
- Upper Salinas River RCD
- Agriculture at Large

In addition to contacting the WRAC, public outreach for this grant application included the advisory bodies as shown on Figure 1: County Planning Department, County Farm Bureau, PRIOR landowners, other small water purveyors including the San Miguel CSD, the Templeton CSD, and the City of Atascadero.

B.2.2. Community Support

As described above, numerous agencies and groups were contacted regarding this grant application and the preparation of a regional groundwater mangement plan. Overall, there is significant local and regional support for this application and plan as demonstrated by the letters of support received from the individual agencies, which are listed below and included in the following pages:

- Water Resources Advisory Committee (WRAC)
- PRIOR overlying pumpers
- San Luis Obispo County Planning Department
- San Luis Obispo County Department of Public Works
- Shandon Advisory Council (opposed to project)
- San Luis Obispo County Farm Bureau

The advisory bodies shown on Figure 1 were contacted regarding this application. The only reply was from the Shandon Advisory Council (SAC), who provided a letter (attached) that stated they feel they do not have enough information about the project to address their concerns. This is a primary reason for developing, circulating, and adopting a GMP via a transparent process: to answer public questions, provide information, and address public concerns.

We appreciate their level of concern to protect their water supply and the potential costs to the community. District staff had communicated the desire to get a letter of support from the SAC to support this grant application.

The need for improved groundwater mangement for the Basin, including the preparation of a groundwater management plan, was discussed at the November 7, 2007, Shandon Advisory Committee meeting that was attended by approximately 40 members of the community. At the November 7 meeting, the consultant preparing the Groundwater Banking Feasibility Study for the Paso Robles Basin provided an update to the project (a copy of the presentation is included in Attachment 10). As shown on slides 20 and 21, the presentation included:

- Groundwater Banking Operational Considerations (prior to the development of a groundwater bank) may include:
  - Groundwater Monitoring
  - Groundwater Banking Operating Agreements
  - Groundwater Banking Operational Criteria
- Groundwater Mangement Recommendations(which should be done to improve groundwater management in the basin) include:
  - Prepare a Groundwater Management Plan
  - Develop a Monitoring Plan
  - Install Dedicated Monitoring Wells to Fill Data Gaps

The response at the meeting was favorable regarding increased monitoring to improve the understanding and tracking of the groundwater basin.

We appreciate SAC considering the request to support the project. Recognizing their role in protecting their water supply, we should have provided them additional information as follow up to the November presentation regarding this application and the value of the groundwater mangement plan to get their support at this time. We believe the response of the SAC further demonstrates the need for this project and the extensive stakeholder involvement (Task 2 of the Work Plan) needed to garner support for groundwater management throughout the Basin. Additional briefings have been added to Task 2 of the Work Plan to ensure adequate outreach to the local advisory councils in the Basin (shown on Figure 1), including:

- Shandon Advisory Council
- Creston Advisory Body
- Templeton Advisory Committee
- San Miguel Community Advisory Council

Note that these briefings are in addition to the three scheduled briefings to the WRAC and the six scheduled project meetings, which will be open to the public and invited stakeholder involvement.

B.3 Technical Adequacy of Work to Be Performed

B.3.1. Project Description

As described in Section B.1, groundwater management in the Basin consists of numerous efforts that have been implemented since 1998, which in total address numerous groundwater management issues that are included in SB 1938. These activities will be consolidated into the more formalized GMP for the following reasons:

- To incorporate groundwater management activities for the Basin into the County's IRWM Plan.
- To improve water supply reliability, additional groundwater management opportunities and projects, including conjunctive use projects, will be identified.
- To build upon the existing interest and efforts of the stakeholder groups and public outreach to improve the understanding of the role of groundwater management to the County.
- The Plan will foster regional coordination to allow this group to be competitive with other regional planning entities in the pursuit of grants to fund the planning and implementation of groundwater management projects.

Table 1 identifies how individual groundwater management planning components that have been addressed in previous activities in the Basin will be incorporated into the development of an SB 1938-compliant GMP. Table 1 also identifies the specific task of the work plan included in Section B.3.2 where the groundwater management component would be addressed.

B.3.2. Work Plan

The following work plan was developed to complete and adopt the Plan and to update the regional groundwater monitoring plan.

Task 1 –Administrative Requirements of Groundwater Management Plan Process

The purpose of this task is to provide support to the project participants to satisfy the administrative requirements for completing an SB 1938-compliant Plan. Some of the actions include:

Table 1
How Groundwater Management Activities Are Addressed in Existing and Proposed GMP's

Groundwater Management Activity		How Addressed	
		Existing Groundwater Studies	**Proposed Paso Robles Regional GMP**
A. CWC § 10750 et seq., Required Components (SB1938)			
1.	Documentation of public involvement statement.	Not Addressed	To be included as part of public involvement process. (**Task 1**)
2.	Basin Management Objectives (BMOs).	The SLOC IRWMP (Attachment 5) identifies county-wide groundwater monitoring and management objectives.	To be developed as part of Plan.(**Task 3**)
3.	Monitoring and management of groundwater elevations, groundwater quality, inelastic land surface subsidence, and changes in surface water flows and quality that directly affects groundwater levels or quality or are caused by pumping.	The draft Update for the Paso Robles Groundwater Basin (Attachment 8) includes monitoring for groundwater levels for 2006.	To be developed as part of Plan (**Task 5**)
4.	Plan to involve other agencies located within groundwater basin.	Includes only a few agencies within and within the Paso Robles Basin.	To include additional agencies within Paso Robles Basin. (**Task 1 & 2**)
5.	Adoption of monitoring protocols by basin stakeholders.	Addressed in draft Update for the Paso Robles Groundwater Basin (Attachment 8).	Start with monitoring protocols from the Basin Update. (**Task 5**)
6.	Map of groundwater basin showing area of agency subject to GMP, other local agency boundaries, and groundwater basin boundary as defined in DWR Bulletin 118.	Boundary defined by DWR, modfied by Paso Robles Groundwater Basin Study (2002).	GMP Area located within Paso Robles Basin. (**Task 3**)
7.	For agencies not overlying groundwater basins, prepare GMP using appropriate geologic and hydrogeologic principles.	Not Applicable	Not Applicable
B. DWR's Suggested Components			
1.	Manage with guidance of advisory committee.	The North County Water Forum addresses water resources issues in the northern San Luis Obispo County.	The North County Water Forum will be used as the starting point to form the Paso Robles Basin Groundwater Advisory Committee. (**Task 2**)
2.	Describe area to be managed under GMP.	Paso Robles Groundwater Basin as delineated in the Paso Robels Groundwater Basin Study.	Paso Robles Groundwater Basin as delineated in the Paso Robels Groundwater Basin Study. (**Task 3**)
3.	Create link between BMOs and goals and actions of BMP.	Not Addressed	Link between BMOs and actions will be developed as part of Plan. (**Task 3 and 6**)
4.	Describe GMP monitoring program.	Addressed in draft Update for the Paso Robles Groundwater Basin (Attachment 8).	Start with monitoring protocols from Basin Update.(**Task 5**)
5.	Describe integrated water management planning efforts.	The SLOC IRWMP (Attachment 5) identifies county-wide groundwater monitoring and management objectives.	Includes land and water use evaluation of current and future conditions that will be coordinated with the County Planning Department (**Task 4**). Potential projects will be identified as part of the GMP. (**Tasks 6)**
6.	Report on implementation of GMP.	Includes brief discussion of implementation by individual agencies based on their level of interest.	Paso Robles Regional GMP includes Implementation Plan.(**Task 6**)
7.	Evaluate GMP periodically.	Not Addressed	Included in Implementation Plan. (**Task 6**)
C. CWC § 10750 et seq., Voluntary Components (AB3030)			
1.	Control of saline water intrusion.	Basin dependent on groundwater use, no evidence of widespread saline intrusion	Water quality monitoring of groundwater salinity water to be included in monitoring plan. (**Task 6**)
2.	Identification and management of wellhead protection areas and recharge areas.	Not Addressed	This project will utilize existing soils and land use analysis to identify favorable undeveloped recharge areas, and provide information to County Planning Department. (**Task 6**)
3.	Regulation of the migration of contaminated groundwater.	Supports Regional Water Quality Control Board (RWQCB) to enforce water quality regulations	Continue to support RWQCB. (**Task 6**)
4.	Administration of well abandonment and well destruction program.	Not Addressed	Rely on well permitting agency for abandonment and destruction program. (**Task 6**)
5.	Mitigation of conditions of overdraft.	Some areas with localized groundwater overdraft identified.	Continue to monitor groundwater levels to identify areas of overdraft in Paso Robles Basin. Develop plans for recharge and conjunctive use to reduce overdraft. (**Task 6**)
6.	Replenishment of groundwater extracted by water producers.	Need for replenishment of pumped water identified in exisitng studies. The Nacimiento Water Project will replace groundwater pumping with surface water supply.	Need to develop recharge and conjunctive use opportunities, especially near areas of concentrated pumping. (**Task 6**)
7.	Monitoring of groundwater levels and storage.	Recognizes need for adequate monitoring network of the aquifer systems. Currently monitoring network consists of production wells.	Proposes groundwater monitoring plan to establish monitoring network of the aquifer systems and identification of data gaps and need for dedicated monitoring wells (**Task 5**)
8.	Facilitating conjunctive use operations.	Conjunctive use is being developed as part of Nacimiento Water Project. Additional conjunctive use may be considered using SWP supply.	The GMP is needed to develop support for conjunctive use projects. (**Task 6**)
9.	Identification of well construction policies.	Well construction authority should remain with counties and cities. Participating agencies should request copies of well permits and well logs.	No change to authority. Well construction information will be included in data base. Well logs will be used to increase understanding of hydrogeologic setting in subbasin.(**Task 6**)
10.	Construction and operation by local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.	The Nacimiento Water Project and the importation of SWP water may be potential recharge projects.	One purpose of the Regional GMP is to identify and develop groundwater management projects to protect, maintain groundwater resources. (**Task 6**)
11.	Development of relationships with state and federal regulatory agencies.	Existing reports identify the importance of developing relationships with state and federal agencies. San Luis Obispo County is an SWP contractor.	Continue to maintain relationship with state and federal agencies. (**Task 6**)
12.	Review of land use plans and coordination's with land use planning agencies to assess activities that create reasonable risk of groundwater contamination.	Existing efforts recognizes importance of land use planning in groundwater management in the Basin, and generate most of the interest among stakeholders.	There will be significant coordination with the County Planning Departmetn on the land and water use analysis (**Task 4**). These efforts will be used by the County Planning Department to support the Resouces Capacity Study and Conservation Element update,

- Establishing a public participation/public involvement process
- Assisting the project participants to comply with the public involvement requirement in SB 1938
- Assisting the project participants with other administrative procedures

As shown on the project schedule, the administrative requirements occur primarily at the beginning and end of the preparation of the Plan. This task will be led by the City of Paso Robles with support by the District and the consulting team.

Task 2 – Public Outreach and Stakeholder Involvement

This task includes activities associated with the public outreach and stakeholder involvement process, such as communication with Basin stakeholders and other interested parties. There is an established and very active stakeholder process in northern San Luis Obispo County. This process has been used extensively to address issues and build consensus among a very diverse group of stakeholders. This includes six regularly scheduled meetings to report on project progress, review of project deliverables, and receipt of comments on the plan development and interim deliverables. Additional meetings and briefings are listed below.

- Paso Robles City Council briefings
- Three briefings to the WRAC at selected times in the project schedule to provide meaningful updates to the WRAC. Up to four additional briefings will be provided to the local advisory bodies during the preparation of the Plan to keep the local stakeholders and interested parties informed of the progress of the Plan and to elicit feedback.
- Newsletters will be circulated in advance of the meetings as part of the public outreach and encourage stakeholder involvement.

This task will be led by the City with support by the District and the consulting team.

Task 3 – Identify Groundwater Issues and Develop Basin Management Objectives

The purpose of this task is to identify the groundwater management issues within the Plan Area and develop BMOs that identify the groundwater management activities that are linked to each BMO. The BMOs will include objectives for water levels, water quality, and land subsidence. The activities associated with the development of BMOs will address the groundwater management components and may be organized into the following groups.

- Groundwater protection issues may include:

- Control of saline water
- Identification of well protection and recharge areas
- Regulation of the migration of contaminated groundwater
- Administration of a well abandonment and well destruction program
- Identification of well construction policies
- Coordination with agencies responsible for groundwater contamination cleanup, recharge, storage, recycling, and extraction projects
- Review of land use plans and coordination with land use planning agencies to assess activities that create a reasonable risk for groundwater contamination

▪ Groundwater use/recharge issues may include:

- Prevention and mitigation of conditions of overdraft
- Replenishment of groundwater extracted by water producers
- Monitoring of groundwater quality and storage levels
- Facilitating conjunctive use operations

The groundwater subareas were identified in the Basin Study (2002) based on water quality, source of recharge, groundwater movement, and contours on the base of permeable sediments. The Annual Report (2007) used these same subbasin/subarea delineations. It is expected that the BMOs will be developed based upon the groundwater subarea delineations (Figure 1) from the Basin Study which include:

- North Gabilan Subarea
- Bradley Subarea
- South Gabilan Subarea
- Estrella Subarea
- Creston Subarea
- Shandon Subarea
- Creston Subarea
- Atascadero Subbasin

This task will be led by the consulting team. Independent technical review of this task will be completed by the consulting team as described in Task 7. The deliverable for this task will be a technical memorandum documenting the groundwater issues and provisional BMOs for each subarea.

Task 4 – Water Demand and Supply Analysis

The purpose of this task is to document the current and future land use and the associated water uses in the Basin based on readily available information. There are three expected land use and water use planning activities in the County that are coincident with the proposed schedule for the development of the Basin Study that will be incorporated into the update of the water demand and water supply analysis in the Basin.

- **Resource Capacity Study** - In its June 5, 2007, meeting, the Board recommended a Level of Severity I designation for the Basin, indicating a low immediacy of resource deficiency. This designation was made with reference to the 1980-1997 groundwater level decreases in the Estrella subarea and to increases in the extent of overlying land uses, including ranchettes, golf courses, and vineyards. As a result of this designation, County staff was directed to prepare a Resource Capacity Study that will focus on the area of groundwater level decrease. The Resource Capacity Study will be considered by the Board in February 2008. The work completed in this task will support the Resource Capacity Study and will be coordinated with the County Planning Department.

- **Conservation Element of the County General Plan** - The Conservation Element of the County's General Plan is being updated to improve, consolidate, and revise the existing policies and programs, including those related to water resources. "Cutting edge" policies will be developed related to green building, watershed protection, water conservation, biological resource protection, and conservation-oriented land use patterns such as smart growth that may have an impact on future groundwater basin management efforts. The Conservation Element of the County General Plan will be completed by the County Planning Department. The work completed in this task will support the update of the Conservation Element for the portion of the County within the Basin and will be coordinated with the Planning Department.

- **Countywide Master Water Plan** - In addition, the Countywide Master Water Plan update is scheduled for 2009. Incorporating recent documents such as urban water management plans, general plan updates, and water/wastewater master plans, the Countywide update will include current and future water use projections for water planning areas. The work completed in this task will support the preparation of the Countywide Master Water Plan for the portion of the County within the Basin, and will be coordinated with the County Public Works Department.

The technical analysis of this task will be led by the consulting team and is expected to include considerable coordination with the County's Planning Department and Public Works Department. The County Department of Planning staff will be responsible for completing the Resource Capacity Study and Conservation Element, and the Public Works staff will be responsible for completing the Countywide Master Water Plan update described above. Independent technical review of this task will be completed by the consulting team as described in Task 7. The deliverable for this task is a technical memorandum documenting the existing and expected future land and water use conditions. In addition, the GIS files used in the analysis will be provided to the County Planning Department.

Task 5 – Prepare 2009 Annual Groundwater Report

The purpose of this task is to build upon the existing groundwater monitoring taking place in the Basin and to formalize the groundwater monitoring program. This includes the following activities:

- Prepare a Sampling and Analysis Plan (SAP) that includes monitoring protocols for the Basin.
- Develop a data management system to store, manage, analyze, and present monitoring data.
- Review available data to identify indicator wells for each subarea wells that represent the overall trends for use in development of provisional BMOs.
- Monitor groundwater levels in the indicator wells in the spring and fall of 2009.
- Prepare groundwater level maps for spring and fall 2009.
- Collect groundwater samples from selected wells from each subarea for water quality analysis during the spring monitoring.
- Summarize groundwater quality data.
- Develop the format for future annual groundwater reports.
- Prepare a report of the 2009 groundwater conditions of the Basin.

The Paso Robles GBC recently completed the draft *Update for the Paso Robles Groundwater Basin* (Update). Much of the information included in the Update will be used to guide the development of the SAP and preparation of the 2009 Annual Groundwater Report.

This task will be led by the consulting team. The deliverables for this task includes the Sampling and Analysis Plan and the 2009 Annual Groundwater Report, which will present the results of the 2009 monitoring activities. In addition, this task will include a data management system. Independent technical review of this task will be completed by the consulting team as described in Task 7. In addition, the draft 2009 Annual Groundwater Report will be presented to the Paso Robles Basin GAC, WRAC, and interested local advisory committees in order to obtain review and comment by the stakeholders and interested parties.

Task 6 – Prepare Groundwater Management Plan

A draft and final version of the Plan will be completed as part of this task. The draft document will be distributed to the project participants, stakeholders, and DWR for review and comment. The final document will be prepared, based on information collected on the draft document. The final Plan will be provided to the project participants for adoption. Project costs associated with this task are for the production and distribution of 10 draft and 20 final copies of the Plan.

This task will include the preparation of an implementation plan to outline the GMP that will be used to direct groundwater management in the Basin and support other planning efforts such as the IRWMP. The project participants and stakeholders will develop the implementation plan, which will address:

- Continuation of the groundwater monitoring program, including the analysis and reporting of annual groundwater conditions
- Continuation of monitoring groundwater protection efforts
- Ongoing planning for groundwater recharge and conjunctive use opportunities
- Planning to periodically update the Plan as additional information is developed
- Identifying funding for continued groundwater management activities in the subbasin

This task will be led by the consulting team. Independent technical review of this task will be completed by the consulting team as described in Task 7. In addition, the draft GMP will be presented to the Paso Robles Basin GAC. the WRAC and interested local advisory committees in order to get review and comment by the stakeholders and interested parties.

Task 7 – Technical Review – QA/QC

This task includes an independent technical review by the members of the consulting team experienced in groundwater management, but not directly involved in the development of this GMP. This internal QA/QC will provide additional review and expertise to the project to ensure it meets the expectations of the local project participants and stakeholders, provides a vision and framework for the implementation of groundwater management in the Basin, and meets the requirements for SB 1938. The technical review is expected to take place at four specific areas:

- Identification of groundwater issues and development of BMOs (Task 3)
- Documentation of the water demand and supply analysis (Task 4)
- Preparation of the Sampling and Analysis Plan and the 2009 Annual Groundwater Report (Task 5)
- Review of the draft groundwater management plan including the implementation plan (Task 6).

This task will be led by the consulting team. It will be coordinated with the review and comment of the interim deliverables by the stakeholders and interested parties as shown on the project schedule. The project budget included on Table 2 presents two staff that are assigned only to this task.

Table 2

Budget Summary

Applicant Name: City of Paso Robles

Project Title: Paso Robles Regional Groundwater Management Plan

Task	Description	Requested Grant Funds	Cost Share	Total Costs	Source of Local Funding
1	Support Administrative Requirements	$ 5,400	$ 2,600	$ 8,000	City of Paso Robles staff
2	Conduct Public Outreach and Stakeholder Involvement	$ 33,320	$ 28,800	$ 62,120	City of Paso Robles staff District Staff Stakeholders
3	Identify Groundwater Issues and Develop Basin Management Objectives	$ 37,360	$ 4,800	$ 42,160	District staff and County Planning Department staff
4	Document Water Demand and Supply Analysis	$ 45,340	$ 10,000	$ 55,340	County Planning Department Staff and District Staff
5	Prepare 2009 Annual Report	$ 60,360	$ 3,200	$ 63,560	District staff
6	Prepare Groundwater Management Plan	$ 43,820	$ 2,400	$ 46,220	District Staff
7	Technical Review-QA/QC	$ 9,040	$ 4,800	$ 13,840	District Staff
8	Project Administration and Management	$ 7,800	$ 12,600	$ 20,400	City of Paso Robles Staff
				$ -	
				$ -	
				$ -	
	Grand Total (sum columns for each task)	$ 242,440	$ 69,200	$ 311,640	

Comments:

Task 8 – Project Management

This task includes general project management and coordination during the development of the Plan. This task includes:

- The consultant's project management activities, including preparing monthly invoices and progress reports. This was budgeted to take approximately one hour per month (for the duration of the project) each for the project manager and project administrator, and an additional two hours for each quarterly report. This effort is included in the grant application.

- Overall project management by the City's project manager, including preparing invoices and progress reports for DWR. This was budgeted to take approximately four hours per month (for the duration of the project) for the City's project manager and two hours per month for the project administrator. An additional four hours is needed for each quarterly report to DWR. This effort will be provided as a cost share.

Project management activities will continue throughout the duration of the project.

Project Deliverables

The project deliverables identified in the work plan are listed below.

- Participation in six project meetings and up to eight briefings (Task 2)

- Interim technical memorandum documenting the groundwater issues and BMOs (Task 3)

- Interim technical memorandum documenting water use and supply analysis (Task 4)

- Sampling and Analysis Plan (Task 5)2009 Annual Groundwater Report (Task 5)

- Water level and water quality data management system (Task 5)

- Draft and final Plan (Task 6)

- Quarterly progress reports to DWR (Task 8)

B.3.3. Budget

The estimated level of effort and budget to complete the scope of work totals $311,640 (all budget items subject to change) as presented in the Table 2. The City and other participating agencies will provide in-kind services totaling $69,200. The grant requested from DWR totals $242,440.

The scope of work and estimated level of effort assumes that qualified consulting firm(s) familiar with the hydrogeologic setting of the Basin will complete most of the technical work. The consultant's project manager should be a California registered geologist or certified hydrogeologist with several years of experience preparing groundwater management plans and developing groundwater monitoring networks in California.

The project rates used to estimate the project budget are based on the consultant rates used for the recently completed Water Banking Feasibility Study completed for the District. Table 3 presents the estimated hours by staff level to complete each task.

City management and staff will participate in the project and coordinate with the project participants, stakeholders, and DWR. The City will also provide administrative support to complete the public participation and administrative requirements for the project.

Katie DiSimone, PE, and Christine Halley, PE, make up the City's project management staff for the proposed Plan. Together, they provide an additional level of overall project quality assurance as well as practical knowledge and insight of the local conditions.

- Katie DiSimone earned her bachelor's degree in environmental engineering from California Polytechnic State University, San Luis Obispo, in 1995, followed by her master's degree in civil and environmental engineering from the University of California, Davis, in 1996. Mrs. DiSimone began her career 11 years ago as staff engineer at Dames & Moore Consulting Engineer's San Diego office, then dedicated five years as water resources control engineer with the Regional Water Quality Control Board, Central Coast Region. While at the Regional Board, she reviewed technical reports and groundwater/geotechnical investigations for a variety of sites throughout the Central Coast. She spent four years as the City of San Luis Obispo's water projects manager, responsible for contracts totaling over $11 million. Mrs. DiSimone led the City's efforts in the Water Reuse Master Plan and effectively presented findings and progress reports to the City Council and various organizations. As the City of Paso Robles' utilities manager, she is responsible for implementation of the adopted Integrated Water Resources Management Plan and overseeing the City's utilities staff. Mrs. DiSimone is responsible for development of the City's pretreatment and source control program as well as the water conservation program. She manages the City's Urban Water Management Plan preparation and plays a lead role in implementation of all City water resource projects, including the Nacimiento Water Project. She is an effective communicator, particularly in explaining complex engineering issues to the rate-paying public.

Table 3
Paso Robles Regional Groundwater Management Plan
Detailed Project Budget

	Grant-funded Services (Consultant)												Participating Agency In-Kind Services								COST SHARE	
Task Number/Name	Managing Executive Engineer Grade 9 $210	Senior Principal Engineer Grade 8 $190	Managing Senior Engineer Grade 6 $145	Senior Engineer/ Geologist Grade 5 $125	Engineer/ Geologist Grade 3 $95	Staff Engineer Grade 1 or 2 $85	GIS Grade 3 $95	AA & Clerical $70	**TOTAL LABOR HOURS**	TOTAL LABOR COSTS	OTHER DIRECT COSTS	**TOTAL PROJECT COSTS**	Manager/ Engineer $100	Admin & Clerical $50	**TOTAL LABOR HOURS**	TOTAL LABOR COSTS	OTHER DIRECT COSTS	**In-Kind PROJECT COSTS**	**Total In-Kind Service Project Costs**	**TOTAL PROJECT COSTS**	**Local Agency Funded Project Costs**	**Grant Funded Project Costs**
Task 1 - Support Administrative Requirements	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**12**	**36**	**$5,400**	**$0**	**$5,400**	**16**	**20**	**36**	**$2,600**	**$0**	**$2,600**	**$2,600**	**$8,000**	**$2,600**	**$5,400**
Task 2 - Conduct Public Outreach and Stakeholder Involvement	**0**	**134**	**0**	**0**	**0**	**0**	**24**	**24**	**182**	**$29,420**	**$3,900**	**$33,320**	**280**	**16**	**296**	**$28,800**	**$0**	**$28,800**	**$28,800**	**$62,120**	**$28,800**	**$33,320**
Task 3 - Identify Groundwater Issues and Develop Basin Management Objec	**0**	**56**	**112**	**0**	**60**	**16**	**36**	**0**	**280**	**$37,360**	**$0**	**$37,360**	**48**	**0**	**48**	**$4,800**	**$0**	**$4,800**	**$4,800**	**$42,160**	**$4,800**	**$37,360**
Task 4- Document Water Demand and Supply Analysis	**0**	**36**	**92**	**0**	**200**	**0**	**56**	**12**	**396**	**$45,340**	**$0**	**$45,340**	**100**	**0**	**100**	**$10,000**	**$0**	**$10,000**	**$10,000**	**$55,340**	**$10,000**	**$45,340**
Task 5 - Prepare 2009 Annual Report	**0**	**16**	**52**	**0**	**140**	**80**	**52**	**32**	**372**	**$37,860**	**$22,500**	**$60,360**	**32**	**0**	**32**	**$3,200**	**$0**	**$3,200**	**$3,200**	**$63,560**	**$3,200**	**$60,360**
Task 6 - Prepare Groundwater Management Plan	**0**	**44**	**88**	**0**	**140**	**0**	**32**	**48**	**352**	**$40,820**	**$3,000**	**$43,820**	**24**	**0**	**24**	**$2,400**	**$0**	**$2,400**	**$2,400**	**$46,220**	**$2,400**	**$43,820**
Task 7 - Technical Review-QA/QC	**24**	**0**	**0**	**32**	**0**	**0**	**0**	**0**	**56**	**$9,040**	**$0**	**$9,040**	**48**	**0**	**48**	**$4,800**	**$0**	**$4,800**	**$4,800**	**$13,840**	**$4,800**	**$9,040**
Task 8 - Project Administration and Management	**0**	**30**	**0**	**0**	**0**	**0**	**0**	**30**	**60**	**$7,800**	**$0**	**$7,800**	**96**	**60**	**156**	**$12,600**	**$0**	**$12,600**	**$12,600**	**$20,400**	**$12,600**	**$7,800**
TOTAL HOURS	**24**	**340**	**344**	**32**	**540**	**96**	**200**	**158**	**1734**				**564**	**96**	**660**							
TOTAL COSTS	**$5,040**	**$64,600**	**$49,880**	**$4,000**	**$51,300**	**$8,160**	**$19,000**	**$11,060**		**$213,040**	**$29,400**	**$242,440**				**$69,200**	**$0**	**$69,200**	**$69,200**	**$311,640**	**$69,200**	**$242,440**

- Christine (Ferrara) Halley has 26 years of experience in water resource management with 22 years on Central Coast water resources. Mrs. Halley is a leading water resource expert in San Luis Obispo County, having been a key author/project manager for the majority of the relative projects listed in Section B1. Mrs. Halley earned her BSCE in 1981 from Pennsylvania State University and began her California practice in 1986. She was employed by Boyle Engineering Corp. for twelve years, and from 1990 to 1999 was manager of the Boyle San Luis Obispo office. She worked as operations manager for the Atascadero Mutual Water Company then dedicated four years (2000 to 2004) as the utilities division manager for the San Luis Obispo County. In that role, Mrs. Halley was responsible for the countywide groundwater monitoring program and for the studies listed herein. She holds the distinction of sustained leadership in the Nacimiento Water Project dating back to 1992 and continues her role as Nacimiento Project Engineer for the Flood Control District. She now works with TJ Cross Engineers, Inc. based in Bakersfield, California, and supports water resource efforts on behalf of the City of Paso Robles. She was lead author of the City's *Water Resources Plan Integration and Capital Improvement Program* and provides project management services for the City's water treatment plant design.

The additional members of the Paso Robles Groundwater Banking Committee have worked in an integrated fashion to complete the following projects:

- Paso Robles Groundwater Basin Study (2002)
- Paso Robles Groundwater Basin Study Phase II –Numerical Model Development, Calibration, and Application (2005)
- Paso Robles Groundwater Basin Agreement (2005)
- San Luis Obispo County Integrated Regional Water Management Plan (2005)
- Annual Report on the Paso Robles Groundwater Basin (2007)
- Paso Robles Groundwater Basin Water Banking Feasibility Study (2007)

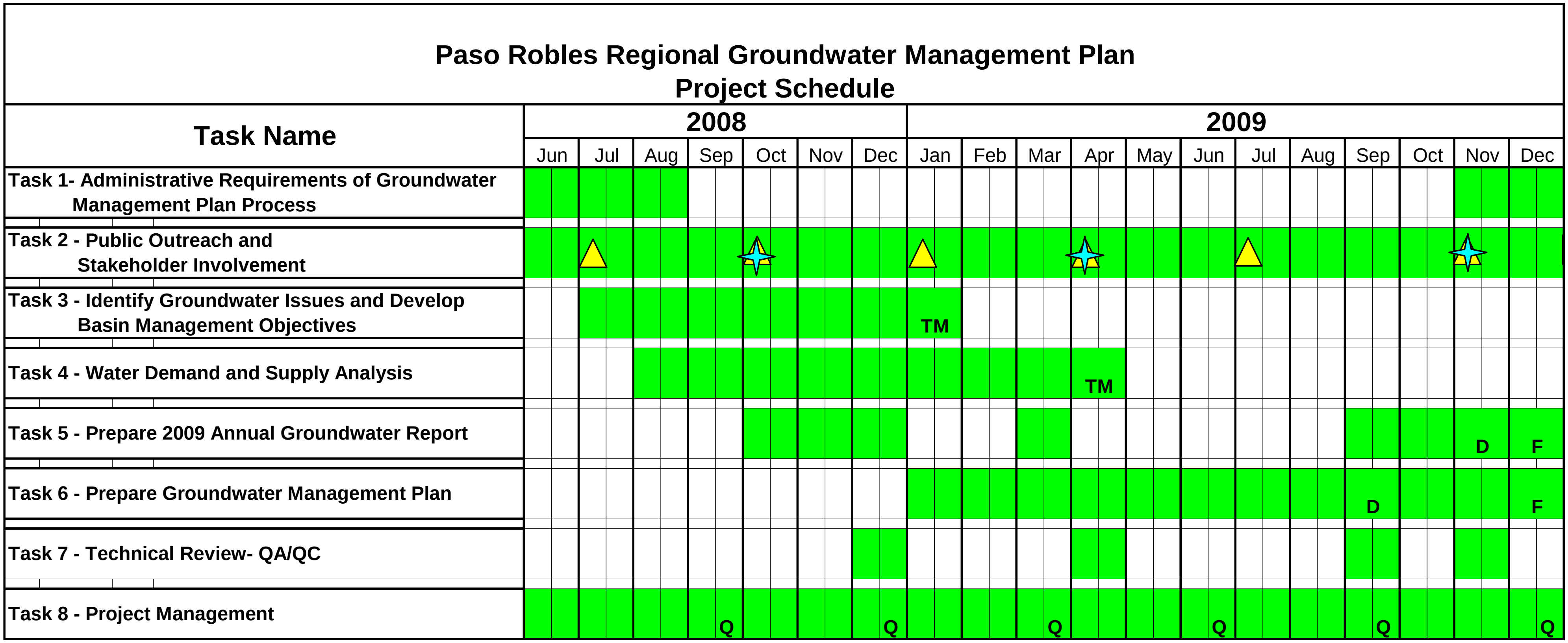
B.3.4 Schedule

Based on the tasks outlined above, the project schedule for the development of the Plan is expected to have an 18-month duration. In order to meet grant schedule requirements, the project is assumed to begin in June 2008 and be completed in December 2009.

The project schedule includes the approximate dates of completion of the following:

- Preliminary project meeting dates, briefings to the WRAC (Task 2)

- Preliminary BMOs (Task 3)
- Water Supply and Demand Analysis (Task 4)
- 2009 Annual Groundwater Report (Task 5)
- Draft and Final Groundwater Management Plans (Task 6)
- Technical Review and Quality Control/Quality Assurance (Task 7)
- Quarterly progress reports (Task 8)



Paso Robles Basin GAC Meetings
Presentations to WRAC
TM Technical Memorandum
Q Quarterly Progress Reports
D Draft GMP
F Final GMP

B.3.5. Information

The project will yield a high quality and quantity of useful information about the physical setting of the Plan Area and the management aspects of the available groundwater resources.

The technical information will be obtained using technically feasible and appropriate methods as outlined in the work plan and completed by knowledgeable and experienced professionals. The details included in the work plan are based on review of the available data and experience in completing groundwater investigations, developing groundwater monitoring programs, and implementing groundwater management plans.

Implementation of the extensive quality assurance program presented in Section B.3.7 and project performance measures presented in Section B.4.2 of this application ensures a high quality of work to be developed from this project.

The quantity of information developed for this project is described in the project work plan presented in Section B.3.2, and listed at the end of that section under the Project Deliverables heading.

B.3.6. Environmental Compliance and Permits

The proposed project does not include any direct or indirect changes to the existing environment nor does it include any foreseeable changes to the environment in the future. The project does not include construction, grading activities, or facility improvements. The project includes a desktop analysis of current facilities and may include site visits to facilities within the Plan Area.

Since the proposed project is primarily an off-site study that does not include any physical changes to the environment, it is not subject to the California Environmental Quality Act (CEQA). The project does not qualify as a “project” under Section 15378 of the CEQA Guidelines.

B.3.7. Quality Assurance

As mentioned in the statement of work, a qualified consultant will be used to complete the scope of work, which includes planned quality assurance checks of the technical work at various stages of the project. Multiple levels of QA/QC will be included throughout the preparation of the technical work products and development of the GMP. The specific quality assurance activities include the following:

- The work will be performed by consultant who is familiar with the hydrologic and hydrogeologic setting of the Paso Robles Basin and knowledgeable of the groundwater management activities currently being implemented and evaluated in the Basin. The technical components will be peer reviewed by the consultant(s) by qualified senior level staff that are not directly involved in the preparation of the work products.

- An independent technical review will be provided by District staff.

- Katie DiSimone and Christine Halley will provide an additional level of overall project quality assurance as well as practical knowledge and insight of the local conditions.

- The interim deliverables will also be provided to the Paso Robles Basin GAC prior to the six scheduled project meetings to facilitate review and discussion from project participants and stakeholders.

- The WRAC will also be briefed about the progress of the development of the Plan through the three meetings identified on the project schedule and elicit input from the Countywide water resources perspective.

B.3.8. Past Performance

- **Nacimiento Water Project Design and Financing –** As the largest participant in this $178 million water resource project, the City successfully informed rate payers of the manner in which this project fits into the City's water portfolio. The City, together with the District and other participants, certified the Nacimiento Water Project Environment Impact Report in 2004 followed within seven months by execution of the delivery entitlement contracts. The project team was assembled such that design, permitting, and financing were completed on time, i.e. by mid 2007. Construction of this regional water project is now underway. The City proposes to engage the same project team for preparation of the GMP that successfully shepherded the Nacimiento Project into construction. Specifically, the Paso Robles Mayor, Frank Mecham, sits in a leadership role as the Nacimiento Project Commission vice-chairman; the City's Public Works Director, Doug Monn (proposed Grant Manager), is a member of the Technical Advisory Committee, and Christine Halley, the City's proposed day-to-day project contact, is the Nacimiento Project Engineer.

- **2002 Paso Robles Groundwater Basin Study –** The City worked successfully with the District to complete this keystone report on the Basin as well as the 2005 numerical model. Again, the familiar team of Doug Monn and Christine Halley played key roles in the timely completion of this study, with the active support of Todd Engineers. This is a good example of a project completed with an effective means of garnering shareholder input.

- **Water Resources Plan Integration and Capital Improvement Program –** The City's integrated water resource plan was completed in a seven-month period and adopted by the City Council at first presentation. This effort in particular demonstrates the alignment of the City Council on regional water resource issues and the City's overall goals for such resources on a long-term basis. Doug Monn and Christine Halley were primary authors of this report and CIP.

- **2007 Annual Report on the Basin –** The City took the lead in publication of this Basin status report, thereby sustaining the momentum of interest in the Basin. This was a coordinated effort with the District, managed by Doug Monn under contract with Todd Engineers.

- **Annual Groundwater Monitoring Program and WRAC –** The water level monitoring program and WRAC's advisory function have consistently been funded and staffed by the District with participation from the City. This fact lends concrete evidence to both the sustained regional cooperation that exists in the County and the ongoing value placed on hydrologic data gathering.

- **Groundwater Banking Feasibility Study –** As described previously, the District has been the lead agency for numerous investigations and studies in the Basin. The District is currently completing the Groundwater Banking Feasibility Study for the Paso Robles Groundwater Basin, which is being managed by the District under contract of the consulting team lead by GEI Consultants, Inc.

- **Study Alternatives for Handling of Hot Springs Water –** The City of Paso Robles secured California Energy Commission Grant No. GEO-04-002 in the amount of $145,500 plus local matching share. The CEC grant term extended through June 2007 and the City completed the funded activities on time. Grant monies were used to study alternatives for handling the hot springs water that surfaced near City Hall as a result of the San Simeon Earthquake in December 2003.

B.4 Use of Information Gained from the Proposal

B.4.1. Need and Value

Need for Proposed Project

Since 2002, the members of the Paso Robles Basin GAC have taken active roles in managing the groundwater resources in the Basin. This historically agricultural area has experienced significant agricultural growth, primarily in vineyards, over the last 20 years. Additionally, urban growth has increased primarily on the west side of the Basin and along the Highway 46 corridor.

The increase in water demand associated with these changing land use conditions is currently all met with groundwater. This growth has placed increasing reliance on the groundwater basin to provide groundwater of suitable quantity and quality to meet these demands.

Improved groundwater management is needed to:

- Develop necessary information to understand the groundwater conditions and potential benefits of implementing planned projects such as the Nacimiento Water Project, demand management, water recycling, or conjunctive use projects.

- Communicate this information effectively to local landowners, stakeholders, and interested parties,

- Identify necessary actions needed to ensure long-term groundwater supply reliability and sustainability.

This project is needed to facilitate coordinated regional groundwater management in the Paso Robles Basin, which will protect and preserve the groundwater resources and ensure their availability to meet current and future water needs.

Value of Proposed Project

This project will provide the following benefits to the Basin through the completion of the work plan:

- Update regional land and water use data for the Basin to support County land use planning activities to be lead by the County Planning Department by estimating the current and future water use conditions.

- Develop a monitoring protocol for the Sampling and Analysis Plan.

- Develop a useable data management system to store, manage, and analyze groundwater level, quality, and land subsidence data.
- Identify gaps in the monitoring program that will need to be addressed in the future.
- Develop water level and water quality maps to facilitate improved groundwater management.
- Establish the regional Plan, with the necessary stakeholder and public involvement.
- Develop BMOs.
- Provide an implementation plan to guide future groundwater management activities.

Value of Proposed Project and Relation to Past Work

The proposed project builds upon the work completed over the last ten years and establishes a framework to continue to improve regional groundwater management in the Basin. As shown in Table 1, many of the components for groundwater management related to groundwater management were addressed through the studies that have been completed since 2002.

These have resulted in additional groundwater data and a better understanding of the hydrogeologic setting of the Basin. This information will be used in this project to update the understanding of the groundwater resources in the subbasin, and incorporate this information into a concise summary to support groundwater management planning efforts, including the continued efforts to investigate conjunctive use opportunities in the Basin with supplies from the Nacimiento Water Project and the SWP.

B.4.2. Performance of the Project

The City will continually monitor the project performance to ensure the successful completion of both the individual activities and the overall project. As previously mentioned in B.3.7 of this application, there is an extensive quality assurance component to the project. The City's project manager will be responsible for implementing the quality assurance measures and communicating the overall project progress and performance to the stakeholders and DWR.

Communication with DWR

The overall project performance will be conveyed to DWR in quarterly progress reports. The City will prepare six quarterly progress reports and one final progress report (completed at the end of the project) during the 18-month project schedule. Preliminary dates for submittal of the progress reports are shown on the project schedule in Part B.3.4.

Communication with Stakeholders

The project performance will be conveyed to project stakeholders at the six project meetings to the Paso Robles Basin GAC and briefings to the WRAC and other advisory groups. Preliminary dates for the project meetings are shown on the project schedule in Part B.3.4. Members of the WRAC, and other stakeholder groups will be invited to participate in the project, attend the project meetings, participate in the development of the Plan, and provide a regional perspective on the project (in the case of the WRAC).

Completion of Project Tasks

The work plan presented in Part B.3.2 will be completed with participation from the project participants and stakeholders. The performance of the tasks will be compared to the project goals and objectives established in the work plan. Some of the performance measures for the individual activities are outlined below:

- Completing the administrative requirements to prepare and adopt a groundwater management plan (**Task 1**).
- Establishing a regional Paso Robles Basin GAC, with the necessary stakeholder and public involvement (**Task 2**)
- Identifying the groundwater issues that support the development of BMOs for the Basin (**Task 3**).
- Coordinating with the other scheduled land use planning efforts to develop the regional land and water use data and water supply setting for the Plan Area (**Task 4**).
- Developing the framework for an annual groundwater level report, and preparing the 2009 Annual Report (**Task 5**).
- Completing and adopting the Plan, which will address all the groundwater management components identified in the California Water Code associated with an AB 3030 and SB 1938 groundwater management plan (**Task 6**). This includes the preparation of the implementation plan.
- Completing the technical review and QA/QC by the consulting team at the four parts of the project schedule identified in Section B.3.4. (**Task 7**)
- Implementing a project management program to maintain effective and timely progress including coordination among project participants, consulting team, and with DWR (**Task 8**).

B.4.3. Ongoing Use

The information developed from this project will greatly increase the understanding of the groundwater system in the basin and provide a framework for regional groundwater management. This information will be used to develop a baseline set of regional information for use in future studies (including groundwater modeling updates), groundwater monitoring, and continued groundwater management efforts including investigation of conjunctive use opportunities. Many of these data collection and management efforts will continue to be funded, as they have been in the past, by a combination of sources that primarily depend on the County and, to a lesser degree, by entities within the Basin such as the City of Paso Robles. Additional funding may be pursued for specific projects such as groundwater modeling or groundwater investigations. The following list identifies some of the future uses for the information developed during this project:

- The regional land and water use data will also be used by the County Planning Department to support the Resource Capacity Study. This information will ultimately be used to update water demand projects and determine the need for groundwater recharge and conjunctive use operations.

- The existing monitoring program utilizes production wells from willing participants. The monitoring program will need to be expanded using dedicated monitoring wells as part of the long-term monitoring program.

- The basin-wide groundwater level data will be used in future groundwater management efforts such as monitoring the effectiveness of conjunctive use operations.

- The groundwater data from the ongoing groundwater monitoring efforts will be incorporated into the data management system developed as part of this project to produce annual groundwater reports. This will support and streamline future monitoring and reporting efforts.

- The SB 1938 GMP will continue to be implemented and maintained. The Paso Robles Basin GAC will continue to lead the groundwater management effort. This includes continued general groundwater management activities and participation in the Paso Robles Groundwater Basin Committee (Paso Robles Groundwater Basin perspective) and at the WRAC (County perspective).

B.4.4. Information Dissemination

During the project, the consultant will provide monthly status reports by e-mail to the Committee on the progress of work. As the lead agency, the City will forward these e-mails to DWR. Information will also be available about the project at the six project meetings. The dates and times of the workshops will be provided to the stakeholders and project participants and also be posted on the City's website at www.prcity.com/, and at the District's website at http://www.slocountywater.org/.

The City will prepare and distribute to DWR quarterly progress reports in compliance with the PSP. Preliminary dates for submittal of the progress reports are shown on the project schedule in Part B.3.4.

The data associated with this project will be provided to DWR in compliance with Section 7.D (Monitoring Requirements) of the PSAP. This includes meeting the requirements consistent with the Groundwater Quality Monitoring Act of 2001 (Part 2.76 (commencing with 10780) of Division 26 of the California Water Code.

Upon completion of the project, the final Plan will be distributed to basin stakeholders, project participants, and DWR. A hard copy will be available for review at the City, District, and local libraries. Electronic versions of the Plan will be available at the City and District websites.

Supporting Documentation

Attachment 1 - Paso Robles Groundwater Basin Study (2002)

Attachment 2 – Paso Robles Groundwater Monitoring Program Evaluation (2003)

Attachment 3 - Paso Robles Groundwater Basin Study Phase II –Numerical Model Development, Calibration, and Application (2005)

Attachment 4 - Paso Robles Groundwater Basin Agreement (2005)

Attachment 5 - San Luis Obispo County Integrated Regional Water Management Plan (2005)

Attachment 6 – Draft City of Paso Robles Urban Water Management Plan (2007)

Attachment 7 - Water Resources Plan Integration and Capital Improvement Program (2007)

Attachment 8 - Annual Report on the Paso Robles Groundwater Basin (2007)

Attachment 9 - Paso Robles Groundwater Basin Water Banking Feasibility Study (2007)

Attachment 10 – Presentation to the Shandon Advisory Council on November 7, 2007

FUGRO WEST, INC.

660 Clarion Court, Suite A
San Luis Obispo, California 93401
Tel: (805) 542-0797
Fax: (805) 542-9311

August 30, 2002
Project No. 3014.005

County of San Luis Obispo
Public Works Department
County Government Center, Room 207
San Luis Obispo, California 93408

Attention: Ms. Christine Ferrara

FINAL REPORT
Paso Robles Groundwater Basin Study

Dear Ms. Ferrara:

Fugro West and Cleath & Associates are pleased to submit this FINAL REPORT of the Paso Robles Groundwater Basin Study. The purpose of the project was to investigate the hydrogeologic conditions and quantify the water supply capability of the basin.

The study defined the lateral and vertical extent of the groundwater basin, evaluated groundwater flow and movement within the aquifer, reported on current water quality conditions and trends, and calculated the perennial yield of the basin. A single subbasin, the Atascadero subbasin, was defined as a hydrogeologically distinct portion of the basin

The study concluded that the perennial yield of the Paso Robles Groundwater Basin (including the Atascadero subbasin) is 94,000 acre feet per year under current conditions. The perennial yield of the Atascadero subbasin is 16,500 acre feet per year.

Basin pumpage in 2000 was approximately 82,600 af, compared to the perennial yield estimate of 94,000 afy. This statement must be tempered, however, because water demand and gross groundwater pumpage may increase in the future as the population of the region continues to grow, and as municipal and agricultural pressures on the basin increase. For instance, the San Luis Obispo County Master Water Plan Update projects 2020 water demands of 120,000 afy for the area covered by the Paso Robles basin. Furthermore, although the overall basin is relatively stable, concentrated pumping centers have created localized pumping depressions and declining water levels in parts of the basin. As an illustration, the area immediately east of the City of Paso Robles, along Highway 46 between Paso Robles and Whitley Gardens, has experienced dramatically declining water levels over the past five to ten years.

Pumpage in the Atascadero subbasin in the year 2000 was 11,100 af. The County Master Water Plan Update projects 2020 water demands in the subbasin area of approximately 16,000 to 20,000 afy.

In closing this phase of work for the San Luis Obispo County Public Works Department, we would like to express our appreciation to the Public Works Department staff, the Technical Review Committee, and the North County Water Resources Forum for their interest and cooperation throughout the study. It has been both a pleasure and a challenge to conduct this investigation, which we know is of utmost importance to the community. We will remain available at your convenience to discuss this report or to answer any questions.

Sincerely,

FUGRO WEST, INC.

Paul A. Sorensen

Paul A. Sorensen, RG, CHg
Senior Hydrogeologist

D Gardner

David A. Gardner, CEG, CHg
Principal Hydrogeologist

CLEATH & ASSOCIATES

Timothy S Cleath

Timothy S. Cleath, RG, CHg
Principal Hydrogeologist

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APPENDICES

FINAL REPORT
PASO ROBLES GROUNDWATER BASIN STUDY

EXECUTIVE SUMMARY

GENERAL

This Final Report of the Paso Robles Groundwater Basin study presents the results of efforts to investigate and quantify the hydrogeologic conditions of the basin. The work was conducted jointly by Fugro West, Inc. and Cleath and Associates, in conjunction with Peter Canessa, P.E. and ETIC Engineering, Inc.

The Paso Robles Groundwater Basin study was a technical investigation intended to provide the San Luis Obispo County Public Works Department, North County public water agencies, and overlying landowners and water users a better understanding of the basin by answering questions related to the quantity of groundwater in the basin, the hydraulic movement of groundwater through the basin, sources and volumes of natural recharge, and trends in water quality. Although this study does not address specific planning or water management issues, it provides the foundation that the community needs to participate in water resource planning. The knowledge gained by this study, including the comprehensive compilation of key data, is necessary for the community to develop a confident and consensus based decision-making process.

BASIN DEFINITION AND BASIN BOUNDARIES

The Paso Robles Groundwater Basin encompasses an area of approximately 505,000 acres (790 square miles). The basin ranges from the Garden Farms area south of Atascadero to San Ardo in Monterey County, and from the Highway 101 corridor east to Shandon.

Internally, a single hydrologically distinct subbasin was defined. The Atascadero subbasin encompasses the Salinas River corridor area south of Paso Robles, including the communities of Garden Farms, Atascadero, and Templeton.

GROUNDWATER OCCURRENCE, LEVELS, AND MOVEMENT

Water level data show that over the base period from July 1980 through June 1997 there is no definitive upward or downward water level trend for the whole basin. However, different water level trends are observed at specific locations in the basin. Water levels have declined, in some areas rather dramatically, in the Estrella and San Juan areas, with rising water levels in the Creston area.

In general, groundwater flow moves northwesterly across the basin towards the Estrella area, thence northerly towards the basin outlet at San Ardo. The biggest change in groundwater flow patterns during the base period is the hydraulic gradient east of Paso Robles, along the Highway 46 corridor, which has steepened in response to greater pumping by the increasingly concentrated development of rural ranchettes, vineyards, and golf courses.

WATER QUALITY

In general, the quality of groundwater in the basin is relatively good, with few areas of poor quality and few significant trends of ongoing deterioration of water quality. Historical water quality trends were evaluated to identify areas of deteriorating water quality. A major water quality trend is defined as a clear trend that would result in a change in the potential use of water within 50 years, if continued.

Six major trends of water quality deterioration in the basin were identified, including:

1. increasing total dissolved solids (TDS) and chlorides in shallow Paso Robles Formation deposits along the Salinas River in the central Atascadero subbasin;
2. increasing chlorides in the deep, historically artesian aquifer northeast of Creston;
3. increasing TDS and chlorides near San Miguel;
4. increasing nitrates in the Paso Robles Formation in the area north of Highway 46, between the Salinas River and the Huer Huero Creek;
5. increasing nitrates in the Paso Robles Formation in the area south of San Miguel; and
6. increasing TDS and chlorides in deeper aquifers near the confluence of the Salinas and Nacimiento rivers.

GROUNDWATER IN STORAGE

The total estimated groundwater in storage within the Paso Robles Groundwater Basin is approximately 30,500,000 acre feet (af). This value changes yearly, depending on recharge and net pumpage. Between 1980 and 1997, groundwater in storage increased approximately 12,400 af, an approximate 0.04% increase. This represents an average increase in storage of 700 acre feet per year (afy). On one hand, this relatively small percentage could be viewed as an indication of stable basin-wide conditions; however, it is noted that steadily decreasing storage in the 1980's was offset by increased water in storage throughout the 1990's. Furthermore, not all areas of the basin have observed the same trends in water levels and change in storage.

In the Atascadero subbasin, total groundwater in storage averaged about 514,000 af. Approximately 2,600 af more groundwater was in storage in the subbasin in 1997 compared to 1980, a 0.5% increase in total groundwater in storage during the base period. This represents an increase of about 200 afy in storage.

HYDROLOGIC BUDGET

The purpose of a hydrologic budget (or water balance) is to assess all the inflows and outflows of water to the groundwater basin over the base period. The water budget was performed by calculating each component of water inflow and outflow for each year of the base period, and comparing the totals to the annual change in groundwater in storage as determined by the specific yield method. The base period, defined in this study from July 1980 through June 1997, is a representation of the long-term average conditions of water supply.

The hydrologic budget is simply a statement of the balance of total water gains and losses from the basin, and can be summarized by the following equation:

Inflow = Outflow (±) Change in Storage

where Inflow equals the sum of:

- ⇨ subsurface inflow
- ⇨ percolation of precipitation
- ⇨ streambed percolation
- ⇨ percolation of irrigation return water
- ⇨ percolation of wastewater discharge, and
- ⇨ imported water;

and Outflow equals the sum of:

- ⇨ subsurface outflow
- ⇨ gross agricultural pumpage
- ⇨ municipal, rural domestic, and small commercial systems pumpage
- ⇨ extraction by phreatophytes, and
- ⇨ exported water.

Using this inventory, the sum of all the components of outflow from the Paso Robles Groundwater Basin exceeded the sum of all the components of inflow by an estimated 2,700 afy.

As described earlier, an independent method of calculating the change in the volume of groundwater in storage was performed using the specific yield method and compared to the results of the inventory method. This approach indicated a slight annual increase in groundwater in storage of about 700 afy.

For the Atascadero Subbasin, the sum of all the components of outflow approximately equaled inflow during the base period, with total groundwater in storage of about 514,000 af.

The change in storage calculation showed an annual increase in groundwater over the 17-year base period of about 200 afy.

Reconciliation of the hydrologic budget shows a consistency in the results of the two methods of calculation. At first glance, the results of the hydrologic budget calculations, along with the change in storage calculations and analysis of the water level data, indicate a basin-wide stability. This conclusion, however, is tempered by the recognition that parts of the basin have experienced significant declines in water level over the past several years, particularly in the Estrella area along the Highway 46 corridor from the eastern edge of Paso Robles to Whitley Gardens as a result of relatively concentrated development of rural residential housing, golf courses, and vineyards.

PERENNIAL YIELD

The perennial yield of a basin, as defined in this investigation, is the rate at which water can be pumped over a long-term without decreasing the groundwater in storage. Many definitions of perennial yield (or safe yield) tie the concept of basin yield to the rate of groundwater extraction that will not create an economic impact. However, for the purposes of this study, the concept of perennial yield is more closely tied to the natural rate of replenishment or recharge to the basin, such that there is no decrease in groundwater in storage.

The results of this investigation indicate a perennial yield value of approximately 94,000 afy for the Paso Robles Groundwater Basin (which includes the Atascadero subbasin). Calculated separately, the perennial yield of the Atascadero subbasin approximates 16,500 afy.

BASIN CONDITIONS IN 2000

In the year 2000, groundwater pumpage in the Paso Robles Groundwater Basin was approximately 82,600 af, compared with the perennial yield estimate of 94,000 afy. Similarly, Atascadero subbasin pumpage in the year 2000 was approximately 11,100 af, compared to the perennial yield estimate of 16,500 afy.

Total net groundwater pumpage in the basin (and the subbasin) declined steadily from 1984 through 1998. Groundwater production data since 1998 show, however, that groundwater pumpage may again be increasing. Pumpage in 2000 was higher than at any previous time since 1992. It should also be noted that groundwater pumpage exceeded the perennial yield from the start of the base period in 1980 through 1990. Only in the last decade has pumpage been less than the perennial yield.

Currently, agricultural pumpage comprises 69% of total basin pumpage. Depending on new trends or pressures in the agricultural industry, it is likely that basin pumpage will approach or exceed the perennial yield in the near future. The San Luis Obispo County Master Water Plan Update (EDAW, 1998) projects future water demands for the area to be 120,620 afy by the year 2020, which suggests that future water demands may soon exceed the 94,000 afy perennial yield of the basin.

In the Atascadero subbasin, municipal, rural domestic, and small commercial water systems comprise 91% of total pumpage in the subbasin. Interpolation of data from the County Master Water Plan projects water demand in 2020 in the Atascadero subbasin to be in the range of 16,000 to 20,000 afy, compared to the perennial yield value of 16,500 afy.

It is important to note that short-term periods of groundwater extractions in excess of the perennial yield will not necessarily result in significant negative economic impacts. Groundwater in storage in the basin is sufficiently large such that short-term overdraft conditions may be acceptable to withstand drought periods.

RECOMMENDATIONS

It is recommended that a basin-wide numerical groundwater flow model be developed for the Paso Robles Groundwater Basin. The model will serve as a tool for quantitative evaluation of existing and future hydraulic conditions across the basin, including changing groundwater level elevations, well yields, natural and artificial recharge, and associated effects on surface water-groundwater interaction and water quality. Specifically, the objectives of the model include:

- Refining uncertain components of the hydrologic budget for the basin;
- Refining estimates of perennial yield for the basin;
- Evaluating water quality trends in response to hydraulic changes across the basin;
- Evaluating potential impacts on groundwater levels and perennial yield as a result of continued and varied basin operations and hydraulic conditions; and
- Defining operational options for comprehensive and/or localized management of groundwater use across the basin.

Cleath & Associates
Engineering Geologists
Ground Water
(805) 543-1413
1390 Oceanaire Drive
San Luis Obispo
California 93405

October 30, 2003

Kirsten Arnold
County of San Luis Obispo
Public Works Department
County Government Center
San Luis Obispo, California 93408

SUBJECT: Paso Robles Groundwater Monitoring Program Evaluation

Dear Ms. Arnold:

Cleath & Associates has completed the evaluation of the Paso Robles Basin Groundwater Monitoring Program. The purpose of this evaluation was to improve the efficiency and effectiveness of the County of San Luis Obispo Monitoring Program for wells located in the Paso Robles Groundwater Basin.

Introduction

Wells included in this monitoring program evaluation are limited to those wells within San Luis Obispo County, within the Paso Robles Groundwater Basin. For this evaluation basin wells are defined as wells that produce from either alluvial aquifers or the Paso Robles Formation aquifers. The basin boundaries are shown on Figure 1.

Our scope of services included the following tasks:

1. Review the distribution of monitoring wells with respect to the extent of the groundwater basin and the aquifer zones present in each main area and determine which wells to maintain, which wells to discontinue or replace with another well, and where additional monitoring wells would be beneficial.

2. Summarize in tabular form the data available from each monitoring well and determine if each well has adequate information to give meaningful value to the data monitored. This relates to well log, well construction, pumping interferences, and pumping test and quality data.

3. Review issues related to well head access and ingress to properties which could affect the ease of obtaining data from specific wells.

4. Determine the need for the construction of additional monitoring wells by the County of San Luis Obispo, and include typical well specifications and cost estimate for any additional monitoring well.

Background

The County of San Luis Obispo has been monitoring ground water levels for more than 40 years in the Paso Robles Groundwater Basin. Over time this network has grown and been modified as wells have been lost or newly drilled and to meet the demands for this information. Ground water uses have changed dramatically during this time and urban uses have increased.

Cleath & Associates was involved in the Paso Robles Groundwater Basin Study completed in 2002. During this study, the major portions of the groundwater basin were characterized in terms of aquifers, ground water levels, and groundwater quality. This information has been used in evaluating the coverage of the existing network.

During the past year, we have reviewed the existing network of wells which are monitored and discussed the importance of each well. The County has established purposes and goals for this monitoring program. This written report documents our findings from this previous review, establishes monitoring program criteria based on the County's purposes and goals, and makes recommendations for modifying the existing program to achieve those purposes and goals.

The value of the monitoring program is based on how useful the well data is to ground water investigations. Well data collected by the program may be used in the following ways:

- to document seasonal fluctuations in water levels;
- to establish water level changes during drought conditions;
- in the preparation of ground water level contour maps;
- to determine ground water flow direction;
- to provide an accurate trend of ground water levels for safe yield analyses;
- to differentiate between aquifers;
- comparison of recharge between alluvial and deep wells;
- calibration of ground water models;
- to demonstrate relationships between stream flow and ground water levels using wells located near stream gages;
- to design new wells;
- to predict depths to ground water when drilling new wells;
- and to prepare of hydrographs to show historic water levels.

Monitoring Well Distribution

The Paso Robles Groundwater Basin has been divided into separate areas (including the formally recognized Atascadero subbasin) in the Paso Robles Groundwater Basin Study. The division into the areas is based on water quality, source of recharge, ground water movement, and basin depth. The distribution and number of existing program monitoring wells has been determined for the entire basin and for each area

(Figure 1). There are 154 wells in the existing program that are monitored in the spring and autumn of each year in the basin. The number of monitoring wells in the existing program are listed below for each of the basin areas:

- Atascadero 44
- Bradley 0
- Creston 18
- Estrella 50
- Gabilan 1
- San Juan 16
- Shandon 25

Of the 154 wells in the program, County Public Works employees monitor 99 wells in the basin, and 55 wells are monitored by local municipal water company employees. Water level data is forwarded by the water company employees to the County Public Works for inclusion in the monitoring program data base.

Monitoring Well Data

Currently, the data collected for each well is recorded in bound books containing card files for each well. Each well card file includes the well name, a location sketch, description of well head and access, latitude and longitude, water level measurement reference point, water levels by date, observer's initials, and comments. In addition, some wells, but not all, include water use, depth to perforations, pump information, and date drilled.

To give meaningful value to the data monitored, each well file should include all of the above parameters plus well casing diameter, perforation intervals, producing aquifer (alluvium or Paso Robles Formation), total depth of the well, and pump status (equipped, unequipped, inactive, or active). For each well, a well construction report, and any available pump test or water quality data should be maintained in an office file.

A list of wells currently monitored is shown in Table 1. The table lists various well parameters, and was used as a matrix to identify wells that should be dropped from the monitoring program. The table may also be used to identify program wells that have incomplete data.

Criteria for Program Monitoring Wells

The value of information to be obtained from wells in the area was assessed to determine which wells should be included in the monitoring program, and which wells should be eliminated from the program. To assess impacts to alluvial aquifers, the program should include wells that monitor water levels within the shallow alluvium in the Salinas River, Estrella River, Huer Huero Creek, and San Juan Creek. Alluvial wells located near stream gages are important for future analyses of stream recharge. Wells should be included in the program that tap the various aquifers within the Paso Robles Formation. Wells tapping different aquifer zones may be located in close proximity to each other without producing redundant monitoring data. The various Paso Robles Formation aquifer types to be represented by monitoring wells include shallow-unconfined zones, lower-confined (pressure) zones, and thermal aquifer zones. The depth to the top of the lower-confined zones varies considerably throughout the basin, and is generally separated from the shallow-unconfined zone by a laterally extensive clay zone.

Monitoring well distribution should be based on population density and areas of projected population growth because of the greater well pumping impacts in those areas. Assessor's parcel maps and the location of urban areas were used as an indicator of population density. The Salinas River, Estrella River, and Huer Huero Creek corridors, along with the Highway 46 corridor between Paso Robles and Shandon include the greatest population and therefore should include the highest density of monitoring wells. Other areas in the basin that should be represented by monitoring wells include areas previously identified as having declining or rising water levels. Wells proposed for addition to the monitoring program are included in Table 2.

More than one well on the same property, within 2000-feet of each other, tapping the same aquifer, are not necessary for the program, unless the property owner specifically asks that multiple wells be monitored as a condition of property access. Because water system production wells are generally in close proximity to each other, they may not all need to be monitored, unless agency is sending data to county.

Wells recommended to be replaced or eliminated from the monitoring program are listed in Table 3. Wells may be listed for replacement or elimination are wells that meet one or more of the following criteria:

- redundant wells: wells in close proximity to other monitoring wells tapping the same aquifer;
- pumping frequency: wells that are pumping on more than three occasions during the last 10 site visits;
- access: unsafe or difficult ingress to property, or restricted access to well head;
- downhole problems: obstructions to sounding device, oily conditions, cascading water;

Not all redundant wells should be eliminated from the program. Some redundant wells have been selected to serve as backup wells to nearby wells that cannot be measured during a monitoring event because of problems with access or if a well is pumping. Redundant wells to be used as backup wells are listed in Table 3. To confirm whether two or more wells are redundant, any lacking well data should be obtained to determine if the wells are tapping the same aquifer.

Stream Gages

Monitoring results from shallow wells located near stream gages can be related to stream flow. Ground water elevation hydrographs when compared to stream gage results can be an indicator of recharge to alluvial aquifers and to shallow-unconfined Paso Robles Formation aquifers. The county currently monitors wells located near the County Gage #23 in Hog Canyon and the County Gage #3 on Cholame Creek. We propose the addition of four existing wells to the monitoring program that are located near USGS gages on the Salinas River at Paso Robles, on the Estrella River near Estrella, on the Nacimiento River below the Nacimiento Dam, and near the County Gage #15 on the Santa Margarita Creek near Santa Margarita. The stream gages and their associated monitoring wells are listed on Table 4.

Summary

Currently, there are 154 wells located within the limits of the Paso Robles Groundwater Basin that are monitored by the San Luis Obispo County Department of Public Works. Cleath & Associates recommends the following changes in the number of wells in the program:

- 30 wells should be eliminated;
- 26 existing wells in the basin should be added to the program;
- 10 wells currently in the program should be used only as backups to other wells in the program;

The total number of wells in the updated monitoring program reflecting the changes listed above, would be 140 monitoring wells. Table 5 shows how these changes would be distributed between the basin areas. Three of the wells to be eliminated in the Estrella area and three of the wells to be eliminated in the San Juan area should be replaced by three new wells in each of the two areas. Each of the wells would be replaced by wells located in their immediate vicinity (Table 2). Of the 140 monitoring wells in the updated program, 94 would be monitored by Department of Public Works employees, and 46 would be monitored by municipal water company employees.

The construction of additional monitoring wells by the County may be necessary. A construction diagram for a typical monitoring well is shown on Figure 2. Wells recommended for inclusion to the monitoring program are the existing wells listed in Table 2. The presence of these wells preclude the necessity of new monitoring well construction. If a well listed for inclusion in Table 2 is not available, an alternative existing well in the vicinity should be selected for the monitoring program. If an alternative existing well is not available, the construction of a new monitoring well should be considered.

Wells added to the program must have a Water Well Drillers Report, and any historic available water level information should be obtained. All pertinent data should be recorded on the well information page. Both the existing wells and additional wells should have accurate reference point elevations.

Recommendations

Cleath & Associates recommends that the County staff contact well owners to add or eliminate the wells listed in Tables 2 and 3. The well monitoring books should be updated to reflect the changes to the monitoring program and new well data should be obtained and added for each new well. The additional needed well data listed in Table 1 for existing program well should be obtained and added to the monitoring books. An updated index sheet listing each monitoring well should be included in the front of each book. Reference point elevations for existing and added wells should be surveyed (some public agencies may have this information already).

An important tool derived from ground water elevations is the hydrograph. Hydrographs relate ground water elevations to the water level measurement dates. With the county's existing format used in Microsoft Access, hydrographs from the county's water level data base are created by exporting water levels and corresponding dates to Microsoft Excel from which a chart depicting the hydrograph is created. Cleath & Associates recommends that the Access database be reformatted by the addition of a chart option, so that the user could select a button on the database front page, to view either the tabulated water levels as they are currently presented, or as a hydrograph.

Because existing water well data are vital tools in any ground water study and are used by water resource professionals and property owners, we recommend that the County's data base be made available to the public either on compact disc or on the County's Internet site. We understand that some of the well owners in the monitoring program have requested that their well data remain confidential, however, we recommend that wells be selected, based on the owners permission, to be included in a public access database.

Cleath & Associates recommends that the well locations and well data be incorporated into a County geographic information system (GIS) layer. With GIS, the data stored in Microsoft Access, the data recorded in the monitoring books, and well location maps are combined into a single format that allows access to all of the monitoring data.

To incorporate well locations into the GIS program and improve data collection efficiency, we recommend that the well location coordinates be determined using a geographic positioning system (GPS). The GPS system should be accompanied by a digital mapping system such as Maptech's Terrain Navigator Pro. When using a portable lap-top computer or a hand-held data collector (PDA) connected to a GPS unit during the well site monitoring, the well coordinates, well name, water levels, and any observations can all entered into the lap-top computer or PDA. Terrain Navigator Pro uses U.S.G.S. 1:24,000 and 1:100,000 scale topographic maps, and aerial photographs that may be viewed on the lap-top computer or PDA. These maps may be used to determine the most efficient routes between monitoring well locations. Terrain Navigator Pro maps and aerial photos may be used as base layers in ArcView, ArcGIS, Intergraph, AutoCAD, MapInfo, MicroStation, ERDAS, Photoshop, and other applications. The current cost for Maptech's "Terrain Navigator Pro" is $300. The current cost for the Maptech's software Pocket Navigator that works within the PDA is $100.

We understand that the current method of uploading well data by typing in the recorded data from the well books into the county's Microsoft Access well database requires up to four weeks time. The time required to upload well data from a lap-top computer or a PDA to the well database would be significantly shorter.

If you have any questions concerning this report, or would like to discuss these recommendations in detail, please call.

Sincerely,

David R. Williams
Staff Geologist

Timothy S. Cleath, HG 81
Principal Hydrogeologist

Table 1
Well Data
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Book Number	Basin Area	Well Type	Aquifer			Well Data				1998-2003 (10 Events)				2003 Status	Data by Others	Comments
					Alluvial	Paso Robles Fm.	Older Formations	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems			
29S13E-5K2	Betencourt	1	Atascadero		x			20-50	50	929						A		
29S13E-5F3	LaSalle	1	Atascadero							916						In		Need log
28S13E-31L1	O'Reilly	1	Atascadero	I		x				921	x					A		Drop (located near AMWC wells)
28S13E-31L2	O'Reilly	1	Atascadero	I		x		150-450	450	921	x					A		
28S12E-13Q2	Wilkenson	1	Atascadero	D/I		x		120-200	200	921						A		
27S12E-22M1	Little	1	Atascadero			x			500	851			x			A		Need log - good well
27S12E-33F1	Morrison #1	1	Atascadero	I		x		140-340	353	880	x					A		
27S12E-33G1	Morrison #2	1	Atascadero	I		x		200-460	500	862	x		x			A		Use only as back-up to 33F1
28S12E-3B1	Wilcoxson	1	Atascadero	I		x			280	861						NE		
27S12E-9M3	Thunderbird 13-PR	2	Atascadero	M			x	70-130	140	721	x	x	x			A	x	Drop from program
27S12E9M2	Thunderbird 10-PR	2	Atascadero	M		x		50-200	210	720	x		x			A	x	
27S12E-9M4	Thunderbird 17-PR	2	Atascadero	M			x	70-130	140	722	x		x			A	x	
27S12E-4K2	Borcherd-PR	2	Estrella			x		175-400	400	740			x			A	x	
26S12E-33Q1	Ronconi 1-PR	2	Estrella		x			20-65	65	690	x		x			In	x	Drop from program
26S12E-33Q4	Ronconi 4-PR	2	Estrella		x			20-70	70	690	x		x			In	x	
26S13E-18K1	Tarr 19-PR	2	Estrella	I		x		350-885	885	826			x			A	x	
26S12E-13D3	Dry Creek 18-PR	2	Estrella			x		400-1075	1200	761			x			A	x	
26S12E-13N1	Fox 21-PR	2	Estrella	MW			x	464-1060	1060	807			x			A	x	
26S12E-22J1	Butterfield 12-PR	2	Estrella	M		x		275-775	1004	801	x		x			A	x	Water Temp. at pump test = 85 deg
27S12E-2E1	Sherwood 9-PR	2	Estrella	M		x		175-600	600	800	x		x			A	x	
27S12E-2F2	Sherwood 11-PR	2	Estrella	M		x		275-592	600	825	x	x	x			A	x	Drop from program
27S12E-2D1	Sherwood 6-PR	2	Estrella	M		x		160-758	758	810	x		x			In	x	
27S12E-2H1	Royal Oak 20-PR	2	Estrella	M		x		410-430,	600	831			x			A	x	
27S12E-2L2	Osbourne 14-PR	2	Estrella	M		x		180-524	524	811	x		x			A	x	
27S12E-9M6	Thunderbird 23-PR	2	Atascadero	M		x		90-140	150	722	x		x			A	x	
26S12E-22L2	Cuesta 22-PR	2	Estrella	M		x		330-430	430	680	x		x			A	x	
28S12E-3M1	Atas Mut 10	2	Atascadero	M			x	190-550	550	803	x		x			A	x	
28S12E-3M3	Atas Mut 11	2	Atascadero	MW			x	265-506	506	792	x		x			In	x	
28S12E-3M4	Atas Mut 16-A	2	Atascadero	MW	x			30-65		794			x			In	x	
28S12E-4J2	Atas. Mut.4	2	Atascadero	M	x			21-86	86	808	x		x			A	x	
28S12E-4J3	Atas Mut 16-C	2	Atascadero	M			x	53-113	260	792	x		x			?	x	

Table 1
Well Data
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Book Number	Basin Area	Well Type	Aquifer			Well Data				1998-2003 (10 Events)				2003 Status	Data by Others	Comments
					Alluvial	Paso Robles Fm.	Older Formations	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems			
28S12E-4J4	Atas Mut 16-D	2	Atascadero	MW	x			30-70	120	793	x		x			?	x	
28S12E-4J5	Atas Mut 17	2	Atascadero	MW		x		Top 145	480	792			x			NE	x	
28S12E-4J6	Atas Mut 16E-1	2	Atascadero	MW		x		93-153	160	801	x		x			?	x	Drop from program
28S12E-4J7	Atas Mut 16E-2	2	Atascadero	MW			x	50-150		802	x		x			?	x	
28S12E-4J8	Atas Mut 18	2	Atascadero	M		x		40-160	180	801	x		x			NE	x	
28S12E-4J9	Atas Mut 19	2	Atascadero	M			x	35-105	115	791	x		x			A	x	
28S12E-10A3	Atas Mut 7	2	Atascadero	M			x	150-500	500	808	x		x			A	x	Drop from program
28S12E-10B1	Atas Mut 9	2	Atascadero	M		x		Top 150	505	803	x		x			A	x	
28S12E-10B2	Atas Mut 16B	2	Atascadero	MW	x			40-50	80	799			x			?	x	
28S12E-10H4	Atas Mut 6	2	Atascadero	M			x	150-450	450	811	x		x			A	x	
28S12E-10R4	Atas Mut 3A	2	Atascadero		x			50-70	70	810	x		x			A	x	
28S12E-10R5	Atas Mut 1A	2	Atascadero	M	x			50-75	75	818	x		x			A	x	Drop from program
28S12E-11K2	Atas Mut 12	2	Atascadero	M			x	300-600	600	820			x			A	x	
28S12E-11N6	Atas Mut 5	2	Atascadero	M	x			0-90		825	x		x			A	x	
28S12E-11N7	Atas Mut 5A	2	Atascadero	M			x	50-100	100	824	x		x			A	x	Drop from program
28S12E-14L2	Atas Mut Obs@15	2	Atascadero	MW		x		130-480	480	821			x			NE	x	
28S12E-14K4	Atas Mut 2A	2	Atascadero		x				81	None			x			A	x	Get reference point
28S13E-31D2	Atas Mut 13A	2	Atascadero	M		x		210-310	330	891	x		x			A	x	
28S13E-31F2	Atas Mut 8	2	Atascadero	M		x		100-310	310	884	x		x			A	x	Drop from program
29S13E-8N5	Garden Farms 1	WW6	Atascadero	D	x			40-80	87	1003	x		x			?	x	
29S13E-8M1	Garden Farms 2	WW6	Atascadero	D				220	250	948	x		x			?	x	
29S13E-8F1	Garden Farms 3	WW6	Atascadero	M	x			55-80	80	947			x			?	x	
27S12E-21D2	TCSD Silva 2	WW6	Atascadero	M						756			x			?	x	
27S-12E-9N2	TCSD Platz 2	WW6	Atascadero	M	x			Top 44		721	x		x			?	x	
27S12E-9N3	TCSD Platz 3	WW6	Atascadero	M		x		260-640	650	721	x		x			?	x	
27S12E-29H3	TCSD Smith	WW6	Atascadero							751			x			?	x	
25S11E-36N2	Williams	3	Estrella	D						838	x					A		Need log
25S11E-36N3	Williams	3	Estrella	D						843	x					A		Use only as a backup to 36N2
25S11E-35G1	Willard	3	Estrella	D					150	880	x					A		
25S11E-35F2	Willard	3	Estrella	I		x		64-250	304	None	x					A		Use only as a backup to 35G1
26S12E-26E7	Whitmore	3	Estrella	I		x			400	835						A		

Table 1
Well Data
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Book Number	Basin Area	Well Type	Aquifer			Well Data				1998-2003 (10 Events)				2003 Status	Data by Others	Comments
					Alluvial	Paso Robles Fm.	Older Formations	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems			
26S12E-22P2	LaPointe	3	Estrella	D		x			300	824		x	x		x	A		Drop from program
26S12E-15N1	Loftus	3	Estrella	D		x		200-800	800	771						A		
26S12E-11K1	Jaureguy	3	Estrella	D		x		200-400	400	775						A		
26S12E-7F2	Linn	3	Estrella	D		x			170	868	x				x	A		Use only as backup to 7G1
26S12E-7G1	Linn	3	Estrella	D						871	x					A		Need log
25S12E-32K1	Thoraldsen	3	Estrella	D		x			300	681						E,In		
26S12E-14K1	Boys Sch 4	4	Estrella	M		x				786	x		x			?	x	Drop from program
26S12E-14G1	Boys Sch 2	4	Estrella	M		x			740	795	x		x			?	x	
26S12E-14G2	Boys Sch 1	4	Estrella	M		x		Top 640	840	786			x			?	x	
26S12E-14H1	Boys Sch 3	4	Estrella	M		x		Top 180	1230	790			x			?	x	
28S12E-25B1	St Hospt 1	4	Atascadero	D		x			160	861	x		x			?	x	
28S12E-25B3	St Hospt 2	4	Atascadero	D		x		100-120	120	868	x		x			?	x	
28S12E-25B4	St Hospt 3	4	Atascadero	D	x			20-77	77	868	x		x			A	x	
25S13E-11E1	Ernst	5	Gabilan	S						1185						A		Windmill, near stream gage, sound
25S12E-20K3	SLO Parks (Old Adobe)	5	Estrella	D					156	625						A		
25S12E-20Q2	Hansen	5	Estrella	D		x				681						A		Need log
25S12E-16E3	San Miguel WW #1, #4	5	Estrella	M		x		Top 162	360	619						A		
25S12E-16E1	San Miguel WW #1, #4A	5	Estrella	MW		x		110-120, 160-170	195	622						NE		
25S12E-16E2	San Miguel WW #1, 4B	5	Estrella	MW		x		270-280, 330-340	360	622						NE		
25S12E-16K6	San Miguel WW #1	5	Estrella	MW		x		468-478, 508-518	528	670						NE		
25S12E-16K5	San Miguel WW #1	5	Estrella	MW		x		300-310, 330-340	350	670						NE		
25S12E-16K4	San Miguel WW #1	5	Estrella	MW		x		194-204, 214-224, 234-244, 264-274	284	670						NE		

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County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Book Number	Basin Area	Well Type	Aquifer			Well Data				1998-2003 (10 Events)				2003 Status	Data by Others	Comments
					Alluvial	Paso Robles Fm.	Older Formations	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems			
25S12E-21G1	San Miguel WW #1 (SLT)	5	Estrella	M		x		1766-400	400	690						In		
25S12E-28N1	Cagliero	5	Estrella	I	x			12-39	49	639		x	x			A		Replace with 28M1
25S12E-26L1	Webb	5	Estrella	I		x			400	700	x					A		Replace with deep well in Sec 26
25S12E-26K1	DaCosse	5	Estrella	D		x				730	x		x			A		Use only as backup to 26K2
25S12E-26K2	DaCosse	5	Estrella	I		x			530	715	x					A		
25S13E-19R1	Von Dallen	5	Estrella	D		x			200	916						A		Replace with "New" dom. Well 19R2
26S13E-5D1	Wilken	5	Estrella	I		x		200-400	410	745	x					A		
26S13E-5D2	Borchert	5	Estrella	I		x			1000	740	x					A		
26S13E-5F1	Borchert	5	Estrella	I						740	x					A		Need log, use as backup for 5D2
26S13E-11F2	Bonel Ranch	5	Estrella	D						820			x			A		
26S13E-7Q1	Morris	6	Estrella							800		x	x			In		Need log
26S13E30B2	Ernst	6	Estrella	D		x			600	935						A		Need log
26S13E-34B1	Hess	6	Estrella	I/D		x			700	1005						A		Need log
26S14E-18J1	Green River	6	Shandon	D		x		174-438	440	980		x	x			A		
26S13E-24R1	Camino	6	Shandon	I						None			x		x	A		Drop. No record in data base
26S15E-16P2	Enrotabere	6	Shandon	I						1051						NE		Need log
26S15E-18K1	Ballert Res.	6	Shandon	I		x			435?	1029	x					A		Artesian when drilled in 1937
26S15E-18J1	Ballert Old	6	Shandon	I		x		Top 125	600	1023	x					A		Drop from program
26S15E-18J2	Ballert New	6	Shandon	I		x			400	1024	x				x	A		Drop from program
26S15E-17K1	Ballert Stock	6	Shandon	S	?				130	1038	x			x		NE		Well is gone in 2003
26S15E-21G2	Halpin	6	Shandon	I		x			575	1058		x	x			A		
26S15E-21E1	Davis	6	Shandon	I						1037		x	x	x		A		Drop from program
26S15E-20B3	CSA 16 #3	6	Shandon	M		x		Top 285	400	1035	x		x	x		NE		Drop. Well capped, 2002
26S15E-20B2	CSA 16 #2	6	Shandon	M		x		Top 200	415	1037	x					NE		
26S15E-20B4	CSA 16 #4	6	Shandon	M		x				1036	x					A		Use as backup for 20B2
26S15E-20G3	Shandon HS	6	Shandon	D		x		215-375	380	1939	x					A		
26S15E-29N1	Shandon Hills Vineyard	6	Shandon	D		x			350	1135						A		
26S15E-29M1	Shandon Hills Vineyard	6	Shandon	I						1115	x	x	x			A		Drop from program
26S15E-30J1	Eversal	6	Shandon			x		195-605	605	1123		x	x			A		

Table 1
Well Data
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

					Aquifer			Well Data				1998-2003 (10 Events)						
Well Number	Common Well Name	Book Number	Basin Area	Well Type	Alluvial	Paso Robles Fm.	Older Formations	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems	2003 Status	Data by Others	Comments
26S15E-19E1	Pankey	6	Shandon	I		x		223-512	512	None	x		x			A		Get reference point
26S14E-24B1	Peck Estrella Cr	6	Shandon	I						1001	x					A		Need Log
27S14E-11R1	Peck New	7	Shandon	I		x		180-630	630	1161		x	x			A		
27S14E-24B1	Peck Shed N.	7	San Juan	I						1181	x	x	x			A		Need log
27S15E-19M1	Peck Shed E.	7	San Juan	I						1260	x	x	x	x		A		Need log
27S14E-25J1	Peck Shed S.	7	San Juan	I						1226	x	x	x	x		A		Need log
27S14E-25A1	Clark Ranch	7	San Juan	S						1225	x	x	x	x	x	A		Windmill, sound well
26S15E-28Q1	Russel	8	Shandon	I						1090		x	x	x	x	A		Drop from program
26S15E-33C1	San Juan Vineyards A	8	Shandon	I						1095	x					A		Use as backup to 33Q1
26S15E-33Q1	San Juan Vineyards C	8	Shandon	I						1102	x					A		Need log
27S15E-3E1	San Juan Vineyards D	8	Shandon	I						1121						A		Need total well depth
26S15E-34P2	Russel	8	Shandon	D		x			82	1129	x			x	x	NE		Drop from program
27S16E-7P1	Van Horn	8	San Juan	S		x			225	1225						A		Need log
28S15E-24E2	Morrison	8	San Juan	S						1339		x	x			A		Replace with 28S15E-14F2
28S16E-15D1	Miller #7	8	San Juan	I		x				1405			x	x	x	A		Replace with 28S16E-15E1
28S16E-14G1	Miller #3	8	San Juan	I						1402	x		x		x	A		Drop from program
28S16E-14G2	Miller #4	8	San Juan	I						1402	x					A		Need log
28S16E-13M1	Van Horn	8	San Juan	I						None	x	x	x		x	A		Use only as backup to 14G2, Get reference point
28S16E-14N1	Miller #2	8	San Juan	I						1413	x		x			A		
27S15E-35F1	Sinton	8	San Juan	I		x				1230			x		x	A		Replace with 27S15E-26N2
26S15E-2N1	Tosco	9	Shandon			x			475	1095				x		A		Located near stream gage
29S14E-4P1	Bixler	10	Creston	D	x			45-65	65	1415			x			E,In		
29S14E-4E2	Bacon	10	Creston	I	x				76	1400						A		Reference point is estimated
29S14E-5F1	Anderson	10	Creston	D/I	x			50-79	80	1380	x	x	x			A		
29S14E-5F2	Anderson	10	Creston	I	x				100	1380	x		x			A		Drop from program
28S13E-4K1	Std. Oil Co.	10	Creston							1200	x					NE		Need log
28S13E-4K2	Std. Oil Co.	10	Creston	D		x		219-426		1185	x					E		Need log
28S13E-4K3	Std. Oil Co.	10	Creston	D						1185	x					A		Need log

Table 1
Well Data
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

					Aquifer			Well Data				1998-2003 (10 Events)						
Well Number	Common Well Name	Book Number	Basin Area	Well Type	Alluvial	Paso Robles Fm.	Older Formations	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems	2003 Status	Data by Others	Comments
27S13E-28F1	Wayne	10	Creston	I		x		118-212	212	1072						NE		
27S13E-33L1	Houston	10	Creston	I		x		275-640	640	1181		x	x			A		
27S13E-27P2	Klintworth	10	Creston	S		x		120-200	201	1055						A		Windmill
27S13E-22Q1	Boulger	10	Creston	I		x			300	1044				x		A		
27S13E-9P1	Fuller	10	Creston	D					120	900						In		Windmill
27S13E-23R3	Cardiff	10	Creston	I	?				62	1040			x	x	x	A		Drop from program
27S14E-29G1	Danens	10	Creston	D						1202						A		
27S13E-36R1	Tosco	10	Creston		x				97	1100			x		x	A		
28S13E-13D1	Chandler	10	Creston	I		x		135-376	376	1172	x				x	E		Use only as backup to 14J1 & 12M1
28S13E-14J1	Chandler-Old	10	Creston	I		x		340-540	540	1191	x		x	x		NE		
28S13E-12M1	Heilman	10	Creston	I	x				127	1150						A		
28S16E-23M1	Rudnic	11	San Juan	S	x			19-72	72	1439			x	x		In		Drop from program
28S16E-35F1	Rudnic	11	San Juan	S	x					1474						A		Windmill, sound well
28S16E-35Q1	Rudnic	11	San Juan	I		x				1691		x	x			A		Need log
29S16E-2R1	Rudnic	11	San Juan	S		x				1542						A		Need log

I = Irrigation
S = Stock
M = Municipal
D = Domestic
MW = Monitoring Well
A = Active
E = Equipped
NE = Non-equipped
In = Inactive

Table 2
Wells to be Added to Program
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Basin Area	Well Type	Aquifer		Well Data			Comments
				Alluvial	Paso Robles Fm.	Screened Interval	Aquifer Zones Penetrated	Total Depth	
29S13E-17M1		Atascadero							3/4 mile north of S. Margarita, west of El Camino Real. Downstream of gage
25S12E-35A1	Smith	Estrella		x		20-80	Alluvium	80	Estrella Rd. Near stream gage
25S13E-19R2	Von Dallen	Estrella							Replaces 25S13E19R1
25S12E-28M1	Cagliero	Estrella							Replaces 25S12E-28N1
25S12E-26K	Cagliero	Estrella					Deep aquifer		Replaces 25S12E-26L1
26S12E-21B		Estrella			x		+100^{o}F artesian, geothermal zones	880	Taps Paso Robles & Monterey Fms.
26S12E-33B		Estrella							Along Salinas R. near stream gage
26S13E-13R1		Estrella			x		Deep, artesian zone	500	Artesian near Whitley Gardens
26S13E-21P1		Estrella							Replaces abandoned 26S13E-28L3
26S13E-23D		Estrella			x		Shallow aquifer	470	Near Hwy. 46, West of Whitley G.
26S12E-25C		Estrella			x			760	Mill Rd. On edge of declining WL
26S13E-15F		Estrella							North of Hwy 46, edge of declining WL
25S13E-7 (delete)	PR Vineyards	Gabilan			x	330-990	Deep aquifer	1040	Jardine & Tower Rd. APN: 025-441-048
26S14E-21M		Shandon							S. of Hwy 46, area of declining WL
26S14E-23	Central Coast Farms	Shandon			x	445-890	Deep aquifer	900	Estrella Cr. Road, APN: 019-171-002. North of declining WL area.
28S15E-14F2		San Juan							Replaces 28S15E-24E2. Near Shell and Camatta Creeks
28S16E-15E1		San Juan	I		x				Replaces 28S16E-15D1
27S15E-26N2		San Juan							Replaces 27S15E-35F1
28S13E-1G		Creston			x		Interbedded sand & gravel zones	410	In town of Creston
28S13E-1C		Creston			x		Shallow Main and interbedded zones	440	Just north of town of Creston
28S14E-4F	South Corps Winery	Creston	I		x	340-660	Deep	720	Ryan Rd.

Table 2
Wells to be Added to Program
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Basin Area	Well Type	Aquifer		Well Data			Comments
				Alluvial	Paso Robles Fm.	Screened Interval	Aquifer Zones Penetrated	Total Depth	
28S13E-12A1		Creston			x		Deep	430	Artesian
27S13E-36A		Creston			x		Interbedded zones	370	North of Hwy 41, edge of rising WL
25S11E-17E	W-23	Bradley	?						Downstream of Nacimiento R. gage, in Camp Roberts
25S11E-5L	MG Range	Bradley			x		Shallow aquifer	210	Camp Roberts
25S11E-13F	W-15	Bradley			x				Camp Roberts

Table 3
Wells To Be Dropped Or To Be Used As Backup Wells
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Book Number	Basin Area	Well Type	Aquifer		Well Data				1998-2003 (10 Events)				2003 Status	Comments
					Alluvial	Paso Robles Fm.	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems		
28S13E-31L1	O'Reilly	1	Atascadero	I		x			921	x					A	Drop (located near AMWC wells)
27S12E-33G1	Morrison #2	1	Atascadero	I		x	200-460	500	861.5	x		x			A	Use only as back-up to 33F1
27S12E-9M3	Thunderbird 13 PR	2	Atascadero	M					721	x	x	x			A	Drop from program
28S12E-4J6	Atas Mut 16E-1	2	Atascadero	MW		x	93-153	160	800.5	x		x			?	Drop from program
28S12E-10A3	Atas Mut 7	2	Atascadero	M			150-500	500	808.3	x		x			A	Drop from program
28S12E-10R5	Atas Mut 1A	2	Atascadero	M	x		50-75	75	817.6	x		x			A	Drop from program
28S12E-11N7	Atas Mut 5A	2	Atascadero	M			50-100	100	823.5	x		x			A	Drop from program
28S13E-31F2	Atas Mut 8	2	Atascadero	M		x	100-310	310	884.3	x		x			A	Drop from program
26S12E-33Q1	Ronconi 1-PR	2	Estrella						690	x		x			?	Drop from program
27S12E-2F2	Sherwood 11-PR	2	Estrella	M					825	x	x	x			?	Drop from program
25S11E-36N3	Williams	3	Estrella	D					843.3	x					A	Use only as a backup to 36N2
25S11E-35F2	Willard	3	Estrella	I		x	64-250	304	None	x					A	Use only as a backup to 35G1
26S12E-22P2	LaPointe	3	Estrella	D		x		300	824		x	x		x	A	Drop from program
26S12E-7F2	Linn	3	Estrella	D		x		170	867.5	x				x	A	Use only as backup to 7G1
26S12E-14K1	Boys Sch 4	4	Estrella	M		x			786	x		x			?	Drop from program
25S12E-28N1	Cagliero	5	Estrella	I	x		12-39	49	639		x	x			A	Replace with 28M1
25S12E-26L1	Webb	5	Estrella	I		x		400	700	x					A	Replace with deep well in Sec 26
25S12E-26K1	DaCosse	5	Estrella	D		x			730	x		x			A	Use only as backup to 26K2
25S13E-19R1	Von Dallen	5	Estrella	D		x		200	915.8						A	Replace with "New" dom. Well 19R2
26S13E-5F1	Borchert	5	Estrella	I					740	x					A	Need log, use as backup for 5D2
26S13E-24R1	Camino	6	Shandon	I					None			x		x	A	Drop. No record in data base
26S15E-18J1	Ballert Old	6	Shandon	I		x	Top 125	600	1023	x					A	Drop from program
26S15E-18J2	Ballert New	6	Shandon	I		x		400	1023.5	x				x	A	Drop from program
26S15E-17K1	Ballert Stock	6	Shandon	S				130	1038	x			x		NE	Well is gone in 2003
26S15E-21E1	Davis	6	Shandon	I					1037		x	x	x		A	Drop from program
26S15E-20B3	CSA 16 #3	6	Shandon	M		x	Top 285	400	1035.0	x		x	x		NE	Drop. Well capped, 2002
26S15E-20B4	CSA 16 #4	6	Shandon	M		x			1036.4	x					A	Use as backup for 20B2
26S15E-29M1	Shandon Hills Vineyard	6	Shandon	I					1115	x	x	x			A	Drop from program
26S15E-28Q1	Russel	8	Shandon	I					1090		x	x	x	x	A	Drop from program
26S15E-33C1	San Juan Vineyards A	8	Shandon	I					1095	x					A	Use as backup to 33Q1

Table 3

Wells To Be Dropped Or To Be Used As Backup Wells

County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Well Number	Common Well Name	Book Number	Basin Area	Well Type	Aquifer		Well Data				1998-2003 (10 Events)				2003 Status	Comments
					Alluvial	Paso Robles Fm.	Screened Interval	Total Depth	Reference Point	Redundant Location	Pumping Frequency	Data Gaps	Restricted Access	Downhole Problems		
26S15E-34P2	Russel	8	Shandon	D		x		82	1129	x			x	x	NE	Drop from program
28S15E-24E2	Morrison	8	San Juan	S					1338.5		x	x			A	Pumping frequently, replace with 28S15E-14F2
28S16E-15D1	Miller #7	8	San Juan	I		x			1405			x	x	x	A	Replace with 15E1
28S16E-14G1	Miller #3	8	San Juan	I					1401.5	x		x		x	A	Drop from program
28S16E-13M1	Van Horn	8	San Juan	I					None	x	x	x		x	A	Use only as backup to 14G2, Get reference point
27S15E-35F1	Sinton	8	San Juan	I		x			1230			x		x	A	Replace with Well 26N2
29S14E-5F2	Anderson	10	Creston	I	x			100	1380	x		x			A	Drop from program
27S13E-23R3	Cardiff	10	Creston	I	?			62	1040			x	x	x	A	Drop from program
28S13E-13D1	Chandler	10	Creston	I		x	135-376	376	1172	x				x	E	Use only as backup to 14J1 & 12M1
28S16E-23M1	Rudnic	11	San Juan	S	x		19-72	72	1439.3			x	x		In	Drop from program

I = Irrigation
S = Stock
M = Municipal
D = Domestic
MW = Monitoring Well
A = Active
E = Equipped
NE = Non-equipped
In = Inactive

Table 4
Stream Gages
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Gage Location	Gage Number	Township, Range & Section	Latitude	Longitude	Period of Record	Gage Location Relative to Programs Wells
Salinas River at Paso Robles	USGS Gage 11147500	26S12E-33	35.6286	-120.6833	1939 to present	Near proposed well 26S12E-33B
Estrella River near Estrella	USGS Gage 11148500	25S12E-36	35.7172	-120.6392	1954 to present	Near proposed well 25S12E-35A1. 6,000 ft upstream from program well 25S12E-26K2
Nacimiento River below Nacimiento Dam	USGS Gage 11149400	25S10E-14	35.7614	-120.8544	1957 to present	Upstream from proposed well 25S11E-17E
Hog Canyon	County Gage #23	25S13E-11	35.776	-120.5472	1993 to 1996	Upstream from program well 25S13E-11E1
Santa Margarita	County Gage #15	25S12E-36 (NW cor)	35.385	-120.6267	1987 to 2000	6,000 ft upstream from proposed well 29S13E-17M1
Cholame Creek at Palo Prieta	County Gage #3	25S15E-36 (NE cor)	35.7139	-120.3042	1984 to 1995	10,000 ft upstream from program well 26S15E-2N1

Table 5
Updated Monitoring Program
County of San Luis Obispo Monitoring Wells in the Paso Robles Ground Water Basin

Area	Wells Currently in Program	Wells Added to Program	Wells Dropped From Program	Wells Currently in Program To Be Used Only As Backups	Wells in Updated Program
Atascadero	44	1	7	1	37
Estrella	50	11	7	5	49
Gabilan	1	1	0	0	2
Shandon	25	2	9	2	16
San Juan	16	3	5	1	13
Creston	18	5	2	1	20
Bradley	0	3	0	0	3
Total Wells	154	26	30	10	140

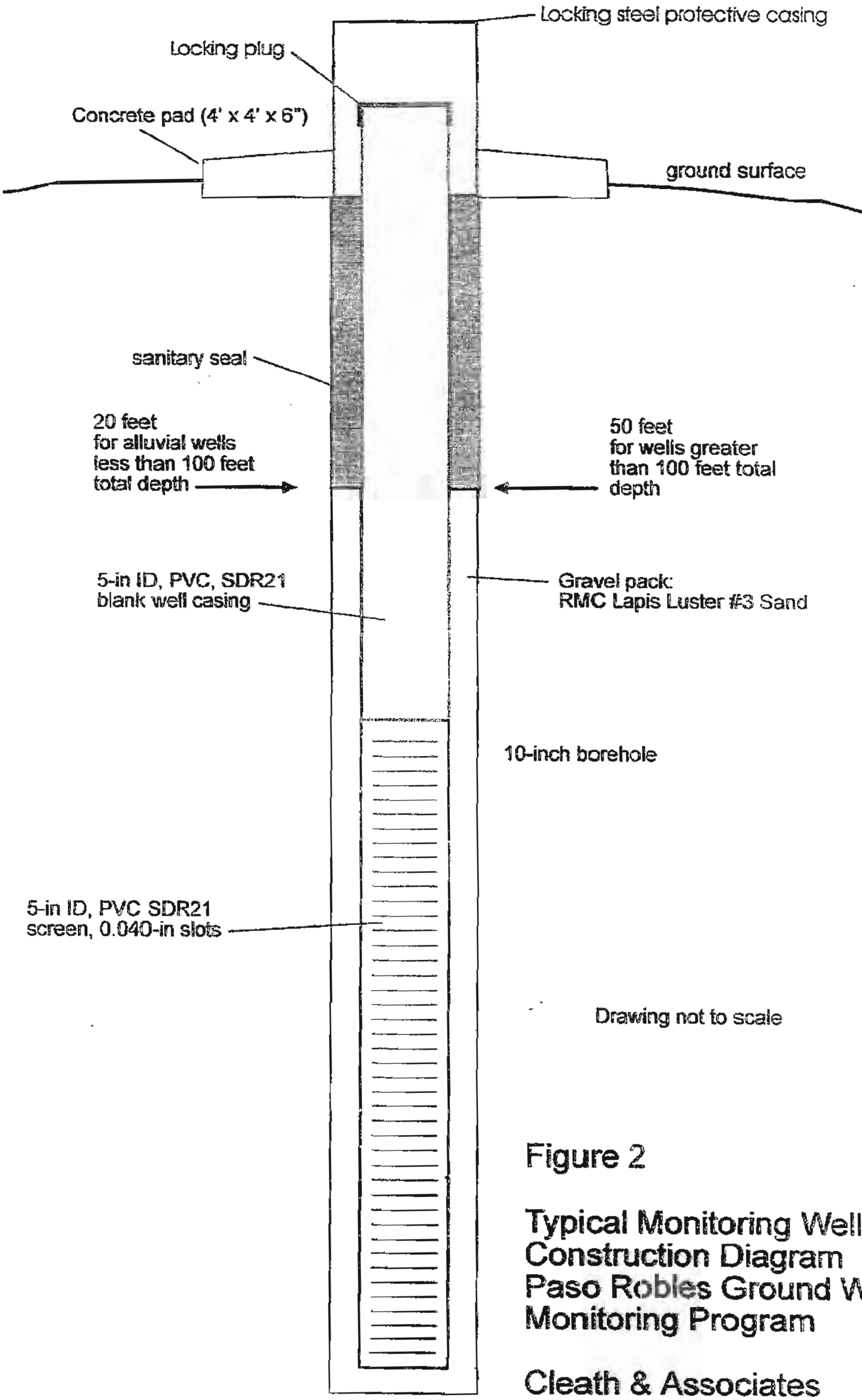

Figure 2

Typical Monitoring Well Construction Diagram Paso Robles Ground Water Monitoring Program

Cleath & Associates

FINAL REPORT

PASO ROBLES GROUNDWATER BASIN STUDY PHASE II

NUMERICAL MODEL DEVELOPMENT, CALIBRATION, and APPLICATION

Prepared for:

COUNTY OF SAN LUIS OBISPO
PUBLIC WORKS DEPARTMENT

Prepared by:

FUGRO WEST, INC.
ETIC ENGINEERING, INC.
CLEATH AND ASSOCIATES

February 2005

FUGRO WEST, INC.

660 Clarion Court, Suite A
San Luis Obispo, CA 93401
Tel: (805) 542-0797
Fax: (805) 542-9311

February 28, 2005
Project No. 3014.007.05

County of San Luis Obispo
Public Works Department
County Government Center, Room 207
San Luis Obispo, California 93408

Attention: Mr. Frank Honeycutt

FINAL REPORT
Paso Robles Groundwater Basin Study, Phase II

Dear Mr. Honeycutt:

Fugro West, Inc. and ETIC Engineering, Inc. are pleased to submit this FINAL REPORT of the Paso Robles Groundwater Basin Study, Phase II. The purpose of the project was to develop a numerical groundwater flow model as a quantitative tool to evaluate future basin hydraulic conditions. Using the model, the issues to be addressed in the Phase II efforts included an evaluation of the basin response to current and future water demands, with and without supplemental water, and an identification of areas of declining water levels.

Through the use of the model as a tool to refine our understanding of the dynamic flow conditions of the basin, the perennial yield is estimated to be 97,700 acre-feet per year (AFY) under current conditions. As of 2000, basin pumpage was approximately 82,600 acre-feet, under relatively stable conditions. However, concentrated pumping centers, particularly in the area along Highway 46 between Paso Robles and Whitley Gardens, have created localized pumping depressions and declining water levels.

The groundwater flow model was applied to simulate potential impacts to groundwater levels resulting from projected build-out conditions in the basin. With a projected basin pumpage of 108,300 AFY at build-out (without the importation of any supplemental water), groundwater storage would decline at a rate of approximately 3,800 acre-feet per year. Because of the concentration of pumping sources along Highway 46 east of Paso Robles, the localized pumping depressions developed over the past several years would be manifested by continued lowering of water levels.

Implementation of the Nacimiento water project would reduce the potential adverse impacts of build-out identified in the full build-out scenario. A direct in lieu exchange of Nacimiento water for a portion of the municipal pumpage would result in a general improvement of water levels relative to the projected build-out conditions. The water levels would not decline as much as would be the case without the water project; however, the currently contracted volume of Nacimiento water does not make up the entire deficit between build-out pumpage and perennial yield. With projected basin pumpage of 102,100 AFY at build-out (with importation of 6,250 AFY of Nacimiento water by Atascadero, Templeton, and Paso Robles), groundwater storage in the basin would still decline at a rate of approximately 1,200 AFY.

Comparison of the simulations of projected build-out conditions with and without the Nacimiento project indicates a net benefit of the Nacimiento water supply of about 2,600 AFY in the average annual change in groundwater storage. The benefits of the Nacimiento water project occur almost entirely along the Salinas River corridor.

Development of the model has increased our understanding of the dynamic flow processes of the basin. An increase in pumping does not result in an associated equivalent loss of groundwater storage because of complex interactions of groundwater and surface water, particularly along the Salinas River. This indicates that groundwater pumping locations and pumping volumes, particularly with respect to municipal supplies, can be optimized to manage groundwater levels.

In closing this phase of work for the San Luis Obispo County Public Works Department, we would like to express our appreciation to County staff, the Technical Review Committee, and the North County Water Resources Forum for their interest and cooperation throughout the study. It has been both a pleasure and a challenge to conduct the study. We will remain available at your convenience to discuss this report or to answer any questions.

Sincerely,

FUGRO WEST, INC.

Paul A. Sorensen, RG, CHg
Associate Hydrogeologist
Project Manager

ETIC ENGINEERING, INC.

Mehrdad M. Javaherian, Ph.D., P.Hg.
Vice President

Michael Maley, RG, CHg
Senior Hydrogeologist

ACKNOWLEDGEMENTS

During the course of this investigation, both Phase I and Phase II which collectively transcended almost five years of time and effort, valuable information and assistance were obtained from a great number of individuals and agencies. It would be impossible to list all those that contributed to the effort, but all the contributions are gratefully acknowledged and truly appreciated.

Special mention is made of the Technical Review Committee (TRC), who met on a periodic basis to review and discuss the ongoing work efforts and the interim reports. The TRC participants are listed below.

Frank Honeycutt
Senior Engineer
Public Works Department
County of San Luis Obispo

Frank Mecham
Mayor
City of El Paso de Robles

Lynda Auchinachie
Environmental Resource Specialist
Dept. of Agriculture/Measurement Standards
San Luis Obispo County

Iris Priestaf, PhD
President
Todd Engineers

Doug Filipponi
Filipponi and Thompson Drilling Co., Inc.

Steve Sinton
Rancher
Water Resource Advisory Committee
County of San Luis Obispo

Michael Isensee
Agricultural Resource Specialist
Dept. of Agriculture/Measurement Standards
San Luis Obispo County

Ken Weathers
Chief Executive Officer
Atascadero Mutual Water Company

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EXECUTIVE SUMMARY

This Final Report of Phase II of the Paso Robles Groundwater Basin Study presents the results of the development, calibration, and application of a numerical groundwater flow model of the basin. These Phase II efforts were designed to develop a sound, defensible flow model that will serve as a planning tool to quantitatively evaluate potential future trends in groundwater flow and water quality across the Paso Robles Groundwater Basin. The model was designed as a basin-wide model to evaluate long-term, regional trends and the overall inflow and outflow to and from the basin. Specific objectives for the model application during this Phase II work included refining uncertain components of the hydrologic budget for the basin, refining estimates of basin perennial yield, and evaluating potential impacts on groundwater levels and basin storage as a result of future build-out scenarios.

The overall purpose of the Phase I and II studies is intended to provide the San Luis Obispo County Public Works Department, North County public water agencies, and overlying landowners and water users with a better understanding of the basin by answering questions related to the quantity of groundwater in the basin, the hydraulic movement of groundwater through the aquifer, sources and volumes of natural recharge, and trends in water quality.

Through development and calibration of the model as a quantitative planning tool, there is now a tool capable of simulating groundwater trends over time across the entire basin. The calibration results indicate that the model accurately portrays previously measured groundwater flow conditions across the basin and is ready for use as a predictive tool to evaluate potential future trends in groundwater quantity and quality.

The groundwater flow model was applied to evaluate the perennial yield for the basin, and to simulate impacts to groundwater levels resulting from projected build-out conditions in the basin. General conclusions from these scenarios include:

- The model indicates that the perennial yield for the Paso Robles Groundwater Basin is 97,700 acre-feet per year (AFY).
- The perennial yield analysis shows that not all of the total volume of an increase in pumping comes out of groundwater storage. Because of the complex interaction of the groundwater with the surface water sources, increased basin pumping induces additional stream percolation as well as affecting other inflow and outflow components. Similarly, a decrease in pumping affects not only groundwater in storage, but concurrently reduces stream recharge and affects other inflows and outflows. Understanding this relationship suggests that groundwater pumping locations and amounts can be optimized to manage groundwater levels and protect beneficial uses.
- The Build-Out Scenario (Scenario 2) simulated the effects of urban build-out and maximum reasonable agricultural water demand (agricultural “build-out”). This scenario, reflecting basin pumpage of 108,300 AFY, results in an average annual decline in groundwater storage of 3,800 AFY. Declining groundwater storage would be manifested in a general lowering of water levels across much of the basin, particularly in the Estrella subarea and the northern part of the Atascadero Subbasin.
- The Build-Out Scenario with Nacimiento water (Scenario 3) simulated the impacts on basin storage and water levels by replacing a portion of municipal pumping with an equal portion of Nacimiento project water. The volume of applied Nacimiento water in this scenario was equal to the amounts presently contracted by Atascadero Mutual Water Company (2,000 AFY), Templeton Community Services District (250 AFY), and the City

of Paso Robles (4,000 AFY). This scenario, which simulated basin-wide annual pumping of 102,100 AFY, results in an average annual decline in groundwater storage of 1,200 AFY at full build-out.

- Comparison of Scenarios 2 and 3 indicates an overall positive net benefit of the Nacimiento project of 2,600 AFY in the average annual change in groundwater storage. Although a slight general lowering of water levels would still occur throughout the basin at build-out with implementation of the Nacimiento project, the benefits would be most apparent in the Estrella subarea and the Atascadero Subbasin, where all of the municipal pumping occurs.
- Municipal pumping is more significantly affected than agricultural pumping by groundwater-surface water interactions associated with the Salinas River. The hydraulic link between the groundwater and surface water indicates that municipal groundwater pumping locations and amounts can be optimized to manage the groundwater levels. Additional scenarios with alternative well locations and pumping rates in the vicinity of the Salinas River could be useful in managing groundwater storage, optimizing groundwater pumping, and maintaining beneficial river flows.
- The agricultural pumping component of the hydrologic budget is the single largest outflow of groundwater from the basin. It is also the single largest estimated parameter because the pumpage volumes are not metered but rather estimates based on land use and irrigation practices. Thus, minor variations of agricultural water demand estimates may have widespread impacts on groundwater storage and groundwater elevations.
- A sensitivity analysis was run on the Scenario 2 maximum reasonable agricultural water demand (simulating “agricultural build-out”). Agricultural pumpage was changed at each well to 90% of the projection for the first run and to 110% for the second run. The 90% run resulted in a small groundwater storage increase of 500 AFY, relative to the impacts simulated by the Scenario 2 conditions. The 110% run resulted in groundwater storage declines of 8,000 AFY. Because future agricultural trends are so problematic to forecast, slight misforecasts in agricultural demand predictions could have large implications relative to changes in groundwater storage and water levels. Given a perennial yield value of 97,700 AFY and estimated basin pumpage at 102,100 AFY at build-out (with Nacimiento water), it is clear a relatively slight adjustment in “build-out” agricultural pumping could make the difference between potential basin overdraft or not.
- Agricultural pumpage, by being more widespread across the basin and comprising much of the pumpage located away from the Salinas River, shows a more direct relationship with groundwater storage and less interaction with the Salinas River. Thus, basin-wide changes in agricultural trends that would result in changes in agricultural pumping would have a more direct effect on groundwater storage than would parallel changes in municipal pumping.

The computer model is a dynamic groundwater management tool that can be used by water resource managers and planners to analyze issues on a coordinated, basin-wide basis and to manage water resources for the long-term benefit of all overlying landowners. Specific recommendations include the following:

- Simulation of possible projects involving artificial recharge and/or provision of alternative irrigation supplies. These scenarios should involve simulation of impacts on groundwater levels and water quality. These scenarios also should involve simulation of the effect of turning off or resting wells with provision of an alternative water supply (e.g., reclaimed wastewater or surplus Nacimiento Water Project water). A particular focus for such possible projects would be the portion of the Estrella subarea that is characterized by groundwater level declines.

- Simulation of alternative well locations and pumping rates. The simulations documented in this report revealed the importance of the dynamic hydraulic interaction of groundwater and surface water, particularly along the Salinas River. Additional scenarios should focus on modifying the operation of municipal wells along the Salinas River to manage groundwater storage, optimize pumping, and preserve beneficial uses of river flow.
- Water quality modeling. Although the Phase 2 effort did not specifically include simulation of water quality trends, the model was developed with a water quality component that will allow for assessment of water quality trends and impacts. Particular areas of focus may include the areas with increasing TDS, chloride, and nitrate that were identified in the Atascadero Subbasin and in the Estrella subarea south of San Miguel.
- Update of the model on a regular basis. Annual compilation of data and update of the hydrologic budget is recommended; a full model update and recalibration of the model to current conditions is recommended every three to five years. This recommendation is particularly important because groundwater pumpage in the projected build-out scenarios is the result of many different decisions made by groundwater users and is close to the perennial yield value. Particular focus should be placed on agricultural pumping, and land use patterns, estimates of agricultural pumping, and distribution of agricultural pumping should be updated regularly.

IN THE BOARD OF SUPERVISORS

County of San Luis Obispo, State of California

Tues day November 8, 2005

PRESENT: Supervisors Harry L. Ovitt, Jerry Lenthall, K.H. "Katcho" Achadjian, James R. Patterson and Chairperson Shirley Bianchi

ABSENT: None

RESOLUTION NO. 2005-342

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SAN LUIS OBISPO, ACTING ON BEHALF OF COUNTY SERVICE AREA NO. 16 (SHANDON), APPROVING THE PASO ROBLES GROUNDWATER BASIN AGREEMENT

The following resolution is hereby offered and read:

WHEREAS, the San Luis Obispo County Service Area No. 16 Water System (CSA 16) is an active municipal user of the Past Robles Groundwater Basin; and

WHEREAS, CSA 16, the San Luis Obispo County Flood Control and Water Conservation District (District), the City of Paso Robles, and certain private landowners known as the "PRIOR" group have negotiated an Agreement regarding monitoring of the Paso Robles Groundwater Basin; and

WHEREAS, the agreement establishes a cooperative approach to monitoring of groundwater resources while establishing specific procedural requirements that the District and municipal users must comply with to mitigate risks of groundwater adjudication or other specified actions affecting groundwater rights; and

WHEREAS, it is in the public interest that the Paso Robles Groundwater Basin Agreement is approved.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED, by the County of San Luis Obispo, acting on behalf of the San Luis Obispo County Service Area No. 16 that the attached Paso Robles Groundwater Basin Agreement is hereby approved.

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Upon motion of Supervisor Achadjian, seconded by Supervisor Lenthall, and on the following roll call vote, to wit:

AYES: Supervisors Achadjian, Lenthall, Ovitt, Patterson, Chairperson Bianchi

NOES: None

ABSENT: None

ABSTAINING: None

the foregoing Resolution is hereby adopted.

SHIRLEY BIANCHI

Chairperson of the Board of Supervisors

ATTEST:

JULIE L. RODEWALD
Clerk of the Board of Supervisors
By: C.M. CHRISTENSEN Deputy Clerk
[SEAL]

APPROVED AS TO FORM AND LEGAL EFFECT:

JAMES B. LINDHOLM, JR.
County Counsel

By:
Deputy County Counsel

Dated: 10/28/05

L:\MANAGMNT\NOV05\County Resolution 11082005.doc.PAO:CAH

STATE OF CALIFORNIA, }
County of San Luis Obispo, } ss.

I, JULIE L. RODEWALD, County Clerk and ex-officio Clerk of the Board of Supervisors, in and for the County of San Luis Obispo, State of California, do hereby certify the foregoing to be a full, true and correct copy of an order made by the Board of Supervisors, as the same appears spread upon their minute book.

WITNESS my hand and the seal of said Board of Supervisors, affixed this 9th day of November, 20 05.

JULIE L. RODEWALD
County Clerk and Ex-Officio Clerk of the Board of Supervisors

(SEAL)

By CMChristensen
Deputy Clerk. 87

CD-325

RECORDING REQUESTED BY &
WHEN RECORDED RETURN TO:

PASO ROBLES GROUNDWATER BASIN AGREEMENT

This Agreement is entered into this 19th day of August, 2005, by and between the landowners identified in Exhibit "A" hereto ("Landowners"), the City of El Paso de Robles ("Paso Robles") and the County of San Luis Obispo ("County") acting solely for and on behalf of its Service Area No. 16 ("Service Area 16") (collectively referred to as "Municipal Users"); and the San Luis Obispo County Flood Control and Water Conservation District ("District") acting solely as technical advisor to the Landowners and Municipal Users.

WHEREAS, the Landowners own certain lands overlying the Paso Robles Groundwater Basin ("Basin"), principally used for agricultural purposes, and have been exercising or in the future may exercise overlying groundwater rights by using groundwater on such lands; and

WHEREAS, Paso Robles operates certain wells to supply its residents and businesses within its boundaries principally for domestic, municipal and industrial purposes, by exercising appropriative groundwater rights; and

WHEREAS, Service Area 16 operates various wells to supply its residents and businesses with water primarily for domestic, municipal, and industrial purposes, by exercising appropriative groundwater rights; and

WHEREAS, Landowners wish to preserve their overlying groundwater rights without Municipal Users developing or asserting a prescriptive groundwater right should the groundwater basin ever be in a condition of overdraft; and

WHEREAS, the parties wish to reach an amicable solution with respect to administration and management of groundwater within the Basin and avoid potential litigation; and

WHEREAS, the parties acknowledge that monitoring, appropriate management of existing Basin supplies and/or bringing additional water resources to the Basin could delay or even avoid entirely the Basin becoming overdrafted in the future; provided however, the parties wish to preserve their rights with respect to their respective groundwater rights notwithstanding implementation of any management measures; and

WHEREAS, the parties recognize that Landowners, Paso Robles and Service Area 16, even combined, represent a minority of the pumping which occurs within the Basin, and that none of them has control over other overlying landowners or others pumping groundwater for residential, municipal, or industrial uses from the Basin, and therefore the parties will structure this Agreement such that other overlying landowners and/or Municipal Users who wish to can be added as parties.

NOW, THEREFORE, the parties agree as follows:

1. BASIN NOT IN OVERDRAFT

The parties agree that, as against any other party to this agreement, they shall not assert that, as of the date of this Agreement, the Basin was in overdraft. As used herein, the term "Basin" means the Paso Robles Groundwater Basin (excluding the Atascadero Sub-basin) examined in the Paso Robles Groundwater Basin Study prepared for the District by Fugro West, Inc. and Cleath and Associates, dated August 30, 2002.

2. LANDOWNERS NOT FILING ACTION

As long as this Agreement is in effect, Landowners agree not to commence any action, such as declaratory relief, quiet title or inverse condemnation action, that is intended to establish a priority of groundwater rights over Municipal Users. The foregoing shall not preclude any Landowner or Municipal User from commencing an action alleging unreasonable pumping interference to enjoin or curtail pumping in a particular location against persons in the immediate vicinity; provided that any such action shall not affect the groundwater rights of the parties, but shall only affect the manner of use of such rights, and such action shall not terminate this Agreement.

3. PROCEDURE FOR TERMINATING AGREEMENT AND DECLARING BASIN TO BE IN OVERDRAFT

No Municipal User may, as against Landowners, commence any declaratory relief action, groundwater adjudication or other action affecting groundwater rights, or take a position in any judicial or administrative proceeding that the Basin is in a condition of overdraft and that any prescriptive period to establish a prescriptive right has commenced, until and unless that Municipal User has complied with the following procedures:

a. The District has made a determination based on published studies that the Basin is in a condition of overdraft.

b. The Municipal User, following a noticed public hearing, adopts a resolution that includes appropriate findings and determinations, declaring that it agrees with the determination described in Article 3.a above and electing to terminate this Agreement pursuant to this provision. The Municipal User shall give advance notice of the hearing by delivering written notice to Landowners' agents designated in Article 8 at least 20 days before the hearing, and by publishing a notice in a newspaper of general circulation published in the County once a week for 2 consecutive weeks, with the first publication occurring at least 20 days prior to the hearing. Until such a resolution is adopted, the Municipal User shall be precluded from asserting that any prescriptive period has commenced to run as against Landowners. This Agreement shall be deemed terminated upon final adoption of such a resolution and no further notice need be given to Landowners or other Municipal Users.

c. Nothing in this Agreement shall be deemed to require that any Municipal User must first proceed under this Article 3 before asserting at any time that the prescriptive period has commenced to run as against any party who has not as of that time entered into this Agreement.

d. The term of this Agreement shall be ten years from January 1 of the calendar year following the execution of the Agreement by the County of San Luis Obispo on behalf of the District, and shall automatically renew for additional successive terms of five years unless a Municipal User or the District provides written notice of non-renewal to the Landowners' designated agent and other Municipal Users at least four months prior to the termination date. Upon such termination, no Landowner or Municipal User may thereafter assert that a condition of overdraft commenced at any time prior to its termination.

4. COOPERATION WITH GROUNDWATER MANAGEMENT ACTIVITIES

a. Landowners and the Municipal Users shall each designate at least one person to participate in good faith in a committee or forum, should one be organized by the District or another public agency with jurisdiction to develop a plan or program ("Plan") for monitoring and evaluating groundwater conditions in the Basin. Such Plan shall include consideration of measures to avoid a condition of overdraft. In developing and implementing any such Plan, the District or another public agency with jurisdiction over the Basin shall facilitate, to the extent reasonably possible, the participation of other overlying owners within the Basin who are not parties to this Agreement.

b. This Agreement does not obligate or require any public agency with jurisdiction over any part of the Basin to adopt a groundwater management plan under California Water Code §10750, et seq. (commonly known as "AB 3030"), or under similar laws, nor to adopt an ordinance to regulate groundwater use within the Basin under its police power, if applicable. Conversely, nothing in this Agreement restricts or otherwise limits any public agency with jurisdiction from adopting such a groundwater management plan or ordinance. Nothing in this Agreement, however, shall be deemed to be a waiver by Landowners or any other party of their rights to comment upon or otherwise challenge the adoption of such plan or ordinance.

c. Landowners and Municipal Users shall cooperate with the District to maintain the existing program to monitor groundwater levels and water quality within the Basin and related water resources, and encourage others to cooperate to expand such program, including the installation of additional monitoring wells, to the extent the parties through the process referred to in Article 4 deem it necessary to carry out the purposes of this Agreement. Nothing in this Agreement shall require the District to expand its existing program of monitoring without its consent.

5. FAILURE TO PARTICIPATE IN GROUNDWATER MANAGEMENT ACTIVITIES

Should any party to this Agreement fail to participate in the activities described in Article 4, at the option of any other party, this Agreement will be deemed terminated as though terminated under Article 3, if the party failing to participate does not cure the deficiency and participate in the process following 45 days' written notice to cure such deficiencies; provided that, prior to termination of this Agreement for failure to participate in Article 4 activities, the parties shall submit the matter to mediation as described in Article 11 below; and provided further, however, that repeated failure to participate in Article 4 activities (more than one-third of scheduled meetings in a two-year period) shall relieve the participating party of the obligation to mediate prior to termination of the Agreement. Should the parties be unable to reconcile any differences with respect to such lack of participation after good faith effort (including mediation, if provided for above), this Agreement may be terminated on 20 days' written notice to the other party's representatives. Notwithstanding the foregoing, the time within which Municipal Users have to cure deficiencies related to financial obligations shall be nine months from the date of notice.

6. COSTS

Each of the parties shall bear their respective costs of participation in this Agreement, including the activities described in Article 4; provided, however, nothing in the Agreement shall be deemed to require a party to share in the cost of preparing a groundwater management plan, including costs of outside consultants' work on such plans described in Article 4.b, absent a separate written agreement to do so.

7. RESERVATION OF RIGHTS

Each of the parties to this Agreement reserves all its respective rights, except as specifically limited by this Agreement. With respect to any declaration of groundwater rights or adjudication of same as among and between the parties hereto, this Agreement is intended solely to address when the prescriptive period would start to run as between Landowners and Municipal Users. If any person who is not a party to this Agreement (or does not become a party in the future, in accordance with Article 9) commences an action to declare or adjudicate groundwater rights within the Basin, or that could affect the groundwater rights of any party, any party may terminate this Agreement by providing 20 days' written notice to the other parties, the effect of which shall be that this Agreement is terminated, as though terminated under Article 3.b.

8. DESIGNATION OF LANDOWNER AGENTS/NOTICE

All notices required to be sent under this Agreement shall be in writing, sent via First Class U. S. Mail and shall be deemed delivered three days after depositing in the mail, unless otherwise specified by this Agreement:

PASO ROBLES: City Manager
City of Paso Robles
1000 Spring Street
Paso Robles, CA 93446

COUNTY: Director of Public Works, County of San Luis Obispo
County Government Center
San Luis Obispo, CA 93408

LANDOWNERS: The three initial agents designated by Landowners to receive notice as herein provided are:

Stephen J. Sinton,
c/o Canyon Ranch
P. O. Box 112
Shandon, CA 93461

Kent Gilmore
8455 Creston Road
Paso Robles, CA 93446

Walter Nielsen
c/o Twist Ranches
9635 Creston Road
Paso Robles, CA 93446

Landowners may change their designated agents at any time in a manner agreed to among the Landowners. Should any of the agents resign, die or otherwise become incapacitated, the remaining agents may appoint a replacement, and shall promptly notify Municipal Users in the manner herein prescribed.

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement.

9. ADDITIONAL PARTIES

Additional overlying landowners or additional parties purveying water for domestic or municipal and industrial purposes may desire to become a party to this Agreement. To provide for the orderly administration of additional parties, the following procedure shall be utilized:

a. If an overlying landowner within the Basin desires to be added as a Landowner under this Agreement, the landowner shall execute and have acknowledged the "Addition of Overlying Landowner to Agreement" form attached hereto as Exhibit "B", which shall become effective when accepted by the then existing Landowner Agents designated in Article 8 and without any action by Municipal Users. Landowner Agents will accept an Addition form unless the new Landowner refuses to reimburse a reasonable, fair share of Landowners' costs incurred as determined by the existing Landowners. Upon acceptance, Landowner Agents shall provide a copy of each Addition form to every Municipal User. The effect of acceptance is that the new landowner henceforth will be bound by this Agreement, as though the new landowner had executed it originally.

b. If a purveyor of water for domestic or municipal and industrial purposes desires to become a Municipal User under this Agreement, it shall execute a form entitled "Addition of Municipal User to Agreement" attached as Exhibit "C", which shall become effective when accepted by a majority of the then existing Municipal Users. Notice of the acceptance shall be delivered to Landowners' agents.

10. WITHDRAWAL OF LANDOWNER PARTIES

Any Landowner may withdraw from the Agreement at any time by giving notice to the other parties as provided in Article 8 and recording a Notice of Withdrawal as set forth in Exhibit D. Upon withdrawing from the Agreement, the rights of the withdrawing overlying Landowner and the Municipal Users shall be the same with respect to that Landowner as if the Landowner had never been a party to this Agreement. In this event, this Agreement shall be deemed an offer to compromise under California Evidence Code Section 1152. The withdrawal of a Landowner shall not affect the rights and obligations of the remaining parties to this Agreement with respect to each other and the Agreement shall remain in full force and effect with respect to those remaining parties.

11. MEDIATION

Should a disagreement arise regarding the interpretation or implementation of this Agreement, the party asserting the dispute shall give written notice to the other parties involved in the dispute. Those parties shall submit the matter to a mediator mutually acceptable to those parties within 30 days. If the dispute cannot be resolved within 90 days of the original notice of the dispute, any of the parties is free to pursue resolution of the dispute through a court of competent jurisdiction as otherwise provided by law.

12. MISCELLANEOUS

a. This Agreement shall constitute a covenant running with all of each Landowner's lands within the Basin, and all such lands shall be described in Exhibit "A". The benefits and burdens of this Agreement shall bind each successive owner of said lands, or portion thereof, and every person having or who may acquire an interest in said lands. Landowners may record an executed copy of this

Agreement in the San Luis Obispo County, California Official Records. If recorded, the parties agree they do not need to record any notice of future amendments of this Agreement, and any such amendments will be fully effective as though notice were recorded. In the event of termination of this Agreement for any reason, any party may execute and record a Memorandum of Termination in substantially the form in Exhibit "D".

b. Waiver of any provision of this Agreement shall not be effective unless such a waiver is made expressly in writing. Express waiver of any one breach shall not be deemed a waiver of any other breach of the same, or any other provision of this Agreement.

c. The language of all parts of this Agreement shall in all cases be construed as a whole, according to its fair meaning, and not strictly for or against any party. No presumptions or rules of interpretation based upon the identity of the party preparing or drafting the Agreement, or any part thereof, shall be applicable or invoked.

d. This Agreement shall be governed by and construed in accordance with the laws of the State of California.

e. This Agreement constitutes the entire agreement among the parties and supercedes all prior understandings or agreements with respect to its subject matter.

f. This Agreement shall not be altered, amended, modified or otherwise changed, except in writing duly executed by the Landowner Agents designated in Article 8, and by each Municipal User; provided that nothing in this Article shall be deemed to limit the provisions of Article 9 regarding the process for adding additional parties.

g. This Agreement may be executed in counterparts, which taken together shall constitute an original. Execution of the document referred to in Article 9 by an additional party shall be deemed that party's execution of a counterpart of this Agreement.

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____

____

PASO ROBLES:

____
Frank R. Mecham, Mayor

____

BOARD OF SUPERVISORS,
COUNTY OF SAN LUIS OBISPO,
acting solely for and on behalf of
SERVICE AREA 16

____

Attest:______________________________
Clerk, Board of Supervisors

Approved as to form:

____
County Counsel
10/28/05

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____

____

BOARD OF SUPERVISORS,
COUNTY OF SAN LUIS OBISPO,
acting solely for and on behalf of
SERVICE AREA 16

____

Attest: ______________________
Clerk, Board of Supervisors

Approved as to form:

____
County Counsel
10/28/05

PASO ROBLES:

____
Frank R. Mecham, Mayor

Attest: ______________________
Sharilyn M. Ryan
Deputy City Clerk

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Luis Obispo } ss.

On December 8, 2005 before me, Sharilyn M Ryan, Notary Public
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared FRANK R. Mecham,
Name(s) of Signer(s)

☑ personally known to me
☐ proved to me on the basis of satisfactory evidence

to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity~~(ies)~~, and that by his/~~her/their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

SHARILYN M. RYAN
Commission # 1454117
Notary Public - California
San Luis Obispo County
My Comm. Expires Dec 2, 2007

WITNESS my hand and official seal.

Sharilyn M. Ryan
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: Paso Robles Groundwater Basin Agreement

Document Date: August 19, 2005 Number of Pages: ________

Signer(s) Other Than Named Above: ________

Capacity(ies) Claimed by Signer

Signer's Name: ________

☐ Individual
☐ Corporate Officer — Title(s): ________
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ________

Signer Is Representing: ________

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

BOARD OF SUPERVISORS,
COUNTY OF SAN LUIS OBISPO,
acting solely for and on behalf of
SERVICE AREA 16

JULIE L. RODEWALD

Attest: County Clerk and Ex-Officio Clerk, Board of Supervisors
County of San Luis Obispo, State of California
Clerk, Board of Supervisors

Approved as to form: By: CMChristensen
Deputy Clerk

County Counsel

COUNTY OF SAN LUIS OBISPO
FLOOD CONTROL AND
WATER CONSERVATION
DISTRICT:

JULIE L. RODEWALD

Attest: County Clerk and Ex-Officio Clerk, Board of Supervisors
County of San Luis Obispo, State of California
Clerk, Board of Directors

By: CMChristensen
Deputy Clerk

Approved as to form:

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN LUIS OBISPO)

On November 8, 2005, before me, **C.M. Christensen,** Deputy County Clerk-Recorder, County of San Luis Obispo, State of California, personally appeared **Shirley Bianchi** personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that she executed the same in her authorized capacities, and that by her signature on the instrument the person or the entity upon behalf of which the person acted, executed the instrument.

WITNESS my hand and official seal.

JULIE L. RODEWALD, County Clerk-Recorder and Ex-Officio Clerk of the Board of Supervisors

By: CMChristensen
Deputy County Clerk-Recorder

(SEAL)

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

DRY CREEK CORP.

BY: ______________________________
ROBERT J. GALLO, CO-PRESIDENT

____

____

____

____

____

____

____

PASO ROBLES:

____

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of Stanislaus

On 8/24, 2005, before me, LYNDA K. SILVA Notary Public, personally appeared R. J. Gallo;

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

LYNDA K. SILVA
COMM. #1390861
NOTARY PUBLIC-CALIFORNIA
STANISLAUS COUNTY
My Comm. Expires Jan. 14, 2007

Witness my hand and official seal.

Lynda K Silva

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement

[DOCUMENT TITLE]

____

[NO. OF PAGES]

____

[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

By: ______________________________

WALTER R. NIELSEN, President
TWIST RANCHES, A California Corporation

____

____

____

____

____

____

____

PASO ROBLES:

____

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of SAN LUIS OBISPO } ss.

On August 23, 2005 (Date), before me, LYLE E. STEVENS, Notary Public, (Name and Title of Officer (e.g., "Jane Doe, Notary Public")),

personally appeared WALTER R. NIELSEN (Name(s) of Signer(s)),

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

LYLE E. STEVENS
Commission # 1416713
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 6, 2007

Place Notary Seal Above

WITNESS my hand and official seal.

Signature of Notary Public

LYLE E. STEVENS, Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: PASO ROBLES GROUND WATER BASIN AGREEMENT

Document Date: August 19, 2005 Number of Pages: 20 including this acknwledgement page

Signer(s) Other Than Named Above: CITY OF PASO ROBLES AND COUNTY BOARD OF SUPERVISORS, SAN LUIS OBISPO COUNTY

Capacity(ies) Claimed by Signer

Signer's Name: WALTER R. NIELSEN

☐ Individual TWIST RANCHES, A California Corporation
☒ Corporate Officer — Title(s): President
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Signer Is Representing:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

S & A VINEYARDS, LLC

BY: ______________________________

STEPHEN CASS, MEMBER

____

____

____

____

____

____

____

PASO ROBLES:

____

____

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
}
County of San Luis Obispo

On August 26, 2005, before me, C.L. Chapman Notary Public, personally appeared Stephen Cass;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

C. L. CHAPMAN
COMM. # 1499712
NOTARY PUBLIC-CALIFORNIA
SAN LUIS OBISPO COUNTY
COMM. EXP. JULY 10, 2008

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

James Dudley Rookus and Virginia H Rookus, husband and wife joint tenants Trustees under the revocable living trust.

____

James Dudley Rookus
Virginia H Rookus

____

____

____

____

____

____

PASO ROBLES:

____

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

____

____

State of California

County of San Luis Obispo

On August 29, 2005 (DATE) before me, John D. Barnes - Notary Public (NAME/TITLE OF OFFICER-i.e. "JANE DOE, NOTARY PUBLIC")

personally appeared James D. Rookus & Virginia H. Rookus (NAME(S) OF SIGNERS(S))

☐ personally known to me **-OR-** ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

ARS6
JOHN D. BARNES
COMM. #1413706
NOTARY PUBLIC - CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires April 26, 2007
ARS6

Witness my hand and official seal.

(SEAL)

John D. Barnes

(SIGNATURE OF NOTARY)

RIGHT THUMBPRINT (Optional)

TOP OF THUMB HERE

CAPACITY CLAIMED BY SIGNER(S)

☐ INDIVIDUAL(S)
☐ CORPORATE ________
OFFICER(S) ________ (TITLES)
☐ PARTNER(S) ☐ LIMITED ☐ GENEREAL
☐ ATTORNEY IN FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ________

SIGNER IS REPRESENTING:
(Name of Person(s) or Entity(ies)

RIGHT THUMBPRINT (Optional)

TOP OF THUMB HERE

CAPACITY CLAIMED BY SIGNER(S)

☐ INDIVIDUAL(S)
☐ CORPORATE ________
OFFICER(S) ________ (TITLES)
☐ PARTNER(S) ☐ LIMITED ☐ GENEREAL
☐ ATTORNEY IN FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ________

SIGNER IS REPRESENTING:
(Name of Person(s) or Entity(ies)

ATTENTION NOTARY

The information requested below and in the column to the right is OPTIONAL. Recording of this document is not required by law and is also optional. It could, however, prevent fraudulent attachment of this certificate to any unauthorized document.

THIS CERTIFICATE MUST BE ATTACHED TO THE DOCUMENT DESCRIBED AT RIGHT:

Title or Type of Document ________

Number of Pages ________ **Date of Document** ________

Signer(s) Other Than Named Above ________

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Jerry J. Rava Sr. and Suzanne Rava, Trustees of the Jerry J. Rava, Sr. and Suzanne Rava Trust Agreement under Trust Agreement Dated August 8, 1994

Jerry J. Rava, Sr.

JERRY J. RAVA, SR., TRUSTEE

Suzanne Rava

SUZANNE RAVA, TRUSTEE

PASO ROBLES:

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of Monterey

On August 30, 2005, before me, Mary K. Harbin Notary Public,

personally appeared Jerry J. Rava Sr. + Suzanne Rava

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

VRS2 MARY K. HARBIN COMM. # 1392019 Notary Public-California County of Monterey My Comm. Exp. Dec. 27, 2006 VRS2

Witness my hand and official seal.

Mary K. Harbin

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

The Gilmore Revocable Living Trust dated 5/14/1996.

BY: [signature]
KENT GILMORE, TRUSTEE

[signature]
See ATTACHED CA. ACKNOWLEDGEMENT.

BY: Dorreene Gilmore
See ATTACHE CA. ACKNOWLEDGEMENT
DORREENE GILMORE, TRUSTEE

Trustees of the Gilmore Revocable Living Trust dated 5/14/199

PASO ROBLES:

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Luis Obispo } ss.

On Sept. 13, 2005 (Date) before me, Louise A. Jennings Notary Public (Name and Title of Officer (e.g., "Jane Doe, Notary Public"))

personally appeared Dorreene Gilmore (Name(s) of Signer(s)),

☐ personally known to me
☑ proved to me on the basis of satisfactory evidence

to be the person~~(s)~~ whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity(~~ies~~), and that by ~~his~~/her/~~their~~ signature(s) on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

LOUISE A. JENNINGS
Commission # 1591059
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 24, 2009

WITNESS my hand and official seal.

Louise A Jennings
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: Paso Robles Groundwater Basin Agreement

Document Date: 9/13/05 Number of Pages: 19

Signer(s) Other Than Named Above: K.C. Gilmore

Capacity(ies) Claimed by Signer

Signer's Name: ______

☑ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

9/13/05 ATTACHED TO AGREEMENT LAJ

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of SAN LUIS OBISPO } ss.

On SEPT. 13, 2005 (Date) before me, LOUISE A. JENNINGS NOTARY PUBLIC (Name and Title of Officer (e.g., "Jane Doe, Notary Public"))

personally appeared K. C. GILMORE (Name(s) of Signer(s)),

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence

to be the person(~~s~~) whose name(~~s~~) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(~~s~~) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

LOUISE A. JENNINGS
Commission # 1591059
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 24, 2009

WITNESS my hand and official seal.

Louise A. Jennings
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: PASO ROBLES GROUNDWATER BASIN AGREE.

Document Date: 9/13/05 Number of Pages: 19

Signer(s) Other Than Named Above: DORREENE GILMORE

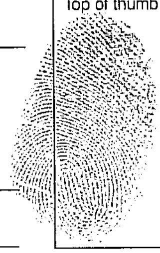
Capacity(ies) Claimed by Signer

Signer's Name: K.C. GILMORE

☒ Individual
☐ Corporate Officer — Title(s):
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other:

Signer Is Representing:

RIGHT THUMBPRINT OF SIGNER
Top of thumb here



ATTACHED TO AGREEMENT 9/13/05 LAG

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Frank T. Aguiar and Patricia A. Aguiar, Trustees of the Aguiar Family Trust

BY: Frank T. Aguiar Trustee for the Aguiar Family Trust

BY: Pat A. Aguiar Trustee
PATRICIA A. AGUIAR, TRUSTEE

FRANK JAY LLOYD AND JUDY A. LLOYD TRUSTEES OF THE FRANK JAY LLOYD 1979 TRUST UNDER AGREEMENT DATED AUGUST 17, 1979

BY: Frank Jay Lloyd
FRANK JAY LLOYD Trustee

BY: Judy A Lloyd, Trustee
JUDY A. LLOYD, TRUSTEE

PASO ROBLES:

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CA

County of SACRAMENTO

On Aug 31, 2005, before me, KASHMIR DHEENSA Notary Public, personally appeared FRANK THOMAS AGUIAR + PATRICIA ANN AGUIAR

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is/~~are subscribed to the within instrument and acknowledged to me that ~~he/she/~~they executed the same in ~~his/her/~~their authorized capacity(ies), and that by ~~his/her/~~their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

KASHMIR DHEENSA
Commission # 1388747
Notary Public - California
Sacramento County
My Comm. Expires Dec 6, 2006

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER

☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER:

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

2
[NO. OF PAGES]

08-31-05
[DATE OF DOCUMENT]

Signers Other Than Above:
None.

Signer(s) is/are representing:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
}
County of San Luis Obispo

On Sept 8, 2005, before me, Andrea D. Ingwerson Notary Public, personally appeared Frank J. and Judith A. Lloyd ;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

SM01 ANDREA D. INGWERSON
COMM. #1456439
NOTARY PUBLIC-CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires December 15, 2007 SM01

Witness my hand and official seal.

Place Notary Seal Above

Andrea D. Ingwerson
SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

(see attached original signature)
ALBERT T. WEBSTER

Lynda W. Dayton
LYNDA W. DAYTON

PASO ROBLES:

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

ALL-PURPOSE ACKNOWLEDGMENT

State of Nevada

County of Clark)

On October 5, 2005, before me, Susan Lopez Notary Public,

personally appeared LYNDA W. DAYTON;

☒ personally known to me

☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

NOTARY PUBLIC
STATE OF NEVADA
County of Clark
SUSAN LOPEZ
No: 99-59690-1
My Appointment Expires Dec. 2, 2007

Witness my hand and official seal.

Susan Lopez

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL

☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______

DESCRIPTION OF ATTACHED DOCUMENT:

Signature page w/ Exhibit A of the Paso Robles Groundwater Basin Agmt

[DOCUMENT TITLE]

2

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

EXHIBIT A

LANDOWNERS' NAMES AND LEGAL DESCRIPTIONS OF ALL THE LANDS WITHIN THE BASIN OWNED BY EACH

LANDOWNERS' NAMES: Albert T. Webster and Lynda W. Dayton

LEGAL DESCRIPTION

Real property in the City of unincorporated area,County of San Luis Obispo, State of California, described as follows:

Lot 82 and the Southerly half of abandoned County Road No.25, lying adjacent to the Northerly line of said lot and between the Northerly prolongation of the Easterly and Westerly lines of said lot of the subdivision of the Rancho HuerHero and adjacent lands, in the County of San Luis Obispo,State of California, ACCORDING TO MAP THEREOF FILED IN BOOK A, PAGE 110 OF MAPS,in the office of the County Recorder of said county.

COUNTY TAX ASSESSMENT NO.043,091,046
PROPERTY DESCRIPTION; RHO HR HRO LT82

ALBERT T. WEBSTER 8-25-05

LYNDA W. DAYTON

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of SAN LUIS OBISPO } ss.

On 8-26-05 before me, HELENA HOGUE, NOTARY PUBLIC
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared ALBERT T. WEBSTER,
Name(s) of Signer(s)

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence

HELENA HOGUE
COMM. #1498949
NOTARY PUBLIC-CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires July 6, 2008

to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Helena Hogue
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer

Signer's Name: ______

☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Patricia S. Noel, Trustee

Patricia S. Noel as trustee of the
Patricia S. Noel Separate Property Revocable Trust

Patricia S. Noel, Trustee

Patricia S. Noel as trustee of the
Hayes and Patricia Noel Family Trust

Patricia S. Noel, Trustee

Patricia S. Noel as trustee of the
Thomas John Schoettler Trust

Hayes A. Noel, Trustee

Hayes A. Noel as trustee of the
Hayes and Patricia Noel Family Trust

PASO ROBLES:

General Acknowledgment Form

State of California)
County of ~~Capitola~~ Santa Cruz) ss.

On December 22, 2005, before me, T. Norris, a Notary Public in and for said State, personally appeared **PATRICIA S. NOEL AND HAYES A. NOEL** personally known to me (or proved to me on the basis of satisfactory evidence) to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same in their authorized capacities, and that by their signatures on the instrument the persons, or the entity upon behalf of which the persons acted, executed the instrument.

T. NORRIS
COMM. # 1571667
NOTARY PUBLIC-CALIFORNIA
SANTA CRUZ COUNTY
COMM. EXP. APRIL 22, 2009
MGC1

WITNESS my hand and official seal.

Signature ______________________ (seal)

acknow.frm

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

The Schoettler Family Partnership LLLP
by Gail S. Schoettler

The Schoettler Family Partnership, LLLP
By: Gail S. Schoettler

PASO ROBLES:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of Colorado

}

County of Arapahoe

On 9/22, 2005, before me, Linda J. Crawley Notary Public,

personally appeared Gail S. Schoettler ;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

LINDA J. CRAWLEY
NOTARY PUBLIC
STATE OF COLORADO
My Commission Expires 07/07/2007

Witness my hand and official seal.

Linda J. Crawley
SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Martha Noel

____
Martha Noel

____
William Noel

____
Julie Michele Sinton

____
Daniel Stephen Sinton

____
Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
James D. Schoettler

____
Lee Katherine Schoettler

PASO ROBLES:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of San Mateo

On 9/28, 2005, before me, Steven Paul Mortiboys Notary Public,

personally appeared Martha Noel;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity~~(ies)~~, and that by ~~his~~/her/~~their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

STEVEN PAUL MORTIBOYS
COMM. # 1555159
NOTARY PUBLIC-CALIFORNIA
SAN MATEO COUNTY
COMM. EXP. FEB. 26, 2009

Place Notary Seal Above

Witness my hand and official seal.

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement

[DOCUMENT TITLE]

____

[NO. OF PAGES]

____

[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____
Martha Noel

____
William Noel

____
Julie Michele Sinton

____
Daniel Stephen Sinton

____
Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
James D. Schoettler

____
Lee Katherine Schoettler

PASO ROBLES:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of ~~California~~ Virginia
}
County of Rockbridge

On Oct. 5, 2005, before me, Sarah G. St.Clair Notary Public, personally appeared William Noel;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal.

Place Notary Seal Above

Sarah G StClair
SIGNATURE OF NOTARY PUBLIC
Commission expires August 31, 2008

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____
Martha Noel

____
William Noel

____
Julie Michele Sinton

____
Daniel Stephen Sinton

____
Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

James D Schoettler
____
James D. Schoettler

____
Lee Katherine Schoettler

PASO ROBLES:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
}
County of Santa Clara

On Sep. 28, 2005, before me, SOO YUN KIM Notary Public, personally appeared James D. Schoettler;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is~~/are~~ subscribed to the within instrument and acknowledged to me that he~~/she/they~~ executed the same in his~~/her/their~~ authorized capacity~~(ies)~~, and that by his~~/her/their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

SOO YUN KIM
COMM. #1446785
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
My Comm. Expires Nov. 19, 2007
TGJ1 TGJ1

Witness my hand and official seal.

[signature]

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:
____

Signer(s) is/are representing:
Oneself

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____
Martha Noel

____
William Noel

____
Julie Michele Sinton

____
Daniel Stephen Sinton

____
Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
James D. Schoettler

____
Lee Katherine Schoettler

PASO ROBLES:

____

____

see attached notary

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of Orange

On Oct. 3, 2005 2005, before me, Linda A. Gagnon, Notary Public, personally appeared Lee Katherine Schoettler;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity~~(ies)~~, and that by ~~his~~/her/~~their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

LINDA A. GAGNON
Commission # 1600856
Notary Public - California
Orange County
My Comm. Expires Aug 13, 2009

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

18
[NO. OF PAGES]

8-19-05
[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____
Martha Noel

____
William Noel

Julie Michele Sinton
____
Julie Michele Sinton

____
Daniel Stephen Sinton

____
Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
James D. Schoettler

____
Lee Katherine Schoettler

PASO ROBLES:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of Tennessee

}

County of Davidson

On 9-30, 2005, before me, Marcia N. Bailey Notary Public,

personally appeared Julie Michele Sinton ;

☐ personally known to me
☑ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MARCIA N. BAILEY STATE OF TENNESSEE NOTARY PUBLIC DAVIDSON COUNTY

Witness my hand and official seal.

Marcia N. Bailey
SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above: Julie Michele Sinton

Signer(s) is/are representing:

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

____
Martha Noel

____
William Noel

____
Julie Michele Sinton

____
Daniel Stephen Sinton

Stephen J. Sinton
Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

Jane H. Sinton
Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

____
James D. Schoettler

____
Lee Katherine Schoettler

PASO ROBLES:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of San Luis Obispo

On September 27, 2005, before me, Christina N. Garcia Notary Public, personally appeared Stephen J. Sinton ;

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

CHRISTINA N. GARCIA
Commission # 1488070
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 3, 2008

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of San Luis Obispo

On September 23, 2005, before me, Christina N. Garcia Notary Public,

personally appeared Jane H. Sinton ;

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

CHRISTINA N. GARCIA
Commission # 1488070
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 3, 2008

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S) ☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Martha Noel

William Noel

Julie Michele Sinton

Daniel Stephen Sinton

Daniel Stephen Sinton

Stephen J. Sinton as trustee of the Stephen And Jane Sinton Family Trust

Jane H. Sinton as trustee of the Stephen And Jane Sinton Family Trust

James D. Schoettler

Lee Katherine Schoettler

PASO ROBLES:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
}
County of San Francisco

On 10-4-, 2005, before me, S. O Kish Notary Public, personally appeared Daniel Stephen Sinton ;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

S. O. KISH
Commission # 1558569
Notary Public — California
San Francisco County
My Comm. Expires Apr 10, 2009

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

19
[NO. OF PAGES]

10-4-05
[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

James B. Sinton

James B. Sinton as Trustee of the James B. Sinton Family Revocable Trust, U/D/T, Dated May 28, 1997

PASO ROBLES:

Norma M. Sinton

Norma M. Sinton as Trustee of the James B. Sinton Family Revocable Trust, U/D/T, Dated May 28, 1997

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
}
County of San Luis Obispo

On September 20, 2005, before me, Christina N. Garcia Notary Public, personally appeared James B. Sinton;

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

CHRISTINA N. GARCIA
Commission # 1488070
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 3, 2008

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT
Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CALIFORNIA

}

County of SAN LUIS OBISPO

On 9/23/05, 2005, before me, Louise A. Jennings Notary Public,

personally appeared NORMA A. SINTON;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(~~s~~) whose name(~~s~~) is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity(~~ies~~), and that by ~~his~~/her/~~their~~ signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

LOUISE A. JENNINGS
Commission # 1591059
Notary Public - California
San Luis Obispo County
My Comm. Expires Jun 24, 2009

Witness my hand and official seal.

Louise A. Jennings
SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: _______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

____
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

EDWARD JOSEPH BERNARD and LINDA ANN BERNARD TRUSTEES OF THE 2000 BERNARD FAMILY TRUST DATED SEPTEMBER 6, 2000

by Edward Joseph Bernard

by Linda Ann Bernard

see attached notary acknowledgment

PASO ROBLES:

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of San Luis Obispo }

On Sept. 1st, 2005, before me, Tamara K. Miller Notary Public,

personally appeared Edward Joseph Bernard and Linda Ann Bernard;

☑ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal.

TAMARA K. MILLER
COMM. #1415131
NOTARY PUBLIC-CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires May 31, 2007
SM01

Tamara K Miller
SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Noel A Ryan

NOEL A RYAN

____

____

____

____

____

____

____

PASO ROBLES:

____

BOARD OF SUPERVISORS, COUNTY OF SAN LUIS OBISPO, acting solely for and on behalf of SERVICE AREA 16 and the COUNTY OF SAN LUIS OBISPO FLOOD CONTROL AND WATER CONSERVATION DISTRICT:

____

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
}
County of San Luis Obispo

On Oct. 3, 2005, before me, Ramona Gouff Notary Public, personally appeared Noel A Ryan;

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

RAMONA GOUFF
Commission # 1527427
Notary Public - California
San Luis Obispo County
My Comm. Expires Nov 18, 2008

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

10/17/05

JOHN ANTHONY QUINLAN

ELIZABETH ANNE CURRIE 10·17·05

PASO ROBLES:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of SAN LUIS OBISPO } ss.

NOTARY

On 17 OCT. 05, before me, CLARENCE RUSSELL McMILLIN,
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared JOHN ANTHONY QUINLAN,
Name(s) of Signer(s)

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

CLARENCE RUSSELL MCMILLIN
Commission # 1600120
Notary Public - California
San Luis Obispo County
My Comm. Expires Aug 9, 2009

Place Notary Seal Above

WITNESS my hand and official seal.

Clarence Russell McMillin
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of SAN LUIS OBISPO } ss.

NOTARY

On 17 OCT. 05, before me, CLARENCE RUSSELL McMILLIN
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared ELIZABETH ANNE CURRIE,
Name(s) of Signer(s)

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

CLARENCE RUSSELL MCMILLIN
Commission # 1600120
Notary Public - California
San Luis Obispo County
My Comm. Expires Aug 9, 2009

Place Notary Seal Above

WITNESS my hand and official seal.

Clarence Russell McMillin

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

additional party shall be deemed that party's execution of a counterpart of this Agreement.

b. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

MORRISON RANCH CORP.

BY: Kenneth D. Morrison
KENNETH D. MORRISON, PRESIDENT

Roy + Uva Morrison Ranch Corp.
Kenneth D. Morrison (Pres.)

PASO ROBLES:

8/18/05 FINAL
777255-3 80307Rv3 33444/0001

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of MADERA

On October 4, 2005, before me, Sharon F. Bump Notary Public, personally appeared Kenneth D. Morrison;

[X] personally known to me
[ ] proved to me on the basis of satisfactory evidence to be the person(~~s~~) whose name(~~s~~) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

SHARON F. BUMP
Commission # 1450545
Notary Public - California
Madera County
My Comm. Expires Nov 11, 2007

Witness my hand and official seal.

Sharon F. Bump

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
[X] INDIVIDUAL
[ ] CORPORATE OFFICER(S)

TITLES

[ ] PARTNER(S)
[ ] LIMITED
[ ] GENERAL
[ ] ATTORNEY-IN-FACT
[ ] TRUSTEE(S)
[ ] GUARDIAN/CONSERVATOR
[ ] OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

10 (TEN)
[NO. OF PAGES]

August 19, 2005
[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

8/15/05 FINAL
:777255-3 8056/8v3 33444/0001

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CALIFORNIA

County of Madera

On October 4, 2005, before me, Sharon F. Bump Notary Public,

personally appeared Kenneth D. Morrison ,

☑ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(~~s~~) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

SHARON F. BUMP
Commission # 1450545
Notary Public - California
Madera County
My Comm. Expires Nov 11, 2007

Witness my hand and official seal.

Sharon F. Bump

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☑ CORPORATE OFFICER(S)

President
TITLES

☐ PARTNER(S) ☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

10 Ten
[NO. OF PAGES]

August 19, 2005
[DATE OF DOCUMENT]

Signers Other Than Above: ____________

Signer(s) is/are representing: ____________

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

Robert K. Morrison and Dianne H. Morrison,
Trustees of the 2000 Morrison Family Trust
UDT ~~dated June 19~~, 2000

BY: Robert K Morrison
ROBERT K. MORRISON, TRUSTEE

Robert K Morrison

BY: Dianne H Morrison
DIANNE H. MORRISON, TRUSTEE

PASO ROBLES:

Vice President Rag-Vera Ranch Corp.

MID-STATE BANK&TRUST

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CALIFORNIA

County of SAN LUIS OBISPO

On October 8, 2005 before me, Susan Gomez, Notary Public, personally appeared Robert K Morrison and Dianne H Morrison,

☐ personally known to me - **OR** - ☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

SUSAN GOMEZ
Commission # 1410229
Notary Public - California
San Luis Obispo County
My Comm. Expires Apr 10, 2007

WITNESS my hand and official seal.

Susan Gomez

Signature of Notary

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER (PRINCIPAL)

☒ Individual
☒ Corporate Officer

Title

☐ Partner(s) ☐ Limited ☐ General
☐ Attorney-in-Fact
☐ Trustee(s)
☐ Guardian/Conservator
☐ Other:

Absent Signer (Principal) is Representing:

DESCRIPTION OF ATTACHED DOCUMENT

Title or Type of Document
PRIOR Agreement Instructions

Number of Pages
19

Date of Document
August 2005

Signer(s) Other Than Name(s) Above

EXHIBIT A

LANDOWNERS' NAMES AND LEGAL DESCRIPTIONS OF ALL THE LANDS WITHIN THE BASIN OWNED BY EACH

In the unincorporated area of the County of San Luis Obispo, State of California, described as follows:

DRY CREEK CORP. (Gallo Vineyards Inc.)

PARCEL 1:

The South one-half of Lot 3 and all of Lot 4, of the Dunning and Dresser Tract, in the County of San Luis Obispo, State of California, according to map filed October 19, 1889 in Book A at page 119 of Maps, in the Office of the County Recorder of said County, and being portions of Section 20, Township 27 South, Range 13 East, Mount Diablo Base and Meridian.

PARCEL 2:

That portion of Lots 5 and 6 of the Dunning and Dresser Tract, in the County of San Luis Obispo, State of California, according to map filed October 19, 1889 in Book A at page 119 of Maps, in the Office of the County Recorder of said County, and being a portion of Section 21, Township 27 South, Range 13 East, Mount Diablo Base and Meridian, lying Westerly of the following described line:

Beginning at a point on the Southerly line of Lot 5 of the Dunning and Dresser Tract that is distant along said Southerly line, North 89° 13' East 648.45 feet from the center line of the unnamed road adjoining the Westerly line of said Lot 5; thence an 0° 27' 55" East to the Northerly line of said Lot 6.

EXCEPTING therefrom that portion of said Lot 6 lying Northerly of the Easterly prolongation of the Southerly line of the North half of Lot 3 of said Dunning. and Dresser Tract.

PARCEL 3:

Lot 113 and Lot 119 adjacent to said Lot 113 of the Subdivisions of the Rancho Santa Ysabel and adjacent lands, in the County of San Luis Obispo, State of California, according to map filed for record January 25, 1887 in Book A at page 29 of Maps, in the Office of the County Recorder of said County, excepting and excluding, however, that lot and parcel designated 119 and adjoining Lot 120 as shown on the map of said subdivision.

EXCEPTING therefrom that portion of Lot 113 described in deed recorded December 30, 1977 in Book 2036 at page 881 of Official Records.

ALSO EXCEPTING therefrom a one-half interest in and to all crude oil, petroleum, gas, brea, asphaltum and all kindred substances and other minerals under and in said land, said reservation to expire 12:00 P.M. May 1, 1976 as reserved by Sidney P. Wachs and Ivy May Wachs, husband and wife, in deed dated June 13, 1961 and filed for record July 3, 1961 in Book 1131 at page 108 of Official Records, under Recorder's Series Number 13419.

PARCEL 4:

Lots 1, 2, 13 and 14 of the Dunning and Dresser Tract, in the County of San Luis Obispo, State of California, according to map filed for record October 19, 1889, in Book A at page 119 of Maps, in the Office of the County Recorder of said County, and being portions of Sections 17 and 20 of Township 20 South, Range 13 East, Mount Diablo Base and Meridian.

NOTE: Lots 1 and 2 above described are the same as the West half of the Southeast quarter of Section 20, Township 27 South, Range 13 East, Mount Diablo Base and Meridian.

EXCEPTING therefrom a one-half interest in and to all crude oil, petroleum, gas, brea, asphaltum and all kindred substances and other minerals under and in said land, said reservation to expire 12:00 P.M. May 1, 1976 as reserved by Sidney P. Wachs and Ivy May Wachs, husband and wife, in deed dated June 13, 1961 and filed for record July 3, 1961 in Book 1131 at page 108 of Official Records, under Recorder's Series Number 13419.

PARCEL 5:

That portion of Lot 112 of the subdivision of the Rancho Santa Ysabel and adjacent lands, in the County of San Luis Obispo, State of California, according to map filed January 25, 1887 in Book A at page 29 of Maps, in the Office of the County Recorder of said County, and being more particularly described as follows:

Commencing at SY 340 on the South line of said Lot 112; thence along said South line South 85° 38' 10" East, 187.21 feet to the Point of Beginning; thence leaving said South line North 7° 45' 31" East, 43.46 feet to the South line of Creston Road; thence along said South line of Creston Road from a tangent that bears South 82° 14' 29" East along a curve to the left whose radius is 1040.69 feet through a central angle of 14° 16' 08" for an arc length of 257.17 feet; thence North 83° 10' 30" East, 1838.88 feet to the intersection of the South line of Creston Road with the South line of Lot 112; thence along the South line of said Lot 112, South 77° 21' 20" West, 1429.59 feet to SY 341; thence North 85° 38' 10" West, 703.00 feet to the True Point of Beginning.

TWIST RANCHES, a California corporation
APN: 035-101-050

Lots 30 and 44 of the Subdivisions of Huer Huero Rancho and adjacent lands, in the County of San Luis Obispo, State of California, according to the map recorded August 2, 1884, in Book A, page 110 of Maps, in the office of the County Recorder of said County.

EXCEPT from said lot 30 that portion thereof described as follows:

Beginning at Stake S.969 set at the northwest corner of said lot and running thence South 77 1/2° East along the northerly line of said lot, 44.12 chains, more or less, to stake S.258 at the northeast corner of said lot; thence South 24 1/2° East along the easterly line of said lot, 20.48 chains to a stake, thence South 77 1/2° West, 52.74 chains to stake on the westerly line of said lot; thence North 20.50 chains to a stake S.969 the point of beginning.

ALSO EXCEPT from Lots 30 and 44 that portion of said land described in deed to John W. Akers and Glenna M. Akers, husband and wife, each as to an undivided 1/2 interest, as tenants in common, dated July 13, 1967, and recorded August 1, 1967, in Book 1443, page 585 of Official Records.

ALSO EXCEPT an undivided 1/3 of all oil, gas, and other hydrocarbon substances and/or minerals, in, and under said land, as reserved in deed from Benjamin H. Richardson and Etta M. Richardson, his wife, recorded January 21, 1946, in Book 400, page 325 of Official Records.

ALSO EXCEPT therefrom an undivided 1/3 of all oil, gas, and other hydrocarbon substances and/or minerals in and under said land as reserved by Samuel Brask, et ux., in deed dated March 31, 1955, and recorded May 4, 1955, in Book 802, page 419 of Official Records.

Said land is shown as Parcel B on Record of Surveys Map recorded August 8, 1967, in Book 16, page 10 of Record of Surveys.

Together with all buildings and improvements thereon.

Together with the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

SUBJECT to a Deed of Trust with Assignment of Rents to secure an indebtedness of $212,000.00, recorded February 13, 1974, in Book 1764, of Official Records at page 881, office of the County Recorder, County of San Luis Obispo, California, dated January 29, 1974, executed by Betty Burke, an unmarried woman, Trustor, to Crocker National Bank, a national banking association, Trustee, in favor of Mike C. Boldur and Clara B. Boldur, as Trustees under Declaration of Trust, dated July 27, 1972, Beneficiaries.

SUBJECT to a Deed of Trust to secure an indebtedness of $99,160.00, recorded February 14, 1978, in Book 2047, of Official Records at page 376, office of the County Recorder, County of San Luis Obispo, California, dated December 23, 1977, executed by JOHN E. S. BUCHANAN and BARBARA J. BUCHANAN, his wife, Trustors, to FIRST AMERICAN TITLE INSURANCE COMPANY, Trustee, in favor of JAMES M. DUENOW and JUDITH M. DUENOW, Beneficiaries.

SUBJECT to all taxes and assessments, leases, liens, reservations, restrictions, conditions, exceptions, regulations, zoning, codes, easements, rights-of-way, ordinances, licenses affecting the property, if any, encroachments, if any, upon any street, highway or other property.

S & A VINEYARDS, LLC, a California Limited Liability Company
APN: 035-032-014
035-032-018

Parcel 6 of Parcel Map Coal 99-0104 as per Map recorded in Book 55 of Parcel Maps Page 76 Records of San Luis Obispo County.

James Dudley Rookus and Virginia H. Rookus, husband and wife, joint tenants, as Trustees, under the Revocable Living Trust for The James D. Rookus Familty Trust DTD 8/26/70
APN: 35-101-044
35-101-048
35-101-049

That portion of lots 30 and 44 of the subdivision:, of the Huer Huero Rancho and adjacent lands in the County of San Luis Obispo, State of California, according to Map recorded August 2, 1884 in Book A, Page 110 of Maps, in the office of the County Recorder of said county, said portion of lots 30 and 44 also being shown in Book 16 of Licensed Surveys, at Page 10 and being more particularly described as follows:

Beginning at the southwest corner of Parcel 2 as said Parcel 2 is shown in Book 16 of Parcel Maps, at Page 11;
Thence along the westerly line of said Parcel 2, north 1560.87 feet to a point;
Thence north 78° 25' 14" east, 1584.96 feet to the westerly line of said Parcel 2;

Thence along said westerly line, north 23° 21' 12" west, 1848.66 feet to a point on the south line of Parcel 1 as said Parcel 1 is shown in Book 16 of Parcel Maps, at Page 11;
Thence along said south line, north 77° 34' 02" east, 1600.00 feet to the east line of said Parcel 1;
Thence along said east line which is also the west line of Parcel B according to Book 16 of Licensed Surveys, at Page 10;
Thence along said westerly line of Parcel B and the easterly line of the aforementioned Parcel 2, south 6° 39' 44" east, 961.40 feet; thence south 2° 54' 46" west, 740.08 feet;
Thence south 47° 15' 14" east, 933.20 feet;
Thence south 1° 22' 17" west, 1587.56 feet to a point that lies 30.00 feet north of the south line of Parcel 8 as said Parcel B is shown in Book 16 of Licensed Surveys at Page 10, north 88° 37' 43" east, 133.73 feet;
Thence north 74° 52' 19" east, 462.58 feet;
Thence north 88° 37' 43" east, 192.88 feet;
Thence south 43° 30' 00" east, 148.32 feet to a point that lies 30.00 feet north of the south line of said Parcel B;
Thence parallel to and 30.00 feet north of said south line, north 88° 37' 43" east, 1706.21 feet to the westerly line of Creston road; thence along said westerly line, south 22° 31' 59" east, 32.17 feet to the south line of said Parcel B;
Thence along said south line of Parcel B and the south line of the aforementioned Parcel 2, south 88° 37' 43" west, and 5779.05 feet to the point of beginning.

Jerry J. Rava Sr. and Suzanne Rava, Trustees of the Jerry J. Rava, Sr. and Suzanne Rava Trust Agreement under Trust Agreement dated August 8, 1994
APN: 035-341-022
035-341-020

Lot 19 and 21 of Dunning and Dresser Tract, in the County of San Luis Obispo, State of California, according to map recorded October 19, 1889 in Book A, Page 119 of Maps, in the office of the County Recorder of said County.

Kent C. Gilmore and Dorreene G. Gilmore, Trustees of the Gilmore Revocable Living Trust dated May 14, 1996
APN: 35-081-45

PARCEL 1:

That portion of Lot 30 of the Subdivision of the Rancho Huer Huero and adjacent lands in the County of San Luis Obispo, State of California, according to the map recorded August 2, 1884 in Book 4, page 110 of Maps, in the office of the County Recorder of said County, described as follows:

Beginning at Stake S.969 at the Northwest corner of said lot, and running thence North 77 1/2° East along the Northerly line of said lot, 44.12 chains, more or less, to Stake S.259 at the Northeast corner of said lot; thence South 24 1/2" East along the Easterly line of said lot, 20.48 chains to a stake; thence South 77 1/2° West, 52.74 chains to stake on the Westerly line of said lot; thence North 20.50 chains to Stake S.969, the point of beginning.

EXCEPTING *therefrom* that portion of said land described in deed to Franklin Irvin Perry and wife recorded on November 2, 1962 in Book 1209, Page 459 of Official Records; and that portion described in deed to Muriel A. Ross, a married woman recorded November 2, 1962 in Book 1209 Page 457 of Official Records and that portion described in deed to Ruth K. Castle, a married woman, recorded November 2, 1962 in book 1209, Page 458 of Official Records and that portion described in deed to Amy Botts recorded November 14, 1963 in Book 1270, Page 116 of Official Records.

PARCEL 2:

An easement for ingress, egress over that portion of county road #5214 (also known as Feenstra Road) as described in resolution vacating a portion of Feenstra Road, Supervisorial District No. 1, recorded April 25, 1985 in Book 2700, Page 266 of Official Records, which would pass with conveyance of Lot 1 of the Associated Almond Orchard Independence Tract No. 10-C, according to the map recorded June 16, 1921 in Book 2, Page 26 of Maps, only in the event that normal access is impassible due to wet weather, recorded October 10, 1989 in Book 3395, Page 152 of Official Records.

Frank Jay Lloyd and Judy A. Lloyd, Trustees, of The Frank Jay Lloyd 1979 Trust under Agreement dated August 11, 1979
Frank T. Aguiar and Patricia A. Aguiar, Trustees, of The Aguiar Family Trust
APN: 035-101-59
035-101-60

Parcel No. 1 of Parcel Map C090-013, recorded in January 23, 1991 in Book 47, Page 88 of Parcel Maps, in the office of the county recorder of said county.

Albert T. Webster and Lynda W. Dayton
APN: 043-091-046
DESCRIPTION: RHO HR HRO LT82

Real property in the City of unincorporated area, County of San Luis Obispo, State of California, described as follows:

Lot 82 and the Southerly half of abandoned County Road No. 25, lying adjacent to the Northerly line of said lot and between the Northerly prolongation of the Easterly and Westerly lines of said lot of the subdivision of the Rancho Huer Hero and adjacent lands, in the County of San Luis Obispo, State of California, ACCORDING TO MAP THEREOF FILED IN BOOK A, PAGE 110 OF MAPS, in the office of the County Recorder of said county.

Patricia S. Noel Separate Property Revocable Trust (dated December 23, 2002), Hayes and Patricia Noel Family Trust (dated December 23, 2002), Martha Noel, William Noel, The Schoettler Family Partnership, LLLP, dated July 22, 2005, Lee Katherine Schoettler, James D. Schoettler, Thomas John Schoettler Trust (dated October 7, 1996)

The Southwest quarter of Section 11, the North half of the Northwest quarter and the Southeast quarter of the Northwest quarter of Section 14, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, constituting a portion of that property commonly known as the Canyon Ranch,
EXCEPTING therefrom the easterly fifty (50) foot strip of land along the West half of Section 11 and the easterly fifty (50) foot strip of land along the Northeast quarter of Section 14 of said township and range.
APN: 37-351-26 & 37-371-25

The Northwest quarter, the North half of the Southwest quarter, the Southeast quarter of the Southwest quarter and the East half of the Southwest quarter of the Southwest quarter of Section 2, and the North half of the Northwest quarter of Section 11, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, constituting a portion of that property commonly known as the Canyon Ranch.

EXCEPTING therefrom the easterly fifty (50) foot strip of land along the East half of the West half of Section 2 and the easterly fifty (50) foot strip of land along the Northeast quarter of the Northwest quarter of Section 11 of said township and range.
Excepting therefrom the easement for the County road.
APN: 37-351-23

The West half of the Southwest quarter of the Southwest quarter of Section 2, Township 28 South and the Southeast quarter, the East half of the Southwest quarter, the South half of the Northeast quarter and the Southeast quarter of the Northwest quarter of Section 27, Township 27 South, both of Range 15 East, Mount Diablo Base and Meridian, constituting a portion of that property commonly known as the Canyon Ranch.
APN: 37-351-21; 37-341-21; 37-341-22

The East half of the Northeast quarter of Section 3, Township 28 South and the East half and East half of the West half of Section 34, Township 27 South, both in Range 15 East, Mount Diablo Base and Meridian, constituting a portion of that property commonly known as the Canyon Ranch.
APN: 37-351-18 & 37-341-13

The West half, the Southeast quarter, and the West half of the Northeast quarter of Section 3, Township 28 South, both in Range 15 East, Mount Diablo Base and Meridian, constituting a portion of that property commonly known as the Canyon Ranch.
APN: 37-351-19

The East half of the Northwest quarter of Section 10, in Township 28 South, Range 15 East, Mount Diablo Base and Meridian, containing 80 acres, more or less.
APN: 37-351-11

The West half of the Northeast quarter of Section 10, in Township 28 South, Range 15 East, Mount Diablo Base and Meridian, containing 80 acres, more or less.
APN: 37-351-11

The East half of the Northeast quarter of Section 10 and the South half of the Northwest quarter of Section 11, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, with the easterly 50 foot strip of land of said the South half of the Northwest quarter of Section 11, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, with the easterly 50 foot strip of land of said South half of the Northwest quarter, Section 11, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, to be excluded therefrom as shown on a portion of parcel #2 of Parcel Map COAL-73-157.
APN: 37-351-17

The Stephen and Jane Sinton Family Trust (dated June 9, 2004), Julie Michele Sinton, Daniel Stephen Sinton

The Northwest quarter of the Northwest quarter of Section 24, and the North half of the Northeast quarter of Section 23, all in Township 28 South, Range 15 East, Mount Diablo Base and Meridian, containing 120 acres, more or less.
APN: 37-371-16

The Southeast quarter of the Southeast quarter of Section 14, and the Southwest quarter of the Northeast quarter of Section 23, all in Township 28 South, Range 15 East, Mount Diablo Base and Meridian, containing 80 acres, more or less.
APN: 37-371-16

The West half of the Southeast quarter and the Southeast quarter of the Southwest quarter of section 23, Township 28 south, Range 15 East, Mount Diablo Base and Meridian, being a portion of Parcel 2 on map record 1 in Book 10 of Parcel Maps, at page 9, Document No. 38906, County of San Luis Obispo, State of California.
APN: 37-351-20

The East half of the Northwest quarter and the Northeast quarter of the Southwest quarter of Section 23, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, shown as a portion of parcel #2 of Parcel Map COAL-73-158. Said sections of land being more particularly described in deeds 1429 of Official Records at page 347; 1600 of Official Records at page 593, on file in the office of the San Luis Obispo County Recorder.
APN: 37-401-20

The West half of the Southeast quarter, the Southeast quarter of the Southeast quarter and the North half of the Northeast quarter of Section 34, and the Southwest quarter of the Southwest quarter of Section 26, both of Township 28 South, Range 15 East, Mount Diablo Base and Meridian,
APN: 37-401-28; 37-401-29; 37-401-30

The South half of the Southwest quarter of Section 34, Township 28 South, Range 15 East, and Lot 42, Township 29 South, Range 15 East, Mount Diablo Base and Meridian, APN: 37-401-32; 71-011-01
The East half of the West half and the West half of the East half of Section 26, Township 28 South, Range 15 East, Mount Diablo Base and Meridian.
APN: 37-401-19

The South half of the Northeast quarter and the Northeast quarter of the Southeast quarter of Section 34, and the Northwest quarter and the Northwest quarter of the Northeast quarter of Section 35, both of Township 28 South, Range 15 East, Mount Diablo Base and Meridian,
APN: 37-401-21; 37-401-08; 37-401-07

The Southeast quarter of the Southeast quarter of Section 32, the South half of the South half and the North half of the Southeast quarter of Section 33, and the Northwest quarter of the Southwest quarter of Section 34, all of Township 28 South, Range 15 East, Mount Diablo Base and Meridian,
APN: 37-391-21; 37-401-34

James B. Sinton Family Revocable Trust, U/D/T, Dated May 28, 1997

The Western half of Section 35; the Southwest quarter and the South half of the Northwest quarter of Section 26 of Township 27 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-341-019

The West half of the NW ¼, and the West half of the SW ¼ of Section 23 in Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-371-019

The East half of Section 22, Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-371-023

The South half of the SW ¼ in Section 14; and the SE ¼ of the SE ¼ of Section 15, Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California,

according to the official plat thereof.
APN: 037-371-024

All of Section 27, in Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-401-009

The West half of the NW 1/4 , and the NW V4 of the SW 1/4 of Section 26, in Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-401-026

The NW ¼ of Section 34 and NE ¼ of SW ¼ of Section 34, in Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-401-033

The W ½ of the SE ¼ and the SW ¼ of the NE ¼ of Section 14, in Township 28 South, Range 15 East, Mount Diablo Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.
APN: 037-371-024

The easterly fifty (50) foot strip of land along the East half of the West half of Section 2, and along the West half of Section 11 and along the Northeast quarter of Section 14 of Township 28 South, Range 15 East, Mount Diablo Meridian.
APN: 37-351-17, 37-351-23, 37-351-26 & 37-371-25

Edward Joseph Bernard and Linda Ann Bernard, Trustees of the 2000 Bernard Family Trust dated September 6, 2000
APN: 035-101-058

PARCEL 2 OF PARCEL MAP C090-013 RECORDED JANUARY 23,1991 IN BOOK 47, PAGE 88 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

Noel Anthony Ryan
APN: 043-241-004
043-241-007

PARCEL 5:

Lot 105 of the Subdivisions of the Huer Huero Rancho and adjacent lands, in the County of San Luis Obispo, State of California, as per map filed August 21, 1884 in Book A, Page 110 of Maps, in the Office of the County Recorder of said County.

PARCEL 7B:

The Northeast quarter of Section 17 (said Northeast quarter of Section 17 being also described as the South 160 acres of Lot 98, as laid down on the map of the Subdivisions of the Huer Huero Rancho above referred to) in Township 28 South, Range 14 East, Mount Diablo Base and Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof.

John A. Quinlan and Elizabeth Anne Currie, husband and wife as Joint Tenants
APN: 037-371-021
037-401-024
037-401-025

PARCEL 1:
That certain land being portions of Sections 23, 24, 25 and 26, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, in the County of San Luis Obispo, State of California, more particularly described as follows:

Beginning at a 1 1/4" iron pipe tagged "LS 3485" on the Northeasterly boundary line of Parcel C as shown on the Record of Survey recorded in Book 35, Page 84 of Record of Surveys, said point being on the East line of said Section 23, lying 1500 feet South of the Northeast corner of said Section 23, according to the deed recorded September 7, 1979 in Book 2183, Page 642 of Official Records;
Thence leaving said East line of Section 23 and following the Easterly boundary line of said Parcel C the following courses and distances:
South 54° 28' 38" East, 1778.20 feet to a 1 1/4" I.P. tagged "LS 3485";
South 63°52' 26" East, 168.04 feet to a 1 1/4" I.P. tagged "LS 3485";
South 31 ° 24' 59" East, 571.00 feet to a 1 1/4" I.P. tagged "LS 3485";
South 23° 54' 59" East, 530.00 feet to a 1 1/4" I.P. tagged "LS 3485";
South 2° 59' 24" West, 567.61 feet to a 1 1/4" I.P. tagged "LS 3485";
South 33° 52' 22" East, 151.98 feet to a 1 1/4" I.P. tagged "LS 3485";
South 5° 34' 53" East, 558.97 feet to a 1 1/4" I.P. tagged "LS 3485";
South 2° 08' 53" West, 789.05 feet to a 1 1/4" I.P. tagged "LS 3485";
Thence South 25° 50' 58" West, 386.55 feet;
thence leaving said Easterly boundary line of Parcel C South 89° 44' 25" West, 3342.44 feet to a point on the Westerly boundary line of said Parcel C, said point also being on the West line of the Northeast quarter of the Northeast quarter of said Section 26; thence Northerly along said West line of the Northeast quarter of the Northeast quarter of Section 26, 596 feet, more or less, to the Northwest corner thereof;
thence according to the deed recorded September 7, 1979 in Book 2183, Page 642 of Official Records, Northerly along the West line of the East half of the Southeast quarter of said Section 23 to the Northwest corner thereof;
Thence Northerly along the West line of the Southeast quarter of the Northeast quarter of Section 23 to the Northwest corner thereof;
thence Easterly along the Northerly line of the Southeast quarter of the Northeast quarter of Section 23, to the Northeast corner of the Southeast quarter of the Northeast quarter of Section 23;
Thence Southerly along the East line of said Section 23, 162.5 feet, more or less, to the point of beginning.

PARCEL 2:
A non-exclusive easement to use the hereinafter described property which is improved with an aircraft landing strip, hangars, and appurtenant facilities, for airport purposes, said easement to be appurtenant to those properties hereinabove described.

Description of Airport Easement;
Being a portion of Section 24, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, in the County of San Luis Obispo, State of California, more particularly described as follows:

Beginning at the Northwest corner of said Section 24;
Thence South 0° 21' 35" East along the West line of Section 24, a distance of 2161.71 feet;

Thence North 89° 38' 25" East, at a right angle to said West line of Section 24, a distance of 2258.80 feet to the true point of beginning;
thence South 52° 57' 49" East, a distance of 2670.96 feet;
thence South 34° 33' 08" West, a distance of 213.16 feet;
thence North 32° 42' 17" West, a distance of 314.10 feet;
thence North 53° 12' 16" West, a distance of 2328.18 feet;
thence North 10° 19' 08" East, a distance of 127.62 feet to the true point of beginning.

PARCEL 3:
An easement for all purposes, including vehicular ingress and egress and public utilities and incidental purposes, said easement described as follows:

Being an easement for purposes of egress and ingress over that portion of Section 24, Township 28 South, Range 15 East, Mount Diablo Base and Meridian, in the County of San Luis Obispo, State of California, included within a strip of land 60 feet wide, lying 30 feet on each side of the following described center line:

Beginning at a point on the course recited as "North 40° 14' 11 " West, 170.29 feet" in Exhibit "A" attached to a Deed of Trust recorded June 3, 1974 as Instrument No. 17264, in Book 1781, Page 854 of Official Records that is distant along said course North 40° 14' 11 " West, 11.24 feet from the most Easterly terminus thereof;
thence South 0° 09' 33" East, a distance of 39.37 feet to the Southwesterly edge of an easement 60 feet wide described in said deed being the true point of beginning;
thence South 0° 09' 33" East, a distance of 861.68 feet to a point that bears South 54° 28' 38" East, 1262.65 feet from the most Northwesterly terminus of that certain course described as "South 54° 28' 38" East, 1778.20 feet" in the description of Parcel C of the Camatta Ranch, said Parcel C is shown on the map approved by the Board of Supervisors of the County of San Luis Obispo, October 23, 1978, said map is is known as Parcel Map No. CO-78-163.

PARCEL 4:
A non-exclusive easement for the purposes of ingress and egress from the public street known as Shell Creek Road and described as follows:

Over those portions of Sections 15, 16, 17, 18, 19 and 20 of Township 28 South, Range 16 East, Mount Diablo Base and Meridian, and those portions of Sections 14, 23 and 24 of Township 28 South, Range 15 East, Mount Diablo Base and Meridian, in the County of San Luis Obispo, State of California, according to the official plat thereof, included within a strip of land 60 feet wide, lying 30 feet on each side of the following described center line:

Beginning at a point on the course recited as "South 2' 28' 41" West, 7347.88 feet" in Exhibit "A" attached to the Partial Reconveyance recorded November 27, 1973 as Instrument No. 38563, in Book 1755, Page 51 of Official Records, in the office of the County Recorder of said County, that is distant along said course South 2° 28' 41" West, 40 feet from the Northerly terminus of said course;
thence North 79° 08' 37" West, 743.30 feet;
thence South 67° 57' 50" West, 453.10 feet;
thence South 49° 23' 55" West, 276.59 feet;
thence North 83° 09' 26" West, 1258.97 feet;
thence North 72° 10' 52" West, 588.22 feet;
thence North 88° 27' 56" West, 1120.40 feet;
thence South 60° 50' 35" West, 1087.84 feet;
thence South 45° 27' 46" West, 2188.67 feet;
thence South 64° 43' 20" West, 796.24 feet;
thence South 72° 59' 31" West, 1333.31 feet;

thence South 42° 33' 48" West, 997.92 feet;
thence North 88° 26' 16" West, 550.21 feet;
thence South 63° 50' 44" West, 1247.76 feet;
thence South 85° 45' 49" West, 541.48 feet;
thence South 55° 14' 39" West, 596.41 feet;
thence South 74° 57' 13"West, 481.51 feet;
thence South 66° 19' 04" West, 311.21 feet;
thence North 42° 52' 44" West, 191.05 feet;
thence North 7 ° 35' 41" West, 151.33 feet;
thence North 43° 40' 04" West, 304.14 feet;
thence South 57° 59' 41" West, 188.68 feet;
thence North 46° 32' 53" West, 130.86 feet;
thence North 1 ° 47' 24" West, 160.08 feet;
thence South 66° 22' 14" West, 261.96 feet;
thence South 42° 24' 51" West, 548.57 feet;
thence South 25° 12' 04" West, 187.88 feet;
thence South 50° 39' 49" West, 859.80 feet;
thence South 75° 48' 05" West, 428.08 feet;
thence South 47° 38' 33" West, 690.16 feet;
thence South 68° 52' 09" West, 878.42 feet;
thence South 80° 19' 36" West, 446.35 feet;
thence South 63° 04' 41" West, 717.79 feet;
thence South 30° 32' 51" West, 354.15 feet;
thence South 55° 22' 33" West, 1020.78 feet;
thence South 32° 26' 33" West, 764.28 feet;
thence South 75° 04' 07" West, 155.24 feet;
thence South 57° 31' 44" West, 260.77 feet;
thence North 47° 29' 22" West, 2441.82 feet;
thence North 59° 02' 10" West, 699.71 feet;
thence North 22° 37' 12" West, 650.00 feet;
thence North 58° 10' 21" West, 341.32 feet;
thence North 40° 14' 11" West, 170.29 feet;
thence North 64° 05' 50" West, 3868.66 feet;
thence South 40° 21' 52" West, 262.49 feet to the Easterly line of Camatta Canyon Road as shown on the map of the Subdivision of California Ranchos, filed in Book A, Page 165 of Maps, in the office of the County Recorder of said County.

The sides of said easement shall be lengthened or shortened to intersect at angle points to terminate Westerly in the Easterly line of said Camatta Canyon Road and to terminate Easterly in the Westerly line of the land described as Parcel A in deed recorded December 22, 1978 in book 2122, Page 613 of Official Records.

EXCEPTING therefrom any portion thereof lying Northeasterly of the airport easement as set forth in Parcel No. 2 herein.

Robert K. Morrison and Dianne H. Morrison, Trustees of the 2000 Morrison Family Trust U-D-T dated June 19, 2000; Kenneth D. Morrison, Morrison Ranch Corp. Roy and Veva Morrison

APN's: 37-051-12; 37-051-13; 37-051-14; 37-091-02; 37-091-03; 37-091-04; 37-091-05; 37-091-06; 37-091-07; 37-101-01; 37-101-15; 37-131-02; 37-131-03; 37-131-04; 37-131-05; 37-131-07; 37-131-08; 37-141-15; 37-181-02; 37-181-03; 37-181-04; 37-181-05; 37-181-06; 37-181-07; 37-191-10; 37-231-01; 37-231-02; 37-231-03; 37-231-04; 37-231-05; 37-231-06; 37-241-04; 37-241-05; 37-241-06; 37-311-02; 37-311-03; 37-311-04; 37-311-05; 37-341-01; 37-341-02; 37-341-03; 37-341-04; 37-351-01; 37-351-02; 37-351-03; 37-371-01; 37-371-02; 37-371-22; 37-401-16; 71-071-06; 71-071-13; 71-071-15; 71-081-01; 71-081-06; 71-081-09; 71-081-13; 71-081-18; 71-081-21; 71-091-13; 71-101-09

THE FOLLOWING DESCRIBED PARCELS OF LAND, ALL IN THE COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA.

PARCEL 1:

THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN;
THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER, AND THE WEST ONE-HALF OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN; AND
THE WEST ONE-HALF OF THE WEST ONE-HALF AND THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 5, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTING THEREFROM THE FOLLOWING:

.) EXCEPT THEREFROM THAT PORTION OF THE WEST ONE-HALF OF THE WEST ONE-HALF OF SAID SECTION 5, WHICH LIES WESTERLY OF THE WESTERLY LINE OF THE COUNTY ROAD AS SAID ROAD EXISTED OCTOBER 30, 1964.

!) ALSO EXCEPT FROM ALL OF SAID LAND THE 50% INTEREST IN AND TO ALL OIL, GAS AND OTHER MINERALS OF EVERY KIND, WHETHER SIMILAR OR DISSIMILAR TO THOSE HEREIN MENTIONED (HEREINAFTER CALLED "SAID SUBSTANCES") IN, UNDER OR THAT MAY BE PRODUCED FROM SAID LANDS WHICH WAS CONVEYED TO CAMATTA RANCH INCORPORATED, A CORPORATION, BY CAMATTA RANCH CO., A LIMITED PARTNERSHIP, IN DEED RECORDED IN BOOK 1105, PAGE 160 OF OFFICIAL RECORDS, WHICH PROVIDES IN PART AS FOLLOWS:

"THE INTEREST HEREIN CONVEYED SHALL NOT INCLUDE ANY RIGHT OF SURFACE ENTRY AND SHALL AUTOMATICALLY TERMINATE AND BE OF NO FURTHER EFFECT UPON THE EXPIRATION OF TWENTY-FIVE (25) YEARS FROM THE DATE HEREOF, OR UPON THE DEATH OF THE LAST SURVIVOR OF THE LIVING DESCENDANTS OF THE LATE PRESIDENT THEODORE ROOSEVELT, WHICHEVER SHALL FIRST OCCUR, WHETHER OR NOT ANY OF SAID SUBSTANCES ARE THEN BEING MINED OR PRODUCED.

(3) TOGETHER WITH AND EXCEPTING THE RIGHTS, INTEREST AND PRIVILEGES CONTAINED AND SET FORTH IN THE DEED FROM ELIZABETH BROOME MILLER TO COUNTRY CLUB ESTATES DATED 12-21-78 AND RECORDED CONCURRENTLY HEREWITH.

PARCEL 2:

THE NORTH ONE-HALF, THE SOUTHWEST QUARTER, THE NORTH ONE-HALF OF THE SOUTHEAST QUARTER, AND THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF, THE EAST ONE-HALF OF THE SOUTHWEST QUARTER, THE NORTH ONE-HALF OF THE NORTHWEST QUARTER, AND THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF, THE EAST ONE-HALF OF THE NORTHWEST QUARTER, AND THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 5, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTING THEREFROM THE FOLLOWING:

(

EXCEPT THEREFROM THAT PORTION OF THE EAST ONE-HALF OF THE NORTH-WEST QUARTER OF SAID SECTION 5, FIRST DESCRIBED IN THE DEED TO THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION, RECORDED APRIL 28, 1964 IN BOOK 1294, PAGE 739 OF OFFICIAL RECORDS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

ALSO EXCEPT FROM ALL OF SAID LAND THE/INTEREST IN AND TO ALL OIL, GAS AND OTHER MINERALS OF EVERY KIND, WHETHER SIMILAR OR DISSIMILAR TO THOSE HEREIN MENTIONED (HEREINAFTER CALLED "SAID SUBSTANCES") IN, UNDER OR THAT MAY BE PRODUCED FROM SAID LANDS WHICH WAS CONVEYED TO CAMATTA RANCH, INCORPORATED, A CORPORATION, BY CAMATTA RANCHO CO., A LIMITED PARTNERSHIP, IN DEED RECORDED IN BOOK 1105, PAGE 160 OF OFFICIAL RECORDS, WHICH PROVIDES IN PART AS FOLLOWS:

"THE INTEREST HEREIN CONVEYED SHALL NOT INCLUDE ANY RIGHT OF SURFACE ENTRY AND SHALL AUTOMATICALLY TERMINATE AND BE OF NO FURTHER EFFECT UPON THE EXPIRATION OF TWENTY-FIVE (25) YEARS FROM THE DATE HEREOF, OR UPON THE DEATH OF THE LAST SURVIVOR OF THE LIVING DESCENDANTS OF THE LATE PRESIDENT THEODORE ROOSEVELT, WHICHEVER FIRST OCCURS, WHETHER OR NOT ANY OF SAID SUBSTANCES ARE THEN BEING MINED OR PRODUCED."

(3) TOGETHER WITH AND EXCEPTING THE RIGHTS, INTEREST AND PRIVILEGES CONTAINED AND SET FORTH IN THE DEED FROM ELIZABETH BROOME MILLER TO COUNTRY CLUB ESTATES DATED 12-21-78 AND RECORDED CONCURRENTLY HEREWITH.

PARCEL 3:

THE SOUTH ONE-HALF, THE SOUTH ONE-HALF OF THE NORTH ONE-HALF ~~AND~~ THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 13, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF SECTION 14, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF AND THE EAST ONE-HALF OF THE SOUTHWEST QUARTER OF SECTION 23, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTIONS 24 AND 25, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER, AND THE EAST ONE-HALF OF SECTION 26, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF SECTION 35, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTION 36, TOWNSHIP 27 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER, AND THE SOUTH ONE-HALF OF LOTS 1 AND 2 OF SECTION 18, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTION 19, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE SOUTH ONE-HALF, THE SOUTH ONE-HALF OF THE NORTHWEST QUARTER, AND TH NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 20, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE WEST ONE-HALF OF THE SOUTHWEST QUARTER OF SECTION 21, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE SOUTH ONE-HALF OF THE SOUTHWEST QUARTER, AND THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 27, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE SOUTH ONE-HALF, THE NORTHWEST QUARTER AND THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 28, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTIONS 29, 30, 31, 32 AND 33, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE SOUTH ONE-HALF, THE NORTHWEST QUARTER AND THE SOUTHWEST ONE-HALF OF THE NORTHEAST QUARTER BEING THAT PORTION OF THE NORTHEAST QUARTER LYING SOUTHWESTERLY OF A STRAIGHT LINE DRAWN FROM THE SOUTHEAST CORNER OF SAID NORTHEAST QUARTER, NORTHWESTERLY TO THE NORTHWEST CORNER OF SAID NORTHEAST QUARTER OF SECTION 34, TOWNSHIP 27 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTION 1, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF SECTION 2, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF SECTION 11, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTIONS 12 AND 13, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF THE NORTHEAST QUARTER, THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER, AND THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 14, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF THE SOUTHEAST QUARTER, AND THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 23, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF, THE SOUTHWEST QUARTER, THE EAST ONE-HALF OF THE NORTHWEST QUARTER, AND THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 24, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE EAST ONE-HALF OF THE EAST ONE-HALF OF SECTION 26, TOWNSHIP 28 SOUTH RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF THE NORTHEAST QUARTER OF THE NORTH-EAST QUARTER OF SAID SECTION 35, WHICH LIES SOUTHERLY OF THE SOUTHERLY LINE OF STATE HIGHWAY NO. 58, AS SAID HIGHWAY EXISTED ON OCTOBER 30, 1964.

ALL OF SECTION 36, TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID SECTION 36 WHICH LIES SOUTHWESTERLY OF THE SOUTHWESTERLY LINE OF STATE HIGHWAY NO. 58, AS SAID HIGHWAY EXISTED OCTOBER 30, 1964.

THE SOUTH ONE-HALF OF THE SOUTHWEST QUARTER OF SECTION 2, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THAT PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 2, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF. DESCRIBED AS FOLLOWS:

BEGINNING AT A STAKE MARKED 1/16S IN THE WEST LINE OF SAID SECTION 2, DISTANT NORTH 0° 45' EAST, 20.12 CHAINS FROM THE SOUTHWEST CORNER OF SAID SECTION 2, SAID 1/16S CORNER BEING THE SOUTHWEST CORNER OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 2;
THENCE ALONG THE WEST LINE OF SAID SECTION 2, NORTH 0° 45' EAST, 7.53 CHAINS TO FENCE POST MARKED M.1;
THENCE SOUTH 39° 30' EAST, 8.47 CHAINS TO STAKE MARKED M.2 STANDING IN THE CENTER OF THE PEAR TREE SPRING;
THENCE ALONG A FENCE WITH THE FOLLOWING COURSES:
NORTH 38° 15' EAST, 4.82 CHAINS TO A STAKE MARKED M.3,
NORTH 74° EAST, 3.52 CHAINS TO A FENCE POST MARKED M.4,
SOUTH 80° 45' EAST, 1.08 CHAINS TO A FENCE POST MARKED M.5, AND
SOUTH 50° 30' EAST, 7.37 CHAINS TO FENCE POST MARKED M.6;
THENCE LEAVING SAID FENCE AND RUNNING SOUTH 87° 30' WEST, 18.65 CHAINS TO THE POINT OF BEGINNING.

ALL OF SECTIONS 3, 4, 5, 6, 7, 8, 9 AND 10, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOI

THE SOUTH ONE-HALF, THE NORTHWEST QUARTER, THE SOUTH ONE-HALF OF THE NORTHEAST QUARTER, AND THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 11, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN ACCORDING TO THE OFFICIAL PLAT THEREOF.

THAT PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 13, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE WEST LINE OF SAID SECTION, DISTANT SOUTH 45.38 CHAINS FROM THE NORTHWEST CORNER OF SAID SECTION;
THENCE ALONG A FENCE NORTH 88° EAST, 3.36 CHAINS;
THENCE SOUTH 17° EAST, 1.80 CHAINS;
THENCE SOUTH 52° 30' WEST, 4.84 CHAINS TO THE WEST LINE OF SAID SECTI
THENCE ALONG SAID LINE NORTH 4.55 CHAINS TO THE POINT OF BEGINNING.

ALL OF SECTION 14, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THAT PORTION THEREOF LYING SOUTH AND EAST OF A LINE DESCRIBED AS BEGINNING AT A POINT ON THE EAST LINE OF SAID SECTION DISTANT 70 FEET NORTH OF THE SOUTHEAST CORNER OF SAID SECTION AND RUNNING SOUTHWESTERLY IN A STRAIGHT LINE TO A POINT IN THE SOUTH LINE OF SAID SECT DISTANT 70 FEET WEST FROM THE SOUTHEAST CORNER OF SAID SECTION.

ALL OF SECTIONS 15, 16, 17, 18, 19, 20, 21 AND 22, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE WEST ONE-HALF OF THE SOUTHWEST QUARTER OF SECTION 26, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTIONS 27, 28, 29, 30, 31, 33 AND 34, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 35, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE WEST ONE-HALF OF SECTION 2, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THE DEED TO ROBERT G. LEWIS, ET UX., RECORDED APRIL 9, 1965 IN BOOK 1345, PAGE 487 OF OFFICIAL RECORDS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

ALL OF SECTIONS 3 AND 4, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

THE SOUTHEAST QUARTER, THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER AND THE WEST ONE-HALF OF SECTION 6, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID SECTION 6 WHICH LIES SOUTHERLY OF THE SOUTHERLY LINE OF THE COUNTY ROAD AS SAID ROAD EXISTED OCTOBER 30, 1964.

LOT 2 OF SECTION 6, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

ALL OF SECTIONS 8, 9 AND 10, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF THE WEST ONE-HALF OF SAID SECTION 8 WHICH LIES WESTERLY OF THE WESTERLY LINE OF THE COUNTY ROAD AS SAID COUNTY ROAD EXISTED OCTOBER 30, 1964.

ALSO EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THE DEED TO ROBERT G. LEWIS, ET UX., RECORDED APRIL 9, 1965 IN BOOK 1345, PAGE 487 OF OFFICIAL RECORDS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

THE WEST ONE-HALF OF THE NORTHWEST QUARTER, THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER, AND THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 11, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THE DEED TO ROBERT G. LEWIS, ET UX., RECORDED APRIL 9, 1965 IN BOOK 1345, PAGE 487 OF OFFICIAL RECORDS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

THE NORTHWEST QUARTER AND THE NORTHWEST QUARTER OF THE NORTHEAST QUARTE OF SECTION 15, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THE DEED TO ROBERT G. LEWIS, ET UX., RECORDED APRIL 9, 1965 IN BOOK 1345, PAGE 487 OF OFFICIAL RECORDS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNT

THE NORTH ONE-HALF OF SECTION 16, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOU DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THE DEED TO ROBERT G. LEWIS, ET UX., RECORDED APRIL 9, 1965 IN BOOK 1345, PAGE 487 OF OFFICIAL RECORDS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

THE NORTH ONE-HALF OF SECTION 17, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPT THEREFROM THAT PORTION OF SAID LAND DESCRIBED IN THE DEED TO ROBERT G. LEWIS, ET UX., RECORDED APRIL 9, 1965 IN BOOK 1345, PAGE 487 OF OFFICIAL RECORDS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

ALSO EXCEPT THEREFROM THAT PORTION OF SAID SECTION 17 DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID SECTION 17;
THENCE NORTH 89° 54' 30" EAST ALONG THE NORTH LINE OF SAID SECTION 17, 2770.08 FEET TO THE CENTER LINE OF THE COUNTY ROAD, 80 FEET IN WIDTH,

AS CONVEYED TO THE COUNTY OF SAN LUIS OBISPO BY DEED DATED FEBRUARY 4, 1935 AND RECORDED SEPTEMBER 25, 1935 IN BOOK 171, PAGE 448 OF OFFICIAL RECORDS;
THENCE ALONG SAID CENTER LINE THE FOLLOWING COURSES AND DISTANCES:
ON A CURVE TO THE LEFT, TANGENT TO A LINE THAT BEARS SOUTH 8° 12' EAST, WITH A RADIUS OF 1,000 FEET, THROUGH AN ANGLE OF 7° 15' FOR A DISTANCE OF 126.61 FEET;
SOUTH 15° 27' EAST, 75.45 FEET;
ON A CURVE TO THE LEFT WITH A RADIUS OF 1,000 FEET, THROUGH AN ANGLE OF 11° 50' FOR A DISTANCE OF 206.53 FEET;
SOUTH 27° 17' EAST, 64.82 FEET;
ON A CURVE TO THE RIGHT WITH A RADIUS OF 1,000 FEET, THROUGH AN ANGLE OF 24° 38' FOR A DISTANCE OF 429.93 FEET;
SOUTH 2° 39' EAST, 356.85 FEET;
ON A CURVE TO THE RIGHT WITH A RADIUS OF 1,000 FEET, THROUGH AN ANGLE OF 16° 40' FOR A DISTANCE OF 290.89 FEET;
SOUTH 14° WEST 20.03 FEET;
ON A CURVE TO THE LEFT WITH A RADIUS OF 800 FEET, THROUGH AN ANGLE OF 13° 17' FOR A DISTANCE OF 185.47 FEET;
SOUTH 0° 43' WEST, 102.74 FEET;
ON A CURVE TO THE LEFT WITH A RADIUS OF 1,000 FEET, THROUGH AN ANGLE OF 11° 12' FOR A DISTANCE OF 195.48 FEET;
SOUTH 10° 29' EAST, 137.12 FEET;
ON A CURVE TO THE LEFT WITH A RADIUS OF 600 FEET, THROUGH AN ANGLE OF 62° 18' 46" FOR A DISTANCE OF 652.54 FEET;
THENCE LEAVING SAID CENTER LINE, SOUTH 0° 13' EAST, 67.22 FEET, MORE OR LESS, TO THE SOUTH LINE OF THE NORTH HALF OF SAID SECTION 17;
THENCE WEST ALONG SAID SOUTH LINE TO THE WEST QUARTER CORNER OF SAID SECTION;
THENCE NORTH ALONG THE WEST LINE OF SAID SECTION 17, TO THE POINT OF BEGINNING.

ALSO, EXCEPTING THEREFROM:

ALSO EXCEPT FROM ALL OF SAID LAND THE/INTEREST IN AND TO ALL OIL, GAS AND OTHER MINERALS OF EVERY KIND, WHETHER SIMILAR OR DISSIMILAR TO THOSE HEREIN MENTIONED (HEREINAFTER CALLED "SAID SUBSTANCES"), IN, UNDER OR THAT MAY BE PRODUCED FROM SAID LANDS, WHICH WAS CONVEYED TO CAMATTA RANCH, INCORPORATED, A CORPORATION, BY CAMATTA RANCH CO., A LIMITED PARTNERSHIP, IN DEED RECORDED IN BOOK 1105, PAGE 160 OF OFFICIAL RECORDS, WHICH PROVIDES IN PART AS FOLLOWS:

"THE INTEREST HEREIN CONVEYED SHALL NOT INCLUDE ANY RIGHT OF SURFACE ENTRY AND SHALL AUTOMATICALLY TERMINATE AND BE OF NO EFFECT UPON THE EXPIRATION OF TWENTY-FIVE (25) YEARS FROM THE DATE HEREOF, OR UPON THE DEATH OF THE LAST SURVIVOR OF THE LIVING DESCENDANTS OF THE LATE PRESIDENT THEODORE ROOSEVELT, WHICHEVER SHALL FIRST OCCUR, WHETHER OR NOT ANY OF SAID SUBSTANCES ARE THEN BEING MINED OR PRODUCED."

(2) TOGETHER WITH AND EXCEPTING THE RIGHTS, INTEREST AND PRIVILEGES CONTAINED AND SET FORTH IN THE DEED FROM ELIZABETH BROOME MILLER TO COUNTRY CLUB ESTATES DATED 12-21-78 AND RECORDED CONCURRENTLY HEREWITH.

PARCEL 4:

LOT 1 AND THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 29 SOUTH, RANGE 16 EAST, MOUNT DIABLO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF.

TOGETHER WITH AND EXCEPTING THE RIGHTS, INTEREST AND PRIVILEGES CONTAINED AS SET FORTH IN THE DEED FROM ELIZABETH BROOME MILLER TO COUNTRY CLUB ESTATES DATED 12-21-78 AND RECORDED CONCURRENTLY HEREWITH.

EXCEPT FROM THE ABOVE DESCRIBED PARCELS 1, 2, 3 AND 4 OF THE FOLLOWING DESCRIBED PARCELS OF PROPERTY, THE DIVISION OF SAID PARCELS HAVING BEEN APPROVED BY THE SAN LUIS OBISPO COUNTY BOARD OF SUPERVISORS ON OCTOBER 23, 1978 AND ARE DEPICTED ON PARCEL MAP NO. CO-78-163, S SAID BOARD OF SUPERVISORS HAVING FORMALLY WAIVED THE REQUIREMENT FOR THE FILING OF A FINAL PARCEL MAP:

PARCEL A:

THAT CERTAIN LAND, BEING PORTIONS OF SECTIONS 2, 3, 4, 9, 10, 11, 13, 14, 15, 16 AND 22, TOWNSHIP 28 SOUTH, RANGE 16 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO SECTIONS 11, 12, 13 and 14 ACCORDING TO THE DEED RECORDED NOVEMBER 7, 1931, IN VOLUME 115, PAGE 294 OF DEEDS: THENCE SOUTHERLY ALONG THE EAST LINE OF SECTION 14 A DISTANCE OF 2995.08 FEET; THENCE LEAVING SAID EAST LINE NORTH 88° EAST A DISTANCE OF 221.76 FEET; THENCE SOUTH 17° EAST A DISTANCE OF 118.80 FEET; THENCE SOUTH 52° 30' WEST A DISTANCE OF 319.44 FEET TO A POINT IN THE EAST LINE OF SECTION 14; THENCE SOUTHERLY ALONG SAID EASE LINE TO A POINT LYING NORTHERLY 70 FEET FROM THE SOUTHEAST CORNER OF SECTION 14; THENCE LEAVING SAID EAST LINE SOUTHWESTERLY, A DISTANCE OF 99 FEET, TO A POINT ON THE SOUTH LINE OF SECTION 14 LYING 70 FEET WESTERLY OF SAID SOUTHEAST CORNER; THENCE WESTERLY ALONG SAID SOUTH LINE TO THE SOUTHWEST CORNER OF SAID SECTION 14; THENCE SOUTHERLY ALONG THE EAST LINE OF SAID SECTION 22 TO A POINT LYING 2,130.70 FEET NORTHERLY OF THE SOUTHEAST CORNER OF SECTION 22. THENCE LEAVING SAID EAST LINE THE THE FOLLOWING COURSES AND DISTANCES; SOUTH 84° 54' 35" WEST A DISTANCE OF 693.67 FEET TO A 1-1/4" IRON PIPE TAGGED L.S. 3485;

THENCE SOUTH 73° 20' 19" WEST, 2,402.57 FEET;
THENCE NORTH 37° 32' 48" WEST, 1,490.61 FEET;
THENCE NORTH 6° 05' 50" EAST, 2,038.66 FEET;
THENCE NORTH 5° 59' 05" WEST, 482.92 FEET;
THENCE NORTH 2° 46' 03" EAST, 968.08 FEET;
THENCE NORTH 69° 30' 42" WEST, 953.25 FEET;
THENCE NORTH 15° 12' 34" WEST, 170.04 FEET;
THENCE NORTH 31° 55' 06" WEST, 158.61 FEET;
THENCE NORTH 0° 45' 35" WEST, 197.00 FEET;
THENCE NORTH 19° 32' 50" EAST, 146.82 FEET;
THENCE NORTH 13° 19' 16" WEST, 143.95 FEET;
THENCE NORTH 8° 45' 42" EAST, 247.02 FEET;
THENCE NORTH 33° 16' 25" EAST, 100.53 FEET;
THENCE SOUTH 88° 07' 23" EAST, 448.98 FEET;
THENCE NORTH 16° 36' 19" EAST, 89.40 FEET;
THENCE NORTH 10° 08' 22" WEST, 187.36 FEET;
THENCE NORTH 23° 55' 32" WEST, 825.15 FEET;
THENCE NORTH 14° 53' 30" WEST, 322.71 FEET;
THENCE NORTH 82° 29' 00" EAST, 200.00 FEET;
THENCE NORTH 20° 40' 46" WEST, 250.76 FEET;

THENCE SOUTH 73° 21' 23" WEST, 188.69 FEET;
THENCE SOUTH 18° 58' 08" EAST, 68.60 FEET;
THENCE NORTH 74° 23' 44" WEST, 95.95 FEET;
THENCE SOUTH 83° 49' 49" WEST, 227.78 FEET;
THENCE NORTH 64° 55' 58" WEST, 128.34 FEET;
THENCE NORTH 17° 44' 25" EAST, 111.54 FEET;
THENCE NORTH 82° 58' 36" WEST, 628.10 FEET;
THENCE NORTH 9° 07" 16' EAST, 478.79 FEET;
THENCE NORTH 13° 53' 14" EAST, 428.33 FEET;
THENCE NORTH 18° 34' 00" EAST, 239.83 FEET;
THENCE NORTH 43° 31' 09" WEST, 236.79 FEET;
THENCE NORTH 23° 49' 31" EAST, 230.68 FEET;
THENCE NORTH 12° 56' 54" WEST, 675.89 FEET;
THENCE NORTH 41° 20' 31" EAST, 483.46 FEET;
THENCE NORTH 5° 43' 14" WEST, 265.87 FEET;
THENCE NORTH 42° 43' 40" WEST, 275.80 FEET;
THENCE NORTH 49° 43' 36" EAST, 649.39 FEET;
THENCE NORTH 23° 43' 38" EAST, 648.05 FEET;
THENCE NORTH 38° 22' 22" EAST, 364.28 FEET;
THENCE NORTH 53° 29' 36" EAST, 419.94 FEET;
THENCE NORTH 60° 06' 24" EAST, 332.82 FEET;
THENCE NORTH 30° 18' 54" EAST, 292.01 FEET;
THENCE NORTH 37° 09' 09" EAST, 325.12 FEET;
THENCE NORTH 48° 26' 38" WEST, 201.66 FEET;
THENCE NORTH 44° 51' 07" EAST, 225.78 FEET;
THENCE NORTH 88° 37' 44" WEST, 424.54 FEET;
THENCE NORTH 42° 59' 32" EAST, 497.11 FEET;
THENCE NORTH 35° 29' 58" EAST, 1,719.44 FEET;
THENCE NORTH 18° 03' 45" EAST, 567.76 FEET;
THENCE NORTH 40° 47' 26" EAST, 404.76 FEET;
THENCE NORTH 2° 48' 01" WEST, 587.07 FEET;
THENCE NORTH 62° 41' 04" WEST, 652.51 FEET;
THENCE NORTH 59° 22' 49" WEST, 1,032.14 FEET;
THENCE NORTH 77° 50' 35" WEST, 400.77 FEET;
THENCE SOUTH 78° 03' 07" WEST, 949.38 FEET;
THENCE NORTH 88° 34' 48" WEST, 506.95 FEET;
THENCE NORTH 6° 56' 03" EAST A DISTANCE OF 2,230.87 FEET TO A 1-1/4" IRON PIPE TAGGED L.S. 3485; THENCE SOUTH 85° 07' 43" EAST A DISTANCE OF 5251.91 FEET TO A POINT ON THE EAST LINE OF SAID SECTION 3 ACCORDING TO DEED RECORDED NOVEMBER 7, 1931, IN VOLUME 115, PAGE 294 OF DEEDS LYING 525.54 FEET SOUTHERLY OF THE NORTHEAST CORNER OF SECTION 3; THENCE SOUTHERLY, ALONG THE EAST LINE OF SECTION 3, TO A POINT LYING 1824.90 FEET NORTHERLY OF THE SOUTHEAST CORNER OF SECTION 3; THENCE SOUTH 39° 30' EAST A DISTANCE OF 559.02 FEET; THENCE NORTH 38° 15' EAST A DISTANCE OF 318.12 FEET; THENCE NORTH 74° EAST A DISTANCE OF 232.32 FEET; THENCE SOUTH 80° 45' EAST A DISTANCE OF 71.28 FEET; THENCE SOUTH 50° 30' EAST A DISTANCE OF 486.42 FEET TO A POINT IN THE NORTH LINE OF THE SOUTH HALF OF THE SOUTHWEST QUARTER OF SECTION 2, SAID POINT BEARS NORTH 87° 30' EAST A DISTANCE OF 1,230.90 FEET FROM A POINT IN THE WEST LINE OF SECTION 2 LYING 1,327.92 FEET NORTHERLY OF THE SOUTHWEST CORNER OF SECTION 2; THENCE EASTERLY ALONG SAID NORTH LINE OF THE SOUTH HALF OF THE SOUTHWEST QUARTER OF SECTION 2 TO THE NORTHEAST CORNER THEREOF; THENCE SOUTHERLY ALONG THE EAST LINE OF SAID SOUTH HALF OF THE SOUTHWEST QUARTER OF SECTION 2 TO THE SOUTHEAST CORNER THEREOF; THENCE EASTERLY ALONG THE NORTH LINE OF SECTION 11 TO THE NORTHEAST CORNER OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 11; THENCE SOUTHERLY ALONG THE EAST LINE OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 11 TO THE SOUTHEAST CORNER THEREOF; THENCE EASTERLY ALONG THE NORTH LINE OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF SAID SECTION 11 TO THE NORTHEAST CORNER THEREOF; THENCE SOUTHERLY ALONG THE EAST LINE OF SAID SECTION 11 TO THE CORNER COMMON TO SECTIONS 11, 12, 13 and 14, SAID CORNER BEING THE POINT OF BEGINNING FOR THIS DESCRIPTION.

CONTAINING 3,150 ACRES, MORE OR LESS.

THIS DIVISION WAS APPROVED BY THE SAN LUIS OBISPO COUNTY BOARD OF SUPERVISORS ON OCTOBER 23, 1978, AND IS KNOWN AS PARCEL MAP NO. CO-78-163, SAID BOARD OF SUPERVISORS HAVING FORMALLY WAIVED THE REQUIREMENT FOR THE FILING OF A FINAL PARCEL MAP.

PARCEL C:

THAT CERTAIN LAND, BEING PORTIONS OF SECTION 23, 24, 25, 26, 35 AND 36 OF TOWNSHIP 28 SOUTH, RANGE 15 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE EAST LINE OF SAID SECTION 23 ACCORDING TO DEED RECORDED NOVEMBER 7, 1931 IN VOLUME 115, PAGE 294 OF DEEDS, LYING 1,500.00 FEET SOUTHERLY OF THE NORTHEAST CORNER OF SECTION 23, THENCE LEAVING SAID EAST LINE THE FOLLOWING COURSES AND DISTANCES:
SOUTH 54° 28' 38" EAST A DISTANCE OF 1,778.20 FEET TO A 1-1/4" IRON PIPE TAGGED L.S. 3485;
THENCE SOUTH 63° 52' 26" EAST, 168.04 FEET;
THENCE SOUTH 31° 24' 59" EAST, 571.00 FEET;
THENCE SOUTH 23° 54' 59" EAST, 530.00 FEET;
THENCE SOUTH 2° 59' 24" WEST, 567.61 FEET;
THENCE SOUTH 33° 52' 22" EAST, 151.98 FEET;
THENCE SOUTH 5° 34' 53" EAST, 558.97 FEET;
THENCE SOUTH 2° 08' 53" WEST, 789.05 FEET;
THENCE SOUTH 25° 50' 58" WEST, 551.04 FEET;
THENCE SOUTH 37° 12' 15" EAST, 1,282.90 FEET;
THENCE SOUTH 34° 59' 52" EAST, A DISTANCE OF 3,675.92 FEET TO A 1-1/4" IRON PIPE TAGGED L.S. 3485; THENCE SOUTH 29° 48' 45" WEST A DISTANCE OF 5,157.86 FEET TO A POINT OF INTERSECTION WITH THE SOUTHWESTERLY LINE OF STATE HIGHWAY NO. 58 ACCORDING TO DEED RECORDED IN VOLUME 1337, PAGE 532, OFFICIAL RECORDS OF SAN LUIS OBISPO COUNTY; THENCE NORTHWESTERLY ALONG THE SOUTHWESTERLY LINE OF SAID STATE HIGHWAY NO. 58 TO A POINT OF INTERSECTION WITH THE WEST LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35; THENCE LEAVING SAID SOUTHWESTERLY LINE OF STATE HIGHWAY NO. 58 NORTHERLY ALONG SAID WEST LINE ACCORDING TO DEED RECORDED NOVEMBER 7, 1931 IN VOLUME 115, PAGE 294 OF DEEDS, OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35 TO THE NORTHWEST CORNER OF SAID NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35; THENCE NORTHERLY ALONG THE WEST LINE OF THE EAST HALF OF THE EAST HALF OF SECTION 26 TO THE NORTHWEST CORNER OF SAID EAST HALF OF THE EAST HALF OF SECTION 26; THENCE NORTHERLY ALONG THE WEST LINE OF THE EAST HALF OF THE SOUTHEAST QUARTER AND THE WEST LINE OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 23 TO THE NORTHWEST CORNER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 23, THENCE EASTERLY ALONG THE NORTH LINE OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 23 TO THE NORTHEAST CORNER OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 23, THENCE SOUTHERLY ALONG THE EAST LINE OF SECTION 23 TO A POINT LYING 1,500.00 FEET SOUTHERLY OF THE NORTHEAST CORNER OF SECTION 23, BEING THE POINT OF BEGINNING. CONTAINING 1,050 ACRES, MORE OR LESS.

RECORDING REQUESTED BY
& RETURN TO:

EXHIBIT B

ADDITION OF OVERLYING LANDOWNER TO AGREEMENT
(RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT)
DATED _____________, 2005, RECORDED ____________, 2005)

WHEREAS, certain Landowners (sometimes referred to as the "PRIOR" group), and certain Municipal Users have entered into an Agreement entitled "Paso Robles Groundwater Basin Agreement" dated _________________, 2005, ("Agreement"), which was recorded in the Official Records of San Luis Obispo County, California on ____________________, 2004 as Document No. ______________________; and

WHEREAS, Article 9 of said Agreement provides for the addition of landowners to said Agreement after execution thereof; and

WHEREAS, the undersigned Landowner, having received and reviewed a copy of the Agreement, wishes to become a party to it.

NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of at least two of the three Landowner Agents currently designated in accordance with the Agreement, the undersigned Landowner of the lands described below shall become a party to the Agreement and to a separate "PRIOR Memorandum of Operating Principles" (Principles) (to which the Municipal Users are not a party), effective immediately. Said undersigned Landowner shall bear the benefits and enjoy the burdens of the Agreement and Principles as though said Landowner had originally executed said Agreement and Principles as they now exist or may be amended in the future, and for so long as the Agreement remains in effect. Without limiting the foregoing, said Landowner understands and agrees that the

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement. The foregoing shall constitute a covenant running with the all Landowner's lands within the Basin, described below, and the benefits and burdens of the Agreement shall bind each successive owner of said lands or portion thereof, and each person having or who may acquire an interest in said lands.

IN WITNESS HEREOF, the foregoing is executed and agreed to this _______ day of ________________.

By:_______________________________

Address: ____

City Zip

Email address: ____

Legal Property Description:
Assessors Parcel Number: _______________________________________

ACCEPTED AND APPROVED ON BEHALF OF THE DULY APPOINTED AGENTS OF THE LANDOWNERS IN ACCORDANCE WITH THE AGREEMENT:

By:_______________________________

By:_______________________________

By:_______________________________

RECORDING REQUESTED BY
& RETURN TO:

EXHIBIT C

ADDITION OF MUNICIPAL USER TO AGREEMENT

(RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT)

DATED ____________, 2005, RECORDED ____________, 2005)

WHEREAS, certain Landowners (sometimes referred to as the "PRIOR" group), and certain Municipal Users have entered into an Agreement entitled "Paso Robles Groundwater Basin Agreement" dated ____________, 2005, ("Agreement"), which was recorded in the Official Records of San Luis Obispo County, California on ____________, 2004 as Document No. __________; and

WHEREAS, Article 9 of the Agreement provides for the addition of a purveyor of water for domestic or municipal and industrial purposes ("Purveyor") that desires to become a Municipal User under the Agreement; and

WHEREAS, the undersigned Purveyor, having received and reviewed a copy of the Agreement, wishes to become a party to it.

NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of a simple numerical majority of the existing Municipal Users (all of which Municipal Users are listed in the signature blocks below), the undersigned Purveyor shall become a party to the Agreement, effective immediately. Said undersigned Purveyor shall bear the benefits and enjoy the burdens of the Agreement thereafter, as a Municipal User, as though the Purveyor had originally executed the Agreement as it now exists or may be amended in the future, and for so long as the Agreement remains in effect.

IN WITNESS HEREOF, the foregoing is executed and agreed to this _______ day of _________________.

(Purveyor)

By:____________________________

ACCEPTED AND APPROVED:

[List all existing Municipal Users below]

By:____________________________

By:____________________________

RECORDING REQUESTED BY
& RETURN TO:

EXHIBIT D

MEMORANDUM OF TERMINATION OF PASO ROBLES GROUNDWATER BASIN AGREEMENT

Notice is hereby given that the PASO ROBLES GROUNDWATER BASIN AGREEMENT executed on ____________________________, 2005 by certain Landowners and certain Municipal Users, that was recorded in the Official Records, San Luis Obispo County, California on ____________________________, 2005 as Document Number ______________ terminated on ________________________ as to the lands owned by the undersigned, which lands are described as follows:

____.

Dated:______________________________

____

RECORDING REQUESTED BY
& RETURN TO:

EXHIBIT E

NOTICE OF NON-RENEWAL OF

PASO ROBLES GROUNDWATER BASIN AGREEMENT

Notice is hereby given that the PASO ROBLES GROUNDWATER BASIN AGREEMENT executed on ______________________________, 2005 by certain Landowners and certain Municipal Users, that was recorded in the Official Records, San Luis Obispo County, California on ______________________________, 2005 as Document Number _______________ and will automatically terminate as of [DATE] pursuant to written notice provided by [MUNICIPAL USER or DISTRICT] pursuant to Article 3.d of said Agreement.

Dated:___________________________

[MUNICIPAL USER]

By:____________________________________
[Name]

Its:____________________________________
[Title]

JULIE RODEWALD
San Luis Obispo County – Clerk/Recorder
Recorded at the request of
Public

DG
5/11/2006
8:25 AM

DOC#: 2006032770

Titles: 1 Pages: 79

Fees	0.00
Taxes	0.00
Others	0.00
PAID	$0.00

RECORDING REQUESTED BY
& RETURN TO:

San Luis Obispo County Flood
Control and Water Conservation
District – Public Works Department

Recording Fee Waived, Govt. Code 6103

EXHIBIT B

ADDITION OF OVERLYING LANDOWNER TO AGREEMENT (RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT) DATED NOVEMBER 8, 2005, RECORDED MARCH 16, 2005)

WHEREAS, certain Landowners (sometimes referred to as the "PRIOR" group), and certain Municipal Users have entered into an Agreement entitled "Paso Robles Groundwater Basin Agreement" dated November 8, 2005, ("Agreement"), which was recorded in the Official Records of San Luis Obispo County, California on March 16, 2005 as Document No. 2006018273; and

WHEREAS, Article 9 of said Agreement provides for the addition of landowners to said Agreement after execution thereof; and

WHEREAS, the undersigned Landowner, having received and reviewed a copy of the Agreement, wishes to become a party to it.

NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of at least two of the three Landowner Agents currently designated in accordance with the Agreement, the undersigned Landowner of the lands described below shall become a party to the Agreement and to a separate "PRIOR Memorandum of Operating Principles" (Principles) (to which the Municipal Users are not a party), effective immediately. Said undersigned Landowner shall bear the benefits and enjoy the burdens of the Agreement and Principles as though said Landowner had originally executed said Agreement and Principles as they now exist or may be amended in the future, and for so long as the Agreement remains in effect. Without limiting the foregoing, said Landowner understands and agrees that the

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement. The foregoing shall constitute a covenant running with the all Landowner's lands within the Basin, described below, and the benefits and burdens of the Agreement shall bind each successive owner of said lands or portion thereof, and each person having or who may acquire an interest in said lands.

IN WITNESS HEREOF, the foregoing is executed and agreed to this _____ day of April.

By: See Attached ____________________

Address: ____
City Zip

Email address: ____

Legal Property Description:
Assessors Parcel Number: See Attached ____________________

ACCEPTED AND APPROVED ON
BEHALF OF THE DULY
APPOINTED
AGENTS OF THE LANDOWNERS
IN
ACCORDANCE WITH THE
AGREEMENT:

By: Approved ____________________

By: ____________________

By: ____________________

additional party shall be deemed that party's execution of a counterpart of this Agreement.

h. The provisions of this Agreement shall apply to and bind the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement is executed and agreed to by the parties as of the date set forth above.

LANDOWNERS:

West Bay Company, LLC
a Delaware limited liability company

By.
Thornhill Ranches, L.P.
A California limited partnership,
Managing Member

By Bridge Street Associates, Inc.
a California corporation,
General Partner

By
Stephen T B Miller, President

PASO ROBLES:

8/18/05 FINAL
:777255-3 803678v3 33444/0001

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of Santa Barbara

On September 30, 2005, before me, Rand E. Posin Notary Public, personally appeared Stephen T. B. Miller ;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

RAND E. POSIN
COMM. # 1487040
NOTARY PUBLIC-CALIFORNIA
LOS ANGELES COUNTY
COMM. EXP. MAY 28, 2008

Place Notary Seal Above

Witness my hand and official seal.

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

____
[NO. OF PAGES]

September 30, 2005
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

RECORDING REQUESTED BY

RECORDING REQUESTED BY:
CHICAGO TITLE

WHEN RECORDED MAIL TO

West Bay Company, LLC
132 East Carrillo Street
Santa Barbara, CA 93101

JULIE RODEWALD
San Luis Obispo County – Clerk/Recorder

Recorded at the request of
Chicago Title Company

JR
4/24/2003
8:00 AM

DOC#: 2003043505

[redacted]

Titles: 1	Pages: 45
Fees	139.00
Taxes	1,056.00
Others	10.00
PAID	$1,205.00

SPACE ABOVE THIS LINE FOR RECORDER'S USE

271968 REB

GRANT DEED

SURVEY MONUMENT FEE $10.00

The undersigned grantor declares: APN: (see **Exhibit "A"**)
Documentary transfer tax is $ 1,056.00
(x) computed on full value of property conveyed, or
( ) computed on full value less value of liens and encumbrances remaining at time of sale.
(x) unincorporated area: ( ) City of ______________________, and

FILED	FEE PAID	EXEMPT	OUT OF STATE
Sh			

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, LINDA I. SMITH, TRUSTEE OF THE LINDA IRVINE SMITH TRUST DATED OCTOBER 8, 1996, ("Grantor"), hereby GRANTS to WEST BAY COMPANY, LLC, all of Grantor's: (i) undivided fifty percent (50%) interest in the real property in the County of San Luis Obispo, State of California, described in **Exhibit "B"**; (ii) interest in appurtenant easements described in **Exhibit "C"**; and (iii) beneficial interests under those recorded agreements described in **Exhibit "D"**. All exhibits referenced herein are attached hereto and incorporated herein by this reference.

SUBJECT TO: (i) the lien securing non-deliquent taxes and assessments, both general and special, and (ii) all matters affecting title to the Property of record or that are apparent.

Dated: APRIL 10, 2003

LINDA IRVINE SMITH TRUST DATED
OCTOBER 8, 1996

By: [signature]
Linda I. Smith, Trustee

MAIL TAX STATEMENTS TO:

WEST BAY COMPANY, LLC
132 East Carrillo Street
Santa Barbara, CA 93101

Miller\French Camp\Smith Transaction\Deed

Santa Barbara, CA 93101

Exhibit "A"

San Luis Obispo County Assessor's Parcel Numbers

037-191-023
037-191-024
037-191-025
037-241-008
037-241-009
037-241-010
037-241-011
071 ~~037~~-071-019
071 ~~037~~-071-020

JULIE RODEWALD
San Luis Obispo County – Clerk/Recorder
Recorded at the request of
Public

SK
8/28/2007
12:15 PM

DOC#: 2007058633

Titles: 1 Pages: 14

Fees	46.00
Taxes	0.00
Others	0.00
PAID	$46.00

RECORDING REQUESTED BY & RETURN TO:

Stephen J. Sinton

P.O. Box 112

Shandon, CA 93461

ADDITION OF OVERLYING LANDOWNER TO AGREEMENT (RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT) DATED 2005, RECORDED MARCH 16, 2006, DOCUMENT #2006018273)

WHEREAS, certain Landowners (sometimes referred to as the "PRIOR" group), and certain Municipal Users have entered into an Agreement entitled "Paso Robles Groundwater Basin Agreement" dated 2005, ("Agreement"), which was recorded in the Official Records of San Luis Obispo County, California on March, 2006 as Document No. 2006018273; and

WHEREAS, Article 9 of said Agreement provides for the addition of landowners to said Agreement after execution thereof; and

WHEREAS, the undersigned Landowner, having received and reviewed a copy of the Agreement, wishes to become a party to it.

NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of at least two of the three Landowner Agents currently designated in accordance with the Agreement, the undersigned Landowner of the lands described below shall become a party to the Agreement and to a separate "PRIOR Memorandum of Operating Principles" (Principles) (to which the Municipal Users are not a party), effective immediately. Said undersigned Landowner shall bear the benefits and enjoy the burdens of the Agreement and Principles as though said Landowner had originally executed said Agreement and Principles as they now exist or may be amended in the future, and for so long as the Agreement remains in effect. Without limiting the foregoing, said Landowner understands and agrees that the

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement. The foregoing shall constitute a covenant running with the all Landowner's lands within the Basin, described below, and the benefits and burdens of the Agreement shall bind each successive owner of said lands or portion thereof, and each person having or who may acquire an interest in said lands.

IN WITNESS HEREOF, the foregoing is executed and agreed to this ______ day of Aug 16, 2007

Jonathan Cagliero

By: ____________________

Samantha Cagliero

Address: [Intentionally left blank] ____________________

City Zip

Email address: [Intentionally left blank] ____________________

Legal Property Description: Attached Ex. 1
Assessors Parcel Number: ____________________

ACCEPTED AND APPROVED ON BEHALF OF THE DULY APPOINTED AGENTS OF THE LANDOWNERS IN ACCORDANCE WITH THE AGREEMENT:

By: ____________________
Kent C Gilmore

By: ____________________
Stephen Sinton

By: ____________________
Walter R. Nielsen

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Luis Obispo } ss.

On August 16, 2007 (Date), before me, Doreen Lee Gretter Notary Public (Name and Title of Officer (e.g., "Jane Doe, Notary Public")), personally appeared Jonathan Cagliero and Samantha Cagliero (Name(s) of Signer(s))

DOREEN LEE GRETTER
Commission # 1551333
Notary Public - California
San Luis Obispo County
My Comm. Expires Feb 10, 2009

☒ personally known to me

☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Place Notary Seal Above

Doreen Lee Gretter
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: Paso Robles Groundwater Basin Agreement

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
- ☒ Individuals
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Luis Obispo } ss.

On August 28, 2007, before me, Michelle C. Brechtel, Notary Public,
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared Kent Gilmore, Walter Nielsen, Stephen Sinton,
Name(s) of Signer(s)

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MICHELLE C. BRECHTEL
COMM. #1571632
NOTARY PUBLIC - CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires APR. 22, 2009

Place Notary Seal Above

WITNESS my hand and official seal.

Michelle C. Brechtel
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
☐ Individual
☐ Corporate Officer — Title(s): ______
☐ Partner — ☐ Limited ☐ General
☐ Attorney in Fact
☐ Trustee
☐ Guardian or Conservator
☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Jon and Samantha Cagliero Ranch Complet e APN List

027	143	003	FIRST BOOSTER
027	143	004	ALMOND FIELD
027	143	005	VINEYARD BLOCKS 9-10
027	143	006	VINEYARD BLOCKS 7-8
027	143	008	FIRST BOOSTER, WITH WELL
027	143	009	VINEYARD BLOCKS 5-6
027	143	010	VINEYARD BLOCKS 1-2
027	143	011	VINEYARD BLOCKS 3-4
027	143	012	LOWER 2ND BOOSTER, W/ WELL
027	143	013	UPPER 2ND BOOSTER
027	143	014	GRAZING HILLS
027	143	015	PHILLIPS FIELD AND RIVER
027	143	016	LOWER 2ND BOOSTER
027	143	017	OLD PASTURE FIELD
027	144	007	
027	144	008	RYAN NORTH
027	144	009	RYAN SOUTH
027	181	019	RIVER SAND
027	181	023	JESPERSEN NORTH
027	181	024	JESPERSEN SOUTH

Please Return to
Kent Gilmore

JULIE RODEWALD
San Luis Obispo County – Clerk/Recorder
Recorded at the request of
Public

SK
8/28/2007
12:15 PM

DOC#: 2007058631

Titles: 1	Pages: 5
Fees	19.00
Taxes	0.00
Others	0.00
PAID	$19.00

RECORDING REQUESTED BY & RETURN TO:

Stephen J. Sinton
P.O. Box 112
Shandon, CA 93461

ADDITION OF OVERLYING LANDOWNER TO AGREEMENT (RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT) DATED 2005, RECORDED MARCH 16, 2006, DOCUMENT #2006018273)

WHEREAS, certain Landowners (sometimes referred to as the "PRIOR" group), and certain Municipal Users have entered into an Agreement entitled "Paso Robles Groundwater Basin Agreement" dated 2005, ("Agreement"), which was recorded in the Official Records of San Luis Obispo County, California on March, 2006 as Document No. 2006018273; and

WHEREAS, Article 9 of said Agreement provides for the addition of landowners to said Agreement after execution thereof; and

WHEREAS, the undersigned Landowner, having received and reviewed a copy of the Agreement, wishes to become a party to it.

NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of at least two of the three Landowner Agents currently designated in accordance with the Agreement, the undersigned Landowner of the lands described below shall become a party to the Agreement and to a separate "PRIOR Memorandum of Operating Principles" (Principles) (to which the Municipal Users are not a party), effective immediately. Said undersigned Landowner shall bear the benefits and enjoy the burdens of the Agreement and Principles as though said Landowner had originally executed said Agreement and Principles as they now exist or may be amended in the future, and for so long as the Agreement remains in effect. Without limiting the foregoing, said Landowner understands and agrees that the

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement. The foregoing shall constitute a covenant running with the all Landowner's lands within the Basin, described below, and the benefits and burdens of the Agreement shall bind each successive owner of said lands or portion thereof, and each person having or who may acquire an interest in said lands.

IN WITNESS HEREOF, the foregoing is executed and agreed to this 4TH day of AUGUST, 2007

By: ____________________
KENDALL C REED

By: ____________________
LINDA A REED

Address: ~~[Intentionally left blank]~~ 1718 Speyer Lane, Redondo Beach, CA 90278

City Zip

Email address: ~~[Intentionally left blank]~~

Legal Property Description: Attached

Assessors Parcel Number: 019-301-065

ACCEPTED AND APPROVED ON BEHALF OF THE DULY APPOINTED AGENTS OF THE LANDOWNERS IN ACCORDANCE WITH THE AGREEMENT:

By: ____________________
Kent C Gilmore

By: ____________________
Stephen Sinton

By: ____________________
Walter R Nielsen

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

}

County of Los Angeles

On August 04, ~~2005~~ 2007, before me, Michael Ohannesian Notary Public,

personally appeared Kendall C. Reed and Linda A. Reed;

☐ personally known to me
☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(~~ies~~), and that by ~~his/her~~/their signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

MICHAEL OHANNESIAN
NOTARY PUBLIC - CALIFORNIA
COMMISSION # 1479282
LOS ANGELES COUNTY
My Comm. Exp. March 28, 2008

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNERS
☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)

____
TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: _______________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

2
[NO. OF PAGES]

AUGUST 04, 2007
[DATE OF DOCUMENT]

Signers Other Than Above:

____

Signer(s) is/are representing:

____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California
County of San Luis Obispo } ss.

On August 28, 2007 (Date), before me, Michelle C. Brechtel, Notary Public (Name and Title of Officer (e.g., "Jane Doe, Notary Public")), personally appeared Kent Gilmore, Walter Nielsen, Stephen Sinton, (Name(s) of Signer(s))

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by his/her/~~their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MICHELLE C. BRECHTEL
COMM. #1571632
NOTARY PUBLIC - CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires APR. 22, 2009

Place Notary Seal Above

WITNESS my hand and official seal.

[signature]
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

RECORDING REQUESTED BY
& RETURN TO:

Stephen J. Sinton

P.O. Box 112

Shandon, CA 93461

JULIE RODEWALD
San Luis Obispo County – Clerk/Recorder
Recorded at the request of
Public

SK
8/28/2007
12:15 PM

DOC#: 2007058630

Titles: 1	Pages: 7
Fees	25.00
Taxes	0.00
Others	0.00
PAID	$25.00

ADDITION OF OVERLYING LANDOWNER TO AGREEMENT (RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT) DATED 2005, RECORDED MARCH 16, 2006, DOCUMENT #2006018273)

WHEREAS, certain Landowners (sometimes referred to as the "PRIOR" group), and certain Municipal Users have entered into an Agreement entitled "Paso Robles Groundwater Basin Agreement" dated 2005, ("Agreement"), which was recorded in the Official Records of San Luis Obispo County, California on March, 2006 as Document No. 2006018273; and

WHEREAS, Article 9 of said Agreement provides for the addition of landowners to said Agreement after execution thereof; and

WHEREAS, the undersigned Landowner, having received and reviewed a copy of the Agreement, wishes to become a party to it.

NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of at least two of the three Landowner Agents currently designated in accordance with the Agreement, the undersigned Landowner of the lands described below shall become a party to the Agreement and to a separate "PRIOR Memorandum of Operating Principles" (Principles) (to which the Municipal Users are not a party), effective immediately. Said undersigned Landowner shall bear the benefits and enjoy the burdens of the Agreement and Principles as though said Landowner had originally executed said Agreement and Principles as they now exist or may be amended in the future, and for so long as the Agreement remains in effect. Without limiting the foregoing, said Landowner understands and agrees that the

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement. The foregoing shall constitute a covenant running with the all Landowner's lands within the Basin, described below, and the benefits and burdens of the Agreement shall bind each successive owner of said lands or portion thereof, and each person having or who may acquire an interest in said lands.

IN WITNESS HEREOF, the foregoing is executed and agreed to this 30TH day of JULY, 2007.

By: John R Buerge   Joy B Buerge

Address: [Intentionally left blank]
City Zip

Email address: [Intentionally left blank]

Legal Property Description: Attached
Assessors Parcel Number: __________

ACCEPTED AND APPROVED ON BEHALF OF THE DULY APPOINTED AGENTS OF THE LANDOWNERS IN ACCORDANCE WITH THE AGREEMENT:

By: Kent C Gilmore

By: Stephen Sinton

By: Walter R Nielsen

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CALIFORNIA

County of LOS ANGELES)

On July 30, ~~2005~~ 2007, before me, J. SCOTT DAVIS Notary Public,

personally appeared JOHN R. BUERGE & JAY B. BUERGE

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

J. SCOTT DAVIS
Commission # 1710137
Notary Public — California
Los Angeles County
My Comm. Expires Dec 11, 2010

Witness my hand and official seal.

Place Notary Seal Above

SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☒ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S) ☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

TWO (2)
[NO. OF PAGES]

JULY 30, 2007
[DATE OF DOCUMENT]

Signers Other Than Above:
NOT APPLICABLE

Signer(s) is/are representing:
THEMSELVES

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of San Luis Obispo } ss.

On August 28, 2007 (Date), before me, Michelle C. Brechtel, Notary Public (Name and Title of Officer (e.g., "Jane Doe, Notary Public")),

personally appeared Kent Gilmore, Walter Nielsen, Stephen Sinton (Name(s) of Signer(s)),

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MICHELLE C. BRECHTEL
COMM. #1571632
NOTARY PUBLIC - CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires APR. 22, 2009

Place Notary Seal Above

WITNESS my hand and official seal.

Michelle C. Brechtel

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

JULIE RODEWALD
San Luis Obispo County – Clerk/Recorder
Recorded at the request of
Public
SK
8/28/2007
12:15 PM
DOC#: 2007058632
Titles: 1 Pages: 5
Fees 19.00
Taxes 0.00
Others 0.00
PAID $19.00

RECORDING REQUESTED BY
& RETURN TO:
Stephen J. Sinton
P.O. Box 112
Shandon, CA 93461

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(RELATED TO PASO ROBLES GROUNDWATER BASIN AGREEMENT)
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NOW, THEREFORE, acknowledging that the Whereas clauses above are correct and are a part of this agreement, upon acceptance by signature below of at least two of the three Landowner Agents currently designated in accordance with the Agreement, the undersigned Landowner of the lands described below shall become a party to the Agreement and to a separate "PRIOR Memorandum of Operating Principles" (Principles) (to which the Municipal Users are not a party), effective immediately. Said undersigned Landowner shall bear the benefits and enjoy the burdens of the Agreement and Principles as though said Landowner had originally executed said Agreement and Principles as they now exist or may be amended in the future, and for so long as the Agreement remains in effect. Without limiting the foregoing, said Landowner understands and agrees that the

Landowner Agents designated in the Agreement, and not the Municipal Users, are responsible for keeping all Landowners advised of matters related to this Agreement. The foregoing shall constitute a covenant running with the all Landowner's lands within the Basin, described below, and the benefits and burdens of the Agreement shall bind each successive owner of said lands or portion thereof, and each person having or who may acquire an interest in said lands.

IN WITNESS HEREOF, the foregoing is executed and agreed to this ______ day of 8/9/07. Cort T. Palmer CORT T. Palmer &

By: ~~By~~

Dianne Bea Palmer

Address: [Intentionally left blank] Diane B. Palmer

City Zip

Email address: [Intentionally left blank]

Legal Property Description: Attached
Assessors Parcel Number: ______

ACCEPTED AND APPROVED ON BEHALF OF THE DULY APPOINTED AGENTS OF THE LANDOWNERS IN ACCORDANCE WITH THE AGREEMENT:

Kent C. Gilmore By: [signature]

Stephen Sinton By: Stephen Sinton

Walter R Neilson By: [signature]

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of CA

County of San Luis Obispo

On 8-9, 2007, before me, Marilyn Hufford Notary Public, personally appeared Cort T. Palmer & Diane B. Palmer

☒ personally known to me
☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribed to the within instrument and acknowledged to me that ~~he~~/~~she~~/they executed the same in ~~his~~/~~her~~/their authorized capacity(ies), and that by ~~his~~/~~her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MARILYN HUFFORD
COMM. #1549634
NOTARY PUBLIC CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm Expires FEB. 3, 2009

Witness my hand and official seal.

Place Notary Seal Above

Marilyn Hufford
SIGNATURE OF NOTARY PUBLIC

OPTIONAL

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to an unauthorized document.

CAPACITY CLAIMED BY SIGNER
☐ INDIVIDUAL
☐ CORPORATE OFFICER(S)

TITLES

☐ PARTNER(S)
☐ LIMITED
☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: ____________

DESCRIPTION OF ATTACHED DOCUMENT

Paso Robles Groundwater Basin Agreement
[DOCUMENT TITLE]

[NO. OF PAGES]

[DATE OF DOCUMENT]

Signers Other Than Above:

Signer(s) is/are representing:

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of San Luis Obispo } ss.

On August 28, 2008 before me, Michelle C. Brechtel, Notary Public,
Date — Name and Title of Officer (e.g., "Jane Doe, Notary Public")

personally appeared Kent Gilmore, Walter Nielsen, Stephen Sinton,
Name(s) of Signer(s)

☐ personally known to me

☒ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that ~~he/she~~/they executed the same in ~~his/her~~/their authorized capacity(ies), and that by ~~his/her~~/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MICHELLE C. BRECHTEL
COMM. #1571632
NOTARY PUBLIC - CALIFORNIA
SAN LUIS OBISPO COUNTY
My Comm. Expires APR. 22, 2009

Place Notary Seal Above

WITNESS my hand and official seal.

[signature]
Signature of Notary Public

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- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here


San Luis Obispo County
Integrated Regional Water
Management Plan

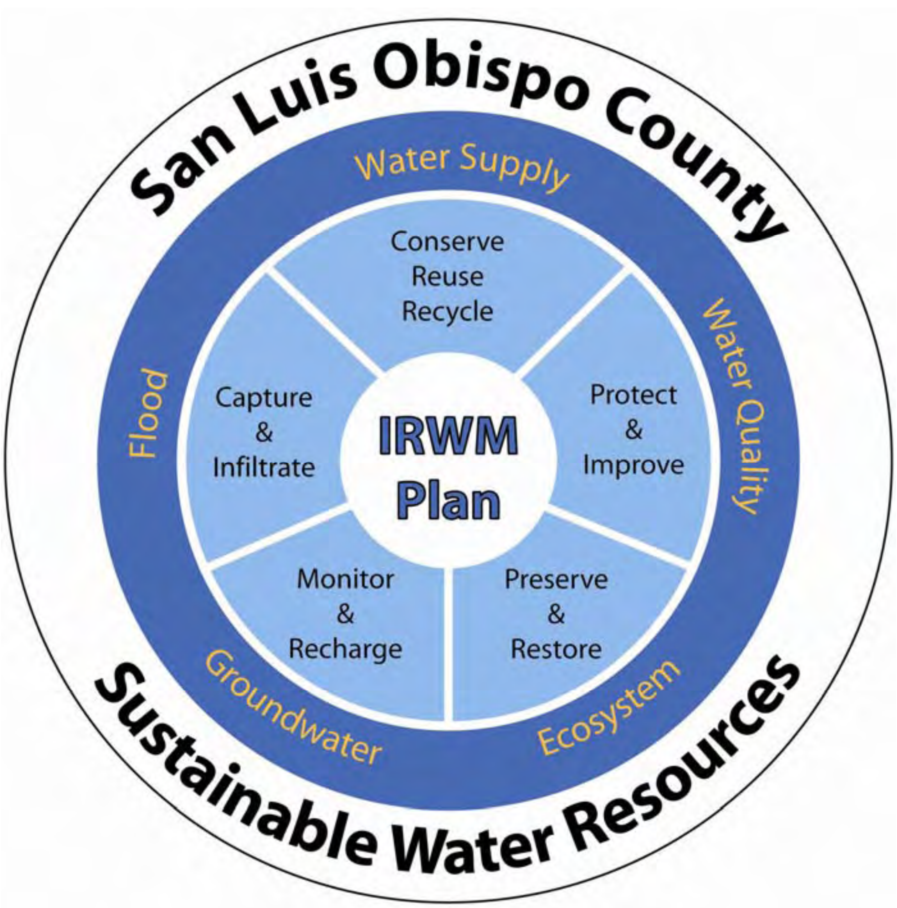
San Luis Region
Integrated Regional Water Management Plan

A Strategic Plan for Sustainable Water Resources to Meet Human and Environmental Needs in San Luis Obispo County

Adopted
December 2005

Amended
July 2007

<u>Regional Agency</u>
San Luis Obispo County
Flood Control and Water Conservation District



SAN LUIS OBISPO COUNTY
DEPARTMENT OF PUBLIC WORKS
County Government Center, Room 207 • San Luis Obispo, CA 93408 • (805)781-5252

July 26, 2007

Members of the San Luis Obispo County Region
Integrated Regional Water Management Planning

Subject: IRWM Plan Update

Dear Members of the San Luis Obispo County Region:

Upon direction of Resolution No. 2005-403 of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, the governing body of the regional agency authorized to develop, and that has responsibility for implementation of, the Integrated Regional Water Management Plan (Plan) for the San Luis Obispo County Region have implemented the first year tasks identified in the five-year schedule, originally adopted on December 6, 2005.

Plan Year	Fiscal Year	IRWM Plan Update Activities
#1	2006-07	Review the plan's goals, objectives, strategies, and priorities with stakeholders. Amend Plan.
#2	07-08	No later than January 1, 2008, complete the four (4) plan components that are described in the region's Planning Grant proposal.
#3	08-09	Prepare a status report on plan activities and an interim scorecard. Identify alternative strategies that may enhance implementation efforts.
#4	09-10	Evaluate the results of Plan efforts; prepare the scorecard and compare to baseline developed in Plan Year #1.
#5	2010-11	Update the Plan, its goals and objectives, refine integration strategies, rank new priorities, and consider other changes

Proposed amendments to the Plan were presented at a public workshop on May 23, 2007. Comments received were then incorporated as additional amendments. On July 18, 2007, the Water Resources Advisory Committee, which includes 29 members representing elected officials of all seven cities, other local agencies including the region's community services districts, private water purveyors, agriculture and environmental stakeholders, unanimously approved a motion supporting the updated Plan and the projects being considered for the San Luis Obispo County Region Proposition 50 IRWM implementation grant application (See Section F, Page 4).

On behalf of the District, I would also like to recognize the efforts of Courtney Howard P.E., who led our efforts.

Sincerely,

Noel King

NOEL KING
Director of Public Works

BEFORE THE BOARD OF SUPERVISORS

of the

SAN LUIS OBISPO COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

Tues day December 6, 20 05

PRESENT: Supervisors Harry L. Ovitt, Jerry Lenthall, K.H. "Katcho" Achadjian, James R. Patterson and Chairperson Shirley Bianchi

ABSENT: None

RESOLUTION NO. 2005-403

RESOLUTION APPROVING THE INTERGRATED REGIONAL WATER MANAGEMENT PLAN

The following resolution is hereby offered and read:

WHEREAS, the State of California has encouraged the development of Integrated Regional Water Management Plans to address the management of California's water and water dependent resources pursuant to the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Water Code Section 79560 *et seq.*) (Also known as Proposition 50); and

WHEREAS, the concepts, direction, and approach to water resource management embodied in the State's guidelines closely match those of the San Luis Obispo County Flood Control and Water Conservation District; and

WHEREAS, in order to effectively and efficiently integrate water resource management planning objectives and implementation strategies in the five key water management areas of: Water Supply; Water Quality Protection and Improvement; Ecosystem Preservation and Restoration; Groundwater Monitoring and Management; and Flood Management; and

WHEREAS, The Integrated Water Management Plan identifies goals, objectives, strategies and projects designed to improve regional water supply reliability, water recycling, water conservation, water quality improvement, storm water capture and management, flood management, recreation and access, wetlands enhancement and creation, and environmental and habitat protection and improvement.

C-50

NOW, THEREFORE, BE IT RESOLVED AND ORDERED, by the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, that the Integrated Regional Water Management Plan for the San Luis Region is hereby approved, and further the Director of Public Works of the County of San Luis Obispo is hereby authorized and directed to implement the five-year update plan contained within it.

Upon motion of Supervisor Achadjian, seconded by Supervisor Lenthall, and on the following roll call vote, to wit:

AYES: Supervisors Achadjian, Lenthall, Ovitt, Patterson, Chairperson Bianchi

NOES: None

ABSENT: None

ABSTAINING: None

the foregoing Resolution is hereby adopted.

SHIRLEY BIANCHI
Chairperson of the Board of Supervisors

ATTEST:

JULIE L. RODEWALD
Clerk of the Board of Supervisors

[SEAL] By: C.M. CHRISTENSEN Deputy Clerk

APPROVED AS TO FORM AND LEGAL EFFECT:
JAMES B. LINDHOLM, JR.
County Counsel

By: [signature]
Deputy County Counsel

Dated: 11/18/05

L:\Environmental\DEC05\BOS\IRWM Adoption Board Resolution.doc.lnd.mh

STATE OF CALIFORNIA,
County of San Luis Obispo, } ss.

I, JULIE L. RODEWALD, County Clerk and ex-officio Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, do hereby certify the foregoing to be a full, true and correct copy of an order made by the Board of Supervisors, as the same appears spread upon their minute book.

WITNESS my hand and the seal of said Board of Supervisors, affixed this 23rd day of December, 20 05.

JULIE L. RODEWALD
County Clerk and Ex-Officio Clerk of the Board of Supervisors

(SEAL)

By CMChristensen
Deputy Clerk.

Table of Contents

List of Appendices

List of Tables

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Introduction

Introduction

This Integrated Regional Water Management (IRWM) Plan promotes coordination with state-wide water planning efforts (i.e. the California Water Plan) by seeking to align the regional roadmap for achieving sustainable water resource management with the State's Roadmap to 2030. This IRWM Plan presents a comprehensive water resource management approach focused on sustaining the region's water resources to meet current and future needs. It is built on the existing foundation of inter-agency cooperation. Sustaining and enhancing our existing balanced approach to water resource management will continue to rely on long-term strategies that integrate stakeholder participation, interagency partnerships, and environmental needs with regional water reliability needs and efficient resource management objectives and strategies including conservation and emergency response provisions.

Historical Management Efforts

The San Luis Region's historical water management efforts have been consistent with the State's IRWM approach. With a local culture that includes active environmental stakeholders, local land-use decisions have been subject to important debate and deliberations over the years with focus on the relationship of those decisions to water resource management and environmental needs, among other growth related concerns. The "quality of life" of the San Luis Region is an important cultural value that is being sustained through existing socio-political processes. The IRWM model developed by the State has likewise been locally embraced, in part because it is recognized as a tool that can be utilized to help improve the efficiency and effectiveness of existing dynamic processes.

While the region has a solid water resource management balance and has enjoyed significant accomplishments benefiting long term objectives, the process of continuously evaluating and self-evaluating institutional structures, policies, and approaches will help ensure that the region adapts to changing circumstances over time. In September of 2005 the San Luis Obispo County Board of Supervisors, sitting as both the County Board and the Board of the San Luis Obispo County Flood Control and Water Conservation District, voted to strengthen both existing institutional structures and general plan approaches to water issues, thereby ensuring that regional water management continues to be addressed in multiple forums.

Historical Accomplishments

Inter-agency cooperation has resulted in solutions to many of the region's historical water supply challenges, and while conflicts inevitably emerge from time to time, continued emphasis on cooperation has been instrumental in resolving those conflicts.

Several examples illustrate the San Luis Region's historical approach to integrating water management objectives, a few of which are listed below.

- Decisions on implementation of the Coastal Branch of the State Water project, which occurred in 1992 and 1993, included significant review of reliability concerns on the project and the importance of not developing a dependency on imported supplies.

- Since 1980, San Luis Obispo County's Resource Management System (RMS) includes an annual review of the adequacy of five (5) vital resources, including water, needed for "smart" land-use development.

- The 1998 County-wide Master Water Plan identified goals associated with evaluating environmental water needs.

- The region's Water Resources Advisory Committee has represented local stakeholders on regional water management efforts for over 50 years – essentially since 1945 when the State legislature created the San Luis Obispo County Flood Control and Water Conservation District (District) to act as the regional water management agency[1].

- Approval of inter-agency water delivery contracts in 2004 initiated the implementation of the Nacimiento Water Supply project and established the Nacimiento Commission – resolving decades of intra-regional water supply issues. The project will result in the completion of regional "backbone" facilities needed for long-term water supply reliability, and will open doors to groundwater banking and other conjunctive use programs.

- The County Office of Emergency Services' response during the San Simeon earthquake of December 2003 included regional water officials that coordinated inter-agency cooperation and emergency equipment transfers to aid the continuity of water services for impacted communities.

The San Luis Region's approach to its IRWM Plan

The District has prepared the San Luis Region's IRWM Plan with stakeholders because it aligns with many of our existing water management efforts. With support and leadership at the State level, we maintain optimism that the IRWM approach to water resource management will further enhance our existing efforts by increasing stakeholder awareness of important issues, providing more opportunities for collaborative efforts, and improving efficiencies in government and water management.

[1] The San Luis Obispo County Flood Control and Water Conservation District Act was approved as Section 7205 of the Uncodified Water Act.

Implementation and Vision

While the Plan identifies several specific actions that are ongoing within the region, this Plan also recognizes that those actions are prompted by several different cues. Some actions are prompted by State legislation, others by local legislative actions. Regulatory actions prompt some; judicial decrees and settlements are yet another prompt to act. Likewise, while regional actions often provide the best avenue to implementing water related efforts, other actions are still best implemented by individual jurisdictions and/or sub-regional associations or partnerships. This Plan therefore focuses on identifying the efforts, goals and objectives of stakeholders overall while not attempting to dictate the specific method of implementation for the various activities that are ongoing within the region. Furthermore, the Plan includes a component for measuring the performance of water management efforts within the region, development of data associated with those efforts, and updating and modifying IRWM approaches to adapt to change - and to refine, improve and enhance. The following vision statement was developed for the San Luis Region's Plan.

The San Luis Region's IRWM Plan vision statement:

The San Luis Integrated Regional Water Management Plan seeks to enhance regional cooperation promoting sustainable water resource management while balancing economic, environmental and cultural values, and property rights; recognizing the role of regulatory agencies and the autonomy of individual jurisdictions.

Local Collaboration

The success of the San Luis Region's Plan, and water management within the region, will require ongoing collaborative effort by stakeholder representatives including cities and other local agencies, private water purveyors, agriculturalists, conservation organizations, and land use planners. Although the original intent was to develop a "functional equivalent" document, the number of water resource related plans in the San Luis Region muted our ability to point to one, a few, or several as characterizing the entirety of our regional efforts. In essence, they all reflect the region's collaborative efforts. Consequently, this Plan incorporates information found in existing Master Water Plans, Urban Water Management Plans, Watershed Management Action Plans, Land Use Plans, and other water resource management documents into an umbrella document covering the entire region.

This Plan reflects a turning point as well. It is the first Plan in the San Luis Region to attempt to illustrate the extensive efforts of the numerous environmental organizations that exist in the region together with the more traditional water planning efforts. So, while the San Luis Region has a successful track record of integrating water management objectives through the results of democratic debate and deliberations, this plan is the first to provide a cornerstone document for future integrated efforts that will hopefully lead to more collaboration and efficiencies.

The San Luis Region also believes that it is extremely important to understand that promoting regional integrated efforts includes realistic awareness that water resource management is very dynamic and that the IRWM planning approach will not fit all situations. It is instead a document intended to express vision and promote efficient and cooperative efforts. Whether final actions are prompted by litigation, legislative actions, or cooperative efforts, the San Luis Region's IRWM Plan is intended to improve communication and cooperation and minimize conflict-generated solutions.

Plan Integration

This Plan integrates water resource management strategies to:

- Protect communities from drought;
- Protect and improve water quality;
- Avoid dependence on imported water;
- Reduce conflicts; and
- Achieve other multiple benefits and objectives.

This Plan identifies water resource management planning objectives and implementation strategies in the following five inter-related water management categories, and defines a path to achieving the region's highest priority objectives:

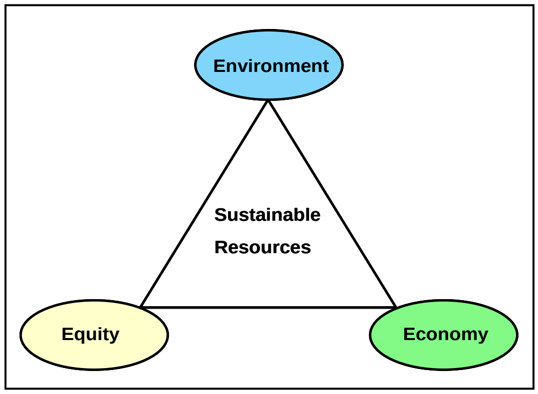
1) Water supply;
2) Water quality protection and improvement;
3) Ecosystem preservation and restoration;
4) Groundwater monitoring and management; and
5) Flood management.

Multiple benefits are achieved when all five categories are considered during water resource planning and implementation. Figure I.1 illustrates the integration of water management strategies to achieve water resource management objectives for the five key water management categories covered in this Plan.

Figure I.1
IRWM Plan Wheel Diagram

Maintaining water resource sustainability means that the region will be able to meet the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainability recognizes the relationship between economic growth, environmental protection, and social equity. The synergy of these goals promotes a healthy economy, a clean environment, and an involved citizenry. Figure I.2 illustrates the 3 "E's" of Sustainability: **E**nvironment, **E**conomy, and Social **E**quity.

Figure I.2
The 3 E's of Sustainability: Environment, Economy, and Equity



This Plan also encourages ecologically sustainable water resource management in San Luis Obispo County. To ensure appropriate consideration of environmental issues, an ecological approach was applied during Plan development. The issues and needs for protecting, preserving, and restoring the region's key ecological processes and important environmental resources were considered as important Plan objectives.

The Plan is organized in fifteen sections, each representing the required sections of the State's IRWM Plan standards. Each section includes the applicable State standard and describes how it is achieved in the Plan.

- Sections A and B provide background information about the Regional Agency, the region's stakeholders, and a description of the region.
- Section C describes the IRWM goals and objectives developed by stakeholders for all five areas of water resource management.
- Section D describes the water management strategies considered to achieve the IRWM goals and objectives
- Section E describes how these strategies work together.
- Section F describes the regional priorities for plan implementation.
- Section G shows the details of the implementation action plan.
- Section H discusses the impacts and benefits of the Plan.
- Sections I and J discuss the technical analyses and data used to develop and monitor the Plan.
- Section J describes the data management techniques used.
- Section K provides information about potential funding for Plan implementation and ongoing project operation and maintenance.
- Section L describes the Plan and its relationship to statewide priorities, environmental justice and disadvantaged communities.
- Section M discusses the relationship of the Plan to local land use planning.
- Section N describes the stakeholder involvement and communication during plan development.

- Section O discusses the coordination needed with the State and Federal governments and any assistance that will be needed to implement the Plan. And, the
- Appendices provide additional reference information.

included in not less than five units of the California State Park system located within the County. The County itself owns or manages over 10,000 acres of open space and local cities contribute an additional several hundred acres to the open space inventory.

This objective will result in improvements of the ecological condition of existing open space areas as well as increase the inventory of these lands. Several agencies and private organizations have developed inventories of sensitive areas within the County, particularly within the Coastal Zone. Efforts towards preserving urban greenbelts within and surrounding communities have already been implemented in the Cities of San Luis Obispo and Paso Robles as well as around the unincorporated community of Los Osos. The San Luis Obispo County General Plan specifies urban reserve limits for all developed areas within the County and currently mirrors smart growth principles designed to limit urban sprawl, preserve community separators, open space, and agricultural lands.

Key watersheds in San Luis Obispo County include the Salinas River (the largest in the County), the Carizzo Plain Natural Area, and the Cuyama River (Santa Maria River) watersheds that drain the majority of the northern and eastern portions of the County. The larger coastal watersheds include San Simeon Creek, Santa Rosa Creek, Morro Creek, Chorro Creek, Los Osos Creek, San Luis Obispo Creek, and Arroyo Grande Creek. These coastal watersheds are also interspersed with smaller streams that flow directly into the ocean. While the challenges faced by each watershed may be specific to that watershed, several common issues are evident and integrating efforts will hopefully help with efficient solutions to those common challenges.

This objective includes developing and implementing a full set of watershed management plans for all key watersheds in the County. In addition, cross-cutting programs initially focused on storm water and non-point source water pollution are included as "connectors" to other watershed based initiatives. Focusing on the development and implementation of Watershed Management Plans (by the Resource Conservation Districts and other conservation groups) will provide a common set of tools and techniques than can be applied across multiple watersheds, promoting efficiency and taking advantages of experiences developed in other areas. The watershed approach is a key component of creek, river, and lake restoration efforts because all elements of the entire watershed must be considered in order to achieve a successful project.

C5. Groundwater Monitoring and Management Objectives

The Basin Plan provides ground water quality objectives for the Sub-basins and sub-areas in San Luis Obispo County, as shown in Table C5.1. Each of the objectives in Table C5.1 are intended to ensure that the Basin Plan groundwater quality objectives and IRWMP groundwater goal can be attained and maintained to ensure the region's groundwater resources remain suitable for their continued use.

Table C5.1 Basin Plan Median Groundwater Quality Objectives (mg/L)

Sub-basin/Sub-Area	TDS	Cl	SO_4	B	Na	N_b
Santa Maria[c]						
Upper Guadalupe[f]	1000[d]	165	500[d]	0.5	230	1.4[e]
Lower Guadalupe[f]	1000[d]	85	500[d]	0.2	90	2.0[e]
Lower Nipomo Mesa[f]	710	95	250	0.15	90	5.7[e]
Orcutt[f]	740	65	300	0.1	65	2.3[e]
Santa Maria[f]	1000[d]	90	510	0.2	105	8.0[e]
Cuyama Valley	1500	80	--	0.4	--	5
Soda Lake	e	e	e	e	e	e
Estero Bay						
Santa Rosa	700	100	80	0.2	50	5
Chorro	1000	250	100	0.2	50	5
San Luis Obispo	900	200	100	0.2	50	5
Arroyo Grande	800	100	200	0.2	50	10
Salinas River						
Upper Valley[f]	600	150	150	0.5	70	5
Upper Forebay[f]	800	100	250	0.5	100	5
Lower Forebay[f]	1500	250	850	0.5	150	8
180 foot Aquifer[f]	1500	250	600	0.5	250	1
400 foot Aquifer[f]	400	50	100	0.2	50	1
Paso Robles[g]						
Central Basin[f]	400	60	45	0.3	80	3.4
San Miguel[f]	750	100	175	0.5	105	4.5
Paso Robles[f]	1050	270	200	2.0	225	2.3
Templeton[f]	730	100	120	0.3	75	2.7
Atascadero[f]	550	70	85	0.3	65	2.3
Estrella[f]	925	130	240	0.75	170	3.2
Shandon	1390	430	1025[h]	2.8	730	2.3

a Objectives shown are median values based on data averages; objectives are based on preservation of existing quality or water quality enhancement believed attainable following control of point sources.
b Measured as Nitrogen
c Basis for objectives is in the "Water Quality Objectives for the Santa Maria Ground Water Basin Revised Staff Report, May 1985" and February 1986, Staff Report.
d These are maximum objectives in accordance with Title 22 of the Code of Regulations.
e Ground water basin currently exceeds usable mineral quality.
f Ground water basin boundary map available in appendix.
g Basis for objectives is in the report "A Study of the Paso Robles Ground Water Basin to Establish Best Management Practices and Establish Salt Objectives", Coastal Resources Institute, June 1993.
h Standard exceeds California Secondary Drinking Water Standards contained in Title 22 of the Code of Regulations. Water quality standard is based upon existing water quality. If water quality degradation occurs, the Regional Board may consider salt limits on appropriate discharges.

1. Develop monitoring and reporting programs for groundwater basins in the region.

Currently the groundwater data is collected from over 400 wells throughout the region. Most of this data is private and can not be published without written permission from each of the relevant well owners. This objective seeks to develop a program to obtain unlimited permission from each of the well owners for releasing or publishing groundwater. Wider access to this data will allow for more thorough groundwater studies by all interested parties and thus encourage greater cooperation between different water users.

Currently, the groundwater data is limited to a single measurement taken in April and October of each year. If the well is temporarily inaccessible or has recently been pumped, no data is collected. The method and times for data collection need to be reevaluated for effectiveness.

Newer technology is available that may allow determining draw down, seasonal variations, and quality in a cost effective manner.

Monitoring for sea water intrusion is currently being performed but may need additional emphasis in the future. Efforts between individual purveyors, USGS, DWR, and/or the District should be coordinated and re-evaluated for completeness. Those basins that are susceptible to damage should be identified and the risk for damage should be assessed.

2. Evaluate and consider Groundwater Banking Programs.

Groundwater banking may provide an opportunity to store surplus water to be used later when needed. The banked water can be made available in drier years or at other times when a regular source of supply is interrupted.

The Paso Robles groundwater basin is a basin within the region that maybe capable of long term storage or banking. This basin may provide an opportunity to bank the region's excess State Water project allocation and thus allow for increasing the reliability of the State Water project delivery requests within the region and for improving local groundwater resources. Since the coastal branch of the State Water project also serves Santa Barbara County, joint participation in a project with the Central Coast Water Authority is currently being considered.

3. Protect and improve groundwater quality from point and non-point source pollution, including nitrate contamination; MTBE and other industrial, agricultural, and commercial sources of contamination; naturally occurring mineralization, boron, radionuclide, geothermal contamination; and seawater intrusion and salts.

There are numerous potential sources of point and non-point groundwater pollution and even more strategies and approaches to deal with the potential sources. Some of the strategies and measures in the San Luis Obispo region that will help meet this objective include:

A. Continue and comply with post-closure operations of those landfills that create risks to groundwater supplies.
B. Continue enforcement covering operations of existing landfills to protect groundwater quality.
C. Update Watershed evaluations to identify new potential sources of contamination.
D. Enforce land-use regulations to ensure land use activities do not contribute to groundwater pollution.

4. Conduct public education and outreach about ground water protection.

Many property owners are not aware of their ground water protection opportunities or responsibilities. A public information and education program should be developed in selected locations to inform residents and property owners about groundwater protection and issues, their responsibilities, best management practices, and how to get assistance.

Seawater intrusion tends to be a result of pumping by several parties. Therefore a solution will need to be a cooperative effort by those parties. Awareness and understanding of the issues are necessary to bring this cooperation about. A public education and outreach program specifically targeted at coastal groundwater pumpers is an objective of the San Luis Obispo region.

5. Identify areas of known or expected conflicts and target stakeholders on specific actions that they should take to help protect groundwater basin quality and supply.

The primary strategy to meet this objective will be to continue to pursue cooperative resolution of groundwater issues that have been the subject of litigation for the beneficial implementation of settlement agreements and to develop cooperative agreements among stakeholders in groundwater areas where litigation may be imminent. Providing expertise, historical data and other technical resources normally available to the District can often be used to facilitate cooperation.

However, as a measure of last resort, regional ordinances on groundwater management that might be implemented under governmental police powers will be considered. Exercising the use of police powers has been used in other counties, but has historically been avoided in this region. Exploring the circumstances and the effectiveness of ordinances in other jurisdictions can verify if a future ordinance could be considered a useful or a counter-productive option.

6. Recharge ground water with high quality water.

The California Water Plan Update states the importance of protecting groundwater recharge:

> *Protection of recharge areas is important, but protecting recharge areas by itself does not provide a supply of water. Recharge areas only function when aquifer storage capacity is available, and when regional and local governments and agencies work together to secure an adequate supply of good quality water to recharge the aquifer. Protecting existing and potential recharge areas allows them to serve as valuable components of a conjunctive management and groundwater strategy.*

San Luis Obispo County obtains nearly 80 percent of its water from groundwater supplies and protecting the quantity and quality of the groundwater resources is critical to a reliable water supply for the region.

C6. Flood Management Objectives

Flood protection is a high priority for the San Luis Obispo region. The flood protection objectives were developed with the recognition that local financing options are limited, community support is critical, and other watershed benefits need to be integrated into flood protection measures.

Section J. Data Management

IRWM Plan Standard:
"Include mechanisms by which data will be managed and disseminated to stakeholders and the public, and include discussion of how data collection will support statewide data needs. At a minimum assess the state of existing monitoring efforts for water quantity and water quality, and identify data gaps where additional monitoring is needed. If the Plan includes a water quality component, include a discussion of the integration of data into the SWRCB's Surface Water Ambient Monitoring Program and Groundwater Ambient Monitoring and Assessment Program."

J1. Data Collection and Management Mechanisms

Include mechanisms by which data will be managed. At a minimum, assess the state of existing monitoring efforts for water quantity and water quality.

Data used for plan development and implementation is available from several existing, ongoing programs that regularly collect from agencies and locations within the region.

The District has long recognized the value in collecting watershed and water use data. All effective efforts for water resource planning, water use management, drought protection, and water rights dispute resolution begin with a foundation of reliable and credible data. The following table summarizes the data collection sites used by the District:

WATERSHED DATA COLLECTION SITES				
	Precipitation	**Stream**	**Evaporation (or ETO)**	**Groundwater Depth**
ALERT Type Gagues	23*	14**		
Continuous Recording Gauges	11	3		
Volunteer Daily Gauges	51			
Evaporation Pans			4	
CIMIS	4		4	
Community Wells				147
Private Wells				268
Monitoring Wells				25
USGS		7		
NOAA	12			
TOTAL	**101**	**24**	**8**	**440**

* Three gauges maintained by another agency
** One gauge maintained by another agency

The following three types of data are collected directly by the District:

Precipitation
The District maintains 20 ALERT type precipitation gauges throughout the region which are capable of measuring rainfall and instantaneously transmitting data to the Public Works office. These data are made ready for timely use in storm watches and flood warnings. The District maintains 11 additional continuous read and record stations. These stations, along with the ALERT type stations, are capable documenting regional precipitation patterns and therefore can later be used for all kinds of hydrologic studies. The District also cooperates with more than 50 volunteers throughout the region who commit to taking daily precipitation readings.

Stream Flow
The District maintains 13 ALERT type stream gauges. As with the ALERT type rain gauges, these gauges provide timely information for storm watches and flood warnings, and assist in ongoing stream gauging operations and maintenance. These gauges, along with 3 continuous read and record stream gauges, are used to document stream flow patterns and are useful for flood studies, flood protection and infrastructure design. Some of these gauges are also instrumental in the operation of the Lopez and Salinas reservoirs.

Groundwater
The District maintains a database of groundwater level measurements for over 850 wells (with approximately 400 actively measured wells) within the region. Groundwater level information is provided by water purveyors for approximately 100 wells. District staff measures the remaining wells in April and October of each year. These data have been useful in monitoring groundwater trends and in preparing groundwater studies. The Paso Robles groundwater basin model, currently being utilized in the Paso Robles Groundwater Banking Feasibility Study, was made possible, in part, because of the completeness of the database.

Data Collection by Other Agencies

In addition to the District-maintained data collection sites, other local, regional, state and federal agencies maintain precipitation, stream, groundwater and/or weather monitoring locations throughout the region. At the local level, individual airports, cities, community service districts and non-governmental organizations collect data for special studies and operations that help to create a complete picture of water resources in the region. At the interregional level, information and effort is also shared cooperatively between the District and bordering IRWM Regions as described in section B8. For example, the District and Santa Barbara County cooperatively maintain groundwater level measurements in the Santa Maria basin which crosses the county line. At the State and Federal level, the District cooperates with DWR to collect data from three CIMIS weather stations and with the USGS on the maintenance and operation of two stream gauges. The data available from these sites supplement the data exclusively collected by the District, often providing information that would otherwise not be collected.

Water Use

The District supports the County Planning Department in collecting water use records annually from each of the purveyors within the region. These data are managed as a part of the County's Resource Management Systems (RMS). The RMS was established in 1980 to monitor land use patterns and also to recommend steps the region's entities should take to properly plan resources including water supply.

The District works with all stakeholders within the region to periodically update the estimate of current and future agricultural, urban, and environmental water needs for the County-wide Master Water Plan. These demand estimates are compared to all of the water resources available to the region in order to address potential deficiencies. The resulting Master Water Plan information is then incorporated into the IRWM Plan and RMS.

Water Quality

Drinking water quality data are collected and reported by water suppliers in the region. These data are distributed to consumers in annual Consumer Water Quality Reports. Source water assessment data are also collected by water suppliers and provided to DHS. Groundwater quality data for public wells are available through the SWRCB's Geotracker database. Geotracker is an Internet accessible environmental management database system that integrates groundwater data collected by a number of state and local agencies. The SWRCB's Geotracker database provides access to public well monitoring data conducted throughout the region. The Central Coast Ambient Monitoring Program (CCAMP) is the Central Coast RWQCB's regionally scaled water quality monitoring and assessment program. The purpose of the program is to provide scientific information to Regional Board staff and the public, and to protect, restore, and enhance the quality of the waters of central California. CCAMP data are also Internet accessible.

J2. Data Dissemination to Stakeholders and the Public

Include mechanisms by which data will be…disseminated to stakeholders and the public.

Data has been and will continue to be managed to ensure that it will be available to fulfill the needs of stakeholders, the state, and the general public.

Public Data Access

All watershed data collected by the District is available for public use with the exception of some groundwater measurements. The District website (www.SLOCountyWater.org) is the primary method for disseminating data to the public. However, the District recognizes that some stakeholders have limited internet access, so the internet can not replace the option to receive data and information via the telephone, email, or US Mail. Dissemination of data to stakeholders, agencies, and the public is integrated into the IRWMP process through WRAC meetings, newspaper announcements, handouts, e-mail notices, and agency contacts.

Data currently available on the internet includes, at a minimum:

- Annual Drinking Water Quality Reports
- Annual On-Site Inspections of Creek Channels
- Rain Gauge Data
- Stream Level Data
- Reservoir Data
- Rainfall Summaries
- Hydrologic Reports
- Urban Water Management Plans
- Integrated Regional Water Management Plan
- Meeting agenda, minutes, and schedules

The District is continually providing more data and analysis reports on the website and ultimately all public hydrological data will be accessible online.

At the request of a well owner, groundwater measurements from their well can only be released with their permission on a case by case basis. State law and District policy prohibit releasing well information and data that is collected from private wells without well owner request. The District is currently seeking permission from each of the well owners to allow the data to be released. Although the general release of groundwater information is limited for private property rights and security reasons, giving the owner the option to participate with this protection at least ensures the data is collected. Most owners are willing to release the information upon learning how the data will be used.

Water Resources Advisory Committee

The Water Resources Advisory Committee (WRAC) has maintained a keen interest in District activities since the 1950's. The WRAC, formed to advise the District's Board of Supervisors on important water resource issues, is a committee made up of local environmental and agricultural at-large representatives interested in water resource issues and local agency representatives. The meetings are open to the public. Each year the WRAC reviews the District's progress on various issues and assists in setting budget and priorities for the following year. District staff serves as secretary to the WRAC and attends the monthly WRAC meetings to discuss water resource issues.

Resource Management System (RMS)

As previously indicated, the RMS was established in 1980 to monitor land use patterns and to recommend steps the region's entities should take to properly plan for resources such as water supply. Watershed data, and particularly the policy recommendations based upon that data, is made available for public review and comment each year. Progress on water resource projects and other kinds of actions are also reviewed annually in this process.

Homeland Security

Historically, water systems were analyzed for threats from natural causes, accidental events, or unplanned mechanical failures. As a result of international relations, new consideration has been given to protecting systems from intentional threats. Data and reports that reveal the location of major water system infrastructure or that otherwise expose the vulnerability of the supply system are now being withheld from general public release.

J3. Statewide Data Needs

Include a discussion of how data collection will support statewide data needs. If the Plan includes a water quality component, include a discussion of the integration of data into the SWRCB's Surface Water Ambient Monitoring Program and Groundwater Ambient Monitoring and Assessment Program.

Where opportunities for data sharing exist, the District will coordinate with state and federal monitoring and data management efforts to determine specific reporting requirements and formats. With information readily available on the internet, entities statewide can access and research data for the San Luis Region. Copies of a multitude of documents, from County General Elements and the RMS to local water system and supply planning documents, are available for use in case studies, trend monitoring and statewide water resources analysis. The District is willing to collect and share data, and work with local stakeholders to collect and share data, in a manner consistent with any statewide data needs.

SWAMP / GAMA / CERES

The Surface Water Ambient Monitoring Program (SWAMP) and the Groundwater Ambient Monitoring and Assessment (GAMA) Program are a result of a combined effort between several State agencies (including SWRCB, DWR, CDFG, and RWQCB) and the USGS. These two programs are intended to develop a uniform comprehensive water quality database of the surface and groundwaters throughout the State. It is also intended to make this data readily accessible to the public while minimizing overlap and duplication of efforts. The California Environmental Resources Evaluation System (CERES) program is managed by the California Resources Agency. The goal of CERES is to improve environmental analysis and planning by integrating natural and cultural resource information from multiple contributors. It includes an environmental information catalog and a natural resources project inventory.

The District has been cooperating with the State in providing data to the GAMA program for the Paso Robles groundwater basin. This work focused on the groundwater source for the public water systems in the area, which include the Cities of Paso Robles and Atascadero as well as the communities of Templeton, San Miguel, Shandon, and Garden Farms.

At the conclusion of this GAMA work, the District will coordinate data collection efforts and evaluate the District's procedures for consistency with these programs. The success and lessons learned will be used to as model to encourage other local agencies within the region to also participate.

Where applicable, water quality monitoring data will be collected according to SWAMP, GAMA, and CERES guidelines to enable data integration into the databases. Data received will be managed in a format that is compatible with these databases to facilitate efficient submission. This will include ensuring that proper quality control and quality assurance of data has been performed.

Currently, the District and WRAC member agencies generates surface water quality data and an annual groundwater report that can be submitted and utilized for statewide data needs. All groundwater and surface water data reports developed as part of Project Assessment and Evaluation Plans (PAEP) for State-funded projects will also be compatible with CERES, SWAMP, and GAMA reporting requirements and formats. The reports that will be developed as part of the PAEPs for State-funded projects include, but are not limited to:

- Groundwater Reports: Water quality and extraction amounts.
- Metering Reports: Distribution system and individual well metering results.
- USGS Reports: Creek flow gauge results.
- DHS Drinking Water Program Annual Report: Water quality results.

PAEPs will be developed for each State-funded project consistent with State requirements and compatible with State formats.

J4. Monitoring Data Gaps

Identify data gaps where additional monitoring is needed.

As part of the 1998 Master Water Plan, the District reviewed the effectiveness of the data collection program. Several of the deficiencies and gaps have been addressed since the conclusion of that plan. The gaps that remain are generally described as follows:

Groundwater

As mentioned previously, State law and District policy prohibit releasing well information and data that is collected from private wells without well owner request. The District is currently seeking permission from each of the well owners to allow the data to be released. The State's GAMA program also addresses groundwater quality data for private drinking water wells through the Voluntary Domestic Well Assessment Program.

Seawater Intrusion

The potential for seawater intrusion is becoming a growing issue in select areas of the region, particularly in the Santa Maria and Los Osos Valley groundwater basins. The Santa Maria Groundwater Basin was recently adjudicated, resulting in three water management areas that are required to monitor and report on the status of the basin to the Water Master. A Groundwater Management Plan was instituted for the Los Osos Valley groundwater basin, but is also now in litigation. Some monitoring is currently being performed as an indirect result of other programs. The District and the County Planning Department work cooperatively with the agencies in these basins to collect information on seawater intrusion issues. The District will review the efforts being undertaken in the region and attempt to encourage more monitoring by the affected pumpers. Once collected, this data can be easily managed by District.

Agricultural Water Demand

The District is in the early stages of developing a GIS database for the region. One of the uses for the database will be for tracking agricultural trends and better estimating water use. Maintaining this database will allow more thorough, more uniform, and more cost effective water resource studies in the future.

Stream Flow

Historically, most stream gauge sites within the region were selected based upon the potential for a water supply dam. The 1998 Master Water Plan recommends placing new gauges on each of the major coastal streams. The need to evaluate the stream component of groundwater recharge has also become more apparent in several recent groundwater studies.

Environmental Water Demand

1998 Master Water Plan notes that quantifying the environmental demand on streams and habitat has not been adequately addressed. It is anticipated that data collected from ongoing studies and historical hydrological trends can be used to develop a database for environmental demand. The Arroyo Grande Creek HCP and the Estero Bay HCP are two examples of such studies.

Data to Measure Plan Performance

A significant data need that is new as a result of IRWM efforts is the need to develop data for evaluating Plan performance. The mechanism for collecting data to measure plan performance is via the RMS and County-wide Master Water Plan. Section I describes project specific performance measurements as well as approaches to programmatic performance measurements and the four cornerstones of a District “scorecard” (Institutional, Fiscal, Regulatory, and Community Acceptance). The development of data to monitor performance is also, in part, related to the iterative process of adaptive management. As a result, the Plan’s implementation schedule includes developing a “baseline” scorecard, with data review by the Water Resources Advisory Committee. The performance measurement data – including both the data included in this Plan and additional data that will be developed through adaptive management and ongoing review – will be compiled and posted on the District’s website specifically developed for IRWM efforts.

Draft

2005
Urban Water Management Plan

September 2007

Prepared for:

City of El Paso de Robles
California

Prepared by:

Todd Engineers
Emeryville, California

Draft

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Urban Water Management Plan

September 2007

Prepared for

City of El Paso de Robles
Paso Robles, California

Prepared by

Todd Engineers
2200 Powell Street, Suite 225
Emeryville, California 94608
510-595-2120 / Fax 510-595-2112
toddengineers.com

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EXECUTIVE SUMMARY

This Urban Water Management Plan (UWMP or Plan) for the City of Paso Robles documents the City's sources of water supply and water demands, presents a contingency plan for water shortages, and supports efficient use of the City's existing water supplies through water conservation. This 2005 Plan builds on the 2000 UWMP and the Integrated Water Resources Plan (IWRP) process adopted in May 2007.

Water Supply and Demand

As the City's population increases over the next 25 years, total water demand is projected to more than double from 6,735 acre feet per year (AFY) to 15,265 AFY. Currently, much of the water demand is for single-family residential uses; in the future, it is expected that multi-family and commercial/industrial demands will increase relative to single-family residential demand and irrigation demand. Future supplies are projected to meet demands because the volume of groundwater pumped will be varied to meet future demands.

The City currently relies on groundwater from two sources: Salinas River underflow and groundwater in the Paso Robles Groundwater Basin. While the City's Salinas River underflow is defined by its water rights, the groundwater basin resource is shared among many users and is subject to increasing demands. The City is an active participant in the Paso Robles Groundwater Basin Agreement with San Luis Obispo County and specific basin landowners. This agreement supports groundwater management to avoid overdraft and thereby promotes long-term groundwater supply reliability.

The City is developing two additional sources for the future. First, the City recently entered an agreement to import 4,000 AFY of Lake Nacimiento water by 2010. Lake Nacimiento water is high quality relative to groundwater and would provide better water quality to City customers. In addition, use of Nacimiento water would improve wastewater quality. This is important because City wastewater is recharged to the groundwater basin and improved quality would yield long-term water quality benefits to the groundwater basin. In addition, the City is actively planning to provide as much as 2,000 AFY of recycled water for irrigation by 2025.

The City of Paso Robles water system provides built-in reliability. First, the water system uses two groundwater sources, Salinas River underflow and the groundwater basin, with wells dispersed throughout the service area, ensuring that no single event is likely to disrupt more than four wells. Provision of Lake Nacimiento water and recycled water will enhance this reliability. Lake Nacimiento supply is independent of local groundwater supplies and the Lake Nacimiento contracts give the City and other San Luis Obispo County agencies high priority in droughts. Recycled water not only releases potable groundwater for higher beneficial uses, but presents the advantages of being very reliable, especially in drought, and locally controlled.

Comparison of planned water supply sources and projected water demand in the long term--to 2025 and beyond--indicates that even with Lake Nacimiento and water recycling, the City will increasingly rely on basin groundwater. At current rates of municipal and agricultural pumping, local groundwater already is subject to chronic declines; in the long term, future municipal pumping rates are projected to exceed current pumping rates. If agricultural pumping, which constituted 68 percent of the Paso Robles Groundwater Basin pumping in 2000, also increases, a risk of overdraft exists. This risk, which undercuts water supply reliability, can be reduced by several means, including development of Lake Nacimiento supply beyond the currently planned amount, water recycling, and water conservation.

Water Shortage Contingency Plan

In addition to evaluating the overall reliability of water supply, this Plan also assesses the reliability of City water supply during single-year and multiple-year droughts, and in the event of a catastrophe. In brief, single year droughts do not significantly affect the City's wells. Instead droughts with durations of three, four, or five years appear to be the most problematic. A recent study *Water Source Evaluation* (Boyle, September 2006b), evaluated the ability of the City to handle a drought similar to 1987-1991 given its existing water demand and current facilities. This assessment indicated that the City has the present capability to withstand a drought like that of the rainfall years 1987-1991, but with little margin for operational problems or for significant growth in water demand without new water supply sources. More recently, the City requested a citywide voluntary water conservation goal of 25 percent for July to September 2007 to meet peak water use demands. The water system was strained to satisfy peak demands because production from Sherwood No. 9 and 11 wells had been temporarily decreased to install arsenic treatment facilities, and water demand was high due to a dry spring and early hot summer (Monn, July 3, 2007).

The Water Shortage Contingency Plan recommends that the City consider developing and adopting a water shortage contingency plan resolution that addresses water shortage due to drought. Given increasing water demands on groundwater in the future, such a resolution would help ensure that the City of Paso Robles experiences future droughts with minimal difficulty.

Water Demand Management Measures

Water demand management (water conservation) provides numerous benefits to the City. These include cost savings through reduced water production and distribution costs and deferred capital costs. In addition, benefits to the groundwater basin will occur as groundwater that is not pumped will remain in storage, helping to maintain groundwater levels and increase long-term groundwater supply reliability (including during droughts). Through water conservation, citizens can be assured that the City is using its existing water supplies efficiently while pursuing additional water supplies.

The City already is conserving water as a result of its metering with commodity rates. Additional savings, as high as 800 AFY, can be achieved depending on the choice of measures and the degree and timing of implementation. Staffing a water conservation position would benefit City water customers. Future implementation of conservation pricing would provide substantial benefits to the City and a program should be developed with City stakeholders to set a pricing structure that is both effective and fair. Additional study of unaccounted-for water is recommended to determine how much the system leaks. If substantial, then a leak detection and repair program offers significant water savings. Water conservation programs for commercial/industrial and large landscape uses are recommended, as these programs can yield cost-effective water savings.

1. INTRODUCTION

1.1 Plan Preparation and Adoption

This Urban Water Management Plan (Plan) has been prepared for the City of Paso Robles to meet Water Code sections 10610 and following and to guide the City's water conservation efforts to the year 2010. This Plan documents the City's sources of water supply, defines water demands, presents a water shortage contingency plan, and describes implementation of water demand management measures.

This 2005 Plan builds on and updates the 2000 UWMP, accounting for recent changes in the California Water Code and recent local efforts including the 2003 General Plan Update, Paso Robles Groundwater Basin Study (Fugro, 2002 and 2005), and the Water Resources Plan Integration and Capital Improvement Program (WRPI/CIP) (T.J. Cross Engineers, February 2007). In addition, the State of California has identified the UWMP as a foundational document for compliance with Senate Bills (SB) 610 and 221, which require documentation of adequate and reliable water supply prior to approval of large developments. Accordingly, the 2005 Plan includes information relevant to SB 610 water supply assessments and SB 221 verifications.

The City established the following water resource goals in 2004:

- Improve water quality,
- Increase and diversify water resources,
- Increase reliability of water supplies,
- Reduce groundwater basin dependence,
- Reduce salt loading into the basin and thereby comply with regulatory mandates,
- Maintain strong water rights position,
- Anticipate regulatory requirements, and
- Prioritize public works expenditures to meet these goals.

To attain these goals, a series of water resource reports were generated for the City and included the following:

- Storm Water Management Plan (URS, December 2004),
- Wastewater Treatment Plant Audit (Boyle, September 2005),
- Wastewater Pretreatment/Source Control Memorandum (Boyle, October 2005),
- Draft Sewer Collection System Master Plan (Boyle, June 2006a),
- Revised Draft Potable Water Distribution System Master Plan (Boyle, June 2006b),
- Recycled Water Study Update (Boyle, September 2006a),
- Water Source Evaluation (Boyle, September 2006b), and
- Storm Drain Master Plan (in progress).

The *Water Resources Plan Integration* (T.J. Cross, February 2007) summarizes key recommendations from these reports as well as those from a preliminary draft of this 2005 Plan. The schedule for this Plan was extended to allow inclusion of significant determinations of the WRPI/CIP (T.J. Cross, February 2007). These include:

- Potable water demand is projected to more than double by 2025.
- Significant infrastructure expansion is needed to deliver more water at a faster rate and to collect more wastewater.
- Treatment and disposal of wastewater will become increasingly difficult and costly due to salt loading and more restrictive regulations.
- Salt loading can be decreased through delivery of high quality Nacimiento Project water and by decreasing the use of residential water softeners (which increase salts in the waste stream).The resulting improved wastewater quality would reduce treatment costs and disposal issues and advance the use of recycled water for irrigation.
- More water should be conserved as there is much opportunity in the City, especially with large irrigators and possibly through the use of recycled water. The conservation of water would defer infrastructure improvement costs.

The 2008-2017 Capital Improvement Program is suggested to generally occur in the following sequence (T.J. Cross, February 2007):

1. Accept and treat Nacimiento water
2. Initiate a water conservation program and a wastewater source control/water softener ordinance to reduce salt loading and comply with toxicity limits at the wastewater treatment plant
3. Determine the degree of treatment needed to recycle water and install recycled water delivery pipelines
4. Identify recycled water users and determine the level of treatment needed for these specific uses. Include ammonia level compliance considerations in the treatment plant upgrade.
5. Proceed with design and construction of upgraded wastewater treatment plant and recycled water delivery system. The design should incorporate the impacts of water conservation and salt reduction.
6. Revise the Potable Water Distribution Master Plan to incorporate conservation and recycled water use once the programs are up and running.

The Plan is a key component in the advancement of the City toward their water resource goals. Most notably, the Plan documents the quantity and quality of the City's water supplies, both current and future. This provides baseline information for future augmentation and diversification of City supplies. The Plan also provides specific assessment of the reliability of City water supplies during normal and drought years and in emergencies. In addition, the Plan documents the City's water rights and measures taken by the City to protect its use of water supplies.

In accordance with section 10642 of the Water Code and section 6066 of the Government Code, Paso Robles will hold a public hearing at least 45 days after the circulation of the Draft Plan and prior to adoption of the Plan. A public notice will be posted before the public hearing. This Plan will be presented to the City Council for review and adoption. The draft resolution to adopt the Plan is included in Appendix A. The adopted Plan will be filed with the Office of Conservation in the Department of Water Resources, as required by law. California regulations require Urban Water Management Plans to be updated at least once every five years in years ending in five and zero. Accordingly, this is the 2005 Plan, which will be updated by December 31, 2010.

1.2 Agency Coordination and Public Participation

Paso Robles has provided for agency coordination and community participation in its urban water management planning efforts. Table 1 lists the organizations that were contacted and summarizes citizen participation. This Draft Plan was distributed to the public in September 2007 for comment with a public presentation in October 2007 to summarize the Draft Plan. Table 1 also summarizes circulation of the Draft Plan. The Draft Plan was sent to the listed organizations with a request to provide comments. Comments will be addressed in an appendix to the Final Plan.

In addition to preparation of this report, coordination with other agencies is ongoing in the Paso Robles area. A jointly supported study of the Paso Robles Groundwater Basin (Fugro, August 2002 and February 2005) was completed that documents existing and potential long-term water supply. Building on that effort, on September 6, 2005 the City entered the Paso Robles Groundwater Basin Agreement with San Luis Obispo County and a number of overlying landowners, which states that the basin is not in overdraft now and that parties will not take court action to establish any priority of groundwater rights over another party as long as the agreement is in effect. The agreement also supports cooperative participation in monitoring and management of groundwater resources. In addition, the City of Paso Robles is one of several agencies participating in a project to obtain surface water from Nacimiento Reservoir. These studies and plans are discussed in more detail in the following sections of this report.

1.3 Acknowledgements

This Plan was prepared by Iris Priestaf, Katherine White, and Craig Gaites. We appreciate the considerable assistance provided by the City of Paso Robles staff including Doug Monn, Katie DiSimone, Brad Hagemann, Meg Williamson, and Kelly Dunham. James App, City Manager, provided invaluable guidance as did Christine Halley of T. J. Cross Engineers. We thank Boyle Engineering staff, including Michael Nunley and Christopher Alakel, who provided data and draft versions from their water resource investigation reports. This Plan was prepared using the checklists and worksheets provided by the California Department of Water Resources (DWR) from their website,

http://www.owue.water.ca.gov/urbanplan/index.cfm

and in their *Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan* (January 18, 2005).

The table below presents the Water Code requirements and directs the reader to the section of the Plan where the requirements are addressed.

Required Element	Water Code §	Section in Plan
Agency Coordination and Public Participation	10620(d), 10621(b), 10642	1.2
Tools to Maximize Resources and Minimize Imports from Other Regions	10620(f)	2.5, 2.6, 2.7
Service Area Description	10631(a)	2.1
Current and Projected Population (5-year increments)	10631(a)	2.3
Climate	10631(a)	2.2
Other Demographic Factors	10631(a)	2.3
Existing and Planned Sources of Water (5-year increments)	10631(b)	2.7
Reliability & Vulnerability	10631(c)	2.8, 3.2
Average Water Year Availability	10631(c)	2.7
Single Dry Year Availability	10631(c)	3.2
Multiple Dry Year Availability	10631(c)	3.2
Plans for Replacing Inconsistently Available Sources	10631(c)	3.3
Opportunities for Water Exchanges or Transfers	10631(d)	2.7
Past, Current & Projected Water Use	10631(e)	2.4
Description of Demand Management Measures	10631(f)	4.2
Evaluation of Demand Management Measures Currently Not Being Implemented	10631(g)	4.2, 4.3, 4.4, Appendix D
Description of all Water Supply Projects & Program Being Undertaken to Meet Demand	10631(h)	2.7
Description of Desalinization Opportunities	10631(i)	2.7
Supply and Demand Data Exchange with Wholesalers in 5-Year Increments	10631(k)	2.7
Water Shortage Contingency Analysis	10632	3.2, 3.3
Actions to be Undertaken in Response to Water Supply Shortages	10632(a)	3.4, 3.5
Estimate of the Maximum Amount of Water Available during the Next 3 Years Based on Driest 3-Year Historic Sequence	10632(b)	3.2
Actions to be Undertaken in Response to Catastrophic Interruptions	10632(c)	3.4, 3.5
Additional Mandatory Prohibitions Against Specific Water Uses	10632(d)	3.4, 3.5
Consumption Reduction Methods for the Most Restrictive Stages	10632(e)	3.4, 3.5
Penalties and Charges for Excessive Use if Applicable	10632(f)	3.4, 3.5
Analysis of Water Shortage Contingency Methods on Revenues & Expenditures	10632(g)	3.5
Draft Water Shortage Contingency Ordinance	10632(h)	Appendix B
Mechanism for Determining Actual Reductions	10632(i)	3.5
Additional Requirements for Groundwater		
Discussion of groundwater management plans/authority	10631(b)(1)	2.5
Description of adjudications or legal rights to pump	10631(b)(2)	2.5
Descriptions of DWR determinations related to groundwater	10631(b)(2)	2.5
Description of the groundwater basin	10631(b)(2)	2.5
Description and analysis of the location, amount & sufficiency of groundwater pumped in the last 5-years by the City	10631(b)(3)	2.5
Description and analysis of the amount and location of groundwater projected to be pumped by the City	10631(b)(4)	2.5
Additional Requirements for Recycled Water		
Description and Quantification of Wastewater Systems	10633(a)	2.6

Description of Current Recycled Water Use in the Service Area	10633(b)	2.6
Description and Quantification of Potential Recycled Water Uses	10633(c)	2.6
Projected Use in the Service Area (5-year Increments)	10633(d)	2.6
Descriptions of Actions Taken to Encourage the Use of Recycled Water	10633(e)	2.6
Plan of Optimizing the Use of Recycled Water	10633(f)	2.6
Water Quality and Effect of Quality on Supply Management Strategies	10634	3.3
Assessment of Reliability in the Normal, Single Dry and Multiple Dry Years (5-year Increments)	10635	3.2

Table 1

Coordination with Appropriate Agencies and the Community

	Participated in developing the plan	Was contacted for assistance	Was sent a copy of the draft plan or notified plan would be supplied upon request	Attended public meetings	Commented on the draft	Was sent a notice of intention to adopt
Atascadero Mutual Water Company			X			
Templeton Community Services District			X			
San Luis Obispo County Engineering Department			X			
City of Atascadero			X			
Paso Robles Public Library			X			
California Regional Water Quality Control Board			X			
Paso Robles Chamber of Commerce			X			
San Miguel Community Services District			X			
Paso Robles Imperiled Overlying Rights (PRIOR)			X			
Citizens (see Appendix XX)						

2. WATER SUPPLY AND DEMAND

2.1 Location

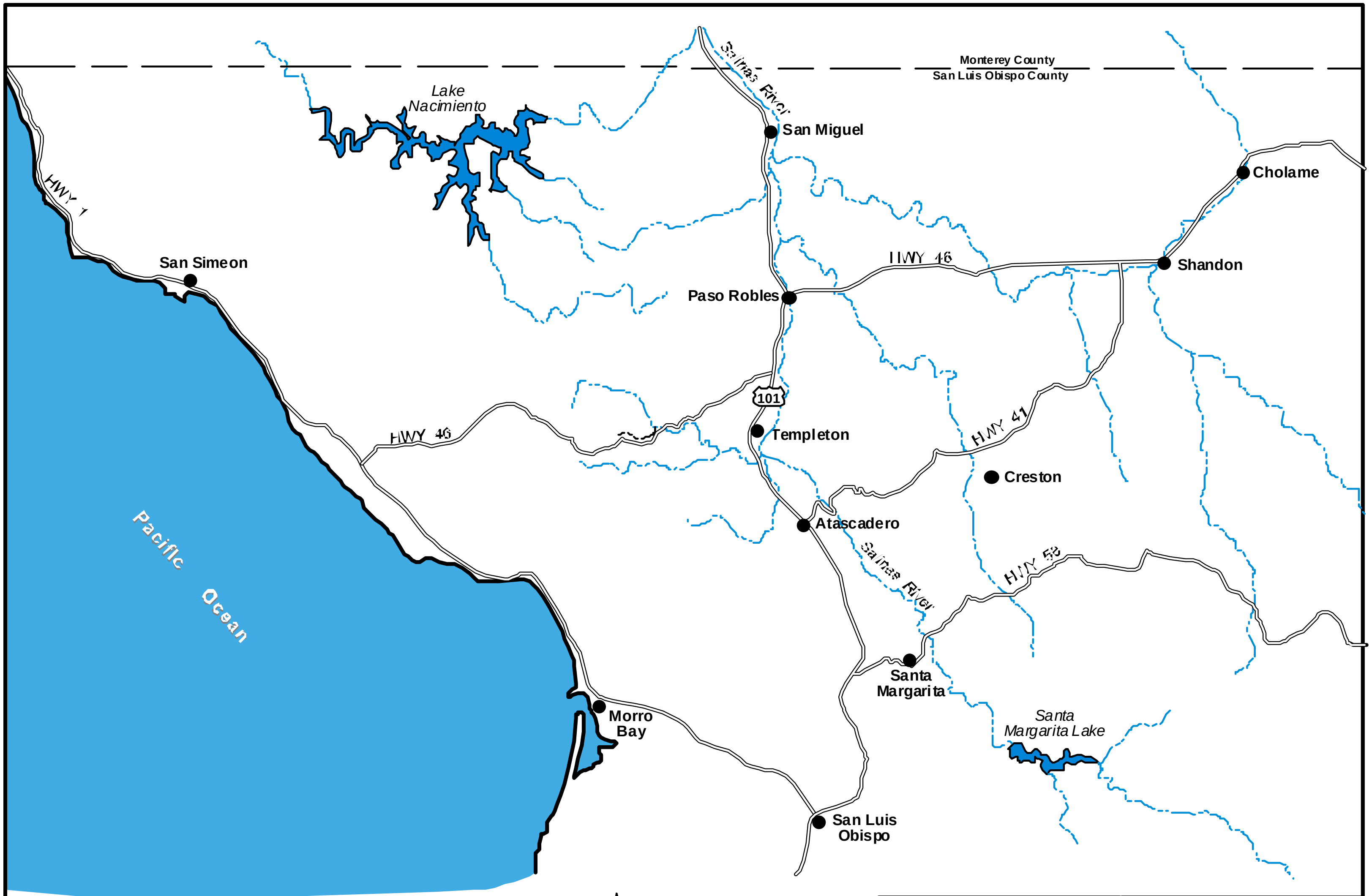
The City of Paso Robles is located in northern San Luis Obispo County (North County), on the eastern, inland side of the Santa Lucia Mountains. As illustrated in Figure 1, Paso Robles is situated on the upper Salinas River, which flows north toward Monterey County. Incorporated in 1889, the City of El Paso de Robles (Paso Robles) now encompasses a total area of 11,985 acres on both sides of the Salinas River (Rincon, General Plan 2003). Other communities in the vicinity of Paso Robles include Templeton, the City of Atascadero, Santa Margarita, and San Miguel. The City also is situated on the western margin of the Paso Robles Groundwater Basin, which is the water-bearing portion of the upper Salinas River drainage area.

2.2 Climate

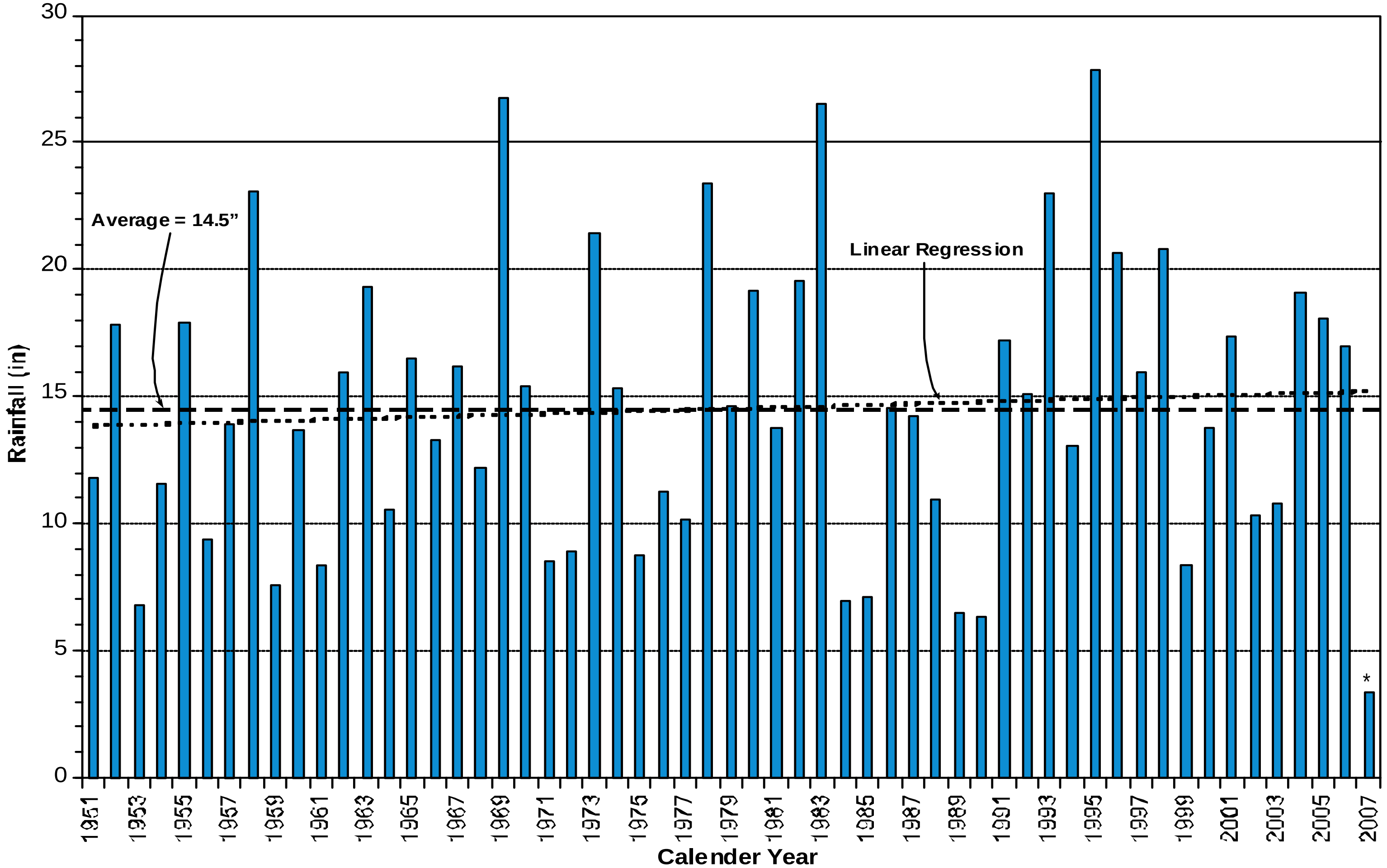
Paso Robles has a semi-arid, Mediterranean climate characterized by hot sunny summers and cool winters. Because of its inland location, the influence of fog and maritime breezes is less pronounced than in San Luis Obispo. Most of the precipitation occurs in the winter months (November through April) as summarized in Table 2. Precipitation on the Paso Robles Groundwater Basin area ranges from an annual average of 18 inches or more in the west to five to eight inches in the eastern portion of the basin (Fugro, August 2002).

Average annual precipitation near the City of Paso Robles is about 14.5 inches with a median of 14.2 inches; however, the area is subject to wide variations in annual precipitation as shown on Figure 2. The location of the precipitation gage is shown on Figure 3. Since 1951, the lowest recorded annual rainfall was 6.37 inches (1990 calendar year) and the greatest annual rainfall was 27.83 inches (1995 calendar year) [USGS/DWR Salinas River at Paso Robles Station]. Note that available rainfall data for 2007 indicates that this current year will be one of the driest on record with only 3.37 inches so far for January through July. A linear regression line or trend line has also been plotted on Figure 2 showing a very slight increasing trend of rainfall amounts since 1951.

Table 2 also presents average evapotranspiration (ET) data. ET is the loss of water to the atmosphere by evaporation from soil and plant surfaces and transpiration from plants. It is an indicator of how much water crops, lawns, gardens, and trees need for healthy growth and productivity. ET from a standardized grass surface is commonly denoted as ETo. The least ET occurs in the cool wet winter months and greatest ET occurs during the hot dry summer months. This results in peak month water demands in summer that are three times the comparable winter demand.



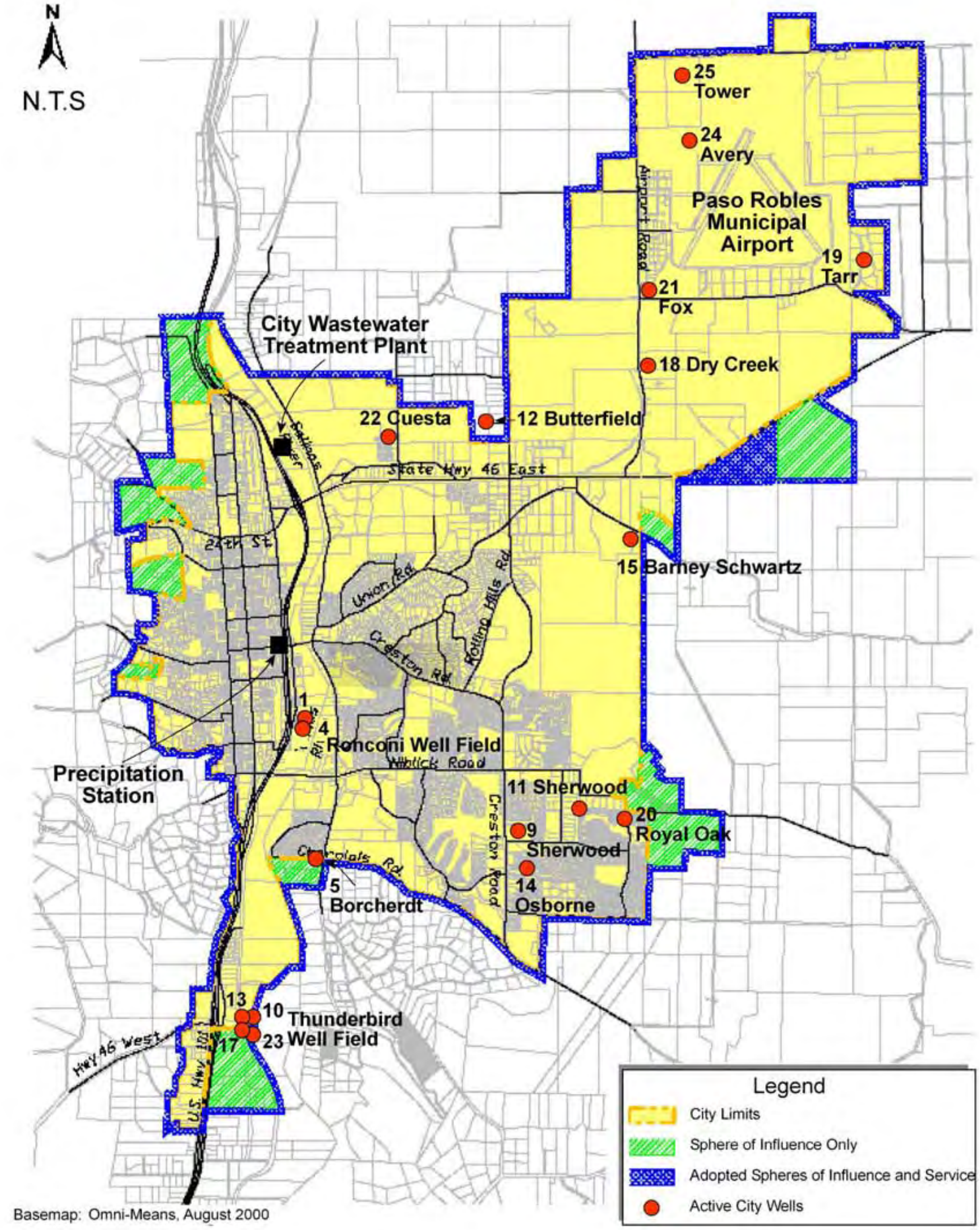
September 2007	Figure 1 Paso Robles Location Map
TODD ENGINEERS Emeryville, California	



Station "Salinas River at Paso Robles (PAS)" monitored by DWR and USGS

* Calendar Year 2007 data through July 2007

September 2007	**Figure 2**
TODD ENGINEERS Emeryville, California	**Paso Robles Precipitation**



September 2007	**Figure 3**
TODD ENGINEERS Emeryville, California	**Paso Robles Boundaries and Facilities**

Table 2 Climate						
	January	February	March	April	May	June
Average Eto (inches/month)	2.21	2.5	3.8	5.08	5.7	6.19
Average Rainfall (inches/month)	2.94	2.81	2.30	1.02	0.26	0.02
Average Temperature (°F)	52.43	56.10	58.68	62.90	69.32	75.03

Table 2 (continued) Climate							
	July	August	September	October	November	December	Annual*
Average Eto (inches/month)	6.43	6.09	4.87	4.09	2.89	2.28	**52.13**
Average Rainfall (inches/month)	0.04	0.04	0.16	0.50	1.47	2.26	**13.82**
Average Temperature (°F)	80.45	80.12	76.76	68.84	57.84	51.40	**65.82**

* Calendar year totals for Eto and Rainfall, Calendar year average monthly temperature
Eto Data Source: CIMIS Station 163 Atascadero, 2000 - 2004
Precip Data Source: NCDC Cooperative Summary of the Day TD3200, Station 6730 Paso Robles, 1943 - 2004
Temperature Data Source: NCDC Cooperative Summary of the Day TD3200, Station 6730 Paso Robles, 1948 - 2001

2.3 Population

The first major commercial activity in the North County was cattle grazing, followed by development of almond groves and most recently, extensive planting of vineyards. In addition to its agricultural base, Paso Robles also has a long history as a resort, based primarily on development of local hot springs. Other major factors affecting historical growth of the City included development of Camp Roberts (a large military base) during World War II and improvement of State Highways 101 and 46. Paso Robles remains the major service center for ranching and agriculture in the North County, particularly areas to the east along Highway 46. Three reservoirs have been developed in the area for flood control, water supply, and recreation; these are Santa Margarita Lake (Salinas Dam) on the upper Salinas River, Lake Nacimiento on the Nacimiento River near the San Luis Obispo-Monterey County line, as well as San Antonio Lake in Monterey County. These lakes are popular vacation destinations, and along with wineries and Mid-State Fairgrounds events, have contributed significantly to tourism in Paso Robles. Paso Robles also has attracted numerous retirees from Southern California metropolitan areas.

Table 3 shows the City's population in 1990 and 2000 along with projections to the year 2025 in five-year intervals as required by the California Water Code. As indicated, census data show that the population increased about 30 percent between 1990 and 2000, a rate of just less than three percent annually. In December 2003, the City approved a maximum residential build-out potential of 44,000 residents by the year 2025 (Rincon, General Plan 2003). This projection results in an approximate 61 percent increase in population over the 20-year period between 2005 and 2025. Population projections for 2010, 2015, and 2020 were derived from a linear interpolation between the estimated 2005 population and the projected 2025 population. This results in a growth rate of about 2.4 percent annually to the 2025 build-out population of 44,000.

Table 3

Population - Current and Projected

	1990	2000	2005	2010	2015	2020	2025
Service Area Population	18,583	24,297	27,361	30,811	34,697	39,073	44,000*

* Buildout as per City of El Paso de Robles General Plan 2003
1990 and 2000 populations from Census
2010, 2015, and 2020 estimated based on annual linear growth rate of approximately 2.4%

The 1990 census indicated an average of 2.65 persons per dwelling unit and 6,984 households (Lata, 2000) while 2005 population and residential connection estimates indicate an average of 2.8 persons per dwelling unit (27,361 people and 9,700 residential connections). The population projections in Table 3 and the number of accounts or dwelling units in Table 4 below are not comparable as these values were derived from different sources. The buildout population of 44,000 was from the City's 2003 General Plan while the number of accounts was derived from water demand values assuming maximum land use buildout and no future conservation of water (Boyle, September 23, 2005). This Plan has reported both numbers to be consistent with these documents. If maximum land use buildout were to occur, the population would be greater.

2.4 Past, Current and Projected Water Demand

Water Connections. Table 4 shows the number of water service connections by customer type. The basic breakdown into the four water use sectors was derived from current meter reading categories and future General Plan land use categories used in recent water demand projections (Boyle, September 23, 2005). The bottom row of Table 4 summarizes total active water service connections for 2000 and 2005 and projected connections at five-year intervals between 2005 and 2025.

The number of connections for each category was derived from demand for that category described in the next section. Typical annual water demands per connection calculated for 2005 are 0.5 acre feet (AF)/connection for single family residential, 0.4 AF/connection for multi-family residential, 1.5 AF/connection for commercial/industrial, and 2.6 AF/connection for irrigation/other. These same demand-per-connection estimates were used to estimate 2025 connections. As with population projections, the estimated number of connections between 2005 and 2025 is based on straight-line interpolation. For comparison purposes, an average California household uses 0.5 to 1.0 AFY for indoor and outdoor uses (San Luis Obispo LAFCO, July 2003).

TABLE 4
Past, Current and Projected Water Deliveries

Water Use Sectors	2000 # of Accounts	2000 Deliveries (AFY)	2005 # of Accounts	2005 Deliveries (AFY)	2010 # of Accounts	2010 Deliveries (AFY)	2015 # of Accounts	2015 Deliveries (AFY)	2020 # of Accounts	2020 Deliveries (AFY)	2025 # of Accounts	2025 Deliveries (AFY)
Single Family	6,862	4,500	8,100	4,170	9,425	4,807	10,750	5,445	12,075	6,082	13,400	6,720
Multi-family	In other categories	In other categories	1,600	685	3,525	1,447	5,450	2,210	7,375	2,972	9,300	3,735
Commercial/ Industrial	437	700	695	1,035	1,111	1,661	1,527	2,287	1,944	2,914	2,360	3,540
Parks, Landscape Irrigation, Other	301	800	325	845	369	951	412	1,057	456	1,164	500	1,270
Total	7,600	6,000	10,720	6,735	14,430	8,866	18,139	10,999	21,850	13,132	25,560	15,265

Connections
2000 total connections from App (April 2000) and assume same breakdown as in 1999 City supplied spreadsheet, multi-family units not all individually metered
2005 connections derived from 2004 DWR Public Water System Status form and General Plan update, p.4 and LU-1, residential units for 2003 which appears to include all multi-family units
2025 connections using Boyle's 2025 demand (September 23, 2005) and same water use (AF/connection) as in 2005
Note conversion of Boyle (September 23, 2005) land use water demand values to connections results in more residential units than General Plan update [p. 4, max residential units = 16, 843]

Deliveries
2000 deliveries estimated from total pumping (assuming 7% loss) and similar use per connection as 2004/2005, 2000 does not include all multi-family connections
2005 deliveries derived from 2004 DWR worksheet total pumping (assuming a 10% loss) and assuming an increase for 2005
2025 deliveries from Boyle draft Table 5 (September 23, 2005) annual demand for various land use categories at 2025 buildout

Assumed linear increase for all land use categories between 2005 and 2025

In 2005 the City provided water to about 10,720 connections. In 2025 it is expected that water service connections will increase to about 25,560, more than double the number of 2005 connections. This assumes maximum potential buildout of all land use categories (Boyle, September 23, 2005). Between 2005 and 2025, single family connections are estimated to increase 65 percent while multi-family connections are estimated to increase 481 percent. The large increase in multi-family units reflects the multi-family land use zoning in the 2003 General Plan and assumes full buildout. Commercial and industrial connections are estimated to increase 240 percent between 2005 and 2025 while the category that includes parks, landscape irrigation and other miscellaneous water uses is expected to increase 54 percent.

The number and type of water service connections provide insight into different customers' water use, which can be useful in defining effective water conservation measures. The parks, landscape irrigation and other category may include commercial, school, park, and multi-family landscape irrigation as well as construction meter use; there are no significant agricultural customers for City water. As indicated, the majority of service connections is residential.

New state legislation (SB 1087 and Government Code section 65589.7) became effective January 1, 2006. It provides that local water agencies and sewer districts must grant priority for service hook-ups to projects that help meet the community's fair housing need. In other words, policies and procedures should be written to provide priority service to new developments with affordable housing and these policies should be updated every five years. The City of Paso Robles is currently reviewing the existing policies and will update these if needed.

Water Demand. Table 4 also summarizes past and current water deliveries and shows projected water demand. Other water use sectors such as sales to other agencies, groundwater recharge, and conjunctive use are not performed in Paso Robles at this time or planned in the future and have not been included in this table. As indicated in the bottom row of Table 4, total water demand is projected to increase from 6,735 acre-feet per year (AFY) in 2005 to 15,265 AFY in 2025, more than double the 2005 water demand. Consistent with water service connections, water demand in the City is subdivided into four categories: single and multi-family residential, commercial and industrial, and irrigation and miscellaneous. Future water demand was based on 2025 build-out land use projections that assume maximum buildout of the land use categories (Boyle, September 23, 2005). The water demand values presented in Table 4 are annual totals. Seasonal variations occur with more water used during hot dry summers especially for agriculture and landscape irrigation.

Between 2005 and 2025, it is estimated that the percentage of residential water demand to total water demand will decrease from 72 percent to 68 percent, commercial and industrial demand will increase from 15 percent to 23 percent, and irrigation/other will decrease from 13 percent to 8 percent. Note that within the residential demand category, single family demand decreases from 62 percent of total demand in 2005 to 44 percent in 2025 while multi-family demand increases from 10 percent to 24 percent, again reflecting the maximum build-out land use.

It was assumed that the population increases linearly from 27,361 in 2005 to 44,000 in 2025 (see Table 3) and that total demand increases linearly from 6,735 AF to 15,265 AF over the same time period. Actual 2005 use was 220 gallons per capita per day (gpcd) and 2025 use is estimated at over 300 gpcd if a population of 44,000 is assumed at buildout. However, as mentioned before, the population and demand values were derived from different sources; buildout population from the 2003 General Plan and the demand values were based on maximum buildout land use. If maximum potential buildout were to occur, the population would be greater than 44,000 resulting in a per capita water use similar to current use. In addition, it is anticipated that proposed water conservation, or water demand management measures identified later in this report, would further reduce the per capita water use to less than 220 gpcd. Per capita use is the average amount of water used by individual residential customers each year, including water that they do not directly use but which benefits them such as fire fighting, park and school irrigation, commercial and industrial uses, and other municipal and irrigation uses. For comparison purposes, dividing the 2005 water deliveries for only single and multi-family users with the population results in a use of 159 gpcd.

As a matter of perspective, Paso Robles water use rates can be compared to statewide averages and those for other nearby communities. Average urban water use in California was estimated to be 232 gpcd in 2000 (Public Policy Institute of California, July 2005). Between 1994 and 2000, the City of Atascadero used an average of 0.237 AFY per person or 211.6 gpcd (San Luis Obispo LAFCO, July 2003). The City of San Luis Obispo total water use was 182 gpcd before the early 1990s drought, dropped to 86 gpcd with drastic penalties during the drought, crept back up to 132 gpcd by the late 1990s, and stabilized at approximately 118 gpcd by 2002 (New Times, April 2002). An UWMP prepared for the Central Coast Water Authority summarized water use rates for 16 water purveyors in Santa Barbara County including the cities of Santa Barbara and Santa Maria and the Goleta Water District (Central Coast Water Authority, December 2005). Water use varied from 79 to 267 gpcd with an average of 167.8 gpcd. The City of Bakersfield Urban Water Management Plan (October 2005) indicates water use in 2005 of 278.5 gpcd (reported as 101,670 gallons per person per year) with a decrease by 2030 to 248.8 gpcd (90,797 gallons per person per year).

This comparison indicates that water use in the City of Paso Robles is on the high end of water demand rates. This reflects high water demands for landscape irrigation during hot summers, particularly when compared to cool coastal communities with low landscaping water use. The City's high summer irrigation demands result not only in substantial consumption of water, but also can strain the City's capability to satisfy peak demands. Such high demands can be reduced effectively through water-saving landscaping and irrigation practices, or satisfied with recycled water.

System Losses and Total Water Use. A small portion of water produced in any water system is unaccounted between water production (e.g., groundwater pumping) and water delivery. Annual system losses for the City were assumed to be between seven and ten percent to generate the loss values shown in Table 5. Unaccounted water may have been as high as 15 percent in 2004 but new billing software and diligent reading of all meters reduced this amount to below 7 percent in 2005 (Boyle, January 2007a). Unaccounted urban water use in California generally ranges from 6 to 15 percent and averages about 10 percent (California DWR, August 1994). The tracking and monitoring of all water usage, new system software, and installation and/or replacement of meters will continue to reduce the percentage of future losses (Boyle, January 2007a). Table 5 also shows water demands from Table 4 and provides the total water use from 2000 to 2025, the sum of water demand and system losses. This is the total amount of needed water supply.

Table 5 Water Losses and Total Water Use (AFY)						
Water Use	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Unaccounted-for System Losses	449	679	664	831	968	1,135
Water Deliveries (from Table 4)	6,000	6,735	8,866	10,999	13,132	15,265
Total	**6,449**	**7,414**	**9,530**	**11,830**	**14,100**	**16,400**

2.5 Sources of Water Supply and Facilities

The City of Paso Robles has historically relied upon local groundwater of the Paso Robles Groundwater Basin for its municipal water supply. This section describes the groundwater basin in terms of major aquifers, groundwater levels and flow, perennial yield and groundwater use, and groundwater quality. This section also discusses the City's two existing sources of water supply (Salinas River underflow and percolating groundwater of the basin) and describes its water facilities. In the future, the City of Paso Robles will receive 4,000 acre-feet per year of relatively high quality, untreated water from the Nacimiento Water Project (see Section 2.7). This section ends with a brief discussion of the City's water sales.

Groundwater Basin. The groundwater basin is variously defined by different agencies. The Department of Water Resources has defined the Paso Robles Area Subbasin as a portion of the Salinas Valley Groundwater Basin and designated as basin number 3-4.06.

For this Urban Water Management Plan, the basin is defined as the Paso Robles Groundwater Basin, as delineated in the *Paso Robles Groundwater Basin Study* (Fugro, August 2002). The Paso Robles Groundwater Basin encompasses about 790 square miles in San Luis Obispo County and southern Monterey County. The Paso Robles Groundwater Basin is the water-bearing portion of the upper Salinas River drainage area. The drainage area covers 1,980 square miles and extends from the Nacimiento River in Monterey County to south of the Salinas Reservoir (Santa Margarita Lake). The Salinas River system, consisting of the Salinas River and many tributaries, drains the basin area and flows north along the western edge of the drainage area. The drainage area is a large valley surrounded by mountainous or hilly terrain. The drainage divides are the Santa Lucia Mountains on the west, La Panza Range on the south, and Diablo and Temblor ranges on the northeast (Fugro, August 2002).

In the California DWR Groundwater Bulletin Update (2004) DWR indicated that hydrographs from the Paso Robles Area Subbbasin of the Salinas Valley Groundwater Basin have shown that groundwater levels have been steady since 1995. The Update does not indicate that the basin is in overdraft or will become overdrafted if present management conditions continue.

The most recent studies of the Paso Robles Basin, *Paso Robles Groundwater Basin Study* (Fugro, August 2002) and *Paso Robles Groundwater Basin Study, Phase II* (Fugro, February 2005), were sponsored by San Luis Obispo County Flood Control and Water Conservation District and supported by North County water purveyors and users including the City of Paso Robles. The Phase I portion of the study included basic data compilation and review, definition of the basin and subbasins, aquifer characterization, assessment of water quality conditions, and a water balance study. Most of the City of Paso Robles wells are located in the Estrella subarea of the Paso Robles Basin, with the Thunderbird wellfield located along the Salinas River in the Atascadero Subbasin. Phase II consisted of development of a numerical model, model calibration, and model application.

The major aquifers (or water-bearing units) in the basin include alluvial deposits and the Paso Robles Formation. The alluvial deposits are up to 100 feet in depth and include recent stream-laid sands and gravels along the floodplains of the Salinas River and its tributaries, and older finer-grained terrace deposits along the Salinas River and Estrella River. The alluvium along the Salinas River is the unit associated with Salinas River underflow. Wells in alluvium typically produce in excess of 1,000 gallons per minute (gpm) (Fugro, August 2002).

The Paso Robles Formation is the most extensive aquifer and consists of sedimentary layers extending from the surface to depths of more than 2,000 feet. It is typically unconsolidated and generally poorly sorted. The water bearing sediments in the basin are 700 to 1,200 feet thick and typically extend to sea level. Paso Robles Formation sediments are relatively thin, often discontinuous sand and gravel layers interbedded with thick layers of silt and clay. Wells generally produce several hundred gpm (Fugro, August 2002).

Groundwater flows generally to the northwest; however, flow from the Cholame Hills is toward the southwest and flow along the Salinas River is to the north. The Paso Robles Formation provides percolating groundwater not only to the City of Paso Robles, but also to other municipal, domestic, and agricultural pumpers throughout the basin.

The Paso Robles Groundwater Basin *Phase II Numerical Model Development* report (Fugro, February 2005) presents the results of the development, calibration, and application of a numerical groundwater flow model of the Paso Robles Groundwater Basin. Specific objectives included refining the basin's hydrologic budget and perennial yield, and simulating impacts to groundwater levels resulting from projected build-out conditions in the basin both within urban and agricultural areas. Important conclusions from these scenarios include the following (Fugro, February 2005):

- The perennial yield for the Paso Robles Groundwater Basin is 97,700 AFY.
- Basin pumpage amounts to an average annual rate of 93,200 AF with agricultural pumpage accounting for about 83 percent of the total pumping.
- The basin currently is not in overdraft.
- A Build-Out Scenario simulated the effects of urban buildout and maximum reasonable agricultural buildout. This scenario, reflecting basin pumpage of 108,300 AFY, results in an average annual decline in groundwater storage of 3,800 AFY, with particular groundwater level declines in the Estrella subarea and northern Atascadero Subbasin.

- A Build-Out with Nacimiento Scenario evaluated the effect of replacing municipal pumping with Nacimiento project water as presently contracted by Atascadero Mutual Water Company (2,000 AFY), Templeton Community Services District (250 AFY), and the City of Paso Robles (4,000 AFY). This scenario, simulating basin-wide annual pumping of 102,100 AFY, results in an average decline in groundwater storage of 1,200 AFY at full buildout.
- Comparison of the Build-Out Scenarios indicates an overall net benefit of the Nacimiento project of 2,600 AFY in the average annual change in groundwater storage. Although a slight lowering of water levels would still occur throughout the basin at buildout with the Nacimiento project, benefits would be most apparent in the Estrella subarea and the Atascadero Subbasin.
- Municipal pumping is more significantly affected than agricultural pumping by groundwater-surface water interactions associated with the Salinas River. The hydraulic link between the groundwater and surface water indicates that municipal groundwater pumping locations and amounts can be optimized to manage the groundwater levels.
- Agricultural pumpage, by being more widespread across the basin and comprising much of the pumpage located away from the Salinas River, shows a more direct relationship with groundwater storage and less interaction with the Salinas River. Thus, basin-wide changes in agricultural pumping would have a more direct effect on groundwater storage than would parallel changes in municipal pumping.
- Agricultural pumping is the single largest outflow of groundwater from the basin. It is also the single largest *estimated* parameter because the pumping volumes are not metered but rather estimated based on land use and irrigation practices. Minor variations in agricultural water demand estimates may have widespread impacts on groundwater storage. A sensitivity analysis indicated that a relatively slight adjustment in agricultural pumping could make the difference between potential basin overdraft or not.

Groundwater Quality. Total dissolved solids (TDS) is a measure of the general mineral quality of water. In Paso Robles Groundwater Basin wells, TDS concentrations generally range from 300 to 1,000 parts per million (ppm). Between 1998 and 2001, TDS concentrations ranged from 160 to over 2,000 ppm and averaged 550 ppm in the Atascadero subbasin, 490 ppm in the Creston area, 750 ppm in the San Juan area, and 600 ppm in the Shandon area (Fugro, August 2002 and February 2005). Wells screened along the Salinas River in the recent alluvium generally have TDS concentrations between 300 and 800 ppm, reflecting the quality of stream recharge water. Wells screened in the Paso Robles Formation have generally good quality water, although a few isolated pockets exist of poor quality water with TDS concentrations over 1,000 ppm.

TDS concentrations in Paso Robles City wells average about 475 ppm while basin wells average about 650 ppm. The Paso Robles Groundwater Basin Study (Fugro, August 2002) reviewed available water quality data and identified deteriorating water quality trends. These include increasing TDS and chloride in the shallow Paso Robles Formation in the central portion of the Atascadero subbasin (southwest of the City along the Salinas River) and near San Miguel, and increasing nitrate south of San Miguel and north of Highway 46 between the Salinas River and Huer Huero Creek.

In general, City water quality is good, but has relatively high TDS and hardness. In response to the hardness, many residents use home water softeners. However, use of water softeners results in addition of salts to the City's wastewater, which is treated and discharged to the groundwater basin. This is one factor in locally increasing TDS and chloride in groundwater. This situation may be improved in the future with the introduction of Lake Nacimiento water. Lake Nacimiento water is lower in hardness and TDS than groundwater, and obviates the need for water softeners. If citizens stop using water softeners, they will not only enjoy cost savings, but will also help preserve the quality of local groundwater.

Groundwater Sources. The City of Paso Robles supply is subdivided into two types of groundwater sources according to water rights. These are Salinas River underflow and percolating water of the Paso Robles Groundwater Basin. Figure 3 shows City well locations.

Salinas River underflow refers to shallow groundwater flowing as a subterranean stream in direct connection with the Salinas River. This underflow is subject to appropriative water rights and permitting by the State Water Resources Control Board (SWRCB). An approved SWRCB application (Application filed 1941; Permit number 5956 issued November 6, 1981) allows the City to extract up to eight cubic feet per second (cfs or 3,590 gpm) with a maximum extraction of 4,600 AFY (January 1 to December 1). The permit includes a moveable point of diversion.

Use of underflow by the City has historically been below the full appropriation due to limited pumping capacity until 2005. In 2005, the City pumped 4,558 AF. Between 1989 and 2004 maximum annual underflow well production was 4,324 AF (2004), the minimum was 2,304 AF (1989), and the average was 3,305 AF. Seven underflow wells are currently active and the City is considering additional wells near the river, probably in the south, and optimizing pumping. These seven active underflow wells (Thunderbird 10, 13, 17, and 23; Ronconi 1 and 4; and Borcherdt 5) are shown on Figure 3. Future operation of the underflow wells will require an optimum pumping plan that limits instantaneous flow rates to eight cfs while maximizing annual production to 4,600 AF. This operational plan is currently being developed as part of the WRPI/CIP (T.J. Cross, February 2007). Efforts are also underway to obtain a license for the permitted amounts.

Salinas River underflow also provides water supply to Atascadero Mutual Water Company, which serves the City of Atascadero upstream of Paso Robles. Atascadero Mutual Water Company has water rights to seven cfs of underflow. Underflow is also pumped for agricultural irrigation.

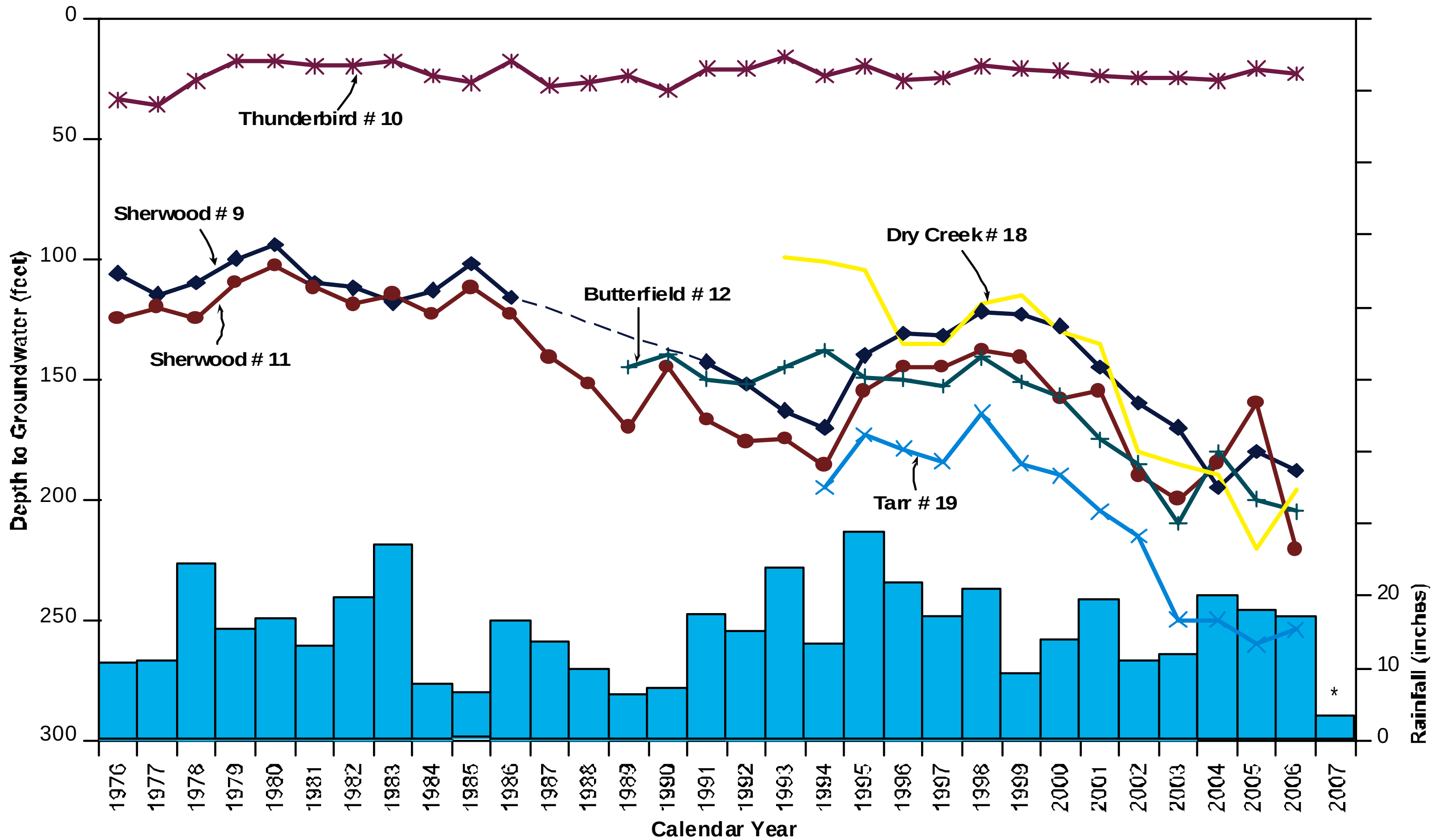
Salinas River underflow is replenished by surface water flows of the Salinas River and its tributaries, which together drain a watershed area of about 390 square miles. The Salinas River is characterized by a wide range of flow conditions, and typically is dry from June into December. Accordingly, recharge of underflow from the river occurs primarily in winter and early spring. Salinas River flows are affected by operation of Salinas Dam (Santa Margarita Lake), which was constructed in 1941 with a reservoir capacity of 23,843 AF. This reservoir currently is operated by San Luis Obispo County Flood Control and Water Conservation District primarily as a source of water for export to the City of San Luis Obispo.

Percolating groundwater of the Paso Robles Groundwater Basin also is available to the City of Paso Robles as a source of water supply. Between 1989 and 2006 use of percolating groundwater by the City's basin wells has ranged from 1,385 AFY (1995) to 3,789 AFY (2002). In 2006, the City pumped about 3,366 AF of this water from basin wells.

Figure 4 shows annual rainfall amounts and hydrographs of depths to groundwater in selected City wells from 1976 through 2006. The wells were selected based on length of water level record, source of groundwater, and geographic distribution. Thunderbird 10 is a 210-foot deep well along the Salinas River, which derives its yield mainly from Salinas River underflow. As shown, groundwater levels in the underflow wells have been relatively steady, reflecting recharge from the Salinas River.

Paso Robles Groundwater Basin wells are represented by the Sherwood 9 and 11 wells, located in the southeastern portion of the City, and the Butterfield 12, Dry Creek 18, and Tarr 19 wells in the northeastern portion of the City near the airport. These wells show the groundwater level declines in the Estrella subarea resulting from intensive local municipal and agricultural pumping.

Total basin and underflow pumpage from City wells is shown on Table 6 for 2000 through 2004 while Table 7 presents estimated pumpage for 2010 through 2025. For comparative purposes, the percentage of City pumpage to total water supply or rate at which water can be pumped without decreasing the groundwater in storage of the basin is shown in the bottom lines of Tables 6 and 7. The perennial yield value of 97,700 AFY was used (Fugro, February 2005). Note that the pumpage totals conservatively include pumpage from underflow wells. Between 2000 and 2004, City well pumpage increased from 6.6 to 7.6 percent of the estimated basin perennial yield. Future pumpage is estimated to decrease to 5,530 AFY (5.7 percent) in 2010 with delivery of Nacimiento water, but then increase to 10.6 percent of the estimated basin perennial yield assuming 2025 buildout.



Salinas River at Paso Robles
Precipitation station monitored by DWR and USGS

* Calendar Year 2007 data through July 2007

September 2007	**Figure 4**
TODD ENGINEERS Emeryville, California	**Paso Robles Depth to Groundwater and Rainfall**

Table 6 Amount of Groundwater Pumped (AFY)							
Basin Name (s)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Paso Robles Basin	2,797	3,132	3,789	3,742	3,138	2,856	3,366
Salinas River Underflow	3,652	3,587	3,548	3,728	4,324	4,558	4,065
Total Pumpage	**6,449**	**6,719**	**7,337**	**7,470**	**7,462**	**7,414**	**7,431**
% of Total Supply	**6.6%**	**6.9%**	**7.5%**	**7.6%**	**7.6%**	**7.6%**	**7.6%**

Table 7 Amount of Groundwater Projected to be Pumped (AFY)				
Basin Name(s)	**2010**	**2015**	**2020**	**2025**
Paso Robles Basin	930	2,230	4,000	5,800
Salinas River Underflow	4,600	4,600	4,600	4,600
Total Pumpage	**5,530**	**6,830**	**8,600**	**10,400**
% of Total Supply	**5.7%**	**7.0%**	**8.8%**	**10.6%**

Total Supply = 97,700 AFY perennial yield of Paso Robles Basin as defined in Paso Robles Groundwater Basin Study Phase II (Fugro, February 2005)

Groundwater Basin Monitoring and Management. San Luis Obispo County conducts a groundwater monitoring program that consists of collecting groundwater level measurements twice a year (April and October). Data are collected from about 350 wells countywide. Information from about 100 additional wells comes from water purveyors.

Recognizing that the City is an active municipal user of the Paso Robles Groundwater Basin, on September 6, 2005, the City Council passed Resolution No. 05-181, which approves City participation in a Paso Robles Groundwater Basin Agreement with San Luis Obispo County Flood Control and Water Conservation District (District) and certain private landowners, who have organized as the Paso Robles Imperiled Overlying Rights (PRIOR) group. Key elements of the Agreement are a clear acknowledgement that the Basin is not in overdraft now, and that the parties will not take court action to establish any priority of groundwater rights over another party as long as the Agreement is in effect. In addition, the parties agree to participate in a meaningful way in groundwater management activities, and to develop a plan for monitoring groundwater conditions in the Basin.

An initial meeting of Agreement representatives in February 2006 confirmed the parties' intent to monitor and evaluate groundwater conditions and to consider measures to avoid overdraft, and also started the process of evaluating the existing District monitoring program in light of the intent of the Agreement. Preparation of an Annual Report of the Paso Robles Groundwater Basin by Todd Engineers has recently been approved. A draft of the report should be available in the fall of 2007 with funding from the City and the District. Execution of the Paso Robles Groundwater Basin Agreement and initiation of cooperative groundwater monitoring and management reduces the likelihood of overdraft and water rights disputes and promotes the long-term reliability of groundwater supplies.

Facilities. The City has 19 active wells. City boundaries and facilities are shown on Figure 3. City wells are distributed throughout the City.

Seven wells are completed along the Salinas River aquifer in the shallow underflow aquifer, and all of the wells are within the moveable point of diversion defined in Permit 5956. Four of these are in the Thunderbird well field (Wells 10, 13, 17, and 23- located in the southwest portion of the City) and two are in the Ronconi well field (Wells 1 and 4 - located several miles north of the Thunderbird well field). Ronconi 1 and 4 were brought back online in the summer of 2007 after many years of nonuse. All wells are screened in the shallow aquifer with the exception of Thunderbird 10 which is also screened in the deeper basin aquifer. In addition, the City has historically reported the Borcherdt 5 well is classified as an underflow well. This well is located between the Ronconi and Thunderbird well fields.

Twelve wells are screened in and produce water from the Paso Robles Basin and are located on the east of the Salinas River. They are Sherwood 9, Sherwood 11, Butterfield 12, Osborne 14, Dry Creek 18, Tarr 19, Royal Oak 20, Fox 21, Cuesta 22, Barney Schwartz 15 (park irrigation only), Avery 24 (drilled in 2003), and Tower 25 (completed in March 2007).

Well pumping capacity ranges from 400 to 900 gpm in the wells pumping river underflow and from 200 to 950 gpm in Paso Robles Basin wells.

The City also has two inactive wells (Ronconi 16 and Sherwood 6) The casing in the Ronconi 16 has failed and the well is capped due to hydrogen sulfide odor; it currently has no piping and wellhead facilities. It is anticipated that this well will be properly abandoned in the near future. The Sherwood 6 well is inactive because of detections of PCE and poor water quality resulting from high sulfur content. There is potential for this well to be reactivated in the future.

City facilities also include five booster stations to pump water to higher elevations, four storage reservoirs that can store collectively up to 12,150,000 gallons (two 4 million gallon (MG) tanks on Golden Hill Road, one 4 MG reservoir on West Side, and a 150,000 gallon tank on Merryhill - all able to be monitored by a remote system), and 148 miles of water pipe ranging in diameter from 2 to 24 inches (Boyle, July 15, 2005 and Paso Robles website, 2007).

The City's water system is City-owned and operated. At this time the City neither imports water from nor exports water to any other agency. The City signed an agreement with San Luis Obispo County Flood Control District on August 17, 2004 to purchase water from the Nacimiento Water Project, which is projected to deliver 4,000 acre-feet per year of relatively high quality, untreated water. At time of writing, contracts have been awarded by the County to build the intake, pipelines, and other facilities. Nacimiento Project water is expected to be delivered to the City in late 2010. The City of Paso Robles is progressing with its plans for a water treatment plant; the City's Capital Improvement Program (T.J. Cross Engineers, February 2007) includes design of the water treatment plant beginning in 2007, construction starting in 2009, and startup of the plant in 2010 to coincide with first availability of Nacimiento water.

Water Sales. Single family residential water connection rates are $8,923 for a ¾-inch meter. Connection fees and rates vary for commercial accounts (Paso Robles website, 2007). As of early 2007 basic water service was $1.24 per 100 cubic feet (cf) plus a $12 Nacimiento Water surcharge. This Nacimiento Water surcharge increased to $24 in October 2007 and will add $12 more every July until 2010 when it will be $60. This flat rate increase was selected to receive the best bond interest rate to finance the Nacimiento water project. The City is currently considering alternative rate structures after the Nacimiento bonds are sold, including conversion to a consumption-based rate. Rate changes are subject to Proposition 218 requirements allowing rate payers with an opportunity to protest.

2.6 Wastewater and Water Recycling

The City of Paso Robles owns and operates a secondary wastewater treatment plant, which treats wastewater from the City of Paso Robles, a portion of the Templeton Community Services District south of the City, and the California Youth Authority Paso Robles Boys School east of the City. The plant is east of Highway 101, along the Salinas River. As of March 2005 there were approximately 10,094 residential wastewater connections and 592 commercial/industrial wastewater connections (Boyle, July 15, 2005).

Wastewater influent is treated with ferric chloride to mitigate hydrogen sulfide in the digester gas. Primary treatment includes influent screening, aerated grit removal, clarification/primary sedimentation. Secondary treatment includes biological treatment (two-stage trickling filters), secondary clarification, and disinfection. Treated effluent is discharged to a series of six polishing ponds for dechlorination with the overflow from the sixth pond discharging to the Salinas River. The effluent eventually recharges the groundwater basin north of the City. It should be noted that the wastewater resource could be an asset to the City in the future when reused for irrigation or for groundwater recharge.

The plant operates in accordance with the City's National Pollutant Discharge Elimination System (NPDES) permit No. CA0047953 and Waste Discharge Requirements (WDR) Order No. 2004-0031, which allow a maximum treatment capacity of 4.9 million gallons per day (MGD) and a maximum peak wet weather flow of 10 MGD (Boyle, September 2005). In 2003, the average daily flow was 2.78 MGD and the peak hour wet weather flow was 4.6 MGD (Boyle, September 2005).

Wastewater Flows. Table 8 documents past, current, and projected wastewater flows. In 2000, the plant treated 3,152 AF of wastewater; by 2005 this increased to 3,315 AF (Hagemann, 2005 and 2006). Wastewater flows per capita in 2000 and 2005 ranged between 0.12 and 0.13 acre feet. Buildout (2025) wastewater flows were estimated to be 0.11 AF per capita, slightly lower than current rates due to future water conservation. As shown in Table 8, wastewater flows are expected to increase linearly between 2005 and 2025.

Table 8 Wastewater Collection and Treatment (AFY)						
Type of Wastewater	2000	2005	2010	2015	2020	2025
Wastewater Collected and Treated in Service Area*	3,152	3,315	3,740	4,160	4,585	5,005
Volume that Meets Tertiary Standard**	0	0	0	1,000	1,500	2,000

*2000 and 2005 from Hagemann (2005 and 2006)
Assumes 0.11 AF/capita for 2025 and linear increase between 2005 and 2025
**Unlimited use assuming full tertiary disinfection, from Hagemann (2005)

Sewer Rates. Paso Robles has a minimum monthly billing for combined residential water and sewer service inside the City limits of $49.06. Sewer connection fees are $5,037 for single family residences (Paso Robles website, 2007).

Wastewater Quality. The WDR order also regulates water quality, placing both interim and final limits on specific contaminants in the wastewater effluent and providing a compliance schedule. As part of the City's water resource investigations, the quality of the wastewater plant effluent was compared with the WDR requirements; this comparison revealed exceedances at times for TDS, chloride, and sodium. In addition, the plant apparently has difficulty meeting the WDR limits for unionized ammonia, cyanide, copper selenium, bromodichloromethane, dichlorobromomethane and bis(2-ethylhexyl)phthalate (Boyle, May 2, 2005).

The City is addressing the water quality issues associated with its wastewater treatment and disposal through a series of recent investigations. In 2001, a *Salt Management Study* (Carollo, February 2001) considered methods to reduce salt loading in the City's effluent. Among other findings, the report recommended that salts in plant effluent be reduced by limiting salts in plant influent. This could be achieved by improving water supply quality through blending high-quality surface water supply from Lake Nacimiento with existing groundwater supply or through well head treatment to reduce salts. The report also concluded that restriction of water softener use (which adds salt to wastewater) would be difficult for legal reasons at the time. Accordingly, the report recommended a focus on controlling salts in industrial and commercial discharges. Subsequently, the City sponsored a study, *City Wastewater Total Dissolved Solids (TDS) Loading Analysis* (Malcolm-Pirnie, June 11, 2003) that helped identify sources of salt loading; for example, showing that more than 50 percent of the TDS salt loading is from the groundwater supply, with residences accounting for most of the mass loading. An additional study addressed alternatives for reducing salts (*Water & Wastewater Quality Concerns—Water Quality Strategy*, Malcolm-Pirnie, March 2003), including blending well water with Lake Nacimiento water, desalting well water, and desalting wastewater effluent.

In 2005, the City completed a *Wastewater Treatment Plant Audit (*Boyle, September 2005), which provided a review of operations and staffing, a process analysis and solids handling assessment, design criteria for a SCADA system and instrumentation upgrades, and identification of wastewater usage options with analysis of treatment alternatives. The *Audit* provides specific recommendations for improving the performance and operability of the existing plant and for upgrading the treatment process to allow potential water recycling. Findings of the *Audit* were incorporated into the City's WRPI/CIP (T.J. Cross, February 2007).

Water Recycling Options. Recycled water is a water supply resource that can help sustain the City's landscapes through the summer dry season and through drought without over-burdening the potable water supply. In 2000, the City of Paso Robles prepared a *Comprehensive Recycled Water Study* (Carollo, July 2000). The study summarized the existing wastewater treatment and disposal system, confirmed existing regulations and guidelines, and provided projections for future wastewater flows. The study also addressed a wide range of alternatives for both wastewater disposal and recycled water reuse, with detailed evaluation of five reuse/disposal scenarios involving growing season irrigation with winter season river discharge, disposal to ponds, or discharge to wetlands. The 2000 report concluded that no compelling circumstances existed at the time for implementation of wastewater recycling and recommended deferring consideration of water recycling options to the future.

More recently, the City's water resource investigation process has identified goals supporting water recycling; these include recovering wastewater for reuse within the City instead of exporting it downstream and reuse of wastewater for irrigation in lieu of groundwater pumping, thus helping to alleviate local groundwater level declines. Five recycled water usage options have been identified: 1) restricted irrigation (secondary-23 disinfection), 2) unrestricted irrigation (tertiary disinfection), 3) groundwater recharge (tertiary disinfection with denitrification), 4) groundwater recharge (tertiary disinfection with desalination), and 5) maintain current discharge practices. Options 1, 2, and 3 were selected for further evaluation. Option 4 was considered prohibitively expensive and Option 5 does not meet future City goals and may not meet future regulations (Boyle, September 2005). Tertiary disinfection will require new filtration and disinfection facilities to be constructed at the treatment plant for the design flow of 4.9 MGD. The *Recycled Water Study Update* (Boyle, September 2006) examined five recycled water alternatives: 1) continued Salinas River discharge, 2) enhancing wastewater treatment with Salinas River discharge, 3) piping recycled water to customers along the Salinas River corridor, 4) piping recycled water to customers along the Highway 46 corridor, and 5) combination of alternatives. Key recommendations included: 1) perform percolation tests at two locations, 2) evaluate effluent water quality in terms of suitability for irrigation, 3) determine potential reduction in salt loading from a source control program, and 4) contact potential recycled water users.

Table 9 lists agencies that are expected to be involved in the recycled water planning process. Table 10 summarizes volumes of non-recycled wastewater disposal while Table 11 projects future uses of recycled water between 2010 and 2025. Summation of the volumes in Tables 10 and 11 equals the total wastewater collected and treated. Recycled water is anticipated to become available by 2015 (1,000 AFY) and gradually increase to 2,000 AFY by 2025. Although very preliminary, Table 12 presents methods to encourage recycled water use. The City's 2010 UWMP will contain more rigorous recycled water information reflecting the *Recycled Water Study* recommendations and progress of the Water Resources Plan Integration and Capital Improvement Program (WRPI/CIP) (T.J. Cross Engineers, February 2007).

Table 9 Recycled Water Plan Participating Agencies	
	Role in Plan Development
San Luis Obispo County	Advisory
Regional Water Quality Control Board	Advisory

Table 10 Disposal of Non-Recycled Wastewater (AFY)						
Method of Disposal	Treatment Level	2005	2010	2015	2020	2025
Ponds	Secondary	3,315	3,740	3,160	3,085	3,005
	Total	3,315	3,740	3,160	3,085	3,005

from Hagemann (2005 and 2006) and Table 8

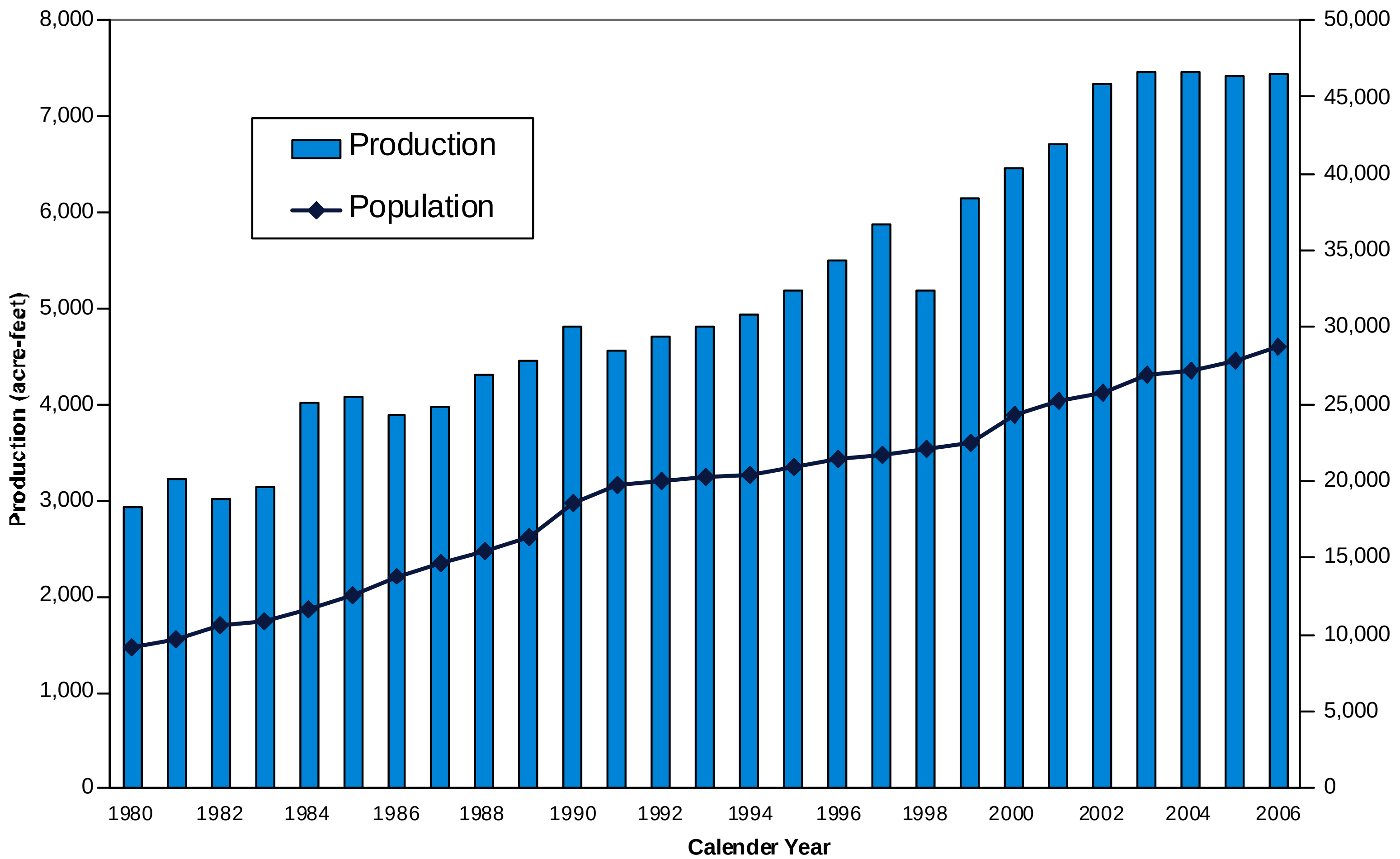
Table 11 Projected Future Use of Recycled Water in Service Area (AFY)				
	2010	2015	2020	2025
Recycled Water Use	0	1,000	1,500	2,000
Total	0	1,000	1,500	2,000

from Hagemann (2005) and Table 8

Table 12 Methods to Encourage Recycled Water Use				
	AF of Use Projected to Result from this Action			
	2010	2015	2020	2025
Financial Incentives and Public Education	0	1,000	1,500	2,000
Total	0	1,000	1,500	2,000

2.7 Past, Current, and Projected Water Supplies

Paso Robles historically has obtained its entire water supply from groundwater. Figure 5 graphically shows annual groundwater production between 1980 and 2004. Production has gradually increased from 2,924 AF in 1980 to 7,462 AF in 2004, which is an average increase of 189 AF per year [(7,462 AF -2,924 AF)/24 years]. For comparison purposes, population has also increased gradually as shown by the line on Figure 5. Population increased from 9,163 in 1980 to about 27,200 in 2004 or about an average of 721 people per year. Thus, between 1980 and 2004 an additional acre-foot of water was needed for every four new residents.



September 2007	**Figure 5**
TODD ENGINEERS Emeryville, California	**Paso Robles Groundwater Production and Population**

Table 13 summarizes current and planned water supply for the City of Paso Robles. Water supply is projected to come from four sources: groundwater (basin wells and river wells), Lake Nacimiento water, and recycled water. These are discussed in the paragraphs below. There are no plans in the next 20 years for the City to use desalinated water, nor to export, transfer, exchange, or sell water other than water sales to City customers and thus these categories are not included in the summary tables.

Table 13

Current and Planned Water Supplies (AFY)

Water Supply Sources	2005	2010	2015	2020	2025
Basin Wells	2,856	930	2,230	4,000	5,800
River Wells	4,558	4,600	4,600	4,600	4,600
Nacimiento Water	0	4,000	4,000	4,000	4,000
Recycled Water (projected use)	0	0	1,000	1,500	2,000
Total	**7,414**	**9,530**	**11,830**	**14,100**	**16,400**

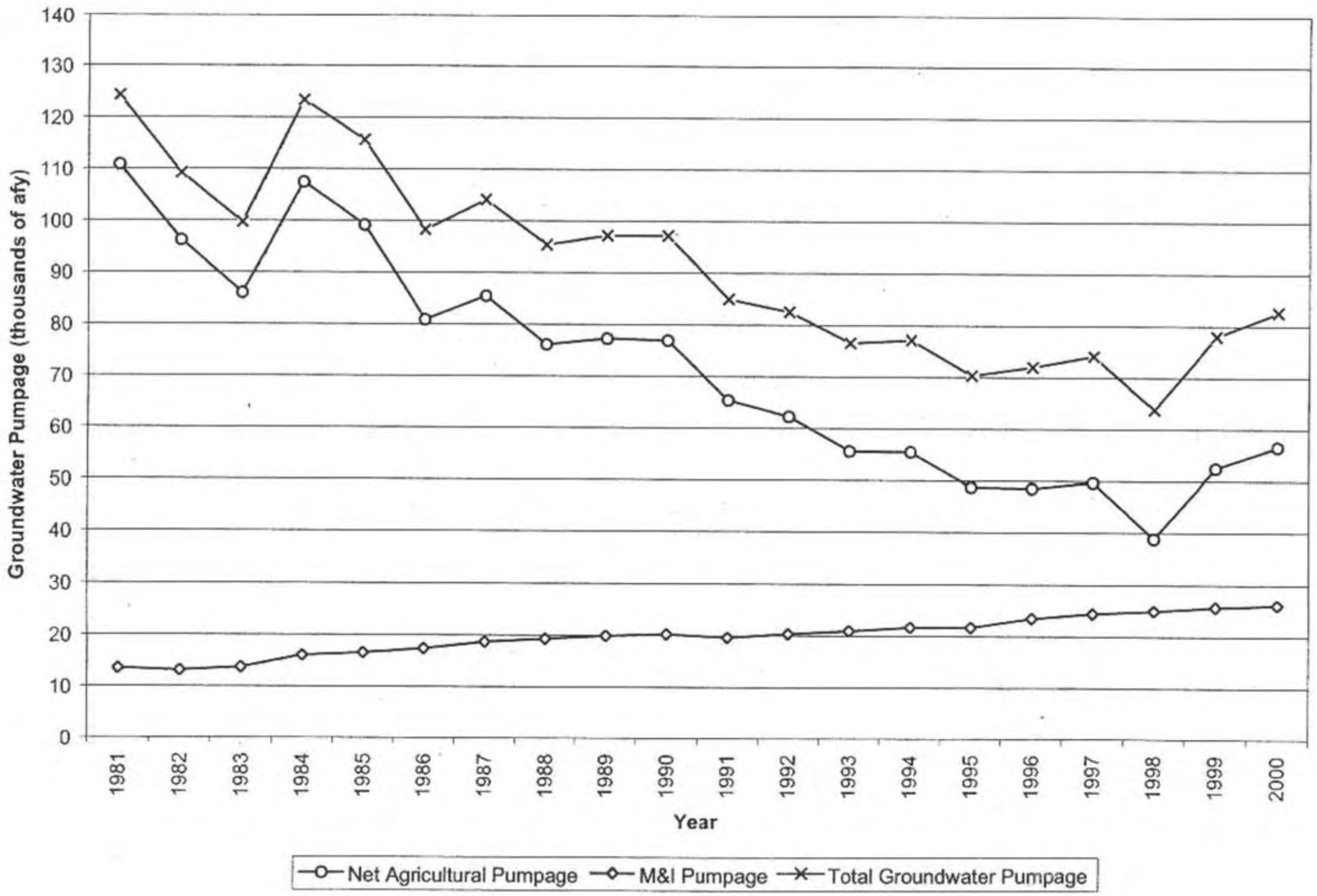
River Wells (underflow). It is assumed that by 2010 the City will be pumping their full appropriation of underflow water rights of 4,600 AFY. Efforts are underway to obtain a license for the permitted amounts. The combined capacity of the City's river wells is currently about 5,800 AFY, with a summer production capability of about 3,600 gpm. Because of the surface water treatment rule, groundwater from river wells that are within 150 feet of the river require treatment prior to distribution. This includes Ronconi 1 and 4 and, on a seasonal basis, Thunderbird 10. A review of the feasibility and costs associated with pumping and treating groundwater from Ronconi wells was conducted (Carollo, April 17, 2000). This review reported costs of $2.6 million for a treatment system and suggested further consideration of water quality issues and treatment options. Alternatively, new additional wells could be sited and designed to make use of the City's underflow water rights and to the extent possible, minimize or avoid water treatment costs. The City has already pumped 99 percent of the 4,600 AFY, that is 4,558 AF in 2005, and anticipates similar full use of the underflow water rights permit source in future years.

Basin Wells. To date, the City's Paso Robles Basin wells have provided up to about 3,980 AFY (in 2002). Between 2005 and 2010, basin wells will supply about 3,000 to 4,000 AFY to supplement the river wells. As shown in Table 13, basin groundwater use will decrease substantially when Lake Nacimiento water becomes available in 2010. This short-term surplus of groundwater production capacity will potentially allow retirement of older or low-yield wells, provide backup capacity in time of water shortage or emergency, and offer the City the opportunity to site and install new basin wells. Initiation of water recycling by 2015 also will moderate the use of basin wells. However, unless projected water demand is reduced or other supplies are developed, basin well pumping is projected to increase in the following 15 years to 5,800 AFY or about 145 percent of maximum historical pumping. The City's percentage of basin perennial yield is approximately 7.6 percent now and is projected to increase to 10.6 percent in 2025 (Table 7). Although the basin as a whole is not now in overdraft, increases in agricultural and rural pumping also could result in localized groundwater level declines and the potential for overdraft. Figure 6 shows the groundwater pumpage history of the Paso Robles Groundwater Basin (Fugro, August 2002). Municipal and industrial (M & I) pumpage has gradually increased between 1981 and 2000. Agricultural pumpage declined between 1981 and 1998 but increased in 1999 and 2000 and constitutes 68 percent of the total pumping in 2000.

Nacimiento Water. In 1959, San Luis Obispo County Flood Control and Water Conservation District (District) signed an agreement with Monterey County Water Agency that entitled the District to approximately 17,500 AFY of the annual yield of Lake Nacimiento for uses in San Luis Obispo County. To date, use of the Lake Nacimiento entitlement has been limited to the vicinity of the lake because of the lack of conveyance facilities. Efforts are underway to build a 45 mile pipeline to deliver the unused County water supply to Paso Robles, Templeton, Atascadero, and San Luis Obispo. These communities have committed to take delivery of 9,630 AFY, with the City of Paso Robles committing to 4,000 AFY at this time. Commitment of the remaining supply of 7,870 AFY currently is being considered by other water agencies.

Lake Nacimiento water is expected to be available to the City by 2010, conveying a number of advantages. Use of Lake Nacimiento water confers water quality benefits to the City. Lake Nacimiento water is high quality relative to groundwater, with TDS concentrations in the range of 150 to 300 parts per million (ppm), while TDS concentrations in City wells average about 475 ppm. Accordingly, use of Nacimiento water would provide better water quality to City customers. In addition, use of Nacimiento water would improve wastewater quality as the softer water (less minerals and salts or TDS) will encourage elimination of household water softeners which introduce additional salts onto the waste stream. This is important to the City because TDS concentrations of City wastewater effluent have occasionally exceeded the permitted maximum TDS of 1,100 ppm. The improvement in wastewater quality will also facilitate use of recycled water by reducing needed treatment.

In addition, Lake Nacimiento supply is independent of local groundwater supplies. Consequently, its development reduces the City's dependence on groundwater and thereby provides the City with increased water supply reliability. As shown in Table 13, use of 4,000 AFY of Lake Nacimiento water will allow reduction of City groundwater pumping until after 2015. As indicated by the computer modeling for the *Paso Robles Groundwater Basin Study Phase II* (Fugro, February 2005), municipal use of Lake Nacimiento water at currently committed rates would reduce the rate of groundwater storage declines projected for agricultural and municipal buildout. The rate of groundwater storage decline without Lake Nacimiento supply was simulated to be 3,800 AFY and with Lake Nacimiento supply would continue at a rate of 1,200 AFY. Although not simulated in the *Paso Robles Groundwater Basin Study Phase II*, it is reasonable to presume that use by the City of additional Lake Nacimiento water supply (on the order of 1,200 AFY or more) would halt the storage declines and allow recovery under municipal and agricultural build-out conditions.



From Fugro, August 2002

September 2007	**Figure 6**
TODD ENGINEERS Emeryville, California	**Paso Robles Groundwater Basin Pumpage History**

Recycled Water. Wastewater and water recycling are described in the previous section. Potential recycled water users have been identified and four percolation sites along the Highway 46-East corridor have been investigated (Boyle, September 2005). Table 13 includes recycled water as a potential source of water supply to supplement groundwater. For the purposes of this Plan, it is assumed that by 2015, 1,000 AFY of recycled water would be used and would increase to 2,000 AFY by 2025. Note that between 2010 and 2025, groundwater would continue to supply the greatest percentage of water.

2.8 Reliability of Water Supply

The City of Paso Robles water system provides built-in reliability. First, the water system uses two groundwater sources, Salinas River underflow and the groundwater basin, with differing recharge characteristics. Second, City wells are dispersed throughout the service area, ensuring that no single catastrophe is likely to disrupt more than four wells. It is notable also that the West and East Zones of the City water system are linked so that water can be conveyed from one zone to another if needed in emergency.

Two additional sources of water will be available in the near future: Lake Nacimiento water and recycled water. Lake Nacimiento surface water supply is independent of local groundwater supplies and would provide the City with increased water supply reliability and improved delivered water quality, as well as wastewater quality. Use of recycled water by the City for non-potable irrigation use would release potable groundwater for higher beneficial uses. Although relatively costly, recycled water has advantages of being very reliable, especially in drought, and locally controlled. However, the comparison of planned water supply sources and projected water demand in the long term--to 2020 and beyond--indicates that the City will increasingly rely on basin groundwater to meet water demand. At current rates of municipal and agricultural pumping, local groundwater already is subject to chronic declines; in the long term, future municipal pumping rates are projected to exceed current pumping rates. If agricultural pumping also increases, a real risk of overdraft exists. This risk, which undercuts water supply reliability, can be reduced by several means, including monitoring and management of the basin through the Paso Robles Groundwater Basin Agreement, development of additional Lake Nacimiento supply and water recycling. In addition, the long-term reliability of water supply can be increased through management of water demands, or in other words, water conservation that allows already-developed water supplies to be used effectively. The next section of the Plan discusses in more detail the reliability of the City's groundwater and future surface and recycled water supplies. Water demand management, an integral part of water resource planning, is discussed in a subsequent section.

3. WATER SHORTAGE CONTINGENCY PLAN

3.1 Introduction

The California Urban Water Management Planning Act requires that each water supplier provide an assessment of the reliability of its water supply during normal, dry, and multiple dry years. The previous section of this Plan addressed City of Paso Robles' sources of water supply under normal or long-term average rainfall conditions. This section considers the impact on water supplies of two types of drought, a single extreme drought year and a severe drought that is prolonged over at least three years. In addition, a catastrophic water shortage could also occur, for example, as a result of earthquake damage, regional power outage, or water quality emergency. This section presents the City of Paso Robles response to potential water shortages, including catastrophic water supply interruption and drought.

The *Water Source Evaluation* (Boyle, September 2006b) includes evaluation of the ability of the City's wells to satisfy water demands during drought. This includes evaluation of historical rainfall periods to establish a standard drought for future planning, documentation of groundwater levels over time, evaluation of City wells in terms of drought performance, and recommendation of operational strategies to maximize groundwater production during drought.

3.2 Water Supply Shortages

The water supply shortages addressed by the Urban Water Management Planning Act include an extreme single-year drought, a severe multi-year drought, and catastrophic water supply interruptions such as a regional power outage, earthquake, or other disaster. The following paragraphs present a reasonable scenario for each of these water supply shortages.

As noted in the preceding section, *Sources of Water Supply and Facilities*, Paso Robles overlies a large groundwater basin with storage amounting to 30.5 million AF (Fugro, August 2002). All of this water cannot be extracted reasonably, but the volume that can be used during drought is sizable. This is predicated on available well capacity to extract the water and also on replenishment of groundwater during wet years and stabilization of water levels over the long term.

For Paso Robles, the key issue with regard to short-term shortages is not the absolute availability of supply; instead, drought issues have involved the available pumping capacity of wells and the impact on wells of water level declines during the shortages. For example, water level declines associated with drought could result in exposure of the well screens causing loss of pumping efficiency and loss of saturated thickness in the aquifer resulting in reduced well yield. The City recently requested a citywide voluntary water conservation goal of 25 percent for July to September 2007 to meet peak water use demands. The water system was strained to satisfy peak demands because production from Sherwood No. 9 and 11 wells had been temporarily decreased to install arsenic treatment facilities, and water demand was high due to a dry spring and early hot summer (Monn, July 3, 2007).

Extreme Single-Year Drought. Rainfall records for Paso Robles document an average annual precipitation of 14.5 inches (USGS/DWR Salinas River at Paso Robles Station data). However, rainfall in Paso Robles is variable, having ranged since calendar year 1951 from a record low of 6.37 inches in 1990 to a record high of 27.83 inches in 1995. Available rainfall data for 2007 indicates that this current year will be one of the driest on record with only 3.37 inches in January through July. In the past 57 years, six years have been marked by rainfall less than 50 percent of normal or 7.26 inches (1953, 1984, 1985, 1989, 1990, and most likely 2007). It is notable that five of the six extreme drought years occur within the past 24 years, suggesting greater climatic variability in recent decades.

As reported in the 2000 UWMP, basic review of groundwater hydrographs for City wells suggests that one or even two consecutive extreme dry years do not have a discernable impact on groundwater levels in or yields from the City's Paso Robles Groundwater Basin wells. Hydrographs from the City's underflow wells along the Salinas River also show little change in response to single-year droughts, probably reflecting recharge from the Salinas River that occurs even in drought years plus the available, albeit limited, groundwater storage in the alluvial aquifer along the river.

Preliminary information provided by the *Water Source Evaluation* (Boyle, September 2006b) also indicates that single year droughts do not significantly affect City well fields. Instead, droughts with durations of three, four, or five years appear to be most problematic.

Severe Multi-Year Drought. The seven-year period of calendar year 1984 through 1990 was marked in Paso Robles by below-average rainfall, averaging 9.5 inches overall (65 percent of normal). The most severe portion of this drought extended over three years (1988-1990), when rainfall averaged less than 8 inches, or just below 55 percent of normal. Accordingly, three or more consecutive years with an annual average rainfall of 60 percent or less is a reasonable approximation of a severe, multi-year drought. The City's preliminary *Water Source Evaluation* (Boyle, September 2006b) standard drought period generally coincides, and is defined as the five rainfall years (starting July 1) from 1987 through 1991.

During the seven-year drought, the underflow wells along the Salinas River showed declines in groundwater levels. Review of Figure 4 indicates that Thunderbird 10 showed a decline between 1984 and 1990 of about six feet, with a subsequent recovery. Two Paso Robles Groundwater Basin wells monitored through this period, Sherwood 9 and 11, show a decline in groundwater levels that started in 1985 (the second year of the drought) and persisted to 1994, indicating a lag effect between the occurrence of rainfall and water level changes. Overall, declines in the two wells amounted to 68 feet in Sherwood 9 and 74 feet in Sherwood 11. Subsequently, water levels rose between 1995 and 1998 but since have declined to at or below 1994 levels in these two wells (see Figure 4).

Throughout the seven-year dry period, the City was able to meet all water demands without invoking water use restrictions. Media coverage of water shortages experienced in other local communities resulted in a noticeable decrease in gross per capita consumption from 247 gallons per day per person (gpd/person) in 1984 to a low of 167 gpd/person in 1992 (Boyle, April 1995).
Preliminary conclusions of the *Water Source Evaluation* (Boyle, September 2006b) are that City has

the present capability to withstand a drought like that of the rainfall years 1987-1991. However, there is little margin for operational problems or for significant growth in water demand without new water supply sources.

Water Supply Reliability in Normal and Drought Years. The Urban Water Management Planning Act requires tabulation of available water supply volumes in normal (average), single dry, and multiple dry years. The City of Paso Robles has relied on groundwater resources to satisfy growing water demands in recent years that have included both extreme dry years (including consequent extreme dry years in 1984-1985 and 1989-1990) and prolonged severe drought extending over seven years (1984-1990). City groundwater supplies have proven reliable to meet existing demands.

Accordingly, Table 14, Supply Reliability, lists the City's water production as of 2005 (7,414 AF) as the known reliable supply in normal years and in drought. Production in 2006 was similar at 7,431 AF. As required, the percentage of normal is shown at the bottom of Table 14. Since historic pumping has not been greatly affected by drought periods, the percentage is considered to be 100 percent of normal. Although there may be local drought-related impacts on individual wells, it is assumed that the City will be able to continue to pump its normal water supply in multiple dry years. Table 15 is similar to Table 14 and shows the minimum water supply available during the next three years (2007-2009) based on the driest three-year historic sequence.

Table 14

Supply Reliability (AFY)

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years			
		Year 1	Year 2	Year 3	Year 4
7,414	7,414	7,414	7,414	7,414	7,414
% of Normal	100%	100%	100%	100%	100%

Table 15

Three-Year Estimated Minimum Water Supply (AFY)

Source	Normal	2007	2008	2009
Percolating and Underflow Groundwater	7,414	7,414	7,414	7,414

Future supplies will be even more resilient to droughts by 2010 when Lake Nacimiento water will be available. Lake Nacimiento water is a reliable and stable source of water as San Luis Obispo County has contractual priority to the reservoir yield. In addition, future use of recycled water--a nearly constant source--will also increase supply reliability. Future water supply projects are summarized in Table 16.

Table 16 Future Water Supply Projects							
Project Name	Projected Start Date	Projected Completion Date	Normal-Year (AF)	Single-Dry Year (AF)	First Multiple-Dry Year (AF)	Second Multiple-Dry Year (AF)	Third Multiple-Dry Year (AF)
Nacimiento	ongoing	2010	4,000	4,000	4,000	4,000	4,000
Recycled	2010	2025	2,000	2,000	2,000	2,000	2,000

Tables 17 through 19 compare water supply to water demand in five year increments between 2010 and 2025 for a normal year. Note that the supply and demand values are the same, because the volume of groundwater pumped will be varied to meet demand. It is projected that by 2025, demand will be 221 percent of the current 2005 demand.

Table 17 Projected Normal Water Supply (AFY)				
(from Table 13)	2010	2015	2020	2025
Supply	9,530	11,830	14,100	16,400
% of Normal Year (2005)	129%	160%	190%	221%

Table 18 Projected Normal Water Demand (AFY)				
(from Table 5)	2010	2015	2020	2025
Demand	9,530	11,830	14,100	16,400
% of Year 2005	129%	160%	190%	221%

Table 19 Projected Supply and Demand Comparison (AFY)				
	2010	2015	2020	2025
Supply Totals	9,530	11,830	14,100	16,400
Demand Totals	9,530	11,830	14,100	16,400
Difference (Supply-Demand)	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%

Tables 20 through 22 present the same estimates for a single dry year. The supply will be the same as that available during normal years (Table 17); groundwater can be pumped at similar rates during dry years and Lake Nacimiento water and recycled water will still be available. For this set of tables, it is assumed that dry conditions will prompt voluntary water conservation in the City of ten percent. This is seen in Table 21 where the demand values have been decreased ten percent from those in Table 18. Although the City's water supply is projected to be adequate through 2025 with provision of Nacimiento water and recycled water, the City will nonetheless encourage water conservation as outlined in their Water Shortage Contingency Resolution section below. The voluntary ten-percent conservation represents the first stage of a water shortage and is prompted by reduction of rainfall to 65 percent or about nine inches. As a result, the City's wells will pump less and lessen the groundwater impact during drought. This reduced pumping, indicated in Table 22 as the difference between supply and demand, will range between 953 AFY (in 2010) and 1,640 AFY (in 2025).

Table 20

Projected Single Dry Year Water Supply (AFY)

	2010	2015	2020	2025
Supply	9,530	11,830	14,100	16,400
% of Projected Normal	100%	100%	100%	100%

Table 21

Projected Single Dry Year Water Demand (AFY)

	2010	2015	2020	2025
Demand	8,577	10,647	12,690	14,760
% of Projected Normal	90%	90%	90%	90%

Table 22

Projected Single Dry Year Supply and Demand Comparison (AFY)

	2010	2015	2020	2025
Supply Totals	9,530	11,830	14,100	16,400
Demand Totals	8,577	10,647	12,690	14,760
Difference (Supply-Demand)	953	1,183	1,410	1,640
Difference as % of Supply	10%	10%	10%	10%
Difference as % of Demand	11%	11%	11%	11%

A series of tables were generated to compare annual supply and demand during multiple dry year periods for five year periods between 2006 and 2025. This information is presented on Tables 23 through 34. In these tables, supply values were kept the same as those for normal years (Table 17) assuming linear increases between the five-year periods. Demand values were assumed to decrease by 20 percent. This is in accordance with the City's Water Shortage Contingency Resolution (discussed in the next section) and reflects the second stage of a water shortage. The second stage involves reduction of rainfall to 65 percent that persists over two winter rainy seasons or an extreme drought characterized by 50 percent rainfall (seven inches) that persists past one winter rain season. The resulting reduction of pumping is seen in the last table of each of the four series as the difference between supply and demand. Values range between 1,575 AFY in 2006 to 3,280 AFY reflecting the 20-percent reduction in demand.

Table 23

Projected Supply During Multiple Dry Year Period Ending in 2010 (AFY)

	2006	2007	2008	2009	2010
Supply	7,876	8,289	8,703	9,116	9,530
% of Projected Normal	100%	100%	100%	100%	100%

Table 24

Projected Demand Multiple Dry Year Period Ending in 2010 (AFY)

	2006	2007	2008	2009	2010
Demand	6,300	6,631	6,962	7,293	7,624
% of Projected Normal	80%	80%	80%	80%	80%

Table 25

Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2010 (AFY)

	2006	2007	2008	2009	2010
Supply Totals	7,876	8,289	8,703	9,116	9,530
Demand Totals	6,300	6,631	6,962	7,293	7,624
Difference (Supply-Demand)	1,575	1,658	1,741	1,823	1,906
Difference as % of Supply	20%	20%	20%	20%	20%
Difference as % of Demand	25%	25%	25%	25%	25%

Table 26 Projected Supply During Multiple Dry Year Period Ending in 2015 (AFY)					
	2011	2012	2013	2014	2015
Supply	9,990	10,450	10,910	11,370	11,830
% of Projected Normal	100%	100%	100%	100%	100%

Table 27 Projected Demand Multiple Dry Year Period Ending in 2015 (AFY)					
	2011	2012	2013	2014	2015
Demand	7,992	8,360	8,728	9,096	9,464
% of Projected Normal	80%	80%	80%	80%	80%

Table 28 Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2015 (AFY)					
	2011	2012	2013	2014	2015
Supply Totals	9,990	10,450	10,910	11,370	11,830
Demand Totals	7,992	8,360	8,728	9,096	9,464
Difference (Supply-Demand)	1,998	2,090	2,182	2,274	2,366
Difference as % of Supply	20%	20%	20%	20%	20%
Difference as % of Demand	25%	25%	25%	25%	25%

Table 29 Projected Supply During Multiple Dry Year Period Ending in 2020 (AFY)					
	2016	2017	2018	2019	2020
Supply	12,284	12,738	13,192	13,646	14,100
% of Projected Normal	100%	100%	100%	100%	100%

Table 30 Projected Demand Multiple Dry Year Period Ending in 2020 (AFY)					
	2016	**2017**	**2018**	**2019**	**2020**
Demand	9,827	10,190	10,554	10,917	11,280
% of Projected Normal	80%	80%	80%	80%	80%

Table 31 Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2020 (AFY)					
	2016	**2017**	**2018**	**2019**	**2020**
Supply Totals	12,284	12,738	13,192	13,646	14,100
Demand Totals	9,827	10,190	10,554	10,917	11,280
Difference (Supply-Demand)	2,457	2,548	2,638	2,729	2,820
Difference as % of Supply	20%	20%	20%	20%	20%
Difference as % of Demand	25%	25%	25%	25%	25%

Table 32 Projected Supply During Multiple Dry Year Period Ending in 2025 (AFY)					
	2021	**2022**	**2023**	**2024**	**2025**
Supply	14,560	15,020	15,480	15,940	16,400
% of Projected Normal	100%	100%	100%	100%	100%

Table 33 Projected Demand Multiple Dry Year Period Ending in 2025 (AFY)					
	2021	**2022**	**2023**	**2024**	**2025**
Demand	11,648	12,016	12,384	12,752	13,120
% of Projected Normal	80%	80%	80%	80%	80%

Table 34 Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2025 (AFY)					
	2021	2022	2023	2024	2025
Supply Totals	14,560	15,020	15,480	15,940	16,400
Demand Totals	11,648	12,016	12,384	12,752	13,120
Difference (Supply-Demand)	2,912	3,004	3,096	3,188	3,280
Difference as % of Supply	20%	20%	20%	20%	20%
Difference as % of Demand	25%	25%	25%	25%	25%

3.3 Factors in Water Supply Reliability

Table 35 lists potential legal, environmental, water quality, and climatic factors that could result in inconsistency of supply and shortages. Each is discussed below.

Legal. The City is addressing potential legal limits on its groundwater supplies, which include loss or reduction of Salinas River underflow water rights and adjudication of the Paso Robles Groundwater Basin. The City is actively pursuing perfection of underflow water rights as discussed in previous sections of this report. With regard to the Paso Robles Groundwater Basin, the City is an active party to the Paso Robles Groundwater Basin Agreement with the San Luis Obispo County Flood Control and Water Conservation District (District) and private landowners with properties overlying the Paso Robles Groundwater Basin. The agreement acknowledges that the Basin is not in overdraft now, and establishes a process for monitoring its condition in the future. It contains provisions reserving all the parties' respective legal rights. The agreement sets the stage for the City and District to be stewards of groundwater in the North County, and provides for a committee to monitor the basin and consider means to avoid overdraft. This committee has been established. Overall, the Agreement supports cooperative monitoring and management of the basin to avoid overdraft and minimize the likelihood of litigation over water rights. This cooperate monitoring process has already commenced with the preparation of an annual report for the 2006 water year. In addition, the City is considering policies that regulate non-City wells within City limits and thereby protect City wells and pumping. These policies include provisions to ensure that private wells are maintained and operated in a manner to prevent cross-connection with the City water system, protect the groundwater basin, support expanded monitoring, and require that unused wells are abandoned correctly to prevent migration of surface contaminants to groundwater.

In addition, the volume of recycled water available for use could be limited if stringent restrictions were imposed in the future.

Table 35 Factors Resulting in Inconsistency of Supply				
Name of supply	**Legal**	**Environmental**	**Water Quality**	**Climatic**
Basin Groundwater	Potential basin adjudication	Potential overdraft, earthquake damage, power outage	Potential contamination	Long-term severe drought
Underflow Groundwater	Loss or reduction of water rights	Earthquake damage, power outage	Potential contamination	Long-term severe drought
Nacimiento Water	None anticipated	Earthquake damage	Potential contamination	Long-term severe drought
Recycled Water	Future restrictions on use and quality	Earthquake damage	Potential salt loading in basin	None anticipated

Environmental. The most likely environmental factors affecting City water supply would derive from substantially increased pumping from other groundwater basin users resulting in basin overdraft. The City is actively participating in the Paso Robles Groundwater Basin Agreement with the goal of avoiding such overdraft although the City's ability to control agricultural use, which is most of the Basin pumping, is extremely limited. Use of Nacimiento water after 2010 by Paso Robles and other local communities will reduce dependence on groundwater until about 2020. Earthquakes also can be considered an environmental event that could affect supply consistency in the short term as repairs are made to potentially damaged facilities (e.g., storage tanks, pipelines, wells).

Power outages during heat waves have occurred in Paso Robles and some City wells do not have backup generators. The City has resorted to renting generators under these circumstances (DiSimone, September 20, 2007).

Water Quality. Potential water quality impacts on water supply reliability are addressed in Table 35 and Table 36. As indicated in Table 36, it is not anticipated that the quality of groundwater, Lake Nacimiento water, or recycled water will degrade in such a manner that affects the volume of water available for use. However, it is useful to consider water quality in terms of the potential inconsistency of water supply. Water quality issues include the potential for contamination plumes and long-term regional impacts.

Table 36 Current and Projected Water Supply Changes due to Water Quality (percent)					
Water Source	2005	2010	2015	2020	2025
Groundwater	0	0	0	0	0
Nacimiento	0	0	0	0	0
Recycled	0	0	0	0	0

While all but one of the Salinas River underflow wells are clustered in two well fields, the remaining City wells are distributed widely. Accordingly, the response to contamination of a well field or one or more wells would be cessation of pumping in the affected wells and greater temporary reliance on the remaining wells (as well as future Lake Nacimiento and recycled water supply).

The likelihood of contamination of City wells is reduced through preparation of a Drinking Water Source Assessment and Protection Program (DWSAP), a federally-mandated program being coordinated by the California State Department of Health Services. The City prepared DWSAs for 14 wells in 2002: Sherwood 9, Sherwood 11, Butterfield 12, Osborne 14, Dry Creek 18, Tarr 19, Royal Oak 20, Fox 21, Cuesta 22, Borcherdt 5, and the Thunderbird wells 10, 13, 17, and 23. DWSAs were prepared for the Avery 24 well in 2003 and for the Ronconi wells 1 and 4 and the Tower 25 well in 2006 (Paso Robles, 2002, 2003 and 2006). A DWSA was not prepared for the Barney Schwartz 15 well since it is only used for park irrigation. Ronconi 16 is capped and not expected to be used. For each well, the DWSAs:

- Delineated source protection areas for both surface water and groundwater;
- Identified all potential sources of significant contamination in source protection areas; and
- Determined the susceptibility of water sources to contamination within protection areas.

The 18 assessments found water supply sources vulnerable to agricultural drainage, auto repair shops, gas stations, home manufacturing, low-density septic systems, sewer collections systems, dry cleaners, metal plating/finishing/fabricating, animal operations, agriculture and irrigations wells, and plastic and synthetics producers.

The City's Water Shortage Contingency Resolution discussed in the next section can be used if unforeseen water supply interruptions occur due to water quality problems. Water supply wells are dispersed through out the City and it is unlikely that more than one cluster of wells would be impacted. As mentioned before, use of Nacimiento water after 2010 and recycled water after 2015 will increase the City's water supply reliability by reducing dependence on groundwater.

With regard to regional groundwater quality, the Estrella subarea of the Paso Robles Groundwater Basin, which includes most of the City, is characterized locally by increasing TDS, chloride and nitrate concentrations. These adverse water quality trends are unlikely to affect City water supply in the near future, given that groundwater currently provided by the City meets all drinking water standards and the increases in TDS, chloride and nitrate are localized. Nonetheless, salt loading to the groundwater basin is an important long-term concern. Recognizing that City wastewater disposal is one source of salt loading, the City has made the reduction of salt loading one of their water resource goals. Major means to reduce salt in City wastewater include planned use of high-quality Lake Nacimiento supply, reduced use of home water softeners, strategic use of wells with lower salt concentrations, and implementation of an industrial waste discharge ordinance.

Climatic. The climatic events most likely to affect water supply are droughts, which are addressed in other sections of this report by examining historical droughts and considering their impact on current and future water supply and demand. However, future climate change—and specifically global warming—brings additional uncertainty to water supply management. It is noteworthy that Paso Robles does not have surface water supplies dependent on snowmelt, which is likely to be affected by global warming. Effects of global warming on local rainfall remain highly uncertain; however, it is likely that continued global warming would increase evapotranspiration losses. In other words, water demand for irrigation would increase as well as evaporation of Lake Nacimiento water. At this time, the significance of such an effect is not known but warrants continued consideration, particularly given the high summer season water demand that already has stressed the City water system capacity. Effects on the water system of increased irrigation demand can be minimized through water conservation measures and provision of recycled water.

Catastrophic Water Shortage. The Urban Water Management Planning Act requires that water purveyors describe actions to be taken in the event of catastrophic water supply interruption, such as earthquake and regional power outage. Regional power outages represent a potential interruption in water supply. The City has backup generators at some but not all City wells. In the past, the City has resorted to renting generators during power failures (DiSimone, September 20, 2007).

In Paso Robles, catastrophic interruption of water supply is most likely to occur due to an earthquake, which has potential to damage wells, piping, and reservoirs. The December 22, 2003 earthquake seriously damaged two reservoirs. In response, a City-wide water shortage emergency was declared and a temporary water shortage contingency plan was adopted with the purpose of reducing the City's water demand by 25 percent. This temporary water shortage contingency plan is discussed in the next section.

3.4 Response to Catastrophic Water Supply Interruption

The City adopted Resolution 90-49 Water Management Contingency Plan in 1990. This resolution, provided in Appendix B, recognizes that the City, although having two dependable sources of groundwater, requires an operations contingency plan in the event of emergency. This resolution mentions long-term drought as a factor adversely affecting the City's water supply, but focuses on an emergency situation such as an earthquake.

On December 22, 2003, the City suffered significant damage in the San Simeon earthquake. No other city of similar size to Paso Robles has, in recent history, been challenged to manage a water shortage emergency of this scale resulting form an earthquake. The earthquake resulted in loss of use of one of the City's three storage reservoirs. A City-wide water shortage emergency was declared in April 20, 2004 and a temporary water shortage contingency plan was adopted August 3, 2004 with the purpose of reducing the City's water demand by 25 percent. A copy of this resolution, Resolution 04-171, is also included in Appendix B. Although not as comprehensive as Resolution 90-49, this resolution was specific to this earthquake event. The Plan entailed voluntary community wide conservation and mandatory construction hydrant flow restrictions and 25 percent reduction in irrigation of City park facilities. If Golden Hill Road reservoir levels reached a depth of 20 feet, mandatory suspension of City irrigation and construction water use and voluntary suspension of public agency and private irrigation would have occurred. If reservoir levels reached a depth of 15 feet, public agency and private irrigation suspension would have been mandatory and warnings would be issued followed by restrictors and/or meter shut offs. At a depth of ten feet, resulting in low pressure in the lines, boil water notices would be issued for certain portions of the City. Alternative fire fighting means could also have been triggered due to the low volume of stored water, resulting in the use of water tank trucks to fight fires.

After the declaration of a water shortage emergency, the City established a 25 percent city-wide reduction goal, developed a logo, set up a display at City Hall tracking conservation percentage progress, prepared conservation tips for utility bill fliers, distributed urgent call-for-action door hangars, conducted radio announcements, placed newspaper ads, held a conservation contest, distributed restaurant tips and hotel visitor notices, prepared website information, and conducted radio interviews with city staff. The City also distributed some conservation kits and "pilot program" waterless urinals. While no tiered rate structure was implemented, rate increases associated with production and delivery costs and Nacimiento water were imposed, which may have assisted in customer conservation. Repair of the storage tank resulted in rescinding of the emergency shortage declaration on August 16, 2005.

A comparison of total water billings during the water shortage emergency to the same month of the previous year indicated that the highest cumulative conservation rate achieved was 17 percent. The City believes that voluntary reduction in landscape irrigation resulted in the most water savings and that further savings could be obtained, especially in irrigation, through audits and stricter requirements, such as water conserving landscaping (Williamson, Meg 2005).

More recently, the City requested a citywide voluntary water conservation goal of 25 percent for July to September 2007 to meet peak water use demands. The water system was strained to satisfy peak demands because production from Sherwood No. 9 and 11 wells had been temporarily decreased to install arsenic treatment facilities, and water demand was high due to a dry spring and early hot summer (Monn, July 3, 2007).

Stages of Action. Resolution 90-49 establishes four stages of action defined by at least one of three or four water system conditions. Each subsequent stage (minor, moderate, severe, critical) involves an increasingly prolonged or severe water system condition and mandates increasing City actions and public water use restrictions. A fifth stage terminates the emergency response.

Resolution 90-49 describes procedures for administering the Water Management Contingency Plan in event of emergency and describes numerous actions to be undertaken by the City during the emergency. Restrictions on water users are outlined for each stage, including prohibitions on certain types of water use and penalties for noncompliance. The resolution also describes development of procedures and plans in anticipation of water shortage; for example, establishing a materials inventory to ensure availability of critical materials.

Preparation Actions. Table 37 provides a brief summary of actions in response to various water shortage emergencies other than drought. Resolution 90-49 determines what constitutes a water shortage proclamation, provides specific triggers for action stages, and charges the Public Works Director with responsibility for advising the City Council on enactment of the Water Management Contingency Plan and designation of an initial action stage. Resolution 90-49 also provides for stretching existing storage through installation of emergency facilities including storage tanks; obtaining additional water supplies through installation of emergency wells or through water transfers; and developing alternative water supplies through conversion of inactive or agricultural wells into municipal production wells.

Resolution 90-49 includes communication and coordination with other local water agencies and utilities (e.g., PG&E), and effectively identifies the Director of Public Works as the primary coordinator, with the assistance of the Utilities Manager. Although the City has an emergency procedure, Resolution 90-94 does not provide a catastrophe preparedness plan or put employees on call. Actions to be taken by the City in response to the various emergency stages focus primarily on communication with the public.

Table 37

Preparation Actions for a Catastrophe

Possible Catastrophe	Summary of Actions
Regional Power Outage	Backup generator
Earthquake	Initiate Resolution 90-49 (Water Management Contingency Plan) or 04-171 (Water Shortage Contingency Plan from 2003 earthquake) or suggested resolution in Appendix C
Water Quality Impact	Minimized by initiation of DWSAP, response similar to earthquake
System Failure	Response similar to earthquake

Resolution 90-49 refers to development of procedures to expedite financial transactions during emergencies. The current resolution does not address:

- Financial impacts of an emergency,
- Source of funding for emergency measures, and
- Water quality interruptions.

Overall, Resolution 90-49 provides a detailed response to water shortage emergencies. However, it is recommended that the resolution be reviewed in detail for updating and revision. Suggestions are provided in this Urban Water Management Plan.

It is recommended that the City's response to a more gradually developing, less critical water supply shortage (e.g., drought) be considered specifically. This response may be described in a separate, but coordinated, Water Shortage Contingency Ordinance or Resolution, as described in the next section.

3.5 Water Shortage Contingency Resolution

Resolution 90-49, Water Management Contingency Plan, includes many of the elements required by the water code for a water shortage contingency plan. Specifically, it defines stages of action, provides methods to reduce water consumption, lists mandatory prohibitions against specific water use practices, and presents penalties for excessive water use. Elements required in a water shortage contingency plan beyond the scope of Resolution 90-49 include: analysis of impacts of water conservation on City revenues and expenditures, presentation of measures to overcome those financial impacts, and description of mechanisms to document actual reductions in water use resulting from implementation of the water shortage contingency plan.

The resolution could be revised or supplemented to provide a water shortage contingency plan in accordance with the water code. However, it is recommended that the City consider developing and adopting a new water shortage contingency plan resolution that satisfies all requirements of the Urban Water Management Planning Act and specifically addresses water shortage due to drought. This resolution, addressing a less critical water shortage, would prompt a reasonable water conservation response to drought by the City and community. Given increasing water demands on groundwater in the future, such a resolution would help ensure that the City of Paso Robles experiences future droughts with minimal difficulty.

Draft Water Shortage Contingency Resolution. The Urban Water Management Planning Act requires an adopted or draft water shortage contingency resolution or ordinance. A recommended draft water shortage contingency resolution for the City of Paso Robles is presented in Appendix C. By reference to this Urban Water Management Plan, this resolution fulfills the requirements of the Planning Act including the following:

- Definition of stages of action,
- Provision of consumption reduction methods,
- Development of prohibitions and penalties,
- Analysis of impacts of water conservation on revenues and expenditures, and presentation of measures to overcome those financial impacts, and
- Description of mechanisms to document actual reductions in water use resulting from implementation of the water shortage contingency plan.

Each of these elements is described in the following paragraphs. It is important to recognize that the following are guidelines. The City's actual response to a water shortage will require specific action by the City Council. Nothing in this Plan is intended to limit the City's available options in defining a specific response to a future water shortage.

Water Shortage Stages of Action. Stages of action for many water agencies are defined by available storage in a surface water reservoir or by the annual allotment provided by a water wholesaler. In contrast, Paso Robles overlies vast groundwater storage that has enabled the City to experience recent drought with no significant shortfall in supply.

The amount of rainfall in a given year or series of years is recommended as the basis for definition for stages of action. Rainfall is the ultimate source of recharge to the groundwater basin, is readily monitored, and is recognized as the basis for defining drought. Rainfall would be cumulated over a water year, October 1 through September 30, allowing monitoring of total rainfall over a winter rainy season. If a shortfall in rainfall were demonstrated by May 1, the Council could consider a course of action for the City.

The City response to drought will depend on the magnitude of the shortfall. Table 38 presents suggested water supply shortage stages that would trigger conservation measures. The Urban Water Planning Act requires no specific number of stages, but does require inclusion of a reduction in water supply up to 50 percent.

Table 38

Water Supply Shortage Stages and Conditions

Stage No.	Water Supply Conditions/Rationing	Shortage
1	Voluntary 10% reduction of total	Precipitation 65% of normal for one year
2	Mandatory 20% reduction of total	Precipitation 65% of normal for two years or 50% of normal for one year

The first stage involves reduction of rainfall to 65 percent or about nine inches. This reduction in rainfall is representative of the beginning of a prolonged severe drought. The first stage would trigger voluntary conservation measures resulting in ten-percent savings. The second stage is defined by a reduction of rainfall to 65 percent that persists over two winter rain seasons or an extreme drought characterized by 50 percent rainfall (seven inches) that persists past one winter rain season. The second stage would initiate water conservation measures resulting in a 20 percent water use reduction.

Based on rainfall totals alone, over the past 57 years the first stage could have been triggered by May 1 in 15 of 57 years: 1959, 1960, 1961, 1968, 1970, 1972, 1976, 1977, 1984, 1987, 1989, 1990, 1999, 2002, and 2007. The multi-year droughts of 1959 to 1961 and 1976 to 1977 would have triggered the second stage as well as the drought of 1990 since rainfall was below 50 percent.

Rainfall in 2007 will most likely be below 50 percent (5.3 inches for October 2006 through July 2007). In July 2007, the City requested a citywide voluntary water conservation goal of 25 percent for July to September 2007 to put the City in a better position to handle prolonged heat waves, power outages, or well failures during the summer's most demanding months (Monn, Doug, July 3, 2007).

Consumption Reduction Measures. Once a water shortage stage has been declared, measures will need to be implemented to meet water conservation goals. This section describes consumption reduction methods that may be implemented by the City in response to water shortage. Table 39 provides examples of consumption reduction measures, ranging from public education to mandatory rationing and reduction of pressure in water lines. Given the City's reliable water supply, only selected reduction measures are recommended.

Table 39

Consumption Reduction Methods

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (percent)
Incentives to reduce water consumption	1	10
Education program	1	10
Voluntary rationing	1	10
Mandatory rationing	2	20
Use prohibitions	2	20
Restrict for only priority uses	2	50

Specific recommended measures by the City to reduce water use in both Stage 1 and 2 are as follows.

- Notify all customers of the water shortage,
- Mail information to all customers explaining the importance of water conservation,
- Provide technical information to customers on means to promote water use efficiency,
- Develop a media campaign to promote water conservation, and
- Develop or expand conservation programs such as low-flow toilet rebates.

Prohibitions. Waste of water is prohibited by the City through its 1952 "No-Waste" ordinance, reproduced below.

> Each and every consumer shall at all times maintain in good repair all of his water pipes, faucets, valves, plumbing fixtures, or any other appliances, to prevent waste of water.
>
> Where any consumer willfully neglects to make such necessary repairs the water shall be shut off and sealed by said department and shall not be turned on again until such repairs have been made to the satisfaction of the department and a turn on fee of two dollars paid by said consumer to the said department. (Ord. 174 N.S. § 12, 1952)

The Urban Water Management Planning Act requires provision of mandatory prohibitions against specific water use practices during water shortages. The prohibitions include, but are not limited to use of potable water for street cleaning. Table 40 lists five examples of general prohibitions.

Table 40

Prohibitions

Examples of Prohibitions	Stage When Prohibition is Voluntarily Requested	Stage When Prohibition Becomes Mandatory
Street and sidewalk cleaning	1	2
Washing cars	1	2
Watering lawns/landscapes/parks	1	2
Uncorrected plumbing leaks	1	2
Construction water uses	1	2
Gutter flooding	1	2

Recommended prohibitions for voluntary compliance in Stage 1 and mandatory prohibitions in Stage 2 include the following:

- Unauthorized use of water from any fire hydrant,
- Use of potable water to wash sidewalks or roadways where airblowers or sweeping provides a reasonable alternative,
- Use of potable water for construction purposes, such as consolidation of backfill unless no other source of water or method can be used,
- Restaurant water service to patrons unless upon request,
- Hydrant flushing except where required for public health and safety,
- Refilling existing private pools except to maintain water levels,

- Use of potable water for planting of turf and other new landscaping unless it consists of low water using, drought tolerant plants,
- Use of water for washing cars, boats, sidewalks, driveways or other exterior surfaces without a quick-acting shut-off nozzle on the hose, and
- Operation of any ornamental fountain or car wash unless the water is recirculated.

Depending on the nature of the water shortage and at the discretion of the City Council, the above measures can be modified. Often-used variations include banning water use for planting any new landscaping, limiting landscape watering to specific days of the week, and discontinuing operation of all fountains.

Table 41 provides examples of penalties and charges for excessive water use. The penalties and charges must be within the authority of the water supplier. Resolution 90-49, Water Management Contingency Plan, presents penalties at various shortage stages including house call warnings, installation of flow restrictors, penalties, fines, and disconnection.

Table 41

Penalties and Charges

Penalties or Charges	Stage When Penalty Takes Effect
Flat fine	2
Termination of service	2

For the Water Shortage Contingency Plan, violators should be warned in writing, including time, date, and place of violation; general description of violation, means to correct violation, and date by which the correction is required. The first and subsequent warnings should specify a potential penalty, namely fine and disconnection, with fines increasing with each violation. A fee also should be charged for restoring service.

Revenue and Expenditure Impacts. Successful implementation of water conservation measures results in a decrease in water demand, with the unintended effect of reducing a water purveyor's revenues. Accordingly, the water code requires analysis of fiscal impacts of the water shortage contingency plan on revenues and expenditures and discussion of measures to reduce impacts. For Paso Robles, effective implementation of the water shortage contingency plan would result in a decline in potable water sales of as much as 10 to 20 percent. This is illustrated in Table 42 which assumes a 10 to 20 percent decline in 2004 water revenue. Expenditures are not projected to increase during water shortage emergencies (Table 43) because water supply sources will remain basically the same and, while City staff may focus on shortage-related duties, no hiring of additional temporary staff or extensive overtime work is anticipated. Any additional effort by the City, such as advertising and public education, would be conducted by the City's conservation program staff (see Demand Management Measure 12 in the next section).

Table 42 Actions and Conditions that Impact Revenues	
Type	**Anticipated Revenue Reduction**
Reduced Sales/Income*	$270,000 to $540,000

*10% or 20% of the 2004 water revenue of $2.7 million from Boyle (July 2005)

Table 43 Actions and Conditions that Impact Expenditures	
Category	**Anticipated Cost**
Increase Staff Cost	0
Increased O&M Cost	0
Increased Cost of Supply and Treatment	0

Revenues derived from penalties for excessive water use or water wasting during the water shortage would not effectively offset lost revenues. These presumably limited revenues should be applied toward administration of the water shortage contingency plan.

Declining water demands would be offset to a small degree by a decline in operating expenses related to the amount of water provided, such as pumping (energy) and water treatment costs. Measures to overcome revenue impacts are listed in Table 44. The City anticipates that reserves would be used to offset the revenue impact. If the water shortage emergency is or appears to be long-term or if City reserves are low, the City may elect to initiate rate adjustments to offset these losses.

Table 44 Proposed Measures to Overcome Revenue Impacts	
Names of Measure	**Summary of Effects**
Use of Reserves	Short-term use
Rate Adjustment	For severe situations

The effectiveness of the Water Shortage Contingency Plan can be measured with the monitoring mechanisms listed in Table 45. Weekly monitoring of groundwater production and water distribution (as Nacimiento water and recycled water enter the system) as well as wastewater flow to the treatment plant will occur. These values will be compared to water use and wastewater generation during normal periods and will indicate the level of water conservation. Increased meter readings on a weekly basis will indicate the level of water conservation occurring on a single user basis. These increased meter readings can be on a random basis and also can identify high water users and those customers who are not conserving. This monitoring will also alert the City as to the amount of lost revenue to expect.

Table 45 Water Use Monitoring Mechanisms	
Mechanism for Determining Actual Reductions	**Type data expected**
Monitoring Production	Weekly volumes
Monitoring Distribution	Weekly volumes
Increased Select Meter Reading	Weekly volumes
Monitoring WWTP Inflow	Weekly volumes

Reduction Measuring Mechanisms. The Urban Water Management Planning Act requires a mechanism for determining if reductions in water use are actually being achieved in response to conservation measures. Consistent with Resolution 90-94 (Appendix B) the Director of Public Works would be responsible for implementation of the ordinance and administration of any procedures, rules and regulations. Regular monitoring during a Stage 1 or 2 shortage would include reporting of daily production figures by the Water Supervisor to the Director of Public Works. The Superintendent will compare the weekly production to the target weekly production to verify that the reduction goal is being met. Weekly reports will be forwarded to the Director of Public Works. In addition, water usage by customers from monthly billings would be reported to the Director of Public Works. The Director of Public Works would provide a monthly report to the City Manager and City Council. If reduction goals are not met, the City Manager will notify the City Council and provide them with a Staff Report containing recommended corrective action alternatives for their consideration.

4. WATER DEMAND MANAGEMENT MEASURES

4.1 Introduction

The California Urban Water Management Planning Act requires that each water supplier provide a report describing its implementation of fourteen water demand management measures (DMMs). These measures, also known as water conservation best management practices (BMPs), are intended to enhance the water supplier's long term water use efficiency.

The fourteen DMMs described in this report are consistent with those presented in the California Water Code Section 10631 and in the DWR Guidebook to Assist Water Suppliers in the preparation of a 2005 Urban Water Management Plan. The water code provides for participation in regional, multi-agency urban water management planning, recognizing that cooperative planning can reduce plan preparation costs and contribute to coordinated and efficient water conservation. As such, the requirements of the water code may be fulfilled through membership and participation in the California Urban Water Conservation Council (CUWCC). Membership and participation in the CUWCC entails development of a rigorous water conservation program and submittal of annual reports describing implementation of BMPs.[1] The City of Paso Robles is not currently a member of CUWCC and accordingly, has prepared the following summaries of its water conservation activities in order to satisfy the requirements of the water code.

The structure of this summary differs significantly from that of the summary provided in the City of Paso Robles 2000 UWMP. Each of the fourteen DMMs presented in the water code, and the degree to which each has been implemented by the City of Paso Robles, are described in the section of this report titled *Water Demand Management Measures*. A plan for implementation and expansion of these DMMs is described in the section titled *Phased Water Demand Management Strategy*. Finally, a separate section, *Costs & Benefits of Demand Management Measure Implementation*, provides a framework for evaluating the potential costs and benefits of implementing the various DMMs as part of a phased water demand management strategy.

4.2 Water Demand Management Measures

Each of the fourteen DMMs presented in the water code, and the degree to which each has been implemented by the City of Paso Robles, are described in this section. The fourteen DMMs outlined in the California Water Code are:

1 In 1997, the California Urban Water Conservation Council revised its list of BMPs from 16 to 14.

1. Water Survey Programs for Single-Family and Multi-Family Residential Customers
2. Residential Plumbing Retrofits
3. System Water Audits, Leak Detection and Repair
4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections
5. Large Landscape Conservation Programs and Incentives
6. High Efficiency Washing Machine Rebate Programs
7. Public Information Programs
8. School Education Programs
9. Conservation Programs for Commercial, Industrial, and Institutional Accounts
10. Wholesale Agency Programs
11. Conservation Pricing
12. Water Conservation Coordinator
13. Water Waste Prohibitions
14. Residential Ultra-Low-Flush Toilet Replacement Programs

Each DMM is presented below in listed numerical order.

1. Water Survey Programs for Single-Family and Multi-Family Residential Customers. This measure involves a program of water use surveys for single-family residential and multi-family residential customers. Such surveys would include some or all of the following:

- Inspection of irrigation systems and timers
- Measurement of landscaped areas
- Measurement of total irrigable area
- Development, or review of, customer irrigation schedules
- Leak detection, including detection of leaking toilets and faucets
- Measurement of showerhead and aerator flow rates, coupled with a retrofit or replacement program for high-flow components
- Measurement of toilet flow rates, coupled with a retrofit or replacement program for high-flow components.

Customers would be provided with an evaluation of their water use survey results and a specific set of water-savings recommendations based upon those results. These recommendations might also include advice regarding the replacement of landscaped turf and ornamental plants with more drought resistant and water efficient plant species or native vegetation.

Currently, the City’s water billing system keeps a record of each customer's usage for the same period over the previous year and prints a comparison on the water bill of the current consumption and past year’s consumption. This alerts the customer to any significant short term increases in water use. City staff monitors water usage over time to check for any large increases in the customer’s usage. If a significant change is detected, the meter is read again. If a large increase is verified, the customer is notified and assistance is given as appropriate.

The City's current monitoring of customer usage is useful in detecting major leaks and severe water wasting. However, as currently implemented, these efforts are not sufficient to identify gradually-developed, systematic, or long-term inefficiencies in water use due to old plumbing fixtures, slow leaks, or wasteful landscaping practices. A systematic program of water use audits for residential customers would document such water losses. An auditing program would also provide basic information needed to evaluate the potential benefits of other DMMs that address specific inefficiencies, for example, residential plumbing retrofits (DMM 2).

2. Residential Plumbing Retrofits. This DMM involves programs to retrofit less efficient plumbing fixtures with newer high efficiency replacements. Such retrofit programs focus on plumbing installed prior to 1992, in part reflecting passage of the Federal Energy Policy Act of 1992, which restricted all newly manufactured faucets and showerheads to a flow of 2.5 gallons per minute (California DWR, August 1994).

A key regulation is the requirement by the California Plumbing Code that ultra-low-flush toilets (ULFTs) be installed in all new construction starting January 1, 1992. Accordingly, the City requires ULFTs toilets in all new construction. A description of the status of the City's retrofit program for ULFTs is included as DMM 14, Residential Ultra-Low-Flush Toilet Replacement Programs.

At this time, the City has no comprehensive plumbing retrofit program. Nonetheless, low-flow showerheads, flow diverters for high-flow toilets, and faucets aerators have been provided upon request to all city residents since 2000. Public outreach efforts by the City inform residents of the water conservation benefits of high efficiency plumbing fixtures and other conservation measures. These public outreach efforts are described in DMMs 7 and 8, Public Information Programs and School Education Programs, respectively. As a result, the City estimates that 75 plumbing retrofit kits have been distributed between January 2000 and December 2005.

A first step in defining the benefits of a more extensive systematic retrofit program would be to quantify the number of pre-1992 residential customers currently connected to the City's water distribution system. It is noteworthy that most of the City was built prior to 1992. An overall plumbing retrofit program would involve notification of pre-1992 customers and distribution of water-saving retrofit kits, which could include the low-flow showerheads, toilet flow diverters, and faucet aerators currently distributed by the City on a voluntary basis. It would also include ensuring that building inspectors, major developers, and plumbing supply outlets are fully informed on current plumbing standards and requirements. This retrofit program would be coordinated with the residential water audits described in DMM 1.

3. System Water Audits, Leak Detection, and Repair. This DMM focuses on the water distribution system itself, and includes a system wide water audit, documenting total system production and total system deliveries to customers. The procedure for conducting such an audit will be described below. Also included in this DMM are distribution system leak detection and leak repair. DWR guidelines suggest conducting audits every three years consistent with the American Water Works Association *Manual of Water Supply Practices, Water Audit and Leak Detection Guidebook, 1999.* This measure is widely regarded as effective. System water audits are readily implemented with a high level of customer acceptance, water savings can be substantial and easily documented, and the effect is sustainable and within the direct control of the water provider.

The first step in a system wide water audit is relatively straightforward, involving comparison of the amount of water produced with the amount of water delivered to customers. The difference is termed unaccounted-for water, which includes actual losses (leaks) in the distribution system, authorized but un-metered use (e.g., hydrant flushing and fire fighting), unauthorized water use, and meter error. Unaccounted-for urban water use in California generally ranges from 6 percent to 15 percent and averages about 10 percent (California DWR, August 1994).

Public water system statistics reported by DWR for the City of Paso Robles in 2003 indicate that system production apparently exceeded system deliveries by approximately 11 percent. In 2004, the discrepancy was approximately 15 percent but declined to less than 7 percent in 2005 due to refinement of the new billing software (Paso Robles, 2004 and 2005 and Boyle, January 2007a). The first step should be to determine the fraction of that unaccounted-for water that is actually lost (real losses) due to leakage and storage overflows since these losses inflate water production costs (water is extracted and possibly treated, yet does not reach customers). This would be fundamental to evaluating the potential benefits of enhancing the City's leak detection and repair program.

The determination of real losses involves a careful evaluation of past billing records for errors, as well as the institution of a program for the systematic verification of water meter accuracy. Currently the City does not have a program to systematically calibrate either residential or large commercial water meters. Water meter calibrations are currently performed by the City only upon customer request. Should calibration verify that the meter in question is accurate, then the burden of paying for the calibration then falls to the customer. When calibration is required for a large water meter, the City has in the past contracted with outside venders to perform meter verification and conduct meter repairs. This practice has been stopped as the cost to verify and repair large meters is often greater than or equal to the cost of simply installing a new meter.

If the observed level of unaccounted for water involves significant real losses, the next step would be to establish a systematic program for distribution system leak detection and repair. The City currently utilizes leak detection equipment where significant unexplained increases in water use have been reported or documented and repairs all detected leaks. However, the City does not employ a distribution system wide systematic approach to leak detection. It is noteworthy that in 2000 the City conducted a trial leak detection program on an older street and few leaks were located.

4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections. This measure is twofold, including 1) metering of all new connections and meter retrofit of existing connections, and 2) development of commodity water rates, in other words, billing by volume of usage. This demand management measure, which is fundamental to water conservation, has been implemented by the City for many years.

The City is fully metered for all customer types. Currently, water use for single-family residential, multi-family residential, commercial, large landscape irrigation (three or more irrigated acres), and institutional/governmental customers can be tracked separately. The City has had a policy in place since 1990 to separately meter each dwelling unit in multi-family complexes and to require separate irrigation meters for large landscape customers; however, in some cases several multi-family units are serviced by a single metered connection. Future subdivision of the irrigation water classification is planned to identify potential users of recycled water.

5. Large Landscape Conservation Programs and Incentives. Significant water conservation potential exists for landscape irrigation. The City's *Sewer Collection System Master Plan* (Boyle, January 2007b) found that there was a wide difference between summertime water production and the flow that actually reached the wastewater treatment plant. In 2003 and 2004, monthly treatment plant flows were on the order of 80 MG. Monthly production was around 100 MG in the winter months and over 250 MG in the summer months (May through October). This indicates that during the summer over 150 MG per month (more than half of the winter production) was being used for irrigation.

This DMM involves programs to manage and reduce the water demands of large landscape water users. Water demand by large landscape water users can be reduced by providing water audits similar to those outlined in DMM 1 for residential customers. These water audits would involve the following:

- Inspection of irrigation systems and timers
- Measurement of landscaped areas
- Measurement of total irrigable area
- Development, or review of, customer irrigation schedules

Water savings can also be enhanced by offering financial incentives to large landscape water users for installation of drip irrigation systems, electronic ET controllers, other water conservation technologies, or the replacement of irrigation intensive turf with more drought resistant plants or native vegetation. Accordingly, consideration of this measure begins with the identification of large irrigators and their water use, followed by development of a program for regular auditing (at least once every five years), provision of multi-lingual training and information regarding water conservation and related financial incentives.

The City currently requires separate irrigation meters for large landscape (three acres or more) customers. This policy was implemented in 1990 as a first step toward the realization of significant long term water savings from managing large landscape water use. As of 2005, water demand by landscape/recreation users in Paso Robles amounted to 845 AFY, or 13 percent of the total demand of 6,735 AFY. (See Table 4) The City has not yet implemented a water auditing program for large landscape customers.

Similarly, future large landscape water demand management would involve enacting a landscape water conservation ordinance consistent with the California Water Conservation in Landscaping Act. This act was designed to encourage ordinances that provide for the use of plants adapted to particular climatic, geological, or topographical conditions; the use of automatic irrigation systems and seasonal irrigation schedules to ensure efficient irrigation; and landscape maintenance practices that foster long term water conservation. This ordinance would apply to landscape water conservation requirements for new and existing commercial, industrial, institutional, governmental, and multifamily developments. At time of writing, no specific City landscape water conservation ordinance had been identified.

6. High Efficiency Washing Machine Rebate Programs. This DMM involves the replacement of higher water use washing machines with City approved, highly water efficient, H-axial type washing machines. When implemented, this measure can be an effective water saving measure, functionally similar to the low flow residential plumbing retrofit and ULFT retrofit measures described in DMMs 2 and 14, respectively. Financial incentives can also be offered to encourage the replacement of washing machines. In addition, all new construction offering appliances could be required to have high-efficiency washing machines.

Currently, the City neither requires new construction to install high efficiency washing machines, nor has any financial incentives in place to encourage replacement of high water use machines with new more efficient units.

7. Public Information Programs. Provision of information to the public can be an effective method for managing municipal water demand. This DMM involves a public information program with some or all of the following activities: paid advertising and public service announcements promoting water conservation; hosting of speakers for the media, community groups, or schools; hosting of special community conservation events and water conservation demonstrations; distribution of water conservation bill inserts, newsletters, or brochures; and daily water use comparisons on customer's bills. This DMM's effectiveness can also be enhanced through conservation coordination with other government agencies.

The City has implemented this water demand management measure through provision of public events involving speakers, construction and display of an exhibit on landscape water conservation, brochures, paid advertising, and bill inserts. Since 1992 City water bills have shown a percent increase or decrease in water usage for the billing period relative to the same period the previous year. To encourage landscape water conservation, the City has compiled a listing of plant species most appropriate for residential landscaping with regard to water conservation and has posted this listing on the City's website. The City has also partnered with several nearby local water providers, including the City of San Luis Obispo, the County of San Luis Obispo, the Templeton Community Services District and the Atascadero Water Company, to publish an annual water conservation newsletter entitled *Partners in Water Conservation.*

8. School Education Programs. This DMM includes provision of classroom presentations promoting water conservation, and supplementation of those presentations with grade level appropriate education materials and instructional assistance.

The City has an ongoing program to work with local school districts to promote water conservation at school facilities. In 2004 the City public outreach efforts included three presentations describing water conservation to local primary schools. The City has recently contracted with an outside vendor to conduct between 20 and 25 multi-media presentations per-school year on water conservation to local students in grade levels 4 through 6. Approximately $9500 has been budgeted for these in school presentations for the school year beginning in August of 2005. A large portion of this budget is devoted to funding the start-up costs of this program. The program will likely become more cost effective in future school years and therefore is likely to be continued beyond the current one year contract period.

The City also provides educational materials to several grade levels. State and County water system maps, posters, and workbooks have been provided to teachers upon request. As an example of a special project, staff of the City's water division constructed a portable working model showing how water is supplied, stored, and distributed through the City to fire hydrants, homes, schools, businesses, and industries.

9. Conservation Programs for Commercial, Industrial, and Institutional Accounts. Implementation of this DMM, aimed at commercial, institutional and industrial (CII) customers, involves first identifying all CII water users. Next, water use reduction among CII water users is realized through the offering of water audits similar to those described in DMM 1, the provision of information describing the retrofit of water saving technologies, development of financial incentives to offset consumer retrofit costs and encourage installation of these water conserving technologies, and the provision of follow-up audits as needed. Such a program also would involve documentation of the program (e.g., quantifying number of audits and audit findings) and estimating the water savings derived from the program.

The City has already taken the first step by identifying CII water users. As of 2005, the City had 695 commercial/institutional and industrial customers. Water demand for CII accounts in 2005 amounted to 1035 AFY, or 15 percent of the total demand of 6,735 AFY.

As of 2005 the City offers no incentives for water conservation to its CII customers. The City offers the same low flow fixture retrofit kits offered to residential customers, described in DMM 2, to its CII customers. However, as with residential customers, retrofit is voluntary and a specific request to the City is necessary to receive the retrofit kit. Specific technologies targeted to CII water users are not offered. Given that CII demand represents a significant portion of total demand, the next step would be a water conservation outreach program directed to these customers.

10. Wholesale Agency Programs. This DMM involves provision by a wholesaler of financial incentives and support to retail water agencies to encourage water conservation. Since the City of Paso Robles is not a wholesaler, this measure is not applicable.

11. Conservation Pricing. This DMM involves establishment of a pricing structure within which the largest consumers of water pay the largest per unit cost for that water. Often conservation pricing involves the use of an inclining block pricing structure. In such a pricing structure the per-unit cost of water supplied increases in increments as consumption increases. Normally, existing water use patterns are analyzed and a reasonable amount of water use is defined for each customer type, based on community norms. Generally, several consumption thresholds are established relative to this allotment which, when exceeded, trigger price increases. In this fashion, conservation pricing specifically directs the price increases at customers who choose to use large amounts of water and allows the water provider to reduce overall water demand while maintaining acceptable revenue levels. This precludes the need for rate increases for the majority of water customers. This DMM can apply both to water service and sewer service where the urban water supplier also provides sewer service. By instituting conservation pricing for both water and sewer service, the ability of pricing pressures to reduce demand is effectively doubled. The implementation of such a pricing structure by the Irvine Ranch Water District (IRWD) in Orange County resulted in an average annual reduction in water use of 12 percent for the six-year period following implementation when combined with other conservation best management practices (Pacific Institute, 1999).

DMM 4 is a prerequisite for conservation pricing, as thorough and accurate metering of all customers is the foundation for a fair and effective conservation pricing structure. Similarly, regular maintenance of all meters is necessary to fully realize and maintain effective water conservation. This DMM is also strongly connected with DMM 3 as a thorough audit of the City's water systems would reveal the relative levels of water use among consumers and consumer types, and provide a context for the establishment of pricing thresholds. The City does not currently employ inclining block structured conservation pricing but has a flat rate "pay for what you use" pricing structure for water consumption. This pricing structure generally reduces demand relative to a flat monthly payment, but is limited in this capacity when compared to conservation pricing and does not address the demand reduction potential of revising sewer rates. The City Council is considering adopting a tiered rate system in the near future to encourage conservation (DiSimone, September 20, 2007).

12. Water Conservation Coordinator. This DMM measure entails designating a water conservation coordinator responsible for preparing a water conservation plan, managing its implementation, and evaluating the results.

The position of conservation coordinator does not exist at this time as a specific full time or part time position within the City of Paso Robles. The duties of the coordinator have been performed by an existing Water Division staff member who devotes approximately up to five percent of a typical work week to duties as conservation coordinator. Increased implementation of DMMs by the City is likely to require a permanent full-time position with specifically defined responsibilities. These would likely include implementation, tracking, and coordination of water conservation programs; coordination with other agencies; and reporting to senior City staff.

A water conservation coordinator and public information and school education programs have been included in the Water Resources Plan Integration and Capital Improvement Program (WRPI/CIP) (T.J. Cross Engineers, February 2007) starting in the 2007-08 fiscal year. The WRPI/CIP indicates that the position will help advance the goals of improving water quality and reducing salt loading.

13. Water Waste Prohibitions. This DMM involves adoption of an ordinance prohibiting water waste. DWR suggests several specific prohibitions including the following: prohibition of gutter flooding, prohibition of single-pass cooling systems in new connections, prohibition of non-recirculating systems in all new conveyer car wash and commercial laundry systems, and prohibition of non-recirculating decorative water fountains.

The City established a "No-Waste" ordinance in 1952 (see section *Water Shortage Contingency Resolution, Prohibitions* for ordinance text). This ordinance requires only that a customer maintain plumbing facilities to prevent water wasting under the penalty of disconnection and a $2.00 reconnection fee. Replacement of this ordinance was recommended in the 2000 Paso Robles Urban Water Management Plan. A revised ordinance with specific prohibitions and penalties coordinated with those contained in the City's current Water Shortage Contingency Plan was submitted to the Paso Robles' Department of Public Works and is currently under review.

14. Residential Ultra-Low-Flush Toilet (ULFT) Replacement Programs. This DMM involves replacement of toilet fixtures in older construction with newer, efficient ULFT replacements. The first step in implementing such a program would involve the quantification of the number of older toilets still in service within the City and the identification of individual customers whose toilets should be replaced. Currently the City requires the installation of ULFTs in all new and remodeled residential construction, but has made no attempt to determine the number of homes currently using ULFTs.

As noted previously, the City requires ULFTs in all new construction, but currently does not have a retrofit program. An effective retrofit program can be achieved through a combination of voluntary replacement coupled with financial incentives, or through mandatory measures. For example, ULFT installation could be required at the time of property resale or as a permitting requirement for major renovations involving changes in the sanitary sewer lines. Over time, such a requirement would result in a nearly complete retrofit.

4.3 Phased Water Demand Management Strategy

The primary goal of water demand management is to reduce the long term rate of water consumption. However, water is not simply a marketable commodity, but also a basic necessity, sustaining a city's economy and also the very lives of its citizens. For this reason, there is a certain level of water consumption below which consumer demand is inelastic. In this context, the true goal of water demand management is not simply to reduce long term water demand, but also to ensure that sufficient water resources are available to meet this basic inelastic "life-line" level of demand. The recommended water demand management strategy described in the following sections advances the City toward meeting their water resource goals (listed on the first page of this report) for maximizing water resources. Benefits of water demand management (water conservation) include the following:

- Cost savings: reducing water production and distribution costs will save money for the City and its customers through reduced operation costs and possibly, deferred capital costs.
- Groundwater supply benefits: groundwater that is not pumped will remain in storage, helping to maintain groundwater levels and increasing long-term groundwater supply reliability, including during droughts.
- Groundwater basin stewardship: City actions to manage groundwater pumping and maintain groundwater levels support the cooperative management and beneficial uses of the groundwater basin.

- Wastewater treatment and disposal benefits: reducing indoor water use will reduce wastewater flows. However, potential cost savings must account for the increase in wastewater strength and quality of discharge to the river or for future recycling.
- Public perception benefits: the public can be assured that the City is using its existing water supplies efficiently while pursuing additional water supplies.

The phased water demand management strategy proposed in this section describes an approach to the implementation of the fourteen DMMs with the intent to reduce long term water demand while maintaining water affordability for consumers. When implementing any water conservation program, short term costs related to the set-up and establishment of that program can be expected to be incurred by both consumers and the water supplier. However, an appropriately-designed demand management program should yield sustainable increases in the efficiency of the water supply chain, shift consumption patterns in the direction of water conservation, and sustain levels of revenue to the water supplier relative to cost, producing long term cost savings through demand reduction.

The four phases of the proposed water demand management strategy are as follows:
- Phase I – Support revenue and promote conservation demand
- Phase II – Encourage voluntary stakeholder conservation
- Phase III – Assess further conservation potential relative to long term costs
- Phase IV – Apply technological conservation solutions

Each of these four phases would involve the strategic implementation of complementary DMMs. It is intended that each phase, once completed, would support the next phase. Each completed phase should provide the information needed to make informed management decisions in the next phase. Each phase should also be able to produce significant water savings on its own, should implementation of the next phase prove unfeasible, financially or otherwise.

Phase I. The goals of the initial phase are twofold. One goal is to temporarily raise additional revenue for the City's water agency through the institution of conservation pricing (DMM 11). The additional revenue generated through conservation may be used to fund other DMMs, but is intended to replace the revenue lost due to conservation efforts. This recognizes that successful reduction of customer consumption will also result in reduced revenue to the city. Another goal is to use pricing pressure to increase the demand for other water saving measures such as water audits and low flow plumbing fixtures.

First, we recommend retention of a water conservation coordinator to assist City staff and citizens in saving water (Water Conservation Coordinator - DMM 12). The conservation coordinator would guide the implementation of all phases of the demand management strategy, assessing the effectiveness of each phase, and adjusting the timing and degree of each DMM's implementation based on emerging information. The coordinator would be actively involved in the planning of the other DMMs instituted in the first phase of the demand management strategy, most notably conservation pricing, which requires a focused professional dedication and sensitivity to community concerns. A more extensive discussion regarding the costs and benefits of all the integrated DMMs proposed for this phase are provided in Appendix D.

Conservation pricing (DMM 11) uses a progressive billing structure to ensure that those customers least able to afford billing increases would be subject to minimal or no price increase, while at the same time presenting a choice to water users with unusually high water use: pay a higher rate or conserve water. Conservation pricing has been demonstrated to be an effective means of reducing consumer water use while at the same time maintaining a water provider's revenue in the face of this reduced consumption (Pacific Institute, 1999). A more extensive discussion regarding the costs and benefits of conservation pricing is provided in Appendix D.

As a prerequisite to conservation pricing, the City would fully meter all existing water connections and ensure the installation of meters on all new connections (DMM 4). Also, it may be useful to conduct a system wide water audit (DMM 3) in order to inform the process of developing appropriate conservation water rates and inclining block price increase thresholds. With accurate information regarding water use patterns, the City could better direct pricing pressures toward the market segments possessing the largest potential for conservation while minimizing the impact to water affordability. Taking a system wide inventory of water use before instituting conservation pricing would also serve to assure customers that all water use is accounted for, that the highest bills are indeed going to the heaviest water users, and that no customer is paying for water leaked from poorly maintained transmission lines.

A recommended first step in this system-wide water audit would be an audit of water use at all City parks and municipal facilities. By auditing City facilities first, the City will be able to demonstrate the water savings potential of an expanded system audit to customers, and at the same time gain an understanding of the costs associated with a large scale complete system audit. If this initial City facilities audit should prove financially beneficial, the City will be well positioned to justify and fund a complete system audit.

Phase II. The second phase is intended to build on the increased demand for water conservation triggered by the price pressure applied on heavy water users through conservation water rates. This phase focuses on voluntary water savings on the part of consumers. Ideally, Phase III would be carried out concurrently with Phase II.

Public information programs (DMM 7) and school information programs (DMM 8) are important ways to encourage water savings. The emphasis of these programs would be on consumer cost saving through reductions in water consumption. Materials and presentations would be prepared for consumers that highlight water saving measures that can be implemented easily by consumers with little or no upfront cost, such as irrigating landscaping after nightfall. The potential cost savings offered by such measures should be stressed. Information programs should also be used to explain the potential benefits, in terms of consumer cost savings, offered by participation in residential, large landscape, and CII water surveys (DMMs 1, 5, and 9, respectively). These water surveys are the focus of Phase III of the demand management strategy. Specific recommendations for the designing the content of public and school information programs and a discussion of the costs and benefits of these programs are presented in Appendix D.

Phase III. The third phase focuses on the residential, large landscape, and CII water surveys of DMMs 1, 5, and 9. The success of this phase depends largely on the success of the previous two phases. The pricing incentives created during Phase I should have created a demand among customers for information on water conservation. That information, provided during Phase II, should have allowed those customers to realize noticeable reductions in their water bills through their voluntary actions, heightening the demand for further cost savings. Phase II should also have established the water surveys proposed for this phase as the primary vehicle through which additional cost savings could be realized.

The residential water surveys of DMM 1 involve the largest number of customers, representing most of the water use in Paso Robles. A significant water savings is realized through the combined small water savings for many individual residential water users. For residential water surveys to be effective, significant efforts would be needed to involve a large number of residential customers. This effort would have begun in Phase II through DMMs 7 and 8, but would be continued in this phase as part of DMM 1. A discussion of the costs and benefits associated with the extensive marketing and performance of residential water audits is presented in Appendix D.

CII and large landscape water surveys (DMMs 5 and 9) would involve a significantly smaller number of customers. Unlike residential water surveys, significant water savings may be realized through a small number or even a single water audit. Landscape irrigation is a substantial portion of the water usage, particularly in summer. Reduced landscape irrigation would not only conserve water supply overall, but also reduce the large seasonal water demands that represent a serious challenge to the water system's capability to provide water supply.

In order for this measure to be cost effective, the City would determine which CII and large landscape customers are currently using the largest volumes of water. Rather than marketing water audits to all CII and large landscaped customers in aggregate, those high volume usage customers would be identified specifically for participation. A more extensive discussion of the costs and benefits associated with the performance of CII and large landscape water audits is presented in Appendix D.

Phase IV. The final phase involves the retrofit of low flow water fixtures, water saving appliances, and other water conservation technologies through the distribution of devices or the provision of financial incentives to water customers. The DMMs involved in this phase of the demand management strategy are Residential Plumbing Retrofits (DMM 2), High Efficiency Washing Machine Rebate Programs (DMM 6), Water Waste Prohibitions (DMM 13), and Residential Ultra-Low-Flush Toilet Replacement Programs (DMM 14).

The various water surveys conducted in Phase III would provide much of the necessary information to establish proper levels of subsidization for the various retrofit DMMs. Subsidization levels would reflect the relative level of water savings offered by the type of retrofit to be subsidized and also the degree to which water conservation demand would drive that type of retrofit in the absence of subsidization. The conservation pricing thresholds established in Phase I would have stimulated a demand for such measures among water customers which should serve to lower the levels of subsidization required to achieve a significant degree of customer implementation. The successful implementation of Phase II should also have had a similar effect by increasing customer knowledge of the water and cost savings provided by device retrofits.

Information gained in Phase III would also prove useful when designing water waste prohibitions by informing the City as to which types of activities and technologies are the least efficient users of water. That information should also help the City to gauge the potential impacts to the City's economy of proposed prohibitions as the number of customers utilizing potentially regulated water wasting technologies and processes will have been assessed. Appendix D discusses the costs and benefits associated with the various retrofit programs.

Unincorporated DMMs. No wholesale agency programs are proposed for the phased demand management strategy. As previously noted, the City of Paso Robles sells its water directly to the consumers, therefore no retail water agencies are involve in the production or distribution of water within the City. This measure is therefore not applicable for further consideration at this time.

4.4 Costs and Benefits of Demand Management Measure Implementation

The preceding section provides an overall strategy for implementing DMMs based on the degree to which the various DMMs interact and how one DMM supports another. Another important criterion for implementation is the cost relative to benefits. This section examines the costs and benefits of each DMM and provides specific recommendations for implementation, continuation, or deferral. The potential net financial benefits (or costs) of implementing the DMMs planned for the phased demand management strategy are discussed below in the proposed order of implementation. Table 46 provides a summary of the DMMs (listed in order of phased implementation) in terms of costs and benefits and recommendations. With regard to water savings, the City already is conserving water as a result of its DMM 4, metering with commodity rates, which has projected water savings of 126 to 631 AFY for 2006 to 2010, respectively. Additional water savings can be achieved through initiating other DMMs. While the potential total savings depends on timing and is somewhat uncertain, the analysis indicates that additional water savings can exceed 800 AFY or about 10 percent of the 2010 water demand.

In brief, while resulting in a net cost, providing dedicated staff for a water conservation program is recommended as a requirement for effective implementation of other DMMs.

Several programs should be continued, including public information, school education, and metering with use of commodity rates, which already conserves water cost-effectively. Future implementation of conservation pricing would provide substantial benefits to the City and a program should be developed with City stakeholders to set a pricing structure that is both effective and fair.

Several water conservation programs require additional study. Most notably, a study is needed of City unaccounted-for water, which is significant relative to other water agencies in California. If a significant portion of unaccounted-for water is leaks, then a leak detection and repair program offers significant water savings. Such a program also assures the public that the City is using its existing water supplies wisely. Water survey programs for residential customers also is pending study; while potentially yielding significant water savings, it also entails significant costs.

Water conservation programs for commercial/industrial and large landscape uses are recommended, as these programs can yield cost-effective water savings. Other programs (plumbing retrofits, toilet and washing machine rebates, water waste prohibitions) yield little or no water savings and a range of costs/benefits, and can be implemented by the water conservation staff.

Table 46
DMM Implementation Summary

DMM	Recommended?	Cost or Benefit?	Range of Water Savings, AFY 2006 to 2010
Phase 1			
12. Conservation Coordinator	Yes	Cost	Not applicable
4. Metering with Commodity Rates	Yes, continue	Benefit	126 to 631
3. System Water Audits	Pending further study	Cost	0
Leak Detection	Pending further study	Cost	67 to 269
11. Conservation Pricing	Yes	Benefit	135 to 63
Phase 2			
7. Public Information Program	Yes, continue	Not estimated	Not estimated
8. School Education Program	Yes, continue	Not estimated	Not estimated
Phase 3			
1. Water Survey Programs	Pending further study	Cost	165 to 437
9. Conservation of CII	Yes	Benefit	165 to 437
5. Large Landscape Programs	Yes	Possible benefit	34 to 85
Phase 4			
2. Residential Plumbing Retrofits	Yes	Small Cost	3 to 9
6. High Efficiency Washing Machines	Defer	Cost	0 to 2
14. Ultra-Low-Flush Toilets	Yes	Benefit later	3 to 16
13. Water Waste Prohibitions	Yes	Not applicable	Not applicable
Not Applicable			
10. Wholesale Agency Programs	Not applicable	Not applicable	Not applicable

Gross financial benefits were calculated as the cost to produce an amount of water equivalent to the projected water savings associated with the DMM, including the cost to treat the resulting additional wastewater volume. It is important to understand that these financial benefits are long term benefits which will be realized as future water supply expansion projects are avoided or limited due to reduced per capita water demand. Gross financial expenditures were calculated as the sum of all capital, equipment and human resources costs incurred during the implementation of a DMM. Net expenditures are gross expenditures minus any revenue generated through that DMM's implementation. Negative net expenditures (where the revenue produced by a DMM exceeds all expenditures), when they occurred, were added to the gross financial benefit of the DMM in question in order to calculate net financial benefit (or cost). Similarly, positive net expenditures were subtracted from the gross financial benefit of the DMM in question. All dollar figures are stated in Consumer Price Index (CPI) adjusted 2003 dollars.

Appendix D contains details of each of the four DMM implementation phases and discussion of specific water savings and financial benefit of implementing each DMM as summarized in Table 46 above. Future City supplies are projected to meet demands because the volume of groundwater pumped will be varied to meet future demands. The implementation of these DMMs provides numerous benefits to the City. These include cost savings through reduced water production and distribution costs and deferred capital costs. Landscape water conservation, particularly in the summer when demands soar, would reduce the strain on the City water system. In addition, benefits to the groundwater basin will occur as groundwater that is not pumped will remain in storage, helping to maintain groundwater levels and increase long-term groundwater supply reliability (including during droughts). Through water conservation, citizens can be assured that the City is using its existing water supplies efficiently while pursuing additional water supplies.

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APPENDIX A

Resolution Adopting the Urban Water Management Plan

APPENDIX A

Resolution No. ____

A Resolution of the City Council of the City of Paso Robles
Adopting the Urban Water Management Plan

WHEREAS, the California Urban Water Management Planning Act ("Act") (California Water Code Sections 10620 et seq.) requires every urban water supplier providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to develop an Urban Water Management Plan; and

WHEREAS, the Act requires that an urban water management plan be updated every five years; and

WHEREAS, the City of Paso Robles last updated its Urban Water Management Plan in 2000; and

WHEREAS, the City of Paso Robles has revised and updated its Urban Water Management Plan for adoption; and

WHEREAS, a draft of the updated Urban Water Management Plan has been circulated for public review and all comments received have been reviewed and considered; and a properly noticed public hearing was held by the City Council on December ???, 2007, prior to adoption of a Final Urban Water Management Plan, all in compliance with the requirements of the Act.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Paso Robles as follows:

1. The Urban Water Management Plan is hereby adopted and ordered filed with the City Clerk.
2. The Director of Public Works is hereby authorized and directed to file this Plan with the California Department of Water Resources;
3. The Director of Public Works is hereby authorized to declare a Water Shortage Emergency and implement the Water Shortage Contingency Plan included in this Urban Water Management Plan;
4. The Director of Public Works shall recommend to the City Council additional procedures, rules, and regulations to carry out effective and equitable allocation of water resources during a water shortage.

Passed and adopted this ___ Day of ____________, 2006 by the following vote:

AYES:

NOES:

ABSENT:

____
Mayor

ATTEST:

____
City Clerk

(blank)

APPENDIX B

Resolution No. 90-94
Adopting the Water Management Contingency Plan
and
Resolution No. 04-171
Adopting a Water Shortage Contingency Plan due to the
December 22,2003, San Simeon Earthquake

APPENDIX B

RESOLUTION NO. 90-49

**A RESOLUTION OF THE CITY COUNCIL
OF THE CITY OF PASO ROBLES
ADOPTING THE WATER MANAGEMENT CONTINGENCY PLAN**

WHEREAS, a Water Management Contingency Plan has been prepared to address the possibility of reduced water supplies in the future; and

WHEREAS, the City of Paso Robles has two very dependable sources of water, either of which could supply all of the demand; and

WHEREAS, good management of this utility requires an operations contingency plan in the event of extreme circumstances.

NOW, THEREFORE, BE IT RESOLVED AS FOLLOWS:

Section 1. That the City Council of the City of Paso Robles approves the attached Water Management Contingency Plan.

PASSED AND ADOPTED by the City Council of the City of Paso Robles, this 3rd day of April, 1990, on the following vote:

AYES:	Russell, Conway, Cousins and Martin
NOES:	None
ABSENT:	Reneau

Steven W. Martin

Steven W. Martin, Mayor

ATTEST:

Jerry Bankston

Jerry Bankston, City Clerk

STATE OF CALIFORNIA)
COUNTY OF SAN LUIS OBISPO)ss.
CITY OF EL PASO DE ROBLES)

I, ...Jerry Bankston.........., City Clerk/~~Deputy City Clerk~~ of the City of El Paso de Robles, California, do hereby certify that the foregoing ....Resolution No. 90-49........ was duly and regularly adopted, passed and approved by the City Council of the City of El Paso de Robles, California, at a ...regular...... meeting of said City Council held at the regular meeting place thereof, on the .3rd................ day of ....April..........., 19.90..., by the following vote:

AYES:..........Russell, Conway, Cousins and Martin...........

NOES:..........None..

ABSENT:........Reneau......................................

ABSTAINED:.....None..

Dated this.........3rd.......day of...April..., 19.90.

Jerry Bankston

City Clerk and Ex-Officio Clerk of the
City Council, City of El Paso de Robles,
State of California

WATER MANAGEMENT CONTINGENCY PLAN

I. POLICY STATEMENT

The City of Paso Robles obtains its water supply from groundwater sources: from the Paso Robles formation and from wells along the Salinas River. Although Paso Robles is not immediately impacted by lack of rainfall as are those municipalities solely dependent upon surface water supplies, long term drought conditions can negatively affect recharge into these groundwater aquifers and an emergency situation, such as the failure of a large well or disruption resulting from a manmade or natural disaster, i.e., an earthquake, which can restrict or impede the City's ability to provide potable water to its citizens. Despite the City's diligent efforts toward planning for the future, while ensuring the water needs of today, it is obviously beneficial to have a Water Management Contingency Plan in place if and when such events occur.

II. PROVISIONS OF WATER MANAGEMENT CONTINGENCY PLAN

Stage 1 - Minor

A. Triggering Criteria: (1) pumpage of 90% of production capacity for three consecutive days, (2) failure to meet maximum day demand for two consecutive days, or (3) falling water levels which do not fill above 90% overnight for two consecutive days.

B. Public Sector Actions: Provide information to the public and disseminate technical information; explain other stages and possible actions; request voluntary reduction of water usage.

C. User Restrictions: None

Stage 2 - Moderate

A. Triggering Criteria: (1) pumpage of 95% of production capacity for three consecutive days, (2) failure to meet maximum day demand for three consecutive days, or (3) water levels which do not fill above 80% overnight for two consecutive days.

B. Public Sector Actions: Use media to provide information to the public; give detailed explanations of restrictions; explain actions in potential succeeding stages. Request voluntary reduction of water usage.

C. User Restrictions: Enact odd-even lawn watering; prohibit unnecessary outside uses; enact detriments to water usuage: (1) peak demand water rates or inclining block water rates, (2) house call warnings, (3) installation of flow restrictors; or enact penalties: (4) shut off and reconnection fees, or (5) fines.

Stage 3 - Severe

A. Triggering Criteria: (1) Pumpage of 95% of production capacity for five consecutive days, (2) failure to meet maximum day demand for four consecutive days, or (3) falling water levels which do not fill above 60% overnight for two consecutive days.

B. Public Sector Actitons: Use media to provide information to the public; give detailed explanations of restrictions; explain actions in potential succeeding stages. Request voluntary reduction of water usage.

C. User Restrictions: Mandatory restrictions on lawn watering; prohibit serving water in restaurants; and detriments and penalties: (1) peak demand water rates or inclining water rates, (2) house call warnings, (3) installation of flow restrictors, (4) shut off and reconnections fees, or (5) fines.

Stage 4 - Critical

A. Triggering Criteria: (1) pumpage of 100% production capacity for four consecutive days, (2) failure to meet maximum day demand for five consecutive days, (3) falling water levels which do not fill above 50% for two consecutive days, or (4) pump or system failure due to natural disaster or other event which causes unprecedented loss of capability to provide water service.

B. Public Sector Actions: Extensive media campaign to provide information on emergency situation and actions; warnings on lack of responsiveness of public to conditions; and other actions as described in previous stages.

C. User Restrictions: Prohibition of all outside water use and water use by selected commercial and industrial establishments, and all other actions and penalties as imposed in previous stages. Terminate service to selected portions of system as last extreme measure.

Stage 5 - Termination

A. Triggering Criteria: The items that may terminate the stage or stages of the Water Management Contingency Plan are discretionary and are based on these factors: (1) ability of the system to meet average and daily demands, (2) filling of water storage reservoirs to acceptable levels, or (3) repair or replacement of facilities; installation of additional facilities that will allow resumption of normal or improved water supply conditions. The contingency plan may be terminated at any stage with regression to a previous stage, or the plan may be completely terminated.

B. Public Sector Actions: Formal public notification that the stage or stages of the Water Management Contingency Plan have been terminated. If the plan has only regressed to a previous stage, then the public shall be informed of this regression and of the measures being taken.

C. User Restrictions: N/A

III. WATER MANAGEMENT CONTINGENCY PLAN PROCEDURES

A. General

1. Upon such time that conditions warrant, the Director of Public Works will make recommendations to the City Council to enact the Water Management Contingency Plan and designate an initial contingency stage.

2. The Water Superintendent shall keep the Director of Public Works apprised of the water supply conditions of the production and distribution systems.

3. As the plan unfolds, the Director of Public Works will make recommendations to the City Council as to the status of the Water Management Contingency Plan and to the stage(s) to which it should progress or regress and to the plan's termination.

4. The Departments/Divisions of the City of Paso Robles shall give their utmost efforts in regard to the effective fulfillment of the Water Management Contingency Plan and give their full cooperation to the Director of Public Works toward achievement of the plan's goals.

IV. CONTINGENCY PLAN ACTIONS AND ALTERNATIVES - PUBLIC SECTOR

A. General

1. Contact local representative(s) of utilities (such as Pacific Gas & Electric) to establish procedures to expedite assistance in time of emergencies.

2. Establish mutual aid procedures with local water utilities and initiate water connections for transfer of water during emergency situations.

3. Install in-line booster pumps at Water Division yard, to provide for equalization of pressures and flows between west and east side water supply areas.

4. Develop plans and procedures for emergency facilities installation/construction (wells, tanks, etc.)

5. Develop procedures for dissemination of information in regard to the stages of the contingency plan and for public notification.

6. Establish cooperation between City departments/divisions as relating to curtailment of water usage during water emergencies.

7. Identify those entities with high volume water usage and develop plans to minimize their impact on the water system, and water shortage impacts on their establishments.

8. Develop procedures to expedite financial transactions and to minimize formalities during water shortage emergencies.

9. Develop water system master list that will identify each system component and designate those components as critical or noncritical, and if critical to what level.

10. Establish materials inventory that will ensure availability of those materials that are associated with critical components.

B. Supply Management

1. Engage in leak detection efforts when water loss exceeds ten percent (10%).

2. Install pressure regulation devices in high pressure areas.

3. Develop action plans to convert inactive wells and agricultural wells into active public wells.

4. Develop and maintain recordkeeping system to monitor production and distribution functions and deviations.

C. Demand Management

1. Utilize pricing mechanisms to gain water conservation:

a. Peak demand water rates - raise rates only during times of water shortage or expected water shortage (e.g., May through August).

b. ~~Inclining block rates - devise tier (or blocks) of rates that would increase the cost of water as the usage increases.~~ Deleted by City Council

2. Initiate regulations, especially those pertaining to the Plumbing Code, to mandate installation of water-saving devices.

3. Develop and implement public education programs to emphasize the importance of water and the various methods and benefits of water conservation.

V. CONTINGENCY PLAN ACTIONS AND ALTERNATIVES - PRIVATE SECTOR

A. Business and Industry

1. Work with the City to develop plans for water shortage - what they can do to assist and what the City can do to provide them assistance.

2. Identify areas for potential water savings and areas of nonessential water use.

B. Residential

1. Residential users should promptly notify the City upon discovery of water waste or a City water leak.

2. Residential users should look for ways to conserve water: in the bathroom, kitchen, laundry, appliances, plumbing, and out-of-door use.

3. Residential users should become involved in the conservation effort and encourage their neighbors to follow the guidelines of the Water Management Contingency Plan.

RESOLUTION NO. 04-171

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PASO ROBLES ADOPTING A WATER SHORTAGE CONTINGENCY PLAN DUE TO THE DECEMBER 22, 2003, SAN SIMEON EARTHQUAKE

WHEREAS, the City water distribution system contains 12 million gallons of storage capacity; and

WHEREAS, as a result of the December 22, 2003, earthquake, the City lost use of one of its three above-ground 4 million gallon storage tanks ; and

WHEREAS, on April 20, 2004, in accordance with California Water Code Section 350 et seq., the City of Paso Robles adopted Resolution No. 04-78 declaring a water shortage emergency, finding that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the City to the extent that there would be insufficient water for human consumption, sanitation, and fire protection use; and

WHEREAS, until normal water storage/supply has been replenished or augmented the City intends to implement certain measures to provide water storage and supply for potable consumption and fire fighting.

NOW THEREFORE, BE IT RESOLVED AS FOLLOWS:

SECTION 1. The City Council of the City of El Paso de Robles does hereby adopt the Emergency Water Shortage Contingency Plan (Exhibit A) that establishes thresholds and methods under which water use will be eliminated or curtailed to address the City's water shortage.

PASSED AND ADOPTED by the City Council of the City of El Paso de Robles this 3rd day of August 2004 by the following vote:

AYES: Finigan, Heggarty, Nemeth, Picanco, and Mecham
NOES: None
ABSTAIN: None
ABSENT: None

Frank R. Mecham, Mayor

ATTEST:

Sharilyn M. Ryan, Deputy City Clerk

RESOLUTION OF THE COUNCIL
OF THE CITY OF PASO ROBLES, STATE OF CALIFORNIA

IN THE MATTER OF: **No. 04-171**

Adopting a water shortage contingency plan due to the December 22, 2003, San Simeon earthquake

I, Sharilyn M. Ryan, Deputy City Clerk of the City of Paso Robles, certify that the foregoing is a full, true and correct copy of Resolution No. 04-171 proposed by Councilmember Nemeth, seconded by Councilmember Finigan, was duly passed and adopted by the Council of the City of El Paso de Robles at its regular meeting on August 3, 2004, by the following vote:

AYES:	Councilmembers:	Finigan, Heggarty, Nemeth, Picanco, and Mecham
NOES:	Councilmembers:	None
ABSTAIN:	Councilmembers:	None
ABSENT:	Councilmembers:	None

Sharilyn M. Ryan

Sharilyn M. Ryan, Deputy City Clerk and
Ex-Officio Clerk of the City Council

CITY OF PASO ROBLES

EMERGENCY WATER SHORTAGE CONTINGENCY PLAN

August 3, 2004

A. Purpose:

To prevent system wide outages and possible infrastructure damage to the City's water delivery system, and to provide potable water for consumption and fire fighting while the City repairs its water storage facilities.

B. Description of Water Curtailing Methods

Community Wide Water Conservation - Voluntary

Voluntary reduction in water use exercised on an individual user basis. No penalties apply if 25% goal is not met. This effort will continue through the summer and beyond.

Construction Water Flow Restrictors – Mandatory (already in place)

There are approximately 50 construction hydrants in use throughout the City. The water is used for dust control and related construction support. When a water truck is filling from a hydrant, there are impacts to the localized water pressure and a spike in demand. The installation of flow restrictors slows the rate that a water truck can fill, thereby reducing the negative impact on localized water pressure and smoothing out the demand spikes.

Construction Water Suspension - Mandatory

The suspension of construction water could save up to 275,000 gallons per day (based on 2003 use statistics). Suspension would affect dust control capabilities and would require water tank trucks to make arrangements for filling outside of the City.

City Irrigation Suspension - Mandatory

The City has already cut park irrigation schedules from 25-50%. It is estimated that emergency suspension of parks watering could save up to 500,000 gallons per day. However, shut down of irrigation cannot be sustained for extended periods without permanently damaging park facilities.

Public Partners Irrigation Suspension – Voluntary and Mandatory

There are several public agencies that are generally high water users (School District, Cemetery District, Housing Authority). The City will seek the cooperation of these agencies in voluntarily suspending their irrigation for limited periods of time. These irrigation suspensions would be coordinated with City irrigation suspensions to minimize long term impact to each agency's facilities.

If voluntary suspensions are ineffective, and water storage further drops to critical levels as established by the contingency plan, the City may make irrigation suspension mandatory for specific limited periods of time.

Community Wide Emergency Conservation Alert – Enforceable

At critical tank levels the City will issue emergency alerts to the public urging them to reduce consumption, including no watering of vegetation or washing of cars and driveways.

Compliance is still voluntary. However, City will have "police authority" to require compliance for blatant offenders. "Policing" could entail issuing warnings for visible water waste, followed by restrictors and/or meter shut offs if deemed necessary.

Landscape Irrigation Shutoffs - Mandatory

There are approximately 250 landscape meters (irrigation only) issued throughout the community. Some of these landscape meters are private properties that are generally high water users because of the amount of landscape area (example - apartment complexes).

If voluntary suspensions are ineffective, and water storage drops to critical levels as established by the contingency plan, the City may make irrigation suspension mandatory for specific limited periods of time for these private users.

Boil Water Orders

In the event that tank levels drop to a point where water pressure falls below 20 psi, the County Department of Environmental Health requires that the City implement specific health and safety notifications. Such an event would necessitate a "boil water order" based on back siphoning from non-potable connections. Boil water orders would apply to only certain specific pressure zones in the City.

Alternative Fire Fighting Measures

The ability to effectively fight fires for sustained periods is in direct correlation to the amount of stored water available. If stored water were depleted, Emergency Services would find it necessary to utilize Water Tenders (water tank trucks). Such a method would severely hinder firefighting capabilities. Declining water storage, where depletion is anticipated, would reasonably necessitate Emergency Services entering into contracts for stationing water tenders locally. These vehicles would otherwise be available on an emergency basis (actual fire), but would require long distance responses.

C. Water Shortage Contingency Plan

City shall implement the following measures as described below based on Golden Hill Road water levels:

Activated Measures

- Community Wide Water Conservation - Voluntary
- Construction Hydrant Flow Restrictors – Mandatory
- City reduction in irrigation of park facilities by 25% - Mandatory

At 20 feet:

- City Irrigation Suspensions - Mandatory
- Partner Agency Irrigation Suspensions - Voluntary
- Private Irrigation Suspension – Voluntary
- Construction Water Suspension – Mandatory

At 15 feet:

- Community Wide Emergency alert to reduce – Police Power triggered
- Partner Agency Irrigation Suspensions – Mandatory
- Private Irrigation Suspension – Mandatory

At 10 feet:

- Boil water notices to higher elevation properties
- Alternative fire fighting means may be triggered

APPENDIX C

Resolution Establishing the Criteria
to Declare a Water Shortage

APPENDIX C

Resolution No. ____

A Resolution of the City Council of the City of Paso Robles
Establishing the Criteria to Declare a Water Shortage

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Paso Robles as follows:

PURSUANT to California Water Code Sections 350 et seq., the City has conducted duly noticed public hearings to establish the criteria under which a water shortage emergency may be declared.

WHEREAS, the City finds, determines and declares as follows:

(a) During 2004, the City served approximately 7,462 acre feet (AF) of water to City property owners and inhabitants;

(b) The demands for water service by City inhabitants and property owners is not expected to lessen spontaneously;

(c) For the foregoing reasons, when the amount of precipitation, and consequently water supply available to the City for service to customers, falls below the Stage 1 triggering levels established in Table 38 of the 2005 Urban Water Management Plan (below), the City has determined that the water supply will not be adequate to meet the ordinary demands and requirements of water consumers without depleting the water supply of the City to the extent that there would be insufficient water for human consumption, sanitation and fire protection and this condition is likely to exist until precipitation and inflow dramatically increases;

Table 38

Water Supply Shortage Stages and Conditions

Stage No.	Water Supply Conditions/Rationing	Shortage
1	Voluntary 10% reduction of total	Precipitation 65% of normal for one year
2	Mandatory 20% reduction of total	Precipitation 65% of normal for two years or 50% of normal for one year

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Paso Robles hereby directs the City Manager when the amount of precipitation and therefore water supply available to the City for service to customers falls below Stage 1 triggering levels established in Table 38 of the 2005 Urban Water Management Plan, to find, determine, declare and conclude that a water shortage exists that threatens the adequacy of water supply for human consumption, sanitation and fire protection requirements, until the City's water supply is deemed adequate. After the declaration of a water shortage, the City Manager is directed to determine the appropriate Action Stage and implement the City's Water Shortage Contingency Plan.

FURTHERMORE, the City shall periodically conduct proceedings to determine additional restrictions and regulations which may be necessary to safeguard the adequacy of the water supply for domestic, sanitation and fire protection requirements.

Passed and adopted this __ Day of ___________, ____ by the following vote:

AYES:

NOES:

ABSENT:

____
Mayor

ATTEST:

____
City Clerk

APPENDIX D

Water Demand Management Measures

APPENDIX D

Water Demand Management Measures

The California Urban Water Management Planning Act requires that each water supplier provide a report describing its implementation of fourteen water demand management measures (DMMs). The fourteen DMMs are presented in the main body of the Urban Water Management Plan in the section titled *Water Demand Management Measures.* A plan for implementation and expansion of these DMMs is described in the section titled *Phased Water Demand Management Strategy*, while another section, *Costs & Benefits of Demand Management Measure Implementation,* provides a framework for evaluating the potential costs and benefits of implementing the various DMMs as part of a phased water demand management strategy. This appendix contains details of each of the four DMM implementation phases and discussion of specific water savings and financial benefit of implementing each DMM as summarized in Table D-1.

Table D-1
DMM Implementation Summary

DMM	Recommended?	Cost or Benefit?	Range of Water Savings, AFY 2006 to 2010
Phase 1			
12. Conservation Coordinator	Yes	Cost	Not applicable
4. Metering with Commodity Rates	Yes, continue	Benefit	126 to 631
3. System Water Audits	Pending further study	Cost	0
Leak Detection	Pending further study	Cost	67 to 269
11. Conservation Pricing	Yes	Benefit	135 to 63
Phase 2			
7. Public Information Program	Yes, continue	Not estimated	Not estimated
8. School Education Program	Yes, continue	Not estimated	Not estimated
Phase 3			
1. Water Survey Programs	Pending further study	Cost	165 to 437
9. Conservation of CII	Yes	Benefit	165 to 437
5. Large Landscape Programs	Yes	Possible benefit	34 to 85
Phase 4			
2. Residential Plumbing Retrofits	Yes	Small Cost	3 to 9
6. High Efficiency Washing Machines	Defer	Cost	0 to 2
14. Ultra-Low-Flush Toilets	Yes	Benefit later	3 to 16
13. Water Waste Prohibitions	Yes	Not applicable	Not applicable
Not Applicable			
10. Wholesale Agency Programs	Not applicable	Not applicable	Not applicable

Phase I Demand Management Measures

- **DMM 12. - Water Conservation Coordinator**

Recommendation: Implementation is recommended. This DMM is required for the effective implementation of all other DMMs.

Detailed Cost/Benefit Analysis:
The conservation coordinator would be responsible for managing and monitoring all phases of the City's demand management program. This person would be chiefly responsible for implementation of the 14 DMMs and therefore, must be able to analyze water use patterns to assess the effectiveness of the various demand management measures implemented by the City, and closely and carefully track the costs and benefits of these measures. Though general discussions of both the cost and benefits of the various DMMs are presented in this report, the conservation coordinator would be responsible for determining the cost to benefit ratio of each DMM specific to the City of Paso Robles.

The conservation coordinator would also be responsible for designing the content of public information programs, drafting water waste prohibitions, and planning the various incentive programs. This person should be able to exercise independent judgment as the water conservation programs involve a significant degree of latitude to plan, schedule, and carry out. Similarly, the conservation coordinator would act as public representatives of the City of Paso Robles during public information activities, providing water conservation advice to City customers.

The knowledge requirements include an understanding of principles and practices of water conservation, familiarity with economics as they relate to water conservation, knowledge of the techniques and equipment used in water distribution, a general understanding of both hydrology and hydraulics, and experience with cost estimation and budget preparation. An understanding of basic principles of soil science, irrigation practices, or civil engineering may also be beneficial. An education equivalent to a B.S. or B.A. degree from an accredited college or university with major course work in environmental studies, civil or environmental engineering, hydrology, hydrogeology or a closely related field would be desirable.

Salary for a dedicated conservation coordinator would be dependant upon experience and might be expected to range from $45,000 to $65,000 per year to start for a full time position. It is not expected that any revenue would be generated directly through the appointment of a conservation coordinator. Similarly, it is not likely that a direct water savings would result from the implementation of this DMM alone. It is important to note, however, that the conservation coordinator would benefit City water customers not only by providing water conservation advice, but also by actively supporting and coordinating all of the other water conservation measures.

An annual breakdown of the expenditures required to staff the conservation coordinator position, through 2010, as well as a breakdown of the expected water savings is presented in Table D-2. This breakdown assumes a starting salary of $55,000 per year for the position with a 3 percent annual cost of living adjustment.

Table D-2
DMM 12 Projected Expenditures and Water Savings

	2006	2007	2008	2009	2010
Gross Expenditures	$55,000	$56,650	$58,350	$60,100	$61,903
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$55,000	$56,650	$58,350	$60,100	$61,903
Projected Water Savings (AFY)	0	0	0	0	0

As no water savings is anticipated as a direct result of this DMM, the gross financial benefit is zero dollars. Similarly, no revenue is generated as a direct result of this DMM, so the net expenditure required for its implementation is equal to the required gross expenditure as shown in Table D-2 (the conservation coordinators salary in this case). Subtracting the required net expenditure from the resultant gross financial benefit reveals that the net financial cost of this DMM is also equal to salary of the conservation coordinator as shown in Table D-3.

Table D-3
DMM 12 Net Annual Financial Benefit

	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	0	0	0	0	0
Gross Financial Benefit	$0	$0	$0	$0	$0
Net Expenditures	$55,000	$56,651	$58,349	$60,100	$61,903
Net Financial Benefit	-$55,000	-$56,651	-$58,349	-$60,100	-$61,903

Although this DMM will result in a net financial cost to the City, its implementation is still recommended. The conservation coordinator plays a pivotal role in the remainder of the demand management program and forgoing this measure's implementation could prevent the successful realization of significant demand reduction.

- **DMM 4. - Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections**

Recommendation: Continued implementation is recommended. Over time a net financial benefit to the City of Paso Robles is produced through this DMM's implementation.

Detailed Cost/Benefit Analysis:
The full metering of all water connections within the City of Paso Robles has already been completed and an existing policy requires installation of a water meter with each new connection. As of 2005 there are approximately 10,720 individual metered water connections. Costs will continue to be incurred for future meter installation as meters are

fit to all new connections. These costs are currently funded by the customer, but may be funded by either the City or customer in the future and are included in Table D-4.

The CUWCC's publication *BMP Costs and Saving Study* (CUWCC, December 2003) cites several estimates for the price of a single water meter installation (including costs to purchase, transport and install that meter) taken from various sources dated in the mid 1990's. The highest of those estimates is $905 ($750 dollars in 1995). It is estimated that by 2025, the number of water service connections within the City of Paso Robles will increase to 25,560 (see UWMP Table 4). Using the 2025 estimated number connections from 2005 through 2010, and assuming a linear increase in the number of water service connections, an annual breakdown of new meter installation expenditures is provided in Table D-4.

Though there would be an upfront expenditure for each water meter, the installation of each meter would allow the City to produce revenue by billing each customer for the amount of water used. Using the City's pricing structure when this appendix was written ($6/month + $1.21/ccf of water use), the average water customer can be expected to owe $162 annually for water service. The annual revenue to the City produced by the metering of water connections through 2010 is presented in Table D-4. The annual net expenditures required for continued metering are also presented in Table D-4.

Table D-4
DMM 4 Projected Expenditures and Water Savings

	2006	2007	2008	2009	2010
# of New Meters to be Installed	742	742	742	742	742
Total # of Connections in City	11462	12204	12946	13688	14430
Gross Expenditures	$671,510	$671,510	$671,510	$671,510	$671,510
Revenue Generated By DMM	$120,204	$240,408	$360,612	$480,816	$601,020
Net Expenditures	$551,306	$431,102	$310,898	$190,694	$70,490
Projected Water Savings (AFY)	126	252	378	505	631

The average water service connection in the City of Paso Robles used 0.68 AF of water in 2004 (Paso Robles Public Water System Statistics, 2004). The CUWCC cites several studies which estimate an aggregate water savings of between 20 percent and 40 percent when water meters are installed on formerly un-metered connections (CUWCC, December 2003). The CUWCC notes, however, that the studies from which these estimates were taken may not take into account that a portion of the water savings resulted from other concurrently-administered water conservation measures. For that reason this report uses the conservative 20 percent estimate of water savings. Accordingly, an un-metered connection in the City of Paso Robles could be expected to have used 0.85 AF of water in 2004. Therefore each new meter installed could reasonably be expected to produce a water savings of approximately 0.17 AFY. An annual breakdown of the water savings provided through continued metering of new water connections is presented in Table D-4.

The annual gross financial benefit to the City produced by continuing to meter all new water connections can be calculated by first determining the annual volume of water conserved by metering, and then determining the cost to increase the water supply by the same amount (and consequently treat the resultant volume of wastewater). On average, during the past three years (2002, 2003, and 2004) the City of Paso Robles has spent $363 per AF to provided water to each customer and an addition $740 per AF to treat wastewater (Boyle, July 2005). Approximately 42 percent of all water delivered annually is returned for wastewater treatment (Boyle, July 2005). In aggregate, the City spends $674 to deliver and treat each AF of water used by the average customer. An annual breakdown of the gross financial benefit of continued metering is presented in Table D-5.

It should be noted that as less water is used, the price to treat each resultant unit of wastewater will increase due to an increase in the concentration of the contaminants in that wastewater (contaminant loading remains constant yet less water volume is available for dilution). This report does not attempt to adjust for this phenomenon.

Table D-5
DMM 4 Net Annual Financial Benefit

	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	126	252	378	505	631
Gross Financial Benefit	$84,924	$169,848	$254,772	$340,370	$425,294
Net Expenditures	$540,904	$422,968	$305,032	$187,096	$69,160
Net Financial Benefit	-$455,980	-$253,120	-$50,260	$153,274	$356,134

Finally, the net financial benefit (or cost) is calculated by subtracting the net expenditure necessary for future metering from the gross financial benefit. An annual breakdown to the net financial benefit (or cost) afforded the city by continued metering of all water service connections is presented in Table D-5. As can be seen in Table D-5, the net financial benefit to the City of Paso Robles for the continued metering of all new water service connections is projected to steadily increase as the benefits of cumulative water savings and revenue generation continue to exceed the static level of gross expenditure required. Furthermore, effective metering of all water connections is a prerequisite for DMM 11, Conservation Pricing. Continued implementation of this DMM is recommended.

- **DMM 3. - System Water Audits, Leak Detection and Repair**

Recommendation: Additional information is required to assess the cost effectiveness of this DMM prior to implementation. It is recommended that a pilot study be conducted in order more accurately project the expenditures necessary for water meter verification and its potential for revenue generation.

Detailed Cost/Benefit Analysis:
The City of Paso Robles currently tracks both the amount of water it produces and delivers to its customers. In 2003 and 2004 unaccounted for water amounted to 12 percent of total water production on average. This is slightly higher than the California

average of 10 percent (California DWR, August 1994). However, simply tracking unaccounted for water says little to the water provider regarding where water is being lost from the system and offers little opportunity for the provider to recover lost revenue.

The American Water Works Association (AWWA website, 2005) recommends that water providers separately track real losses (losses resulting from pipeline leakage and storage overflows) and apparent losses (losses resulting from meter inaccuracies, billing data errors, and unauthorized water use). The AWWA provides a format for conducting a water system wide water balance as part of a water audit. The format of this water balance is provided in Table D-6 shown below.

Table D-6
AWWA Water Balance Format

System Input Volume	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non- Revenue Water
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Customer Metering Inaccuracies	
			Data Handling Errors	
		Real Losses	Leakage on Transmission and Distribution Mains	
			Leakage and Overflows from Storage Tanks	
			Leakage on Service Connections	

Armed with specific information on the causes of system water loss, the cost impact of these losses could be calculated and efforts to recoup these losses could be planned as financially justified. A water provider such as the City of Paso Robles could likely realize significant water savings by addressing the largest sources of system water loss.

City staff members are currently conducting an in-house study on unaccounted-for water in order to separate real losses from apparent losses due to billing system errors; billing software was updated in 2005. The City does not however track real or apparent losses due to water meter inaccuracy or unauthorized water use. In order to track these losses, the City would need to verify the readings of customer water meters as part of the water audit process. Completion of the in-house study on billing system errors and the verification of water meter readings, would allow the City to track both apparent losses and real losses, and to distinguish between the two. Once real losses are known, an informed decision can be made regarding the implementation of a systematic leak detection system as part of this DMM.

The CUWCC provides cost estimates ranging from $211 to $3103 ($150 in 1990 to $2500 in 1994) per meter for the auditing of large water meters of various sizes, and $35 to $70 ($25 to $50 in 1990) for the auditing of residential meters. The City of Paso Robles had 9700 residential water meters, 695 CII meters, and 325 Landscape Irrigation meters in operation in 2005 (Boyle, September 2005). If it is assumed that the average residential water meter costs $53 to audit and that the average CII, Landscape Irrigation or unspecified classification meter costs $1657 to audit, then the total expenditure required for a complete water meter audit can be calculated. An annual breakdown of the expenditures required to conduct a complete water meter audit by 2010 (assuming 20 percent of all currently existing meters are audited every year) is provided in Table D-7. This schedule is consistent with the CUWCC's estimate of four years for the persistence of water savings produced by residential water audits (CUWCC, December 2003).

Table D-7

DMM 3 - Projected Meter Auditing Expenditures and Water Savings

	2006	2007	2008	2009	2010
# of Res. Meters Audited	1940	1940	1940	1940	1940
# of Non-Res. Meters Audited	204	204	204	204	204
Total Number of Audits	2144	4288	6432	8576	10720
Gross Expenditures	$440,848	$440,848	$440,848	$440,848	$440,848
Revenue Generated by DMM	$70,470	$70,470	$70,470	$70,470	$70,470
Net Expenditures	$370,378	$370,378	$370,378	$370,378	$370,378
Projected Water Savings (AFY)	0	0	0	0	0

While it is unlikely that a significant amount of water will be saved by conducting water meter audits, it is likely that those audits will reveal that a percentage of the City's unaccounted for water is indeed delivered to customers and therefore should be billed. For the purposes of projecting the revenue generated by this additional billing, it is assumed that water meter audits using the proposed schedule will reveal that 2 percent of all annual unaccounted for water is indeed being delivered to customers and should be billed. This assumption is made for illustrative purposes, but is likely conservative as such a reduction would reduce unaccounted for water to 10 percent of total production, equal to the California average. Under the City's current billing system this would produce $70,470 of annual revenue. An annual breakdown of the projected additional revenue generated by water meter audits is presented in Table D-7. The true level of additional revenue generated will likely differ from these projections and is best gauged through a pilot study involving a small number of meters of various age and type, possibly focused on City facilities as previously suggested.

Should a water meter audit indicate significant real losses, the next step would involve a system wide leak detection program. The CUWCC cites several AWWA cost estimates for leak detection programs ranging from $105 per mile of water main ($75 in 1990) to $704 per mile of water main ($500 in 1990) (CUWCC, December 2003). The City of

Paso Robles estimates that approximately 148 miles of water main make up its water transmission and distribution system (Paso Robles website, 2005). City water agency staff familiar with the age and service history of the water distribution and transmission system should be consulted in the design of a systematic leak detection schedule. However, for the purpose of this report it is assumed that the City would check its entire distribution and transmission system for leaks once every five years (20 percent per year). This schedule is consistent with the CUWCC's estimates for the persistence of water savings produced by residential water audits (CUWCC, December 2003). An annual breakdown of the expenditures associated with a systematic leak detection program is presented in Table D-8. The expenditures required for leak repair are not factored into this breakdown as any leaks would eventually increase in volume be detected and repaired.

Table D-8

DMM 3 Projected Leak Expenditures and Water Savings

	2006	2007	2008	2009	2010
Miles of Water Mains Checked	30	30	30	30	30
Total # of Miles Checked	30	59	89	118	148
Gross Expenditures	$11,988	$11,988	$11,988	$11,988	$11,988
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures	$11,988	$11,988	$11,988	$11,988	$11,988
Projected Water Savings (AFY)	67	135	202	269	269

Unlike the proposed water meter audits undertaken as the first step of this DMM, it is likely that leak detection will produce an appreciable water savings. Small water main holes with diameters on the order of one half of an inch in diameter can leak tens of gallons per minute of water even under low pressures (CUWCC, December 2003). The actual amount of water saved through leak detection will vary widely depending on the overall condition of the water distribution and transmission system.

It is not unreasonable to assume that a systematic leak detection program could reduce unaccounted for water by an additional 1 percent for every 20 percent of the transmission system inspected. It is expected that water savings realized through leak detection would persist for four years consistent with the CUWCC's estimates for the persistence of water savings produced by residential water audits (CUWCC, December 2003). Under these assumptions, the City could expect to reduce unaccounted for water to 6 percent, consistent with percentages observed among California's most efficient water providers (California DWR, August 1994), by 2010. This 1 percent annual reduction in unaccounted for water represents a direct water savings. An annual breakdown of the water savings might be expected as a result of leak detection is presented in Table D-9.

In order to calculate the gross financial benefit resulting from this water savings, the amount of water saved is multiplied by the cost per AF to produce an equivalent amount of water. From the discussion regarding DMM 4, the City of Paso Robles spends $674 for every AF of water it produces. This includes money spent to treat the resultant wastewater. An annual breakdown of the gross financial benefit produced by DMM 3 is provided in Table D-9.

Table D-9 DMM 3 Net Annual Financial Benefit for Entire DMM					
	2006	2007	2008	2009	2010
Projected Water Savings (leak detection) AFY	67	135	202	269	269
Gross Financial Benefit	$45,394	$90,788	$136,182	$181,576	$181,576
DMM 3 Net Expenditures (entire DMM)	$382,366	$382,366	$382,366	$382,366	$382,366
Net Financial Benefit	-$336,972	-$291,578	-$246,184	-$200,790	-$200,790

Finally, the net financial benefit (or cost) of the entire DMM is calculated by subtracting the net expenditures (water meter audits and leak detection) from the gross financial benefit produced by leak detection (water meter audits produce no water savings). An annual breakdown to the net financial benefit (or cost) afforded the City through the complete implementation of DMM 3 is presented in Table D-9. As shown in Table D-9, a net cost is projected for this DMM reflecting the relatively high cost of conducting water meter audits when compared to the anticipated additional revenue generation. Further examination of the specific expenditures and potential for revenue generation of the water meter auditing step of this DMM (possibly through the previously mentioned City facility pilot study) is recommended prior to its implementation.

- **DMM 11. - Conservation Pricing**

Recommendations: Implementation is recommended. This DMM offers a substantial net financial benefit to the City. City stakeholders should be consulted to determine a mutually agreeable target for water use reduction and a pricing structure should be established to meet this goal.

Detailed Cost/Benefit Analysis:
Conservation pricing uses pricing pressures to reduce customer water use by focusing on those water users with unusually large water use rates. Such users are presented with significant increases in the unit cost of water for water use in excess of a reasonable, predetermined water amount. At the same time, conservation pricing helps to maintain water affordability for those consumers already limiting their water consumption due to financial constraints. With regard to water affordability, care should be taken when applying conservation pricing to multi-family residential dwellings where customers are not individually metered. In such a situation, the combined water use of several customers on the same water meter may trigger a price increase in circumstances where no individual customers use (when individually metered) would justify the same price increase.

The response of water demand to changes in the price of water is termed price elasticity. A more rigorous definition of price elasticity is the percent change in demand induced by a one percent change in price, all other factors being constant. The degree to which water demand is price elastic varies from customer to customer and is dependant on customer type (single family residential, multi-family residential, CII, etc.), season, and whether the water is for indoor or outdoor use. According to the CUWCC, the following general concepts describe the relationship of price elasticity to a variety of factors (CUWCC, December 2003):

- Demand for outdoor use is more price elastic than demand for indoor use.
- Demand for water during summer is more price elastic than demand during winter periods.
- Residential water demand is largely inelastic. The response of residential demand to rate changes, though not zero, is small.
- Demand is more elastic in the long run than in the short run.
- The response to demand is more difficult to predict for large changes in price.

Water demand is also influenced by other factors such as weather fluctuations, economic cycles, personal income growth, and population growth. Assessment of these factors is beyond the scope of this report. For this report, a linear model of demand response where the change in water demand is directly proportional to the aggregate change in the price of water is used. This model is expressed using the equation below (CUWCC, December 2003):

% Change in Price (ΔP) * Price Elasticity (ETP) = % Change in Use (ΔU) **(eq.1)**

While the arithmetic involved in this model is simple, determining the values for both price elasticity (ETP) and percent change in price (ΔP) is not. When designing a rate structure for conservation pricing, accurate information detailing individual customer water use is needed to model the rate structure's effect on the aggregate price of water. Similarly, ETP estimates from current literature can be used initially to design the rate structure, but that ETP will decline over time as customers become accustomed to new water rates. Therefore, ETP needs to be reassessed regularly in order to adjust rate structures to achieve target water savings.

The CUWCC provides estimates for both short and long-term residential ETP. Since the short-term values are more conservative than the comparable long-term values only the short run values are considered in this analysis. The CUWCC offers estimates for short-term residential (single family, and multi-family) ETP ranging from 0 to -0.20. Because some residential water use serve essential functions (such as drinking and bathing) and cannot be reduced, -0.10 is selected for ETP in order to produce conservative estimates of ΔU for a given ΔP.

Estimates of ETP for non-residential uses vary greatly from customer to customer, but are generally higher than for residential customers. Careful consideration of each non-residential customer's water requirements and water use patterns would be required for an accurate assessment of ETP for that customer. Such an analysis is beyond the scope of this report. Nonetheless for the purposes of this report, all City of Paso Robles water use will assume to have an ETP equal to that for residential water use. As a result of this assumption, the water savings predicted here should be smaller than the water savings actually realized through the implementation of conservation pricing.

Using this linear model of water demand response, water savings can be calculated as:

$$\text{Water Savings (WS)} = \Delta U * \text{Current Demand (DM)} \quad \textbf{(eq.2)}$$

Note: A negative value for WS represents a decrease in water use.

In order to design a rate structure it is important to consider the impact on City revenue of changes in the price of water and the consequential reduction in water use. Water provider revenue can be modeled using the following equation:

$$(\text{DM} + \text{WS}) * (\text{Current Price of Water (P)} + \Delta P*P) = \text{Resultant Revenue (RV)} \quad \textbf{(eq. 3)}$$

A first step in evaluating the effect of price changes on revenues might be to determine the maximum theoretical reduction in water use (a negative ΔU) that can be achieved, while maintaining the current level of revenue. This can be done by setting the resultant revenue equal to current revenue as expressed in the equation below:

$$(\text{DM} + \text{WS}) * (P + \Delta P*P) = \text{DM} * P \quad \textbf{(eq.4)}$$

Resultant Revenue = Current Revenue

To determine the level of water use reduction (ΔU) at which water revenue begins to be reduced, equation 1, 2, and 4 presented above must be solved for ΔU. Once ΔU is known, the ΔP that maintains revenue while achieving this maximum theoretical water use reduction can be determined, and a predicted WS for this ΔP can be calculated.

Using the current level of water demand in the City (DM = 6735 AFY), and the portion of the current price of water to consumers which is dependant on use (P = 528 $/AFY, Note: this excludes, both flat monthly sewer fees and flat monthly charges for water service as these charges are independent of the amount of water used), while assuming an ETP of -0.10, ΔU is found to equal -0.90 using the overly simplified linear model used in this report. This means that theoretically, a 90 percent reduction in water use can be achieved without reducing revenue to the City of Paso Robles from water sales. The ΔP necessary to achieve this reduction is equal to 9, which means that the price of water would need to be increased 900 percent to achieve this reduction. The water savings resulting from this increase in price would amount to 6062 AFY.

These results are largely an artifact of the assumptions inherent in the simple model used to predict water demand, and are by no means accurate predictions of the effects of large changes in the aggregate price of water. *It is readily apparent* that this level of price increase and water reduction is not realistic as the impacts to the City's citizens and economy would be profoundly negative. However, the importance of this result is that it indicates that the City is in no danger of reducing its water revenues through the institution of water conservation price increases.

Since revenue reduction will not be a limiting factor when designing a conservation pricing structure, the City of Paso Robles would be best served to consult city stakeholders (citizens, business owners, etc.) to determine a realistic target for water reduction. Once a mutually agreeable water use reduction target is determined, a pricing structure can be designed that would result in the necessary increase in the aggregate price of water to bring about that reduction.

For the purpose of conducting a cost/benefit analysis for DMM 11, an initial water use reduction of 2 percent (ΔU = -0.02) is analyzed. To achieve this initial water use reduction, the present day aggregate price of water sold by the City would have to increase by 20 percent (ΔP = .2). It is important to understand that this 20 percent increase in the aggregate price of water would not be applied to the majority of water users. Instead, those few customers who use water far beyond reasonable, predetermined rates would be faced with the choice of steeply rising rates or reducing water usage. The price increases borne by those who choose to pay would be large enough to effectively increase the average price of water by 20 percent over present day levels.

Once the initial price increase has been implemented, small annual increases in the price of water will need to be continued, or eventually inflation will bring the real price of water back in line with its present day value. Discounting over time using the Consumer Price Index shows that this would take approximately 8 years. The effect of inflation on the real price of water would be expressed as a reduction in water savings over time as water consumer's incomes rise making them more able to bear the additional cost of water under conservation pricing. An annual breakdown illustrating the resultant water savings and additional revenue generated by instituting DMM 11 through an initial price increase of 20 percent, assuming no subsequent price increases, is presented in Table D-10. It is assumed that no expenditures outside of the salary of the conservation staff (see DMM 12), who would be charged with designing the conservation pricing structure, would be incurred in order to implement this DMM.

Table D-10
DMM 11 Projected Expenditures and Water Savings

	2006	2007	2008	2009	2010
Gross Expenditures	$0.00	$0.00	$0.00	$0.00	$0.00
Revenue Generated By DMM	$625,870	$639,141	$650,279	$657,875	$671,189
Net Expenditures - $	-$625,870	-$639,141	-$650,279	-$657,875	-$671,189
Projected Water Savings (AFY)	135	114	96	84	63

As can be seen in Table D-10, both an increase in revenue and a water savings would result from the implementation of DMM 11. Table D-11 presents an annual breakdown of the net financial benefit provided by the implementation of this DMM.

Table D-11
DMM 11 Net Annual Financial Benefit

	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	135	114	96	84	63
Gross Financial Benefit	$90,990	$76,836	$64,704	$56,616	$42,462
Net Expenditures	-$625,870	-$639,141	-$650,279	-$657,875	-$671,189
Net Financial Benefit	$716,860	$715,977	$714,983	$714,491	$713,651

As can be seen in Table D-11, the implementation of DMM 11 would provide the City of Paso Robles with substantial net financial benefits. However, without continued regular small annual increases in the aggregate price of water, water savings would be reduced over time. Consequently, immediate implementation of DMM 11 combined with future small annual price tied to the Consumer Price Index or some other measure of inflation, is recommended.

Phase II Demand Management Measures

- **DMM 7. - Public Information Programs**

Recommendation: Continued implementation of this DMM is recommended as the success of many other complementary DMMs is linked the success of public information programs. The responsibility for designing the scope, scale, and structure of public information programs would fall to the conservation program staff.

Detailed Cost/Benefit Analysis:
A detailed cost/benefit analysis cannot be carried out for this DMM at this time, because the means of quantifying relevant water savings has not been established. Continued implementation of this DMM is nonetheless recommended, because the success of many other complementary DMMs is linked to public information programs.

It is suggested that customer participation in the DMMs implemented during Phases III and IV of the Phased Water Demand Management Strategy be carefully tracked and changes in participation correlated to various public information program efforts. Water savings for this DMM can then be estimated based on the degree to which the measure is able to enhance the more easily estimated water savings attributable to other complementary DMMs. Once a means of assessing the water savings produced by this DMM is established, a cost/benefit analysis similar to those conducted in this report can be performed, and the feasibility of continued implementation of public information programs reassessed.

The responsibility for designing of the public information program belongs to the conservation coordinator. Any future assessment of the cost effectiveness of this DMM is entirely dependant on the specifics of the public information program established. By making the conservation coordinator responsible for both the design of the program, and the establishment of a means for evaluating its effectiveness, it is more likely that future monitoring of program costs and benefits will be effective as that monitoring will be specific to the design of the program.

- **DMM 8. - School Education Programs**

Recommendation: Continued implementation of this DMM is recommended as the success of many other complementary DMMs can be enhanced by school education programs. The responsibility for designing of school education programs would fall to the conservation coordinator.

Detailed Cost/Benefit Analysis:
A detailed cost/benefit analysis cannot be carried out for this DMM at this time, because the means of quantifying relevant water savings has not been established. Continued implementation of this DMM is nonetheless recommended, because the success of many other complementary DMMs can be enhanced through school education programs.

It is suggested that customer participation in the DMMs implemented during Phases III and IV of the Phased Water Demand Management Strategy be carefully tracked and changes in participation correlated to participation in school education programs. Water savings for this DMM can then be estimated based on the degree to which the measure is able to affect the more easily estimated water savings attributable to other DMMs implemented in subsequent phases of the demand management strategy. Once a means of assessing the water savings produced by this DMM is established, a cost/benefit analysis similar to those conducted in this report can be performed, and the feasibility of continued implementation of school education programs reassessed.

The responsibility for designing of school education programs would also fall to the conservation coordinator. Any future assessment of the cost effectiveness of this DMM is entirely dependant on the specifics of the school education programs implemented. By making the conservation coordinator responsible for both the design of these programs, and the establishment of a means for evaluating their effectiveness, it is more likely that future monitoring of program costs and benefits will be effective as that monitoring will be specific to the design of those programs.

Phase III Demand Management Measures

- **DMM 1. - Water Survey Programs for Single-Family and Multi-Family Residential Customers.**

Recommendations: Additional information is necessary to assess the feasibility of this DMM prior to implementation. Further investigation into the true cost of conducting residential water surveys in the City of Paso Robles is recommended.

Detailed Cost/Benefit Analysis:
Residential water survey programs seek to reduce residential customer water use by informing customers of the potential for water use reduction through the modification of current household water use practices. Residential water surveys can target both indoor and outdoor water use and generally involve a site visit by a water agency staff member trained in conducting water surveys. Indoor surveys generally involve checking the flow rates of various plumbing fixtures such as showerheads and faucets, and also involve leak detection for household plumbing. Outdoor water surveys generally involve the measurement or estimation of irrigated area, and provision of a recommended customer irrigation schedule based on that area.

The costs associated with the implementation of this DMM are directly related to these staff visits. The foremost costs are the staff time devoted to each visit and the cost to purchase of any equipment needed by the staff to complete the water survey. Secondary costs might include costs for marketing water surveys to customers, and the costs of any printed information distributed to customers regarding the results of the water survey.

The Contra Costa Water District completed a study of 2,216 completed water audits in order to determine both the costs and benefits associated with the implementation of their water survey program in 1994 (CUWCC, December 2003). This study determined the cost of each residential indoor and outdoor water survey to be approximately $52 ($40.75 in 1994). The CUWCC cites a report by A & N Technical Services from 1995 which places the cost of a target indoor and outdoor residential water survey at $248 ($200 in 1995), and the cost of an untargeted indoor survey at $50 ($40 in 1995). This report formulated its estimates based on the professional judgments of acting conservation coordinators throughout California. For the purpose of this report, $250 is initially assumed as the cost of a single average residential (single or multi-family) indoor and outdoor water survey.

A phased approach to the implementation of water surveys is the most practical means of implementing this DMM. For the purpose of this analysis full implementation of this DMM is assumed to take five years, with 20 percent of all currently existing residential customers (9,700 total residential meters in 2005) surveyed each year. A year by year breakdown of the expenditures associated with residential water audits is presented in Table D-12 below.

Table D-12
DMM 1 Projected Expenditures and Water Savings

	2006	2007	2008	2009	2010
Gross Expenditures	$485,000	$485,000	$485,000	$485,000	$485,000
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$485,000	$485,000	$485,000	$485,000	$485,000
Projected Water Savings (AFY)	165	291	379	427	437

It is important to note that residential water surveys may reduce revenue to the City as any water saved will no longer be billed. However, this potential reduction in revenue, and similar potential revenue reductions attributable to other DMM's, is not reflected in the cost/benefit analyses of this report as water savings are interpreted as foregone future production rather than foregone future sales.

The CUWCC estimates that first year water savings for this DMM average 17 percent, as water users alter their personal water use patterns based on the advice provided during the water use surveys. The Contra Costa County Water District study determined that this water savings declines about 2 percent each year until another water survey is conducted. A year by year breakdown of total water savings is also present in Table D-12.

As with other the other DMMs described in this report, the gross financial benefit to the City is realized as the City avoids the cost of producing a volume of water equal to the water savings produced by the DMM. An annual breakdown of the gross financial benefit, as well as the net benefit of this DMM is presented in Table D-13 below.

Table D-13 DMM 1 Net Annual Financial Benefit					
	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	165	291	379	427	437
Gross Financial Benefit	$111,210	$196,134	$255,446	$287,798	$294,538
Net Expenditures	$485,000	$485,000	$485,000	$485,000	$485,000
Net Financial Benefit	-$373,790	-$288,866	-$229,554	-$197,202	-$190,462

As can be seen in Table D-13, the implementation of DMM 3 does not provide the City of Paso Robles with a net financial benefit. In fact a substantial cost to the City is predicted if this DMM is implemented. However, if the true cost of a water survey approximates Contra Costa County Water District value ($52), then the City would realize a net financial benefit. Consequently, further investigation into the true cost of conducting residential water surveys in the City of Paso Robles is recommended prior to the implementation of DMM 1.

- **DMM 9. - Conservation Programs for Commercial, Industrial, and Institutional Accounts**

Recommendations: Implementation of DMM 9 is recommended; however careful consideration of the costs and benefits to individual CII customers in the City of Paso Robles must be examined more closely prior to implementation.

Detailed Cost/Benefit Analysis:
Conservation Programs for Commercial, Industrial and Institutional Accounts involve water surveys similar in nature to the residential water surveys proposed in DMM 3. These surveys can range in scope from short "walkthrough" inspections, which look for obvious signs of water wasting such as leaky plumbing or excessive irrigation, to sophisticated water efficiency studies. The scope of the survey is dependant on the type of business or industry and the nature of the customer's water use.

The chief cost associated with the implementation of this DMM is the staff time necessary to conduct these surveys and prepare recommendations based on the results. Unlike residential surveys, CII water surveys are generally funded by the customer. Often outside consultants familiar with water efficiency in industrial processes are used to conduct CII water surveys for customers involved in water intensive industries.

To encourage customers to make the necessary expenditure, the water provider should offer incentives to CII customers so that the customer benefits financially from the reduction in their water bill. For example, if a customer will save $100 per year for five years through implementation of the recommendations produced by a water survey, but the survey will cost $700, then the water agency must provide an incentive in excess of $200 to the customer to encourage the water survey. The cost of these incentives is the primary cost to the water provider. Like residential water surveys, a secondary cost to the water provider related to CII water survey is the cost to market participation in water surveys.

The CUWCC cites program cost and water savings data for this DMM analyzed on behalf of the Metropolitan Water District of Southern California by Western Policy Research in 1996. According to the CUWCC, small scale surveys conducted by internal staff analysts required a median expenditure of approximately $704 ($600 in 1996); medium scale surveys conducted by an outside consultant required a median expenditure of $1,741 ($1,484 in 1996); and large scale water efficiency studies required a median expenditure of $9,526 ($8,121 in 1996). The type of water survey conducted will vary based on amount of water used by an individual CII customer.

The CUWCC reports median water use reductions of 20.3 percent for analyst-conducted surveys, 18.0 percent for consultant conducted surveys, and 17.8 percent for large scale water efficiency studies. The largest volume of water is saved by the largest water users through the implementation of survey recommendations. However, given the scale of the water use and complexity of implementing water survey recommendations on such a scale, water savings as a percent of total water use tends to be lower for larger water users. Generally CII customers implement some combination of the following measures where applicable: installation of self closing faucets, installation of ultra-low-flow toilets, use of low flow valves in urinals, and replacement of older food service and preparation equipment with more modern efficient versions. The water use reductions discussed here assume a typical combination of these improvements.

The average CII water customer in the City used 1.5 AF of water. For the purpose of this analysis, it is assumed that the smallest CII water users use 1.2 AFY of water, the next largest CII water users use 2.5 AFY of water, and the largest water users use 10 AFY. To yield the appropriate mean level of water use, approximately 88 percent of water users are assumed to use 1.2 AFY, approximately 10 percent use 2.5 AFY, and approximately 2 percent use 9.7 AFY.

Using these figures for water savings, assumed average water use, and required expenditure, while also knowing the unit price of an AF of water in the City of Paso Robles, the incentive required to encourage each type of survey can be calculated as shown in Table D-14 below. These calculations assume that water savings for each customer decline by 20 percent over the five year period before the next water survey.

Table D-14 DMM 9 Required CII Water Survey Incentives			
	Analyst Survey	**Consultant Survey**	**Water Eff. Study**
Cost	$704	$1,741	$9,526
Water Saving (AFY)	0.2436	0.45	1.78
Financial Savings (Over 5 Years)	$386	$713	$2,820
Required Incentive	$318	$1,028	$6,706

The sum of these incentives represents the expenditure that would be required by the City to implement this DMM. There are currently approximately 695 CII water meters in the City. For the purpose of this cost benefit analysis it is assumed that each meter represents an individual customer similar to those customers observed in the CUWCC cited studies, and that, consistent with earlier assumptions, 88 percent, 10 percent, and 2 percent of CII customers will require small scale analyst water surveys, medium scale consultant water surveys, and large scale water efficiency studies, respectively. Further, it is assumed that 20 percent of all current CII customers would conduct water surveys each year. A year by year breakdown of the required net expenditure and anticipated water savings for this DMM is presented in Table D-15 below.

Table D-15 DMM 9 Projected Expenditures and Water Savings					
	2006	**2007**	**2008**	**2009**	**2010**
Gross Expenditures	$89,916	$89,916	$89,916	$89,916	$89,916
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$89,916	$89,916	$89,916	$89,916	$89,916
Projected Water Savings (AFY)	51	92	123	144	154

As with the other DMMs described in this report, the gross financial benefit to the City is realized as the City avoids the cost of producing a volume of water equal to the water savings produced by the DMM. An annual breakdown of the gross financial benefit, as well as the net benefit of this DMM is presented in Table D-16 below.

Table D-16 DMM 9 Net Annual Financial Benefit					
	2006	**2007**	**2008**	**2009**	**2010**
Projected Water Savings (AFY)	51	92	123	144	154
Gross Financial Benefit	$34,374	$62,008	$82,902	$97,056	$103,796
Net Expenditures	$89,916	$89,916	$89,916	$89,916	$89,916
Net Financial Benefit	-$55,542	-$27,908	-$7,014	$7,140	$13,880

As can be seen in Table D-16, the implementation of DMM 9 could provide the City with a net financial benefit once all CII customers have been surveyed. However, the realization of this benefit is highly dependant on the individual expenditures required by and water savings realized for individual CII costumers. It is important to realize the water savings and costs presented in this analysis are not intended as a prediction of actual water savings or required expenditure for the City. This analysis only examines a hypothetical CII water survey program based on data available from current literature. The estimates made in this section use cost and water savings estimates specific to the group of CII customers which participated in Metropolitan Water District of Southern California Study and may not extrapolate well to CII customers in the City of Paso Robles. Consequently, while implementation of DMM 9 is recommended, the relatively small margin of benefit suggests that careful consideration of the costs and benefits is needed.

- **DMM 5. - Large Landscape Conservation Programs and Incentives**

Recommendations: Implementation is recommended at this time. However, a specific outline for the design of a large landscape conservation program should be formulated, and further investigation into true cost of that program to City of Paso Robles is recommended prior to the implementation of DMM 5.

Detailed Cost/Benefit Analysis:
Large Landscape Conservation Programs involve the provision of water surveys and technical training to large landscape customers. Large landscape customers are defined as customers who irrigate a cumulative area of greater than three acres, and these customers are metered separately from all others in the City of Paso Robles. Large landscape conservation programs can involve some or all of the following: staff site visits, customer training in conservation irrigation practices, irrigation device upgrades, development of water budgets, and institution of water-budget-based rate structures which involve sharp price increases for water use in excess of the water budget. Design of programs varies significantly from water agency to water agency.

The CUWCC has compiled a survey of the several studies which examined the water savings attributable to a variety of methods of implementing this DMM. The CUWCC reports that a study by A&N Technical Services in 1997 found water savings of 20 percent to 35 percent with a large landscape conservation program involving the development of water budgets and institution of water budget pricing. Another study reported by the CUWCC, and conducted by Contra County Water District, found water savings of approximately 20 percent, 8 percent, and 7 percent for the first, second, and third years following the institution of a water conservation program which involved a site visit by an expert in irrigation management who furnished the customer with conservation recommendations.

Based on these studies, this report will model the potential water savings attributable to the implementation of this DMM to be 20 percent of annual use for the first year, declining 5 percent each year thereafter for each individual customer. It is assumed that 20 percent of all current City of Paso Robles large landscape customers (325 in total, total demand of 845 AFY) will be involved in the program each year. An annual breakdown of the water savings that might be expected from this DMM is presented in Table D-17 below.

Table D-17 DMM 5 Projected Expenditures and Water Savings					
	2006	2007	2008	2009	2010
Gross Expenditures	$67,000	$52,000	$52,000	$52,000	$52,000
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$67,000	$52,000	$52,000	$52,000	$52,000
Projected Water Savings (AFY)	34	59	76	85	85

The CUWCC has also compiled a survey of cost estimates for each program detailed in each of the studies which it examined. Expenditures required for the implementation of a conservation program involving water budgets and water budget pricing include an initial expenditure of $3,402 ($3,000 in 1999) and a per site expenditure of $162 ($142 in 1999). Expenditures required for the implementation of a conservation program involving expert water surveys include an initial expenditure of $14,970 ($13,200 in 1999) and a per site expenditure of $ 886 ($755 in 1999). For the purpose of producing a conservative estimate for this report it is assumed that an initial expense of $15,000 and per site expenses of $800 would be incurred by the City of Paso Robles in order to implement this DMM. A year by year breakdown of the net expenditure required for this measures implementation is provided in Table D-17.

As with other the other DMMs described in this report, the gross financial benefit to the City is realized as the City avoids the cost of producing a volume of water equal to the water savings produced by the DMM. An annual breakdown of the gross financial benefit, as well as the net benefit of this DMM is presented in Table D-18 below.

Table D-18 DMM 5 Net Annual Financial Benefit					
	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	34	59	76	85	85
Gross Financial Benefit	$22,916	$39,766	$51,224	$57,290	$57,290
Net Expenditures	$67,000	$52,000	$52,000	$52,000	$52,000
Net Financial Benefit	-$44,084	-$12,234	-$776	$5,290	$5,290

As can be seen in Table D-18 implementation of DMM 5 would provide the City of Paso Robles with a net financial benefit once significant numbers of large landscape customers participate in the program. However, the costs and benefits of a large landscape conservation program are highly dependant on the design of that program. A high cost program may not provide the City with a net financial benefit. While implementation is recommended, a specific outline for the design of a large landscape conservation program should be formulated, and further investigation into true cost of that program to City is recommended prior to implementation of DMM 5.

Phase IV Demand Management Measures

- **DMM 2. - Residential Plumbing Retrofits**

Recommendations: Continued implementation of this DMM is recommended in its present form (voluntary device distribution upon customer request). Given the inherent error in the analysis presented here, further study may indicate that active distribution of devices should be implemented in the future.

Detailed Cost/Benefit Analysis:
Implementation of this DMM involves the distribution of low flow shower heads and faucet aerators to residential water customers with older plumbing fixtures. The success of such a program generally depends on the method of device distribution, as distribution method influences the probability of the actual installation of the devices by customers. The CUWCC reports that installation probabilities range from 49 percent to 59 percent when devices are distributed to customers but not directly install. Distribution through direct installation ensures that the devices are installed, but a certain number of devices are later removed. Field studies conducted in Irvine and Los Angeles found that between 7 percent and 9 percent of devices installed by customers were later removed (CUWCC, December 2003). For the purpose of this report it is assumed that 45 percent of all devices distributed by the City of Paso Robles are installed and retained by customers.

The unit cost of low flow showerhead and faucet aerator retrofit kits is generally low. The CUWCC indicates that a report prepared by A&N Technical Services, which compiled the professional estimates of California water conservation coordinators, found the average cost of a low flow showerhead retrofit kit to be approximately $3 ($2 in 1995). No estimates were offered for faucet aerators, but for the purpose of this report the cost is considered equal to that of a low flow showerhead kit.

The CUWCC provides initial water savings attributable to the installation of a single low flow showerhead or faucet aerator. Low flow showerheads are estimated to save approximately 5.5 gallons per day per showerhead when installed, while faucet aerators are estimated to save 1.5 gallons per day per aerator installed. The useful life of these kits ranges from 1 to 7 years. For this report, it is assumed that water savings from these devices decay linearly to zero over a period of five years. It is also assumed that kits are distributed to 50 percent of all current residential customers (9,700 total residential meters in 2005) over a period of five years at a rate of 10 percent per year and that each customer receives one of each device. A year by year breakdown of the expenditures required and the projected water savings resulting from this DMM are presented in Table D-19 below.

Table D-19 DMM 2 Projected Expenditures and Water Savings					
	2006	2007	2008	2009	2010
Gross Expenditures	$5,820	$5,820	$5,820	$5,820	$5,820
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$5,820	$5,820	$5,820	$5,820	$5,820
Projected Water Savings (AFY)	3	6	8	9	9

As with the other DMMs described in this report, the gross financial benefit to the City is realized as the City avoids the cost of producing a volume of water equal to the water savings produced by the DMM. An annual breakdown of the gross financial benefit, as well as the net benefit of this DMM is presented in Table D-20 below.

Table D-20 DMM 2 Net Annual Financial Benefit					
	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	3	6	8	9	9
Gross Financial Benefit	$2,002	$4,044	$5,392	$6,066	$6,066
Net Expenditures	$5,820	$5,820	$5,820	$5,820	$5,820
Net Financial Benefit	-$3,818	-$1,776	-$428	$246	$246

As can be seen in Table D-20, implementation of the DMM would result in a small net financial cost to the City of Paso Robles. However, the cost modeled here is probably too small to be significant given the degree of error inherent in this analysis. Based on the results of this analysis, continued implementation of this DMM is recommended in its present form of voluntary device distribution upon customer request. Expansion of this DMM, in the form of active device distribution, may be found to provide a financial benefit, pending a more careful analysis that considers the actual number of devices installed based on the residential water surveys. If that is the case, active distribution of devices should be implemented at that time.

- **DMM 6. - High Efficiency Washing Machine Rebate Programs**

Recommendations: Implementation of this DMM is not recommended at this time. Should further study determine that customers would be willing to purchase high efficiency washing machines with significantly smaller incentives than predicted here, then this DMM should be implemented at that time.

Detailed Cost/Benefit Analysis:
High efficiency washing machines are designed to save both energy and water. High Efficiency Washing Machine Rebate Programs involve the provision of financial incentives to customers in order to encourage the purchase of more expensive high efficiency washing machines and consequently the replacement of older less water efficient machines.

To encourage customers to purchase the more expensive high efficiency machines, the water provider must offer incentives. In general, these ensure that the customer can make up the difference in cost through a reduction in their water bill within the time period the consumer intends to use the machine (assumed to be five years for this analysis). For instance, if a customer will spend an additional $200 dollars on average to purchase the high efficiency machine, but will only save $150 through reduced water use over five years, then the water agency must provide an incentive in excess of $50 to the customer to encourage the purchase. The cost of these incentives is the primary cost to the water provider. It is recognized that the washing machines also provide customers with savings on electricity bills and detergent; quantification of these benefits is beyond the scope of this analysis.

A customer pays approximately $100 to $450 more for a high efficiency washing machine, than a comparable non-high efficiency machine (Oxnard's website, 2006). The CUWCC estimates that high efficiency washing machines save a customer, on average, 5085.6 gallons per year. Using these figures for water savings and the difference in expenditure, and knowing the unit cost of an AF of water in the City (approximately $528), the incentive required to encourage each type of survey can be calculated as shown in Table D-21 below. These calculations were made assuming water savings from washing machines are consistent over a five year period.

Table D-21

DMM 6 Required High Efficiency Washing Machine Incentives

	Low-End Machine	High-End Machine	Avergage
Cost Difference	$100	$450	$275
Water Saving (AFY)	0.0157	0.0157	0.0157
Financial Savings (Over 5 Years)	$41	$41	$41
Required Incentive	$59	$409	$234

This sum of these incentives represents the expenditure that would be required by the City to implement this DMM. The total expenditure required for this DMM, and the total water savings it produces, depends entirely on the number of high efficiency washing machines purchased by customers in the City of Paso Robles. For the purpose of this analysis it is assumed that 25 high efficiency washing machines would be purchased and installed in place of conventional washing machine each year. An annual breakdown of the expenditures required and projected water savings associated with the implementation of this DMM is presented in Table D-22 below.

Table D-22

DMM 6 Projected Expenditures and Water Savings

	2006	2007	2008	2009	2010
Gross Expenditures	$5,850	$5,850	$5,850	$5,850	$5,850
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$5,850	$5,850	$5,850	$5,850	$5,850
Projected Water Savings (AFY)	0	1	1	2	2

As with other the other DMMs described in this report, the gross financial benefit to the City is realized as the City avoids the cost of producing a volume of water equal to the water savings produced by the DMM. An annual breakdown of the gross financial benefit, as well as the net benefit of this DMM is presented in Table D-23 below.

Table D-23 DMM 6 Net Annual Financial Benefit					
	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	0	1	1	2	2
Gross Financial Benefit	$263	$532	$795	$1,058	$1,321
Net Expenditures	$5,850	$5,850	$5,850	$5,850	$5,850
Net Financial Benefit	-$5,587	-$5,318	-$5,055	-$4,792	-$4,529

As can be seen in Table D-23, implementation of the DMM would result in a net financial cost to the City. However, the cost predicted here is small and directly related to the predicted cost of the incentives required for the measures effective implementation. Additional benefits to the consumer, including electricity savings, may be sufficient to reduce the actual required cost of these incentives necessary for the measure to be effective. Based on the results of this analysis, implementation of this DMM is not recommended at this time. However, further study may determine that customers would be willing to purchase high efficiency washing machines with significantly smaller incentives than predicted here. If that is the case, then this DMM should be implemented at that time.

- **DMM 14.- Residential Ultra-Low-Flush Toilet (ULFT) Replacement Programs**

Recommendations: Implementation of this DMM is recommended at this time. The City should be cautioned that the water savings predicted here may not accurately reflect those realized by customers in the City of Paso Robles, as a variety of factors which can influence water savings from ULFT programs were not considered here.

Detailed Cost/Benefit Analysis:
Ultra-Low-Flush toilets are designed to save water by using smaller volumes of water when flushed. Residential Ultra-Low-Flush Toilet (ULFT) Replacement Programs involve the provision of financial incentives to customers in order to encourage the purchase of ULFT and replacement of older, less water-efficient toilets.

Incentives are needed to encourage customers to purchase these toilets. In general, the customer will wish to recover the cost of the toilet through a reduction in their water bill over the time period that the consumer intends to use the toilet (assumed to be five years for this analysis). The cost of these incentives is the primary cost to the water provider.

The CUWCC indicates that a 1995 study by A&N Technical Services found that a ULFT costs a customer approximately $162 ($130 in 1995). The CUWCC estimates that

ULFTs save customers, on average, 29 gallons of water per day. With these figures for water savings and expenditures, and the $528 unit cost of per AF of City water, the incentive required to encourage ULFT purchase is shown in Table D-24. These calculations assume that water savings from ULFT are consistent over a five year period.

Table D-24 DMM 14 Required ULFT Incentives	
	Average
Cost to Purchase ULFT	$162
Water Saving (AFY)	0.032484
Financial Savings (Over 5 Years)	$86
Required Incentive	$76

This incentive represents the necessary expenditure by the City to implement this DMM. The total expenditure required for this DMM, and the total water savings it produces depends entirely on the number of ULFT purchased by customers in the City. For this analysis it is assumed that 100 ULFT will be purchased and installed in place of conventional toilets each year. An annual breakdown of the expenditures required and projected water savings for this DMM is presented in Table D-25.

Table D-25 DMM 14 Projected Expenditures and Water Savings					
	2006	2007	2008	2009	2010
Gross Expenditures	$7,600	$7,600	$7,600	$7,600	$7,600
Revenue Generated By DMM	$0	$0	$0	$0	$0
Net Expenditures - $	$7,600	$7,600	$7,600	$7,600	$7,600
Projected Water Savings (AFY)	3	6	10	13	16

As with other the other DMMs, the gross financial benefit to the City is realized as the City avoids the cost of producing a volume of water equal to the water savings produced by the DMM. An annual breakdown of the gross financial benefit, as well as the net benefit of this DMM is presented in Table D-26.

Table D-26 DMM 14 Net Annual Financial Benefit					
	2006	2007	2008	2009	2010
Projected Water Savings (AFY)	3	7	10	13	16
Gross Financial Benefit	$2,191	$4,381	$6,572	$8,755	$10,946
Net Expenditures	$7,600	$7,600	$7,600	$7,600	$7,600
Net Financial Benefit	-$5,410	-$3,219	-$1,029	$1,155	$3,346

As can be seen in Table D-26, implementation of the DMM would result in a net financial benefit to the City over time. Based on the results of this analysis, implementation of this DMM is recommended at this time. However, the City should be cautioned that the water savings predicted here may not accurately reflect those realized by customers in the City, as the water savings resulting from ULFT programs are affected by such factors as the density of multi-family housing and the average size of families purchasing ULFTs.

- **DMM 13. Water Waste Prohibitions**

Recommendations: The City should implement this DMM at this time as effective Water Waste Prohibitions can produce a water savings for the City with minimal expenditure.

Detailed Cost/Benefit Analysis:
A detailed cost/benefit analysis can not be performed for this measure at this time as a means of assessing the water savings attributable to water waste prohibitions has not yet been established. It is unlikely that the City would incur any cost attributable to the water waste prohibition other than the salary of the conservation program staff who would be tasked with developing and enforcing the prohibition. It is recommended however that city stakeholders be consulted in order to develop any proposed prohibitions as these prohibitions may have social or economic costs and benefits external to the City itself.

Water Resources Plan Integration and Capital Improvement Program

Prepared for
City of El Paso de Robles

By

February 2007

Bakersfield

T.J. Cross Engineers, Inc. • 200 New Stine Road • Suite 270
Bakersfield, CA 93309 • Phone: 661-831-8782 • Fax: 661-831-5019

Ventura

T.J. Cross Engineers, Inc. • 5450 Telegraph Road • Suite 106
Ventura, CA 93003 • Phone: 805-658-3282 • Fax: 805-658-3283

City of El Paso de Robles
Water Resources Plan Integration and CIP

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City of El Paso de Robles
Water Resources Plan Integration and CIP

Executive Summary

In 2004, the City articulated water resource goals which are:

- Improve water quality
- Increase and diversify water resources
- Increase reliability of water supplies
- Reduce groundwater basin dependence
- Reduce salt loading into the basin and thereby comply with regulatory mandates
- Maintain strong water rights position
- Anticipate regulatory requirements
- Prioritize public works expenditures to meet these goals

Pursuit of these goals required a rethinking of traditional water and wastewater management, as well as examination of current conditions. Thus, the City commissioned eight related water resource reports, evaluating groundwater, recycled water potential, source control, and utility master planning. Boyle Engineering Corp. has been the primary author of the resource reports.

The reports represent a significant effort of evaluating the condition of the City's utility systems and evaluating projects and programs that could advance the City's resource goals. The goals are intertwined, as are the steps the City could take to achieve them. The possibility of creating a self-sustaining water resource portfolio is taking shape, one that would optimize rainfall and storm water management to recharge the thirsty groundwater basin, in which residents would be careful stewards of the quality of waters allowed to drain to the river and the City wastewater system, and in which highly treated wastewater would be recycled back to meet irrigation needs and/or recharge groundwater. Viewing City water resources in this light invites the possibilities of a balanced, effective water management plan that makes the most of the community's utility investment and provides for the community's long-term water needs.

The eight water resource reports paint a picture of the City's current water resource setting and its potential to advance to a point of integrated water resource use. The Salinas River conveys storm runoff and provides the principal source of recharge to the large Paso Robles Groundwater Basin. With expanding agricultural activity in the river basin and more development, salt levels increase in the river system. As a result, salt levels in the City's water supply have been gradually increasing.

Historically, well water has met 100% of City water needs – drawn from wells that pump both deeper groundwater and river underflow. Homeowners and businesses have adjusted to the relatively high mineral content of the well water through the use of softeners and the result has been even higher discharge of salts into the sewer system. Sewage is collected throughout town and treated at the City's wastewater treatment plant, mostly to address organic loading, and treated effluent is discharged back into the Salinas River with heightened salt concentrations; thus the cycle progresses.

For many years, full reliance on well water was accepted, until basin-wide investigations revealed that changing agricultural demands and thriving urban growth would foreseeably overdraft that supply as early as 2010 if supplemental water were not introduced into the region. Further, freeing up higher mineral content groundwater for uses other than community drinking water strikes a balance with regional water needs and opens the door for exercising the long-held entitlement to higher quality water from Lake Nacimiento.

Further, each step of the City's water use, treatment, and discharge is regulated. First, regulations aimed at control of storm water pollutants are in place with the goal of sound stewardship of the environment as well as protection of drinking water sources. Well extractions of river underflow are limited in quantity and carefully regulated for drinking water quality. Individual dischargers must manage the quality of discharges both to the sewage system and to storm drains and the community wastewater treatment and disposal systems are highly regulated. Each link in the City's water resource chain interconnects with the next and each major component was studied in the various water resource reports.

Starting with water supply, a principal finding of the City's eight water resource reports is that potable water demand may more than double over the next 18 years. This demand will require development of new fresh water supplies along with efforts to conserve water and to provide recycled water for non-potable users. Accompanying this sharp increase in water demand would be an impressive investment in infrastructure to deliver more water, faster and to collect the waste stream for treatment back at the wastewater treatment plant. Handling the waste stream will get increasingly difficult and costly if current salt loading trends continue. The City currently deposits treated wastewater that contains over double the salt concentrations as that which is drawn for use from the very same source. Alternatively, the City could deliver improved water quality principally from Lake Nacimiento while simultaneously alerting customers to the salt-concentrating effects of on-site regenerated water softeners along with pretreatment of commercial discharges. Successfully decreasing salt loading in the waste stream would advance the success of recycling treated wastewater, lessen the potential for long-term degradation of underground fresh water sources, bringing us full circle to using recycled water to offset a portion of the increasing demand for potable water supplies.

The principal recommendations from the water resource reports can be integrated such that efforts in one area build upon advancement toward the City's water resource goals in another area. On the potable water side, the increasing City population could lead to a proportional increase in potable water demand and infrastructure expansion. Much opportunity exists to conserve water, especially in reaching out to large irrigators and possibly making recycled water available to non-potable users. It follows that some capital expenditures could be deferred were conservation to succeed. For example, slowing the pace of water demand could defer total supply capacity, reservoir sizing, and pump station capacity. Following through on the 2005 Urban Water Management

Plan recommendation to staff a water conservation program would advance the City toward this goal.

Further, it was clear in the 2005 Wastewater Treatment Plant Audit that a firm recommendation on the approach to the treatment plant upgrade rests upon the chosen recycling option. The recycling option depends largely on successful salt management, by importation of softer water supply (i.e. Nacimiento deliveries), implementation of the recommended Industrial Waste Discharge Ordinance/Wastewater Pretreatment Program, and restricted use of on-site regenerated domestic softeners.

Integrated planning of water resources is an investment in self-sustainability that addresses a planning horizon of 50 to 100 years. Compare this to a more traditional community infrastructure approach of building things bigger and acquiring more as the community grows. Allowing advancements in one area of utility planning to sustain long-term benefits in a related water resource area opens the possibility of wise investment in the future.

The proposed integrated resources plan offers benefits to City residents by ensuring that investments in one utility area build on needs in another area. For example, the introduction of Nacimiento water supply will both improve drinking water quality and significantly reduce groundwater basin dependence. That markedly softer water supply will directly reduce salt loading into the waste stream and encourage elimination of household water softeners. The resulting improvement of treated wastewater quality positions the City to recycle water to offset potable water needs and lessens or avoids degradation of groundwater sources, thereby demonstrating good resource stewardship and maintaining a strong water rights position. This collective integration of water resources represents a well thought-out set of programs that will benefit City residents for decades to come.

As part of the water resource management, new development standards will be needed to align with the City's goals. Specifically, new standards are needed to better capture storm water and the pollutants that accompany it, to encourage on-site reuse of both storm water and gray water, to discourage the use of self-regenerating softeners, and to conserve and use recycled water.

The accompanying Proposed Capital Improvement Program Budget for FY 2007-08 to FY 2016-17 follows this basic sequence:

1. Accept and treat deliveries of Nacimiento Water first.
2. Initiate a water conservation program along with a wastewater source control/pretreatment program to reduce salt loading. Concurrently, implement the storm water management strategies.
3. Examine quality parameters of the wastewater effluent to further clarify the degree of treatment needed to provide a highly marketable recycled water product.
4. Establish a recycled user base and determine the level of treatment needed to supply such recycled water demands.
5. Make a decision to move into the recycled water market.

6. Proceed with design and construction of the upgraded wastewater treatment plant and recycled water delivery system, allowing sufficient time to measure the impact of water conservation and the salts reduction efforts.
7. Revisit the potable water distribution master plan once the recycled water program and conservation programs are up and running.

This sequence sets the stage for long-term water management such that each aspect of the City's water resource portfolio may build on another. Such long-term sustainability has been met with growing interest throughout California. Competition for adequate supplies of water and the increasing cost of expanding our infrastructure has ushered in a new outlook toward water resource integration. Paso Robles sits in the favorable position of having an assemblage of recent water resource reports as a springboard for such sustainable, integrated planning.

Two natural outcomes of this integration work should be a utility rate study and a staffing assessment. While neither effort is included in this base scope of services, the City may want TJCross to provide more information for use in these future efforts. For example, a cash flow tabulation to accompany the 10-year CIP would be an important element of a rate study. Let's discuss this as the integration progresses to determine if this would be of value to the City.

Christine M. Halley, PE
Water & Utilities Consultant
TJ Cross Engineers

I. Water Resource Plans

a. Introduction

Beginning three years ago, the City commissioned various water resource reports, evaluating groundwater supply, recycled water potential, source control, infrastructure master planning, and other topics. Boyle Engineering Corp. has been the primary author of the resource reports, working in close communication with the City's oversight team, including TJ Cross Engineers.

The reports represent a significant effort of evaluating the condition of the City's utility systems and evaluating projects and programs that could advance the City's resource goals. Each report contains recommendations and, in most cases, estimated costs to carry out those recommendations. As a result, we know much more about the condition of the City's utility systems and a vision of a self-perpetuating, balanced water resource picture is taking shape. This report is an integration of the various water resource reports into a single document containing a prioritized program to carry out the recommendations.

TJ Cross has worked with City staff to develop an integrated and prioritized capital improvement program that takes into consideration both available funding and staffing levels. This document is intended for use each year in establishing the utility capital improvement program (CIP) budgets and for future rate studies.

We started by assembling key recommendations from each of the eight water resource reports and setting priorities/sequence to those recommendations. The preliminary priority list was based on logical steps to meet the City's resource goals. Next, we worked with City staff to include operations staff suggestions and to agree upon a reasonable pace of utility projects and programs, following this scope of work outline:

- Assemble key recommendations from each of the following water resource reports and set initial priorities/sequence to those recommendations:
    - *Water Source Evaluation* dated September 2006 prepared by Boyle Engineering Corp.
    - *Recycled Water Study Update* dated September 2006 prepared by Boyle Engineering Corp.
    - *Wastewater Pretreatment/Source Control Memorandum* dated October 2005 prepared by Boyle Engineering Corp.
    - *Potable Water Distribution System Master Plan* prepared by Boyle Engineering Corp., revised draft dated June 2006.
    - *Sewer Collection System Master Plan* prepared by Boyle Engineering Corp., draft dated June 2006.
    - *2005 Urban Water Management Plan* prepared by Todd Engineers. draft dated March 2006.
    - *Storm Water Management Plan* prepared by URS in December 2004
    - *Wastewater Treatment Plant Audit* dated September 2005 prepared by Boyle Engineering Corp.

The Storm Drain Master Plan is in progress and expected to be completed in early 2007.

- Meet with water and wastewater operations staff to discuss system needs in addition to those addressed in the reports listed above. These needs may fall into the categories of safety issues, deferred maintenance, regulatory compliance, major scheduled maintenance, and routine component upgrades.

- Meet with the City to review initial plan for sequencing the water resource recommendations. Review alternative approaches to establishing a pace of completing the projects and recommendations. Approaches may range from maintaining an even pace of capital expenditures, to consideration of the number of projects in planning, design, or construction at a given time, to varying levels of reliance on consultant support. Consult with City financing staff to discuss revenue needs and financing considerations affecting capital improvements. Discuss the preferred method to sequencing capital improvements and adjust the sequence accordingly.

- Consider staffing impacts of completing the recommended capital projects and utility programs. Address staffing in terms of the effect on the pace of getting programs in place and projects in operation. Meet to discuss staffing assumptions that should go into the recommended CIP.

- Based on the sequencing and pace of improvements at a given staff level discussed above, prepare a recommended integrated capital improvements program. Emphasize improvements over, say, a 10-year period. The CIP is to be accompanied by a narrative describing the logic behind the program and will be in a format that could be referenced during future year's budget cycles.

The following documents the recommended CIP resulting from this effort.

b. Referenced Plans

Eight water resource reports comprise the basis for this CIP. These are:

Storm Water Management Plan prepared by URS in December 2004 - The scope of the *Storm Water Management Plan* includes compliance with the State of California Phase II Storm Water Management Plan regulations, defining strategies and guidelines for protection of water quality and reduction of pollutant discharges from within the City. Key recommendations are 1) extend a public information program to alert the public to the benefits of storm water management; 2) encourage public participation and involvement in urban pollution awareness; 3) detect and eliminate illicit discharges; 4) adhere to a construction site storm water control program; 5) manage post construction storm water; and 6) prevent pollution by encouraging good housekeeping.

Subsequent to the publication of the Storm Water Management Plan, the Regional Water Quality Control Board approved the Phase II Storm Water Management Plan in January 2005 and requires the City to implement measures over the five-year permit cycle. The City's first annual report was submitted in September 2006, followed by a

Notice of Violation from the Regional Water Quality Control Board indicating that the City needs to increase efforts and better track implementation of the plan.

Wastewater Treatment Plant Audit dated September 2005 prepared by Boyle Engineering Corp. - The scope of the *Wastewater Treatment Plant Audit* includes an operations review and staffing evaluation along with a treatment process analysis and solids handling analysis. The addition of the California Toxics Rule parameters to the City's waste discharge permit in May 2004 prompted in part this audit. A variety of treatment plant upgrade approaches are discussed depending on the City's pursuit of a recycled water program. Options for recycled water (discussed in more detail in the 2006 *Recycled Water Study Update)* include reuse for irrigation, groundwater recharge, or continued river discharge and Boyle recommends that the City determine its reuse plan and allow that plan to drive the necessary plant upgrades. Key recommendations of the audit are 1) the existing plant has sufficient hydraulic capacity to meet projected future flow; 2) a series of capital projects are recommended to address process capacity limitations especially in the area of handling organic loading at buildout; 3) four alternative approaches to treatment plant upgrades are presented, depending on the chosen reuse option. The City's chosen direction on water reuse will drive the necessary treatment process upgrades.

Since the publication of the treatment plant audit, the City conducted quarterly analyses of chronic toxicity levels in treated effluent. Prior to 2007, only acute toxicity testing was required. The chronic testing revealed that excess ammonia in the City's effluent is resulting in unacceptably high toxicity levels. Operations staff have already taken measures to reduce ammonia including increased recirculation rates, the addition of ferric chloride at the headworks, and frequent pumping of sludge from the primaries. However, ammonia levels remain high and the addition of a nitrification process is likely needed to reliably bring the plant into compliance. A nitrification process, or tertiary treatment, would be a significant upgrade to the plant that would align nicely with treated water quality needs in support of recycling water. Consultation with the Regional Water Quality Board staff on this compliance point in light of the long-term plan for the plant upgrade is underway.

Wastewater Pretreatment/Source Control Memorandum dated October 2005 prepared by Boyle Engineering Corp. - The scope of the *Wastewater Pretreatment/Source Control Program* includes examination of potable water, influent, and effluent water quality to determine whether a source control or pretreatment program would benefit salt loading and discharge limits. The memorandum also discussed "problem contaminants" that appear likely to cause discharge violations. No discernable trends of increasing salt levels as a result of the City's discharge were revealed in the river underflow. The suspected major contributors of salts and other minerals into the effluent stream are relatively hard well water, regeneration of household water softeners, and industrial dischargers. Key recommendations are 1) supplement community water supply with softer, lower total dissolved solids, Nacimiento supplies; 2) restrict the use of on-site regenerated water softeners via an ordinance; 3) preferentially use wells with lower salt concentrations; and 4) implement the City's existing Industrial Waste Discharge Ordinance. There is also a suggestion that well water be desalted to reduce salt loading into the waste stream.

2005 Urban Water Management Plan prepared by Todd Engineers, draft dated March 2006 - The scope of the *Urban Water Management Plan* includes documentation of the City's sources of water supply and demands, presents a contingency plan for water shortages, and supports efficient use of the City's existing water supplies through water conservation. The plan identifies groundwater and river underflow, both extracted by wells, as the City's current water supply and two upcoming sources of supplemental water; Nacimiento and recycled water. Key findings are 1) the City has capacity to withstand a drought like that of 1987-91 but with little margin of safety; 2) pursue a staffed water conservation program to reduce water production costs and defer capital costs; and 3) include tiered water pricing and large landscaper outreach as main components of the conservation program.

Potable Water Distribution System Master Plan prepared by Boyle Engineering Corp., revised draft dated June 2006 - The scope of the master plan includes evaluation of the water distribution system to meet current and projected City demands at a build-out population of 44,000 people. The report analyzed water demands and projected an increase from current potable water demand of approximately 7,500 acre-feet per year to 15,300 acre-feet per year at General Plan build-out. No adjustments for water conservation or demand offsets resulting from recycled water availability were taken into account. A computer model of the water distribution system was prepared to simulate water distribution throughout the existing pipelines and to forecast system expansions to meet increasing water demand. Key recommendations are 1) three of the five existing booster stations need additional capacity to meet existing and build-out demands; 2) existing water storage tanks in the three primary zones are well-sized to meet existing demands but all will need augmented to reliably meet build-out demands; and 3) more distribution capacity is needed throughout the city to meet customer and fire flow demands. Nearly 9 miles of pipe improvements are recommended to correct existing system deficiencies with an additional 14.5 miles recommended to provide water service at build-out. These figures exclude smaller distribution lines that will be needed on internal collector streets.

Sewer Collection System Master Plan prepared by Boyle Engineering Corp., draft dated June 2006 - The scope of the *Sewer Collection System Master Plan* includes a flow metering and data analysis phase followed by a collection system capacity analysis and capital improvement recommendations. The report states a current average daily sewage flow of 2.87 MGD increasing to 5.03 MGD at build-out. The build-out projection was extrapolated from the 15,300 AFY projected water demand. A computer model of the collection system was prepared with calculated flows compared to lift station flow records and flow metering data collected during 2005. Key recommendations are 1) four of the City's 15 sewage lift stations need additional capacity to pass the peak hourly flow at build-out; 2) new collectors are needed in four major expansion areas; and 3) larger collectors are needed to reliably handle peak flows now and at build-out.

Water Source Evaluation dated September 2006 prepared by Boyle Engineering Corp. – The scope of the *Water Source Evaluation* includes an evaluation of the proposed Nacimiento water treatment plant and a well field assessment prepared by Fugro West Inc. in 2005. Supply characteristics such as volume from each major source and overall water quality characteristics were also addressed. This report described the City's water demand pattern, quantifying seasonal swings in demand and included projections for "build-out" water needs of the community. It went on to describe alternative means of meeting increasing water demand such as increased groundwater pumping, water conservation and recycling, and Lake Nacimiento deliveries. The *Water Source Evaluation* evaluates means of blending treated Nacimiento deliveries with other water sources and considers the merits of desalting groundwater to achieve a better, more uniform water quality to City customers. Key recommendations are 1) to treat Lake Nacimiento water using a 6 million gallon per day (MGD) membrane filtration plant located at the Thunderbird Well Field near Theatre Drive and Highway 101; 2) to double the City's Nacimiento entitlement to 8,000 acre-feet per year (AFY); and 3) to desalt the City's well supply to meet the City's water quality goals over the long term.

Recycled Water Study Update dated September 2006 prepared by Boyle Engineering Corp. - The scope of the *Recycled Water Study Update* includes review and update of a user survey to identify potential users of recycled water, to conceptually lay out a conveyance system to supply recycled water to sets of potential users, to examine potentially suitable sites for groundwater recharge, and to assess pumping and winter storage requirements. One key finding was that a successful source control program that measurably reduces salt loading into the wastewater stream is necessary to both meeting waste discharge requirements and to render recycled wastewater desirable by end users. The report went on to document the wide variation in summertime water demand relative to wastewater flows, an indication of a high irrigation demand off of the potable water system. Five recycled water program alternatives were examined – continued discharge to the Salinas River without reclamation, piping recycled water to users along the Highway 46 corridor, piping to the Salinas River corridor, enhancing wastewater treatment with continued river discharge, and a hybrid approach. Estimated costs of the alternative programs ranged from $22.5 to $61.2 million with widely varying degrees of advancing the City's water resource goals. Boyle's key recommendations from the *Recycled Water Study Update* are 1) to perform further percolation tests at two locations; 2) to evaluate irrigation-related water quality parameters in plant effluent to better establish its suitability as recycled water; 3) determine the level of salt reduction resulting from a successful source control program; and 4) contact potential users regarding the possible use of recycled water. Following these steps, the City may pursue a hybrid recycled water program whereby some recycled water would be delivered for irrigation reuse, some for groundwater recharge along the river, and some seasonally discharged to the river.

c. Principal Findings and Recommendations

The eight reports listed above paint a picture of the City's current water resources setting and make findings regarding the status of each resource. Starting with water supply, a principal finding is that potable water demand will more than double over the next 18 years as efforts are made to conserve water and to provide recycled water for non-potable users. Keeping pace with this sharp increase in water demand would require a significant investment in infrastructure to deliver more water, faster and to collect the waste stream for subsequent treatment. Handling the waste stream will get increasingly difficult and costly if current salt loading trends and regulations continue.

Alternatively, the City could deliver improved water quality principally from the Nacimiento Project while simultaneously alerting customers to the effects of on-site regenerated water softeners. Successfully decreasing salt loading in the waste stream would advance the success of reclaiming treated wastewater, bringing us full circle to using recycled water to offset a portion of the increasing demand for potable water supplies.

It is this author's opinion that the principal recommendations from the water resource reports can be integrated such that efforts in one area build upon advancement toward the City's water resource goals in another area. There exists an opportunity to proceed with a self-sustaining water system that recognizes storm water's role in groundwater and river water quality, that values decreased salt and toxin loading into the waste stream, that welcomes highly treated wastewater for irrigation, and that views potable water as a precious resource to be conserved and used wisely.

For example, the State of California Phase II Storm Water Management Plan regulations are aimed at reduction of pollutant discharge into storm water. Strategies include public outreach, land use policies aligned with pollutant reduction, and regular reporting of measurable indicators pertaining to storm water management. Pollutant reduction relates to the City goal of improving water quality.

On the potable water side, the increasing City population could lead to a proportional increase in potable water demand and infrastructure expansion. Much opportunity exists to conserve water, especially in reaching out to large irrigators and possibly making recycled water available to non-potable users. While the biggest driver of waterline sizing is fire flow, reduced irrigation demand, especially over a defined corridor, could result in smaller pipes or defer the timing of necessary upgrades. Smaller water tanks could result and the need for increased water supply could be slowed. In other words, some capital expenditures could be deferred were conservation to succeed.

Further, it was clear in the 2005 Wastewater Treatment Plant Audit that a firm recommendation on the approach to the treatment plant upgrade rests upon the chosen reuse option. The reuse option depends largely on successful salt management, by importation of softer water supply (i.e. Nacimiento deliveries), implementation of the recommended Industrial Waste Discharge Ordinance, and restricted use of on-site regenerated domestic softeners. More recently, successfully lowering acute and chronic toxicity levels (ammonia) must be addressed in the planned plant upgrade.

These broader aspects of water resource integration were considered in tailoring a capital improvement program for the City. This is discussed further in the Plan Integration section of this report.

d. Utility Operations

The capital projects recommended in the water resource reports comprise part of the City's water infrastructure needs. Planning must also address utility operations needs pertaining to safety, deferred maintenance, regulatory compliance, and buildings and grounds. Meetings with City utility operations staff took place in early November 2006 and their key suggestions for capital projects are listed below.

Suggestions from the operator meetings mentioned above were:

1. Several water system maintenance programs are being phased in, as vacant positions are filled and new employees trained. For example, in Spring 2006 (for the first time since 2001) all fire hydrants in the system were exercised and the system completely flushed. Other preventative maintenance programs that should be implemented as staffing allows includes: a valve exercise program, and air-vacuum release valve maintenance programs. Similarly, there is a need for a regular meter replacement program for residential meters, possibly enacting a remote-read system for more efficient meter reading. Large meters, too, should be on a regular calibration program.

2. Reservoir and well access roads need re-graded and paved with minor fencing improvements. Consider paving around wellheads as a sanitary step.

3. Booster station upgrades were addressed in the 2006 Draft Master Plan. Orchard Bungalow (a hydro pneumatic system) may need variable frequency drives, acknowledging that its long-term operation depends on potential expansion of Chandler Ranch.

4. Portable generators are needed to operate wells and booster stations when power is interrupted. Two 500 kva generators are needed to supplement the one, existing portable generator.[1]

5. 21st Street Water Reservoir was built circa 1980 and is due for replacement. Among other issues, the roof is in bad shape.

6. Mobile geographic information system access would benefit operators. Lap tops tied to the latest GIS mapping would aid in line locating and other emergency response.

7. Tank coating should be budgeted for, say, two tanks over the next decade. Tanks are regularly inspected inside and out and are not cathodically protected.[2]

8. Replace trench shoring jacks and shields compliant with current OSHA safety regulations.

9. Water yard is populated by old buildings that are not compliant with current building codes. Plan is to house water operations staff at the proposed Nacimiento Treatment Plant.

10. Larger buildings to adequately store liquid chlorine volumes are needed at some well sites to store the recommended two-week volume.[3]

Wastewater operators had submitted two previous sets of suggested capital projects dated April 2006, the status of which is:

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[1] Another approach would be to equip each well with a backup generator.

[2] Ongoing observation of tank condition would be an indicator as to whether cathodic protection is warranted.

[3] Alternatively, could consider an alternate disinfectant at the wells. Either way, City would have to maintain a chlorine residual throughout the system so some form of chlorine feed would remain necessary.

- Partially enclose three sides of sludge press area – Confirmed still needed.[4]
- Paint two old digesters – Still needed.
- Retrofit the recirculation room valves – Still needed.
- Replace pipe, valves, and braces on grit chambers plus associated concrete work – Still needed.

Other wastewater projects suggested during our discussion are:

1. Convert to sodium hypochlorite in lieu of continued use of 1-ton gaseous chlorine cylinders.
2. Improve plant head works to reduce the need for manual cleaning.
3. Demolish old facilities at abandoned CYA treatment plant. (Lower priority.)
4. Interceptor Reaches 7 and 8 upgrade to be done concurrent with Nacimiento Water pipeline construction.
5. Consider overflow tanks at Lift Station No. 4 and other locations for longer response time in the event of a power loss.[5]
6. West side sewer line rehabilitation and manhole rehabilitation.
7. Upgrade the clarifier by replacing the trickling filter arm and center column mechanism. Consider a motor drive for consistent RPMs. The feed arm to the center column is suspected of leaking.[6]
8. Provide redundant sludge pumps.
9. Adjust the weirs on the primary clarifier that are out-of-plumb since the San Simeon earthquake.
10. Rehabilitate the grit chambers.
11. Lift station rehabilitation[7]. Provide more capacity in the Mesa Lift Station by replacing rails, pumps, and motors. Higher priority; can no longer get repair parts. The capacity of the Riverbank and Beechwood Lift Stations is adequate, however can no longer get repair parts. Consider a proprietary specification for lift stations, following City procurement guidelines for such an approach. This would result in like equipment at various lift stations, even if they are not all upgraded at one time by the same contractor.
12. Access roads around sludge beds need resurfacing.
13. Pave around the chlorine basin.
14. Provide sanitary shower/locker room for operators. Existing buildings lack such facilities and are not in compliance with current building codes.

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[4] All listed projects are predicated upon which treatment plant upgrade or replacement approach is undertaken. See alternative approaches as outlined in Boyle reports dated 2005 and 2006.
[5] Another option, although not discussed at our meeting, would be to provide natural gas fueled generators at each lift station.
[6] The media may also need replaced to address the ammonia problem.
[7] Out to bid in December 2006.

15. Improve lab such that on-site analysis of constituents at various points in the treatment process may be performed. May need certified exhaust hood.

These suggestions have also been integrated into the 10-year capital improvement program as appropriate. It is clear that an overall plan for the wastewater plant upgrade and the associated recycled water program is needed before major capital investments are made at the plant. This is reflected in the program described herein.

e. Advancing Toward City Goals

Recommendations as presented in individual reports focus for the most part on the focused scope of each report. They are conservative in that they do not necessarily take into account factors addressed in other water resource reports. For example, the 2005 Urban Water Management Plan recommends implementation of a water conservation program however the reduced demands resulting from such a program are not counted in the 2006 Potable Water Distribution Master Plan. Neither is the reduced potable demand resulting from a successful recycling program. In order for one to take on the task of integrating and prioritizing these sets of recommendations, one must trace which steps help advance the City toward their stated water resource goals. These are:

- Improve water quality
- Increase and diversify water resources
- Increase reliability of water supplies
- Reduce groundwater basin dependence
- Reduce salt loading into the basin and thereby comply with regulatory mandates
- Maintain strong water rights position
- Anticipate regulatory requirements
- Prioritize public works expenditures to meet these goals

Considering this set of water resource goals, the principal findings and recommendations from the eight water resource reports that advances the City toward these goals include the Wastewater Pretreatment/Source Control Program focused on reduced salt loading into the waste stream. Further, carrying forward with the recommendations from the Recycled Water Study Update to establish a recycled water user base would advance the City toward reduced groundwater basin dependence and a stronger water rights position. The sequencing of specific recommendations is addressed later.

II. Plan Integration

a. Sources of Funding

Water system operations are funded by an enterprise fund whose revenue comes primarily from water rates and connection fees. Wastewater operations is also an enterprise fund whose revenue comes from rates and connection fees. Funding for a recycled water program has yet to be established and could come in part from user fees and be considered part of both the sewer and water enterprise funds. Implementation of the storm water management program is funded through the City's general fund.

Funding for capital projects comes from accumulated reserves, revenue bond financing, and some assessment districts. Private developers construct a portion of the City's infrastructure as a condition of development approval and must eventually be maintained by the City resulting in additional staff and maintenance costs. The City also qualifies for some grant funding, however this makes up a small portion of capital project funding.

b. Staffing and the Pace of Implementation

Several levels of staffing are impacted by capital projects. The implementation of programs such as the recommended water conservation, pretreatment, recycled water, and storm water management require administrative and technical staff support. Capital projects such as the Nacimiento treatment plant will impact engineering and construction inspection staff as well as financial and administrative staff. Properly certified operations staff should be on board during design and construction of this 6 MGD plant. Once operational, operations and maintenance of the Nacimiento treatment plant will continue to impact water system maintenance workers and supervisory staff.

This year, the $1.7 million wastewater treatment plant budget is supported by three wastewater treatment plant operators and one chief plant operator. The $650,000 wastewater collection system budget is supported by four wastewater collection system maintenance workers. The $3 million water system budget is supported by eight water system maintenance workers, four administrative staff, and one water division superintendent. A specific budget has not been established for the storm water compliance measures. All of these utility activities are overseen by one water resource manager, one capital projects engineer, and one public works director.

The utility responsibilities that these men and women carry directly relate to community health and safety issues. Adherence to drinking water standards, satisfying sufficient fire flows, and proper treatment and disposal of wastewater comprise basic building blocks of sanitary/safety conditions within a given community.

Keeping pace with operations of a growing city infrastructure will require additional operations and maintenance staff, especially to perform the preventative maintenance that is recommended to extend the useful life of system components. A properly staffed utility system that addresses preventative maintenance, new construction, and emergency response will extend the useful life of valuable City assets.

At this point, the author observes that sets of routine water and sewer system maintenance are being deferred due to lack of adequate staffing. Examples of this are routine valve exercising, air-vac valve maintenance, and meter replacement for the water system, and routine sewer pipe jetting and mechanism maintenance at the wastewater plant. It is also apparent that as the utility systems expand and become more complex (such as the construction of more sophisticated treatment plants and the addition of a new surface water supply), more utility workers will be needed to sustain the current level of service that residents have come to expect.

Establishing a proper staffing level requires analysis for each system, an undertaking that extends beyond the scope of this integration effort. The City might look to such organizations as the American Water Works Association for well-researched guidelines for water treatment plant and distribution system staffing. The federal Environmental Protection Agency has long published guidelines for wastewater treatment and collection system staffing, as has the CWEA. One approach would be to compare the City's utility staffing plan with these published guidelines.

III. 10-Year Capital Improvement Program

a. Sequenced Recommendations

Recommended projects and programs that align with these declared City water resource goals were given priority:

- Improve water quality
- Increase and diversify water resources
- Increase reliability of water supplies
- Reduce groundwater basin dependence
- Reduce salt loading into the basin and thereby comply with regulatory mandates
- Maintain strong water rights position
- Anticipate regulatory requirements
- Prioritize public works expenditures to meet these goals

For example, Nacimiento deliveries would advance the City toward all of its water resource goals. The Wastewater Pretreatment/Source Control Program would reduce salt loading into the waste stream. Further, carrying forward with the recommendations from the Recycled Water Study Update to establish a recycled water user base would advance the City toward reduced groundwater basin dependence and a stronger water rights position. From there, decisions pertaining to the wastewater treatment plant upgrade aligned with the recycled water user base would follow. The Urban Water Management Plan recommendations for a water conservation program would increase reliability of water supplies and reduce groundwater dependence and should be given priority. The Water Source Evaluation recommendations pertaining to increased Nacimiento deliveries and well water desalting could be re-evaluated based on the success of the Pretreatment/Source Control Program, the recycled water program, and the water conservation program.

Meanwhile, there is a set of proposed capital projects that addresses existing process problems or safety issues. These are not necessarily tied to advancing a specific water resource goal but are needed to maintain an adequately operating public works system. These were prioritized based on the need to meet permit requirements, extend the useful life of equipment, and to protect public and worker safety.

The pipeline, pump, and storage tank recommendations from the Potable Water Distribution and Sewer Collection System Master Plans depict system expansion to keep pace with the City's adopted General Plan. The pace of these capital projects will largely be driven by the pace of development in particular areas of town and not necessarily by advancement toward the City water resource goals. The Potable Water Distribution

Master Plan would be impacted by successful water conservation and by operation of a recycled water delivery system. For this reason, the Potable Water Distribution Master Plan should be re-evaluated after advancements have been made on both fronts.

City staff considered the improvements recommended as part of the sewer and potable water master plans and estimated the percent allocation to new development for each project. Priority was given to construction of master plan projects that are needed to satisfy the needs of existing customers. Projects with greater allocations to new development were scheduled later in the 10-year period and projects allocated 100% to new development were assumed to be built by developers and are not included in the accompanying table.

The attached Proposed Capital Improvement Program Budget for FY 2007-08 to FY 2016-17 follows this basic sequence:

1. Accept and treat deliveries of Nacimiento Water first.
2. Initiate a water conservation program along with a wastewater source control/water softener ordinance to reduce salt loading and to comply with toxicity limits at the wastewater treatment plant.
3. Examine quality parameters of the wastewater effluent to further clarify the degree of treatment needed to reclaim such wastewater. Require installation of "purple pipe" per State Dept. of Health Services standards for anticipated delivery of recycled water.
4. Establish a recycled user base and determine the level of treatment needed to supply such recycled water demands. Address compliance with ammonia levels, too, in the contemplated plant upgrade.
5. Proceed with design and construction of the upgraded wastewater treatment plant and recycled water delivery system, allowing sufficient time to measure the impact of water conservation and the salts reduction efforts.
6. Revisit the potable water distribution master plan once the recycled water program and conservation programs are up and running.

You will see that proposed improvements at the wastewater treatment plant require discussion in light of the planned plant upgrade. Recent ammonia excursions are under examination by City staff and the Regional Water Quality Board and consultation with that regulator will influence the timing of process upgrades at the plant. In other words, we need to determine which projects should be done now or held until the planned upgrade in 2011-13.

b. Anticipated Inflation

The estimated project costs presented in the various water resource reports are stated in then-current dollars. In other words, cost estimates published in a report dated 2004 represent 2004 dollars. Good financial planning suggests that an inflationary adjustment should be taken into account to more realistically forecast actual project costs at the planned year of construction.

Construction costs have varied widely in recent years, pacing at alarmingly high inflation rates. Much of this was attributed to sharp increases in the price of steel, fuel, and labor rates. Fortunately, pricing trends in public works projects on the West Coast have been stabilizing over the past 18 months or so.

The approach used to bring cost estimates from older reports to current dollars was to reference the Engineering News Record 20-City Construction Cost Index as an adjustment for inflation. For example, the December 2006 CCI is 7887.62. The estimated total project cost for the proposed disinfection improvements at the City's wastewater treatment plant was estimated at $8,957,000 in September 2005.[8] Adjusted to current dollars, this project is now estimated to cost:

2005 cost estimate x current CCI/2005 CCI $8,957,000 x 7887.62/7467.8 = $9,460,000

An additional inflationary adjustment was also made for projects planned in years ahead. Much has been published regarding anticipated cost trends, recognizing that many factors will affect how actual construction costs will vary. For budgeting purposes, an inflationary rate of 5-6% per year seems reasonable for the Central Coast of California. Therefore, an inflation rate of 5.5% per year was applied as follows:

For a project scheduled for construction in 2012, 2012 cost = current cost estimate x 5.5% inflation rate x 5 years

These inflationary adjustments are reflected in the accompanying CIP tables.

c. Capital Improvement Program

In summary, the proposed CIP budget follows the following general sequence. An itemized breakdown may be found in the attached Appendix section.

FY 07/08 - $14.7 million

Major advancements in this fiscal year would be to progress with the Nacimiento Water Project, including design of the City's treatment plant, and to initiate the water conservation program and Industrial Waste Discharge Ordinance to set the stage for the recycled water program. For the water system, a set of water reservoir projects and well rehabilitation would be addressed. Sewer projects include various collection and lift station upgrades plus an update of the storm drain master plan. Staffing the water conservation/industrial waste discharge coordinator position is planned this year, too.

FY 08/09 - $25.4 million

Major advancements in this fiscal year include completion of the design of the Nacimiento water treatment plant and measure the initial success of the water conservation and industrial discharger program. Adoption of a water softener

[8] Source: "Wastewater Treatment Plant Audit" for the City of el Paso de Robles by Boyle Engineering Corp. dated September 2005, page ES-5.

ordinance is slated for this year along with setting a course for the planned wastewater treatment plant upgrade. The Eastside Reservoir construction along with waterline and sewage collection system upgrades are also scheduled for this fiscal year.

FY 09/10 - $25.7 million

Major advancements this fiscal year would include initial phases of construction of the Nacimiento water treatment plant and the reclaimed waterline in River Road. The 21st Street Reservoir would also be constructed this year along with various water and sewage collection system upgrades. Water conservation emphasis would shift to commercial, industrial, and institutional accounts.

FY 10/11 - $95.8 million (Nacimiento costs to be financed over 30 years)

Major advancements in fiscal year 2010/11 would be start-up of the Nacimiento water treatment plant to coincide with deliveries from the lake. Notice that the CIP value for this year is the full Nacimiento Water Project investment, a value that will be spread over a 30-year revenue bond term. Design of the proposed wastewater treatment plant upgrade and recycled water delivery system would be done this year.

FY 11/12 - $43.2 million

Major advancements this fiscal year would include construction of the wastewater plant upgrade and recycled water distribution system. Upgrades to the Templeton Interceptor Sewer would be constructed this year, too.

FY 12/13 - $29.7 million

Major advancements in fiscal year 2012/13 would include completion of the treatment plant and recycled water delivery systems and major work on the downtown storm drain system. Consideration to a residential ultra low flow toilet replacement program is also proposed.

FYs 13/14 to 16/17 - $9.8 million combined

Capital projects planned in these years are as listed in the tables included in the Appendix.

The Proposed CIP Budget is included in the Appendix, showing the sequence of recommended projects spread over the upcoming 10 fiscal years. The first table groups the recommended projects by sequence so that one may see how the various projects are integrated. The second table lists projects by enterprise fund (wastewater, water, storm drain, etc.).

* * *

Appendix Materials

City of El Paso de Robles
2007 Water Resources Plan Integration

TJC P#06461; CMHalley; 2-19-07

PROPOSED C.I.P. BUDGET
Integrated, by Fiscal Year
FY 2007-08 to 2016-17

Inflationary adjustment for Dec 2006 cost basis = *5.50%* *per year*

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
					1	2	3	4	5	6	7	8	9	
	Major Advancements >>> by Fiscal Year >>>			*Initiate water conservation program and Indus Waste Discharge Ordinance to set the stage for plant upgrade. Progress w/ Nacimiento Project.*	*Complete design of Nacimiento treatment plant. Measure initial success of conservation and industrial dischargers. Adopt softener ordinance.*	*Construct Nacimiento plant and concurrent recycled waterlines. Finalize plans for WWTP upgrade and recycled water program.*	*Bond issuance for Nacimiento Supply plus design of WWTP plant upgrade and recycled water delivery system.*	*Construct WWTP plant upgrade along with distribution lines. Initial Nacimiento deliveries.*	*Complete plant construction and start-up delivery system*	*Continued emphasis on water conservation and recycled water delivery. Major work on downtown storm drain system.*				
1	Nacimiento Water Design/Construction Phase	W	ALL	$1,735,500	$1,735,500									$3,471,000
2	Design and construct Nacimiento Water Treatment Plant, 6 MGD membrane filtration plant, located at Thunderbird well field	W	ALL	$1,500,000		$5,565,125	$9,393,931	$619,412						$17,078,468
3	Install reclaimed waterline concurrent with Nacimiento waterline	RW	RELIAB, GW DEP	$500,000		$5,565,125	$2,935,603							$9,000,728
4	Sherwood Well arsenic treatment system (2 at $1 million each)	W	WQ, RELIAB	$2,042,721										$2,042,721
5	21st Street Reservoir construction	W	INF	$500,000	$527,500	$5,565,125								$6,592,625
6	Water Tanks - regular program of coating repairs	W	INF	$20,000	$21,100	$22,261	$23,485	$24,776	$26,139	$27,577	$29,094	$30,694	$32,382	$257,507
7	Acquire water tank sites, Vina Robles, Chandler, S. Vine	W	INF	$1,500,000										$1,500,000
8	New Well #11 installation	W	RELIAB	$500,000										$500,000
9	Osborne Well #14 rehabilitation	W	RELIAB	$102,136										$102,136
10	Sherwood Well #19 rehabilitation	W	RELIAB	$102,136										$102,136
11	Annual well rehabilitation	W	RELIAB	$200,000	$211,000	$222,605	$234,848	$247,765	$261,392	$275,769	$290,936	$306,937	$323,819	$2,575,071
12	W14 - 8" waterline in Highland Park Zone from West 12th St to 17th St	W	INF	$321,729										$321,729
13	Water Meters - ongoing meter replacement program and conversion to automatic meter reading devices	W	RELIAB	$400,000	$21,100	$22,261	$23,485	$24,776	$26,139	$27,577	$29,094	$30,694	$32,382	$637,507
14	Templeton Interceptor Sewer Upgrades	WW	INF	$500,000		$556,513	$1,174,241	$6,194,123	$6,534,800					$14,959,677
15	A1, SE1, SE2 - Sewer service expansion to Northern Airport Area	WW	INF	$204,272			$3,597,971	$3,795,860	$2,402,779					$10,000,882
16	Upgrade Lift Station No. 4	WW	INF	$255,340										$255,340
17	Rehab various existing mains on West Side and elsewhere	WW	INF	$600,000	$738,500									$1,338,500
18	Lift station rehabilitation to upgrade obsolete pumps, rails, and motors and to provide longer response time	WW	INF	$200,000	$211,000		$234,848		$261,392		$290,936		$323,819	$1,521,995
19	Rehab/replace old manholes	WW	INF	$300,000		$333,908		$371,647		$413,653		$460,406		$1,879,614
20	W2 - 8th Street and Pine Sewer Mains	WW	INF	$168,524										$168,524
21	W3 - 36th Street Sewer Service Area	WW	INF	$214,486										$214,486
22	W4 - 2nd Street Sewage Collector	WW	INF	$77,623										$77,623

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
23	W5 - 5th Street Sewage Collector	WW	INF	$77,623										$77,623
24	E2 - Commerce Way and Scott St Sewage Collection	WW	INF	$1,012,168										$1,012,168
25	E5 - Commerce Way Sewage Collection	WW	INF	$406,501										$406,501
26	E6 - Commerce Way and Santa Bella Sewage Diversion to consolidate influence of Chandler Ranch	WW	INF	$43,919										$43,919
27	Update the 1976 Drainage Master Plan and map the storm drain system with target outfalls identified.	SD	WQ	$300,000										$300,000
28	Drainage facilities at 4th and Spring	SD	INF	$500,000										$500,000
29	Downtown storm drain system improvements	SD	INF						$500,000	$1,000,000	$500,000			$2,000,000
30	Melody Basin/park study	SD	WQ	$300,000	$200,000									$500,000
31	Install a vented hood at the wastewater lab.	WW	INF	$30,974										$30,974
32	Consider equipping the wastewater lab to conduct on-site MPN tests.	WW	INF	$12,389										$12,389
33	Ladera Reservoir siting study, design, and construction	W	INF		$3,165,000									$3,165,000
34	Install filtration systems at Sherwood #6 and Ronconi Wells	W			$4,747,500									
35	Install new 5.3 MG East Side Tank	W	INF		$10,550,000									$10,550,000
36	E2 - 8" and 10" waterline from Admore Rd to Gilead Lane	W	INF		$405,153									$405,153
37	E4 - 12" waterline in Miller Ct from Lombardo Ct to end of cul-de-sac	W	INF		$130,382									$130,382
38	W13 - 8" waterline in 15th St from Terrace Hill Dr to Hillcrest Dr	W	INF		$85,125									$85,125
39	W16 - install fire pump at Highland Park Booster Station along with 8" waterline	W	INF		$237,058									$237,058
40	W17 - 12" waterline in Nacimiento Lake Dr and Fairview Ave	W	INF		$425,626									$425,626
41	E3 - Turtle Creek Rd and Commerce Way Sewage Collection	WW	INF		$323,261									$323,261
42	E4 - Linne Rd Sewage Collection	WW	INF		$409,463									$409,463
43	Video tape the entire sewage collection system over next 3-5 years to assess system condition	WW	INF		$211,000	$278,256	$293,560							$782,817
44	LS11 - Lift station capacity expansion	WW	INF		$275,849									$275,849
45	Construct an emergency by-pass around the bar screens.	WW	INF	Reevaluate in light of planned 2011-12 plant upgrade	$36,554									$36,554
46	Convert the scum pump for use as a dedicated primary sludge pump on one clarifier and equip the scum well with a vertical chopper pump	WW	INF		$122,734									$122,734
47	Upgrade controls for recirculation stations with ultrasonic level indicators.	WW	INF		$9,083									$9,083
48	Consider installation of grit removal on the secondary trickling filter pumps if snail shell volume warrants.	WW	INF		$12,362									$12,362
49	Examine the influent piping to the secondary trickling filters and repair as-needed.	WW	INF	lanned de	$25,920									$25,920

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
50	Rehabilitate the distribution arms in secondary trickling filters Nos. 1 and 2 and consider motor-drives for all distribution assemblies.	WW	INF	Reevaluate in light of p 2011-12 plant upgra	$208,803									$208,803
51	Sand and paint secondary distribution arms (Nos. 1, 2, 3, 4)	WW	INF		$47,078									$47,078
52	Raise the walls of the trickling filters to mitigate wind blown wastewater.	WW	INF		$9,748									$9,748
53	Add 6 chlorine residual analyzers	WW	INF		$127,165									$127,165
54	W4 - 10" waterline in 36th St from Spring St to WWTP	W	INF			$394,470								$394,470
55	W5 - 8" waterline in 22nd St from Oak St to Spring St	W	INF			$71,618								$71,618
56	W6 - 10" waterline in 22nd St from Olive St to Oak St	W	INF			$143,237								$143,237
57	W10 - 8" waterline in Olive St from 19th St to 23rd St	W	INF			$277,379								$277,379
58	W11 - 8" waterline in James St to Cherry St	W	INF			$53,430								$53,430
59	W12 - 16" waterline in Chestnut St from 12th St to 11th St	W	INF			$143,237								$143,237
60	W15 - install fire pump at 12th Street Booster Station	W	INF			$2,557,800								$2,557,800
61	FE3 - 16" waterline in Olsen/Beechwood from Creston Rd to Linne Rd	W	INF			$1,647,223	$2,399,847							$4,047,070
62	T1 1 - Templeton Interceptor near LS #1	WW	INF			$31,830								$31,830
63	SE3 - Sewer service expansion to Paso Robles Blvd area	WW	INF			$579,768								$579,768
64	T1 2 - North River Rd trunk sewers (concurrent w/ Nacimiento pipeline)	WW	INF			$1,534,111	$1,618,487							$3,152,599
65	*Alt 2 - Irrigation reuse along Hwy 46 corridor*	*RW*	*RELIAB, GW DEP*	*CHOOSE ONE*	*$48,438,000*									$48,438,000
66	*Alt 3 - Groundwater recharge along Salinas corridor, Site G*	*RW*	*RELIAB, GW DEP*		*$37,008,000*									$37,008,000
67	*Alt 4 - Enhance treatment and continue river discharge, activated sludge*	*RW*	*RELIAB, GW DEP*		*$23,789,000*									$23,789,000
68	*Alt 5 - Hybrid strategy, with seasonal river discharge*	*RW*	*RELIAB, GW DEP*		*$49,118,000*		*Plant design*	*Plant construction and delivery system design*	*Plant start-up and delivery system construction*					$49,118,000
69	Budgetary projection for WWTP upgrade after recycling decision	RW	*RELIAB, GW DEP*				$4,696,966	$26,015,318	$19,604,400					$50,316,683
70	Nacimiento Water delivery costs	W	ALL				$63,860,000							$63,860,000
71	W3 - 8" waterline in 32nd St from Park St to Pine St	W	INF				$56,368							$56,368
72	W7 - 10" waterline in 24th St and Riverside Ave	W	INF				$346,605							$346,605
73	W8 - 8" waterline in Oak St from 4th St to 7th St	W	INF				$217,078							$217,078
74	W9 - 8" waterline in 2nd St from Vine St to Orcutt Rd	W	INF				$207,483							$207,483
75	FE2 - 12", 16", and 24" waterline in Chandler Ranch from Gilead Ln to N/o Hwy 46	W	INF				$2,396,849	$2,528,675						$4,925,524
76	E1 - Creston Rd Sewage Collection	WW	INF				$642,838							$642,838
77	Study high maintenance sewer areas to identify and correct the problems	WW	INF				$46,970							$46,970
78	T1 3 - South River Rd trunk sewers (concurrent w/ Nacimiento pipeline)	WW	INF				$1,164,543	$1,228,593						$2,393,137

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
79	Install influent flow meter	WW	INF				$204,169							$204,169
80	E5 - 12" waterline in Tractor St from Oakwood St to Combine St	W	INF					$328,975						$328,975
81	W1 - 12" waterline in Spring St from 24th St to 36th St	W	INF					$1,471,528						$1,471,528
82	W2 - 8" waterline in Oak St from 30th to 32nd St	W	INF					$301,138						$301,138
83	W18 - 14" waterline in Pine St, 23rd St, and Spring St	W	INF							$970,316				$970,316
84	FE6 - 16" waterline in Linne Rd from Airport Rd to Tract 2526	W	INF							$1,013,973				$1,013,973
85	W6 - Eastside Influent Trunk Sewer	WW	INF							$160,546				$160,546
86	Adopt a well water desalting program including high recovery of raw and treated water.	W	WQ, SALT RED										$3,307,358	$3,307,358
	Totals =			**$14,628,042**	**$25,230,564**	**$25,565,279**	**$95,770,175**	**$43,152,588**	**$29,617,042**	**$3,889,409**	**$1,140,059**	**$828,731**	**$4,019,759**	**$239,094,149**
	Project highlights				*Naci WTP and local pipeline construction*	*Naci local pipeline and Templeton sewer*	*Naci capital investment; WWTP design; Temp sewer*	*WWTP and recycled deliv system constr*	*WWTP and recycled deliv system constr*					

[1] W = Water; WW = Wastewater; SD = Storm Drain;

[2] WQ = improve water quality; SALT RED = reduce basin salt loading; W RTS = maintain strong water rights; RELIAB = increase water supply reliability; GW DEP = reduce groundwater dependence; ALL = advances all major goals.
INF = other infrastructure projects to meet existing customer needs and projected development.

[3] Total Project Costs have both been adjusted to current dollars using ENR 20 Cities Construction Cost Indexes and adjusted for inflation at the rate shown.

Other Major Programs to Implement Recommendations and New Development Standards:													
Water conservation coordinator w/ public information programs and school education programs	W	WQ, SALT RED	$55,000	$56,650	$58,350	$60,100	$61,903	$63,760	$65,673	$67,643	$69,672	$71,763	$630,513
Restrict use of self-regenerating household water softeners via an ordinance	w	WQ, SALT RED		$40,000									$40,000
Residential ultra low flush toilet replacement program	W	RELIAB, GW DEP						$9,933					$9,933
Implement an Industrial Waste Discharge Ordinance	WW	WQ, SALT RED	$25,000										$25,000
Large landscape water conservation programs	W	RELIAB		$26,375	$7,791	$8,220	$8,672	$6,535	$6,894	$7,273	$7,673	$8,095	$87,529
Water conservation programs for commercial, industrial and institutional accounts	W	RELIAB, GW DEP			$100,061								$100,061
Implement the storm water management program	SD	WQ, RELIAB	(Annual costs to be determined)										$0
Require provisions for accepting recycled water in new developments	RW	RELIAB, GW DEP		$30,000									$30,000
Totals Inc. Major Program Costs =			**$14,708,042**	**$25,383,589**	**$25,731,481**	**$95,838,495**	**$43,223,163**	**$29,697,270**	**$3,961,976**	**$1,214,975**	**$906,077**	**$4,099,617**	**$240,017,185**

City of El Paso de Robles
2007 Water Resources Plan Integration
TJC P#06461; CMHalley; 2-19-07

PROPOSED C.I.P. BUDGET
by Utility Area
FY 2007-08 to 2016-17

Inflationary adjustment for Dec 2006 cost basis = 5.50% per year

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
	Recycled Water Projects:													
1	Install reclaimed waterline concurrent with Nacimiento waterline	RW	RELIAB, GW DEP	$500,000		$5,565,125	$2,935,603							$9,000,728
2	*Alt 2 - Irrigation reuse along Hwy 46 corridor*	*RW*	*RELIAB, GW DEP*	*CHOOSE ONE*	*$48,438,000*		*Plant design*	*Plant construction and delivery system design*	*Plant start-up and delivery system construction*					$48,438,000
3	*Alt 3 - Groundwater recharge along Salinas corridor, Site G*	*RW*	*RELIAB, GW DEP*		*$37,008,000*									$37,008,000
4	*Alt 4 - Enhance treatment and continue river discharge, activated sludge*	*RW*	*RELIAB, GW DEP*		*$23,789,000*									$23,789,000
5	*Alt 5 - Hybrid strategy, with seasonal river discharge*	*RW*	*RELIAB, GW DEP*		*$49,118,000*									$49,118,000
6	Budgetary projection for WWTP upgrade after recycling decision	RW	*RELIAB, GW DEP*				$4,696,966	$26,015,318	$19,604,400					$50,316,683
7	**Storm Drain Projects:**													
8	Update the 1976 Drainage Master Plan and map the storm drain system with target outfalls identified.	SD	WQ	$300,000										$300,000
9	Drainage facilities at 4th and Spring	SD	INF	$500,000										$500,000
10	Downtown storm drain system improvements	SD	INF						$500,000	$1,000,000	$500,000			$2,000,000
11	Melody Basin/park study	SD	WQ	$300,000	$200,000									$500,000
12	**Water Projects:**													
13	New Well #11 installation	W	RELIAB	$500,000										$500,000
14	Nacimiento Water Design/Construction Phase	W	ALL	$1,735,500	$1,735,500									$3,471,000
15	Design and construct Nacimiento Water Treatment Plant, 6 MGD membrane filtration plant, located at Thunderbird well field	W	ALL	$1,500,000		$5,565,125	$9,393,931	$619,412						$17,078,468
16	Sherwood Well arsenic treatment system (2 at $1 million each)	W	WQ, RELIAB	$2,042,721										$2,042,721
17	Install filtration system at Sherwood #6 and Ronconi Wells	W			$4,747,500									
18	Osborne Well #14 rehabilitation	W	RELIAB	$102,136										$102,136
19	Sherwood Well #19 rehabilitation	W	RELIAB	$102,136										$102,136
20	Annual well rehabilitation	W	RELIAB	$200,000	$211,000	$222,605	$234,848	$247,765	$261,392	$275,769	$290,936	$306,937	$323,819	$2,575,071
21	W14 - 8" waterline in Highland Park Zone from West 12th St to 17th St	W	INF	$321,729										$321,729
22	21st Street Reservoir construction	W	INF	$500,000	$527,500	$5,565,125								$6,592,625
23	Water Tanks - regular program of coating repairs	W	INF	$20,000	$21,100	$22,261	$23,485	$24,776	$26,139	$27,577	$29,094	$30,694	$32,382	$257,507
24	Water Meters - ongoing meter replacement program and conversion to automatic meter reading devices	W	RELIAB	$400,000	$21,100	$22,261	$23,485	$24,776	$26,139	$27,577	$29,094	$30,694	$32,382	$637,507
25	Acquire water tank sites, Vina Robles, Chandler, S. Vine	W	INF	$1,500,000										$1,500,000
26	Install new 5.3 MG East Side Tank	W	INF		$10,550,000									$10,550,000

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
27	Ladera Reservoir siting study, design, and construction	W	INF		$3,165,000									$3,165,000
28	E2 - 8" and 10" waterline from Admore Rd to Gilead Lane	W	INF		$405,153									$405,153
29	E4 - 12" waterline in Miller Ct from Lombardo Ct to end of cul-de-sac	W	INF		$130,382									$130,382
30	W13 - 8" waterline in 15th St from Terrace Hill Dr to Hillcrest Dr	W	INF		$85,125									$85,125
31	W16 - install fire pump at Highland Park Booster Station along with 8" waterline	W	INF		$237,058									$237,058
32	W17 - 12" waterline in Nacimiento Lake Dr and Fairview Ave	W	INF		$425,626									$425,626
33	W4 - 10" waterline in 36th St from Spring St to WWTP	W	INF			$394,470								$394,470
34	W5 - 8" waterline in 22nd St from Oak St to Spring St	W	INF			$71,618								$71,618
35	W6 - 10" waterline in 22nd St from Olive St to Oak St	W	INF			$143,237								$143,237
36	W10 - 8" waterline in Olive St from 19th St to 23rd St	W	INF			$277,379								$277,379
37	W11 - 8" waterline in James St to Cherry St	W	INF			$53,430								$53,430
38	W12 - 16" waterline in Chestnut St from 12th St to 11th St	W	INF			$143,237								$143,237
39	W15 - install fire pump at 12th Street Booster Station	W	INF			$2,557,800								$2,557,800
40	FE3 - 16" waterline in Olsen/Beechwood from Creston Rd to Linne Rd	W	INF			$1,647,223	$2,399,847							$4,047,070
41	Nacimiento Water delivery costs	W	ALL				$63,860,000							$63,860,000
42	W3 - 8" waterline in 32nd St from Park St to Pine St	W	INF				$56,368							$56,368
43	W7 - 10" waterline in 24th St and Riverside Ave	W	INF				$346,605							$346,605
44	W8 - 8" waterline in Oak St from 4th St to 7th St	W	INF				$217,078							$217,078
45	W9 - 8" waterline in 2nd St from Vine St to Orcutt Rd	W	INF				$207,483							$207,483
46	FE2 - 12", 16", and 24" waterline in Chandler Ranch from Gilead Ln to N/o Hwy 46	W	INF				$2,396,849	$2,528,675						$4,925,524
47	E5 - 12" waterline in Tractor St from Oakwood St to Combine St	W	INF					$328,975						$328,975
48	W1 - 12" waterline in Spring St from 24th St to 36th St	W	INF					$1,471,528						$1,471,528
49	W2 - 8" waterline in Oak St from 30th to 32nd St	W	INF					$301,138						$301,138
50	W18 - 14" waterline in Pine St, 23rd St, and Spring St	W	INF							$970,316				$970,316
51	FE6 - 16" waterline in Linne Rd from Airport Rd to Tract 2526	W	INF							$1,013,973				$1,013,973
52	Adopt a well water desalting program including high recovery of raw and treated water.	W	WQ, SALT RED										$3,307,358	$3,307,358

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
53	**Wastewater Projects:**													
54	Templeton Interceptor Sewer Upgrades	WW	INF	$500,000		$556,513	$1,174,241	$6,194,123	$6,534,800					$14,959,677
55	A1, SE1, SE2 - Sewer service expansion to Northern Airport Area	WW	INF	$204,272			$3,597,971	$3,795,860	$2,402,779					$10,000,882
56	Upgrade Lift Station No. 4	WW	INF	$255,340										$255,340
57	Rehab various existing mains on West Side and elsewhere	WW	INF	$600,000	$738,500									$1,338,500
58	Lift station rehabilitation to upgrade obsolete pumps, rails, and motors and to provide longer response time	WW	INF	$200,000	$211,000		$234,848		$261,392		$290,936		$323,819	$1,521,995
59	Rehab/replace old manholes	WW	INF	$300,000		$333,908		$371,647		$413,653		$460,406		$1,879,614
60	W2 - 8th Street and Pine Sewer Mains	WW	INF	$168,524										$168,524
61	W3 - 36th Street Sewer Service Area	WW	INF	$214,486										$214,486
62	W4 - 2nd Street Sewage Collector	WW	INF	$77,623										$77,623
63	W5 - 5th Street Sewage Collector	WW	INF	$77,623										$77,623
64	E2 - Commerce Way and Scott St Sewage Collection	WW	INF	$1,012,168										$1,012,168
65	E5 - Commerce Way Sewage Collection	WW	INF	$406,501										$406,501
66	E6 - Commerce Way and Santa Bella Sewage Diversion to consolidate influence of Chandler Ranch	WW	INF	$43,919										$43,919
67	Install a vented hood at the wastewater lab.	WW	INF	$30,974										$30,974
68	Consider equipping the wastewater lab to conduct on-site MPN tests.	WW	INF	$12,389										$12,389
69	E3 - Turtle Creek Rd and Commerce Way Sewage Collection	WW	INF		$323,261									$323,261
70	E4 - Linne Rd Sewage Collection	WW	INF		$409,463									$409,463
71	Video tape the entire sewage collection system over next 3-5 years to assess system condition	WW	INF		$211,000	$278,256	$293,560							$782,817
72	LS11 - Lift station capacity expansion	WW	INF		$275,849									$275,849
73	Construct an emergency by-pass around the bar screens.	WW	INF	Reevaluate in light of planned 2011-12 plant upgrade	$36,554									$36,554
74	Convert the scum pump for use as a dedicated primary sludge pump on one clarifier and equip the scum well with a vertical chopper pump	WW	INF		$122,734									$122,734
75	Upgrade controls for recirculation stations with ultrasonic level indicators.	WW	INF		$9,083									$9,083
76	Consider installation of grit removal on the secondary trickling filter pumps if snail shell volume warrants.	WW	INF		$12,362									$12,362
77	Examine the influent piping to the secondary trickling filters and repair as-needed.	WW	INF	Reevaluate in light of planned 2011-12 plan upgrade	$25,920									$25,920

	Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
78	Rehabilitate the distribution arms in secondary trickling filters Nos. 1 and 2 and consider motor-drives for all distribution assemblies.	WW	INF		$208,803									$208,803
79	Sand and paint secondary distribution arms (Nos. 1, 2, 3, 4)	WW	INF		$47,078									$47,078
80	Raise the walls of the trickling filters to mitigate wind blown wastewater.	WW	INF		$9,748									$9,748
81	Add 6 chlorine residual analyzers	WW	INF		$127,165									$127,165
82	T1 1 - Templeton Interceptor near LS #1	WW	INF			$31,830								$31,830
83	SE3 - Sewer service expansion to Paso Robles Blvd area	WW	INF			$579,768								$579,768
84	T1 2 - North River Rd trunk sewers (concurrent w/ Nacimiento pipeline)	WW	INF			$1,534,111	$1,618,487							$3,152,599
85	E1 - Creston Rd Sewage Collection	WW	INF				$642,838							$642,838
86	Study high maintenance sewer areas to identify and correct the problems	WW	INF				$46,970							$46,970
87	T1 3 - South River Rd trunk sewers (concurrent w/ Nacimiento pipeline)	WW	INF				$1,164,543	$1,228,593						$2,393,137
88	Install influent flow meter	WW	INF				$204,169							$204,169
89	W6 - Eastside Influent Trunk Sewer	WW	INF							$160,546				$160,546
	Totals =			**$14,628,042**	**$25,230,564**	**$25,565,279**	**$95,770,175**	**$43,152,588**	**$29,617,042**	**$3,889,409**	**$1,140,059**	**$828,731**	**$4,019,759**	**$239,094,149**
	Project highlights				*Naci WTP and local pipeline construction*	*Naci local pipeline and Templeton sewer*	*Naci capital investment; WWTP design; Temp sewer*	*WWTP and recycled deliv system constr*	*WWTP and recycled deliv system constr*					

1 W = Water; WW = Wastewater; SD = Storm Drain;

2 WQ = improve water quality; SALT RED = reduce basin salt loading; W RTS = maintain strong water rights; RELIAB = increase water supply reliability; GW DEP = reduce groundwater dependence; ALL = advances all major goals.
INF = other infrastructure projects to meet existing customer needs and projected development.

3 Total Project Costs have both been adjusted to current dollars using ENR 20 Cities Construction Cost Indexes and adjusted for inflation at the rate shown.

Other Major Programs to Implement Recommendations and New Development Standards:													
Water conservation coordinator w/ public information programs and schoo education programs	W	WQ, SALT RED	$55,000	$56,650	$58,350	$60,100	$61,903	$63,760	$65,673	$67,643	$69,672	$71,763	$630,513
Restrict use of self-regenerating household water softeners via an ordinance	w	WQ, SALT RED		$40,000									$40,000
Residential ultra low flush toilet replacement program	W	RELIAB, GW DEP						$9,933					$9,933
Implement an Industrial Waste Discharge Ordinance	WW	WQ, SALT RED	$25,000										$25,000
Large landscape water conservation programs	W	RELIAB		$26,375	$7,791	$8,220	$8,672	$6,535	$6,894	$7,273	$7,673	$8,095	$87,529
Water conservation programs for commercial, industrial and institutional accounts	W	RELIAB, GW DEP			$100,061								$100,061
Implement the storm water management program	SD	WQ, RELIAB	(Annual costs to be determined)										$0
Require provisions for accepting recycled water in new developments	RW	RELIAB, GW DEP		$30,000									$30,000
Totals Inc. Major Program Costs =			**$14,708,042**	**$25,383,589**	**$25,731,481**	**$95,838,495**	**$43,223,163**	**$29,697,270**	**$3,961,976**	**$1,214,975**	**$906,077**	**$4,099,617**	**$240,017,185**

City of el Paso de Robles
2007 Water Resources Plan Integration
Projects Lacking Cost Estimates

Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
Projects Lacking Cost Estimates and Evaluation in Light of Planned WWTP Upgrade													
Partially enclose three sides of sludge press area	WW						not stated						$0
Paint two old digesters	WW					not stated							$0
Retrofit the recirculation room valves	WW				not stated								$0
Replace pipe, valves, and braces on grit chambers plus associated concrete work	WW			not stated									$0
Convert to sodium hypochlorite in lieu of gaseous chlorine	WW			not stated									$0
Demolish old facilities at CYA plant	WW											not stated	$0
Resurface access roads around sludge beds	WW				not stated								$0
Pave around the chlorine basin	WW		not stated										$0
Provide sanitary shower/locker room for operators	WW							defer to plant upgrade					$0
Reservoir and well access road paving and fencing improvements	W					not stated							$0
Orchard Bungalow booster station VFD installation	W		not stated										$0
Additional 500 kva portable generator	W		not stated										$0
Mobile geographic information system access for operators	W			not stated									$0
Water tank recoating (one tank every other year)	W			not stated		not stated		not stated		not stated		not stated	$0
OSHA compliant trench shoring jacks and shields	W		not stated										$0
Larger liquid chlorine storage buildings at well sites	W		not stated	not stated									$0
Evaluate irrigation-related water quality parameters of treated plant effluent.	RW		Not CIP										$0
Determine water quality impact of Pretreatment and Source Control Program on viability of reclaiming wastewater.	RW				Not CIP								$0
Double the City's Nacimiento entitlement to 8,000 AFY	W										not stated		$0
Restrict use of self-regenerating household water softeners via an ordinance	RW		not CIP										$0
Preferentially use wells with lower salt levels	W		Not CIP										$0
Implement an Industrial Waste Discharge Ordinance	WW		Not CIP										$0
Water Tanks - internal cathodic protection	W												$0
Valves, hydrants, and air-vacs - annual exercise program	W												$0
Pressure Reducing Valves - regular service program	W												$0

City of el Paso de Robles
2007 Water Resources Plan Integration
Projects Lacking Cost Estimates

Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
Global Information System - semi-annual updates to illustrate new water piping, valves, etc.	W												$0
Water metering with commodity rates	W												$0
Water conservation pricing	W												$0
Install chlorine gas containment and emergency scrubbing system or discontinue use of 1-ton gaseous chlorine cylinders by converting to sodium hypochlorite for disinfection.	WW			not stated									$0
Provide flow proportional control of ferric chloride feed system at the wastewater treatment plant.	WW		Re-evaluate all in light of planned 2011-13 WWTP upgrade	not stated									$0
Replace existing bar screens with smaller openings and equipped with a screenings washer and compactor. Also, provide a reliable timer for the screen rake, consider a level sensor.	WW			not stated									$0
Repair the concrete and exposed equipment above the waterline in the grit chambers.	WW		Re-evaluate all in light of planned 2011-13 WWTP upgrade	not stated									$0
Relocate the grit blower into a sound-dampened enclosure. Provide a second blower for redundancy.	WW			not stated									$0
Adjust ferric chloride feed based on a jar test series.	WW			not stated									$0
Evaluate operating levels and wetwell design of the secondary trickling filter pump station. Repipe as needed.	WW			not stated									$0
Replace the inboard effluent launders in clarifiers Nos. 3 and 4 with perimeter launders and weir baffles to reduce the potential for short-circuiting.	WW			not stated									$0
Investigate the feasibility of installing surface skimmers on clarifiers Nos. 2, 3, and 4.	WW			not stated									$0
Consider discontinuing use of clarifier No. 1.	WW			not stated									$0
Consider routing secondary sludge line in to the primary influent.	WW			not stated									$0
Confirm the wier sizes and chlorine contact basin volumes.	WW			not stated									$0
Install gates or valves to allow isolation of each chlorine contact basin.	WW			not stated									$0

City of el Paso de Robles
2007 Water Resources Plan Integration
Projects Lacking Cost Estimates

Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
Consider dechlorination to ensure effluent chlorine limits as stated in the waste discharge permit.	WW		Re-evaluate all in light of planned 2011-13 WWTP upgrade	not stated									$0
Provide a back-up system for operating the chlorinator if the level indicator fails.	WW			not stated									$0
Improve the mixing and/or dissolved oxygen transfer at the polishing ponds to reduce algae growth.	WW			not stated									$0
Line the polishing pond banks for weed control.	WW			not stated									$0
Consider accepting additional sludge at the wastewater plant.	WW			not stated									$0
Construct an additional lined sludge bed to allow decanting and improve sludge drying.	WW			not stated									$0
Consider operating all 3 digesters as mixed digesters and use a holding tank/mechanical dewatering for solids.	WW			not stated									$0
For reclaimed water options, install 2 vortex grit chambers, grit classifiers, and screen conveyors to replace or flow parallel to the existing grit removal facilities.	RW			Costs included in '06 Recyc. Water Update.									$0
For reclaimed water options, add scum skimmers, scum pump stations, and Stamford density baffles to each of the 3 primary sedimentation basins.	RW			Costs included in '06 Recyc. Water Update.									$0
For reuse as restricted irrigation, add a third chlorine contact basin and replace the 1-ton gaseous chlorine cylinders with sodium hypochlorite generation.	RW			Costs included in '06 Recyc. Water Update.									$0
For broader reuse options, add a third chlorine contact basin, replace the gaseous chlorine facilities with sodium hypochlorite, and add sand filtration process units.	RW			Costs included in '06 Recyc. Water Update.									$0
For broader reuse options, construct a membrane biological reactor and disinfection.	RW			Costs included in '06 Recyc. Water Update.									$0
For broader reuse options, use the existing primary trickling filters as roughing trickling filters and use an aeration basin for conventional plug flow.	RW			Costs included in '06 Recyc. Water Update.									$0

City of el Paso de Robles
2007 Water Resources Plan Integration
Projects Lacking Cost Estimates

Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	TOTAL PROJECT COST[3]
Add tertiary treatment to the selected disinfection approach by installing a flash mixing storage tank to flocculate colloidal particles followed by a membrane or sand filtration step. Include sodium hypochlorite or UV radiation as a final disinfection s	RW		Re-evaluate all in light of planned 2011-13 WWTP upgrade	Costs included in '06 Recyc. Water Update.									$0
For some tertiary treatment processes, provide return activated sludge/waste activated sludge pumps and handling facilities. For this option, provide lined sludge drying beds.	RW			Costs included in '06 Recyc. Water Update.									$0
Add a central control and monitoring system to the wastewater treatment plant	WW			not stated									$0
Consider an upgrade to the standby diesel fuel generator a the wastewater treatment plant sized to run the entire plant.	WW		not stated										$0

[1] Source: City of Paso Robles Water Resources Plan Integration and Capital Improvement Program by TJ Cross Engineers, November 2006.
Assumed inflation rate =
[2] W = Water, WW = Wastewater, RW = Recycled Water, SD = Storm Drain
[3] Source??

City of el Paso de Robles
2007 Water Resources Plan Integration

Project[1]	Group[1]	Goal Advancement[2]	FY 2007-08	FY 2008-09	FY 2009-10
Storm Water Management Program - Recommended Sequence of Events. Not Capital Projects.					
Adopt-a-Street program with annual surveys and a stated goal of +25% participation as compared to 2004 levels	SD				
Maintain a web page to educate the public about water quality issues and track web page hits. Invite comments on the web page and respond accordingly.	SD		Develop an illegal dumping an illicit connections brochure for distribution to anyone cited for illegal dumping.		SD
Distribute brochures or fact sheets to residents to educate them on ways to decrease impact on storm water runoff. Include construction contractors and local businesses and conduct site inspections to determine the degree of measure implementation.	SD		Draft a new illicit discharge ordinance to address non storm water discharges.		SD
Provide a storm water hotline number to get more information on quality issues, motor oil disposal, etc. and track the number of calls.	SD		Record the number of projects permitted and constructed requiring a Grading Permit each year. Achieve 100%		SD
Mark each storm drain with "Don't Dump - Drains to River" and track the percent of total so marked each year.	SD		Record annual number of enforcement actions at construction sites and at conditioned projects along with		SD
City to participate in local events and distribute materials about water quality. Track the number of events and brochures distributed.	SD		Provide all City construction staff with construction best management practices brochures for distribution to		SD
Hold three public meetings over 5 years to present the Storm Water Management Plan to officials and the public.	SD		Annually inspect all completed runoff structures to ensure proper maintenance.		SD
Prepare a "stock presentation" about storm water management, tailor and present it to community groups regularly. Present to City staff and encourage creative ideas for improving water quality.	SD		Evaluate all City-funded projects for adherence to and proper maintenance of storm water best management practices.		SD
Organize volunteer creek clean-up events and present results of storm water sampling in an annual report.	SD		Track at least three innovative projects that protect/improve water quality.		SD
Implement a reporting system for public complaints regarding illicit discharges, hazardous wastes, liquid waste, spills, etc. that could pollute water. Respond to such complaints within 24 hours.	SD		Track the number of permit applications that are returned or rejected.		SD
Revise "Engineering Standard Details and Specifications" to address best management practices in more detail.	SD		Randomly conduct semi-annual inspections to verify contractor adherence to landscape maintenance, street		SD
Revise the Grading Ordinance to include specific requirements for certain development types.	SD		Increase awareness about waste management by including IWMA's web site in		SD
Update the General Plan to include appropriate storm water management design standards.	SD		Develop a single fact sheet to address treatment control or structural control of storm		SD
Inspect targeted outfalls twice yearly to ensure abatement of violations. Complete such inspections within two years.	SD		Conduct quarterly or annual City employee training on responsibilities pertaining to storm water management.		SD

City of el Paso de Robles
2007 Water Resources Plan Integration

Master Plan Piping Recommendations
To be Constructed by Developers*

E1 - 16" and 24" waterline in Airport Area from Golden Hills Rd to Airport Facility	W		$8,085,000
E3 - 10" waterline from Santa Fe Ave to Sherwood Rd	W		$92,000
FE4 - 12" and 16" waterline in perimeter of Airport Area	W		$8,240,000
W1 - Riverside Interceptor	WW		$643,000
W7 - 12th Street Sewage Collector betweeen Vine and Olive	WW		$44,000
LS1 - Lift station capacity expansion	WW		$1,560,000
LS3 - Lift station capacity expansion	WW		$316,000
LS12 - Lift station capacity expansion	WW		$780,000
Total =			**$19,760,000**

* Noted as 100% allocated to future users on Public Works Dept water and sewer impact fee lists.

Update
for the
Paso Robles Groundwater Basin

Report to Paso Robles Groundwater Basin Committee
November 2007

Todd Engineers
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
510-747-6920

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Executive Summary

The purpose of the Paso Robles Groundwater Basin monitoring program and Basin Update is to monitor and evaluate groundwater conditions, recognizing that monitoring and appropriate management of Basin water resources can delay or even avoid basin overdraft. This first Basin Update provides an overview of the current condition of the Paso Robles Groundwater Basin, building on the *Paso Robles Groundwater Basin Study* (Phase I Report) (Fugro, et al., 2002) and the *Paso Robles Groundwater Basin Numerical Model* (Phase II Report) (Fugro, et al., 2005). The Phase I study period was from July 1980 through June 1997; this Basin Update provides an update from 1997 through 2006 on rainfall, groundwater levels and storage, and groundwater management planning.

The study area is located in the Salinas River watershed in northern San Luis Obispo County and southern Monterey County, and includes the Atascadero subbasin and seven subareas. The major water-bearing units in the basin include alluvial deposits and the Paso Robles Formation. Precipitation is the ultimate source of recharge to the groundwater basin. In general, average annual rainfall over the basin varies from 20 inches in the west to 10 inches in the east; this report describes two different maps showing the distribution of rainfall. Since the study period of the Phase I report, rainfall has been slightly higher than average. However, the past water year was one of the driest on record with only 5.48 inches recorded.

Examination of groundwater level data from spring 2006 show that the general direction and pattern of groundwater flow are unchanged from 1997. In addition, historical groundwater level data from over 200 wells were examined to evaluate trends in groundwater levels. Representative hydrographs are presented to characterize the Atascadero subbasin and the seven subareas of the Paso Robles Groundwater Basin. These hydrographs illustrate how groundwater levels change with varying rainfall amounts and changing pumping patterns.

Change in groundwater storage from 1997 to 2006 was calculated using essentially the same method as the Phase I Report. The storage calculations indicate an estimated net groundwater storage decrease of -29,767 acre-feet (AF), equivalent to an average storage decrease of -3,307 acre feet per year (AFY). Between 1997 and 2006, storage decreases were concentrated in the Estrella and Creston subareas, while storage increases are documented in the Atascadero subbasin and Shandon subarea. Storage declines have persisted since 1981 in portions of the Estrella and San Juan subareas.

The San Luis Obispo County Flood Control and Water Conservation District (District), City of Paso Robles, and other local stakeholders have taken the initiative to better manage groundwater Recent project include the ongoing groundwater level monitoring program, Nacimiento Project, Water Banking Study, City of Paso Robles Water Resources Plan Integration, County Resource Capacity and Conservation Element Study and upcoming Water Master Plan Update, and USGS GAMA program.

Conclusions of this first Basin Update are summarized as follows:

- A comparison of existing isohyetal (rainfall) maps reveals differences, particularly in the highland areas west and southwest of the basin.
- Average annual rainfall for the 1997 through 2006 water years was 15.85 inches, slightly higher than the long term average (14.78 inches). Water year 2007 was one of the driest

on record with only 5.3 inches of rainfall. Annual rainfall typically is characterized by long, dry periods and short, intense wet periods.

- The direction and pattern of regional groundwater flow within the basin were basically unchanged from 1997 to 2006.
- Groundwater level hydrographs show that declines have persisted in portions of the Estrella and San Juan subareas from 1981 to 2006.
- Change in groundwater storage for 1997 to 2006 was estimated to be a net decrease of -29,767 acre-feet, or -3,307 acre feet per year. Decreases in storage are documented in the Estrella and Creston subareas, while storage increased in the Atascadero subbasin and Shandon subarea.
- Updating groundwater pumping would help explain local groundwater level changes and would also allow assessment of the current amount of pumping relative to buildout.
- Recharge from rainfall and subsurface inflow may not be fully represented, particularly at the close of the 1997-2006 period. As a result, recharge is likely underestimated and groundwater storage decrease may be overestimated.
- The District, City of Paso Robles, and others have undertaken projects and programs to improve groundwater management, including the ongoing monitoring program, Nacimiento Project, Water Banking Study, City of Paso Robles Water Resources Plan Integration, USGS GAMA program, and upcoming County Resource Capacity Study, Conservation Element and Water Master Plan Update.

Recommendations of this Basin Update are summarized below:

- Subsequent Basin Updates should cover a water year to provide timely updates to the District, City, PRIOR and the public regarding the response of the basin to annual changes in rainfall and pumping.
- Groundwater quality trends should be updated in the next Basin Update.
- Additional investigation of the geographic distribution of rainfall is recommended to better understand recharge.
- The District, City, and PRIOR landowners group should continue cooperative efforts to improve the efficiency and effectiveness of local monitoring programs, focusing on addition of existing wells to the program and data management.
- Groundwater pumping in the basin should be updated next year, including the pumping by agriculture, municipalities, rural and community water systems. The update should be coordinated with the District's Water Master Plan Update.
- The entire water balance should be updated within five years using a comprehensive methodology similar to that of the Phase I Report. Such a schedule would allow the water balance to incorporate effects of the delivery of Nacimiento water.

Introduction

Background

This first Basin Update has been prepared in accordance with the August 2005 Paso Robles Groundwater Basin Agreement among the San Luis Obispo County Flood Control and Water Conservation District (District), City of Paso Robles (City), and certain private landowners, who have organized as the Paso Robles Imperiled Overlying Rights (PRIOR) group. Key elements of the Agreement are a clear acknowledgment that the basin is not in overdraft now, and that the parties will not take court action to establish any priority of groundwater rights over another party as long as the Agreement is in effect.

The District, City, and PRIOR landowners have designated representatives to participate in a committee, informally termed the Paso Robles Groundwater Basin Committee, to develop a plan or program ("Plan") for monitoring groundwater conditions in the basin. This Committee, which has conducted semi-annual meetings since February 2006, has guided preparation of this Basin Update as a means of reporting on groundwater conditions and developing recommendations for improved monitoring.

This first Basin Update provides an overview of the current condition of the Paso Robles Groundwater Basin, including rainfall, groundwater levels and storage, groundwater quality, and groundwater management planning. The Basin Update builds on the *Paso Robles Groundwater Basin Study* (Phase I Report) (Fugro, et al., 2002) and the *Paso Robles Groundwater Basin Numerical Model* (Phase II Report) (Fugro, et al., 2005). Subsequent Basin Updates should cover a water year to provide timely updates to the District, City, PRIOR and the public regarding the response of the basin to annual changes in rainfall and pumping.

Purpose

The purpose of the Paso Robles Groundwater Basin monitoring program and Basin Update is to monitor and evaluate groundwater conditions, recognizing that monitoring and appropriate management of basin water resources can delay or even avoid basin overdraft. Groundwater-related plans and projects are summarized to support coordinated management.

Study Area

The study area of the Basin Update is the Paso Robles Groundwater Basin as defined in the Phase I Report. **Figure 1** shows the groundwater basin boundaries and key geographic features. The groundwater basin is also defined by the California Department of Water Resources as the Paso Robles Area Subbasin of the Salinas Valley Groundwater Basin with a designation as basin number 3-4.06.

As shown in **Figure 1**, the study area encompasses about 790 square miles of the Salinas River watershed in northern San Luis Obispo County and southern Monterey County, and includes the Atascadero Subbasin and seven subareas. The major water-bearing units in the basin include alluvial deposits and the Paso Robles Formation. The alluvial deposits are up to about 100 feet in depth and include recent stream-laid sands and gravels along the Salinas River and its tributaries. Wells in the alluvium typically produce in excess of 1,000 gallons per minute (gpm) (Fugro, et al., 2002). The Paso Robles Formation is the most extensive aquifer and consists of typically unconsolidated sedimentary layers extending to depths of more than 2,000 feet. Wells generally produce several hundred gpm (Fugro, et al., 2002).

Water Year

When applicable, the hydrologic data are reported in terms of water year. A water year begins on October 1 and ends on September 30. The year is denoted by the ending year.

Groundwater Basin Conditions

The most recent studies of the Paso Robles Groundwater Basin, the Phase I and Phase II Reports, were sponsored by the District and supported by local water purveyors and users including the City of Paso Robles. The Phase I Report included basic data compilation and review, definition of the basin and subbasin/areas, aquifer characterization, assessment of water quality conditions, and a water balance study. The Phase II report presents the results of the development, calibration, and application of a numerical groundwater flow model of the Paso Robles Groundwater Basin. This model was applied to a baseline scenario, a buildout scenario with the Nacimiento Water Project, and a buildout scenario without the Nacimiento Water Project. Buildout was defined to include not only municipal buildout but also the maximum reasonable agricultural water demand.

The Phase I Report provides a comprehensive baseline assessment of basin conditions for its study period of July 1980 through June 1997. This study period was selected as representative of then-current land and water use conditions, with overall near-average rainfall. This first Basin Update provides information for the period from June 1997 through September 2006 on groundwater basin conditions, including rainfall, groundwater levels and storage, and groundwater management planning. Groundwater quality information from Phase I is not updated in this Basin Update as data were not readily available. Local beneficial uses of groundwater depend not only on an adequate supply, but also groundwater of high quality. Therefore, water quality trend assessment is recommended for subsequent Basin Updates, with a focus on TDS, nitrate, and chloride.

Precipitation

Viewed from a watershed perspective, precipitation is the ultimate source of recharge to the groundwater basin, directly providing deep percolation and indirectly providing other sources of inflow such as streambed percolation and subsurface inflow. Percolation of precipitation alone accounts for 44 percent of total inflow to the groundwater basin (Fugro, et al., 2002). The remainder comes from streambed percolation (43%), subsurface inflow (8%), wastewater percolation (3%), and irrigation return flow (2%).

Background. The Paso Robles Groundwater Basin has a semi-arid, Mediterranean climate characterized by hot sunny summers and cool winters. Most precipitation occurs in the winter, between November and April. Average annual rainfall over the basin varies from 20 inches in the west to 10 inches in the east.

Geographic Distribution. The geographic distribution of rainfall is important to understanding where recharge occurs to the groundwater basin and is basic to developing a monitoring program. Several rainfall distribution maps have been prepared by others that encompass the upper Salinas River watershed and Paso Robles Groundwater Basin including maps published by the United States Geological Survey (USGS) (Rantz,1969), San Luis Obispo County (1972), and Oregon State University (PRISM, 2007). The two most recent maps are examined here.

Figure 2 shows the distribution across the basin of rainfall with isohyets (lines of equal precipitation) based on data compiled by the County between 1937 and 1967 (San Luis Obispo County, 1972). **Figure 3** is a comparable map, showing isohyets developed by Parameter-elevation Regressions on Independent Slopes Model (PRISM, 2007). PRISM maps are produced by Oregon State University using point measurements from 1961-1990 (e.g., precipitation) and a digital elevation model to generate digital maps available as GIS (Geographic Information Systems). The PRISM maps have been prepared for the entire United States and consequently, the isohyets on **Figure 3** extend beyond the San Luis Obispo County lines. The digital elevation model is used to estimate rainfall amounts and patterns where no climate station exists, for example, on mountain tops. A similar process—relying on professional judgment and without the use of computers—was used in preparing the County map.

A comparison of the two isohyetal maps reveals differences, particularly in the highland areas west and southwest of the basin. Specifically, the County map indicates the highest rainfall amounts in the highlands west of Paso Robles (up to 45 inches per year) while the PRISM map indicates highest rainfall amounts in the highlands south of Atascadero (up to 34 inches). Within the basin, the PRISM map indicates average rainfall in the Creston area six inches greater than the County map. In Shandon, the average rainfall is almost 4 inches greater.

Further review of the distribution of rainfall is important to better understanding recharge, particularly along the perimeter of the basin where rainfall is relatively high. Additional investigation could involve analysis of the rainfall station data used in preparing both the County and PRISM maps, comparison of the respective amounts of rainfall on a watershed basis, and examination of measured stream flow relative to rainfall. The different rainfall maps also should be reviewed with respect to the groundwater flow model developed in the Phase II Report, which averaged data from seven rainfall stations.

Historical Rainfall. Figure 4 illustrates annual rainfall at a representative gage over the past 50 years [Salinas River at Paso Robles Station]. The location of the rainfall gage is shown on **Figure 1**. Average annual rainfall at this gage is 14.78 inches with a median of 13.21 inches for the 1957 through 2007 water years.

As seen on **Figure 4**, annual rainfall is subject to wide variations. Between 1957 and 2006, the lowest annual rainfall was 7.22 inches (1990 water year) and the greatest annual rainfall was 31.50 inches (1969 water year). Water year 2007 was one of the driest on record with only 5.48 inches between October 2006 through September 2007.

The average rainfall at the same gage for the 1981 to 1997 period of study defined in the Phase I Report was 15.00 inches, similar to the long term average of 14.78 inches. This report focuses on the 1997 through 2006 water years, which experienced a slightly higher annual average rainfall (15.85 inches) than the past 50 year annual average (14.78 inches). Median values for the 1981 to 1997 and 1997 to 2006 water years were 13.90 inches and 13.94 inches, respectively, indicating that wet years have skewed the annual average slightly higher. In light of the uneven distribution rainfall over time, it is important to plan for long, dry periods and short, wet periods.

Basin Areas

The Phase I Report defined one subbasin (Atascadero) and seven subareas within the Paso Robles Groundwater Basin (Bradley, Creston, Estrella, North Gabilan, San Juan, Shandon, and South Gabilan). The Atascadero Subbasin lies west of the Rinconada fault, which has been identified as a barrier to groundwater flow. Therefore, the Atascadero Subbasin is considered to be hydrologically distinct. The seven subareas are not identified as formal boundaries, but were informally established in Phase I as a practical approach to subdivide the large basin for discussion purposes.

Groundwater Levels

This first Basin Update describes groundwater conditions at the close of the Phase I base period in spring 1997 through spring 2006. **Figure 5** shows groundwater elevations in spring 1997. These water levels were contoured with data from 119 wells. The data was obtained from the District database as well as on-line records from the USGS and California Department of Water Resources (DWR). In areas where there was little information, contours follow the Phase I Report spring 1997 map (Fugro, 2002). Also, adjustments were made to more closely match the Phase I Report in two locations: along San Juan Creek southwest of Shandon and along the Estrella River near the community of Estrella.

Figure 6 shows groundwater elevations in spring 2006 based on 115 wells. As in the 1997 map, the District data were augmented for the 2006 map with data from the USGS and DWR.

Overall the direction and pattern of groundwater flow is unchanged from 1997 to 2006. Groundwater levels in the basin ranged between above 1500 to below 600 feet above mean sea level (msl). Groundwater flows from the southeast in the San Juan, Creston, and Shandon subareas to the northwest into the Estrella subarea. Groundwater flows from the northeast in the South Gabilan and North Gabilan subareas to the southwest into the Estrella and Bradley subareas, respectively. Along the Salinas River near San Miguel, groundwater flow northwesterly from the Estrella into the Bradley subarea.

In order to evaluate trends in groundwater levels, over 200 hydrographs from the Paso Robles Groundwater Basin were examined. Ten hydrographs, described below, were selected to characterize trends in the Atascadero Subbasin and seven subareas of the Paso Robles Groundwater Basin.

Atascadero. In the eastern portion of the subbasin, east of Templeton, the Phase I Report found that deeper wells were stable or gradually increasing as of 1997. Well 027/S012E-33F001 (**Figure 7**) was increasing up until 1999, but has been stable since that time. Well 027/S012E-22M001 had an increasing trend from 1994 through 1998, but groundwater levels have dropped over 30 feet since that time (**Figure 7**). Comparison of groundwater levels in **Figure 7** with the annual rainfall amounts in **Figure 4** reveals the influence of varying rainfall; for example, the drought water years of 1987 through 1992 are shown on the hydrographs by decreasing groundwater levels.

Bradley. No current water level data from the wells identified in Phase I are available for this subarea. Three existing wells have been proposed by the District for addition to the monitoring program. The Phase I Report indicated that at the confluence of the Nacimiento and San Antonio rivers, water levels in the alluvium are stable due to the influence of stream recharge. Likewise, deeper Paso Robles Formation wells were reportedly stable based on limited available data. In the Hames Valley, the irrigation pumpage resulted in significant water level decreases in the mid 1970's. According to the Phase I Report, this trend had changed and as of 1995, groundwater levels had stabilized.

Creston. Groundwater levels in the northern part of the subarea decreased from the 1960's through the 1990's. The Phase I Report noted that water levels increased over 50 feet during their hydrologic base period. Well 27S/13E27P002 (**Figure 8**) illustrates this trend. Since 2000, however, water levels in this well have generally decreased. In the central part of the basin, along Highway 41, well 28S/13E-04K001 (**Figure 8**) was increasing from the 1950's up through 1988. During subsequent years of below average rainfall, water levels decreased. Water levels recovered from 1993 – 1998, when rainfall was at or well above average. Since that time, water levels have decreased to levels below those measured in the late 1950's.

Estrella. The Phase I Report documented overall groundwater level decreases in the area along Highway 46 east of Paso Robles and concluded that the decreases were the result of pumping from low permeability sediments and the absence of a nearby recharge source. This decreasing trend continues in well 026S/013E-34B001 (**Figure 9**). In the vicinity of Estrella, water levels were increasing but are now decreasing as seen in well 26S/13E-5D001(**Figure 9**).

North and South Gabilan. Well 25S/13E-11E001 is described in the Phase I Report as located on the Gabilan Mesa, near Hog Canyon. As shown in **Figure 10**, water levels increased from the 1950's through the early 1980's. Since that time, water levels have been relatively stable, although fluctuating with wet and dry periods. There are no additional water level data available for this subarea; an additional well is proposed for the monitoring program.

San Juan. Monitoring indicated both rising and falling groundwater levels in the San Juan subarea during the Phase I Report study period. The hydrograph for well 27S/14E-

25A001 (**Figure 11**) steadily decreased between 1959 and 1996. This was attributed to localized agricultural pumping. Beginning in 1997, water levels briefly recovered, indicating that significant stream recharge occurs in Shedd Creek. Since 2005, levels are once again decreasing. The hydrograph for well 28S/16E-15D001 (**Figure 11**) is located along the southern reach of San Juan Creek. Water levels gradually decreased between 1977 and 1995. Since that time water levels have decreased over 50 feet.

Shandon. The hydrograph for well 26S/15E-18J001 (bottom of **Figure 11**) shows water levels with significant seasonal fluctuations. In addition, groundwater levels in this well have followed rainfall over the past 30 years, with elevations dropping below 1,000 feet msl during years of below average rainfall. Water levels appear to have decreased beginning in 2003, suggesting increased local pumping in the area.

Change in Storage

For the Phase I Report, change in groundwater storage was determined in two ways. The first method is termed the *change in storage* method. This method used maps of groundwater levels (in GIS) to calculate the volume of saturated materials between the groundwater level contour surfaces and the base of the fresh groundwater for each year. Specific yield estimates for the Atascadero Subbasin and other subareas were combined with these volumes to identify the change in groundwater volume. **Table 1** (at the end of this section) shows the specific yield values, which range from 7 to 11%. The change in storage was computed as the difference in groundwater volume from one year to the next. The second method used in the Phase I Reports was a *water balance inventory* of all the inflow and outflow components; the change in storage is equal to the difference between inflow and outflow. Using two such methods allows cross-checking; in addition, the availability of pumping data supports interpretation of groundwater level and storage changes.

This Basin Update used a *change in storage* method similar to that of the Phase I Report. Specifically, spring groundwater measurements were used to document the groundwater level changes from 1997 to 2006. For each subarea, change in storage was calculated by multiplying the area, the average change in groundwater elevation from 1997 to 2006, and an average specific yield value from the Phase I Report. The average groundwater level change was determined digitally in GIS by computing the difference between the raster surfaces representing the groundwater elevation in the Paso Robles Groundwater Basin for spring 1997 and spring 2006.

Figure 12 illustrates the groundwater storage changes from Spring 1997 – Spring 2006 across the basin with warm colors indicating groundwater level decreases and cool colors indicating groundwater level increases. No color indicates less than one foot of change; note that most of the basin indicates no change. In some areas of minimal groundwater use (for example, in parts of North Gabilan) this may be reasonable. However, the lack of apparent change in other areas may reflect an absence of monitored wells. For example, review of **Figure 12** indicates extensive areas where long-term groundwater level monitoring is lacking, including areas along streams and the perimeter of the basin where recharge from rainfall and subsurface inflow may be taking place but is not tracked. The monitoring network is, by necessity, based largely on active production wells and is likely skewed toward documenting areas of groundwater production and decreases in storage.

As shown in **Figure 12**, areas of groundwater level decrease occur in the Estrella, Creston, and San Juan subareas. Other small areas of decrease also are indicated, often centered on only one or two monitored wells. Groundwater level increases are shown in the Atascadero Subbasin, northern Estrella subarea, and Shandon and San Juan subareas.

The storage calculations (**Table 1**) indicate that from 1997 to 2006, groundwater storage in the basin decreased by -29,767 AF, equivalent to an average annual storage decrease of -3,307 acre feet per year (AFY). Decreases in storage were concentrated in the Estrella and Creston subareas, while storage increased in the Atascadero subbasin and Shandon subarea. By way of comparison, the Phase I report calculated an average storage change from 1981 to 1997 of -2,700 AFY using the *water balance inventory* and 700 AFY using the *change in storage* method.

Subbasin/Area	Area		Specific	Ave WL Change	Δ Storage
	acres	mi^2	Yield	ft	AF
North Gabilan	52,725	82.4	0.09	0.000	0
Bradley	56,570	88.4	0.07	0.000	0
South Gabilan	44,492	69.5	0.09	-0.180	-721
Estrella	83,595	130.6	0.08	-4.506	-30,133
Shandon	74,665	116.7	0.09	0.984	6,615
Creston	57,587	90.0	0.09	-2.106	-10,914
Atascadero	14,708	23.0	0.11	4.724	7,642
San Juan	84,025	131.3	0.08	-0.336	-2,256
Total	**468,368**	**732**			**-29,767**

Table 1. Specific Yield and Change in Storage (Spring 1997 to Spring 2006)[1]

Groundwater Pumping and Comprehensive Water Balance

Groundwater levels and storage reveal the net effect of changes in the water balance, including changes in inflow (recharge) and outflow (discharge). Changes in recharge are strongly influenced by fluctuations in rainfall, which are accounted for in the evaluation of groundwater levels and storage in this Basin Update. However, changes in discharge, particularly groundwater pumping and use, were not part of this first Basin Update. Groundwater pumping in the basin should be updated, including groundwater pumping by agriculture, municipalities, rural users, and small community water systems.

[1] Average water level changes are shown to a fraction of a foot and change in storage values are shown to the nearest acre-foot (AF). As a result, numbers may appear to be accurate to four or five digits, which is not the case. Values for data that are measured directly, such as water levels in a well, are probably accurate to two or possibly three significant digits. Values for data that are estimated, such as groundwater storage change, are probably accurate to only one or two significant digits. All digits are retained in the text and Table 1 for documentation and to preserve correct column totals.

Table 2 highlights groundwater uses in the Basin as of 1997 (Fugro, et al., 2002). As indicated, agriculture accounted for about two-thirds of groundwater use with the remainder used for urban, rural and small community systems.

Groundwater Use	**Percent of Total**
Agriculture	68 %
Urban	18%
Rural	12%
Small Community Systems	2%

Table 2. Groundwater Uses in the Paso Robles Groundwater Basin, 1997

The recommended update of pumping would reveal changes in the relative proportions of groundwater uses and would allow assessment of the current amount of pumping relative to the buildout scenarios presented in the Phase II Report. Pumping should be updated next year, using land use mapping recently completed by the District. Also, the District is currently developing strategies to evaluate groundwater pumping for the Water Master Plan Update in 2010. An update as of 2006 would provide useful interim information and should be coordinated for a consistent methodology.

Subsequently, the entire water balance should be updated within the next five years. The water balance would be updated using a comprehensive methodology similar to that of the Phase I Report and up-to-date information (for example, recent land use mapping and the latest rainfall distribution maps). Such a water balance would account for *all* inflows (e.g., deep rainfall percolation, streamflow percolation, subsurface inflow, wastewater discharge, and return flows) and *all* outflows (pumping, subsurface outflow, and phreatophyte use). It would also include computation of groundwater storage as the difference between inflow and outflow, providing an independent check on the evaluation of groundwater storage using groundwater level maps.

Scheduling the water balance within the next five years would provide the opportunity to select an optimal study period. The 1981 to 1997 study period for the Phase I Report was selected carefully to represent long-term climatic conditions and to provide the basis for an accurate water balance study, including evaluation of groundwater storage. A selected base period for a water balance study optimally begins and ends after one or more dry years. This minimizes problems accounting for recharge water that is still moving through the unsaturated zone and is not yet represented in a water level rise. In contrast, the period for this Basin Update (water years 1997 through 2006) is not ideal for evaluating storage change. Specifically, the 1997-2006 period ends after two wet years. Accordingly, the estimated storage change probably does not fully account for recharge at the end of the period.

In addition, scheduling of the water balance analysis within the next five years would allow incorporation of the effects of the delivery of Nacimiento water.

Groundwater Management Activities

The local groundwater users—including the District, City, PRIOR and other stakeholders—have taken the initiative to better monitor and manage water resources in the Paso Robles Groundwater Basin. Recent projects and programs relevant to local groundwater management include the ongoing groundwater level monitoring program, Nacimiento Project, Water Banking Study, City of Paso Robles Water Resources Plan Integration, USGS GAMA program, and the upcoming County Resource Capacity Study, Conservation Element, and Water Master Plan Update.

Groundwater Level Monitoring Program. The District has monitored groundwater levels in the Paso Robles Groundwater Basin for 40 years; this effort has provided much of the data for this Basin Update. Currently there are nearly 145 wells in the network, 99 monitored by the District and 55 monitored locally and reported to the District; the City of Paso Robles is an active participant in the program. In 2006, an evaluation of the monitoring program (Cleath & Associates, 2006) provided specific recommendations to improve the program's efficiency and effectiveness. These recommendations addressed data management and identified specific wells for addition to or deletion from the program. Other wells were identified for backup status. Most recently, the District has reviewed the wells to be added to the program, identifying well owners in order to request cooperation with the monitoring program. The PRIOR landowners group is actively participating in the process of contacting well owners. The District, City, and PRIOR landowners group should continue these cooperative efforts to improve the efficiency and effectiveness of local monitoring programs, focusing on addition of existing wells to the program and data management.

Nacimiento Project. The District has a 17,500 AFY entitlement from Lake Nacimiento based on a 1959 agreement with Monterey County. The Nacimiento Water Project involves construction of a water intake at Lake Nacimiento, water storage tanks, pump stations and a 49-mile water transmission pipeline to provide 15,750 AFY of water supply to water providers in both the north and south County areas. Major water purveyors in the north County to receive Lake Nacimiento water include the City of Paso Robles (4,000 AFY) and Atascadero Mutual Water Company (3,000 AFY). Construction of the project is underway. Provision of Lake Nacimiento water to the municipal water purveyors—slated for 2010—will reduce municipal dependence on groundwater basin supplies. Lake Nacimiento water is high quality relative to groundwater and would provide better water quality to municipal customers and improve wastewater quality. This is important because municipal wastewater is recharged to the groundwater basin and improved quality would yield long-term water quality benefits to the groundwater basin. In addition, Lake Nacimiento supply is independent of local groundwater supplies and the Lake Nacimiento contracts provide the District and participating water purveyors with high priority in droughts.

City of Paso Robles Water Resources Plan Integration. Over the past three years, the City of Paso Robles has engaged in intensive water and wastewater resource planning, including preparation of a series of water resource reports, culminating in the *Water*

Resources Plan Integration (T.J. Cross, February 2007) adopted by the City in May 2007. Recognizing the challenges of rising water demand, limited groundwater supply, salt loading to wastewater, and increasingly restrictive wastewater treatment and disposal regulations, the *Water Resources Plan Integration* and associated *Capital Improvement Program* provides a sequence of management actions, including acceptance and treatment of Nacimiento Project water, initiation of water conservation and a wastewater source control programs, continued studies for water recycling, installation of recycled water delivery pipelines, design and construction of an upgraded wastewater treatment plant and recycled water delivery system, and updating of the Potable Water Distribution Master Plan. These actions are scheduled over the period 2008 to 2017.

District Water Banking Feasibility Study. The Water Banking Feasibility Study for the Paso Robles Groundwater Basin, initiated in October 2006, is being led by the District as part of the District's Integrated Regional Water Management Plan. The goal of the Feasibility Study is to determine the water recharge and banking potential in the Paso Robles Basin, recognizing that the Coastal Branch of the State Water Project (SWP) crosses the basin upon entering the County and that the County has an unused allocation of SWP water. At time of writing (November 2007), the Feasibility Study is approaching completion, with the draft report released in late October and the final report scheduled for completion in December. Thus far the Study has evaluated the availability of surface water from the SWP, defined raw water and treated water options, identified recharge methods, and established evaluation criteria. Three water banking alternatives have been identified and evaluated for hydrogeologic feasibility using the Phase II Report groundwater flow model. The preliminary findings of this analysis indicate that the Shell/Camatta/Lower San Juan alternative and the Salinas River/Hwy 46 alternative appear to have adequate groundwater storage capacity and recharge/recovery capacity to support a water banking project, but the Creston alternative does not. Additional engineering analysis, including feasibility-level design and layout and cost estimates, will be provided in the draft report.

County Resource Capacity Study, Conservation Element, and County-wide Master Water Plan. In its June 5, 2007 meeting, the San Luis Obispo County Board of Supervisors recommended a Level of Severity 1 designation for the Paso Robles Groundwater Basin. This designation was made with reference to the 1980-1997 groundwater level decreases in the Estrella subarea and to increases in extent of overlying land uses, including ranchettes, golf courses, and vineyards. As a result of this designation, County staff was directed to prepare a Resource Capacity Study that will focus on the area of groundwater level decrease; the next step is consideration by the Board in February 2008 of a Resource Capacity Study work program. Relevant staff activities to date have included compilation of well and land use data, and review of potential new wells for the District monitoring program. This Basin Update and the Water Banking Feasibility Study will be considered in the Resource Capacity Study.

The County-wide Master Water Plan update, slated for 2009, will update the 1998 document. Incorporating recent documents such as urban water management plans, general plan updates, and water/wastewater master plans, the County-wide update will include current and future water use projections for water planning areas.

The Conservation Element of the County's General Plan is being updated to improve, consolidate and revise the existing policies and programs including those related to water resources. "Cutting edge" policies will be developed related to green building, watershed protection, water conservation, biological resource protection, and conservation-oriented land use patterns such as smart growth that may have an impact on future groundwater basin management efforts.

GAMA Program. In 2001, the California Legislature enacted the Ground-Water Monitoring Act. The Act requires the State Water Board to monitor California's groundwater that is used for municipal supply. In response to this mandate, the USGS will complete a Groundwater Ambient Monitoring and Assessment Program (GAMA) by 2010 in over 100 priority groundwater basins in California to identify the status and trends of groundwater quality. In 2005 the USGS addressed the Paso Robles Groundwater Basin and sampled eleven randomly-selected wells located along the major rivers valleys (USGS, 2005). The GAMA study area in the Paso Robles Groundwater Basin and the locations of sampled wells are shown in **Figure 13**. While trace amounts of pesticides, arsenic, and boron were reported, no constituents of concern were detected above regulatory thresholds.

Conclusions

This first Basin Update provides an overview of the current condition of the Paso Robles Groundwater Basin, building on the *Paso Robles Groundwater Basin Study* and *Paso Robles Groundwater Basin Numerical Model*. The study period for these reports was 1980 through 1997; this report provides an update on rainfall and groundwater levels and storage from 1997 to 2006. Major conclusions include the following:

A comparison of existing historical County and more recent PRISM isohyetal maps reveals differences, particularly in the highland areas west and southwest of the basin. Further review of the geographic distribution of rainfall within the basin is important to better understanding of recharge.

Average annual rainfall for the 1997 through 2006 water years was 15.85 inches, slightly higher than the average rainfall over the 1980 – 1997 study period for the Paso Robles Groundwater Basin Study was (15.00 inches) and the long term average (14.78 inches). Median values for the 1981 to 1997 and 1997 to 2006 water years were 13.90 inches and 13.94 inches, respectively, indicating that a few wet years have skewed the annual average slightly higher. Water year 2007 was one of the driest on record with only 5.3 inches of rainfall. In light of the uneven distribution rainfall over time, it is important to plan for long, dry periods and short, wet periods.

The direction and pattern of regional groundwater flow within the basin were basically unchanged from 1997 to 2006.

Groundwater level hydrographs show declines in portions of the Estrella and San Juan subareas have persisted from 1981 to 2006.

Change in groundwater storage for the period 1997 to 2006 was estimated to be a net storage decrease of -29,767 acre-feet, or -3,307 acre feet per year. Net decreases in storage were concentrated in the Estrella and Creston subareas, while storage increased in the Atascadero subbasin and Shandon subarea. Updating groundwater pumping would help explain local groundwater level changes and would also allow assessment of the current amount of pumping relative to buildout.

Both the study period for the Basin Update and the distribution of monitoring wells influence the storage calculation. Recharge from rainfall and subsurface inflow may not be fully represented, particularly at the close of the 1997-2006 period. As a result, recharge is likely underestimated and groundwater storage decrease is overestimated.

The District, City of Paso Robles, and other local stakeholders have undertaken projects and programs to improve local groundwater management include the ongoing groundwater level monitoring program, Nacimiento Project, Water Banking Study, City of Paso Robles Water Resources Plan Integration, USGS GAMA program, and the upcoming County Resource Capacity Study, Conservation Element and Water Master Plan Update.

Recommendations

The Paso Robles Groundwater Basin Agreement among the District, City of Paso Robles, and PRIOR provides for a committee, informally termed the Paso Robles Groundwater Basin Committee, to develop a plan or program ("Plan") for monitoring and evaluating groundwater conditions in the Basin. The following recommendations support further development of the Plan:

Subsequent Basin Updates should cover a water year to provide timely updates to the District, City, PRIOR and the public regarding the response of the basin to annual changes in rainfall and pumping.

An update of groundwater quality trends should be completed in the next Basin Update.

Additional investigation of the geographic distribution of rainfall is recommended to better understand recharge.

The District, City, and PRIOR landowners group should continue cooperative efforts to improve the efficiency and effectiveness of local monitoring programs, focusing on addition of existing wells to the program and data management.

Groundwater pumping in the basin should be updated next year, including the pumping by agriculture, municipalities, rural and community water systems. The update should be coordinated with the District's Water Master Plan Update.

The entire water balance should be updated within five years using a comprehensive methodology similar to that of the Phase I Report. Such a schedule would allow the water balance to incorporate effects of the delivery of Nacimiento water.

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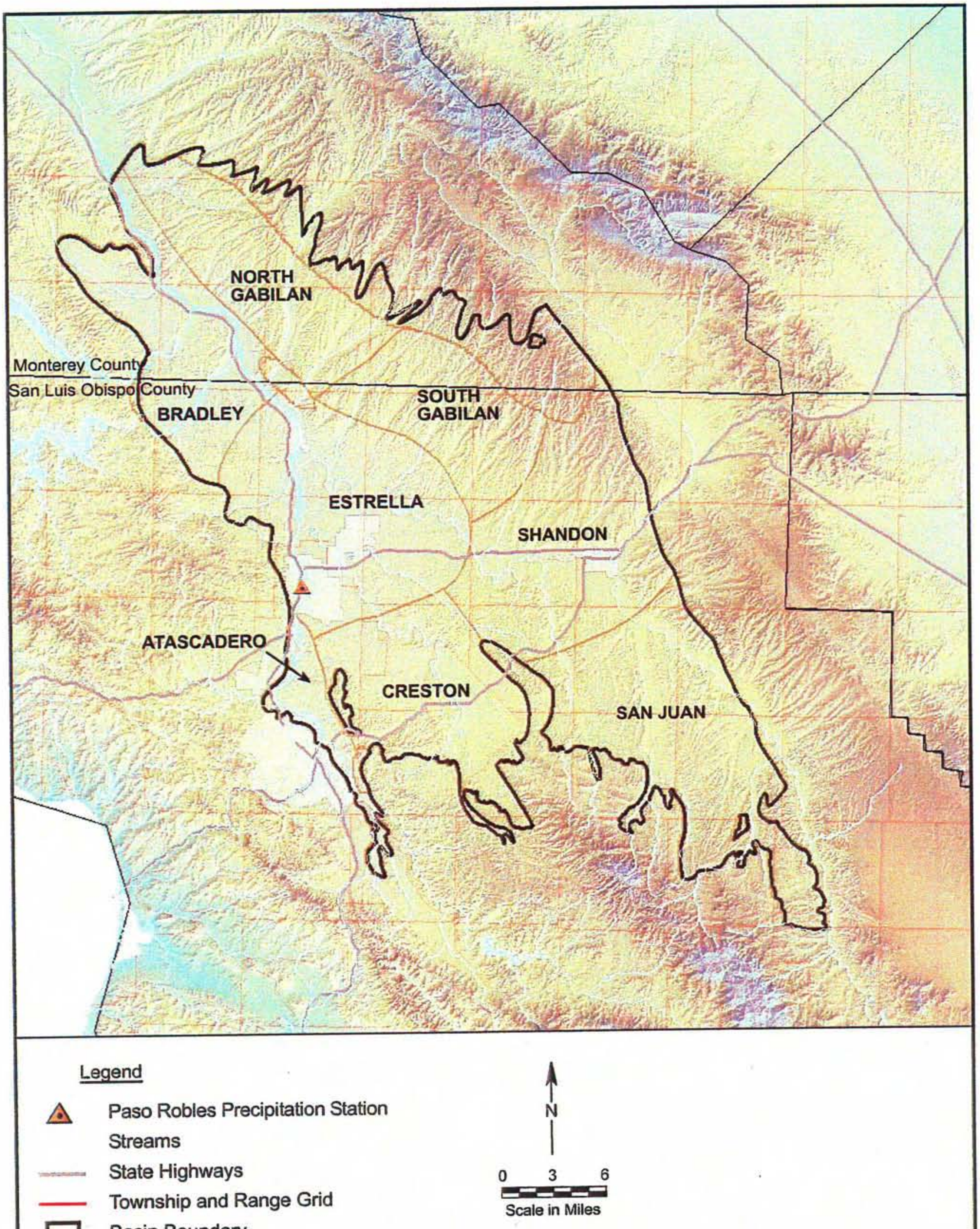
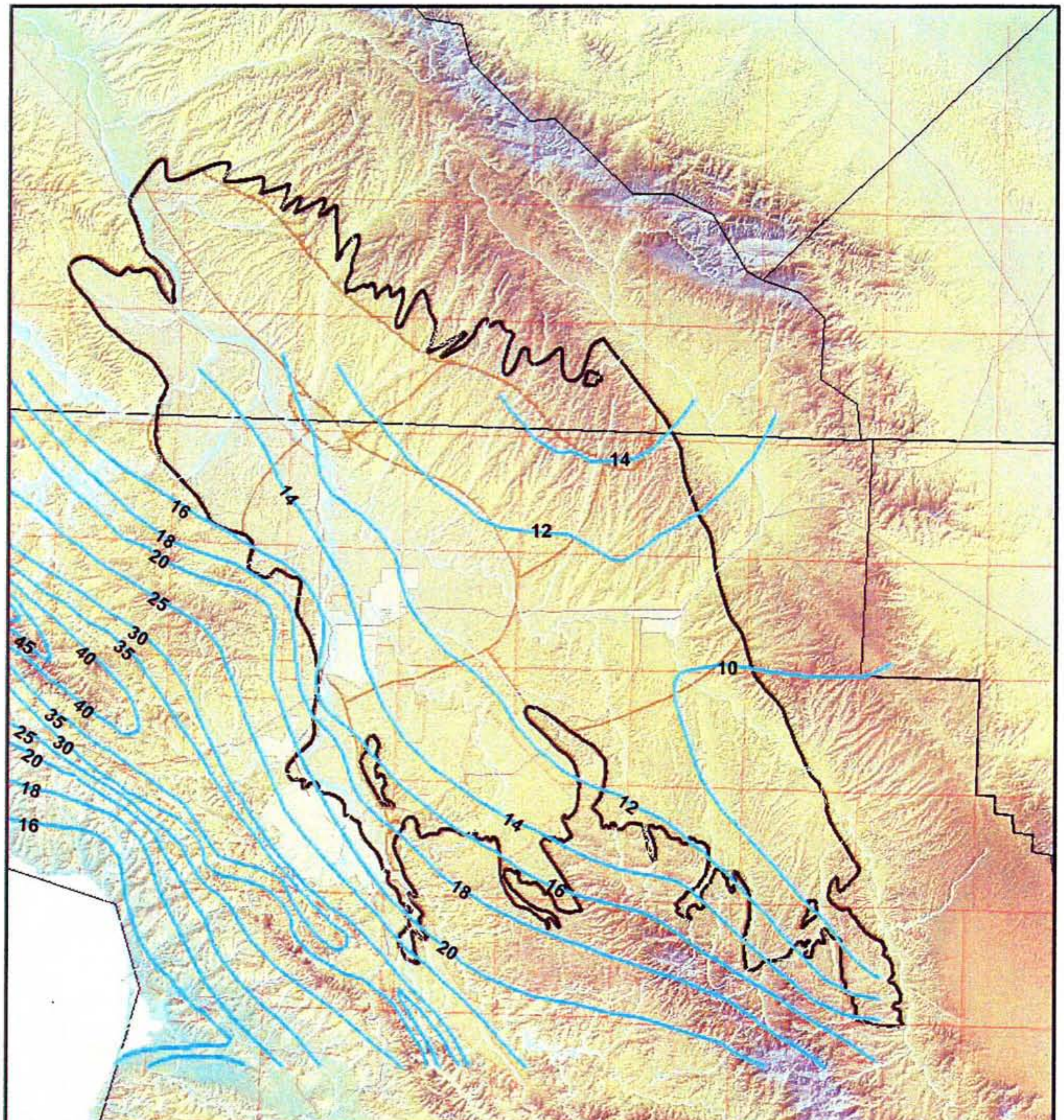


November 2007

TODD ENGINEERS
Emeryville, California

Figure 1
Paso Robles Groundwater Basin



Source: Digitized from 1972 San Luis Obispo County Map

Legend

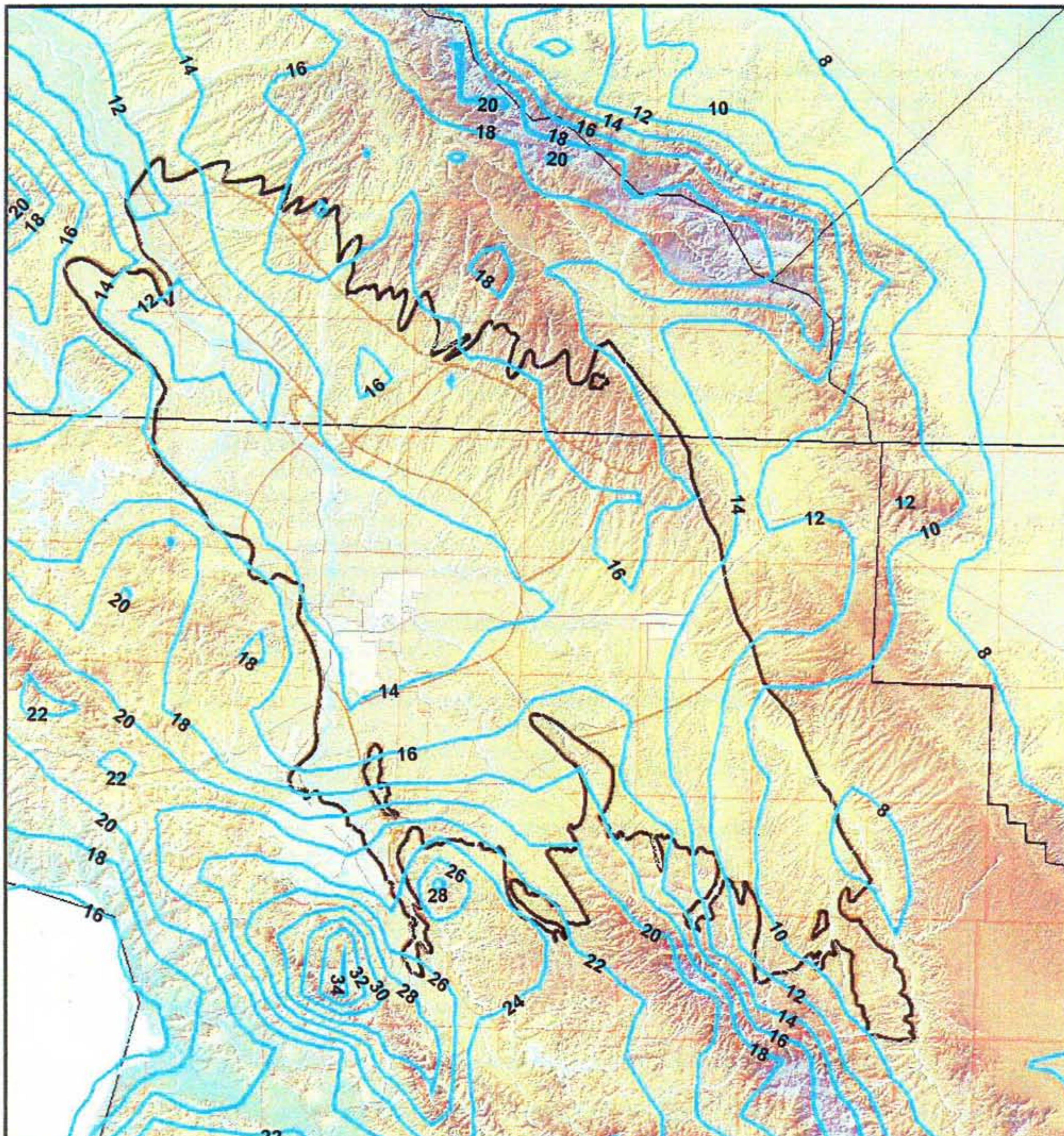
- 10 — Average Annual Rainfall, Inches
- Streams
- State Highways
- Township and Range Grid
- Basin Boundary
- Cities/Communities
- Subareas
- County Lines

N

0 3 6

Scale in Miles

November 2007	**Figure 2** **County Map of Average Annual Rainfall 1937 - 1967**
TODD ENGINEERS Emeryville, California	



Source: PRISM, 2007

Legend

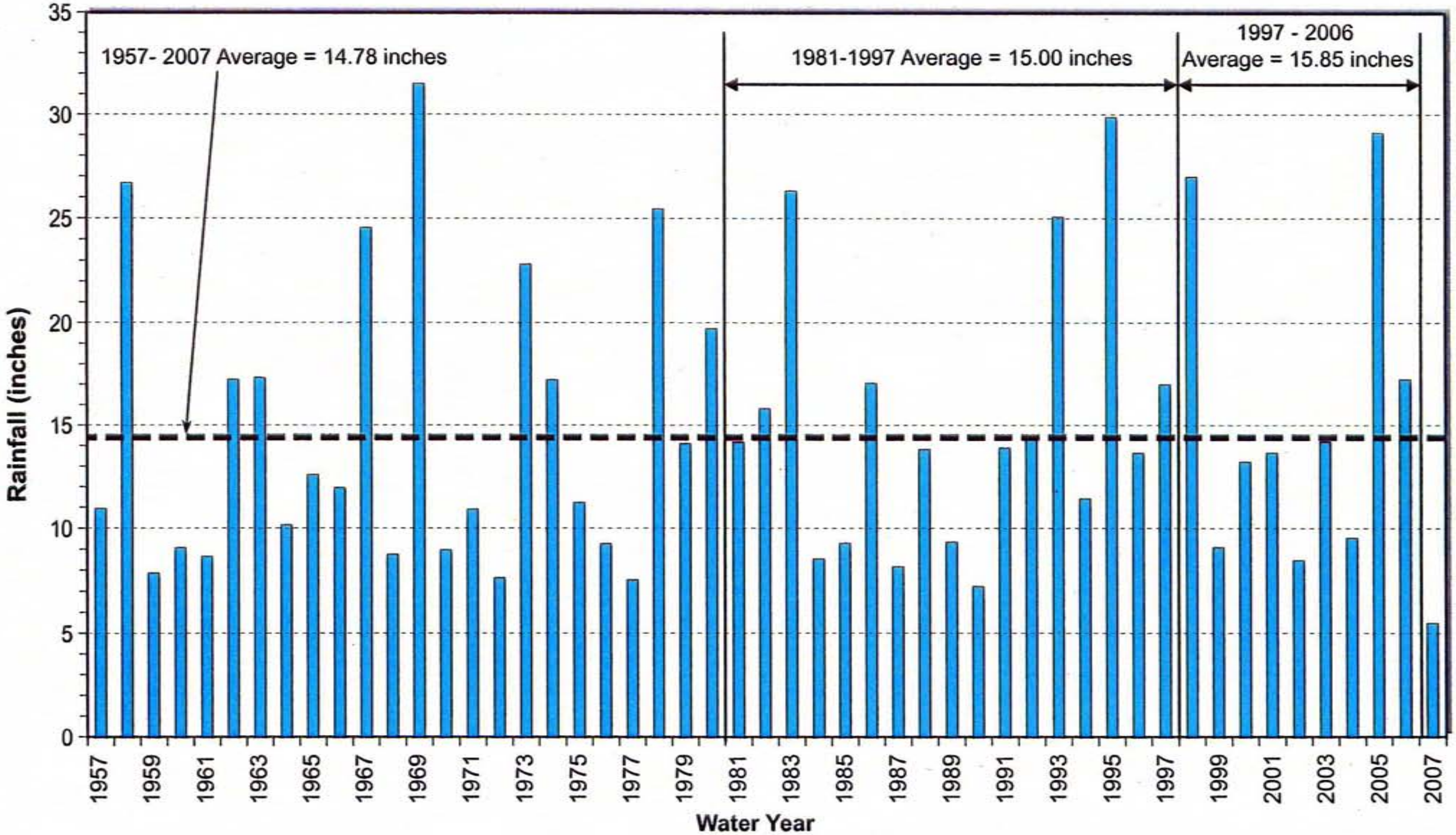
- 10 — Average Annual Rainfall, Inches
- Streams
- State Highways
- Township and Range Grid
- Basin Boundary
- Cities/Communities
- Subareas
- County Line

N

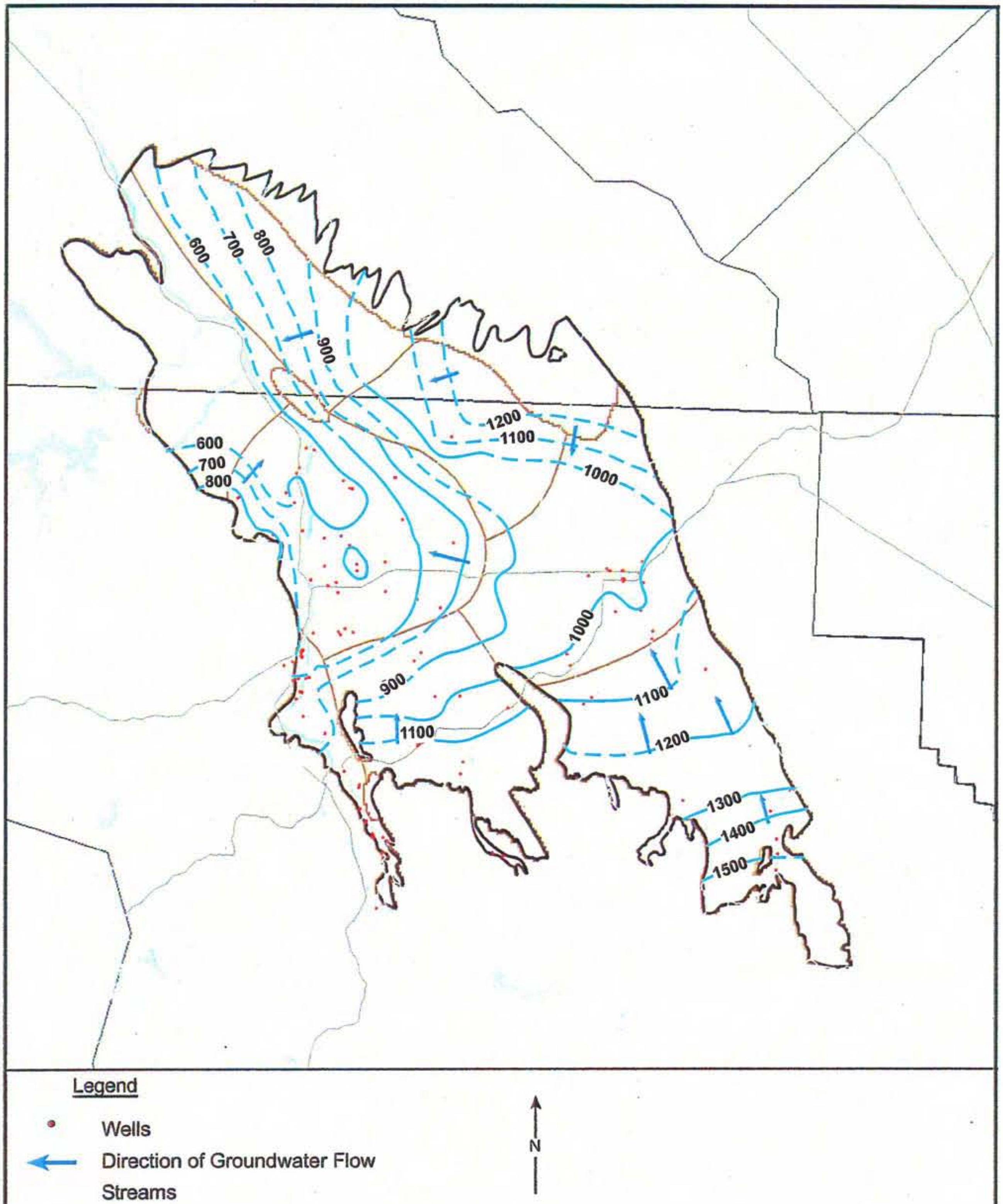
0 3 6

Scale in Miles

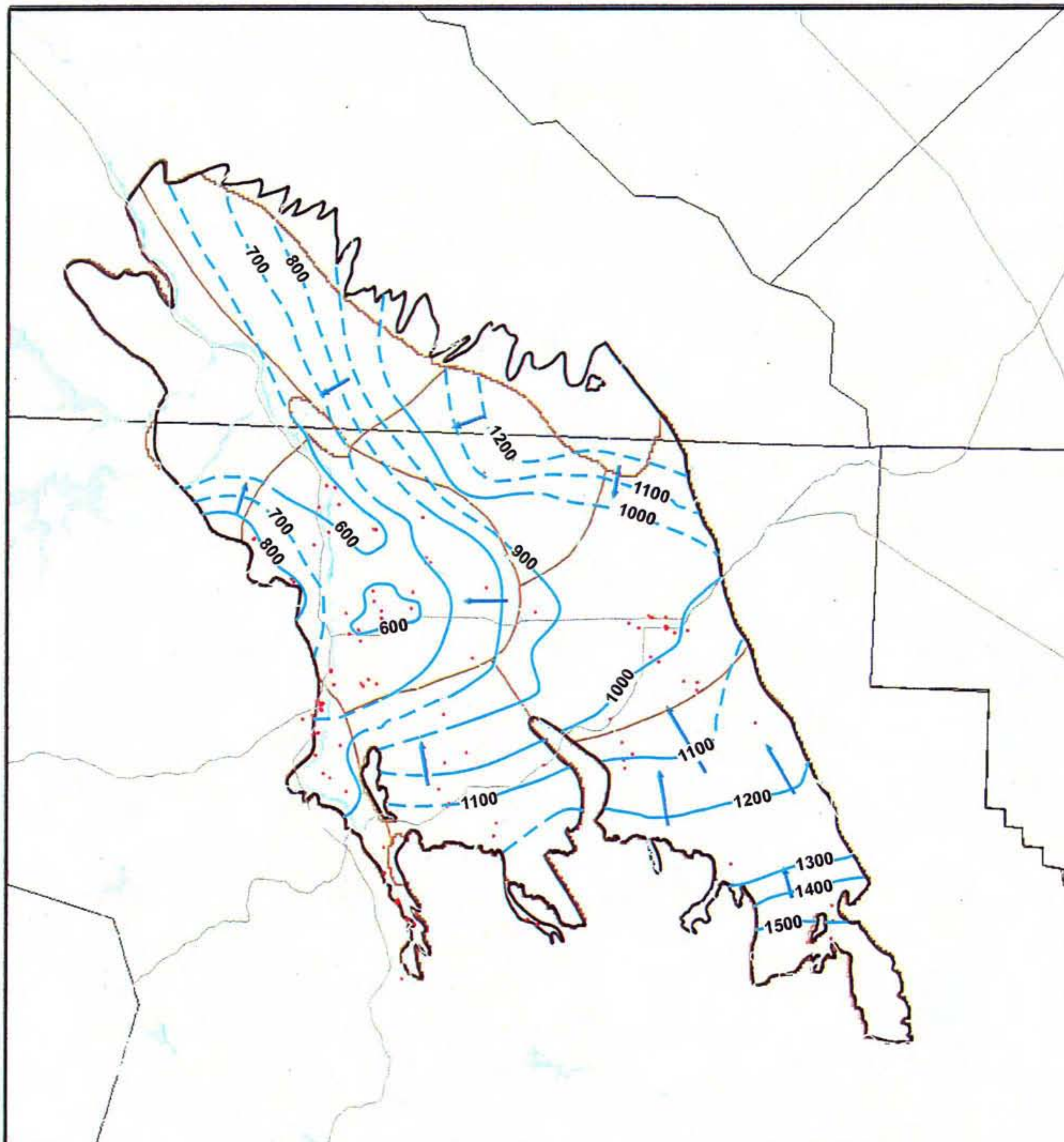
November 2007	Figure 3 **PRISM Map of Average Annual Rainfall, 1961-1990**
TODD ENGINEERS Emeryville, California	



November 2007	**Figure 4**
TODD ENGINEERS Emeryville, California	**Annual Rainfall at Paso Robles, Water Years 1957 - 2007**



November 2007	**Figure 5**
TODD ENGINEERS Emeryville, California	**Groundwater Elevation Map (Spring 1997)**



Legend

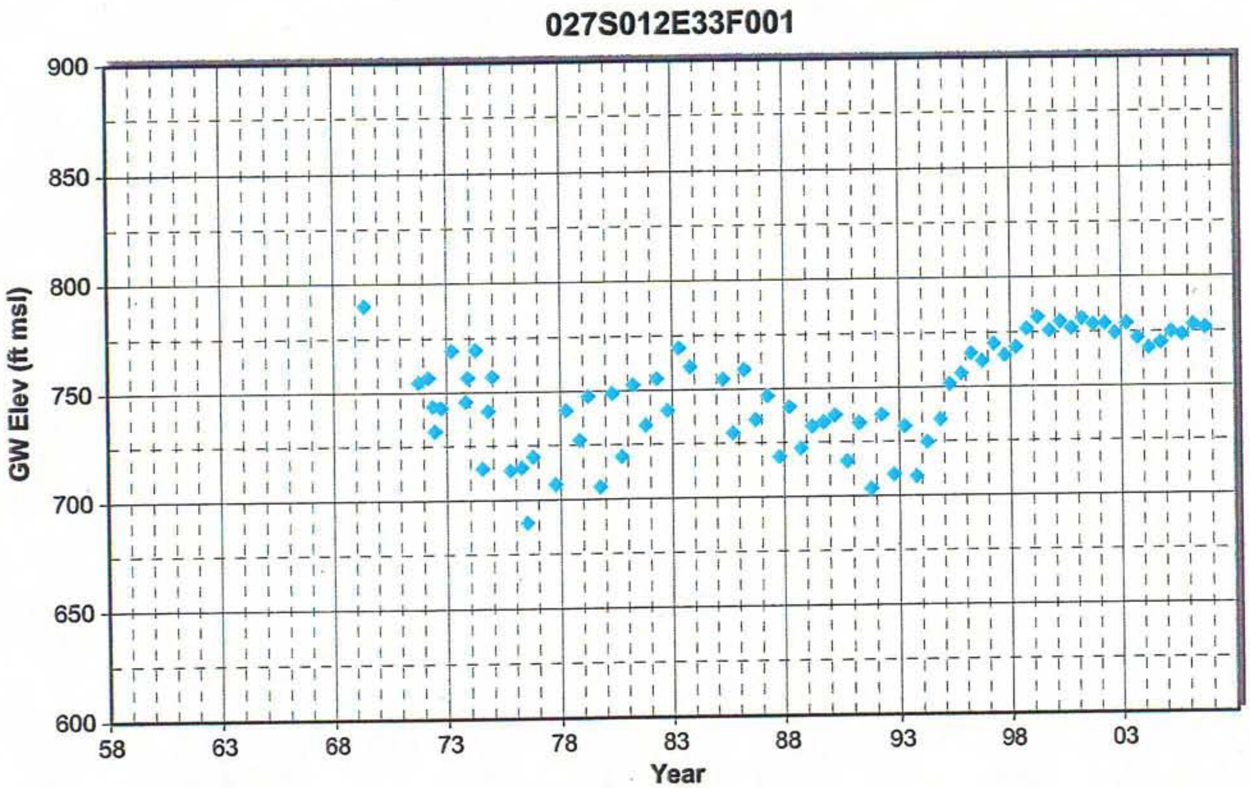
- Wells
- Direction of Groundwater Flow
- Streams
- State Highways
- Spring 2006 Groundwater Elevation (feet MSL)
- Basin Boundary
- Cities/Communities
- Subareas
- Counties

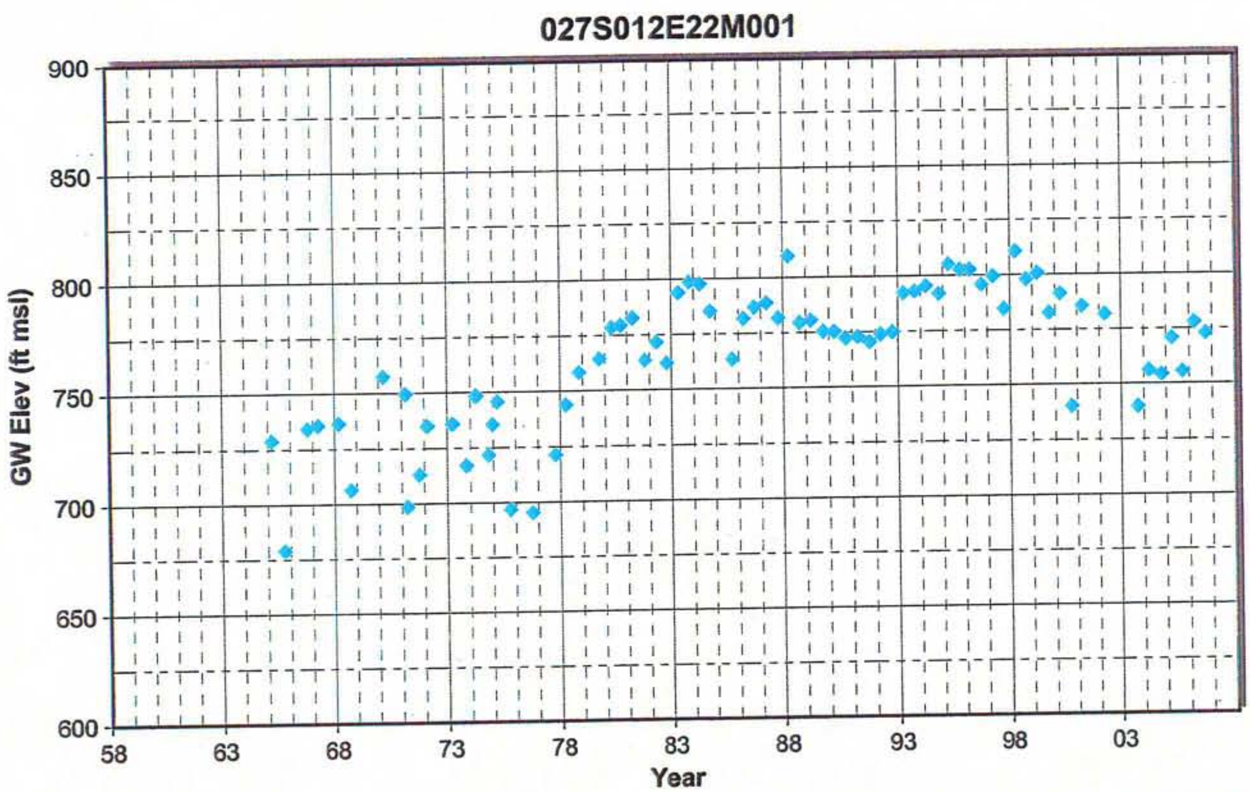
N

0 3 6

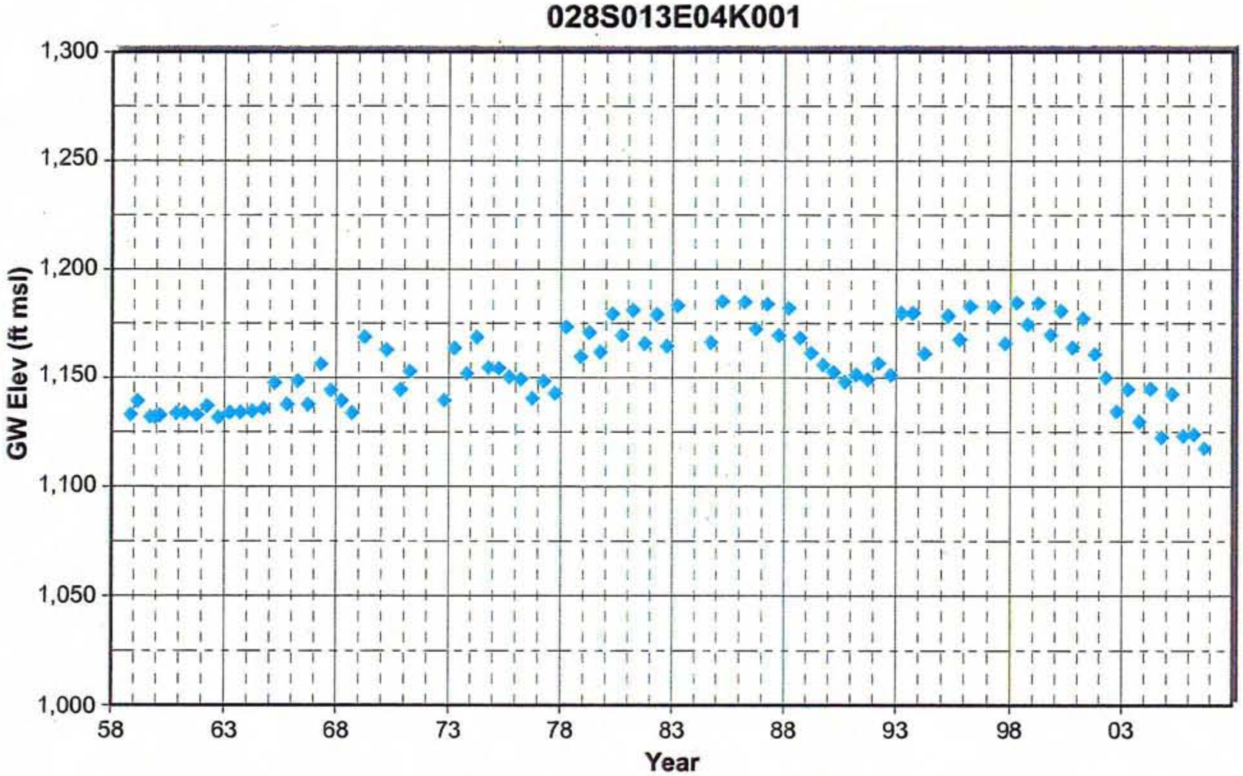
Scale in Miles

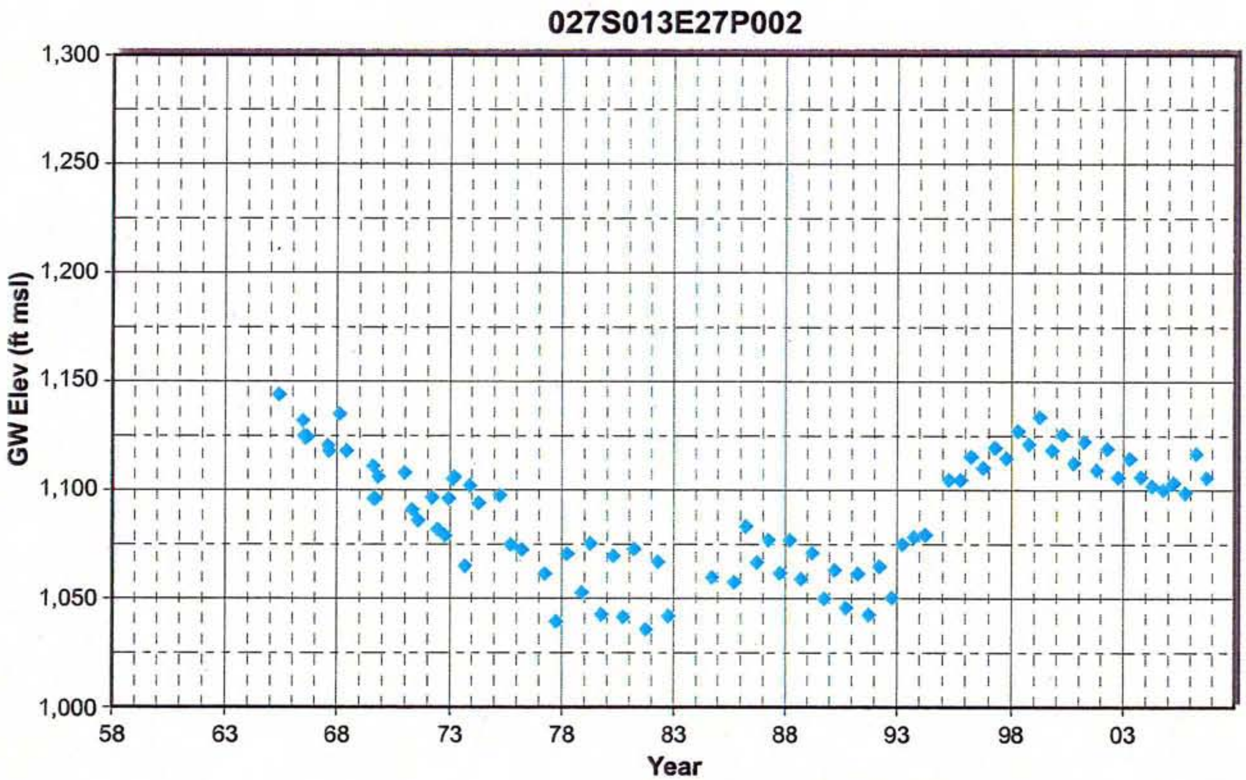
November 2007	**Figure 6**
TODD ENGINEERS Emeryville, California	**Groundwater Elevation Map (Spring 2006)**



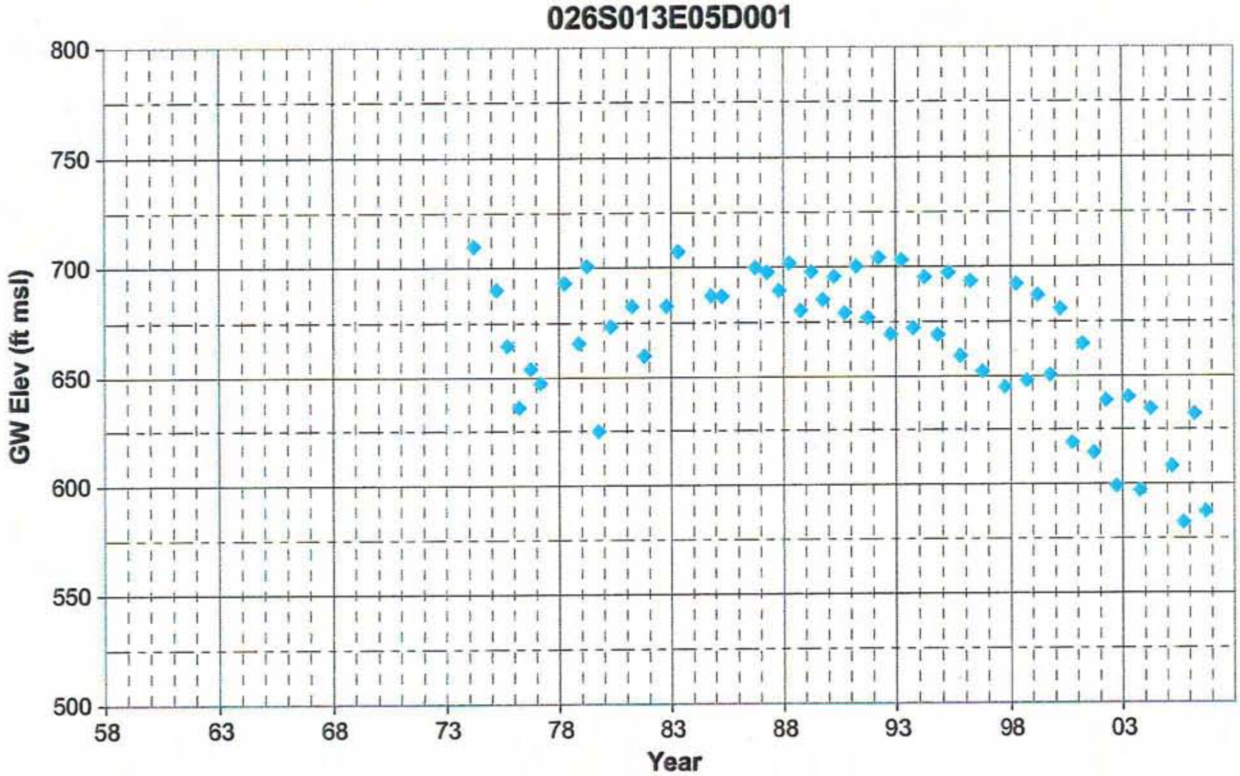


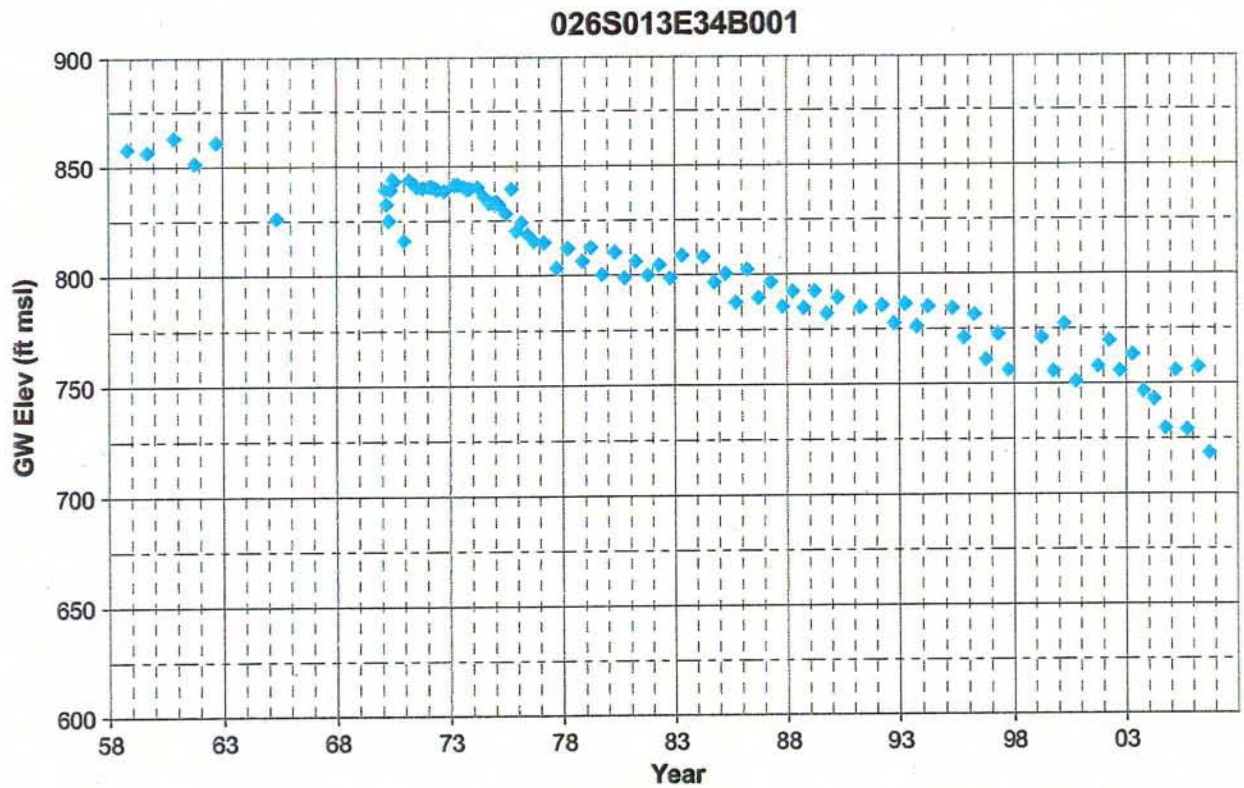
November 2007	**Figure 7** **Atascadero Subbasin Hydrographs**
TODD ENGINEERS Emeryville, California	



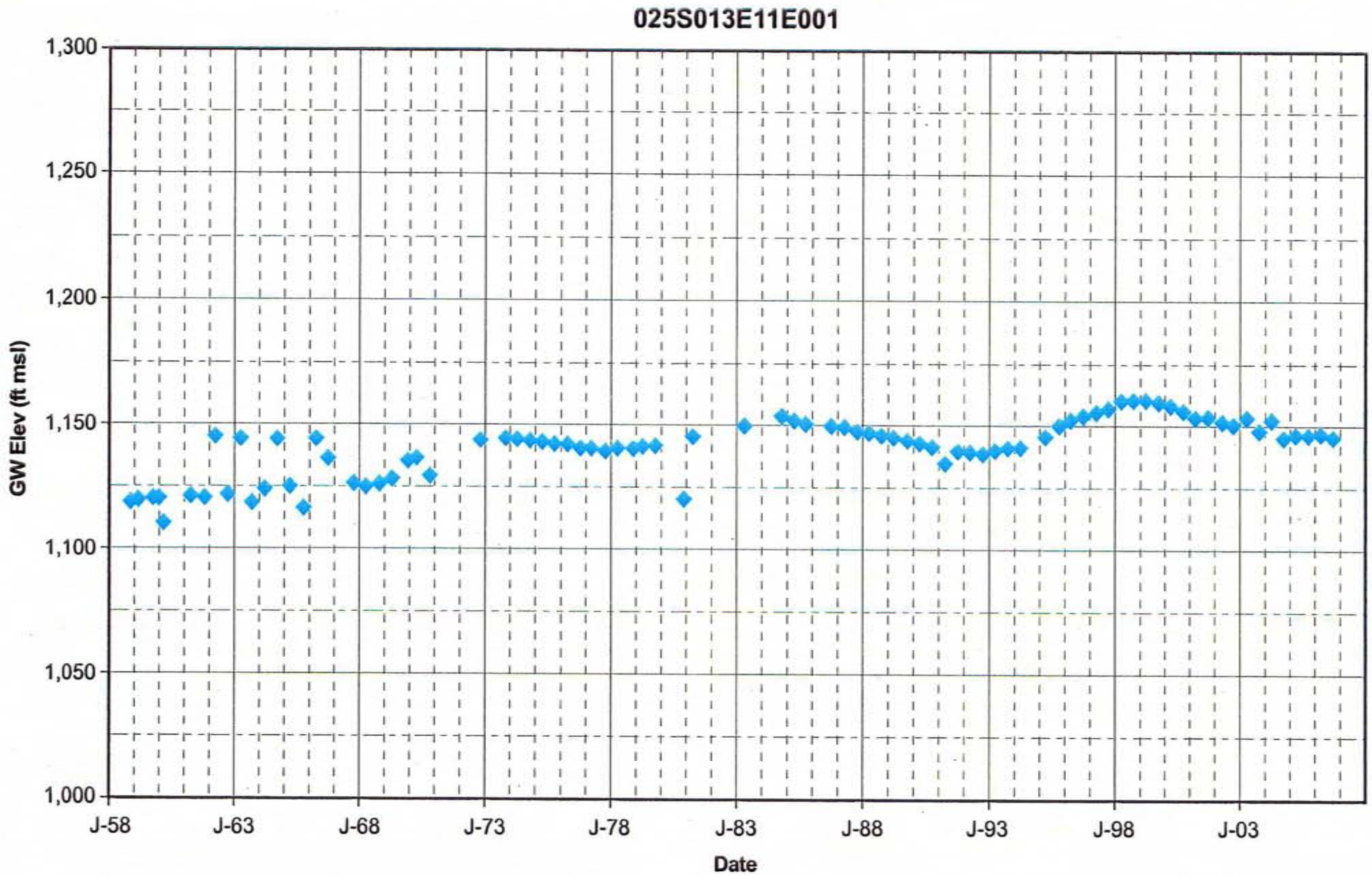


November 2007	**Figure 8**
TODD ENGINEERS Emeryville, California	**Creston Area Hydrographs**

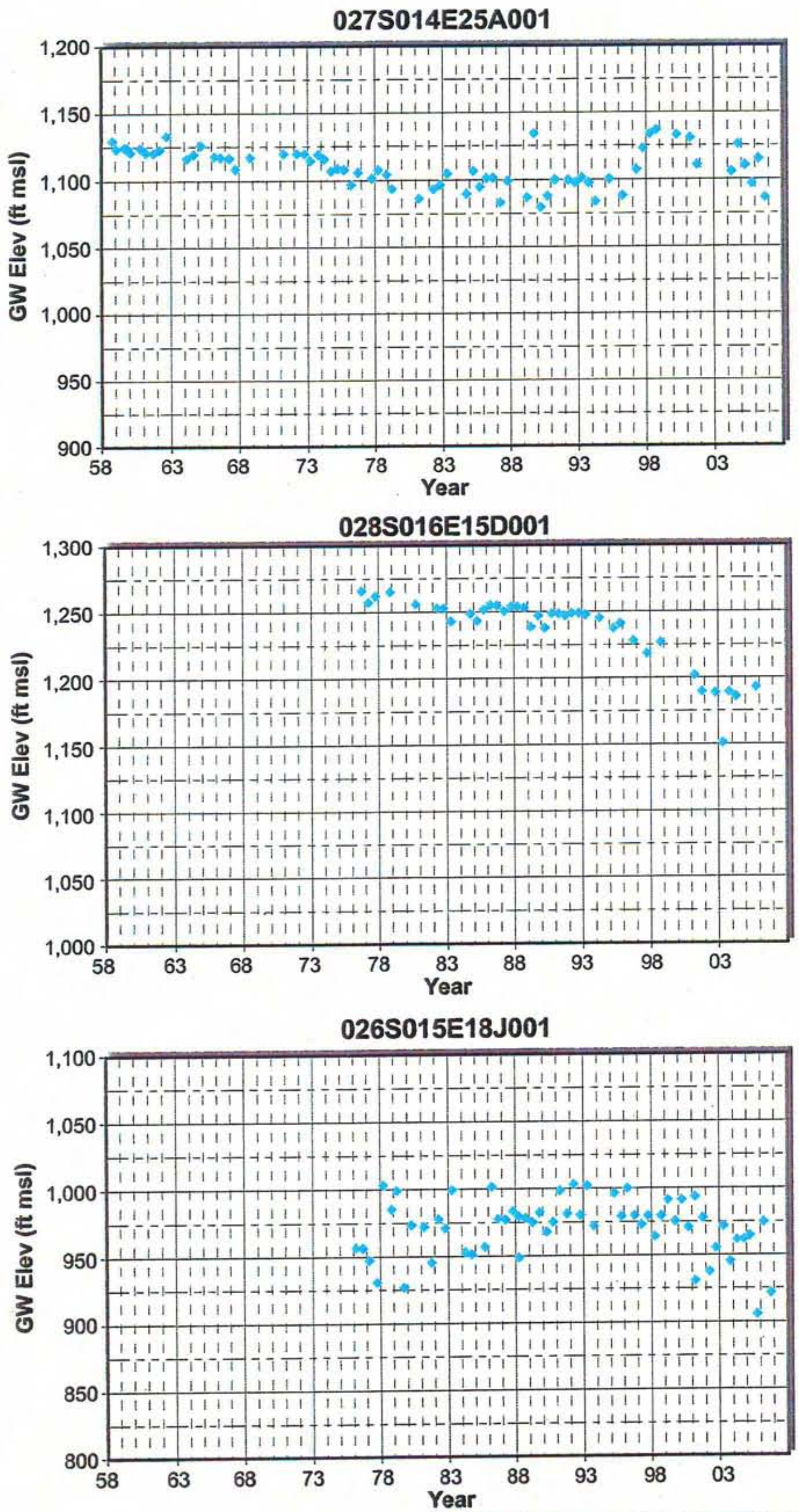




November 2007	**Figure 9**
TODD ENGINEERS Emeryville, California	**Estrella Area Hydrographs**



November 2007	**Figure 10**
TODD ENGINEERS Emeryville, California	**Gabilan Area Hydrographs**



November 2007	Figure 11 San Juan and Shandon Area Hydrographs
TODD ENGINEERS Emeryville, California	

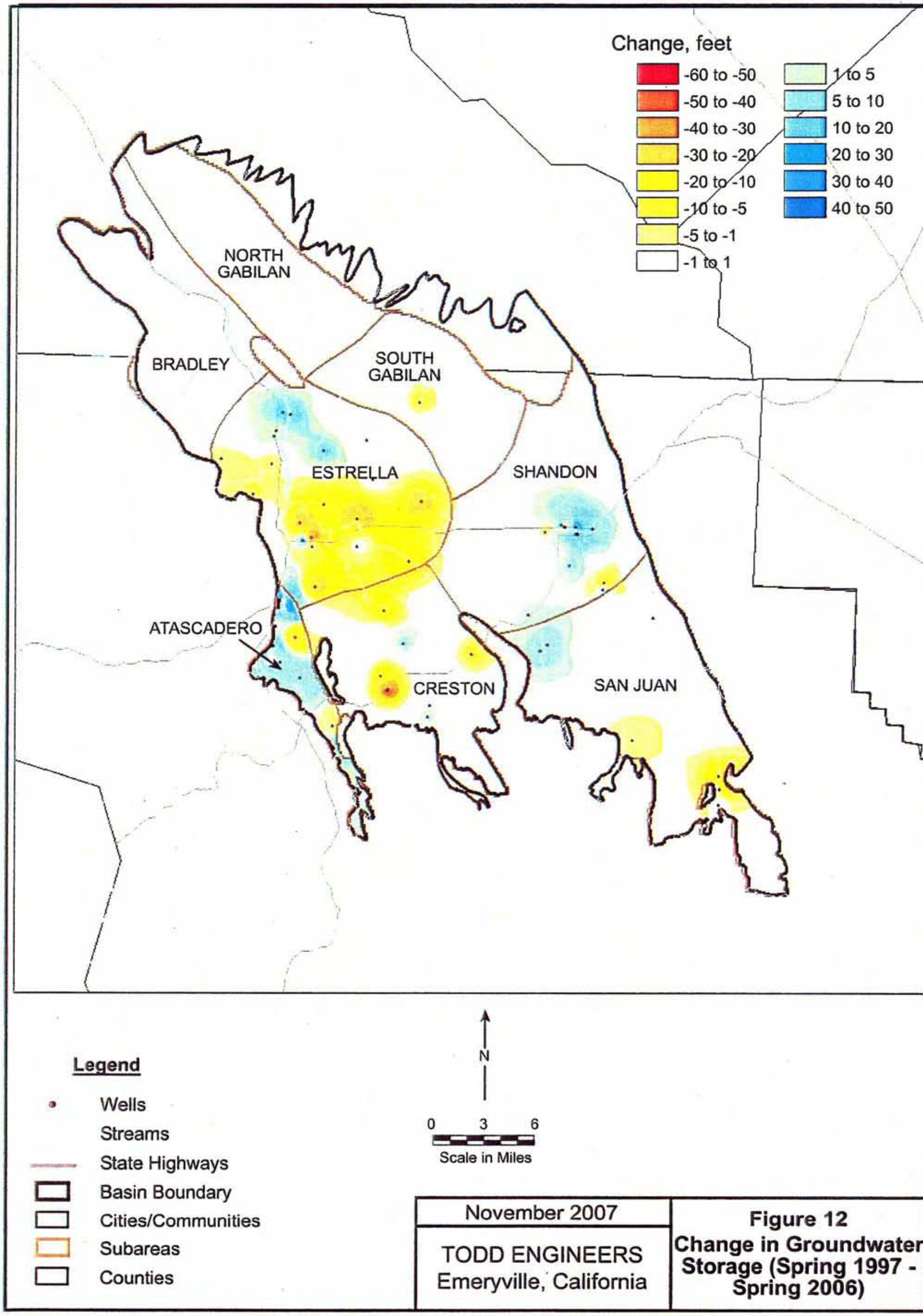
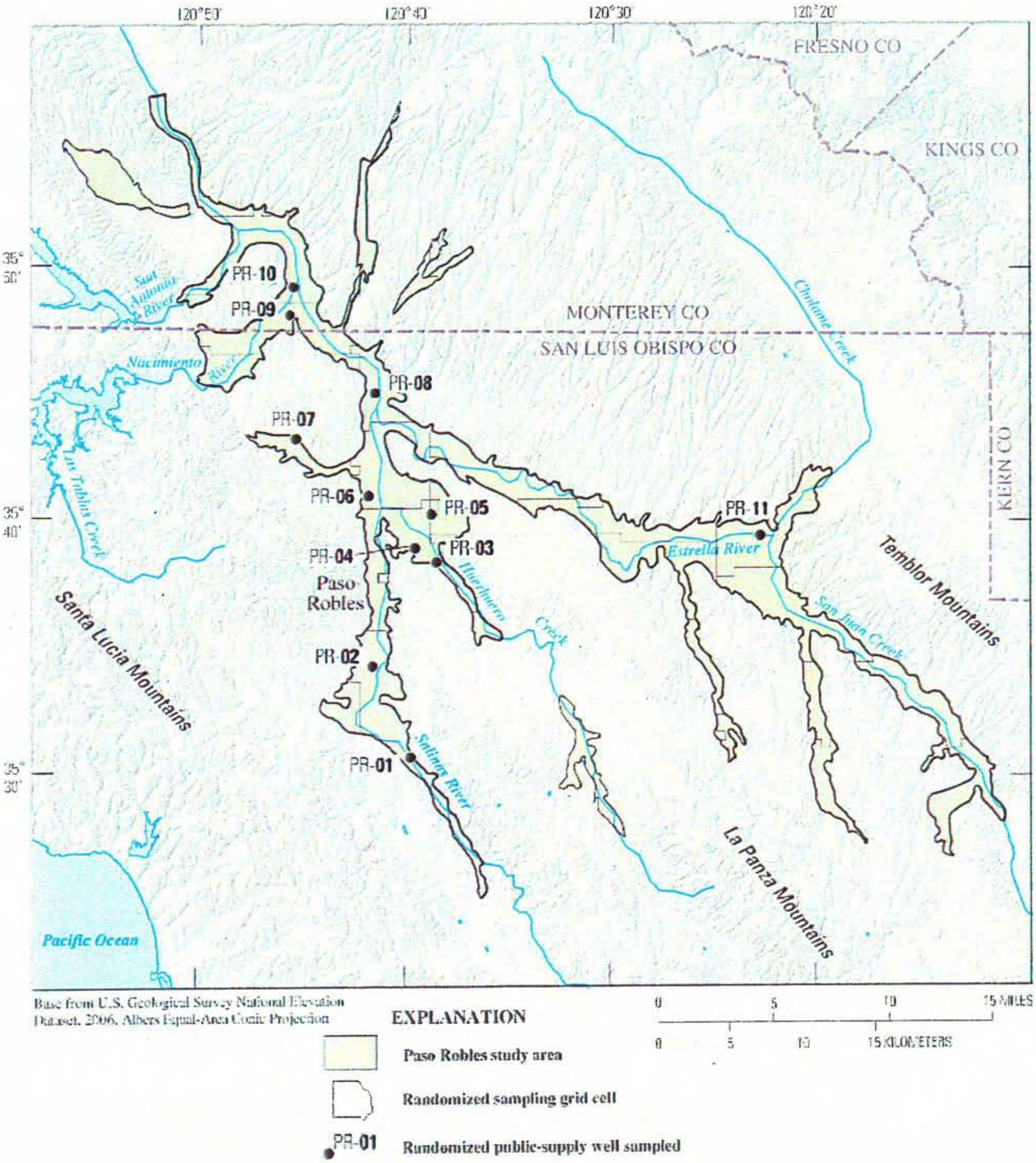


Figure 12
Change in Groundwater Storage (Spring 1997 - Spring 2006)



November 2007	Figure 13 USGS GAMA Wells
TODD ENGINEERS Emeryville, California	

Paso Robles Groundwater Basin

Water Banking Feasibility Study

Prepared for San Luis Obispo County
Flood Control and Water Conservation District

DRAFT
October 2007

Prepared by GEI Consultants, in association with Fugro West

Paso Robles Groundwater Subbasin Water Banking Feasibility Study

Draft Report

San Luis Obispo County Flood Control
And Water Conservation District

Date: October 2007
Project No: 064030

Table of Contents

Abbreviations and Acronyms

CCWA	Central Coast Water Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Acty
CESA	California Endangered Species Act
CNPS	California Native Plant Society
Corps	United States Army Corps of Engineers
County	San Luis Obispo County
CVP	Central Valley Project
District	San Luis Obispo County Flood Control and Water Conservation District
DWR	Department of Water Resources
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	federal Endangered Species Act
Feasibility Study	Paso Robles Groundwater Basin Water Banking Feasibility Study
GBSC	Groundwater Banking Subcommittee
GMP	groundwater management plan
gpm	gallons per minute
IFI	Important Farmlands Inventory

M&I	municipal and industrial
maf	million acre-feet
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic Atmospheric Administration, National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NWP	nationwide permits
O&M	operations and maintenance
PETM	Preliminary Engineering Technical Memorandum
PPWTP	Polonio Pass Water Treatment Plant
Reliability Report	*The State Water Project Delivery Reliability Report 2005*
RWQCB	Regional Water Quality Control Board
SAA	Lake or Streambed Alteration Agreement
SE	state endangered species
SLOAPCD	San Luis Obispo Air Pollution Control District
ST	state threatened species
SWP	State Water Project
TDS	total dissolved solids
TM	Technical Memorandum
USBR	United States Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
WRAC	Water Resources Advisory Committee

1 Introduction

The Paso Robles Groundwater Basin (Basin) located in northern San Luis Obispo County (County) is one of the largest groundwater basins in the County (Figure 1-1). The Coastal Branch of the California State Water Project (SWP) enters the County and the central coast just east of the Basin near the town of Shandon and continues southwest across the Basin. These two features along with the County's unused allocation of SWP water led local water leaders to want to explore the feasibility of banking water in the Basin for the benefit of County residents.

1.1 Project Background

The Paso Robles Groundwater Basin Water Banking Feasibility Study (Feasibility Study) for the Paso Robles Groundwater Basin is being led by the San Luis Obispo County Flood Control and Water Conservation District (District) in coordination with the Groundwater Banking Subcommittee (GBSC) of the Water Resources Advisory Committee (WRAC). Additional stakeholders invited to participate include the North County Water Forum, the Shandon Advisory Committee, the Creston Advisory Body, and San Luis Obispo County State Water Subcontractors.

The San Luis Obispo County Integrated Regional Water Management Plan (IRWM Plan) identified the feasibility study of the groundwater banking potential of the Basin as a high-priority project. Funding for this study, as well as several other planning projects identified in the San Luis Obispo County IRWM Plan, was provided in part by a Proposition 50 Chapter 8 Integrated Regional Water Management Program Fiscal Year 2005-2006 Planning Grant.

1.2 Previous Studies

Over the last several years, a number of studies were completed that will be used to provide information for the Feasibility Study. Some of these studies are briefly summarized below.

1.2.1 San Luis Obispo County Integrated Regional Water Management Plan (2005)

The District in cooperation with the WRAC prepared the region's IRWM Plan to align water resources management planning efforts for achieving sustainable water resources County-side with the State of California's (State) planning efforts through 2030. The

IRWM Plan was used to support the County's planning and implementation of grant applications. The IRWM Plan integrates 19 different water management strategies that have or will have a role in protecting the region's water supply reliability, water quality, ecosystems, groundwater, and flood management, historically or in the future. The integration of these strategies resulted in a list of action items (projects, programs, and studies) needed to implement the IRWM Plan. District staff and the WRAC Integrated Regional Water Management Subcommittee prioritized the action items. The IRWM Plan was adopted in December 2005 and updated in July 2007.

The IRWM Plan identified projects to fill data gaps in four areas, and whose completion would support the overall plan goals, objectives, and strategies and improve the IRWM Plan itself. These projects include:

- Groundwater Banking Plan (this project)
- Regional Permitting Plan
- Data Enhancement Plan
- Flood Management Plan

These planning projects were included in the Proposition 50 Chapter 8 Integrated Regional Water Management Program Fiscal Year 2005-2006 Planning Grant application, which is funding this Feasibility Study.

1.2.2 Paso Robles Groundwater Basin Study (2002)

In 2002, Fugro West and Cleath and Associates prepared the Paso Robles Groundwater Basin Study (Basin Study) investigated the hydrogeologic conditions and quantified the water supply capability of the Basin by defining the lateral and vertical extent of the aquifer, groundwater flow and movement, current water quality conditions, and perennial yield.

1.2.3 Paso Robles Groundwater Basin Study Phase II – Numerical Model Development, Calibration, and Application (2005)

In 2005, Fugro West and ETIC Engineering developed a numerical groundwater flow model as a quantitative tool to evaluate future hydraulic conditions of the Basin. Using the model, the study evaluated the Basin's response to current and future water demands with and without supplemental water and identified areas of declining water levels.

1.3 Project Goals

The goal of the Feasibility Study is to determine the feasibility and magnitude of potential water banking opportunities in the Basin. If feasible water banking opportunities are identified in this Feasibility Study, they can then be compared to other water management options identified by the District to improve the long-term water supply reliability for the residents of the County and the Central Coast. Potential benefits of a water bank may include:

- Improving local groundwater conditions within the Basin.
- Increasing dry-year water supply reliability for local water users and possibly the residents of the County and the Central Coast.
- Improving local groundwater quality in the Basin.
- Providing greater flexibility of water resources management in the County and the Central Coast.
- Reducing the County’s dependence on imported water supplies in below-normal years.

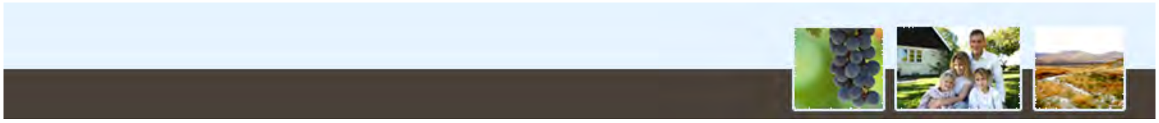
1.4 Project Approach

Potential water banking opportunities within the Basin were evaluated based upon several different feasibility components that contribute to the overall feasibility, including:

- The availability of a water supply for banking.
- The ability to recharge the aquifer system.
- The ability to recover the banked water.
- The ability to deliver the banked water to the end user.

The water banking feasibility factors will be evaluated to address the hydrogeologic considerations, engineering considerations, and other considerations (such as environmental issues and overall groundwater management) to determine the overall feasibility and magnitude of individual water banking opportunities.

- **Hydrogeologic Considerations** focuses on the effects of local geologic and hydrogeologic conditions on the feasibility of banking water at selected locations



within the Basin. The local hydrogeologic conditions also determine the size of potential water banking opportunities.

- **Engineering Considerations** focuses on the technical requirements including water supply availability, infrastructure requirements, project operations, and the associated project costs associated with constructing and operating a water bank in the Basin.

- **Other Considerations** focuses on environmental issues and the overall approach to groundwater management, which may include institutional issues, legal issues, and governance issues associated with groundwater management, including water banking operations.

1.4.1 Project Meetings

The project was completed on an accelerated schedule in order to meet the grant funding project schedule. The GBSC was established during the previously Basin Study to facilitate stakeholder involvement. The GBSC served in a similar capacity during this study. A series of presentations to the GBSC and the WRAC were used to inform the GBWC and interested parties about the project progress and ellicit feedback. A total of six presentations were made to the GBSC/WRAC, listed below.

- GBSC Meeting No. 1 – October 4, 2006 - Introduction and Project Goals

- GBSC Meeting No. 2 – January 4, 2007 – Alternatives Development and Project Screening

- GBSC Meeting No. 3 – March 1, 2007 – Water Banking Project Refinement

- GBSC Meeting No. 4 – May 3, 2007 – Hydrogeologic Reconnaissance and Alternative Selection

- GBSC Meeting No. 5 – September 6, 2007 – Hydrogeologic Feasibility Analysis

- GBSC Meeting No.6 – November 7, 2007 – Engineering Analysis and Draft Report

Presentations to the GBSC, are available on the SLOC water resources website under the IRWM Quicklink at: www.slocountywater.org.

Presentations were also made to the Shandon Advisory Council and the Creston Advisory Body during the project. In addition, members from both of these groups attended the GBSC meetings.

1.4.2 Project Deliverables

The following documents were prepared during the completion of this project and presented to the GBSC to document the progress and refine project assumptions on water banking alternatives and project operations.

- **Preliminary Engineering Technical Memorandum (PETM).** The PETM presented a base level of information on groundwater recharge and conjunctive use project formulation that was used to develop and evaluate potential water banking opportunities in the Basin.

- **Description of Water Banking Alternatives (Alternatives TM).** The Alternatives TM was distributed to the WRAC and presented at the June 6, 2007 meeting (separate from the GBSC meeting list above). The Alternatives TM described the alternatives and operational scenarios that were being considered for evaluation. The alternatives and operational scenarios were refined based on input received on the Alternatives TM and responses from the June WRAC meeting.

- **Hydrogeologic Feasibility Progress Report (Progress Report).** The Progress Report summarized the information and approach used to develop the water banking alternatives, and presented the results of the groundwater modeling conducted to determine the hydrogeologic feasibility of developing a water bank within the Basin.

1.5 Project Team

This work was completed by the project team, which was lead by GEI Consultants, Inc., with hydrogeologic support by Fugro West and Cleath & Associates, and environmental support by Rincon Associates.

1.6 Report Outline

The report is organized into the following sections:

- **Section 1, Introduction,** provides project background information, identifies previous studies, summarizes the project goals, and outlines the project approach.

- **Section 2, Project Setting,** provides some general background information on local agencies, the existing core infrastructure that may be used in a project, the surface water supply availability for water banking operations, and a includes a brief summary of the hydrogeologic setting in the Basin.

- **Section 3, Potential Water Banking Operations,** summarizes the water banking concepts considered by the WRAC and describes potential water banking operations.

- **Section 4, Water Banking Alternatives,** describes the process used to identify and select the alternatives for analysis, and describes the selected alternatives.

- **Section 5, Hydrogeologic Evaluation,** provides some background information on the groundwater model used to evaluate the hydrogeologic feasibility of the alternatives and presents the results of the modeling analysis.

- **Section 6, Engineering Evaluation and Cost Estimate,** identifies the facility requirements for each of the alternatives and associated capital and O&M costs. This section also identifies issues associated with groundwater management and operation of potential projects.

- **Section 7, Environmental and Permitting Considerations,** identifies the environmental and permitting issues that may need to be adderssed to develop a project.

- **Section 8, Conclusions and Recommendations,** summarizes the project results and provides recommendations to further evaluate water banking opportunities.

- **Section 9, References**, provides a list of the references used to complete the project.

2 Project Setting

The purpose of this section is to describe the project setting for water banking opportunities in the Paso Robles Groundwater Subbasin. This includes:

- Describing the water issues of the Central Coast of California.
- Identifying the existing core infrastructure that may be utilized to implement the project.
- Identifying the available water supply to support the project operations.
- Describing the hydrogeologic setting of the Basin.
- Identifying the agencies or groups that may be involved in or affected by project implementation or operations.

2.1 Central Coast Water Conditions

Anticipating the eventual need for supplemental water supplies on the Central Coast, San Luis Obispo County Flood Control and Water Conservation District (District) and Santa Barbara County Flood Control and Water Conservation District (Santa Barbara County) entered into water supply contracts with the State of California in 1963. Under these contracts, water would be delivered to these Central Coast agencies through the Coastal Branch of the California State Water Project (SWP).

Phase I of the Coastal Branch was completed in 1968 and included a 15-mile aqueduct branching off of the California Aqueduct in northwestern Kern County. San Luis Obispo and Santa Barbara Counties postponed construction of the remaining portion of the Coastal Branch until 1991. The postponement in construction was permitted under the Counties' contract with the State. Even though the Coastal Branch had not been constructed, San Luis Obispo County and Santa Barbara County were obligated to make payments under their State contracts for those facilities (such as Oroville Dam and the California Aqueduct) that would eventually convey SWP water to the Central Coast.

The Central Coast Water Authority (CCWA) was formed in 1992 to facilitate the development and operation of the Coastal Branch in San Luis Obispo and Santa Barbara Counties. In San Luis Obispo County, the District has maintained its contractual relationship with the state. It has signed agreements with CCWA to treat its SWP water and to operate and maintain the pipeline and facilities in the County.

2.2 Existing Core Infrastructure

2.2.1 State Water Project

Since 1963, the California Department of Water Resources (DWR) has constructed most of the SWP elements to convey water from northern California to urban and agricultural users throughout the state. The SWP delivers water under long-term contracts to 29 public water agencies, thereby providing water for about two-thirds of the state's population and to irrigate, in part, 700,000 acres of agriculture.

The SWP supplies originate at Lake Oroville on the Feather River. Flows released from Lake Oroville reach the Sacramento-San Joaquin Delta, where much of the water is pumped into the California Aqueduct for delivery to water users to the south. The SWP includes 32 water storage facilities, more than 600 miles of aqueducts, more than 20 pumping plants, and several hydroelectric plants.

The State of California designed, engineered, and constructed these facilities, and operates and maintains them with funds received from its 29 contractors. The payments from the 29 contractors allow the state to fully recover all its costs to finance, design, and build the SWP under "take or pay" contracts.

2.2.1.1 Coastal Branch Phase I

Coastal Branch Phase I branches off the California Aqueduct in southern Kings County near Kettleman City and extends into northern Kern County in the vicinity of Devils Den. Berrenda Mesa Water District and Castaic Lake Water Agency receive water through the Phase I facilities. The two pumping plants within the Phase I reach are the Las Perillas and Badger Hill Pumping Plants.

2.2.1.2 Polonio Pass Water Treatment Plant

The section of the Coastal Branch from Devils Den Pumping Plant to Polonio Pass Water Treatment Plant (PPWTP) was constructed as part of Phase II. This section of the Coastal Branch Pipeline has an estimated capacity of 74,125 acre-feet over the course of 11 months per year.

The PPWTP has an existing capacity rating of 48 mgd for 11 months, equaling 49,286 acre-feet per year. Current demands for treated water on the Coastal Branch total about 44,000 acre-feet per year (4,830 acre-feet per year for San Luis Obispo County and

39,078 acre-feet per year for Santa Barbara County). Based upon these capacity estimates, the Coastal Branch between Devils Den and PPWTP has about 25,000 acre-feet more capacity than the current treatment capacity of the PPWTP.

2.2.1.3 Coastal Branch Phase II

Phase II is a 101-mile buried pipeline extending from Devils Den (Phase I) to Vandenberg Air Force Base. To serve the other cities of southern Santa Barbara, CCWA built a 42-mile extension terminating at Lake Cachuma for a total length of 143 miles. The pipe diameter starts at 57 inches at Devils Den, reduces to 42 inches south of the City of Arroyo Grande, and reduces further to between 30 and 39 inches south of Vandenberg AFB. Two turnouts are located in San Luis Obispo County, Chorro Valley Pipeline and the Lopez Turnout. The Coastal Branch has a treated capacity of about 48,600 acre-feet per year – 45,486 acre-feet per year contracted capacity for CCWA and 4,830 acre-feet per year contracted capacity for the District.

2.2.2 Nacimiento Water Project

The Nacimiento Water Project is one of the high-priority projects for the County and is currently in the design phase. The project consists of a pipeline, storage tanks, pump stations, and appurtenant facilities to convey water from Lake Nacimiento south to the communities of Paso Robles, Templeton, Atascadero, and San Luis Obispo, with options for future extensions. Since only about 60 percent of the supply is committed to the contracting parties, its capacity will meet additional supply reliability needs far into the future. In the meanwhile, groundwater banking opportunities and other conjunctive use possibilities can be researched and evaluated. These may include water banking and conjunctive use opportunities along the western side of the Basin.

2.3 Surface Water Supply Availability

Historically, California water users have relied on multiple sources of water supply in order to meet changing and increasing water demands. Typically, local water providers mix and match their supply sources to maximize water supply and quality and to minimize costs to meet both current and long-term water supply requirements. In addition to groundwater supplies, the County relies on surface supplies from local sources as well as imported supplies. Two imported water supplies to the County include the Nacimiento Water Project (under development) and the SWP.

2.3.1 SWP Water Supply Delivery Reliability

The projected future water delivery for the SWP is presented in the recent DWR report, *The State Water Project Delivery Reliability Report 2005* (Reliability Report*)*. The Reliability Report provides information to local water agencies to help them determine how they should integrate the SWP water supply into their water supply equation.

The Reliability Report describes water delivery reliability as how much one can count on a certain amount of water being delivered to a specific place at a specific time. This description addresses such things as facilities, system operations, water demand, and weather projections. In addition, water delivery reliability is based in part upon an acceptable or desirable level of dependability that is usually determined by the local water agency in coordination with the public it serves. In total, this information is used to determine the level of service and reliability, which, in turn, identifies the need for additional water supply sources, new facilities, demand management, and conservation programs.

2.3.1.1 Water Delivery Reliability Factors

The actual water supply available from the SWP or other imported sources depends on several factors, including the following:

- **Availability of water from the source** – The water source availability depends on the amount and timing of precipitation and runoff.
- **Availability of means of conveyance –** The ability to convey water from the source depends on the existence and physical capacity of the diversion, storage, and conveyance facilities, and on the contractual, statutory, and regulatory limitations on the facilities' operations.
- **The level and pattern of water demand –** The level of water demand is affected by the magnitude and types of water demands, level of conservation strategies, local weather patterns, water costs, and other factors.

2.3.1.2 SWP Level of Demand

The SWP was built with a capacity to deliver about 4.2 million acre-feet (maf) of water. Recent annual deliveries to the 29 contractors have averaged about 2.3 maf and peaked at 3.5 maf in 2000. The following section describes SWP supplies that may be available for banking opportunities in the Basin.

Table A – Individual contractor's portion of its SWP annual allocation is presented on Table A of their contract. Table A contract amounts are not a guarantee of the available supply to the contractor each year, but rather a tool in an allocation process that defines an individual contractor’s share.

Article 21 – Article 21 refers to water supply contracts that allow additional water to be delivered to contractors under certain conditions, including the following:

- It is available only when it does not interfere with Table A allocations and SWP operations.
- It is available only when excess water is available in the Delta.
- It is available only when conveyance capacity is not being used for SWP purposes or scheduled SWP deliveries.
- It cannot be stored within the SWP system; i.e., the contractors must be able to use the Article water directly or store it in their own system.

In order to acquire Article 21 water, SWP contractors must be able to use the water directly or store it in their own system. Article 21 water can be stored directly in a reservoir or by offsetting other water that would have been withdrawn from storage, such as local groundwater. The Reliability Report states that,

> “In the absence of storage, Article 21 water is not likely to contribute significantly to local water supply reliability. Incorporating supplies received under Article 21 into the assessment of water supply reliability is a local decision based on specific local circumstances, facts and level of water supply reliability required.”

Article 21 water represents a SWP water supply source that may be available in some years to SWP contractors.

2.3.1.3 Water Supply Availability for Water Banking

The Reliability Report presents DWR’s current information regarding the annual water delivery reliability of the SWP for existing and future levels of development in the water source areas, assuming historical patterns of precipitation.

The water supply availability for this feasibility study is based in part upon the CalSim II model studies used in the Reliability Report and the District’s Table A allocation. CalSim II is a planning model developed by the DWR and United States Bureau of Reclamation (USBR) to simulate the SWP and Central Valley Project (CVP) and areas tributary to the Sacramento-San Joaquin Delta. It uses historic rainfall and runoff data, which have been adjusted for changes to land and water use conditions that have occurred or may occur in the future, to simulate water resources operations in the Sacramento and San Joaquin River Basins on a month-to-month basis. The month-to-month simulations are based on the 73-year period (1922-1994) of the adjusted historical rainfall/runoff data. This assumption is based on the assumption that the next 73 years will have the same rainfall/snowmelt amount and pattern, within-year and from year to year, as the 1922 to 1994 period.

Table A Allocation – The Table A annual allocation for the District totals 25,000 acre-feet at an instantaneous rate of delivery of 35 cfs. This corresponds to a monthly delivery rate of 2,083 acre-feet. The County currently utilizes 4,830 acre-feet per year of the Table A annual allocation for urban water users in the County, leaving the remaining Table A supply available in any given year for water banking operations.

The County currently utilizes up to 4,830 acre-feet of its Table A allocation, which is delivered to 11 entities within the County. Santa Barbara County currently utilizes about 43,000 acre-feet of its 45,485 acre-feet Table A allocation, which is delivered to numerous entities within the Santa Barbara County. Santa Barbara County is currently considering reacquiring its 12,214 acre-feet of suspended Table A supply.

Drought Buffer – Drought buffer is a portion of unused Table A allocation that has been contractually reserved to firm up the reliability of the contract allocation that is used in those years when full SWP deliveries are not available.

The focus of this study is utilization of the County's SWP water supply; therefore, the Nacimiento Water Project will not be considered as a potential supply source for this Feasibility Study.

2.3.2 SWP Water Quality

Many Californians rely on the State Water Project for part or all of their residential water supply. In addition, the SWP provides water for agriculture, industry, power generation, recreation, and fish and wildlife needs. DWR monitors SWP water quality throughout the system using a combination of automated sampling and field samples collected weekly, monthly, quarterly, or annually to ensure it meets the water quality objectives for the beneficial uses of water. Water quality standards and objectives are categorized by the beneficial use they are intended to protect, including municipal, industrial, agricultural, fish and wildlife.

The existing SWP water quality is consider appropriate for both residential and agricultural uses. The SWP supply is treated at Polonio Pass WTP and delivered through the Coastal Branch Aqueduct for potable M&I uses in San Luis Obispo and Santa

Barbara Counties. In Kern County, raw water from the SWP is used to irrigate crops and recharge the groundwater basin. Table 2-1 lists the 2004 mean water quality data for the California Aqueduct at Kettleman City (Check 21) which is located just upstream of the Coastal Branch.

Table 2-1
2004 Mean Water Quality

Constituents	Units	MCL	Agricultural Water Quality Limits	Kettleman City
Alkalinity	mg/L as $CaCO_3$	-	-	78
Antimony	mg/L	0.006	-	<0.001
Arsenic	mg/L	0.01	0.1	0.003
Beryllium	mg/L	0.004	0.1	<0.001
Boron	mg/L	-	0.7	0.2
Bromide	mg/L	-	-	0.21
Calcium	mg/L	-	-	20
Carbon-Dissolved Organic	mg/L as C	-	-	3.5
Carbon-Total Organic	mg/L as C	-	-	3.6
Chloride	mg/L	250(2)	106	71
Chromium	mg/L	0.05	-	0.002
Copper	mg/L	1.3(1) / 1.0(2)	0.2	0.003
Flouride	mg/L	2	1	<0.1
Hardness	mg/L as $CaCO_3$	-	-	102
Iron	mg/L	0.3(2)	5	0.013
Lead	mg/L	0.015	5	<0.001
Magnesium	mg/L	-	-	13
Manganese	mg/L	0.05(2)	0.2	<0.005
Nitrate + Nitrite	mg/L as N	-	-	0.69
Phosphorus - Ortho	mg/L as P	-	-	0.08
Phosphorus - Total	mg/L	-	-	0.1
Selenium	mg/L	0.05	0.02	0.001
Sodium	mg/L	-	69	49
Electrical Conductivity	µS/cm	-	-	464
Sulfate	mg/L	500(1) / 250(2)	-	36
Total Dissolved Solids	mg/L	500(2)	450	261
Turbidity	NTU	1 / 5(*)	-	6
Zinc	mg/L	5(2)	2	<0.005

Notes:
All reported constituents are the yearly mean of laboratory analytical values sampled monthly. Nondetectable values were not used in the calculation of the yearly mean.
MCL = Primary (or Secondary if noted) Maximum Contaminant Levels based on California Department of Public Health drinking water standards (CA Water Quality Control Board Water Quality Goals)
Agricultural limits based on Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29 (http://www.fao.org/DOCREP/003/T0234E/T0234E00.htm)
mg/L = milligrams per liter
µS/cm = microSiemens per centimeter
NTU = nephelometric turbidity units
(1) = Primary MCL
(2) = Secondary MCL
- = Data not available
* = Limit depends on method of data collection

2.4 Hydrogeologic Setting

The hydrogeologic description presented in the Basin Study is briefly described below.

2.4.1 Basin Definition and Boundaries

The Basin encompasses an area of approximately 505,000 acres (790 square miles). The Basin ranges from the Garden Farms area south of Atascadero to San Ardo in Monterey County, and from the Highway 101 corridor east to Shandon (Figure 1-1). Internally, the Atascadero subbasin was identified, which encompasses the Salinas River corridor area south of Paso Robles and includes the communities of Garden Farms, Atascadero, and Templeton.

2.4.2 Groundwater Occurrence, Levels, and Movement

Water level data show that over the 18-year period extending from July 1980 through June 1997 (base period) there is no definitive upward or downward water level trend for the basin as a whole. However, different water level trends are observed at specific locations within the Basin. Water levels have declined rather dramatically in the Estrella and San Juan areas, while rising water levels have been experienced in the Creston area. In general, groundwater flow moves northwesterly across the Basin towards the Estrella area, then northerly towards the Basin outlet at San Ardo. The biggest change in groundwater flow patterns during the base period is the hydraulic gradient east of Paso Robles, along the Highway 46 corridor, which has steepened in response to greater pumping by the increasingly concentrated development of rural ranchettes, vineyards, golf courses, and municipal supply wells.

2.4.3 Water Quality

In general, the quality of groundwater in the Basin is relatively good, with few areas of poor quality and few significant trends of ongoing water quality deterioration. Historical water quality trends were evaluated to identify areas of deteriorating water quality. A major water quality trend is defined as a clear trend that would result in a change in the potential use of water within 50 years, if continued. Six major trends of water quality deterioration in the Basin were identified, including the following:

- Increasing total dissolved solids (TDS) and chlorides in shallow Paso Robles Formation deposits along the Salinas River in the central Atascadero subbasin.
- Increasing chlorides in the deep, historically artesian aquifer northeast of Creston.
- Increasing TDS and chlorides near San Miguel.

- Increasing nitrates in the Paso Robles Formation in the area north of Highway 46, between the Salinas River and the Huerhuero Creek.
- Increasing nitrates in the Paso Robles Formation in the area south of San Miguel.
- Increasing TDS and chlorides in deeper aquifers near the confluence of the Salinas and Nacimiento rivers.

2.4.4 Groundwater in Storage

The total estimated groundwater in storage within the Basin is approximately 30.5 maf. This value changes yearly, depending on recharge and net pumpage. Between 1980 and 1997, groundwater in storage increased approximately 12,000 acre-feet, or less than 0.1 percent of the groundwater in storage. This represents an average increase in storage of less than 1,000 acre-feet per year. On one hand, this relatively small percentage could be viewed as an indication of stable basin-wide conditions; however, it is noted that steadily decreasing storage in the 1980s was offset by increased water in storage throughout the 1990s. Furthermore, not all areas of the Basin have evidenced the same trends in water levels and change in storage.

In the Atascadero subbasin, total groundwater in storage averaged about 514,000 acre-feet. Approximately 2,600 acre-feet more groundwater was in storage in the subbasin in 1997 compared to 1980, which is an increase of less than one percent in total groundwater in storage during the base period. This represents an annual increase in storage of about 200 acre-feet.

3 Potential Water Banking Operations

As described in Section 2, there are water supply availability and hydrogeologic factors that need to be considered during the evaluation of the project feasibility The purpose of this section is to identify the water banking operations that have been considered by the WRAC, and describe the operations that are being used in this study to test the project feasibility.

3.1 Water Banking Concepts

The October 5, 2005 CCWA memorandum regarding San Luis Obispo County Water Reliability Opportunities Update identified two potential groundwater banking concept alternatives for northern San Luis Obispo County.

Treated Water Banking Concept: This concept included creating a new turnout from the Coastal Branch Aqueduct to deliver treated water to a banking location for recharge (through injection, spreading, or in-lieu recharge). When SWP supplies exist in excess of current demand, water would be banked. When SWP water is not available, the previously banked water would be recovered and conveyed to the Coastal Branch for delivery water users.

Raw Water Banking Concept: This concept would require constructing a new pipeline to convey raw water from PPWTP (prior to treatment) to a banking location in the Paso Robles Groundwater Basin for recharge (through stream recharge, spreading, or in-lieu recharge). When SWP supplies exist in excess of current demand (4,830 acre-feet per year), water would be banked. When SWP water is not available, the previously banked water would be recovered and conveyed to the Coastal Branch for delivery water users, or, if necessary, pumped back to PPWTP for treatment using the same pipeline.

The Raw Water Banking Concept is being evaluated in this feasibility study in part because the available supply for banking significantly exceeds the existing capacity of the PPWTP and treated water pipeline capacity.

3.2 Groundwater Recharge Methods

Groundwater recharge occurs naturally through percolation from rivers and streams, infiltration and percolation of precipitation on the groundwater basin, and the subsurface lateral movement of water into the groundwater basin from areas of relatively higher groundwater levels. In some cases, natural groundwater recharge cannot keep pace with groundwater use, resulting in long-term declines in groundwater levels, which may result in impacts to local streams, degradation of local groundwater quality, or land subsidence. Artificial recharge may be used as a groundwater management tool to protect and maintain the available groundwater resources for current and future uses.

There are two approaches to artificial groundwater recharge: direct recharge and indirect recharge. Direct recharge includes physically delivering water to the aquifer system, whereas indirect recharge increases groundwater storage by reducing the groundwater removed from the basin. There are advantages to each approach, and local conditions may suggest which method(s) is more appropriate for a particular location.

3.2.1 Direct Recharge

The types of direct groundwater recharge methods that have been identified for consideration in this study include the following:

- Recharge Basins/Ponds
- Injection
- River/Stream Recharge

Each of these recharge methods is briefly described below.

3.2.1.1 Recharge Basins/Ponds

The use of surface spreading basins or spreading ponds is the most common type of artificial groundwater recharge. Typically, a recharge location would consist of a series of connected surface basins that may range in size, depending on the available space and slope of the land. Recharged water moves away laterally and vertically from the recharge ponds, initially through the unsaturated zone to the unconfined aquifer system. The existence of low permeability layers in the near surface may affect the performance of the recharge ponds. If low permeability layers are encountered near the ground surface, they may be excavated and removed during pond construction, with the excavated material used to construct the dikes or berms that create the individual ponds.

The type and location of the recharge basins may dictate the level of engineering and construction needed to develop and operate recharge basins/ponds. Spreading ponds utilizing existing excavations, such as sand and gravel mines, borrow pits, or natural depressions such as low lying abandoned river channels, may require few improvements. Where these opportunities do not exist, recharge basins may require more extensive planning, engineering, and construction.

Recharge ponds/basins are often constructed in a series, with the initial ponds serving to settle the fine materials that may clog the pore space. Multiple settling basins are often interconnected to allow individual basins to be removed from service for maintenance. Aside from the periodic drying of the pond bottoms, maintenance may include scarifying, disking, or other mechanical means to remove fines and maintain infiltration rates. Additional maintenance may be needed on the levees or dikes to repair erosion caused by wind or wave action.

Some of the features of recharge basins/ponds include:

- Recharge of unconfined aquifer system,
- Relatively low cost to design and construct,
- No seasonal constraint on their use, and
- Existing opportunities such as gravel pits may be utilized.

Factors affecting successful implementation include:

- Requires large areas of relatively flat land.
- Requires permeable soils with no impermeable layers in near surface.

This method may be utilized in some locations within the Basin. Opportunities for recharge basins have been investigated by the City of Templeton and the City of Atascadero along the Salinas River as part of the Nacimiento Water Project.

3.2.1.2 Injection Wells

Injection wells have been used to recharge aquifer systems for many years with varying degrees of success. Typically, injection wells have been used in areas where spreading may not be feasible due to space constraints; land is too expensive to use more land-intensive recharge methods; or thick, impermeable clay layers overlie the principal water bearing deposits.

Injection wells have been used in the West Coast Basin in Los Angeles for over 40 years to create a barrier to prevent seawater intrusion. These wells have been used only for recharge and not for recovery of the injected water. More recently, specially designed and constructed wells are used to both inject water into the aquifer system and later extract the stored groundwater.

One of the difficulties associated with injection wells is maintaining adequate recharge rates. Several factors that may affect the long-term viability of injection wells include:

- Chemical reactions in the aquifer,
- The formation of biosolids on the well screens,
- Entraining air in the aquifer system, and
- Deflocculation caused by the reaction of high-sodium water with soil particles.

Where it is used, injection well spacing depends upon the radius of influence of the injected water, which, in turn, depends on the aquifer characteristics, water levels, and well construction details such as the length of casing penetrating the aquifer and the number of casing perforations.

This method requires the source water to be treated, and sediment must be almost completely removed. In addition, there may be water quality complications injecting water into the aquifer system.

Injection well recharge is an expensive recharge method that is not likely to be utilized in the Basin because of the high capital costs and high operation and maintenance costs. In addition, the area does not have the space limitations that prevent other recharge methods from being used.

3.2.1.3 River/Stream Recharge

River and stream channels typically have sand and gravel beds with relatively high permeability, which provide natural recharge opportunities as described earlier. In some cases, improvements can be made to increase the amount of water that would percolate naturally by increasing the period of time that water is available for seepage and/or by increasing the wetted area of the streambed.

The length of time that water is available for recharge is usually determined by the hydrologic characteristics of the stream and watershed. The construction of dams or reservoirs may be used to regulate available supplies and therefore modify the duration of flow and increase groundwater recharge.

In addition, streambed modifications may be used to increase the wetted area of the stream. This may include diverting water to sand and gravel areas adjacent to the main meandering stream. Another method may include extending a small weir or low dam across the bed where the stream has a very wide bottom caused by the meandering of the channel. The water behind the weir and spilling over the weir spreads out in a shallow depth over the entire streambed, thereby increasing the wetted area and resultant recharge. Precautions should be taken to not create a hazard in a time of flooding by backing water out of its normal streambed. In this regard, rubber dams have been used to temporarily expand the wetted area.

By its nature, stream and river recharge has direct interaction between the groundwater and surface water systems. This may result in the recharged water returning to the stream at other locations, or during periods when recharge activities are not taking place.

3.2.2 Indirect Recharge

Indirect recharge differs from the direct recharge methods because it does not physically place the water into the aquifer system; rather, surface water replaces the use of groundwater, thereby reducing local demand on the groundwater basin and providing the opportunity for the basin to recharge through the natural sources mentioned earlier. Indirect recharge is often called in-lieu recharge and is commonly used in areas where the historical water demand has relied on the underlying groundwater basin for supply, which has resulted in declining groundwater levels.

In-lieu recharge has been used in both urban and agricultural areas and often utilizes the existing infrastructure to distribute water supply to individual customers. One of the requirements of an in-lieu recharge program is that the replacement supply must be of the appropriate quantity and quality to satisfy the existing supply requirements.

Because recharge is not concentrated as in the case of direct recharge methods, it does not result in a mound of recharge water; rather, a more gradual increase in groundwater levels is evidenced over a larger area where pumping has suspended.

In-lieu recharge programs are often used to improve overall supply reliability by using the imported surface water supply in wet years or months when it is available, thereby reducing the dependence on the groundwater basin. Then in dry years, when imported supplies may be reduced or not available, groundwater is used to meet those demands not met by the imported supply. In this fashion, in-lieu recharge also takes advantage of the existing groundwater infrastructure.

Some of the benefits of in-lieu recharge include:

- Relatively cost-effective when able to use existing local infrastructure,
- Does not require construction of recharge facilities,

- Effectiveness is not dependent upon near surface local hydrogeologic conditions, and
- Does not create a localized mound of banked water near the recharge facilities that may limit recharge capacity.

Factors affecting successful implementation include:

- An existing water demand met by groundwater,
- Access to reliable imported water supply of suitable quality, and
- The ability to utilize existing infrastructure.

This method may be utilized in the Basin where existing groundwater demands have resulted in declines in local groundwater levels.

3.3 Water Banking Operational Scenarios

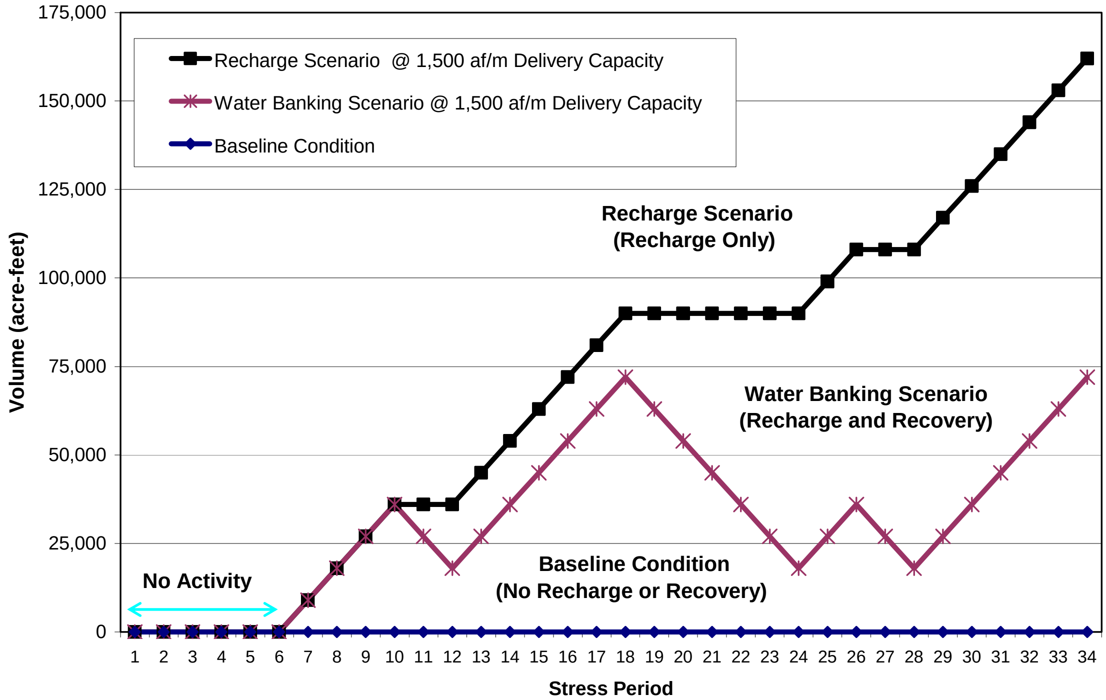
Three operational scenarios are being considered to evaluate the water banking feasibility in the Paso Robles Groundwater Subbasin that bookend the range of groundwater recharge and water banking opportunities that may be considered in the basin based in part upon the SWP supply availability described in Section 2.3. These scenarios include:

- Baseline Condition (no groundwater recharge or recovery),
- Groundwater Recharge Scenario (groundwater recharge only), and
- Water Banking Scenario (groundwater recharge and recovery).

For purposes of this feasibility study, the recharge and recovery capacity was assumed to be 1,500 acre-feet per month (18,000 acre-feet per year). This value represents a potential water supply from the State Water Project that is available to the region in most years through a combination of sources, and is considered to be an appropriate magnitude to test the water banking potential in the Basin.

These operational scenarios were evaluated using the previously developed groundwater model of the Paso Robles Groundwater Basin described in the Phase II Groundwater Basin Study. The model includes a 17-year simulation period of the groundwater model is divided into 34 six-month stress periods, which represent alternating the growing season (April to September) and the non-growing season (October to March). Figure 3-1 shows the project operations for the Baseline Condition, Recharge Scenario, and the Groundwater Banking Scenario based upon the 1,500 acre- feet per month project

Figure 3-1



capacity for the simulation period. Each of these operational scenarios is described below.

3.3.1 Baseline Condition

The Baseline Condition is used to represent the groundwater basin without groundwater recharge or water banking operations, and is therefore used to evaluate the effects of the Recharge Scenario and the Water Banking Scenario (described below) on the groundwater basin. The Baseline Condition for this analysis is the Buildout Scenario (Scenario 2 from the Phase II Groundwater Basin Study). The Buildout Scenario was developed to simulate the effects of urban growth build-out and maximum reasonable agricultural demand on groundwater elevations throughout the Paso Robles Groundwater Basin and to identify areas of special concern within the Basin. The Baseline Condition is described in more detail in the Phase II Groundwater Basin Study.

As shown in Figure 3-1, the Baseline Condition does not include any recharge or recovery operations during the 17-year simulation period.

3.3.2 Recharge Scenario

The Recharge Scenario focuses on improving local water supply conditions by supplementing existing groundwater supplies with an imported water supply. The imported supply may be used instead of pumping groundwater (in-lieu recharge) or by directly recharging the groundwater basin (direct recharge), thereby reducing the net demand on the groundwater system. Reducing the annual net groundwater demand results in higher groundwater levels than would have occurred without the recharge program. Existing (or new) groundwater wells are used to recover the recharged water for use on the overlying lands.

The purpose of the Recharge Scenario is to evaluate the effect of recharge operations on the Baseline Condition. This scenario includes only recharge operations; the groundwater pumping is the same as in the Baseline Condition to meet municipal, agricultural, and rural water demands. As shown in Figure 3-1, recharge occurs in nine years and totals about 162,000 acre-feet during the 17-year simulation period. These recharge periods were selected based upon SWP supply availability, described in Section 2.3.3. Recharge occurs in years with above-average rainfall and runoff.

3.3.3 Groundwater Banking Scenario

The goal of water banking is to store and recover groundwater for an intended use. Imported water is ‘banked’ in wet years when surplus supplies are available and recovered in drier years when the banked water is needed. A groundwater banking program differs from a groundwater recharge program by storing water for others that may or may not overlie the portion of the groundwater basin involved in the groundwater recharge activities. A groundwater banking program requires an accounting system to distribute the costs and benefits of the program among the participants (including the banking partners and overlying groundwater users). The banking program may serve an outside interest that pays either water and/or money to store water in the bank for their time of need.

Groundwater levels in the area affected by water banking operations may have greater fluctuations than there would have been without the banking program. During periods of recharge, groundwater levels may be higher than they would have been without the project. During recovery periods, groundwater pumping may exceed that of what was normally used, resulting in localized drawdown at the recovery wells that would have been greater than without the banking project.

The purpose of the Water Banking Scenario is to evaluate the effect of recharge and recovery operations (for export from the Basin) on the Baseline Condition and the Recharge Scenario. This scenario includes the same recharge operations as the Recharge

Scenario. The recovery operations include the local demand (as in the Recharge Scenario) and an additional recovery component to represent pumping of banked water to meet an additional demand. The disposition of the water recovered from the basin has not been associated with any individual water user.

For the Water Banking Scenario, the recharge operations are the same as the Recharge Scenario, as shown in Figure 3-1. During years when there is no supply for groundwater recharge, it is assumed that the banked water would be recovered and delivered for use outside of the basin. In the Water Banking Scenario, 90,000 acre-feet of groundwater is recovered during the simulation period. This represents about 55 percent of the total amount of recharged water. The recovery of banked water occurs in three periods, stress period 11-12, stress period 19-24 (3-year period), and stress period 27-28.

3.4 Affected Areas

The project participants are identified below because they may have a role in the planning, implementation, and operation of water banking projects in the Paso Robles Groundwater Basin for the following reasons:

- They supply water for banking,
- They use banked water, or
- They may be involved or impacted by recharge and recovery operations.

Future efforts will be needed to identify and codify the specific coordination, cooperation, and management of any future water banking activities among local and state agencies, as well as local land owners.

San Luis Obispo County Flood Control and Water Conservation District (District) – The District has the SWP contract that is being used as the water supply for banking. It also has the contract with CCWA to treat and convey water to the existing municipal and industrial (M&I) contractors in San Luis Obispo County.

Central Coast Water Authority (CCWA) – CCWA owns and operates the Coastal Branch Aqueduct and the PPWTP. CCWA also represents potential urban water users that may be interested in receiving banked water.

Local Agricultural Water Users – Local agricultural water users may provide local agricultural in-lieu recharge opportunities, and may be affected by groundwater banking operations. The local agricultural areas are identified based on a 2006 San Luis Obispo County land use survey prepared by the San Luis Obispo County Agricultural

Commissioner’s Office. Coordination with agricultural land owners that may choose to participate in a feasible water banking project would occur under future efforts.

Local Urban Water Users – Local urban water users may be affected by water banking operations. They may also be potential project participants that utilize banked water. Coordination with local cities and communities may be necessary in the future to evaluate the effects of a potential water banking project on their existing water supply wells and to evaluate opportunities for them to participate in any potential project. This includes local purveyors like the City of Paso Robles and the Templeton CSD, and local advisory groups such as the Shandon Advisory Council and the Creston Advisory Body.

Regional Urban Water Users – Regional urban water users are included to represent potential out-of-basin water users that may become partners in a water banking project.

4 Water Banking Alternatives

This section describes the approach used to identify the locations in the Basin where groundwater recharge and recovery operations would be evaluated. The locations of the water banking alternatives evaluated in this feasibility study were identified primarily on the local hydrogeologic conditions. This approach was described in the PETM and presented at several GBSC meetings as part of the initial project screening and project site selection process.

4.1 Water Banking Evaluation Criteria

An initial screening of all seven groundwater sub-areas was completed using the available hydrogeologic information to identify potential project locations for further consideration.

Each of the water banking opportunities that passed the initial screening was evaluated based on its ability to satisfy the following water banking activities:

- The ability to recharge the aquifer system,
- The ability to recover the banked water, and
- The ability to deliver the banked water to the end user.

The specific hydrologic and engineering criteria described below were used to provide a preliminary assessment of water banking potential for individual sites.

4.1.1 Hydrogeologic Criteria

The specific hydrogeologic evaluation criteria are described below.

- **Geologic/Hydrogeologic Setting**
    - High Feasibility: Includes areas with a thick, highly permeable aquifer that has a simple structure.
    - Low Feasibility: Includes areas with a thin, low-permeability aquifer with a complex structural setting.

- **Near Surface Conditions**

  - High Feasibility: Includes areas with highly permeable soils and near surface conditions and low relief.

  - Low Feasibility: Includes areas with clay-rich soils and saturated near surface conditions and areas with high relief.

- **Available Groundwater Storage Capacity**

  - High Feasibility: Includes areas with large available groundwater storage capacity (thick unsaturated zone).

  - Low Feasibility: Includes areas with small available groundwater storage capacity (thin unsaturated zone).

- **Ability to Recharge Aquifer System**

  - High Feasibility: Includes areas with a highly permeable aquifer, lack of clay-rich aquitards, and direct hydraulic communication with the producing aquifer.

  - Low Feasibility: Includes areas with a low-permeability aquifer, a presence of aquitards and other impediments to vertical percolation, and indirect or no hydraulic communication with the producing aquifer.

- **Ability to Recover Banked Water**

  - High Feasibility: Includes areas with large pumping capability from wells penetrating the receiving aquifer.

  - Low Feasibility: Includes areas with small pumping capability from wells penetrating the receiving aquifer.

- **Interaction with Surface Water**

  - High Feasibility: Includes areas located away from surface streams.

  - Low Feasibility: Includes areas located near surface streams where the banking aquifer system and water table are near the ground surface.

- **Water Quality Considerations**
  - High Feasibility: Includes areas of generally good quality for the specific uses (agricultural or urban) of the target aquifer.
  - Low Feasibility: Includes areas of generally poor quality for the specific uses (agricultural or urban) of the target aquifer. This may include high total dissolved solids, nitrates, boron, or other natural or anthropogenic sources.

4.1.2 Engineering Criteria

The engineering criteria listed below did not effect the selection of potential water banking locations to be evaluated, but were developed to identify other factors that may distinguish between alternatives.

- **Water Supply Availability –** The available water supplies and assumptions regarding their reliability were identified and evaluated for use this study. As described in Section 3, each alternative would be evaluated using the same water supply pattern, so this was not a criteria that would distinguish between alternatives.

- **Ability to Utilize Existing Infrastructure –** The water banking opportunities utilized the available infrastructure to deliver water from the SWP to the Basin, i.e., through the Coastal Branch and the Polonio Pass Pumping Plant. All potential banking projects used this as the starting point to identify additional conveyance requirements. It was determined that each alternative would be evaluated using the same starting point (at PPWTP), so this was not a criteria that would distinguish between alternatives.

- **Capital Cost and Operation and Maintenance Costs –** The required facilities for an individual water banking opportunity were based upon size and location as determined by the hydrogeologic evaluation. Capital costs for the required facilities (suitable for comparative purposes between water banking alternatives) were based on readily available local information. It is expected that project costs will be a significant factor affecting the overall feasibility of water banking opportunities in the Basin, and one of the primary factors distinguishing between projects.

4.2 Selected Alternatives

The three selected alternatives presented below were developed based on review of the existing available information and field investigation to verify local conditions.

For evaluation purposes, each of the three alternatives consists of a combination of direct recharge and agricultural in-lieu recharge. The recharge area was evaluated to determine a combination of direct and in-lieu recharge based upon the existing land use and local hydrogeologic conditions as described above.

For the recovery of banked water, the new recovery wells were located to minimize drawdown interference during recovery operations with existing wells and other recovery wells while limiting infrastructure requirements. The actual number and distribution of recovery wells is based on existing well locations and local hydrogeologic conditions.

Figure 4-1 shows the locations of the three different areas for evaluation which include:

- Shell Creek/Camatta Creek and Lower San Juan Creek Recharge Areas,
- Creston Recharge Area, and
- Salinas River/Hwy 46 Recharge Area.

4.2.1 Shell Creek/Camatta Creek and Lower San Juan Creek Recharge Areas

The purpose of this alternative is to evaluate the groundwater banking potential in the San Juan Subarea shown on Figure 4-2. Potential areas that may support direct recharge were identified along Shell/Camatta Creeks and San Juan Creek. In addition, the agricultural areas (primarily vineyards) present in the Shandon area and along Shell Creek may provide in-lieu recharge opportunities.

The recharge operations included a combination of agricultural in-lieu recharge and direct recharge. This combination of in-lieu and direct recharge would disperse the recharge activities over a large area in order to access as much of the aquifer system as possible. This area is not subject to current groundwater level declines at this time.

Recovery operations would take place throughout the area receiving recharge water. Wells in this area can produce from 1,000 to 2,000 gallons per minute. It is expected that new groundwater recovery wells would be located along the conveyance pipeline to recover the banked water and return it to the PPWTP.

4.2.1.1 Hydrogeologic Setting

The average thickness of the aquifer system in the San Juan Subarea is approximately 450 feet, with an average specific yield of about 10 percent, resulting in an estimated groundwater storage capacity of about 4.2 million acre-feet. The aquifer typically consists of sand and gravel interbedded with discontinuous clay horizons. In the Shell Creek/Camatta Creek area, the aquifer contains sequences of sand and gravel up to several hundred feet thick. Previous field investigations have noted significant stream recharge in Shell/Camatta Creek (Fugro, 2002).

Throughout most of the area, the Paso Robles Formation, which comprises the deep aquifer and primary producing geologic unit, is underlain by the Santa Margarita Formation. Within the stream valleys, the alluvium is thin but highly permeable, consisting of sand and gravel with very high transmissivity values.

In the lower San Juan Creek and Shell Creek/Camatta Creek area, well production typically ranges from 1,000 to 2,000 gallons per minute (gpm), with typical specific capacity values of about 26 gallons per minute per foot of drawdown.

Water levels in wells in the San Juan area have shown both rising and falling conditions over the past 25 years. Wells exhibiting both the greatest decline and the greatest water level increases can be found in Camatta Canyon, indicating the effects of localized heavy agricultural pumping as well as the impacts of significant stream recharge. In general, the lower San Juan Creek and upper Shell Creek areas experienced a long period of declining water levels from the early 1960s through the mid-1990s, followed by a marked increase from the mid-1990s to the present. Wells along Camatta Canyon appear not to have experienced the same period of recovery in the 1990s, however, resulting in a slight decline of water levels. Generally, groundwater flow in the area is to the north-northwest.

Groundwater quality in the subarea is variable, depending on the area and the depth of the well. Groundwater quality in the Shell Creek and Camatta Canyon areas is typically very good, with TDS concentrations in the range of 150 to 300 mg/L, chloride concentrations less than 40 mg/L, and nitrates generally about 10 to 15 mg/L. Concentration levels of the major constituents of concern are relatively stable.

Groundwater quality in the lower San Juan Creek area is more variable. The shallow aquifer zones in the lower San Juan Creek area, above or below the confluence of Camatta Creek and San Juan Creek, have TDS concentrations greater than 2,000 mg/L with increasing nitrate levels that occasionally exceed 45 mg/L. Partially because of the water quality, this shallow zone is not used to a large degree.

The deeper aquifer in the lower San Juan Creek area is more typical of the deep Paso Robles Formation, with TDS concentrations in the 500 to 700 mg/L range and chloride concentrations in the 40 to 60 mg/L range.

The aquifer in the Shell Creek/Camatta Creek area is unconfined, with an apparent high degree of hydraulic communication between the shallow alluvium and the underlying Paso Robles Formation. Streamflow in the Shell Creek/Camatta Creek alluvium directly recharges the underlying deep aquifer. To the north of the confluence of the Camatta Creek and San Juan Creek, however, the deep primary production aquifer is semi-confined to confined, with limited direct hydraulic communication between the aquifer and the shallow alluvial systems. Thus, direct recharge applications in the lower San Juan Creek appear to have limited deep aquifer recharge potential.

4.2.2 Creston Recharge Area

The purpose of this alternative is to evaluate the groundwater banking potential in the Creston Subarea shown in Figure 4-3. The sand and gravel zones of the Creston basin sediments appear to be in direct contact with the shallow alluvial sand and gravel deposits of the Huerhuero Creek, which may provide direct recharge to the basin. Groundwater quality is generally good in the shallow zones, with increased mineralization from the southwest to the northeast.

The East Branch of the Huerhuero Creek has been identified as a potential recharge area. In addition, the agricultural areas (primarily vineyards) present in the Creston area may provide in-lieu recharge opportunities.

The recharge operations included primarily using direct recharge along the Huerhuero recharge area and secondarily using agricultural in-lieu in the Creston Area. This combination of in-lieu and direct recharge dispersed the recharge activities over a large area in order to access as much of the aquifer system as possible. Groundwater levels in this area are relatively stable.

Recovery operations would take place throughout the area receiving recharge water from the shallow alluvial aquifer and the Paso Robles Formation. Wells in this area can produce from 300 to 400 gallons per minute. It is expected that new groundwater recovery wells would be located along the pipeline to recover the banked water and return it to the PPWTP.

4.2.2.1 Hydrogeologic Setting

The average thickness of the aquifer system in the Creston Subarea is approximately 450 feet, with an average specific yield of about 9 percent, resulting in an estimated groundwater storage capacity of about 2 million acre-feet. This area has a two-layered aquifer system, with the shallow alluvial aquifer system overlying the Paso Robles Formation.

Throughout the Creston area, the deep basin sediments of the Paso Robles Formation are underlain predominantly by Tertiary-age marine sediments. In the southern portion of the area, the basin sediments are underlain by and in contact with the granitic rocks that form the groundwater basin boundary. The Paso Robles Formation sediments in the Creston area are typical of the rest of the basin, comprised of relatively thin, discontinuous sand and gravel layers interbedded with thicker layers of silt and clay.

Throughout most of the Creston area, alluvial deposits of variable thicknesses overlie the Paso Robles Formation beneath the flood plains and older stream terraces of Huerhuero Creek. These alluvial deposits reach depths as great as 100 feet in places and consist of much coarser and unconsolidated sedimentary layers than are typically found in the Paso Robles Formation. Groundwater recharge to the Creston area occurs where the shallow alluvial deposits are in contact with (overlying) the coarse-grained Paso Robles Formation aquifer.

Producing water wells in the Creston area penetrate and extract groundwater from both the alluvium and the Paso Robles Formation. Wells producing from the unconfined and highly permeable alluvium typically pump in the range of 300 to 400 gpm, with specific capacities in the range of 60 to 70 gpm per foot. Wells producing from the Paso Robles Formation also typically pump in the range of 300 to 400 gpm, but with much lower specific capacities, generally in the 5 to 10 gpm-per-foot range.

Water levels in wells in the northern part of the Creston area showed a general decline from the mid-1960s into the early 1990s. From the early 1990s to about 2000, water levels in most wells in the area increased markedly, resulting in more than 50 feet of water-level rise in the 20-year period prior to about 2000. Since 2000, water levels appear to have stabilized or perhaps declined slightly.

Near the town of Creston, water levels have remained relatively stable for many years. Several wells, particularly along the course of the Huerhuero Creek south of town, experienced flowing conditions and historic high water levels in the late 1990s.

Groundwater and surface water flows northward out of the Creston area primarily along the Huerhuero Creek drainage. Groundwater flow is generally to the northwest at a regional hydraulic gradient of approximately 0.009 feet per foot.

Groundwater quality in the Creston area is generally very good for drinking and for direct agricultural application. Typical TDS concentrations are in the 250 to 500 mg/L range, with chloride concentrations about 50 mg/L and nitrates generally below 20 mg/L. Overall, water quality trends in the area are relatively stable.

The primary source of recharge to the deep aquifer in the Creston area appears to be Huerhuero Creek. The aquifer in the Creston area, particularly in the northern portion of the subarea, appears to be unconfined for the most part, with an apparent high degree of hydraulic communication between the shallow alluvium of the creek and its tributaries and the underlying Paso Robles Formation.

4.2.3 Salinas River/Highway 46 Recharge Area

The purpose of this alternative is to evaluate the groundwater banking potential along Highway 46 and in the Salinas River Area shown in Figure 4-4.

Within the Subarea, the Estrella River north of Highway 46 has some areas that may provide favorable surface recharge, but the connection of these areas to the main aquifer system is not clearly understood at this time.

The Salinas River just south of Paso Robles has been identified as a potential recharge area. In addition, the agricultural areas (primarily vineyards) present along Highway 46 may provide in-lieu recharge opportunities.

Groundwater levels along Highway 46 and near Paso Robles have experienced the greatest declines in the basin. It is expected that groundwater recharge alternatives in this area may reduce the rate of groundwater-level declines and may allow for the recovery of groundwater levels during recharge operations.

The recharge operations included primarily using direct recharge along the Salinas River recharge area and secondarily using agricultural in-lieu in the Highway 46 Area. This combination of in-lieu and direct recharge dispersed the recharge activities over a large area in order to access as much of the aquifer system as possible.

Recovery operations would take place throughout the area receiving recharge water from the shallow alluvial aquifer and the Paso Robles Formation. Wells in this area can produce up to 1,000 gpm. Groundwater recovery wells may have to be disbursed over a large area to reduce the impacts of recovery operations on existing groundwater users.

4.2.3.1 Hydrogeologic Setting

The aquifer system in the Estrella Subarea averages about 700 feet of thickness with an 8 percent specific yield resulting in an estimated groundwater storage capacity of about 8.8 million acre-feet. This area has a two-layered aquifer system, with the shallow alluvial aquifer system overlying the Paso Robles Formation. Groundwater quality is generally good east of the Salinas River; however, elevated nitrate levels are present in some areas.

In the area of potential in-lieu recharge opportunities along Highway 46, the Paso Robles Formation consists of interbedded sand and gravel zones with clay beds that retard vertical percolation of groundwater. The direct recharge potential appears to be limited in this area because of the prevalence of clay interbeds, relatively low conductivity of the near-surface soils, and the thin to nil alluvial cover.

The Salinas River aquifer is a Recent-age younger alluvium comprised of stream channel and flood plain sediments deposited by the Salinas River. The thickness of the alluvium varies but is typically 75 to 100 feet thick in the potential direct recharge area. Short-term specific capacities at discharge rates of 1,000 gpm range from 20 to 60 gpm per foot of drawdown, with transmissivity values of about 100,000 gallons per day per foot of aquifer.

Well production yields in the Salinas River alluvium typically range from 800 gpm to as high as 1200 gpm. Well yields in the Paso Robles Formation in the Estrella area vary widely, but average about 500 to 800 gpm.

Water levels in wells in the Estrella area have exhibited severe declines over the past 25 years, through a combination of the presence of older, less permeable sediments along with localized increased water demand in the area. Water level declines in wells in the area ranging from 50 feet to as high as 200 feet have been noted.

Groundwater flows into the Estrella area from the north and northeast, from the east from Shandon and the San Juan Creek area, and from the south out of the Huerhuero Creek drainage. Along the Salinas River, groundwater flow follows the river drainage northward across the western portion of the basin towards the basin outlet.

Groundwater quality in the Estrella area is generally good, with TDS concentrations ranging from 400 to 700 mg/L, chlorides in the range of 50 to 80 mg/L, and nitrates generally below 40 mg/L. In the area of potential in-lieu recharge opportunities, water quality trends are relatively stable.

5 Hydrogeologic Evaluation

This section describes the results of the hydrogeologic evaluation of the recharge and water banking scenarios using a numerical groundwater flow model previously developed for the Paso Robles Groundwater Basin.

5.1 Model Background Information

The groundwater flow model used in this study to evaluate the recharge and water banking scenarios was previously developed for the County of San Luis Obispo Public Works Department by Fugro West, Inc. and ETIC Engineering (Fugro, 2005). The numerical groundwater model was developed in MODFLOW-2000 using the Groundwater Vistas graphical-user-interface for MODFLOW. The function of the model was to simulate groundwater level and storage changes in the Paso Robles Groundwater Basin for the 17-year simulation period representing the 1981 through 1997 historical period. In that study, the model was further adapted to evaluate three different scenarios of future water supply and demand in the Paso Robles Groundwater Basin.

The aquifer system in the Paso Robles Groundwater Basin is simulated in the groundwater flow model using four model layers.

- Model layer 1 represents the highly permeable unconfined, coarse-grained alluvial sediments associated with the channel corridors of the Salinas River and the Estrella River. Alternative 3 includes direct recharge into this layer.
- Model layer 2 represents the less permeable channel bed of the Salinas River and a low permeable fine-grained unit that underlies the modeled extent of the Estrella River and also extends to the north and south of the Estrella River by approximately three to four miles in each direction. None of the simulated alternatives include direct recharge into this layer.
- Model layers 3 and 4 represent the upper and lower portions of the confined to semi-confined Paso Robles Formation. Alternatives 1 and 2 include direct recharge into this layer. The project pumping associated with the groundwater recovery operations occur in these model layers.
- Reductions in groundwater pumping resulting from the in-lieu recharge operations were assigned to the individual model layer where the pumping occurs.

The model calculates the changes in groundwater levels and groundwater storage in each layer over the 17-year base period. Each year in the base period was divided into two 6-month stress periods, resulting in a total of 34 stress periods over the 17 years. The stress period concept implies that the modeled groundwater recharge and discharge stresses have constant rates of application during each 6-month stress period. Although the rates are constant in time during a given stress period, the stresses may and often do vary spatially during the same stress period. The different recharge and discharge stresses frequently change from stress period to stress period. In the model, the recharge stresses included: 1) subsurface inflows, 2) percolation of precipitation, 3) streambed percolation, 4) percolation of irrigation water, and 5) percolation of wastewater discharge. Conversely, the discharge stresses included: 1) subsurface outflows; 2) urban; agricultural, and domestic groundwater pumping; 3) discharges to streams; and 4) extraction by phreatophytes.

5.2 Evaluation Criteria

Numerical evaluation of the recharge and water banking scenarios was performed by comparing the simulated groundwater levels, groundwater storage changes, and groundwater mass balance components (i.e., other recharge and discharge stresses) against those generated by the Baseline Condition. Other mass balance components include changes to evapotranspiration losses, stream flows, and subsurface flows through the boundary conditions caused by the recharge and water banking scenarios.

Finally, the efficiency of the recharge and water banking scenarios was evaluated by comparing the simulated volumes of recharge retained in the aquifer system under the various alternatives to the amounts of recharge actually implemented according to the recharge and water banking schedules.

5.3 Baseline Condition

In the groundwater modeling study performed for the Paso Robles Groundwater Basin (Fugro, 2005), Scenario 2 of that study was referred to as the "Build-Out Scenario." The Build-Out Scenario evaluated the future impacts on basin groundwater resources of urban build-out and maximum reasonable agricultural water demand, which increases basin-wide groundwater pumping by about 33,000 acre-feet per year. The groundwater flow model that simulated the Build-Out Scenario is the same model that is used in this study to evaluate the recharge and water banking scenarios for the three alternatives. The simulated groundwater levels and storage changes from the original Build-Out Scenario were used as the baseline conditions (i.e., Baseline Condition) for this study for comparison of the impacts of the recharge and water banking scenarios. The Baseline

Condition therefore represents the future scenario in which no recharge operations and no water banking operations are implemented in the Paso Robles Groundwater Basin.

The annual agricultural groundwater pumping demand for the Baseline Condition is assumed to be constant over the 34 stress periods. For each year, the total annual agricultural pumping demand is divided between the Fall-Winter stress period and the Spring-Summer stress period. Since the Spring-Summer stress period coincides with the predominant portion of the crop-growing season during which agricultural water demands are greatest during the year, the pumping rate for the Spring-Summer stress period is always greater than the Fall-Winter stress period.

5.4 Simulation of Recharge and Water Banking Operations

The modifications to the Baseline Condition to account for recharge and recovery operations evaluated in the groundwater modeling are shown in Figure 3-1.

The recharge operations (i.e., direct recharge plus in-lieu recharge) are applied during the active recharge stress periods numbered 7 to 10, 13 to 18, 25 to 26, and 29 to 34. The in-lieu recharge potential for these areas occurs at specific wells within the model for each alternative. For these active recharge stress periods, pumping from these agricultural wells was disabled in the model simulations and the water demands for those agricultural areas were assumed to be met with available SWP water. During the stress periods when recharge was not active, agricultural pumping in the wells associated with the in-lieu recharge areas are once again active in the model. The total amount of agricultural pumping demand in the in-lieu recharge areas for each stress period was subtracted from the 9,000 acre-feet of available SWP water for recharge operations. The remainder of the 9,000 acre-feet of SWP water is assumed to be available for direct recharge. The allotments of direct recharge and in-lieu recharge for each alternative are presented in Table 5-1.

During water banking operations, recharge operations and recovery operations do not occur during the same stress periods, but vary according to the water banking schedule shown in Figure 3-1 and Table 5-1. Recovery wells for each alternative were located to maximize the recovery of the recharged water while being no less than 2,500 feet from the nearest modeled urban, agricultural, or domestic well. Each recovery well is screened only in model layer 4 (i.e., the Paso Robles Formation).

Table 5-1

Summary of Groundwater Model Input Data

Stress Period	Groundwater Recharge Operations										Groundwater Recovery Operations		
	Alternative 1a and 1b			Alternative 2a and 2b			Alternative 3a and 3b			Cumulative Volume of Groundwater for Recharge Alternatives (acre-feet)	Alternative 1b, 2b, and 3b		Cumulative Volume of Groundwater for Banking Alternatives (acre-feet)
	Direct Groundwater Recharge (acre-feet)	In-Lieu Groundwater Recharge (acre-feet)	Total Groundwater Recharge (acre-feet)	Direct Groundwater Recharge (acre-feet)	In-Lieu Groundwater Recharge (acre-feet)	Total Groundwater Recharge (acre-feet)	Direct Groundwater Recharge (acre-feet)	In-Lieu Groundwater Recharge (acre-feet)	Total Groundwater Recharge (acre-feet)		Total Groundwater Recovery (acre-feet)	Cumulative Groundwater Recovery (acre-feet)	
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	9,000	0	0	9,000
8	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	18,000	0	0	18,000
9	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	27,000	0	0	27,000
10	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	36,000	0	0	36,000
11	0	0	0	0	0	0	0	0	0	36,000	9,000	9,000	27,000
12	0	0	0	0	0	0	0	0	0	36,000	9,000	18,000	18,000
13	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	45,000	0	18,000	27,000
14	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	54,000	0	18,000	36,000
15	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	63,000	0	18,000	45,000
16	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	72,000	0	18,000	54,000
17	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	81,000	0	18,000	63,000
18	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	90,000	0	18,000	72,000
19	0	0	0	0	0	0	0	0	0	90,000	9,000	27,000	63,000
20	0	0	0	0	0	0	0	0	0	90,000	9,000	36,000	54,000
21	0	0	0	0	0	0	0	0	0	90,000	9,000	45,000	45,000
22	0	0	0	0	0	0	0	0	0	90,000	9,000	54,000	36,000
23	0	0	0	0	0	0	0	0	0	90,000	9,000	63,000	27,000
24	0	0	0	0	0	0	0	0	0	90,000	9,000	72,000	18,000
25	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	99,000	0	72,000	27,000
26	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	108,000	0	72,000	36,000
27	0	0	0	0	0	0	0	0	0	108,000	9,000	81,000	27,000
28	0	0	0	0	0	0	0	0	0	108,000	9,000	90,000	18,000
29	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	117,000	0	90,000	27,000
30	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	126,000	0	90,000	36,000
31	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	135,000	0	90,000	45,000
32	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	144,000	0	90,000	54,000
33	8,587	413	9,000	8,935	65	9,000	8,074	926	9,000	153,000	0	90,000	63,000
34	6,660	2,340	9,000	8,630	370	9,000	4,182	4,818	9,000	162,000	0	90,000	72,000
Total	**137,220**	**24,780**	**162,000**	**158,085**	**3,915**	**162,000**	**110,305**	**51,695**	**162,000**		**90,000**		
Average (Stress Period)	**4,036**	**729**	**4,765**	**4,650**	**115**	**4,765**	**3,244**	**1,520**	**4,765**		**2,647**		
Average (Annual)	**4,036**	**729**	**4,765**	**4,650**	**115**	**4,765**	**3,244**	**1,520**	**4,765**		**2,647**		
Percent of Total Recharge	**85%**	**15%**		**98%**	**2%**		**68%**	**32%**					

5.5 Model Implementation and Results

This section describes the application of the groundwater model to each alternative, and presents the resulting changes to the groundwater conditions compared to the Baseline Conditions.

5.5.1 Alternative 1 – Shell Creek/Camatta Creek and Lower San Juan Creek Recharge Areas

5.5.1.1 Alternative 1a: Recharge-Only Scenario

Alternative 1a involves the implementation of the recharge-only schedule in the Shell Creek/Camatta Creek and Lower San Juan Creek recharge areas shown in Figure 4-2. The southern site is located in the Shell Creek/Camatta Creek area and the northern site is located in the Lower San Juan Creek area. Preliminary model simulations of Alternative 1a indicated that the northern site would be inappropriate for recharge-only operations due to the existence of the semi-confining to confining layer. Consequently, all of the water available for direct recharge was directed to the southern recharge site (i.e., Shell Creek/Camatta Creek).

As shown on Table 5-1, the total in-lieu recharge potential for the Fall-Winter and Spring-Summer stress periods in Alternative 1 are 413 and 2,340 acre-feet, respectively, or 4.6 percent and 26 percent of the 9,000 acre-feet of water available for recharge during active recharge stress periods. The remaining water available for direct recharge during the Fall-Winter and Spring-Summer stress periods in Alternative 1 was 8,587 and 6,660 acre-feet, respectively.

Direct recharge in the southern area of Alternative 1 was implemented in 18 grid cells in model layer 4, for a total recharge area of 180 acres (i.e., 10 acres per grid cell).

The model results comparing the changes in groundwater levels and storage between Alternative 1a and the Baseline Condition following stress periods 18, 24, and 34 are shown in Figure 5-1. Direct recharge in the southern area resulted in groundwater levels in the range of 50 to 100 feet higher than would otherwise be observed without the recharge project. As expected, the increased groundwater levels are centered about the recharge cells corresponding to the southern recharge site and decrease radially away from the recharge areas. The decrease in the groundwater levels between stress period 18 and stress period 24 reflects the dissipation of the recharged water into the aquifer system towards the Baseline Condition groundwater levels during this 3-year period in which recharge was not active. The subsequent increase in groundwater levels in Alternative 1a relative to the Baseline Condition from stress period 24 to stress period 34 reflects the active recharge operations from stress periods 25 to 26 and stress periods 29 to 34.

The Change in Groundwater Storage Graph presented in Figure 5-1 shows the effect of Alternative 1a on the Baseline Condition, and the response of groundwater storage to the seasonal and annual fluctuations of the 17-year simulation period (34 stress periods).

The Cumulative Change in Groundwater Storage Graph for Alternative 1a has a similar shape and magnitude to the recharge-only schedule curve that is also displayed in Figure 5-1, demonstrating that much of the recharged water remains in the basin as groundwater storage. Of the total recharge amount of 162,000 acre-feet implemented over the 34 stress periods, approximately 131,400 acre-feet (about 81 percent) of this amount is reflected in increased groundwater storage (Table 5-2).

The remaining 30,600 acre-feet (about 19 percent) of the recharged water discharges from the aquifer system to the stream network and leaves the area as stream outflow (Figure 5-1 and Table 5-2). Increases in evapotranspiration losses and subsurface outflows through the boundary conditions relative to the Baseline Condition were not significant for Alternative 1a.

Table 5-2
Summary of Groundwater Modeling Results at End of Simulation Period

	Groundwater Recharge Activities			Disposition of Banked Water						
	Direct Groundwater Recharge	In-Lieu Groundwater Recharge	Total Groundwater Recharge	Recoverd Groundwater		Change in Groundwater Storage		Change in Stream Outflow		Total
	(acre-feet)	(acre-feet)	(acre-feet)	(acre-feet)	(percent)	(acre-feet)	(percent)	(acre-feet)	(percent)	(acre-feet)
Recharge Alternatives										
Alt 1a	137,220	24,780	162,000	0	0%	131,400	81%	30,600	19%	162,000
Alt 2a	158,085	3,915	162,000	0	0%	45,900	29%	114,800	71%	160,700
Alt 3a	110,305	51,695	162,000	0	0%	78,000	48%	83,900	52%	161,900
Water Banking Alternatives										
Alt 1b	137,220	24,780	162,000	90,000	56%	55,900	35%	16,100	10%	162,000
Alt 2b	158,085	3,915	162,000	90,000	55%	-3,900	-2%	77,300	47%	163,400
Alt 3b	110,305	51,695	162,000	90,000	56%	49,700	31%	22,400	14%	162,100

5.5.1.2 Alternative 1b: Water Banking Scenario

Alternative 1b involves the implementation of the water banking schedule (Figure 3-1) in and around the southern recharge site in the Shell Creek/Camatta Creek area (Figure 4-2). The water banking schedule includes both direct and in-lieu recharge operations according to the recharge schedule used for Alternative 1a as well as recovery operations during stress periods when recharge operations are not active (see Table 5-1 and Figure 3-1). The recharge operations for Alternative 1b are identical to those implemented in Alternative 1a.

For Alternative 1b, a total of eight recovery wells were implemented in the model with a combined extraction rate of 9,000 acre-feet per stress period (i.e., 1,500 acre-feet per month for six months) for stress periods when recharge operations are active.

Maps displaying the differences in simulated groundwater levels in model layer 4 between Alternative 1b and the Baseline Condition following stress periods 18, 24, and 34, are presented in Figure 5-2. At the end of stress period 18 after a three-year recharge operation, regional groundwater levels in Alternative 1b were as high as 50 to 100 feet more than would otherwise be observed if there were no recharge project.

At the end of stress period 24 after a three-year recovery-only operation, the differences in groundwater levels between Alternative 1b and the Baseline Condition ranged from 100 feet lower to 25 feet higher than would otherwise be observed without the recharge and recovery project (Figure 5-2). After stress period 24, groundwater levels in Alternative 1b were generally less than those of the Baseline Condition in the vicinity of the recovery well field; however, groundwater levels for Alternative 1b remained higher in other areas near the recharge site where recovery wells were not present. At the end of stress period 34 after another three-year recharge operation, the differences in groundwater levels between Alternative 1b and the Baseline Condition ranged from about equal to the Baseline Condition (i.e., no overall groundwater level increase or decline) to as much as 100 feet higher than would otherwise be observed without the project (Figure 5-2).

Generally, groundwater level differences after stress period 34 were similar to those differences following stress period 24. Overall, the highest positive differences in groundwater levels for Alternative 1b over the Baseline Condition occurred after the three-year recharge operations (i.e., stress periods 13 to 18 and stress periods 29 to 34); while the highest negative differences occurred after the three-year recovery operation (i.e., stress periods 19 to 24).

A plot of the increase in groundwater storage for Alternative 1b above the Baseline Condition over the 34 stress periods is also presented in Figure 5-2. The cumulative storage change curve over the 34 stress periods is similar in shape to the water banking schedule curve that is also displayed in Figure 5-2. At the end of stress period 34, the water banking operation had extracted 90,000 acre-feet of groundwater; groundwater storage had increased by about 55,900 acre-feet above the Baseline Condition; and 16,100 acre-feet of groundwater above the Baseline Condition discharged to the stream network and left the basin as stream outflow as shown on Table 5-2 (i.e., 90,000 + 55,900 + 16,100 = 162,000 acre-feet of total recharge over the 34 stress periods according to the recharge schedule).

Increases in evapotranspiration losses and subsurface outflows through the boundary conditions relative to the Baseline Condition were not significant for Alternative 1b.

5.5.2 Alternative 2 - Creston Recharge Area

5.5.2.1 Alternative 2a: Recharge-only Scenario

Alternative 2a involves the implementation of the recharge-only schedule in the Creston recharge area (Figure 4-3). The allotments of direct recharge and in-lieu recharge for each stress period are presented in Table 5-1. The total in-lieu recharge potential for the Fall-Winter and Spring-Summer stress periods in Alternative 2 are 65 and 370 acre-feet, respectively, or 0.7 percent and 4 percent of the 9,000 acre-feet of water available for recharge during active recharge stress periods. The remaining water available for direct recharge during the Fall-Winter and Spring-Summer stress periods in Alternative 2 was 8,935 and 8,630 acre-feet, respectively.

Direct recharge in the Creston area was implemented in 9 grid cells in model layer 4, for a total recharge area of 90 acres (i.e., 10 acres per grid cell). Maps displaying the differences in simulated groundwater levels in model layer 4 between Alternative 2a and the Baseline Condition following stress periods 18, 24, and 34 are presented in Figure 5-3. Direct recharge in the Creston Area resulted in significant increases in groundwater levels that would likely result in either water ponding at the ground surface or artesian conditions in some wells. As expected, the increased groundwater levels centered about the recharge cells corresponding to the Creston recharge area and decreased in the northern direction from these recharge cells (Figure 5-3).

As with Alternative 1a, the decrease in the groundwater level rise between stress period 18 and stress period 24 reflects the recovery of the aquifer system towards the Baseline Condition groundwater levels during this three-year period in which recharge was not active. The subsequent increase in groundwater levels in Alternative 2a relative to the Baseline Condition from stress period 24 to stress period 34 reflects again the active recharge operations from stress periods 25 to 26 and stress periods 29 to 34.

The Change in Groundwater Storage Graph presented in Figure 5-3 shows the effect of Alternative 2a on the Baseline Condition, and the response of groundwater storage to the seasonal and annual fluctuations of the 17-year simulation period (34 stress periods).

The Cumulative Change in Groundwater Storage Graph for Alternative 1a has a similar shape and magnitude to the recharge-only schedule curve that is also displayed in Figure 5-3, demonstrating that much of the water recharged remains in the basin as groundwater storage. Of the total recharge amount of 162,000 acre-feet implemented over the 34 stress periods, approximately 45,900 acre-feet (about 28 percent) of this amount is reflected in increased groundwater storage (Table 5-2).

The remaining 114,800 acre-feet (about 71 percent) of the recharged water discharges from the aquifer system to the stream network and leaves the area as stream outflow (Figure 5-3 and Table 5-2). Increases in evapotranspiration losses and subsurface outflows through the boundary conditions relative to the Baseline Condition were not significant for Alternative 2a.

5.5.2.2 Alternative 2b: Water Banking Scenario

Alternative 2b involves the implementation of the water banking schedule (Figure 3-1) in and around the Creston recharge area (Figure 4-3). The water banking schedule includes both direct and in-lieu recharge operations according to the recharge schedule used for Alternative 2a, as well as recovery operations during stress periods when recharge operations are not active. The recharge operations for Alternative 2b are identical to those implemented in Alternative 2a. In the water banking scenario, recharge operations and recovery operations do not occur during the same stress periods but instead alternate according to the water banking schedule.

For Alternative 2b, a total of 33 recovery wells were implemented in the model with a combined extraction rate of 9,000 acre-feet per stress period (i.e., 1,500 acre-feet per month for six months). The locations of the recovery wells are displayed in Figure 5-4. In the model, four recovery wells were placed just east of the grid cells representing the Creston recharge area, one was placed to the west of the recharge cells, and the remaining 29 recovery wells were placed north of these recharge grid cells in the down-gradient direction. The recovery wells were placed in and around the area in which significant groundwater level rises were observed in Alternative 2a following stress periods 18 and 34 (Figure 5-4).

Plan view maps displaying the differences in simulated groundwater levels in model layer 4 between Alternative 2b and the Baseline Condition following stress periods 18, 24, and 34 are presented in Figure 5-4. At the end of stress period 18, groundwater levels were significantly higher than the Baseline Condition, which would likely result in either ponding at the ground surface or artesian conditions in some wells.

At the end of stress period 24, the recovery effects would likely result in groundwater levels several tens of feet lower than would otherwise be observed without the recharge and recovery project.

At the end of stress period 34, the groundwater levels would likely recover in the southern portion of the area where direct recharge occurs, but water levels would still be significantly lowered in the northern and eastern part of the area as a result of the earlier groundwater recovery operations.

Generally, groundwater level differences after stress period 34 were similar to those differences following stress period 24 in and around the immediate recharge area. However, groundwater levels further north from the recharge area after stress period 34 have not recovered to the levels experienced after the three-year recharge period following stress period 18. Overall, the highest positive differences in groundwater levels for Alternative 2b over the Baseline Condition occurred after the three-year recharge operations (i.e., stress periods 13 to 18 and stress periods 29 to 34) in the immediate Creston recharge area, while moderate negative differences persisted elsewhere at the end of the 34 stress periods due to delayed recovery of groundwater levels.

A plot of the increase in groundwater storage for Alternative 2b above the Baseline Condition over the 34 stress periods is also presented in Figure 5-4. The cumulative storage change curve over the 34 stress periods bears a similar shape to the water banking schedule curve, although the two curves diverge significantly by the end of the 34 stress periods because of the continued loss of recharge water in the streams and the inability of the aquifer to absorb the volume of the recharge project. At the end of stress period 34, the water banking operation had extracted 90,000 acre-feet of groundwater; groundwater storage had decreased by 3,900 acre-feet below the Baseline Condition; and 77,300 acre-feet of groundwater above the Baseline Condition discharged to the stream network and left the area as stream outflow. Increases in evapotranspiration losses and subsurface outflows through the boundary conditions relative to the Baseline Condition were not significant for Alternative 2b.

5.5.3 Alternative 3 - Salinas River/Highway 46 Recharge Area

5.5.3.1 Alternative 3a: Recharge-Only Scenario

Alternative 3a involves the implementation of the recharge-only schedule in the Salinas River/Highway 46 recharge area (Figure 4-4). The allotments of direct recharge and in-lieu recharge for each stress period are presented in Table 5-1. The total in-lieu recharge potential for the Fall-Winter and Spring-Summer stress periods in Alternative 3 are 926 and 4,818 acre-feet, respectively, or 10 percent and 54 percent of the 9,000 acre-feet of water available for recharge during active recharge stress periods. The remaining water available for direct recharge during the Fall-Winter and Spring-Summer stress periods in Alternative 3 was 8,074 and 4,182 acre-feet, respectively. Direct recharge in the Salinas River/Highway 46 area was implemented in 9 grid cells in model layer 1, for a total recharge area of 90 acres (i.e., 10 acres per grid cell).

The model results comparing the changes in groundwater levels and storage between Alternative 3a and the Baseline Condition is shown in Figure 5-5 for layer 4 and Figure 5-6 for layer 1.

In general, the highest groundwater level increases in model layer 4 centered about the Salinas River recharge cells and the in-lieu recharge areas to the northwest, and decreased radially away from the middle regions of these areas (Figure 5-5). As with Alternatives 1a and 2a, the decrease in the groundwater level rise between stress period 18 and stress period 24 reflects the recovery of the aquifer system towards the Baseline Condition groundwater levels during this three-year period in which recharge was not active. The subsequent increase in groundwater levels in Alternative 3a relative to the Baseline Condition from stress period 24 to stress period 34 reflects again the active recharge operations from stress periods 25 to 26 and stress periods 29 to 34.

A plot of the increase in groundwater storage for Alternative 3a above the Baseline Condition over the 34 stress periods is also presented in Figure 5-5. The cumulative storage change curve retains a similar shape to the recharge-only schedule curve over the 34 stress periods. The impacts of Alternative 3a on stream outflow, evapotranspiration losses, boundary condition outflows, and overall groundwater storage relative to the Baseline Condition are presented in Table 5-2.

Of the total recharge amount of 162,000 acre-feet implemented over the 34 stress periods, approximately 78,000 acre-feet (about 48 percent) of this amount is reflected in increased groundwater storage (Figure 5-5). The remaining 83,900 acre-feet of the recharge discharges from the aquifer system to the stream network and leaves the area as stream outflow. As with Alternatives 1a and 2a, increases in evapotranspiration losses and subsurface outflows through the boundary conditions relative to the Baseline Condition were not significant for Alternative 3a.

5.5.3.2 Alternative 3b: Water Banking Scenario

Alternative 3b involves the implementation of the water banking schedule (Figure 3-1) in and around the Salinas River/Highway 46 recharge area (Figure 4-4). The water banking schedule includes both direct and in-lieu recharge operations according to the recharge schedule used for Alternative 3a, as well as recovery operations during stress periods when recharge operations are not active (see Table 5-1 and Figure 5-7). The recharge operations for Alternative 3b are identical to those implemented in Alternative 3a. In the water banking scenario, recharge operations and recovery operations do not occur during the same stress periods but instead alternate according to the water banking schedule shown in Figure 3-1 and in Table 5-1.

For Alternative 3b, a total of 17 recovery wells were implemented in the model with a combined extraction rate of 9,000 acre-feet per stress period (i.e., 1,500 acre-feet per month for six months) for stress periods when recharge operations are active. The locations of the recovery wells are displayed in Figure 5-7. The 13 recovery wells in the Salinas River recharge area accounted for 87 percent of the total extraction rate of 9,000 acre-feet per stress period and the 4 recovery wells placed in the in-lieu recharge area accounted for the remaining 13 percent of the total extraction.

Maps displaying the differences in simulated groundwater levels in model layer 4 between Alternative 3b and the Baseline Condition following stress periods 18, 24, and 34 are presented in Figure 5-7. At the end of stress period 24, water levels in the in-lieu area would approach the levels expected in the Baseline Condition. However, as noted previously, only 13 percent of the total recovery extraction occurs in the four recovery wells associated with the in-lieu recharge area, subsequently mitigating the drawdown of groundwater levels during recovery periods. Groundwater levels in the Salinas River Area, however, would likely be depressed and might reflect a condition where not all of the water could be recovered due to declining water levels.

At the end of stress period 34 the difference in groundwater levels would again increase significantly because of the direct and in-lieu recharge programs. Generally, groundwater level differences in and around both the Salinas River recharge area and the in-lieu recharge area after stress period 34 were similar to those following stress period 24. Groundwater levels further north from the Salinas River recharge area after stress period 34 have not completely recovered to the levels experienced after the three-year recharge period following stress period 18 (Figure 5-7). Overall, the highest positive differences in groundwater levels for Alternative 3b over the Baseline Condition occurred after the three-year recharge operations (i.e., stress periods 13 to 18 and stress periods 29 to 34) in the in-lieu recharge area, with moderate positive differences occurring around the Salinas River recharge area.

A plot of the increase in groundwater storage for Alternative 3b above the Baseline Condition over the 34 stress periods is also presented in Figure 5-7. Overall, the cumulative storage change curve for Alternative 3b retains a similar shape to the water banking schedule curve over the 34 stress periods (Figure 5-6). At the end of stress period 34, the water banking operation had extracted 90,000 acre-feet of groundwater; groundwater storage had increased by 49,700 acre-feet above the Baseline Condition; and 22,400 acre-feet of groundwater above the Baseline Condition discharged to the stream network and left the basin as stream outflow. Increases in evapotranspiration losses and subsurface outflows through the boundary conditions relative to the Baseline Condition were not significant for Alternative 3b.

5.6 Summary of Hydrogeologic Feasibility Analysis

The recharge and water banking scenarios were simulated in the three alternative areas using the numerical groundwater model by implementation of the recharge and recovery schedules presented in Figure 3-1. The impacts of these scenarios were evaluated by comparing their results against those of the Baseline Condition (i.e., the "no action" scenario of no recharge and no recovery operations in the same 34 stress periods). For the recharge-only scenarios (i.e., Alternatives 1a, 2a, and 3a), a total of 162,000 acre-feet of SWP water was applied over the 34 stress periods. For each stress period in which recharge operations were active, a total of 9,000 acre-feet of SWP water was applied as either direct recharge in the simulated pond areas or as in-lieu recharge in agricultural areas identified as having in-lieu recharge potential. For the water banking scenarios (i.e., Alternatives 1b, 2b, and 3b), 162,000 acre-feet of SWP water was also applied over the 34 stress periods according to the recharge-only schedule and a total of 90,000 acre-feet of groundwater was recovered (via extraction wells) according to the water banking schedule (Figure 3-1). The impacts on basin groundwater levels and storage from the recharge and water banking operations in the three alternative areas relative to the Baseline Condition were presented in Figures 5-1 through 5-7 and Tables 5-1 and 5-2. The overall results of the recharge and water banking scenarios summarized in Table 5-2 are discussed below.

5.6.1 Summary of Recharge Alternatives

Over the 34 stress periods of the model simulation period, a total of 162,000 acre-feet of SWP water was recharged in each of Alternatives 1a, 2a, and 3a. Relative to the Baseline Condition, the 162,000 acre-feet of recharge in each alternative resulted in changes in groundwater storage, stream outflows, evapotranspiration losses, subsurface flows across constant head boundaries, and subsurface flows across general-head boundaries. Recharge impacts on these groundwater mass balance components differed between alternatives as a function of their differing local aquifer characteristics (e.g., layer thicknesses, hydraulic conductivities); proximity of direct recharge areas to local streams; existing groundwater pumping operations in each area; locations of in-lieu recharge areas relative to direct recharge areas; distribution of recharge between direct recharge and in-lieu recharge; and proximity of recharge areas to constant-head and general-head boundaries.

Of the 162,000 acre-feet of SWP water recharged in Alternative 1a, groundwater storage increased by 131,400 acre-feet (about 81 percent), stream outflows increased by 30,600 acre-feet (about 29 percent), and increased losses through evapotranspiration and other boundary conditions were negligible (less than 1 percent). For Alternative 2a, groundwater storage increased by 45,900 acre-feet (about 28 percent); stream outflows increased by 114,800 acre-feet (about 71 percent); and increased losses through evapotranspiration, constant-head boundaries, and general-head boundaries were about 1,400 acre-feet (about 1 percent). For Alternative 3a, groundwater storage increased by 78,000 acre-feet (about 48 percent); stream outflows increased by 83,900 acre-feet (about 52 percent); and increased losses through evapotranspiration, constant-head boundaries, and general-head boundaries were negligible (less 1 percent). Overall, Alternative 1a retained the greatest volume of recharge in groundwater storage at the end of the 34 stress periods, followed by Alternative 3a and then by Alternative 2a (Figure 5-8). For each of Alternatives 1a, 2a, and 3a, the most significant losses of groundwater in the system resulting from recharge-only operations was due to stream outflows in the basin. As shown in Figure 5-9, Alternatives 2a and 3a had the greatest losses to stream outflows. Losses of groundwater resulting from the recharge-only operations through evapotranspiration, constant-head boundary conditions, and general-head boundary conditions were relatively minor.

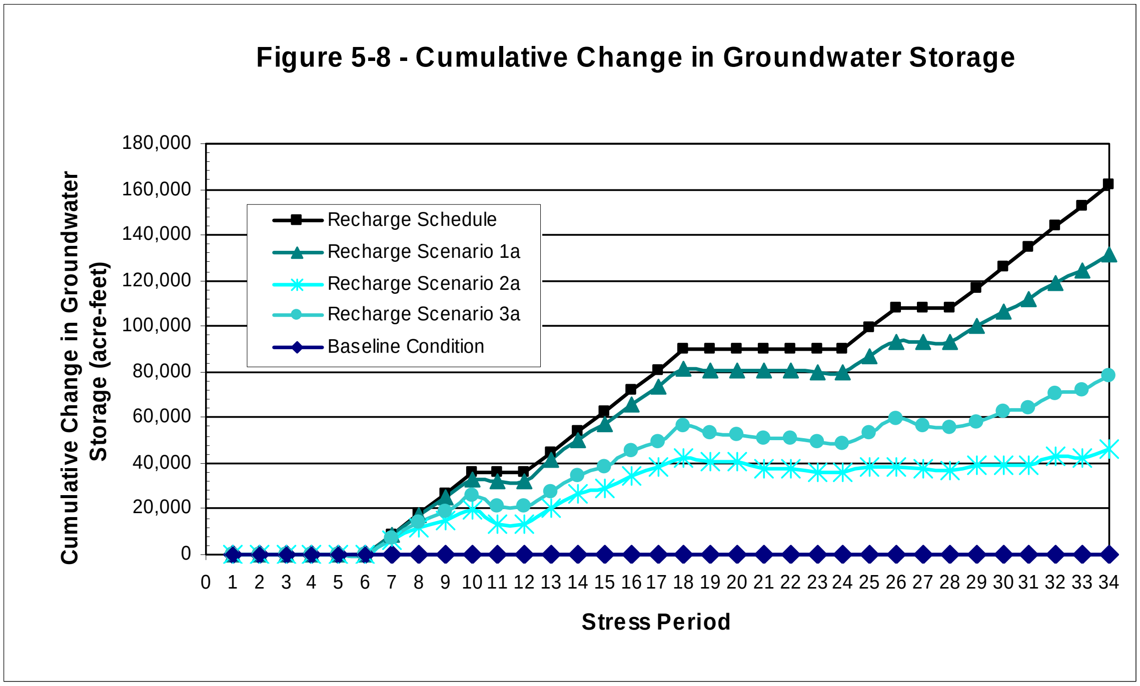


Figure 5-8 - Cumulative Change in Groundwater Storage
Cumulative Change in Groundwater Storage (acre-feet)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
Stress Period
Recharge Schedule
Recharge Scenario 1a
Recharge Scenario 2a
Recharge Scenario 3a
Baseline Condition

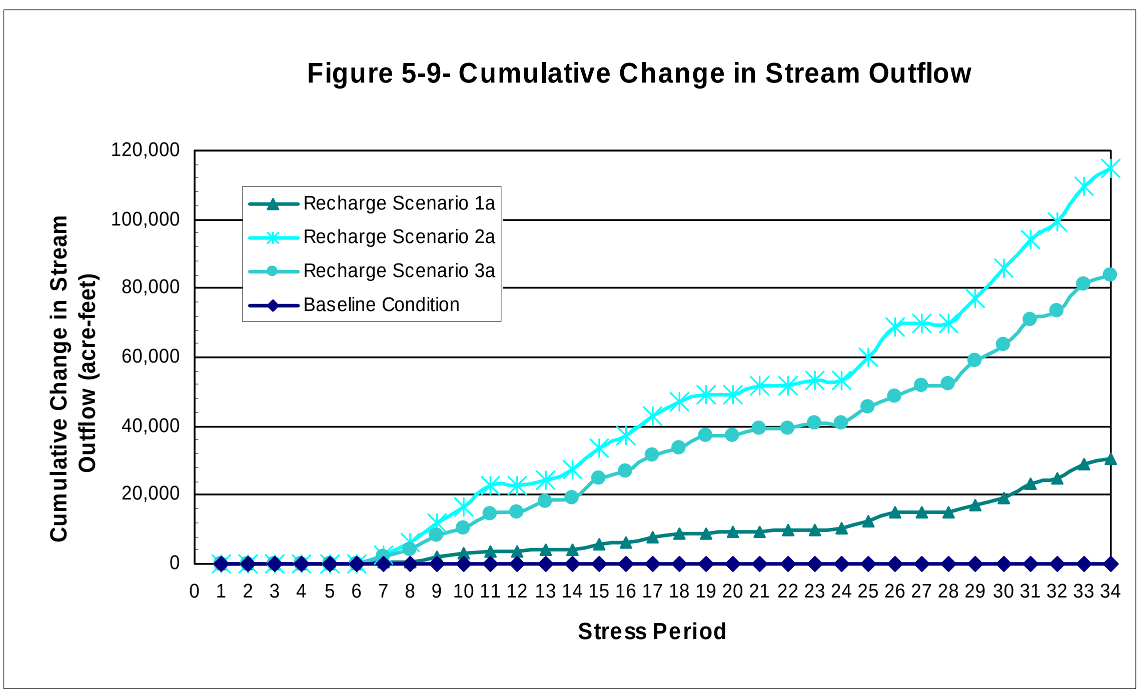


Figure 5-9- Cumulative Change in Stream Outflow
Cumulative Change in Stream Outflow (acre-feet)
120,000
100,000
80,000
60,000
40,000
20,000
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
Stress Period
Recharge Scenario 1a
Recharge Scenario 2a
Recharge Scenario 3a
Baseline Condition

In each alternative, direct recharge in ponds close to local streams no doubt resulted in greater stream flow losses than if the ponds were located in areas away from streams. Losses through stream outflows for Alternative 3a were likely mitigated during the Spring-Summer stress periods when recharge operations were active due to the high allocation of SWP water (54 percent) to in-lieu recharge in the area northeast of the Salinas River/Highway 46 direct recharge site. Relatively high in-lieu recharge allocations of SWP water (26 percent) for Alternative 1a during the Spring-Summer stress periods may have also mitigated against greater stream outflow losses in that area. However, for Alternative 2a, where stream outflows were highest amongst the three alternatives, in-lieu recharge accounted for only 4 percent of the total recharge during the Spring-Summer stress periods when recharge operations were active.

These results suggest that both the location of direct recharge sites and the amount of in-lieu recharge significantly impact the amount of recharge that is retained within groundwater storage.

5.6.2 Summary of Water Banking Alternatives

Over the 34 stress periods of the model simulation period, a total of 162,000 acre-feet of SWP water was recharged in each of the Alternatives 1b, 2b, and 3b, and a total of 90,000 acre-feet of groundwater was also recovered in each. Consequently, a net recharge amount of 72,000 acre-feet (i.e., 162,000 acre-feet of recharge minus 90,000 acre-feet of recovery) was added to the basin over the 34 stress periods. As with the recharge-only scenario, recharge and recovery impacts on the groundwater mass balance components differed between alternatives as a function of a variety of physical and operational differences.

Of the 72,000 acre-feet of net recharge in Alternative 1b, groundwater storage increased by 55,900 acre-feet, stream outflows increased by 16,100 acre-feet, and changes in evapotranspiration losses and other boundary condition flows were negligible. For Alternative 2b, groundwater storage decreased by 3,900 acre-feet, stream outflows increased by 77,300 acre-feet, constant-head boundary inflows increased by about 1,400 acre-feet, and evapotranspiration losses and flows across general-head boundaries were negligible. For Alternative 3b, groundwater storage increased by 49,000 acre-feet, stream outflows increased by 22,400 acre-feet, constant-head boundary inflows increased by about 100 acre-feet, and evapotranspiration losses and flows across general-head boundaries were negligible.

The implementation of recovery operations in Alternatives 1b and 3b resulted in more similar groundwater storage increases at the end of the 34 stress periods between them than under the recharge-only operations. In other words, implementation of recovery operations significantly reduced the amount of losses through stream outflows in comparison to stream flow losses experienced under the recharge-only operations of Alternatives 1a and 3a. For the water banking scenario, stream flow losses in Alternative 1 decreased from 30,700 acre-feet to 16,100 acre-feet while stream flow losses in Alternative 3 decreased from 83,900 acre-feet to 22,393 acre-feet. Overall, groundwater storage increases in Alternative 1b were 55,900 acre-feet (78 percent of total net recharge) while storage increases in Alternative 3b were 49,700 acre-feet (69 percent of total net recharge). Under the recharge-only scenario, groundwater storage increases for Alternative 3a were only 48 percent of the 162,000 acre-feet of recharge versus 81 percent for Alternative 1a. Recharge and recovery operations for Alternative 2b actually resulted in a decrease in groundwater storage relative to the Baseline Condition after the 34 stress periods. For Alternative 2b, due to timing and the locations of the recharge operations, most of the recharge was lost from the area as stream outflow, and the extraction wells subsequently mined the “native” groundwater (i.e., groundwater storage prior to implementation of recharge) thereby reducing groundwater storage below the Baseline Condition levels.

Overall, Alternatives 1b and 3b yielded potentially favorable recharge and recovery results while Alternative 2b performed relatively poorly based on changes in groundwater storage (Figure 5-10) and changes in stream outflow (Figure 5-11). The success of a recharge and recovery program is dependent on the timing, location, and magnitude of application of the recharge. As with the recharge-only scenario, the use of in-lieu recharge can significantly mitigate against the losses of recharge from the system through streams and other boundary conditions located in proximity to the direct recharge sites.

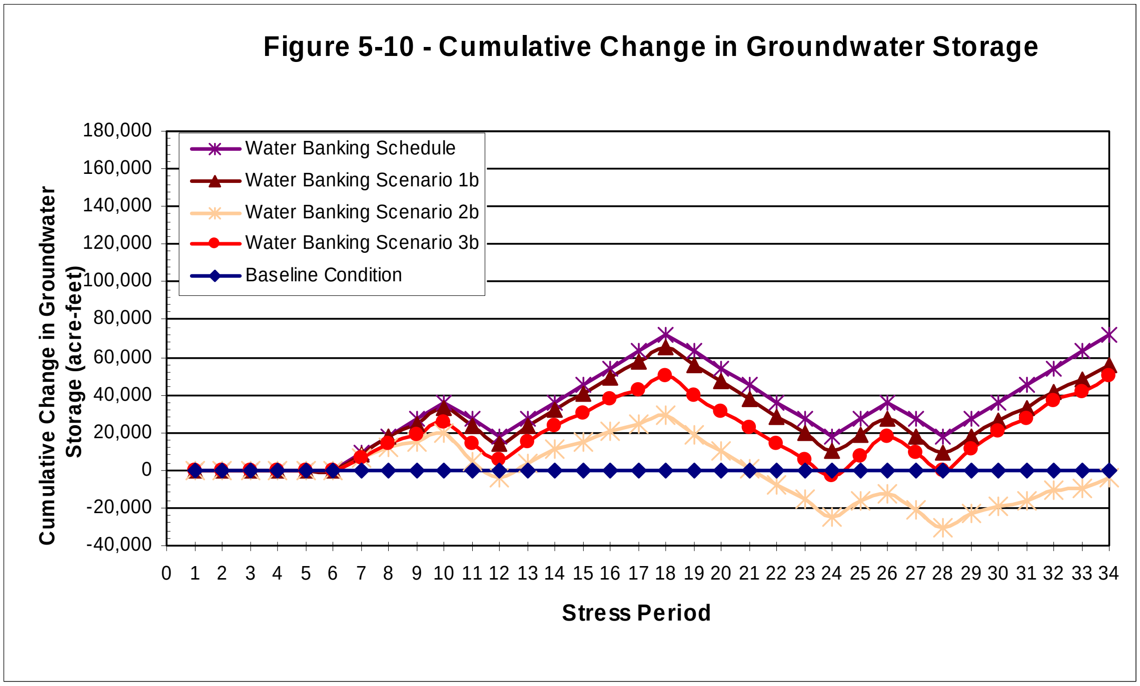


Figure 5-10 - Cumulative Change in Groundwater Storage
Cumulative Change in Groundwater Storage (acre-feet)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
-20,000
-40,000
Water Banking Schedule
Water Banking Scenario 1b
Water Banking Scenario 2b
Water Banking Scenario 3b
Baseline Condition
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
Stress Period

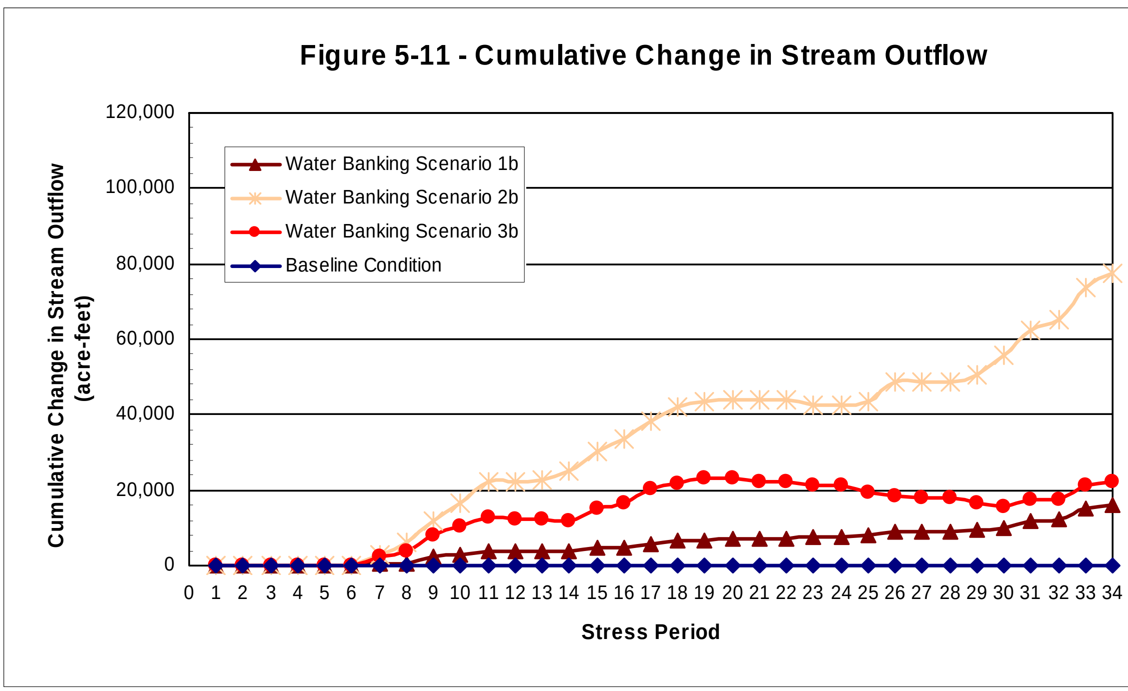


Figure 5-11 - Cumulative Change in Stream Outflow
Cumulative Change in Stream Outflow (acre-feet)
120,000
100,000
80,000
60,000
40,000
20,000
0
Water Banking Scenario 1b
Water Banking Scenario 2b
Water Banking Scenario 3b
Baseline Condition
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
Stress Period

5.6.3 Findings and Recommendations

Based upon the hydrogeologic feasibility analysis completed as part of this analysis:

- Alternative 1 appears to have adequate groundwater storage capacity and recharge and recovery capacity to support a water banking project. Additional analysis may be needed to refine project size and operations to reduce losses to the stream system and reduce the groundwater recovery impacts.

- Alternative 2 does not appear to have adequate groundwater storage capacity and recharge and recovery capacity to support a water banking project.

- Alternative 3 appears to have adequate groundwater storage capacity and recharge and recovery capacity to support a water banking project. The in-lieu recharge component along Highway 46 west of Whitley Gardens appears to provide a considerable recharge opportunity. The direct recharge and recovery operations along the Salinas River may prove problematic because the interconnectivity of the alluvial deposits with the river may reduce the ability to recover the recharged water, resulting in the decline of groundwater levels in the main aquifer system as a result of increased pumping associated with the project. This area is also relied upon by existing municipal groundwater users. Additional analysis may be needed to refine project operations in this portion of the basin to further investigate the benefit of in-lieu recharge opportunities in recharge or water banking operations.

6 Engineering Evaluation and Cost Estimate

The modeling analysis described in Section 5 demonstrated the effectiveness of the alternatives. This section identifies the facilities needed to implement each alternative, and provides a cost estimate that can be used to determine the comparative cost-effectiveness of each of the alternatives.

6.1 Evaluation Criteria

The engineering evaluation criteria identified in Section 4.2 included:

- Water Supply Availability
- Ability to Utilize Existing Infrastructure
- Capital Cost and Operation and Maintenance Costs

All the alternatives evaluated utilized the same existing infrastructure to access the same project water supply available for recharge or water banking operations, so these criteria do not discriminate between the alternatives. The required facilities for an individual alternative were based on the project location (described in Section 4) and hydrogeologic evaluation (described in Section 5). The capital costs of the required project facilities and O&M costs for the project implementation reflect the differences between alternatives, and were therefore used to provide the comparative evaluation between water banking alternatives.

6.2 Water Supply Availability

The San Luis Obispo County SWP Table A contract amount totaling 25,000 acre-feet per year is the primary source of water for this project. This supply is highly variable, with water supply availability ranging from about 20 percent in 1977 to 100 percent in other years, with a long-term average of about 70 percent of the contract amount for SWP contractors south of the Sacramento-San Joaquin Delta. The hydrologic and water delivery uncertainty associated with the SWP supply is documented in past deliveries records and modeling of future operations as described in Section 2.3. Looking to the future, factors such as climate change, the integrity of the Sacramento-San Joaquin Delta levees, and the protection of threatened or endangered species may continue to affect water supply availability, and may reduce future SWP supply availability compared to past conditions. This uncertainty increases the need to have projects in place to fully utilize the SWP supplies when they are available to improve overall water supply reliability and reduce dependence on SWP water in dry and critical dry years or when operations are curtailed.

For purposes of this analysis, the project deliveries of 1,500 acre-feet per month (18,000 acre-feet per year) were used to test the hydrogeologic feasibility of recharge and recovery operations, and determine the facility requirements and their associated costs. The project delivery rate was developed based on an evaluation of the long-term water supply reliability of the SWP supply provided by DWR and an evaluation of the existing commitments of the supply within the County. Table 6-1 shows the disposition of the SWP Table A contract water for the existing condition and six alternatives considered in this study. The existing and proposed uses of the available supplies are described below.

Table 6-1
Disposition of Project Water for Recharge and Water Banking Alternatives
for a 40-Year Project Life

		Calculation	Existing	Alt 1a	Alt 1b	Alt 2a	Alt 2b	Alt 3a	Alt 3b
	Annual Water Use (acre-feet per year)								
R1	Total SLOC Table A contract allocation	Value	25,000	25,000	25,000	25,000	25,000	25,000	25,000
R2	Existing SLOC M&I water contractors allocation	Value	4,830	4,830	4,830	4,830	4,830	4,830	4,830
R3	Existing SLOC M&I water contractors Drought Buffer	Value	3,617	3,617	3,617	3,617	3,617	3,617	3,617
R4	Excess Allocation of SLOC Table A contract allocation	R1-(R2+R3)	16,553	16,553	16,553	16,553	16,553	16,553	16,553
R5	Recharge Operations	Value	0	18,000	18,000	18,000	18,000	18,000	18,000
R6	Recovery Operations	Value	0	0	18,000	0	18,000	0	18,000
R7	Unused Water during Recharge Years	R1-(R2+R5)	20,170	2,170	2,170	2,170	2,170	2,170	2,170
	Years of Operation								
R8	M&I Deliveries	Value	40	40	40	40	40	40	40
R9	Recharge Operations	Value	26	26	26	26	26	26	26
R10	No Drought Buffer/Excess Allocation for Recharge Operations	Value	14	14	14	14	14	14	14
R11	Recovery Operations	Value	0	0	14	0	14	0	14
	Total Water Use (40-year totals in acre-feet)								
R12	SLOC M&I Water Contractors Deliveries	R2*R8	193,200	193,200	193,200	193,200	193,200	193,200	193,200
R13	Drought Buffer (to ensure wet water delivey to M&I contractors)	R3*R10	50,638	50,638	50,638	50,638	50,638	50,638	50,638
R14	Recharge Operations	R5*R9	0	468,000	468,000	468,000	468,000	468,000	468,000
R15	**Total Imported Supply (wet water)**	R12+R14	**193,200**	**661,200**	**661,200**	**661,200**	**661,200**	**661,200**	**661,200**
R16	Available Water of SLOC Table A contract amount	(R1*R8)-(R12+R13+R14)	756,162	288,162	288,162	288,162	288,162	288,162	288,162
R17	40-Year Table A Contract Amount	R13+R15+R16	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
R18	Recovery Operations	R6*R11	0	0	252,000	0	252,000	0	252,000

County M&I Water Contractors - The existing County M&I water contractors have a contract for 4,830 acre-feet per year. Over the 40-year project life, this totals 193,200 acre-feet. These deliveries are assumed to have the highest priority of the potential uses for the supply, and would be delivered prior to deliveries for recharge operations.

Drought Buffer - The existing County M&I water contractors have a drought buffer totaling 3,617 acre-feet per year. The drought buffer is used to ensure full delivery (up to 4,830 acre-feet per year) to the M&I water users in years when delivery amounts are reduced due to dry conditions.

For purposes of this analysis, it is assumed that the drought buffer would be requested in about 35 percent of years during the 40-year project life. No recharge operations take place during these years for the recharge alternatives. For the water banking alternatives, these years coincide with recovery operations (18,000 acre-feet per year). Over the 40-year project life, this totals 50,638 acre-feet. The drought buffer has the second-highest priority for the available SWP supply.

Excess Allocation – This represents the unused portion of the County's SWP supply that is available for others to use. In most years, it is the difference between the contract amount and the actual deliveries to County M&I water contractors. The annual excess allocation is reduced in years when the drought buffer is implemented by the amount of the drought buffer.

The excess allocation represents water that is not imported into the basin. Over the 40-year project life, this totals 288,162 acre-feet. One of the goals of this project is to better utilized the County's SWP supply, which can be described as minimizing the excess allocation.

Recharge Operations – This supply represents the water used for groundwater recharge operations in the Paso Robles Groundwater Basin. In the 65 percent of the years when recharge occurs, it totals 18,000 acre-feet per year. Over the 40-year project life, this totals 468,000 acre-feet. Recharge operations have the third priority for the SWP supply.

Recovery Operations – This supply represents the stored water recovered from the Paso Robles Groundwater Basin and returned to PPWTP for use outside the Basin. In the 35 percent of years when recovery operations occur (14 years), it totals 18,000 acre-feet per year. Over the 40-year project life, this totals 252,000 acre-feet.

6.3 Facility Requirements

Water banking facilities were developed sized to accommodate 1,500 acre-feet per month of recharge and recovery . The main project facilities to implement a recharge or water banking project are listed below.

- **Conveyance Facilities -** The conveyance facilities included the main project pipelines and pumping plants necessary to deliver raw water from PPWTP to the banking location(s) and return recovered water to the PPWTP for delivery to the end users outside of the Basin. The length of the main conveyance pipeline and the number of pumping plants varies for each of the three alternative locations.

- **Recharge Facilities -** The recharge facilities varied by alternative based on the hydrogeologic conditions and the type and amount of in-lieu recharge. The land for the recharge basins, construction of the basins, and additional piping for distribution to the recharge basins are needed for direct recharge operations. Additional pipelines and connections to existing irrigation systems were included to deliver water to the selected agricultural areas for in-lieu recharge operations. The estimated number of recharge basins and agricultural in-lieu recharge acreage varies for each of the three alternative locations.

- **Recovery Facilities** - Recovery facilities include the new wells and pipelines needed to extract the banked water and deliver it to the main conveyance pipeline described above. As described in Section 5, the wells were located to reduce the potential impact of recovery operations on existing wells and other recovery wells in the area. The number of recovery wells and associated collection systems varies for each of the three water banking alternatives.

6.4 Project Costs Assumptions

The project costs were developed for each alternative for comparison purposes based on the facility requirements described in Section 6.3 and the project cost assumptions described below.

6.4.1 Capital Project Costs Assumptions

- **Pipeline Costs** - Pipeline costs were estimated based on information contained in the 2006 version of Means Heavy Construction Cost Data (Means) as adjusted from December 2005 to November 2006 costs by Engineering News Record cost indices (Dec. 2005 at 8462.45, Nov. 2006 at 9123.64). In addition, the national averages published by Means have been adjusted to account for regional differences (Santa Barbara, CA, Dec. 05 at 7647 to Nov. 06 at 7911). The installed cost equaled $211 per foot for ductile iron 30-inch-diameter pipe.

- **Infiltration Basins** - Infiltration basin cost opinions have also been developed through the use of Means. They are based on the use of 11 cubic yard, self-propelled scrapers with a maximum haul distance of 1,500 feet. The cost opinions include the use of a water truck and sheepsfoot roller for compacting berms after the soil is spread by the scrapers. Based on up to five acre basins up to four feet deep and all soil being placed locally, the Engineer's opinion of cost per cubic yard, adjusted in the same manner as above, will be $5.32 per cubic yard.

- **Recovery Wells** - The cost opinions were based on wells estimated to be 16-inch diameter and up to 400 feet deep and producing 1,000 gallons per minute. The well water-level drawdown was assumed to be 100 feet with an additional 50 feet of head loss per well pump which equals an approximate 50 horsepower demand per well. The cost estimates for drilling and construction of water wells for extraction of banked water is based on local knowledge of well drilling and construction. Depending on local conditions, estimates range from $100,000 to $250,000 per well. For purposes of this analysis, well costs were estimated at $200,000 per well.

- **Collection System –** The cost opinions for the collection system were the same as the pipeline costs described above. Each well was assumed to be connected directly to the main pipeline. The total length of the collection system pipeline was based on the number of wells and spacing requirements for the recovery well field. The collection system pipeline was based on 12-inch-diameter PVC pipe with a cost of $32 per foot.

- **Pumping Plants** - The cost for pumping was based on a number of pumping plant estimates and actual construction costs from late 2003. These estimates were adjusted to November 2006 cost factors through the use of ENR cost indices as discussed above. The costs were based on pumping plants of up to 400 horsepower each. The cost equaled $2,500 per horsepower for a plant with open, drip-proof motors; normal piping and valving; manual or local automatic start/stop and electrical controls (no remote control); and a simple concrete block building.

Neither contingencies nor state sales taxes have been included in the cost opinions above.

- **Contingencies and Administrative Costs –** The following adjustments were made to the construction cost estimate:
  - A 30 percent contingency was included in the construction cost estimate to account for the uncertainty associated with the project description and facility locations.
  - Engineering and related costs were estimated at ten percent of the construction costs including contingencies.
  - Costs associated with the construction administration and inspections were estimated at two percent of the construction costs including contingencies.
  - Project administration and legal costs were estimated at two percent of the construction costs including contingencies.

6.4.2 Operating Costs

The opinion of costs to operate a water banking facility was almost entirely based on power usage for mechanical equipment such as wells and pumping plants. For the purposes of this cost opinion, it is assumed that all such facilities will be powered by electric motors rather than bottled gas or diesel engine-driven devices. Assuming that the water banking facility will be eligible for an agricultural rate (this opinion assumes the PG&E tariff AG-1B approved in September 2006 for limited annual energy usage), the energy rate charge for this tariff is $5.98 per kilowatt summer usage and $0.14953 per kilowatt hour for an "average" energy demand charge of $0.19774 per kilowatt hour. This translates to a per hour operating cost of $7.38 for a 50 HP well and $58.93 for a 400 HP pumping plant. The operating costs do not include treatment of the recovered water supply.

6.4.3 Maintenance Costs

Since maintenance cost can vary significantly depending on labor rates and the level of maintenance performed on any system, this opinion assumes the following basis for maintenance costs:

Facility	Maintenance Cost Basis
Pipelines	None, as pipelines can be up to 50 or more years old before requiring any maintenance
Infiltration Basins	0.5 percent of the original capital cost for annual cleaning and other maintenance
Wells	0.05 percent of the original capital cost for annual maintenance
Pumping Plants	0.02 percent of the original capital cost for annual maintenance

6.4.4 Water Costs

The project costs were developed for each alternative for comparison purposes based on the facility requirements described in Section 6.3 and the project cost assumptions described in Section 6.4. The preliminary cost estimates for the recharge and water banking alternatives are described below.

6.4.4.1 Unit Water Costs

The cost of the SWP supply consists of fixed costs and the cost to deliver water to Polonio Pass WTP.

- **Fixed Costs –** The fixed cost for use of the SWP facilities applies to the full contract amount, and totals $64 per acre-foot per year.

- **Delivery Costs –** The current (2007) cost to deliver water to PPWTP totals $494 per acre-foot (including the fixed costs described above).

6.4.4.2 Total Water Costs

The total water costs for the 40-year project life were estimated by applying the unit water costs to the water uses presented in Table 6-1. The total water costs for the different uses are described below.

- **M&I Water Contractors -** The County M&I water contractors have the same water use, and therefore the same water costs, in all the alternatives, totaling about $104.7 million during the 40-year project life, which includes $21.6 for the fixed-costs contractors (including the fixed costs for the Drought Buffer) and $83.1 million for delivery costs. This is paid for by the County M&I water contractors.

- **Excess Allocation** - Under the existing condition, the 40-year cost of the excess allocation totals $45.2 million, which is paid by County residents. The reduction in the excess allocation resulting from the recharge operations reduces the County's cost share to $15.2 million over the 40-year period. The cost difference ($30 million) is included in the water costs for the recharge operations (described below).

- **Project Water for Recharge Operations –** Based upon the unit costs provided above and the recharge operations assumptions, the cost for the water supply for the 40-year project life totals $231.2 million. This includes about $30 million in fixed costs and $201.2 million for delivery of the water to PPWTP. These costs are applied to all the alternatives.

6.5 Cost of Alternatives

The cost estimate for each of the alternatives is presented below.

6.5.1 Alternative 1a –Recharge Operations for the Shell Creek/Camatta Creek and Lower San Juan Creek Recharge Areas

The total 40-year project costs for Alternative 1a totals $282.2 million as shown on Table 6-2.

- **Conveyance Facilities** - The primary conveyance facilities for Alternative 1a include approximately 23 miles of 30-inch-diameter iron pipeline. The estimated cost total for the conveyance facilities is about $25.9 million.

- **Recharge Facilities** - The primary recharge facilities included approximately 180 acres of recharge basins and the conveyance and distribution systems to deliver water from the main pipeline to the basins. The in-lieu recharge facilities include the pipelines and connections to the local irrigation systems to accommodate approximately 240 acres of in-lieu recharge. The estimated cost for the recharge facilities totals about $8.7 million.

- **Recovery Facilities -** This recharge alternative does not include any recovery facilities.

- **O&M Costs –** The O&M costs for this alternative total about $1.2 million.

Table 6-2
40-Year Project Cost Estimate for Alternative 1a

Cost Element	Cost ($ million)	Percent of Total Project Cost
Water	$231.2	82%
Conveyance Facilities	$25.9	9%
Recharge Facilities	$8.7	3%
Recovery Facilities	$0	0%
Contingency and Administration	$15.2	5%
O&M	$1.2	<1%
TOTAL	**$282.2**	**100%**

6.5.2 Alternative 1b–Water Banking Operations for the Shell Creek/Camatta Creek and Lower San Juan Creek Recharge Areas

The total 40-year project costs for Alternative 1b totals $357.0 million as shown on Table 6-3.

- **Conveyance Facilities** - The primary conveyance facilities for Alternative 1b include approximately 23 miles of 30-inch-diameter iron pipeline. Pumpstations with a combined capacity of 3,225 horsepower are needed to return the stored water to PPWTP. The estimated cost total for the conveyance facilities is about $34.0 million.

- **Recharge Facilities** - The primary recharge facilities included approximately 180 acres of recharge basins and the conveyance and distribution systems to deliver water from the main pipeline to the basins. The in-lieu recharge facilities include the pipelines and connections to the local irrigation systems to accommodate approximately 300 acres of in-lieu recharge. The estimated costs for the recharge facilities total about $8.7 million.

- **Recovery Facilities –** The primary recovery facilities for this alternative include eight 1,500 gpm wells and approximately 48,000 feet of collection pipelines to return the recovered groundwater to the main pipeline. The high local well yields result in fewer production wells needed to recover the stored water. The estimated costs for the recovery facilities total about $3.6 million.

- **O&M Costs –** The O&M costs for this alternative total about $59.1 million, which includes the energy costs to pump the banked water and return it to the PPWTP.

Table 6-3
40-Year Project Cost Estimate for Alternative 1b

Cost Element	Cost ($ million)	Percent of Total Project Cost
Water	$231.2	65%
Conveyance Facilities	$34.0	10%
Recharge Facilities	$8.7	2%
Recovery Facilities	$3.6	1%
Contingency and Administration	$20.4	6%
O&M	$59.1	17%
TOTAL	**$357.0**	**100%**

6.5.3 Alternative 2a–Recharge Operations for Creston Recharge Area

The total 40-year project costs for Alternative 2a totals $280.0 million as shown on Table 6-4.

- **Conveyance Facilities** - The primary conveyance facilities for Alternative 2a include approximately 26 miles of 30-inch-diameter iron pipeline. The estimated cost total for the conveyance facilities is about $29.3 million.

- **Recharge Facilities** - The primary recharge facilities included approximately 90 acres of recharge basins and the conveyance and distribution systems to deliver water from the main pipeline to the basins. The in-lieu recharge facilities include the pipelines and connections to the local irrigation systems to accommodate approximately 50 acres of in-lieu recharge. The estimated costs for the recharge facilities total about $4.2 million.

- **Recovery Facilities -** This recharge alternative does not include any recovery facilities.

- **O&M Costs –** The O&M costs for this alternative total about $0.6 million.

Table 6-4
40-Year Project Cost Estimate for Alternative 2a

Cost Element	Cost ($ million)	Percent of Total Project Cost
Water	$231.2	83%
Conveyance Facilities	$29.3	10%
Recharge Facilities	$4.2	2%
Recovery Facilities	$0	0%
Contingency and Administration	$14.7	5%
O&M	$0.6	<1%
TOTAL	**$280.0**	

6.5.4 Alternative 2b–Water Banking Operations for Creston Recharge Area

The total 40-year project costs for Alternative 2b totals $380.2 million as shown on Table 6-5.

- **Conveyance Facilities** - The primary conveyance facilities for Alternative 2b include approximately 26 miles of 30-inch-diameter iron pipeline. Pumpstations with a combined capacity of 3,630 horsepower are needed to return the banked water to PPWTP. The estimated costs for the conveyance facilities total about $38.3 million.

- **Recharge Facilities** - The primary recharge facilities included approximately 90 acres of recharge basins and the conveyance and distribution systems to deliver water from the main pipeline to the basins. The in-lieu recharge facilities include the pipelines and connections to the local irrigation systems to accommodate approximately 50 acres of in-lieu recharge. The estimated costs for the recharge facilities total about $4.2 million.

- **Recovery Facilities –** The primary recovery facilities for this alternative include thirty-three 400-gpm wells, and approximately 198,000 feet of collection pipelines to return the recovered groundwater to the main pipeline. The low local well yields result in considerably more production wells needed to recover the stored water compared to other alternatives. The estimated costs for the recovery facilities total about $14.9 million.

- **O&M Costs –** The O&M costs for this alternative total about $66.3 million, which includes the energy costs to pump the banked water and return it to the PPWTP.

Table 6-5
40-Year Project Cost Estimate for Alternative 2b

Cost Element	Cost ($ million)	Percent of Total Project Cost
Water	$231.2	61%
Conveyance Facilities	$38.3	10%
Recharge Facilities	$4.2	1%
Recovery Facilities	$14.9	4%
Contingency and Administration	$25.3	7%
O&M	$66.3	17%
TOTAL	$380.2	100%

6.5.5 Alternative 3a–Recharge Operations for the Salinas River/Hwy 46 Recharge Area

The total 40-year project costs for Alternative 3a totals $289.4 million as shown on Table 6-6.

- **Conveyance Facilities** - The primary conveyance facilities for Alternative 3a include approximately 31 miles of 30-inch-diameter iron pipeline. The estimated cost total for the conveyance facilities is about $34.9 million.

- **Recharge Facilities** - The primary recharge facilities included approximately 90 acres of recharge basins and the conveyance and distribution systems to deliver water from the main pipeline to the basins. The in-lieu recharge facilities include the pipelines and connections to the local irrigation systems to accommodate approximately 500 acres of in-lieu recharge. The estimated costs for the recharge facilities total about $5.1 million.

- **Recovery Facilities -** This recharge alternative does not include any recovery facilities.

- **O&M Costs –** The O&M costs for this alternative total about $0.6 million.

Table 6-6
40-Year Project Cost Estimate for Alternative 3a

Cost Element	Cost ($ million)	Percent of Total Project Cost
Water	$231.2	80%
Conveyance Facilities	$34.9	12%
Recharge Facilities	$5.1	2%
Recovery Facilities	$0	0%
Contingency and Administration	$17.6	6%
O&M	$0.6	<1%
TOTAL	**$289.4**	**100%**

6.5.6 Alternative 3b–Water Banking Operations for the Salinas River/Hwy 46 Recharge Area

The 40-year project costs for Alternative 3b totals $415.3 million as shown on Table 6-7, with the combined water and energy costs totaling about 80 percent of the total project cost.

- **Conveyance Facilities** - The primary conveyance facilities for Alternative 3b include approximately 31 miles of 30-inch-diameter iron pipeline. Pumpstations with a combined capacity of 5,615 horsepower are needed to return the banked water to PPWTP. The estimated costs for the conveyance facilities total about $48.9 million.

- **Recharge Facilities** - The primary recharge facilities included approximately 90 acres of recharge basins and the conveyance and distribution systems to deliver water from the main pipeline to the basins. The in-lieu recharge facilities include the pipelines and connections to the local irrigation systems to accommodate approximately 500 acres of in-lieu recharge. The estimated costs for the recharge facilities total about $5.1 million.

- **Recovery Facilities –** The primary recovery facilities for this alternative include fifteen 800-gpm wells, and approximately 90,000 feet of collection pipelines to return the recovered groundwater to the main pipeline. The local well yields determined the number of production wells needed to recover the stored water. The estimated costs for the recovery facilities total about $24.0 million.

- **O&M Costs –** The O&M costs for this alternative total about $95.3 million, which include the energy costs to pump the banked water and return it to the PPWTP.

Table 6-7
40-Year Project Cost Estimate for Alternative 3b

Cost Element	Cost ($ million)	Percent of Total Project Cost
Water	$231.2	56%
Conveyance Facilities	$48.9	12%
Recharge Facilities	$5.1	1%
Recovery Facilities	$7.7	2%
Contingency and Administration	$27.1	7%
O&M	$95.3	23%
TOTAL	**$415.3**	**100%**

6.6 Alternative Cost Comparison

The goal of this project was to determine if groundwater banking in the Paso Robles Groundwater Basin is feasible. The alternatives were formulated to deliver the same recharge capacity and recovery capacity (for water banking alternatives) to allow an ‘apples to apples’ comparison of the project effectiveness including the costs. The potential project locations were identified based upon available hydrogeologic information. Groundwater modeling was used to evaluate hydrogeologic feasibility and effectiveness of each of the alternatives. The initial cost estimates for each of the alternatives was developed and provided in Tables 6-2 through 6-7. This information is summarized on Table 6-8 to facilitate a comparison between the recharge and water banking alternatives.

Table 6-8
Preliminary Cost Estimates of Recharge and Water Banking Alternatives
for 40-Year Project Life

		Calculation	Existing	Alt 1a	Alt 1b	Alt 2a	Alt 2b	Alt 3a	Alt 3b
	Unit Water Costs ($/acre-foot)								
R19	SWP Fixed Water Costs	Value	$64	$64	$64	$64	$64	$64	$64
R20	Delivery Costs to PPWTP	Value	$430	$430	$430	$430	$430	$430	$430
R21	Total Water Costs to Deliver to PPWTP	R19+R20	$494	$494	$494	$494	$494	$494	$494
	Total Cost of Water (40-year totals in $millions)								
R22	SLOC M&I Contractors Fixed Costs (including Drought Buffer)	((R2+R3)*R8*R19)/1,000,000	$21.6	$21.6	$21.6	$21.6	$21.6	$21.6	$21.6
R23	SLOC M&I Contractors Delivered Costs to PPWTP	(R2*R8*R20)/1,000,000	$83.1	$83.1	$83.1	$83.1	$83.1	$83.1	$83.1
R24	Excess Allocation Fixed Costs	(R16*R19)/1,000,000	$45.2	$15.2	$15.2	$15.2	$15.2	$15.2	$15.2
R25	Project Water for Recharge Operations - Fixed Costs	(R5*R9*R19)/1,000,000	$0.0	$30.0	$30.0	$30.0	$30.0	$30.0	$30.0
R26	Project Water for Recharge Operations Delivered to PPWTP	(R5*R9*R20)/1,000,000	$0.0	$201.2	$201.2	$201.2	$201.2	$201.2	$201.2
R27	**Cost of Project Water**	R25+R26	**$0.0**	**$231.2**	**$231.2**	**$231.2**	**$231.2**	**$231.2**	**$231.2**
	Project Costs (40-year totals in $ millions)								
R28	Capital Costs for Conveyance Facilities	Cost Estimate	$0	$25.9	$34.0	$29.3	$38.3	$34.9	$48.9
R29	Capital Costs for Recharge Facilities	Cost Estimate	$0	$8.7	$8.7	$4.2	$4.2	$5.1	$5.1
R30	Capital Costs for Recovery Facilities	Cost Estimate	$0	$0.0	$3.6	$0.0	$14.9	$0.0	$7.7
R31	Contingency and Administration	Cost Estimate	$0	$15.2	$20.4	$14.7	$25.3	$17.6	$27.1
R32	Operations and Maintenance Costs	Cost Estimate	$0.0	$1.2	$59.1	$0.6	$66.3	$0.6	$95.3
R33	**Total Capital and O&M**	R28+R29+R30+R31+R32	**$0**	**$51.0**	**$125.8**	**$48.8**	**$149.0**	**$58.2**	**$184.1**
R34	**TOTAL COST (40 year totals rounded to $millions)**	R27+R33	**$0.0**	**$282.2**	**$357.0**	**$280.0**	**$380.2**	**$289.4**	**$415.3**
R35	**Project Cost (40-year totals rounded in $/acre-foot)**	(R34/R14)/1,000,000		**$600**	**$760**	**$600**	**$810**	**$620**	**$890**

6.6.1 Recharge Alternatives

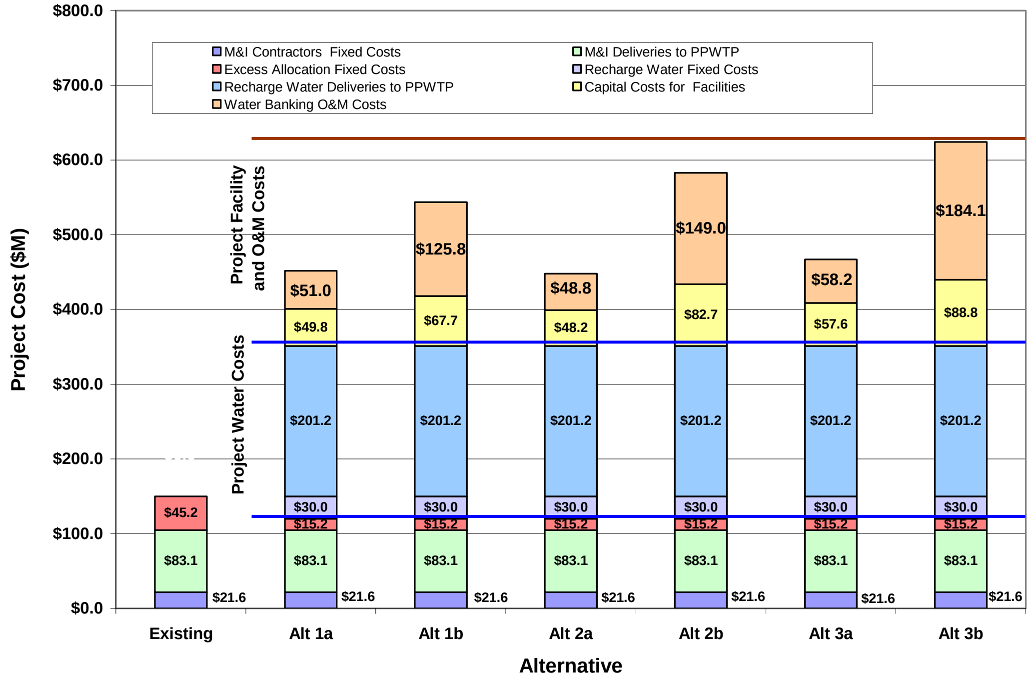
The estimated total costs of the recharge alternatives shown on Table 6-8 reflect the distance of the alternative location from the Polonio Pass WTP and the number of recharge basins needed to meet the recharge goal.

The total estimated 40-year project cost of the recharge alternatives ranges from $282 million to $289 million, which corresponds to $600 to $620 per acre-foot delivered to the recharge area.

The cost of the water, including the fixed costs ($30 million) and the delivery costs to PPWTP ($201.2 million), is the same for all the alternatives (total of $231.2 million) and is about 80 to 83 percent of the total 40-year project cost as shown on Figure 6-1.

Capital costs and O&M costs range from about $51 million to about $183 million, representing about 17 to 20 percent of the 40-year project costs.

Figure 6-1
Distribution of Costs for Recharge and Water Banking Alternatives
Based on 40-Year Project Life



Throughout the 17-year simulation period, each year of additional recharge resulted in an increased percentage of water discharging to the stream system as shown in Section 5. This occurs as the groundwater basin fills as a result of the recharge, exceeding the local groundwater storage capacity, and discharging groundwater into the nearby rivers and streams. Each year of additional recharge results in an increased increment of recharge discharging to the local stream system.

As a result of increased discharges to the stream system with continued long-term recharge, the estimated volume of water that may remain in storage over the 40-year project life may be less (as a percentage of the water recharged each year) compared to the results of the 17-year simulation period. This diminishing return on the recharged water would be expected to occur for all the alternatives, and should be considered when comparing the effectiveness of the alternatives.

Based upon the hydrogeologic analysis and the average water costs presented on Table 6-9, Alternative 1a appears to be the most effective recharge alternative because it has the largest volume of recharged water remaining in storage. Alternatives 2a and 3a retain less than one-half of the water in storage at the end of the simulation period.

Table 6-9
Comparison of Recharge Alternatives

	Change in Groundwater Storage as Percent of Recharged Water	Cost ($/acre-foot)
Alt 1a	81%	$600
Alt 2a	29 %	$600
Alt 3a	48%	$620

From Alternative 3a there appears to be potential recharge opportunity along the Highway 46. This area has a large potential agricultural in-lieu potential, and the area is experiencing declining groundwater levels. This are is also located a greater distance from the Salinas River which may improve the effectiveness of a recharge project.

Based upon the project descriptions and facility requirements, there are no significant differences in the project costs for the recharge alternatives which distinguish between their cost effectiveness.

6.6.2 Water Banking Alternatives

The estimated total costs of the water banking alternatives shown on Table 6-8 reflect the distance of the alternative location from the PPWTP, and the variability of the local hydrogeologic conditions on the ability to recharge and recover water.

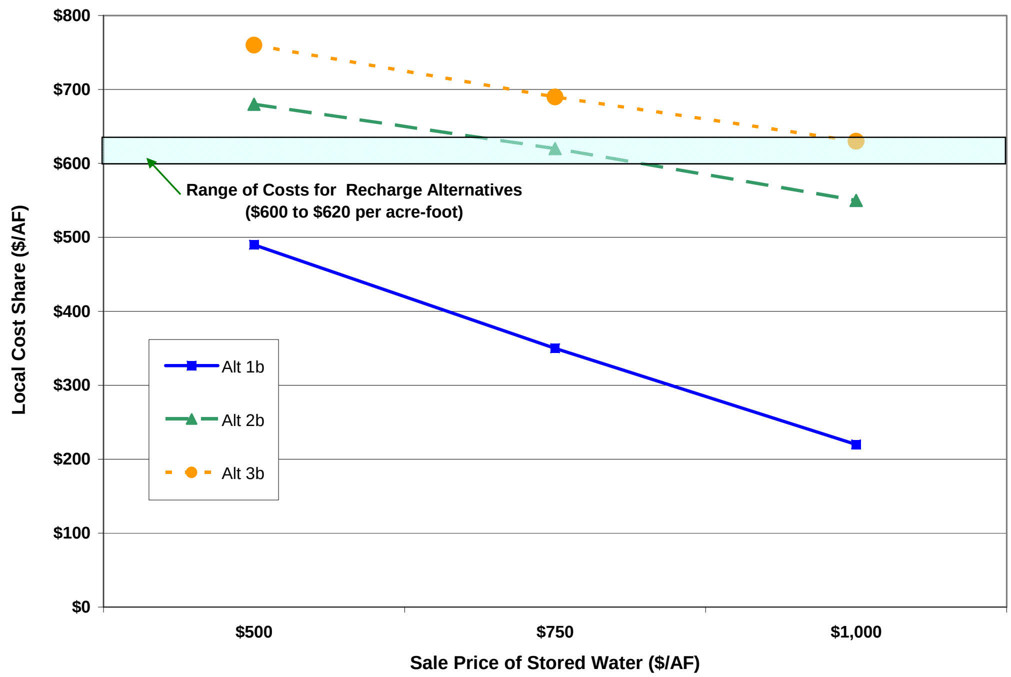
The total estimated 40-year project cost of the water banking alternatives range from $357 million to $415 million, which corresponds to $760 to $890 per acre-foot delivered to the recharge area and the return of stored water to Polonio Pass WTP.

The cost of the water, including the fixed costs ($30 million) and the delivery costs to PPWTP ($201.2 million), is the same for all the alternatives (total of $231.2 million) and is about 56 to 65 percent of the total project cost as shown on Figure 6-1.

The water banking alternatives result in a smaller change in groundwater storage compared to the recharge-only alternatives because of the recovery of banked water. As shown on Table 6-8, over the 40-year project period, the water banking may provide about 252,000 acre-feet of dry year water supply that may be sold to out-of-basin water users to generate revenue to partly fund the projects. In addition, the water banking projects result in increased groundwater in storage in the Basin.

While the recharge alternatives will most likely be funded by the local project participants that benefit from the project, the water banking alternatives distribute the costs among the local project participants and water banking partners, thereby reducing the local cost share. The sale price of the stored water will determine the eventual cost share between local project participants and banking partners. As shown on Figure 6-2, as the price of the stored water increases, the local cost share is reduced.

Figure 6-2
Comparison of Water Costs of Alternatives



Based upon the hydrogeologic analysis and the average water costs presented on Table 6-10, Alternative 1b appears to be the best banking alternative because it has the largest volume of the recharged water remaining in storage and is the lowest cost water banking alternative.

Alternative 2b does not appear to be a viable water banking option because the limited groundwater storage capacity results in losses of the banked water outside of the system, and may result in the recovery of native groundwater to meet the same water banking delivery targets. In addition Alternative 2b

Alternative 3a is the farthest from the Polonio Pass WTP, and thereby has the greatest facility and operations costs of the three water banking alternatives. In addition, as shown in the modeling results, the close interaction between the Salinas River and the adjacent alluvial deposits is likely to result in the losses of recharged water to the Salinas River that are not recoverable. Third, Templeton and the City of Paso Robles have municipal supply wells in the area that may be impacted by groundwater recovery operations.

Table 6-10
Comparison of Water Banking Alternatives

	Change in Groundwater Storage as Percent of Recharged Water	Cost ($/acre-foot)
Alt 1a	35%	$760
Alt 2a	0%	$810
Alt 3a	31%	$890

6.7 Groundwater Management Considerations

Groundwater management is the planned and coordinated local effort of sustaining the groundwater basin to meet future water supply needs. In 1992, with the passage of Assembly Bill AB 3030 (AB 3030), local water agencies were provided a systematic way of formulating groundwater management plans (California Water Code, Sections 10750, et seq.). AB 3030 also encouraged coordination between local entities through joint power authorities or memorandums of understanding (MOU). In 2002, Senate Bill 1938 (SB 1938) was passed, which further emphasized the need for groundwater management in California.

Preparation of a groundwater management plan (GMP) is the first step in developing the management and monitoring framework that can support future groundwater management efforts by:

- Identifying local issues and developing solutions to address them.
- Improving the understanding of the local hydrogeologic setting and groundwater conditions through an expanded groundwater monitoring program.
- Meeting eligibility requirements for funding opportunities that support groundwater management activities such as the Local Groundwater Assistance Act of 2000 (AB303).

6.7.1.1 Groundwater Management Plan Components

A GMP should address the 12 specific technical elements identified in the California Water Code, along with the seven recommended components identified in DWR Bulletin 118 (DWR 2003). Table 6-11 lists the required and recommended components.

Table 6-11
Regional GMP Components

	Description
SB 1938 Mandatory Components	
1.	Documentation of public involvement statement
2.	Basin Management Objectives (BMOs)
3.	Monitoring and management of groundwater elevations, groundwater quality, inelastic land subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality or are caused by pumping
4.	Plan to involve other agencies located in the groundwater basin
5.	Adoption of monitoring protocols
6.	Map of groundwater basin boundary, as delineated by DWR Bulletin 118, with agency boundaries that are subject to the GMP
7.	For agencies not overlying groundwater basins, prepare the GMP using appropriate geologic and hydrogeologic principles
AB 3030 and SB 1938 Voluntary Components	
1.	Control of saline water intrusion
2.	Identify and manage well protection and recharge areas
3.	Regulate the migration of contaminated groundwater
4.	Administer well-abandonment and destruction program
5.	Control and mitigate groundwater overdraft
6.	Replenish groundwater
7.	Monitor groundwater levels
8.	Develop and operate conjunctive-use projects
9.	Identify well-construction policies
10.	Develop and operate groundwater contamination cleanup, recharge, storage, conservation, water-recycling, and extraction projects
11.	Develop relationships with state and federal regulatory agencies
12.	Review land use plans and coordinate with land use planning agencies to assess activities that create reasonable risk of groundwater contamination

Description
DWR Bulletin 118 Suggested Components
1. Manage with guidance of advisory committee
2. Describe area to be managed under GMP
3. Create links between BMOs and goals and actions of GMP
4. Describe GMP monitoring programs
5. Describe integrated water–management planning efforts
6. Report of implementation of GMP
7. Evaluate GMP periodically

6.8 Groundwater Banking Operational Considerations

Prior to the development of a recharge or water banking project, considerable work needs to be completed to develop a program that equitably shares the project's costs and benefits among the participating entities and those affected by the project operations. Some of these issues (i.e., groundwater monitoring) are similar to those included in the GMP described above.

6.8.1 Groundwater Monitoring

A groundwater monitoring program would need to be established to monitor the changes in groundwater levels and groundwater quality due to the operations of the project. The monitoring program would need to be established prior to project operation to document the baseline conditions. Thereafter, routine monitoring of groundwater levels and quality can be used to monitor the basin response and establish the project's operational criteria.

The monitoring program may include land use and crop surveys to identify changing land and water use patterns in the affected area.

The monitoring reports would be made available to the participating agencies and affected parties participating in the management or operation of the project.

6.8.2 Groundwater Banking Operating Agreements

Agreements will be needed to identify all project participants including the lead agency, potential affected parties, water banking participants, and monitoring groups, and establish the goals and objectives of the project.

6.8.3 Groundwater Banking Operational Criteria

Operational criteria are needed to ensure land owners that they will not be adversely impacted as the result of project operations. The criteria may include the following:

- Only water stored under the banking agreement may be withdrawn. Water must first be stored before it can be withdrawn.
- Establishing criteria to monitor and manage rising groundwater levels near the recharge areas.
- A certain amount of stored water will be retained in groundwater storage to account for aquifer and operational losses.
- Establishing water quality criteria for imported water supplies used for recharge.
- In the case of in-lieu recharge, water will not be pumped from a given farm prior to water being delivered for recharge.
- A network of dedicated monitoring wells will be constructed and used to monitor the response of the groundwater basin.
- The withdrawal of stored water would be prohibited if such withdrawals would cause average groundwater levels to be lower than some predetermined level that would have prevailed without the project.
- Groundwater levels will be reviewed regularly by a committee composed of representatives of the local agencies and land owners.
- Establishing procedures to modify project operations in response to impacts to existing local land use or groundwater conditions.

7 Environmental and Permitting Considerations

The following provides an overview of the environmental issues and requirements associated with the Feasibility Study. The objective of this analysis is to evaluate the potential general and site-specific environmental issues and permitting constraints associated with water banking project components and alternatives. The report is organized into the following sections: (1) Introduction, (2) Key Environmental Issues, (3) Permitting Requirements, and (4) Summary/CEQA and NEPA Approaches.

7.1 Key Environmental Issues

The potential key environmental issues associated with the program include agricultural resources (Section 7.2.1), biological resources (Section 7.2.2), cultural resources (Section 7.2.3), land use (Section 7.2.4), and growth inducing effects (Section 7.2.5).

7.1.1 Agricultural Resources

The State of California, Department of Conservation, Office of Land Conservation, Important Farmlands Inventory (IFI) system is used in San Luis Obispo County to inventory lands considered to have agricultural value. This system classifies land based upon the productive capabilities of the land, rather than the mere presence of ideal soil conditions. Land is divided into several categories of diminishing agricultural importance. The State of California's IFI is based in part on the Capability Classification System and the Storie Index. Capability classes demonstrate the suitability of soils for most kinds of field crops according to their limitations when used for field crops, the risk of damage when used, and their response to treatment. Class I soils have few limitations that restrict their use, while Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. The Storie Index expresses numerically a soil's relative degree of suitability for general intensive agriculture. The rating is based only on soil characteristics and is obtained by evaluating such factors as soil depth, surface texture, subsoil characteristics, drainage, salts and alkali, and relief.

Within the IFI classification farmlands are designated as "Prime," "Statewide Importance," "Unique," and "Local Importance," as outlined in the Paso Robles General Plan Open Space Element. "Prime" farmlands are generally defined as irrigated soils (Class I and II) over 40 inches deep with available water holding capacity of 4 inches or more. Generally well drained, they are free from frequent flooding. Farmlands of "Statewide Importance" are irrigated lands other than prime that have a good combination of physical and chemical characters for producing feed, fiber, food, forage, and oilseed crops. “Unique” farmlands are other lands that produce high-value food and fiber crops. “Local Importance” farmlands represent dry farmed lands, and un-irrigated lands of Prime and Statewide Importance. Lands that have lesser agricultural potential are classified as “Grazing,” “Urban,” or “Other.” The latter classification includes areas that are generally unsuitable for agriculture because of geographic or regulatory constraints.

Impacts to agricultural resources could result from loss of important agricultural lands; conflicts with Williamson Act contracts; and reduction in agricultural soil productivity due to erosion, the build-up of trace elements; or salinity in agricultural soils. The conversion of prime agricultural lands to non-agricultural uses is a concern within the county and across the state.

The status of the farmland at any of the three alternative recharge areas as well as along the conveyance and distribution pipeline alignments and pump station locations would need to be evaluated to determine if there is prime farmland or existing Williamson Act contracts. Due to groundwater recharge, soils at and near the recharge areas may remain saturated longer than without the project, which may delay planting of crops. However, it should be noted that groundwater recharge would be considered a beneficial effect on agricultural water supply. The State requires preparation of an Environmental Impact Report (EIR) for any project for which a Fair Argument can be made that it results in a significant and unavoidable environmental impact relative to adopted State or local thresholds of significance. The conversion of designation lands, prime soils areas, and/or agricultural uses to permanent non-agricultural use may be considered a significant and unavoidable environmental impact.

7.1.2 Biological Resources

For the purpose of this report, special-status species are those plants and animals that are:

- Listed, proposed for listing, or candidates for listing as threatened or endangered by the Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (ESA);
- Considered “species of concern” by the USFWS;
- Listed or proposed for listing as rare, threatened, or endangered by the California Department of Fish and Game (CDFG) under the California Endangered Species Act (CESA);
- Animals designated as “Species of Special Concern” by the CDFG; and

- Included in the CDFG Special Vascular Plants, Bryophytes, and Lichens List (July 2005).

This latter document includes the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California, Sixth Edition as updated online (Tibor, 2001). Those plants contained on CNPS lists 1B, 2, and 4 are considered special status species in this study. Per the CNPS code definitions, List 1A species include those presumed extinct in California; List 1B are those declared rare, threatened, or endangered in California and elsewhere; List 2 includes plants that are rare, threatened, or endangered in California but are more common elsewhere; List 3 includes those species that do not fit into another list for lack of necessary information needed to assign them to one list or to reject them; and List 4 species are those of limited distribution or are infrequent throughout a broader range of California, but whose vulnerability or susceptibility to threat appears low at this time.

Riparian and wetland habitat types are of special concern to the resource agencies due to the high value for wildlife and extensive loss of these habitat types in California. Waters of the United States are under the jurisdiction of the United States Army Corps of Engineers (Corps) and waters of the State are under CDFG jurisdiction.

<u>Special-Status Plants and Plant Communities of Special Concern.</u> Special-status plant species that have the potential to occur on the candidate sites include, but are not limited to, the following (Rincon, 2005):

- Davidson’s bush mallow (CNPS List 1B)
- Dwarf calycadenia (CNPS List 1B)
- Hardham’s evening-primrose (CNPS List 1B)
- Hooked popcorn-flower (CNPS List 1B)
- Jared’s pepper grass (CNPS List 1B)
- Mesa horkelia (CNPS List 1B)
- Prostrate navarretia (CNPS List 1B)
- Round-leaved filaree (CNPS List 2)
- San Bernardino aster (CNPS List 1B)
- Santa Cruz microseris (CNPS List 1B)

- Shining navarretia (CNPS List 1B)

Special-Status Wildlife. Special-status wildlife species that have the potential to occur on the candidate sites include, but are limited to, the following (Rincon, 2005):

- American badger (State species of special concern)
- Blunt-nosed leopard lizard (federally and State endangered species)
- Burrowing owl (State species of special concern)
- California horned lark (State species of special concern)
- California tiger salamander (State species of special concern and federally threatened)
- Coast horned lizard (State species of special concern)
- Giant kangaroo rat (federally and State endangered species)
- Least Bell's vireo (State and federally endangered species)
- Loggerhead shrike (State and federal species of special concern)
- Longhorn fairy shrimp (federally endangered species)
- Northern harrier (State species of special concern)
- Prairie falcon (State species of special concern)
- Salinas pocket mouse (State species of special concern)
- San Joaquin kit fox, (State threatened and federally endangered species)
- South-Central California Coast Steelhead (federally endangered species)
- Southwestern pond turtle (State species of special concern)
- Western spadefoot (State species of special concern)
- Vernal pool fairy shrimp (federally threatened species)
- Yellow warbler (State species of special concern)

Conveyance and Distribution Pipelines. Construction of the conveyance and distribution pipelines would temporarily impact habitat special-status plants and plant communities of special concern and special-status wildlife species. The conveyance pipeline may require stream crossings that could require either jack-and-bore installation or horizontal directional drilling (HDD). These methods of stream crossings would avoid/minimize disturbance of existing habitat, thereby potentially avoiding/minimizing costly wetland mitigation and monitoring plans. However, a 404 permit may still be required from the Corps and a 401 water quality certification from the RWQCB due to concerns for potential frac-out (release of bentonite) during HDD operations.

Direct Discharge to Streams. If water were to be directly discharged to Shell Creek, East Branch of Huerhuero Creek, or the Salinas River, it could alter the stream's flow regime and possibly result in a change in stream habitat that could be unsuitable for certain special-status plants and animals. Continual release of water into ephemeral streams would alter the habitat; thereby result in different plants, plant communities, and wildlife. If during a prolonged drought release of water is halted, impacts could occur.

Furthermore, discharge of treated water may impact special-status species due to concentrations of chlorine and/or disinfection by-products in the stream. Conversely, discharge of raw water may cause impacts to special-status species due to introduction of non-native invasive species from Sacramento-San Joaquin Delta source water.

Discharge to Percolation Ponds. Construction of the percolation ponds would permanently impact special-status plants and plant communities of special concern, and special-status wildlife species and their habitats. There may be opportunities to preserve and enhance habitat (e.g., San Joaquin kit fox habitat) within the approximately 90-acre recharge area, such that the project mitigates for on-site removal of special-status species habitat.

Alternative 1 Site

Shell Creek may be waters of the United States under the jurisdiction of the Corps, and waters of the State under CDFG jurisdiction. If the project would disturb riparian or wetland areas, a wetland delineation would be required to determine if the affected area is considered jurisdictional waters

Alternative 2 Site

Huerhuero Creek may be waters of the United States under the jurisdiction of the Corps, and waters of the State under CDFG jurisdiction. If the project would disturb riparian or wetland areas, a wetland delineation would be required to determine if the affected area is considered jurisdictional waters.

Alternative 3 Site

The Salinas River may be waters of the United States under the jurisdiction of the Corps, and waters of the State under CDFG jurisdiction. If the project would disturb riparian or wetland areas, a wetland delineation would be required to determine if the affected area is considered jurisdictional waters. Furthermore, South-Central California Coast Steelhead are known to occur in the Salinas River; therefore, direct discharge of raw or treated water could result in impacts.

If the project traverses indicated riparian areas, a wetland delineation should be conducted to determine the location and extent of jurisdictional wetlands. Any activity that would remove or otherwise alter riparian and wetland habitats in the study area would be scrutinized by the resource agencies through the California Environmental Quality Act (CEQA) review process. Any impacts to the Salinas River, Huerhuero Creek, or Shell Creek, or the associated riparian and wetland habitat could potentially fall under the jurisdiction of the Corps as waters of the United States pursuant to Section 404 of the Clean Water Act (1972), under the jurisdiction of the RWQCB pursuant to Section 401 of the Clean Water Act, and under the jurisdiction of the CDFG pursuant to Section 1600 et. seq. of California Fish and Game Code. If such areas are determined to be jurisdiction, project construction would require a permit/agreement from these agencies. Pursuant to Section 401 of the Clean Water Act, any action that requires a Corps Section 404 permit also requires Water Quality Certification from the RWQCB to ensure the project would uphold state water quality standards (refer to Section 3.0, Permitting Requirements).

Impacts on riparian habitat types would require on-site compensatory mitigation to replace any habitat loss resulting from project implementation. Additionally, on-site riparian habitats could potentially house special-status species that would require evaluation during the permit process (see special-status species discussion below for additional information).

The Corps, CDFG, and RWQCB typically require compensatory mitigation to replace temporary and permanent loss of wetland and riparian habitat in ratios of 2:1, 3:1, and 5:1 (acres provided to acres lost), respectively. The amount of habitat to be restored, a monitoring program, and an adaptive management plan to help ensure the success of the habitat restoration will be required by the agencies.

A mitigation and monitoring plan can usually be developed in about 30 days. The time required to monitor and maintain the replacement and maintenance program is generally five years to prove successful implementation.

7.1.3 Cultural and Archeological Resources

The project area lies within the historic territory of the Native American Indian group known as the Chumash. The Chumash occupied the region from San Luis Obispo County to Malibu Canyon on the coast, and inland as far as the western edge of the San Joaquin Valley and the four northern Channel Islands. The Obispeño were the northernmost Chumash group, occupying much of San Luis Obispo County, including the Paso Robles area.

The archaeological record indicates that sedentary populations occupied the coastal regions of California more than 9,000 years ago. Several chronological frameworks have been developed for the Chumash region including Rogers (1929), Wallace (1955), Harrison (1964), Warren (1968), and King (1990). King postulates three major periods—Early, Middle, and Late. Based on artifact typologies from a great number of sites, he was able to discern numerous style changes within each of the major periods. The Early Period (8000 to 3350 Before Present [B.P.]) is characterized by a primarily seed processing subsistence economy. The Middle Period (3350 to 800 B.P.) is marked by a shift in the economic/subsistence focus from plant gathering and the use of hard seeds to a more generalized hunting-maritime-gathering adaptation, with an increased focus on acorns. The full development of the Chumash culture, one of the most socially and economically complex hunting and gathering groups in North America, occurred during the Late Period (800 to 150 B.P.). Prehistoric marriage patterns and post-mission settlement patterns have also identified Yokuts and Salinan people living in the northern portions of San Luis Obispo County (Gibson, 1998).

The Chumash and Salinan aboriginal way of life ended with Spanish colonization. As neophytes were brought into the mission system, they were transformed from hunters and gatherers into agricultural laborers and exposed to diseases to which they had no resistance. By the end of the Mission Period in 1834, the Chumash and Salinan population had been decimated by disease and declining birthrates. Population loss as a result of disease and economic deprivation continued into the next century.

The first European contact in San Luis Obispo County occurred in 1595, when Sebastian Rodriguez Cermeno put in at Port San Luis. The next documented European expedition to land in the area was Sebastian Vizcaino in 1602. Over 150 years passed before the next major European expedition reached San Luis Obispo County. In 1769, Gaspar de Portola and Fray Crespi departed the newly established San Diego settlement and marched northward toward Monterey with the objective of securing the port and establishing five missions along the route. They passed through present-day San Luis Obispo County that same year. Three years later, in 1772, Father Serra founded the

Mission San Luis Obispo de Tolosa. Spanish rule in Alta California came to an end in 1821 with Mexican Independence and the missions were secularized in 1832.

The State provides criteria for evaluating the importance of cultural resources. The State of California has formulated laws for the protection and preservation of archaeological resources. Generally, a cultural resource shall be considered to be “historically significant” if the resource meets the criteria for listing on the California Register of Historic Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852), including the following:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, or is not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code) or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude an agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1.

California Public Resources Code

Section 5097.9 of the California Public Resources Code stipulates that it is contrary to the free expression and exercise of Native American religion to interfere with or cause severe irreparable damage to any Native American cemetery, place of worship, religious or ceremonial site, or sacred shrine.

State Health and Safety Code § 7050.5 and Public Resources Code §§ 5097.94, 5097.98 and 5097.99

The purpose of the above codes is to provide protection to Native American human burials and skeletal remains from vandalism and destruction and to provide a regular means by which Native American descendents can make known their concerns regarding the need for sensitive treatment and disposition of Native American burials, skeletal remains, and items associated with Native American burials.

Cultural resources have been recorded along the existing Coastal Branch Pipeline alignment. Construction of the conveyance and distribution pipeline may result in impacts to known and/or unknown cultural resources. Furthermore, each of the alternative recharge sites is located adjacent to a waterway, on relatively level ground, which is considered an area that may have been suitable for previous settlement, so the potential for cultural resources exists.

A Phase I Archaeological Investigation should be completed. This investigation shall include a review of previous archaeological surveys and/or excavations within the sites. This review will determine what portions of the site require field surveys. A Phase I Archaeological Investigation would include, but not necessarily be limited to, the following:

- A qualified archaeologist and Native American representative shall monitor all initial earth moving activities within native soil.

- If an archaeological site is found to be significant/important, measures to reduce the project's impacts should be implemented as follows:

    - Avoidance of impacts to the archaeological site is the favored form of mitigation for significant sites whenever feasible.

    - The applicant may choose to cap the resource area using culturally sterile and chemically neutral fill material and shall include open space accommodations and interpretive displays for the site to ensure its protection from development. An archaeologist and Chumash consultant shall be retained to monitor the placement of fill upon the site and to make open space and interpretive recommendations. If a significant site will not be capped, the results and recommendations of the Phase II study shall determine the need for a Phase III Data Recovery Excavation and/or monitoring.

    - Where avoidance is infeasible impacts may be mitigated, when necessary, through a Phase III data recovery program.

If the site is determined to not be important, no capping and/or further archaeological investigation should be required. The results and recommendations of the Phase II study shall determine the need for construction monitoring.

It is estimated that upon project approval, a Phase I Archaeological Investigation would take approximately one month to complete, a Phase II Archaeological Investigation would take approximately two months to complete, and a Phase III Archaeological Investigation would take approximately four months to complete.

At the commencement of project construction, an orientation meeting shall be conducted by an archaeologist for construction workers associated with earth disturbing procedures. The orientation meeting shall describe the possibility of exposing unexpected archaeological resources and directions as to what steps are to be taken if such a find is encountered.

An archaeologist shall monitor construction grading within 50 meters (164 feet) of isolated finds. In the event that prehistoric or historic archaeological resources are exposed during project construction, all earth-disturbing work within 50 meters (164 feet) of the find must be temporarily suspended or redirected until an archaeologist has evaluated the nature and significance of the find. After the find has been appropriately mitigated (e.g., curation, preservation in place, etc.), work in the area may resume. The City should consider retaining a Chumash representative to monitor any field work associated with Native American cultural material.

If human remains are exposed, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98.

Should undocumented cultural resources be identified or discovered, timing would be assessed on a case-by-case basis depending on the extent of the resource.

7.1.4 Land Use

The County Land Use Ordinance and County General Plan Land Use Element regulate land use planning in the County of San Luis Obispo. A constraint is identified for projects that would conflict with existing zoning or General Plan land use designations.

Development of pipelines and recharge facilities most likely would not conflict with agricultural land use designations and zoning; however, the conversion of this land to non-agricultural uses constitutes a constraint with respect to agriculture (See Section 7.2.1).

7.1.5 Growth-Inducing Effects

Section 15126.2(d) of the CEQA Guidelines requires that EIRs discuss the potential for projects to induce population or economic growth, either directly or indirectly. CEQA also requires a discussion of ways in which a project may remove obstacles to growth, as well as ways in which a project may set a precedent for future growth.

Growth does not necessarily create significant physical changes to the environment. However, depending upon the type, magnitude, and location of growth, it can result in significant adverse environmental effects. A project's growth-inducing potential is therefore considered significant if it could result in significant physical effects in one or more environmental issue areas.

Implementation of the project could be considered to result in removal of an obstacle of growth. Various communities within the County of San Luis Obispo have limited water supplies, such that their ability to accommodate future growth may be constrained by the amount of water they have. Provision of additional water (1,500 acre-feet per month or 18,000 acre-feet per year) as a result of the project could result in growth-inducing effects that cause significant environmental impacts.

7.2 Permitting Requirements

This section lists and discusses the regulatory agencies that could have jurisdiction and their permitting requirements within the project area. The program would require numerous federal, state, and local approvals. Refer to Table 7-1 for a list of anticipated permitting agencies that could be involved with permitting the program. Presented below is a description of each regulatory agency's anticipated role in review and permitting of the program.

7.2.1 Federal Agencies

United States Army Corps of Engineers (Corps). The Corps would likely be the lead federal agency for the proposed project for placement of fill (including temporary trench spoils) within navigable waters of the U.S. under Section 404 of the Clean Water Act. The Corps would consult with the USFWS and National Oceanic Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) to identify potential effects to endangered and threatened species as required under Section 7 of the Endangered Species Act (ESA). A Biological Assessment would be required as part of this consultation to provide sufficient information for the Corps, USFWS, and NOAA Fisheries to fully determine the project's potential to affect threatened or endangered species.

A Jurisdictional Waters of the U.S. survey (wetlands delineation) may also be required to identify wetlands that may be impacted by the project. The Corps' jurisdiction under Section 404 of the Clean Water Act extends to the ordinary high water mark of a river or stream. The project may fall within one or more Nationwide Permits (NWP) (i.e., NWP 33) developed by the Corps for major routine types of construction projects within federal waters. A programmatic environmental impact statement (EIS) was previously prepared for these NWPs to comply with the National Environmental Policy Act (NEPA). NWPs involving discharges or fills into wetlands would require a wetland delineation using the accepted Corps methodology to determine the location and extent of wetlands impacted by the project. The Corps verifies the wetland delineations prepared by applicants. Projects with impacts to waters of the United States greater than 0.5 acre may require a Corps Individual Permit.

NOAA Fisheries. NOAA Fisheries is responsible for the protection of marine species by administering the regulations listed in the ESA, Marine Mammal Protection Act, and the Magnuson-Stevens Fishery Management and Conservation Act (Essential Fish Habitat Assessment). This agency would likely participate in a Section 7 consultation under the ESA with the Corps during the review of the proposed project. Due to the limited potential for impacts to steelhead (i.e., changes in stream flow regime); the Corps would likely consult with NOAA Fisheries through an informal consultation. However, if raw water was discharged directly to a stream channel, the Corps may consult with NOAA Fisheries through a formal consultation.

Table 7-1
Potential Permits and Approvals

Agency	Role	Permit/Approval	Regulated Activity	Authority
Federal Agencies				
U.S. Bureau of Reclamation	Federal Lead Agency	NEPA EA or EIS	Federal Funding	NEPA
U.S. Army Corps of Engineers	Responsible Agency	Section 404 permit	Discharge of dredged or fill material into waters of the U.S. during construction. Jurisdictional waters include territorial seas, tidelands, rivers, streams, and wetlands.	Section 404 Clean Water Act (33 USC 1344) NEPA
U. S. Fish and Wildlife Service	Responsible Agency	Endangered Species Act, Section 7 consultation	Impacts to federally listed and species proposed for listing	16 USCA 1513 50 CFR Section 17
NOAA Fisheries	Responsible Agency	Endangered Species Act, Section 7 consultation	Impacts to federally listed anadromous fish (i.e., steelhead)	16 USCA 1513 50 CFR Section 17

Agency	Role	Permit/Approval	Regulated Activity	Authority
		State of California Agencies		
California Department of Fish and Game	Responsible/Trustee Agency	1602 permit Section 2081 Management Agreement	Crossing of streams and rivers that cause major disturbance to the streambed or discharge of water into stream or river Potential adverse effects to State listed species	Sections 1601-1607 of the California Fish and Game Code Section 2081 of the California Fish and Game Code
Regional Water Quality Control Board	Responsible Agency	NPDES Section 401 Water Quality Certification General Construction Permit	Discharge of treated water into stream or river Discharges that may affect surface and groundwater quality If construction area greater than 1 acre	Clean Water Act Porter-Cologne State Water Quality Act (1969)
		Local Agencies		
County of San Luis Obispo	CEQA Lead Agency	CEQA IS/MND or EIR	Proposed Project Land use, grading, drainage	CEQA County General Plan, Land Use Ordinance
City of Paso Robles	Responsible Agency	Use Permit Grading Permit Construction Permit Permit to Remove	Land use, grading, drainage if any project facilities in city limits Removal of Oak Tree	City Ordinance
San Luis Obispo APCD	Responsible Agency	Authority to Construct	Emissions associated with construction may require a permit	Clean Air Act

United States Fish and Wildlife Service. The USFWS would be requested to review the project with respect to potential impacts to threatened or endangered species. Such consultation will be initiated during the 404 permit process. During this process, impacts to federally listed species would be addressed. Impact of critical habitat may also result in seasonal restrictions or recommendations for habitat restoration.

7.2.2 State Agencies

Central Coast RWQCB. The Central Coast RWQCB's primary responsibility is to protect the quality of the surface and groundwater within the Region for beneficial uses. The duty is carried out by formulating and adopting water quality plans for specific ground or surface water bodies, by prescribing and enforcing requirements on domestic and industrial waste discharges, and by requiring cleanup of water contamination and pollution.

Pursuant to Section 401 of the Clean Water Act, the Corps permit under Section 404 is not active until the State of California first issues a water quality certification to ensure that a project will comply with state water quality standards. The authority to issue water quality certifications in the project area is vested with the Central Coast RWQCB. Water Quality Certification requires a completed Section 401 Application Form, a completed copy of the federal application for the Corps Permit, and the appropriate fees, in addition to CEQA compliance.

If the project were to expose greater than one acre of disturbed construction area to stormwater runoff, a General Permit for Stormwater would be required.

Discharge of treated water directly into a stream or river may require a National Pollution Discharge Elimination System (NPDES) permit.

California Department of Fish and Game. CDFG administers Section 1600 of the California Fish and Game Code. That regulation requires a Lake or Streambed Alteration Agreement (SAA) between CDFG and the applicant before the initiation of any construction project that will: 1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; 2) use materials from a streambed; or 3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

In order to notify the CDFG of a proposed project that may impact a river, stream, or lake as required by Fish and Game Code Section 1600, a Lake or Streambed Alteration Notification Form and a Project Questionnaire form along with the appropriate fees must be submitted to the CDFG. CEQA compliance or notice of exemption is also required.

The CDFG also administers a number of laws and programs designed to protect fish and wildlife resources. Principle of these is the California Endangered Species Act of 1984 (CESA - Fish and Game Code Section 2050), which regulates the listing and take of state endangered (SE) and threatened species (ST). Under Section 2081 of the CESA, CDFG may authorize the take of an Endangered and/or Threatened species, or candidate species through an Incidental Take Permit. However, plant or animal species that are "Fully Protected" under state law cannot be taken and no Incidental Take Permits may be issued.

7.2.3 Local Agencies

County of San Luis Obispo. The County of San Luis Obispo would be the lead agency under CEQA for preparation of an EIR. If there is federal funding associated with the project, an Environmental Assessment (EA) or EIS may also need to be prepared pursuant to NEPA. The document would need to assess impacts to various issue areas resulting from construction and operation of the various project components, including:

- Conveyance Pipeline
- Conveyance Pumping Station
- Distribution Pipeline(s)
- Percolation Ponds
- Use of the water

The County may require that a conditional (or minor) use permit, grading permit, and building permit be issued for the construction and operation of the project and would compare the project with any applicable standards or policies. The County may impose specific requirements/conditions be incorporated into the permit governing the design or operation of the project and may not approve the permit unless it is found to be consistent with the County's General Plan and Land Use Ordinance.

San Luis Obispo Air Pollution Control District (SLOAPCD). The SLOAPCD would review the proposed project for compliance with applicable federal, State, and local air quality control criteria.

Detailed documentation of existing and proposed project emissions would be required to obtain an Authority to Construct permit. Such emissions calculations would need to be prepared based on established criteria and detailed project equipment inventories. These inventories shall include equipment type and duration of use.

City of Paso Robles. The City of Paso Robles may also be a permitting agency for the project by requiring building and grading permits. A portion of Alternative 3 recharge area is within the City of Paso Robles. This area may contain oak trees that require removal for construction of the percolation ponds. According to the City of Paso Robles Oak Tree Ordinance, no person shall remove or otherwise destroy an oak tree of six inches or greater diameter growing on private or public property within the City Limits unless they have first received approval of a Permit to Remove as authorized by the Director of Community Development or the City Council. A Permit to Remove application shall contain a plot plan showing the location, type, and size of tree(s) proposed to be removed, a brief statement of the reason for removal, and other pertinent information that the director may require. Once removed, the City of Paso Robles would require the planting of replacement oak trees equivalent to 25% of the diameter of the removed tree(s).

A Permit to Remove must be obtained prior to development of proposed facilities, subject to City Council approval.

7.3 Summary of CEQA/NEPA Approaches

Based on the preliminary evaluation of key environmental issues from the possible development of water distribution and banking facilities at the alternative sites, environmental documentation consisting of an EIR and possibly an EA or EIS would likely be required to adequately assess potential impacts, regardless of the site or sites that are ultimately selected. Table 7-2 summarizes the results of the evaluation contained in Section 7-2.

Table 7-2
Environmental Constraints

Component/ Alternative	Agricultural Resources	Biological Resources	Cultural Resources	Land Use
Conveyance Pipeline	2	2	2	1
Distribution Pipeline	2	2	2	1
Alternative 1 – Shell Creek	2	2	2	1
Alternative 2 – Huerhuero Creek	2	2	2	1
Alternative 3 – Salinas River	2	3	2	1

3 = Major constraint; could be fatal flaw precluding site selection
2 = Moderate constraint; may require additional regulatory permitting time and effort, but site is suitable for proposed use
1 = Minor constraint; this issue may need further evaluation in the CEQA context, but not likely to pose regulatory difficulty

Generally, all components/alternatives have similar environmental constraints. For example, development at all sites could result in impacts to biological resources, particularly because they are each adjacent to riparian areas associated with Shell Creek, Huerhuero Creek, or the Salinas River. At the same time, it is just as likely that such resources could be largely avoided by locating the facilities a sufficient distance from these water bodies/sensitive habitats.

However, the Salinas River alternative may be the only site to have fatal flaws that preclude development of recharge facilities. This is due to the potential for introduction of non-native invasive species into the Salinas River, which is known to provide habitat for various special-status species, including the South-Central California Coast steelhead. If the recharge pond area at this site was not constructed with sufficient flood overflow basins to capture flood flows, raw water could overtop the recharge ponds and flow into the Salinas River. In addition, alteration of the Salinas River flow regime could create impacts due to the near surface aquifer system, including the potential for untreated recharged water to come into contact with the Salinas River system and potentially create significant long-term impacts to biological resources.

Construction of the conveyance pipeline along the existing Coastal Branch Pipeline would have constraints related to agricultural resources, biological resources, cultural resources, and land use. Similar constraints would also occur for the distribution pipeline.

One of the key constraints with the overall water banking program is the potential for growth-inducing effects resulting from the increase in water supplies available to accommodate future growth. Such constraint is not dependent on a specific site alternative, but rather the total volume of additional water that could be created and the reliability of such created water supply.

7.3.1 Approaches to Implement CEQA and/or NEPA

Considering the potential impacts to special-status species as well as potential growth-inducing effects, either a Project-Specific EIR or a Program EIR should be prepared for compliance with CEQA. The former would not require subsequent CEQA documentation, but would require a detailed project description of the water banking project. It may be more appropriate to prepare a Program EIR pursuant to Section 15168 of the CEQA Guidelines:

> *"A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either:*
>
> - *Geographically,*
> - *As logical parts in the chain of contemplated actions,*
> - *In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or*
> - *As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.*

The CEQA Guidelines recognize that a Program EIR can offer a number of advantages in addressing future actions that could be implemented as part of the banking program. Some of these advantages include:

- *Provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action,*

- *Allow the considerations of alternative approaches or locations;*

- *Ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis,*

- *Avoid duplicative reconsideration of basic policy considerations,*

- *Allow the Lead Agency to consider broad policy alternatives and programwide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts, and*

- *Allow reduction in paperwork.*

A Program EIR would serve as an informational document for the public and San Luis Obispo County decision-makers. The process would culminate with Board of Supervisors hearings to consider certification of a Final EIR and a decision whether to approve the proposed project, possibly with conditions of approval.

The disadvantages of a Program EIR are that subsequent CEQA documentation would be required to authorize construction of project-specific components. Such documentation may comprise either a Project EIR or a Mitigated Negative Declaration.

If there is federal funding associated with the program, compliance with NEPA may also be required. Such federal lead agencies may include the USBR. Compliance with NEPA may involve preparation of either an EA or EIS.

8 Conclusions and Recommendations

The goal of this project was to determine the feasibility of developing a recharge or water banking project in the Paso Robles Groundwater Basin using the County's currently unused SWP supply. The feasibility study was intended to identify potential locations within the Basin and scale the size of potential projects based upon local hydrogeologic conditions. The recharge and recovery operations were scaled based upon a review of the available water supplies.

The hydrogeologic feasibility of the recharge and water banking alternatives was evaluated at three different locations within the Paso Robles Groundwater Basin using the existing groundwater model, updated to reflect project operations. Project costs were then estimated based upon the facility and operational requirements of each project to allow for a relative comparison between the alternatives.

This section presents the conclusions regarding water banking feasibility in the Paso Robles Groundwater Basin as a method to improve San Luis Obispo's water supply reliability, and provides recommendations for future efforts to further refine the water banking opportunities.

8.1 Conclusions

8.1.1 Alternative 1

Based upon the hydrogeologic evaluation, Alternative 1 appears to have adequate groundwater storage capacity and recharge and recovery capacity to support a water banking project. The results of the modeling suggest that more recharged water remains in storage than at the other two locations, and fewer wells are needed to recover the stored supply. There are concerns about the potential impacts to the groundwater system during both recharge and recovery operations, which need further investigation to address.

Alternative 1 is the closest alternative to the source of the imported recharge water supply (Polonio Pass WTP), so capital costs and O&M costs are less than the other alternatives. Additional analysis may be needed to optimize the project size and operations to reduce losses to the stream system and reduce groundwater recovery impacts.

No environmental considerations or permitting issues were identified at this time that increase the complexity of implementing a project at this location compared to the other alternatives.

Overall, Alternative 1 has the most favorable hydrogeologic conditions, and the lowest cost of the alternatives evaluated. There are some local concerns about the impacts of the alternatives at this location on local rainfall runoff as they relate to local flooding, and potential delays in early season agricultural activities due to wet or muddy conditions.

8.1.2 Alternative 2

Based on the hydrogeologic evaluation, Alternative 2 does not appear to have adequate groundwater storage capacity and recharge and recovery capacity to support a water banking project of this scale. The results show that the limited storage capacity causes a significant portion of the recharged water to enter the surface water system and leave the area thereby becoming unrecoverable by either local groundwater users or a recovery well field. As a result of the limited groundwater storage capacity and less-favorable aquifer conditions, much of the recovered groundwater is native, not stored, which results in a significant drop in groundwater elevations during recovery operations.

Because of the aquifer conditions, Alternative 2 requires more recovery wells, which increase the cost of the water banking alternative at this location. The water banking operations are also more costly because of the increased distance from PPWTP. Additional analysis is needed to determine if smaller scale recharge operations can be cost-effective at this location, but it does not appear that water banking operations can be effective at this location.

No environmental considerations or permitting issues were identified at this time that increase the complexity of implementing a project at this location compared to the other alternatives.

8.1.3 Alternative 3

Alternative 3 appears to have adequate groundwater storage capacity and recharge and recovery capacity to support a water banking project. The in-lieu recharge component along Highway 46 west of Whitley Gardens appears to provide considerable recharge potential.

The direct recharge and recovery operations along the Salinas River may prove problematic because the interconnectivity of the alluvial deposits with the river may reduce the ability to recover the recharged water. This area is also relied upon by existing municipal groundwater users that may be impacted by groundwater recovery operations.

Alternative 3 is the furthest from the source of the recharge supply, so capital costs and O&M costs are higher compared to the other alternatives. This is evident in the water banking alternative, which includes operations costs nearly 50 percent more than Alternative 1b.

Because of the proximity to the Salinas River, recharge and recovery operations are likely to have additional environmental issues and permitting requirements than the other alternatives.

Water banking operations at this location do not appear favorable compared to Alternative 1b because there are greater potential impacts to the local streams (Salinas River) and other municipal groundwater users, and the project has higher costs.

Recharge opportunities that warrant further investigation may exist along the Highway 46 corridor.

8.2 Recommendations

The following recommendations are suggested to further the understanding and management of the Paso Robles Groundwater Basin and refine potential recharge/water banking opportunities.

Recommendations for improved groundwater management include:

- Preparing a groundwater management plan to provide a framework for managing the Basin and establish BMOs .
- Preparing and implement a groundwater monitoring plan in the Basin to track changes in groundwater levels and quality.
- Installing dedicated monitoring wells as needed to fill data gaps.

If the County continues to pursue groundwater recharge or water banking opportunities in the Paso Robles Groundwater Basin, they may consider the following activities:

- Preparing a preliminary engineering evaluation of the most viable sites, which may include recharge and water banking opportunities in the Shell Creek/Camatta Creek and Lower San Juan Creek Recharge Areas (Alternative 1) and along the Highway 46 corridor (part of Alternative 3).

- Conducting additional hydrogeologic field investigations in potential direct recharge areas to further define the aquifer system and hydrogeologic characteristics.
- Conducting pilot recharge tests in potential recharge areas.
- Conducting a survey of landowners in potential in-lieu recharge areas to determine their interest and willingness to participate in an agricultural in-lieu recharge program.
- Completing a salt balance to estimate the impacts of salt loading resulting from the imported water.
- Refining potential project operations to more accurately reflect annual and seasonal water supply availability and demand.
- Refining the existing groundwater model to provide a more detailed analysis of the potential recharge and water banking operations.
- Conducting additional analysis of the impacts of potential project operations on existing overlying land uses to identify potential impacts from high groundwater levels.

9 References

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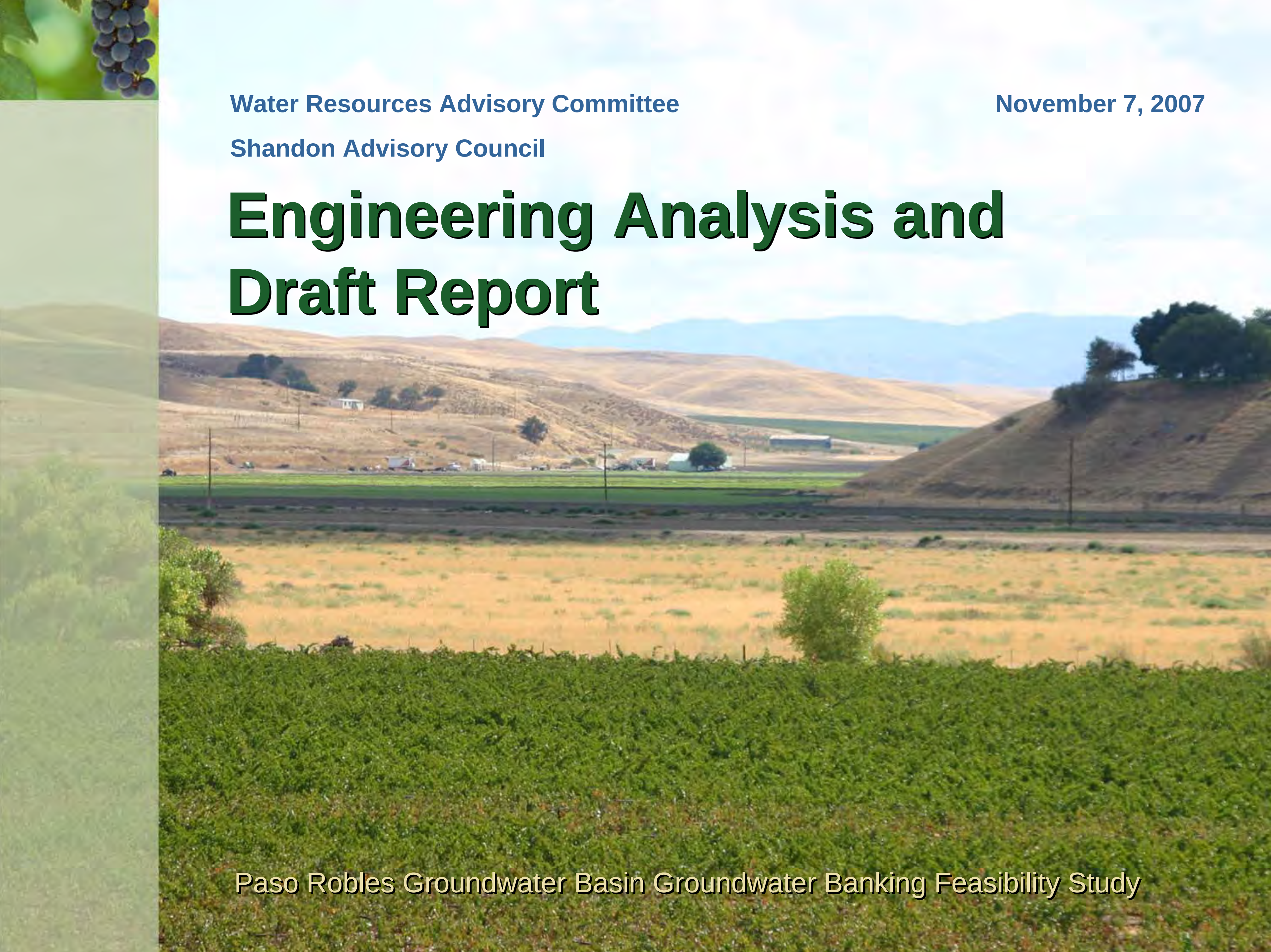
Water Resources Advisory Committee

November 7, 2007

Shandon Advisory Council

Engineering Analysis and Draft Report



Paso Robles Groundwater Basin Groundwater Banking Feasibility Study

Agenda

1. Project Goals and Approach
2. Review Hydrogeologic Feasibility
3. Engineering Evaluation
4. Environmental and Permitting Issues
5. Conclusions and Recommendations
6. Project Report Outline

Project Goal

The goal of this project is to determine the feasibility of groundwater banking alternatives in the Paso Robles Groundwater Basin. This will be determined based on:

- Ability to utilize undelivered SWP supply
- Ability to store and recover water
- Ability to deliver banked water to end user

Project Approach

- Evaluate Technical Feasibility
  – Hydrogeologic Feasibility
  – Engineering Feasibility
- Identify Other Considerations
  – Environmental/Permitting Considerations
  – Groundwater Management/ Operations
  – Project Partners and Funding Opportunities

Hydrogeologic Feasibility

- Compare impacts of recharge or water banking operations to a Baseline Condition

1. **Existing Groundwater Model**

    - Use existing groundwater model of the Paso Robles Groundwater Basin (as developed)

    - The 17-year simulation period represents1981-1997 historical period

    - The simulation period is divided into 34 (6-month) stress periods which represent the growing season and the non-growing season

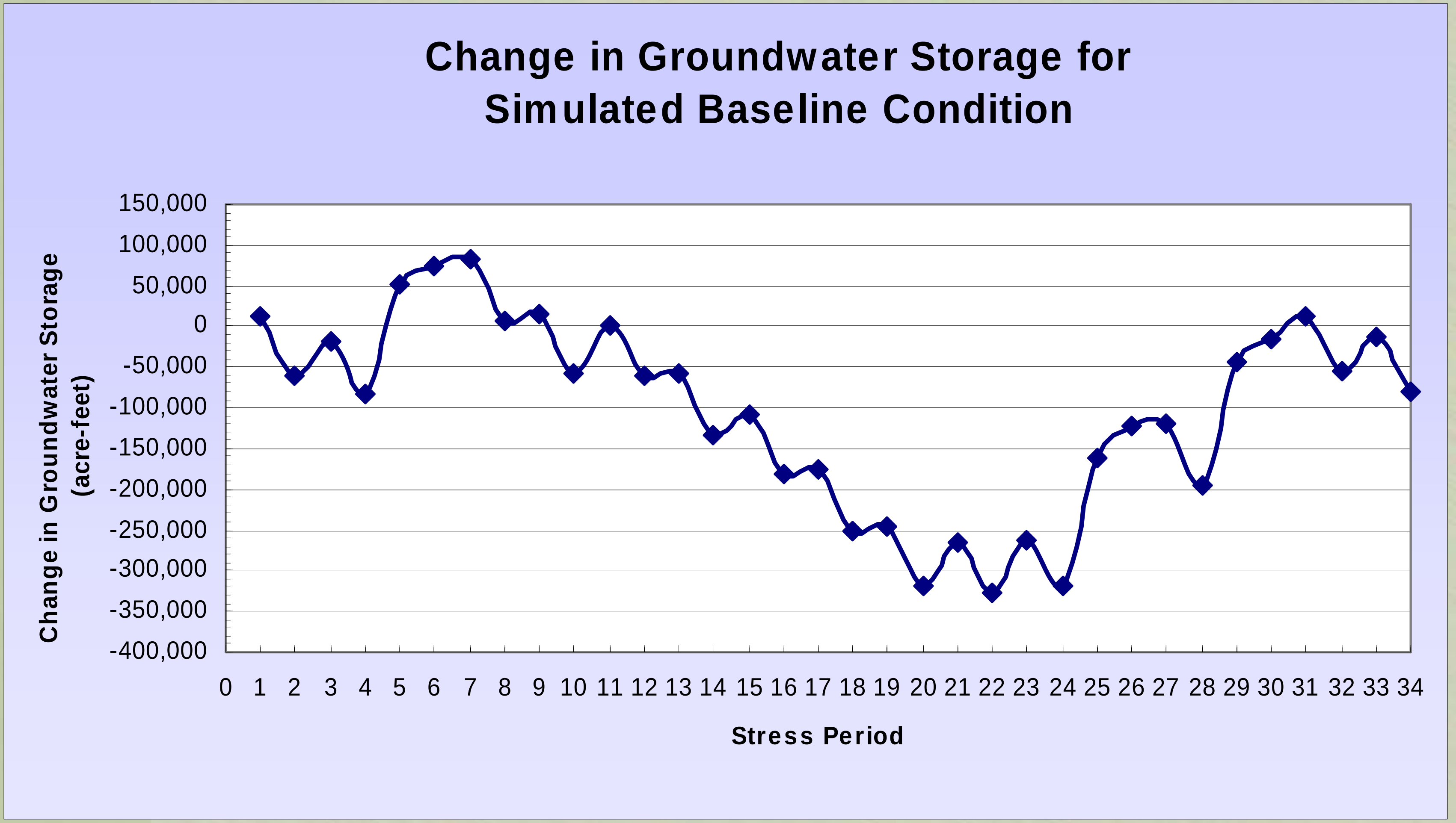
Hydrogeologic Feasibility (cont.)

- Compare impacts of recharge or water banking operations to a Baseline Condition

2. **Three alternative locations**
   - Shell Creek/Camatta Creek Recharge Area
   - Creston Recharge Area
   - Salinas River/Hwy 46 Recharge Area

3. **Two project operational scenarios**
   - Recharge Operations – Recharge Only
   - Water Banking Operations – Recharge and Recovery

Simulated Baseline Condition



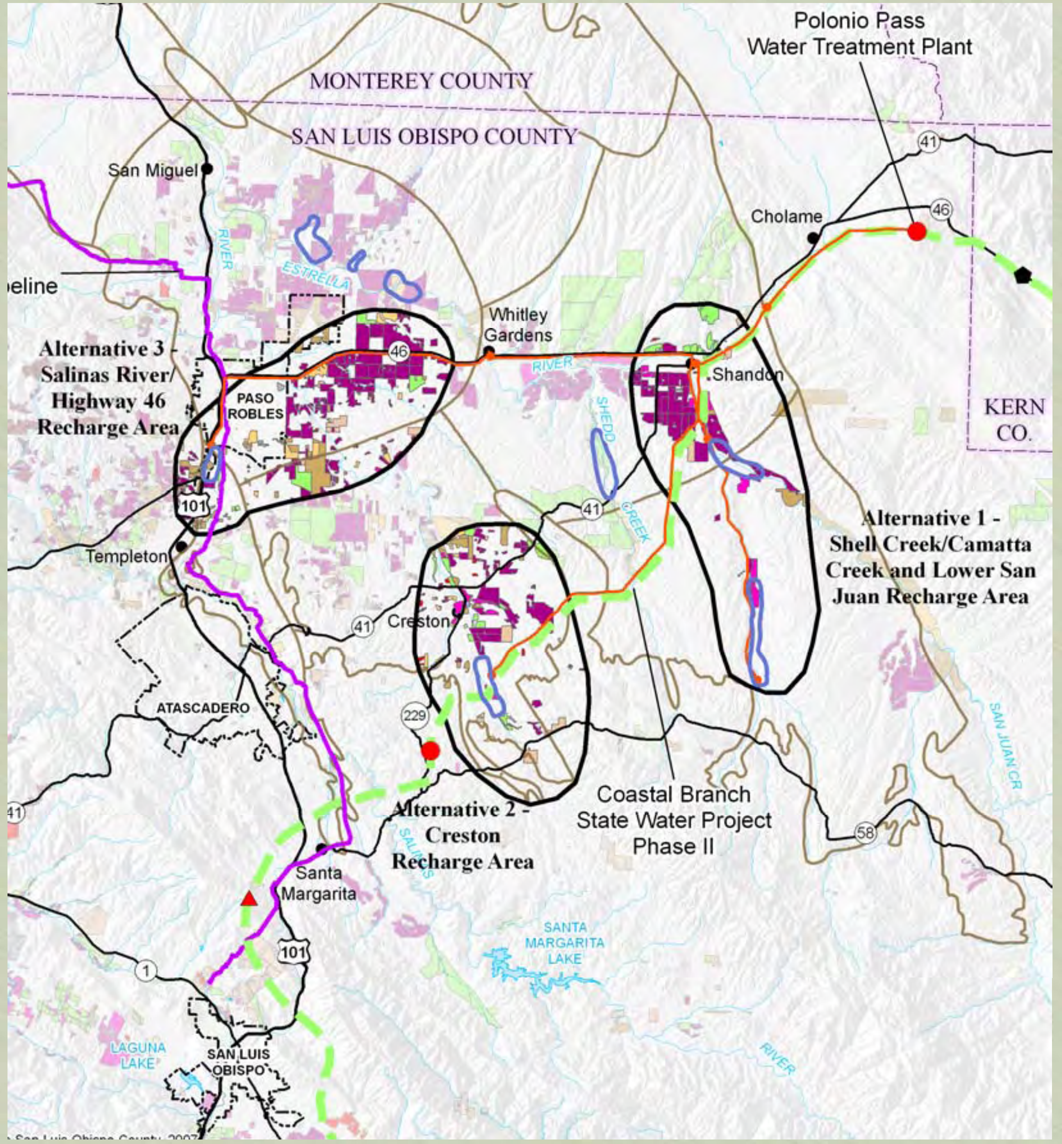
- Buildout Condition from the Paso Robles Groundwater Model
- Each stress period represents 6-months

Alternative Locations

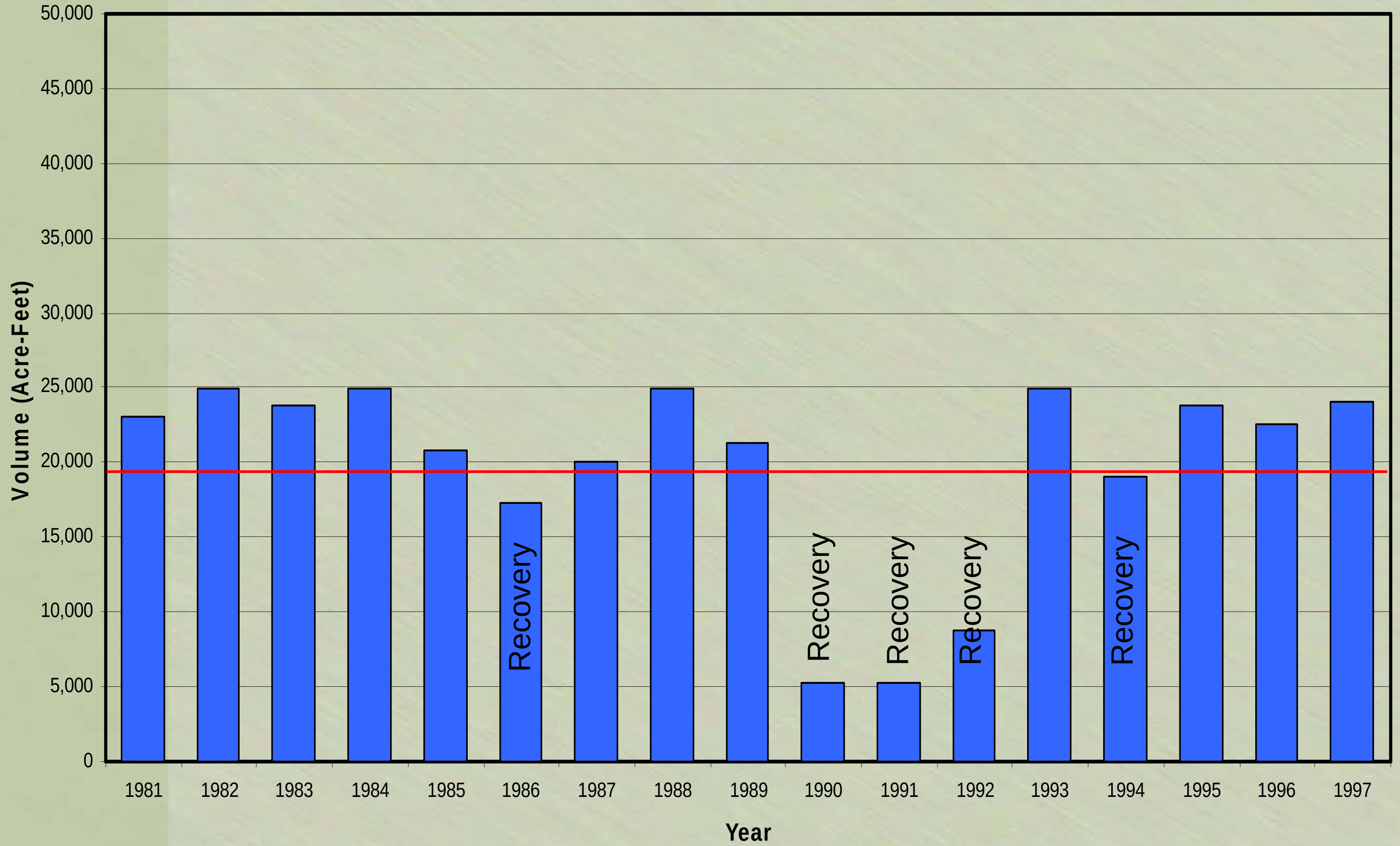
Alt 1 – Shell Creek/Camatta Creek Lower San Juan Creek Area

Alt 2 – Creston Recharge Area

Alt 3 – Salinas River / Hwy 46 Recharge Area

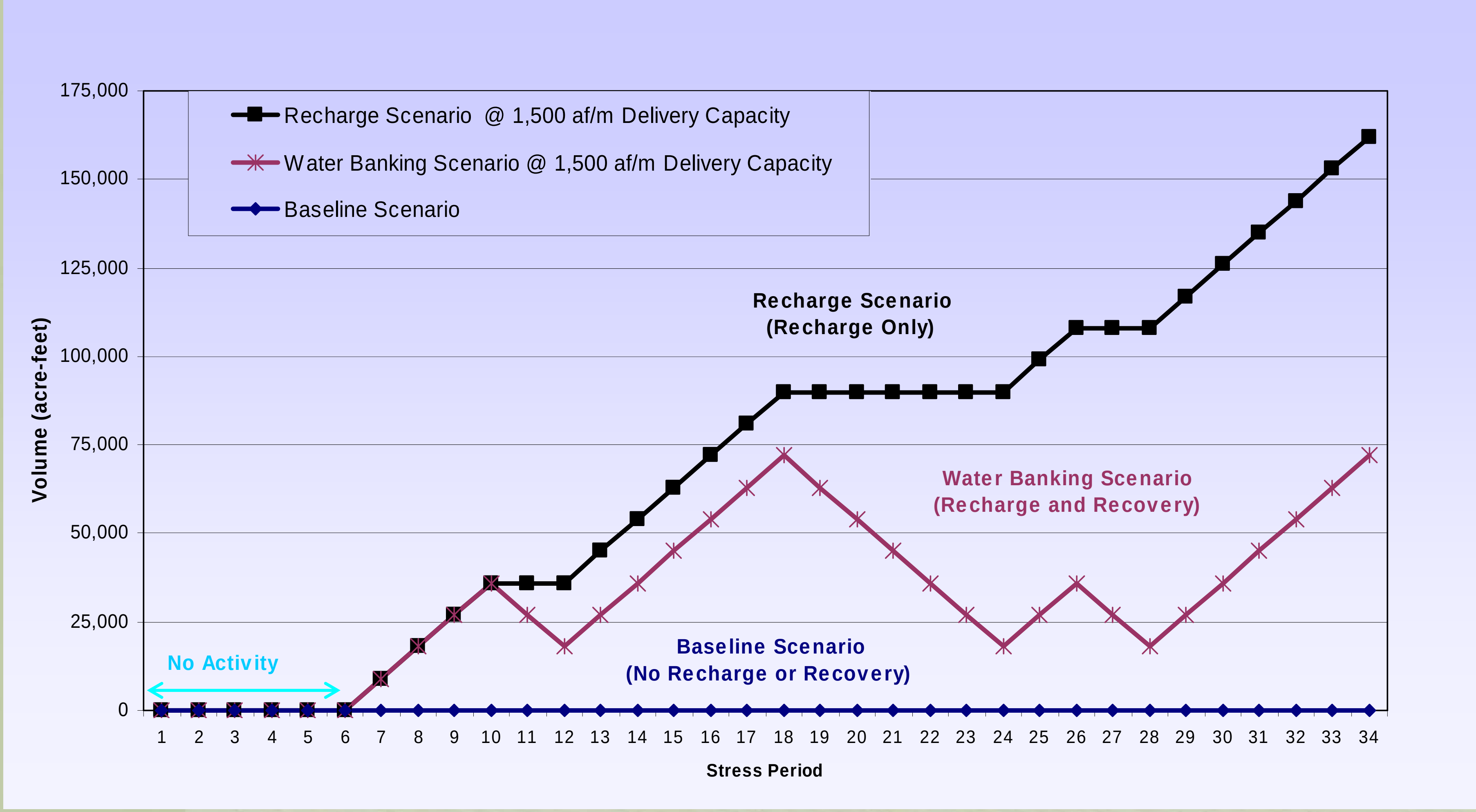


SLOC SWP Table A Allocation for Simulation Period (1981 to 1997)

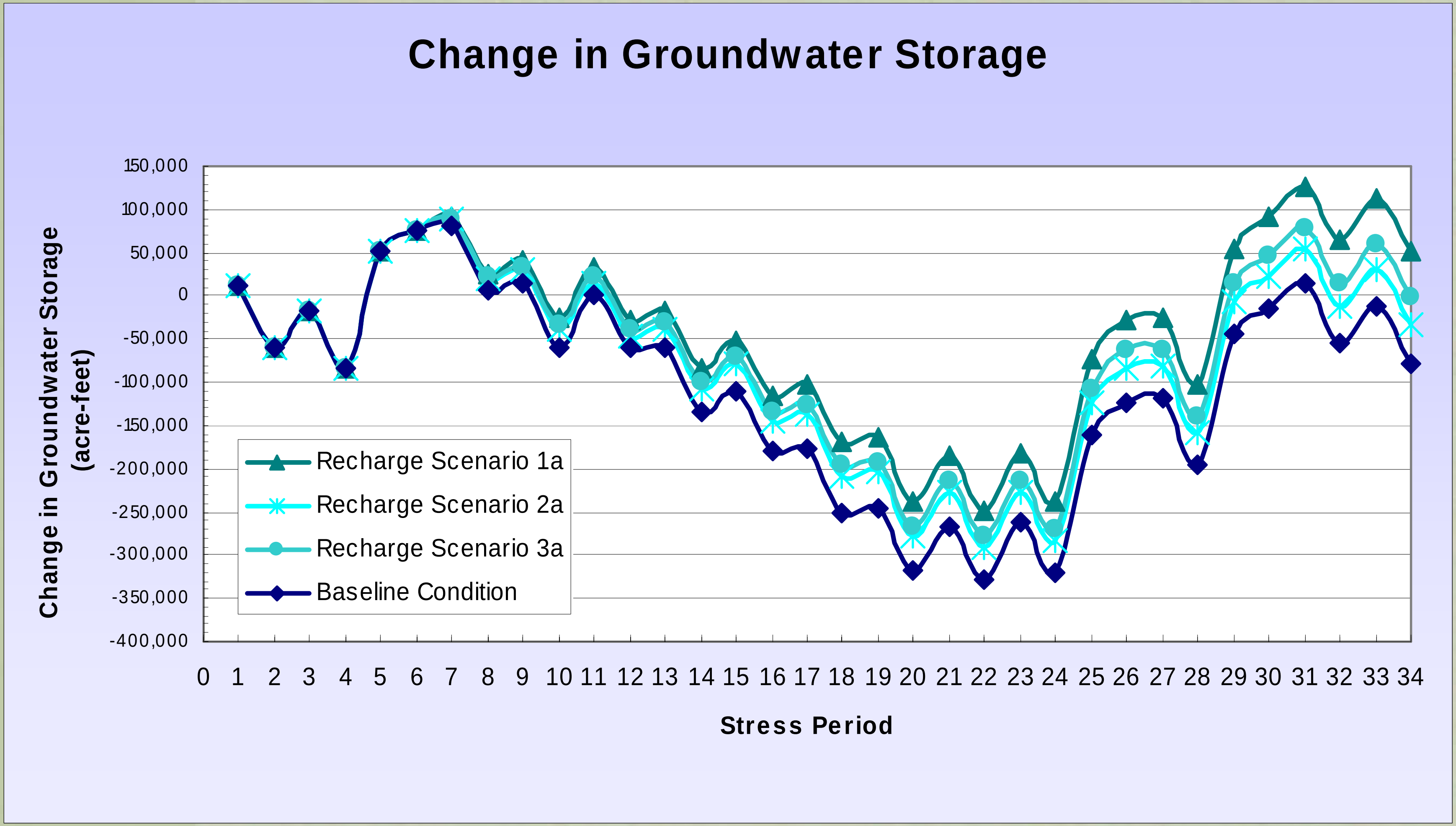


Source: DWR, The State Water Project Delivery Reliability Report 2005

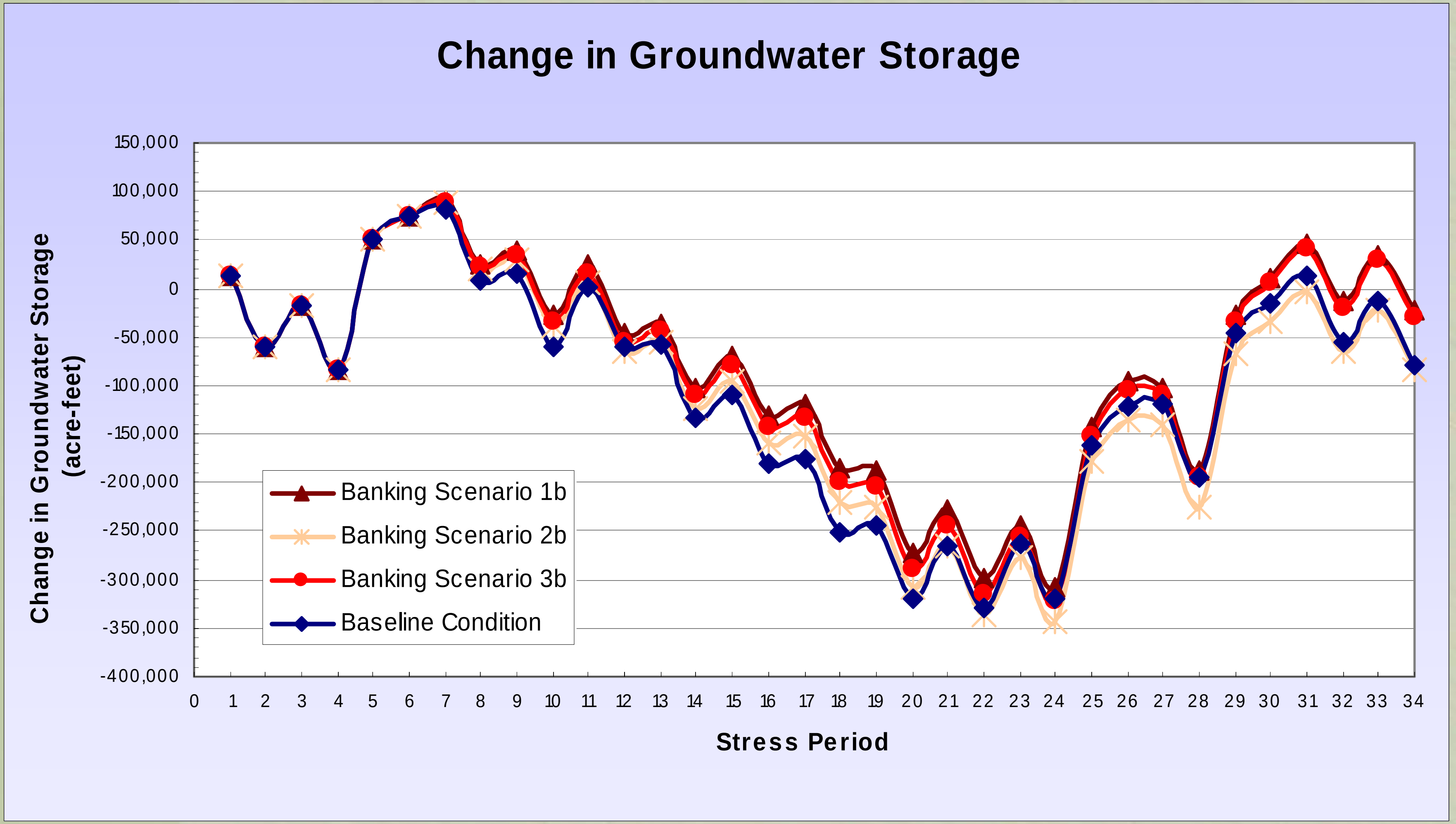
Cumulative Volume for Recharge and Water Banking Scenarios



Comparative Results of Recharge Alternatives



Comparative Results of Water Banking Alternatives



Summary of Hydrogeologic Feasibility

	Recharge Alternatives			Water Banking Alternatives		
	Alt 1a	Alt 2a	Alt 3a	Alt 1b	Alt 2b	Alt 3b
Change in Groundwater Storage	131,400 af (81%)	45,900 af (29%)	78,000 af (48%)	55,900 af (35%)	-3,900 af (-2%)	49,700af (31%)
Recovered Water	none	none	none	90,000 af	90,000 af	90,000 af
Recharge Concerns	Local flooding Impacts from groundwater levels	Large stream losses	Recharge losses to Salinas River	Local flooding Impacts from groundwater levels	Large stream losses	Recharge losses to Salinas River
Recovery Concerns	No Recovery Operations	No Recovery Operations	No Recovery Operations	Localized recovery impacts	Significant recovery impacts	Impacts to Salinas River and M&I wells

- Change in storage at end of 17-year simulation period.
- Actual changes in groundwater storage will be based on annual hydrologic conditions, project operations, project duration.

Engineering Evaluation

- Disposition of the SLOC Table A Supply
- Comparative Project Cost Estimates for Recharge and Water Banking Alternatives
- Groundwater Management Considerations

Disposition of SLOC Table A Supply

Water Use	Annual Amount	Existing Condition 40-Year Total	Recharge Alternative 40-Year Total	Banking Alternative 40-Year Total
SLOC M&I Contractors **(1st priority)**	4,830 af/yr	193,200 af	193,200 af	193,200 af
Drought Buffer **(2nd priority)**	3,617 af/yr	50,600 af	50,600 af	50,600 af
Recharge Operations **(3rd priority)**	Up to 18,000 af/yr	0 af	468,000 af	468,000 af
Excess Allocation	Up to 16,553 af/yr	756,200 af	288,200 af	288,200 af
TOTAL	25,000 af	1,000,000 af	1,000,000 af	1,000,000 af
Recovery Operations	Up to 18,000 af/yr	none	none	252,000 af

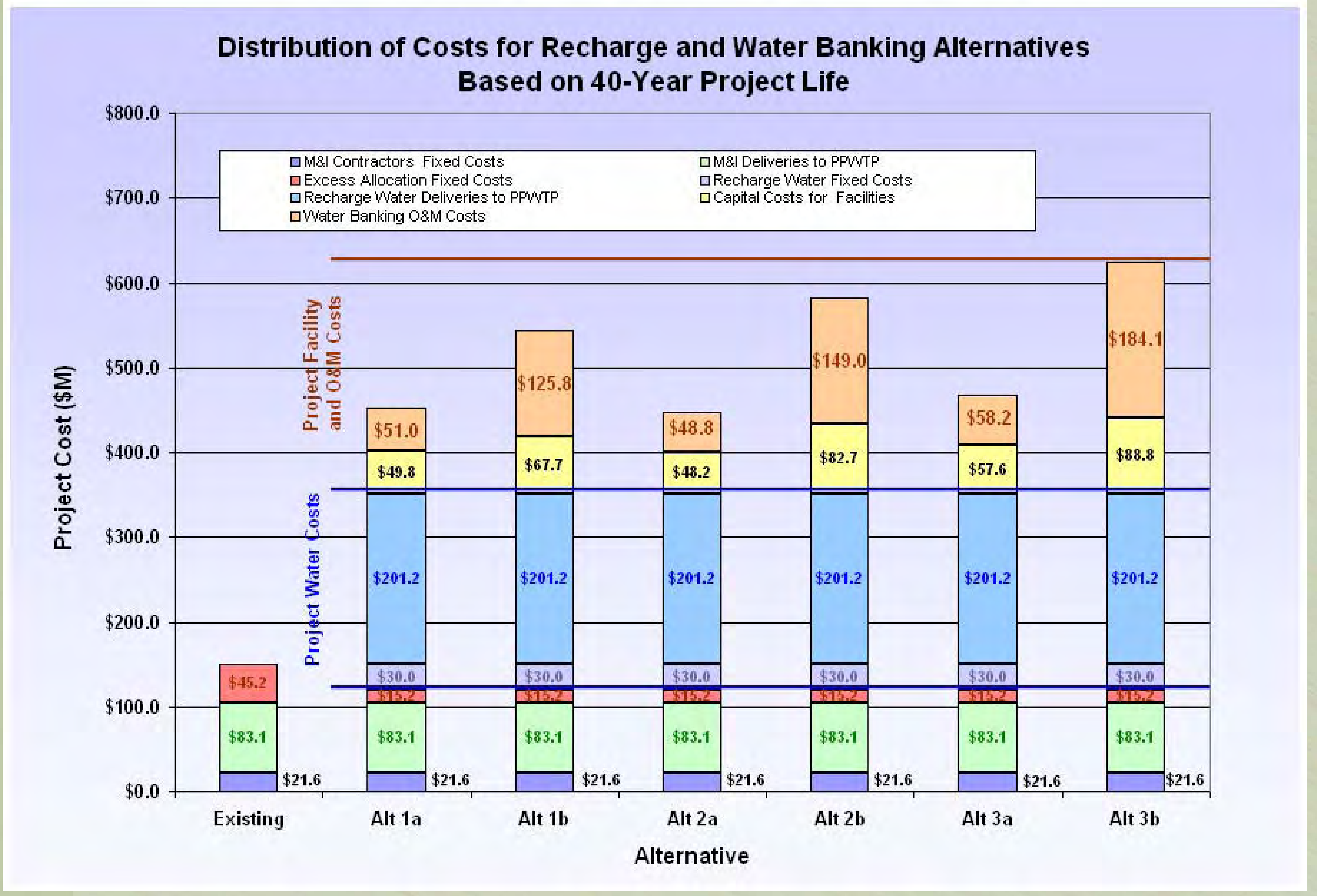
Based on Table A contract amount (25,000 af/yr).

Actual project deliveries will be dependent on annual hydrologic conditions and SWP delivery reliability.

Facility Requirements

- Conveyance Facilities
  - Conveyance Pipeline and Pumpstations
- Recharge Facilities
  - Recharge Basins and In-lieu Recharge Facilities
- Recovery Facilities (water banking operations only)
  - Wells and Collection Systems
- O&M
  - Annual costs to operate alternatives (includes power)

Comparison of Project Costs

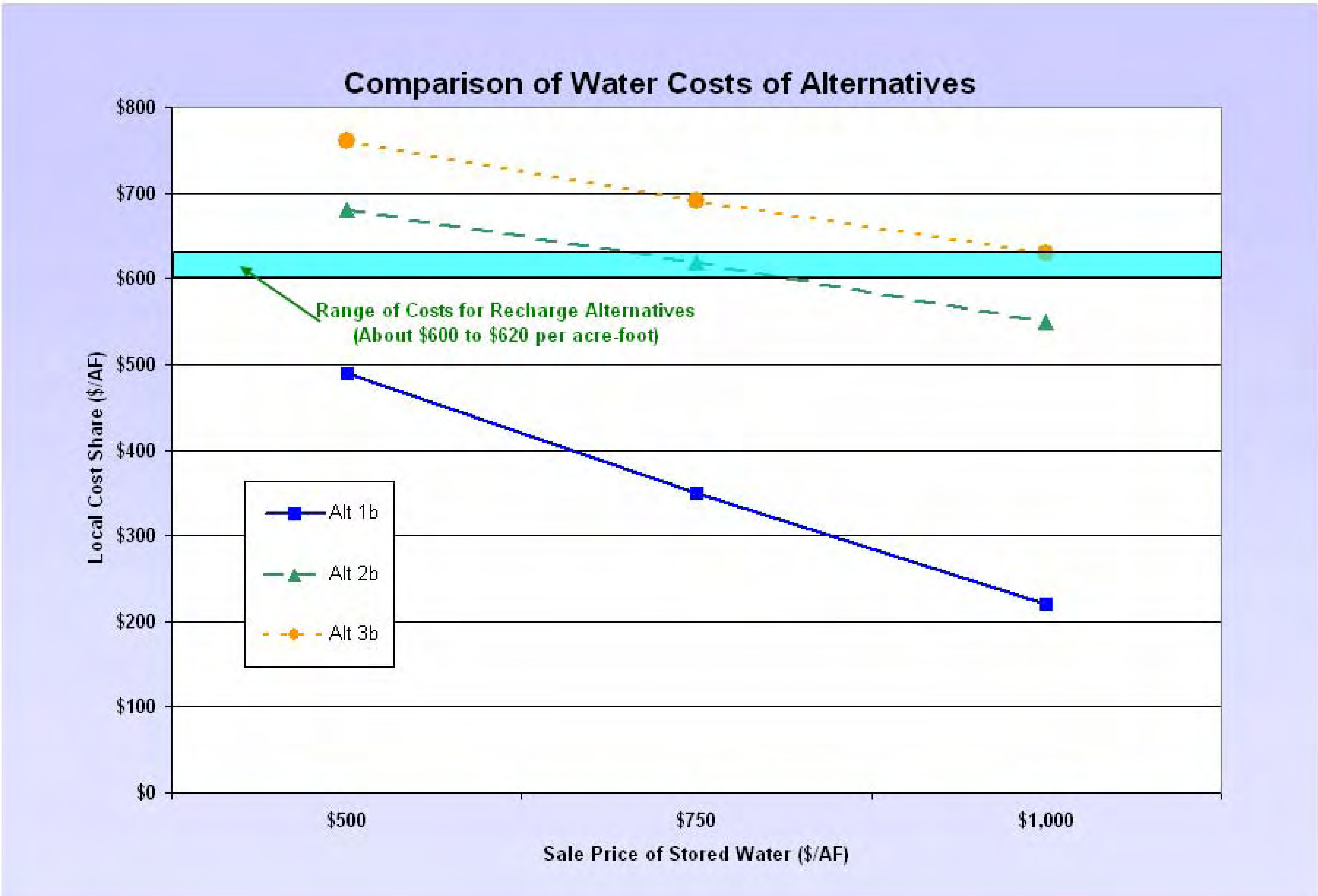


40-Year Total Project Cost Estimates

Cost Component	Recharge Alternatives		Water Banking Alternatives	
	Cost Range	Percent of Total Cost	Cost Range	Percent of Total Cost
Water Cost **(Delivered to PPWTP)**	$231.2 M	80 to 83 %	$231.2 M	56 to 65 %
Capital Costs and O&M Costs	$48.8 M to $58.2 M	17 to 20%	$125.8 M to $184.1 M	35 to 46 %
40 –Year Total Costs	$282 M to $289 M	100%	$357 M to $415 M	100%
Unit Water Cost **($/acre-foot)**	$600 to $620		$760 to $890	

Based on full Table A contract amount (25,000 af/yr).
Actual project costs would will reflect water availability and facility capacity and operations.

Comparison of Water Costs



Groundwater Banking Operational Considerations

- Groundwater Monitoring
  - Establish pre-project conditions
  - Monitor changes in groundwater levels and quality in response to project operations
- Groundwater Banking Operating Agreements
  - Identify all project participants
  - Establish goals and objectives of the project operations
- Groundwater Banking Operational Criteria
  - Ensure equity between land owners and banking partners
  - Manage recharge and recovery operations to minimize impacts

Groundwater Management Recommendations

- Prepare Groundwater Management Plan
  - Provide framework for overall long-term groundwater management in the Basin which may include recharge or water banking operations
  - Required to pursue some funding opportunities
- Develop Monitoring Plan
  - Supports groundwater management planning and basin operations by monitoring changing conditions
- Install Dedicated Monitoring Wells to Fill Data Gaps
  - Improve understanding of basin, and monitoring changing conditions

Environmental and Permitting Considerations

- Key Environmental Issues
  - **Agricultural Resources**
  - **Biological Resources**
  - **Cultural Resources**
  - **Land Use and Growth Inducing Effects**
- Permitting Requirements
  - **Federal Agencies** (COE, NOAA, FWS)
  - **State Agencies** (Central Coast RWQCB, DFG)
  - **Local Agencies** (County of San Luis Obispo, City of Paso Robles, San Luis Obispo Air Pollution Control District)

Environmental Constraints

Component/ Alternative	Agricultural Resources	Biological Constraints	Cultural Resources	Land Use
Conveyance Pipeline	2	2	2	1
Distribution Pipeline	2	2	2	1
Alternative 1 – Shell Creek	2	2	2	1
Alt 2 – Huerhuero Creek	2	2	2	1
Alt 3 – Salinas River	2	3	2	1

3 – Major Constraint; could be fatal flaw precluding site selection

2 – Moderate Constraint; may require additional regulatory or permitting time and effort, but site is suitable for proposed use

1 – Minor Constraint; this issue may need further evaluation in the CEQA context, but not likely to pose a regulatory difficulty

Conclusions – Alternative 1

- Appears to have adequate groundwater storage capacity to support groundwater recharge and recovery operations
- Modeling suggests that more recharged water remains in storage compared to the other locations
- This alternative it the closest to the source of imported water, so the capital and O&M costs are less than the other alternatives
- Additional analysis is needed to optimize the project size to reduce losses and groundwater recovery impacts
- There were no environmental or permitting issues identified as fatal flaws that preclude this project from being pursued.

Conclusions – Alternative 2

- Does not appear to have adequate groundwater storage capacity to support groundwater recharge and recovery operations of the scale evaluated

- Local aquifer conditions require more recovery wells than the other alternatives, increasing project costs

- This alternative is located further from the source of supply compared to Alternative 1

- Additional analysis is needed to optimize the project size to reduce losses and groundwater recovery impacts

- There were no environmental or permitting issues identified as fatal flaws that preclude this project from being pursued.

Conclusions – Alternative 3

- Appears to have adequate groundwater storage capacity to support groundwater recharge and recovery operations of the scale evaluated

- In-lieu recharge along Highway 46 may provide considerable recharge potential and may warrant additional analysis

- Direct recharge along Salinas River may prove problematic due to hydraulic connectivity between the river and alluvial deposits

- This alternative is located the farthest from the source of supply, increasing projects costs particularly for water banking operations

- There may be significant environmental or permitting issues associated with direct recharge near the Salinas River

Recommendations

- Compare study results with other water storage opportunities available to San Luis Obispo County
- Incorporate study results in County Resource Capacity Study
- Prepare preliminary engineering evaluation of most viable sites
- Conduct hydrogeologic field investigation
- Conduct pilot recharge tests

Recommendations (continued)

- Survey land owners to determine interest and willingness to participate in agricultural in-lieu recharge
- Complete salt balance on imported water
- Refine project description and project operations
- Refine/update existing groundwater model to evaluate recharge opportunities in more detail
- Identify and evaluate potential impacts to existing land and water use conditions

Draft Report

Section 1 - Introduction

– Provides project background, goals and approach

Section 2 – Project Setting

– Describes local agencies, available water supplies and existing infrastructure

Section 3 – Potential Water Banking Operations

– Describes water banking concepts and potential banking operations

Section 4 –Water Banking Alternatives

– Describes approach used to identify and select water banking alternatives

Draft Report (continued)

Section 5 – Hydrogeologic Evaluation

- Describes modeling efforts and provides modeling results and hydrogeologic evaluation

Section 6 – Engineering Evaluation and Cost Estimate

- Describes facility requirements and comparative costs for each alternative

Section 7 – Environmental and Permitting Considerations

- Identifies environmental and permitting issues that may need to be addressed

Section 8 –Conclusions and Recommendations

- Summarizes project results and provides recommendations for groundwater management including water banking opportunities

Next Steps

- Comments Due by November 21, 2007
- Final Report Due mid-December 2007

Questions ?