City of Patterson Water System

URBAN WATER MANAGEMENT PLAN, **2005 UPDATE**

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"smart" water engineering
from planning to operations

Final

December, 2006

City of Patterson

Urban Water Management Plan
2005 Update

FINAL

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Table of Contents

Page No.

Table of Contents ii
Abbreviations and Acronyms iii
Water Utility Contact Information vi

Section 1 Introduction
Background 1
Purpose 2

Section 2 Agency Coordination

2.1 Coordination with Appropriate Agencies (§ 10620 (d)) 4
2.2 City and County Notification and Participation (§ 10621 (b)) 5
2.3 Changes or Amendments to UWMP (§ 10621 (c)) 5

Section 3 City of Patterson Characteristics and Water Planning Data

3.1 Service Area (§ 10631 (a)) 6
3.2 Water Supply Sources (§ 10631 (b)) 9
Surface Water 10
Groundwater 17
3.3 Reliability of Supply (§ 10631(c)) 24
3.4 Transfers and Exchanges (§ 10631(d)) 26
3.5 Water Use by Customer (§ 10631(e)) 30
3.6 Demand Management Measures (DMMs) (§ 10631(f-j)) 35
3.7 Water Supply Projects and Programs (§ 10631 (h)) 36
3.8 Desalination Water (§ 10631 (i)) and Water Reuse 41
3.9 Potential Use of Recycled Water (§ 10633 (d-g)) 42

Section 4 Water Shortage Contingency Plan
4.1 Stages of Action (§ 10632 (a)) 45
4.2 Catastrophic Supply Interruption Plan (§ 10632 (c)) 46
4.1 Revenue Impacts During Shortages (§ 10632 (g)) 48

Section 5 Water Quality Impacts on Reliability 49

Section 6 Adoption and Implementation of UWMP 50

LIST OF FIGURES

Figure 3-1 Population Growth Estimates 8

Figure 3-2 Service Connections vs. Population....9
Figure 3-3 Groundwater Use vs Population Growth....19
Figure 3-4 Average Daily Use per Person....32
Figure 3-5 City of Patterson Annual Water Use....33
Figure 3-6 Program Implementation Schedule....40

LIST OF TABLES

Table 2-1 Coordination with Appropriate Agencies....4

Table 3-1 Climate....7
Table 3-2 City of Patterson Groundwater Well Data....20
Table 3-3 Reliability of Supply for 2025....25
Table 3-4 Basis of Water Year Data....25
Table 3-5 Factors resulting in inconsistency of supply....25
Table 3-6 Annual Water Demand Projections....34
Table 3-7 Recommended Tasks for Water Supply Program Implementation....38
Table 3-8 COP WWTP Projected Flow Rates....43

Table 4-1 Drought Contingency Plan....46
Table 4-2 Catastrophic Source Water Failures and Mitigation....47

APPENDICES

A. City of Patterson General Plan
B. COP Adopted Drought Contingency Plan
C. Public Notices and Resolution for Adopted UWMP
D. Notification Letters to Appropriate Agencies

Abbreviations and Acronyms

AF or af	Acre Feet
AFY or afy	Acre Feet per Year
BOR	US Bureau of Reclamation
CA	California Aqueduct
CEQA	California Environmental Quality Act
COP	City of Patterson
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DHS	State of California, Department of Health Services
DMC	Delta Mendota Canal
DMM	Demand Measurement Measures
DWR	State of California, Department of Water Resources
ETo	Evapotranspiration
GMP	Groundwater Management Plan
gpcd	gallons per capita per day
GPM or gpm	Gallons per Minute
gpm/ft	gallons per minute per foot (units of transmissivity)
MG	Million Gallons
MGD	Million Gallons per Day
M&I	Municipal and Industrial
mg/l	Milligrams per liter
NWS	National Weather Service
ppb	Parts per billion (identical to ug/l)
ppm	Parts per million (identical to mg/l)
RWQCB	Regional Water Quality Control Board
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
ug/l	Micrograms per liter
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
WPS	City of Patterson 2006 Water Planning Study
WTP	Water Treatment Plant
WTSF	Water Treatment and Storage Facility

Agency Information

Utility Name	City of Patterson
Address	1 Plaza
City	City of Patterson
State	CA
Zip Code	95363

Contact Information

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City of Patterson

Urban Water Management Plan
2005 Update

1 – Introduction

Background

This Urban Water Management Plan Update ("UWMP") was prepared by the City of Patterson ("COP") in accordance with State of California requirements, as defined in the California Water Code. The UWMP is an update of the previous plan developed in 2002, titled "City of Patterson – Year 2000 Urban Water Management Plan".

Since the completion of the previous study, COP has made significant progress in its water supply planning efforts, which are described herein. Specifically, COP authorized the development of a Water Planning Study ("WPS") in late 2005, to evaluate water demands, sources of supply available to the City, and alternatives for treatment of these sources. Part of the study included aquifer testing to solidify assumptions of groundwater yield made in the 2000 UWMP. This UWMP Update utilized some of the information collected and developed during the WPS document.

Alternatives presented in the draft WPS included use of surface water, groundwater, and conjunctive use of both sources. The WPS recommended water program involves the conjunctive use of ground and surface water sources, providing the COP with the best combination of quality, reliability, and affordability. The COP is currently embarking on the first phase of this program by completing "confirmation" work (i.e. acquiring surface

water entitlements, pilot testing, supplemental water quality testing, property purchases for treatment facilities, funding and financing plans, etc.). However, until the confirmation work is complete, the COP is not expected to officially adopt the WPS recommended water supply program. Thus, the WPS is discussed in concept herein, but the 2005 UWMP is based on current program status, which assumes groundwater use only. Upon adoption of a new water program, the COP will update its UWMP.

The COP is also investigating regional water supply opportunities. The COP and County of Stanislaus recently completed a study to evaluate the feasibility and cost benefits of partnering to provide water supply to both COP and select County service areas. In addition, the COP is discussing partnering options with Western Hills Water District to determine the potential for increasing long-term water supply reliability for both agencies. Negotiations with both the County of Stanislaus and Western Hills Water District are on-going. Therefore, a regional strategy may be incorporated into the future COP water supply program.

COP has also embarked on a water reuse study to determine the feasibility and marketability of using treated wastewater for landscaping and agriculture irrigation. The results of that study are expected sometime during 2006.

Purpose

The purpose of preparing an Urban Water Management Plan is to satisfy the requirements of Division 6 of the California Water Code. Established in 1983 [1], the Urban Water Management Plan Act was adopted to formalize the state's policy that management of urban water demands and efficient use of water shall be a guiding criterion in public decisions, and urban water users shall develop plans to actively pursue

[1] AB 797, Klehs

the efficient use of water supplies. The act has been amended 18 times since its creation, including SB 610 in 2001. [2]

The UWMP Act requires all water suppliers with at least 3,000 customers prepare and adopt a plan every five (5) years. According to the act, the content of the plan shall include a description of water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions. Specifically, the plan must:

- Provide current and projected population, climate, and other demographic factors affecting the supplier's water management planning;
- Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier;
- Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage;
- Describe plans to supplement or replace that source with alternative sources or water demand management measures;
- Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis (associated with systems that use surface water);
- Quantify past and current water use;
- Provide a description of the supplier's water demand management measures, including schedule of implementation, program to measure effectiveness of measures, and anticipated water demand reductions associated with the measures;
- Assessment of the water supply reliability.

UWMP's are required to provide projections of water program data and information for a 20 year horizon, or "*as far as data is available*". Plans shall be adopted by the water supplier, and copies submitted to the California State Department of Water Resources (DWR).

[2] Requires that water assessments be furnished to local governments for inclusion in any environmental documentation (CEQA) for certain projects when absent from UWMP's.

2 – Agency Coordination

2.1 Coordination with Appropriate Agencies (§ 10620 (d))

In accordance with requirements the UWMP Act, and in conjunction with development of the WPS, COP contacted local water purveyors and agencies to discuss its water planning efforts, and possible options for regional water programs. The primary purpose of recent meetings with local water purveyors is to discuss options for water sharing and/or transfers to: 1) minimize the need to import water to the area, and 2) enhance the overall reliability of supplies in the area for periods when imported water is limited or unavailable. Discussions with most of these water purveyors are expected to continue while COP develops its water supply program. Additional information regarding these districts and current coordination efforts are included in Section 3.4.

In early 2006, COP and the County of Stanislaus agreed to jointly study opportunities for a regional water supply program. These studies will examine source supply and treatment options for meeting the demands of COP and future County of Stanislaus developments on the west side (west of the San Joaquin River), near COP. The results of these efforts are expected to be completed in late spring, 2006. In addition, COP has approved a study to determine the feasibility of initiating a wastewater reclamation program to provide additional supplies for irrigation of landscaping and agriculture.

Table 2-1 lists coordination activities that COP has had with local water purveyors.

Table 2-1
Coordination with Appropriate Agencies

	Participated in UWMP development	Commented on draft UWMP	Attended public meetings	Contacted for assistance	Received copy of draft UWMP	Sent notice of intention to adopt	Not Involved / No Information
County of Stanislaus	✘			✘	✘	✘	
Patterson Irrigation District	✘			✘	✘	✘	
Del Puerto Water District	✘			✘	✘	✘	
Oak Flat Water District	✘			✘	✘	✘	
West Stanislaus Irrigation District					✘	✘	
Western Hills Water District	✘			✘	✘	✘	

Each participating agency as shown above received a draft of the UWMP. No written comments were received from participating agencies, nor comments submitted during the public hearing process.

2.2 City and County Notification and Participation (§ 10621 (b))

Upon completion of the Draft UWMP, COP provided notification to Stanislaus County, encouraging review of the UWMP and the invitation to provide comments and participate at the public hearing. No written comments were received from Stanislaus County, nor comments through the public hearing process.

2.3 Changes or Amendments to UWMP (§ 10621 (c))

In the event there are significant changes, impacts or new information that would require the UWMP to be updated or amended prior to the next required plan update in 2010, COP will follow the procedures set forth in Water Code Sections 10640 through 10645.

3 - City of Patterson Characteristics and Water Planning Data

3.1 Service Area (§ 10631 (a))

COP is a vibrant, growing community with a rich agriculture heritage. It is among many diverse communities in the Central Valley of California that was established through the hard work and dedication of many individuals committed to a common vision of prosperity and opportunity. It is proud of its provincial setting and strong sense of community. The City is located on Highway 33, along the Interstate 5 corridor, 280 miles north of Los Angeles, 92 miles south of Sacramento, 89 miles southeast of San Francisco and 45 miles southeast of Livermore.

In 1909, Thomas Patterson subdivided 18,462 acres held by the Patterson Ranch Company into ranches of various sizes and plotted the design of the town of Patterson. Determined to make Patterson different from most, he modeled his town after the radiating street designs of Washington D.C. and Paris, France, designed by the famous French architect and engineer Pierre Charles L'Enfant. Major streets were planted with Palms, Eucalyptus and Sycamore trees. The COP was incorporated in 1919.

With a current population of 17,500 residents, Patterson is a rural, small town surrounded by agricultural land. With agriculture as its primary economic base, orchards of apricots, almonds and walnuts, as well as row crops of dry beans, tomatoes, broccoli, spinach, peas and melons play an important role in Patterson's history. It is commonly referred to as the "Apricot Capital of the World".

In recent years, the City has become a bedroom community for residents that chose to work in nearby urban centers but live in a quieter setting. In response, the City has made

adjustments in its land use, providing for more residential development as well as the creation of more commercial and industrial opportunities.

Climate

COP and surrounding Stanislaus County area averages 11.0 inches of rainfall annually. Temperatures range from an average low of 38° F in the winter to an average high in the upper 90's during summer months. Spring and fall are mild with an average high in the low 80's. Mean monthly rates for evapotranspiration and precipitation, and mean temperatures are shown in Table 3-1.

Table 3-1

Mean Climate Data for City of Patterson [3]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
ET [4]	**1.59**	**2.20**	**3.66**	**5.08**	**6.83**	**7.80**	**8.67**	**7.81**	**5.67**	**4.03**	**2.13**	**1.59**	**57.06**
Precipitation	**2.43**	**2.04**	**1.60**	**0.84**	**0.34**	**0.04**	**0.01**	**0.02**	**0.22**	**0.47**	**1.31**	**1.70**	**11.04**
Temperature	**45.6**	**50.9**	**55.4**	**60.2**	**67.3**	**73.8**	**77.9**	**76.4**	**72.4**	**64.7**	**53.4**	**45.8**	**NA**

Land Use and Population

Land use within COP's sphere of influence is directed by the City's General Plan, adopted on June 11, 1992, and updated on September 7, 2005. The City's General Plan area includes 342 acres of proposed low density residential development, commonly referred to as the "northeast territory", in addition to the area defined by the adopted sphere of influence.

[3] Precipitation and temperature based on nearest Western Regional Climate Center station in Newman, CA. Actual precipitation is expected to be slightly less that shown.

[4] California Irrigation Management Information System, Department of Water Resources

According to City Community Planning records, there has been an average annual increase in population of 7.1% over the past 7 years. The population is currently estimated at approximately 17,500 persons.

At full build-out, the General Plan shows a total population of approximately 36,000 persons, with a majority utilizing low-density residential housing. This build-out population is expected to occur sometime between 2025 and 2030, as illustrated in Figure 3-1. No additional building beyond a population of 36,000 persons is anticipated with the current general plan.

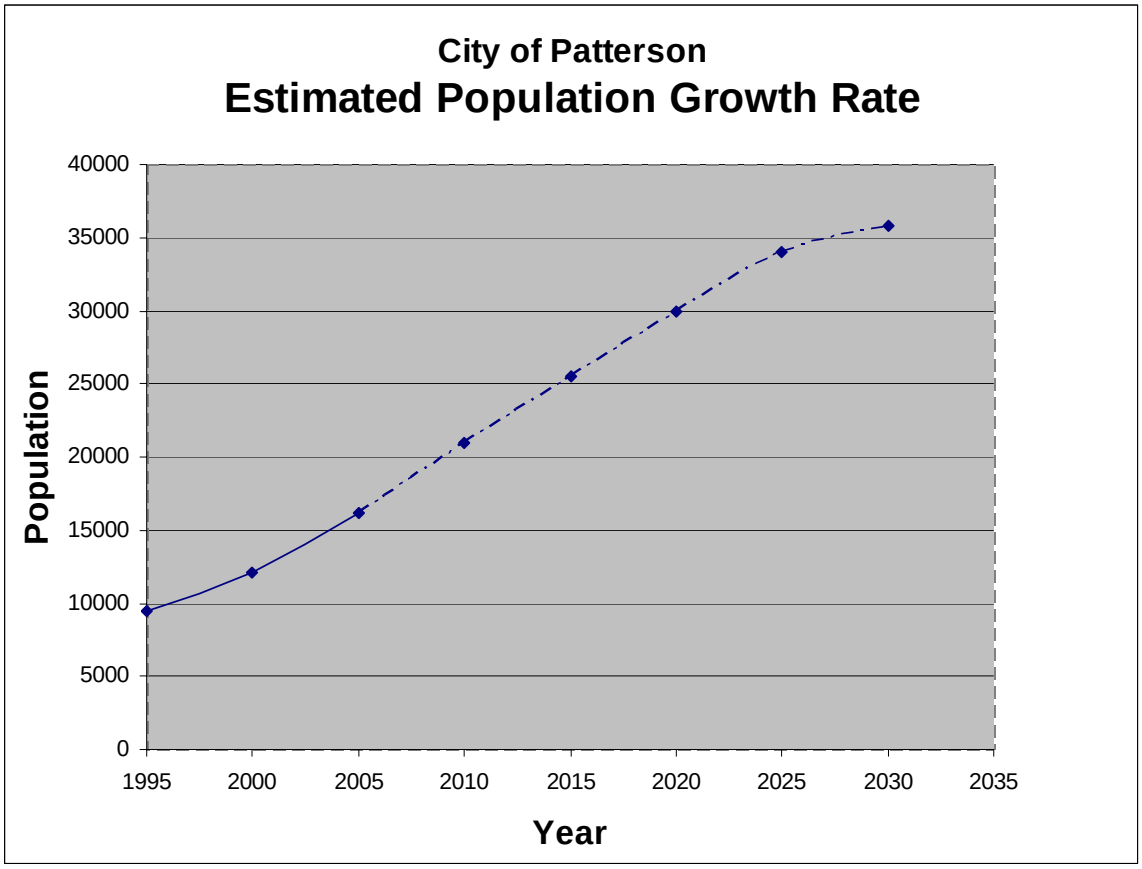

Figure 3-1 – ***City of Patterson estimate of population growth rate.***

Housing density was estimated by comparing the total City population and the number of service connections. An estimate of 3.3 persons per service connection was estimated, based on the relationship shown in the following figure.

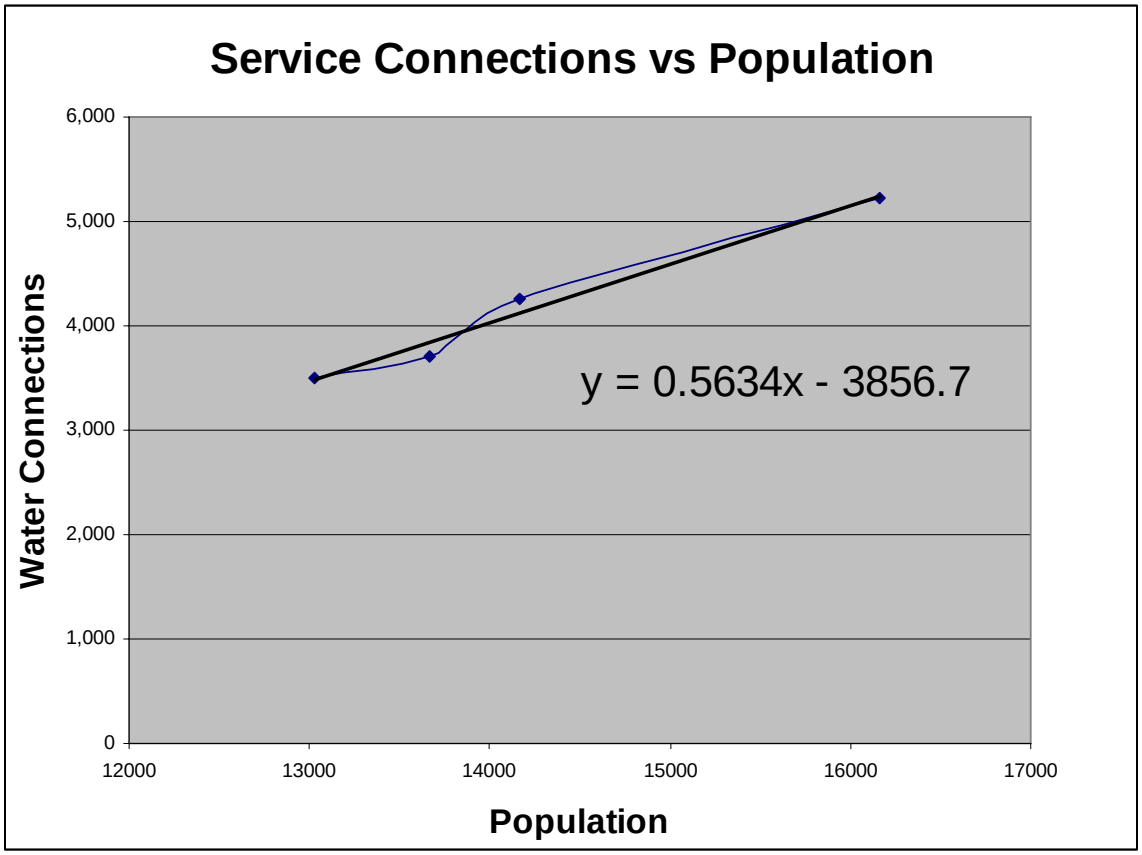

Figure 3-2 – ***Relationship between population and water service connections.***

3.2 Water Supply Sources (§ 10631 (b))

COP has limited sources of water available to choose from for water supplies, although fortunate that it has more than one option. These options include surface water made available from state and federal water projects, and local groundwater. Naturally occurring surface water from local rivers and streams does not appear to be a viable

option for water, either due to the seasonal nature of surface runoff or quality of water in permanently flowing watersheds.

Presently, COP uses groundwater to meet all of its municipal and industrial water demands. The yield available from the local groundwater is sufficient to provide source water for the estimated build-out population, as defined by the City's general plan. However, salinity concentrations in the groundwater may force the City to provide treatment at some time in the future. Total dissolved salts are under the acceptable limit, but could rise as higher rates of groundwater are used. In response, the City authorized a Water Planning Study (WPS) in late 2005 to review options for source water and treatment. The results of that study are discussed in this document, although COP is still reviewing the alternatives recommended in the study.

Surface Water

When analyzing surface water as a source for a community's water supply, it is important to consider the availability of the water, both contractually and physically, and the means of conveying the water to the community. Water must be available (through rights or other entitlement processes), and precipitation must be of sufficient frequency and volume to meet demands. Many communities are located adjacent to large, perennial rivers so access to the water is simple and reliable. Other communities receive water from a state or federal project, whereby water is delivered through manmade facilities. The disadvantage of man-made facilities is they are subject to interruptions due to failure, power outages, natural disasters, or malevolent acts.

San Joaquin River

As discussed in previous reports, [5] the quality of the San Joaquin River near COP is not an acceptable surface water supply source. The quality of the water is severely degraded

[5] Stoddard & Associates, "City of Patterson, Water Supply Options, 2001", pg. 4

due to upstream discharges from municipal sewage plants, storm runoff, and return water from hundreds of farms along the river. In many dry years, the lower section of the river carries no natural flow.

Per water rights decision D-1641 (2000), the State of California Regional Water Quality Control Board was directed to develop salinity objectives for the San Joaquin River upstream of Vernalis. In May of 2003, the Bureau of Reclamation released the Delta-Mendota Recirculation Study that analyzed a program to introduce water to the San Joaquin River near the confluence of the San Joaquin and Merced Rivers through the use of existing federal and state water facilities. The plan would use a combination of stored water in the San Luis Reservoir and Delta water pumped through the Delta-Mendota canal to convey water to the San Joaquin River via the Newman Wasteway (drain) for the purpose of improving water quality in the river. If implemented, this program could improve certain water quality parameters in the river (i.e. dissolved oxygen, salinity), but other contaminants (i.e. mercury, pesticides) may still be present at levels of concern. The study is still being evaluated by state and federal agencies.

Although solutions to the river quality are under investigation, it is doubtful that the quality of the San Joaquin River will ever be a viable source of water for Patterson. The Department of Health Services has stated that the San Joaquin River is not an acceptable source of drinking water, regardless of the level of treatment proposed. Thus, it was eliminated as a surface water alternative.

State and Federal Water Projects

The options for delivery of surface water to COP include two man-made canals located west of Patterson. The canals consist of the California Aqueduct, part of the State Water Project, and the Delta-Mendota Canal, part of the Federal Central Valley Project.

It is important to note that both of the canals consist of concrete lined ditches equipped with mechanical check structures and outlets, and utilize pumps to convey water. Thus, each is subject to periods of outage for repair, replacement of equipment, or a variety of

other improvements. The canals are at or near their design life, and could require major reconstruction at a future date. According to representatives of the SWP, the frequency of service interruptions of the California Aqueduct have increased over time due to age related failures, with some outages exceeding several weeks.

The Delta Mendota Canal

The Delta-Mendota Canal (DMC) is a part of the Central Valley Project, a project overseen and operated by the U.S. Department of Interior and the San Luis and Delta-Mendota Water Authority. The canal was constructed because of impacts from the Madera and Friant-Kern Canal systems of CVP's Friant Division, which diverted most of the San Joaquin River's flow upstream (south) of many water right holders. In 1946, BOR started construction of the DMC and Tracy Pumping Plant to replace the San Joaquin River flows with water from the Sacramento River.

The DMC originates at the Tracy Pumping Plant (headworks) on the bank of Old River, a natural channel in the Delta, just north of the City of Tracy. The Tracy Pumping Plant raises water from the intake channel some 197 feet into the canal which carries the water south. The first ninety-five miles of the DMC have a concrete lining, but the remaining distance is earthen (unlined). The canal stretches a total distance of 115.7 miles. The DMC has a bottom width of 100 feet and a design capacity of 4,600 cubic feet per second, although the maximum flow is currently restricted to about 4,200 cfs due to sedimentation and other downstream constraints.[6] The capacity of the Tracy Pumping Plant is approximately 5,100 cfs. The canal travels through Stanislaus, San Joaquin, and Merced Counties, ending at the Mendota Pool in Fresno County.

The design and operation of the DMC allows for surface water runoff and agricultural return water to enter the canal. In the section between the Tracy Pumping Plant and where the COP would take water (Mile Post 40), there are approximately 87 locations

[6] Per discussions with Joe Pennino, Reclamation Engineer in Tracy.

where surface water can enter the canal, and one (1) location where agricultural return water can be pumped into the canal.[7]

The California Aqueduct

The 444-mile California Aqueduct transports water from the Sacramento-San Joaquin Delta to areas south of the Delta, including Central and Southern California. Construction of the canal began in 1964, and was completed in 1972. Water is feed into the CA Aqueduct from the Harvey O. Banks Pumping Plant, located just south of the Clifton Court Forebay. The canal has a total capacity of almost 11,000 cfs, but environmental and water quality concerns currently limit the pumping rate of the Banks plant to 6,680 cfs. DWR is proposing to increase this rate to 8,500 cfs with improvements associated with the South Delta Improvement Program (see below).

One notable distinction in the design and construction of the CA Aqueduct is DWR excluded inflow of surface water runoff and agricultural return water, as opposed to the DMC which allows these inflows. As a result, the California Department of Health Services (DHS) has stated that this water is a preferred source for potable M&I water.[8] DHS's present position is that the CA Aqueduct is an acceptable water source, whereas the DMC is not.

Other Projects of Interest

South Delta Improvement Program -

Consistent with the CALFED Plan[9] and the overall goals of improving water management of the Bay-Delta system, DWR and Reclamation have proposed the South

[7] San Luis and Delta-Mendota Canal Water Authority

[8] DHS has also stated that the source water from the SWP Banks Pumping Plant is of a higher quality than the CVP Tracy Pumping Plant, and further justifies use of CA Aqueduct water over DMC water.

[9] CALFED Bay/Delta Program Plan, a state and federal multi-agency framework to improve water management in the Bay-Delta system.

Delta Improvements Program (SDIP). According to DWR, The SDIP is a series of physical and operational changes that will improve water quality, protect fish in the South Delta, and allow increased diversions for the SWP. A draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to implement the SDIP was released for a 90 day public review period on November 10, 2005. The project description states:

"The improvements program is a key part of DWR's overall Delta management strategy. Among the proposed physical changes is replacement of seasonal rock barriers with four permanent operable gates. This will protect fish and improve water circulation and quality in the South Delta. Some channel dredging and modifications to local agricultural diversions are also included in the proposed plan. In total, these actions will improve water quality and give farmers improved access to irrigation water.

The operational component of the plan proposes to use existing SWP facilities to provide more water to communities, businesses and agriculture south of the Delta when water supplies are available and it is environmentally sound to do so. The alternatives in the draft EIR would increase the total amount of water diverted by an average of up to three percent to five percent annually."

The Delta Mendota Canal – California Aqueduct Intertie Project –

DWR and Reclamation joined together to construct an intertie between the DMC and CA Aqueduct for the purpose of moving water between the canals. Since the CA Aqueduct has surplus capacity, and the DMC is at capacity, the new intertie will allow Reclamation to convey additional water south of the Delta.

The proposed pumping plant will be located near mile post 7 on the DMC, where the two canals are only about 300' apart. The plant will have capacity to pump approximately 900 cfs, but is expected to only pump about 400 cfs initially. Since the CA Aqueduct sits

approximately 50' higher than the DMC, the facility can also allow water to move from the CA Aqueduct to the DMC via gravity in the case of an emergency (e.g. California Aqueduct repairs, etc.). According to BOR, [10] the project would be used under three different scenarios:

1. Up to 400 cfs would be pumped from the DMC to the CA to help meet water supply demands of Central Valley Project contractors. This would allow the Tracy Pumping Plant to pump to its authorized capacity of 4,600 cfs, subject to all applicable export pumping restrictions for water quality and fishery protections.

2. Up to 400 cfs would be pumped from the DMC to the CA to minimize impacts on water deliveries attributable to required reductions in water levels in the DMC south of the Intertie, or the CA north of the Intertie, for system maintenance or due to an emergency shutdown.

3. Up to 900 cfs would be conveyed from the CA to the DMC using gravity flow to minimize impacts on water deliveries attributable to required reductions in water level in the CA south of the Intertie, or the DMC north of the Intertie, for system maintenance or due to an emergency shutdown of the DMC, Tracy Pumping Plant, or Tracy Fish Facility.

At the writing of this report, the adequacy of the environmental documentation for the project was being challenged, potentially delaying its completion.

Source Reliability

Source reliability is a critical component of the water supply solution. For this study, it is assumed that the probability of periods when surface water deliveries are restricted or absent is high, due to either natural or man-made conditions. All communities that rely

[10] Bureau of Reclamation press release dated November 29, 2004

on water from either state or federal water programs are subject to reductions due to inadequate supplies during drought periods. However, COP faces additional challenges.

Options for surface water deliveries to COP include the California Aqueduct and Delta-Mendota Canal. Since these facilities are manmade, there is a higher probability of interruptions in surface water deliveries compared to communities that receive water directly from rivers above the Delta. Additional constraints that COP could experience include: 1) failure of conveyance facilities (Aqueduct and DMC) due to earthquakes, acts of terrorism, or unscheduled maintenance or facility failures (e.g. canal linings, pumps, gates, etc.), 2) conflicts with Delta water quality goals, 3) competing demands for space in the conveyance systems, 3) deteriorated water quality due to upstream discharges or salt intrusion. Therefore, any scenario whereby COP relies on surface water to meet demands must include provisions for short term and long term water reductions in those supplies.

In general, the reliability of a surface water supply depends on a combination of factors. These generally include ample source water (plenty of rainfall and stored water), facilities to convey water to the user, and competing demands that may reduce deliveries for limited periods of time.

Availability of Source Water

The availability of source water in the "system" depends primarily on the amount of snow and rain that falls above the storage reservoirs during any given year. Most water reliability models use historical data, typically dating back to the early 20th century, to forecast water availability and predict periods of severe shortages. However, studies on climate change suggest that a warming trend may be occurring in our region. Climate models studied by the Scripps Institution of Oceanography indicated that there could be a reduction in northern Sierra precipitation by about one-third to one-half by the middle and end of the century. Other studies by UC Santa Cruz indicate an increase in total

precipitation by about 25 percent in northern regions, but less total snowpack[11]. Thus, it should be recognized that water availability is a variable in long-term water planning.

Conveying Water from Source to Point of Delivery

This factor considers the ability of natural and man-made facilities to move water to the point of delivery. Typically this component includes capacity of facilities as well as institutional limitations (legal, contractual, or regulatory). Most reliability models do not include interruptions due to natural causes, facility failures, malevolent acts, etc.

Competing Demands

Demands on systems have impacts on the reliability of deliveries during specific periods. For example, there is a high demand for water during the summer months from both agriculture and M&I uses. Although there may be available water supplies and facility capacity to delivery annual demands, competition during peak demand periods could hinder deliveries.

Groundwater

COP is located on the west side of Stanislaus County, near Interstate 5, approximately 30 miles south of the City of Tracy, just west of the San Joaquin River. It is within the San Joaquin River Hydrologic Region, as defined by the California Department of Water Resources (DWR). According to DWR, the region is heavily groundwater reliant, with groundwater accounting for about 30 percent of the annual supply used for agricultural and urban purposes in the region. The aquifers are generally quite thick in the San Joaquin Valley subbasins, with groundwater wells commonly extending to depths of up to 800 feet. Aquifers include unconsolidated alluvium and consolidated rocks, with unconfined and confined groundwater conditions. Typical well yields in the San Joaquin Valley range from 300 to 2,000 gpm with yields of 5,000 gpm possible.[12]

[11] California DWR, "The SWP Delivery Reliability Report", 2002, pg. 6.

[12] Per DWR Bulletin 118, 2003 update.

The City is located within the Delta-Mendota Subbasin, as defined by DWR. The geologic units that comprise the ground water reservoir in the Delta-Mendota subbasin consist of the Tulare Formation, terrace deposits, alluvium, and flood-basin deposits. The Tulare Formation is composed of beds, lenses, and tongues of clay, sand, and gravel that have been alternately deposited in oxidizing and reducing environments. The Corcoran Clay Member of the formation underlies the basin at depths ranging about 100 to 500 feet and acts as a confining bed.

Groundwater in the Delta-Mendota subbasin [13] occurs in three water-bearing zones. These include the lower zone, which contains confined fresh water in the lower section of the Tulare Formation, an upper zone which contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation.

Recent data (DWR 2000) show the subbasin groundwater gradient falling to the north-northeast. Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the subbasin. An analysis of historical changes in groundwater levels for the subbasin is based on annual water level measurements by DWR and other cooperators. According to DWR, the average subbasin water level has actually increased by 2.2 feet from 1970 through 2000.

Areas around the City primarily irrigated farmland, and rely on state and federal water projects, or the San Joaquin River for the greater portion of their water needs. Since the City does not have rights to use surface water from the San Joaquin River, it has relied on groundwater for its water supply for over 50 years. It owns and operates public water wells to supply water for municipal and industrial demands.

Water levels and well capacity do not appear to have changed in the area, according to City records. Although the City continues to add wells for additional supplies, the local groundwater table appears to remain stable. Groundwater production has increased as the

[13] Subbasin 5-22.07, consisting of 747,000 acres.

City population has grown, but not in proportion to the population, as shown in the following figure. From 1980 to 2005, groundwater production increased by 373%, whereas the population increased by 413%.[14]

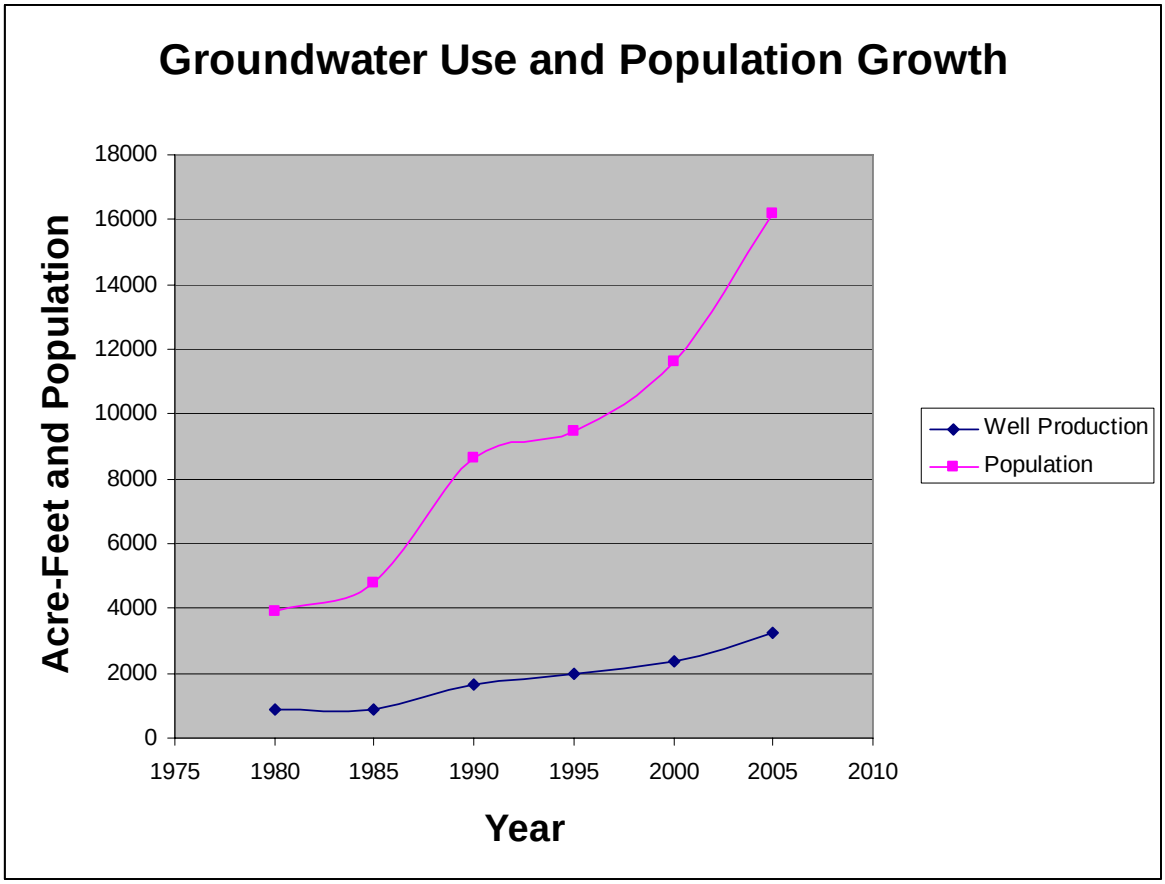

Figure 3-3 - ***Relationship between groundwater use and population growth***

Presently, the City has 6 operational wells with production ranging from 600 gpm to 1,600 gpm, with a total production of approximately 6,700 gpm. All wells are located within the City limits. A detailed description of the City well facilities are shown in Table I.

[14] City of Patterson, 2000 Urban Water Management Plan

Table 3-2
Summary of City of Patterson Groundwater Wells

Well	Type	Year	Depth	Screens	Flow (gpm)
2	Production	1947	360’	170’- 356’	700
4	Production	1971	433’	204’- 433’	800
5	Production	1986	565’	390’- 565’	1,600
6	Production	1994	365’	225’-255’ 345’-355’	600
7	Production	1999	597’	342’- 597’	1,500
8	Production	2004	470’	340’- 390’ 444’-460’	1,500
9	Monitor	2001	440’	350’- 435’	NA
10	Monitor	2001	550’	310’- 530’	NA
11	Monitor	2001	540’	360’- 390’ 520’- 540’	NA

Note: Well No. 1 was destroyed in 1998; Well No. 3 was placed in “inactive” status by the City in 1998 due to excessive sand production.

In 2002, a groundwater study was authorized by COP to review the yield and storage capacity of the local groundwater basin underlying the City.[15] The study concluded that there are essentially two aquifers underlying the City; a lower confined zone, and an upper unconfined zone. The two aquifers are separated by the thick, semi-impermeable Corcoran Clay layer.

In general, groundwater flow was in a northeast direction, with a down-gradient slope of four to eight feet per mile. The study estimated that the transmissivity of the aquifers was approximately 100,000 gpd/ft, resulting in about 9,100 acre-feet of annual recharge into

[15] “Groundwater Supply Evaluation for City of Patterson”, Kenneth Schmidt and Associates, 2002.

the two aquifers, with additional unquantified recharge from canal seepage, percolation of irrigation water, and streamflow seepage.

Due to the importance of understanding the sustainability of groundwater for future planning, a 6 day aquifer test was conducted by COP during the week of February 21, 2006. In summary, the new testing efforts resulted in the following conclusions:

1. The lower aquifer (below Corcoran Clay) transmissivity is 80,000 gpd/ft, with a storage coefficient of 0.0003 (as opposed to 100,000 gpd/ft and 0.001 respectively from 2002 report);
2. No significant downward leakage was found between the upper and lower aquifers (through the Corcoran Clay);
3. Groundwater flow is in a northwesterly direction, as opposed to a northeasterly direction as previously suspected;
4. Total sustainable production from the lower aquifer is approximately 8,000 ac-ft/year (increased from 5,600 ac-ft as indicated in the 2002 study).

The importance of this new information is that there appears to be more sustainable groundwater in the lower aquifer than indicated in past studies, and the recharge (gradient) is from a southeast direction which could be more beneficial for recharge and water quality. In addition, minimal leakage between the upper and lower aquifers allows the City to pump more water without impacting private, shallow wells, and water in the lower aquifer is less susceptible to surface contaminants (i.e. pesticides, nitrates, etc.).

Thus, based on the most recent aquifer tests and hydrological analysis conducted, sustainable yields from the local aquifers have been confirmed at rates that exceed the City's projected build-out population. Any water program alternative that includes groundwater to supply all or a portion of the City's demands is not limited by groundwater availability, as indicated by the latest groundwater study.

Comparing aquifer recharge values with present and predicted water demands, it appears that the City has sufficient source water for build-out of the current general plan.

Projections of water use for 2030 indicate that the City will need between 7,200 acre-feet to 8,200 acre-feet annually to satisfy potable demands, or between 90% to 102% of the confined groundwater safe yield. Additional water would be available from the unconfined aquifer, should it be necessary. All future wells are expected to be constructed within the City's service area boundaries.

San Luis Delta-Mendota Water Authority Groundwater Management Plan and Pumping Analysis

In 1995, the agencies that comprise the San Luis Delta-Mendota Water Authority (SLDMWA) entered into an agreement to jointly fund the preparation of a coordinated regional groundwater management plan (GMP). According to the Central Valley Project Improvement Act (1992) federal water contractors are required to prepare a GMP in accordance with AB 3030 for water conservation purposes. The study included a thorough analysis of the Delta-Mendota Sub-Basin, which includes the City of Patterson.[16] This is the only groundwater management plan or other specific authorization for groundwater management for the basin that includes aquifers used by the City of Patterson. However, since the City is not a participant in the plan, the plan does not directly affect the City's use of the basin

Due to the size of the Delta-Medota Sub-Basin and changes in basin characteristics along its length, the study divided the basin into three areas for analysis; north, central, and south. The City of Patterson is located in the north basin. According to the GMP, the study consisted of: 1) a detailed hydrologic analysis to estimate the changes in groundwater storage from 1986 through 1994, 2) estimate of sustainable yield, 3) estimate the total basin-wide groundwater pumping during the 1986 – 1994 period, and 4) determine any potential impacts of DMC export on the overall water resources balance.

The study used two separate approaches to determine the impacts of groundwater pumping in the sub-basin, including: 1) the *Specific Yield Method*, and 2) the *Water*

[16] Stoddard & Associates, "Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area and a Portion of San Joaquin County", 1995.

Balance Method. Each are commonly used methods for analysis and projecting groundwater use and impacts.

In summary, the Specific Yield Method uses changes in piezometric head in confined and unconfined aquifers and hydrologic theory to estimate changes in basin storage. Groundwater tables respond in accordance to accepted laws and principals when basin storage is increased or decreased (as when groundwater is pumped from the basin).

The Water Balance Method consists of a general accounting of inflows and outflows of basin water. The analysis consists of quantifying water that flows into the basin (through surface recharge from applied water or precipitation, canal leakage, and subsurface inflow), or out of the basin (from crop use, pumping, or subsurface outflow).

According to the study, the northern section of the Delta-Mendota Subbasin is in "a hydrologically balanced condition".[17] Changes in storage capacity did not change significantly during the 8-year study period. Variations in water levels were attributed to reductions in surface water supplies during drought years and changes in precipitation. Under normal conditions, the study projected an increase in storage of 35,000 acre-feet annually, and that that amount of additional pumping could occur without impacting the basin's present water storage.[18]

An important finding of the study is that subsurface outflow (from groundwater basin to the San Joaquin River) varied from 73,000 acre-feet per year to 185,000 acre-feet per year. In other words, water leaves the sub-basin because the water table is higher in elevation than the river. This is likely due to an artificially raised groundwater table resulting from applied surface water from federal and state water projects. Typically, when groundwater basins are in decline, adjacent rivers would add to, or flow into the basin. This is not the case in the northern Delta-Mendota Sub-Basin. Significant

[17] Stoddard & Associates, "Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area and a Portion of San Joaquin County", 1995, page 24.

[18] Stoddard & Associates, "Delta-Mendota Canal Groundwater Pumping Analysis", pages 51, 52.

volumes of water continuously flow out of the basin into the San Joaquin River. This suggests that even more than the 35,000 acre-feet annual increase in pumping could occur without causing a "overdraft" condition. By pumping more than 35,000 acre-feet annually, the basin water table would be stable, but marginally lower than its current elevation, thereby further reducing the outflow. Thus, according to the study, additional pumping of approximately 85,000 acre-feet annually could occur without lowering the water table below natural conditions.

Based on the SLDMWA study, it is clear that the City of Patterson's anticipated increase in pumping of approximately 6,000 acre-feet annually (from 2,000 acre-feet/year[19] to 8,200 acre-feet/year) will be far below the safe yield of the groundwater available in the Delta-Mendota Sub-Basin.

3.3 Reliability of Supply (§ 10631(c))

COP is in the process of evaluating source water and treatment options, as presented in the WPS. Options include use of groundwater only, or a conjunctive use of surface and groundwater. The WPS recommends a conjunctive use strategy whereby a portion of the water comes from either the CVP or SWP. This recommendation is primarily based on water quality issues, not quantity. However, the proportions of surface water and groundwater that the City will use, or whether surface water will be used at all, will depend on the cost and availability of surface water. This decision will be made after the City has collected all pertinent information to make the best choice for the community. It is estimated that a final decision regarding source water supplies will not be made until late 2006, or early 2007.

At the present time, it must be assumed that COP will pursue a program consisting of a conjunctive use of surface water and groundwater, or groundwater will remain the sole source of supply up to and beyond 2025. In the event a conjunctive use program is

[19] 1995 groundwater use per City of Patterson utility records.

initiated, groundwater will be used for periods when surface water is limited due to hydrological factors, or unavailable due to infrastructure failures.

Over the next three (3) years, COP expects a growth rate of 5%, resulting in the addition of approximately 250 new connections per year. This will increase total system demands from 3,250 acre-feet to 3,800 acre-feet. As discussed in other sections of this plan, there is a reliable supply of groundwater to support this growth.

The following tables indicate the reliability of supply and impacts due to supply inconsistencies for COP based on the sole use of groundwater, as stated previously. This is subject to change as the City's water program evolves.

Table 3-3
Supply Reliability for 2025 - AF Year

		Multiple Dry Water Years			
Normal Water Year	**Single Dry Water Year**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
8,200	8,200	8,200	8,200	8,200	8,200
% of Normal	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3-4
Basis of Water Year Data

Water Year Type	Base Year(s)	Hist. Sequence
Average Water Year	1981	1961-1991
Single-Dry Water Year	1989	
Multiple-Dry Water Years	1987-1990	

Table 3-5
Factors resulting in inconsistency of supply

Name of supply	Legal	Environ-mental	Water Quality	Climatic
Groundwater	None	None	None	None

COP has not seen measurable changes in the groundwater table or yield due to periods of low precipitation. Studies of the local groundwater supply have not indicated that precipitation will have an adverse impact on groundwater levels, yields, or quality.

Mitigation for potential quality impacts due to long-term pumping are addressed in the WPS, which include treatment of a portion of the groundwater for salts (TDS).

3.4 Transfers and Exchanges (§ 10631(d))

As part of the WPS, COP has investigated opportunities to transfer and/or share supplies with local water districts holding surface water entitlements. All of the water districts contacted were interested in advancing plans to transfer or share water either on a permanent basis, or for periods when water availability is limited. Other options may exist that would involve water districts not local to the Patterson area, and may be pursued by the City in the event discussions with those districts discussed herein are unproductive. Presently, no formal agreements have been executed by the COP for surface or groundwater transfers.

COP is pursuing water transfer opportunities with local water districts and purveyors first, believing that these agreements will be most feasible. A description of these local water purveyors is provided herein.

State Water Project Contractors - There are two (2) local users of SWP water near COP that receive water from the California Aqueduct. These include Western Hills Water District and the Oak Flat Irrigation District.

Western Hills Water District - The Western Hills Water District (WHWD) supplies water to the Diablo Grande community, located approximately 10 miles west of COP, for M&I use. WHWD is not a SWP contractor, but a sub-contractor of the Kern County Water Agency (KCWA). In June, 2000, an agreement was executed among WHWD, KCWA, and DWR for delivery of 8,000 ac-ft to WHWD for use by Diablo Grande. The water entitlement originated from a pre-1914 Lower Kern River water right that was purchased from the Berrenda Mesa Water District, and banked in the Pioneer Groundwater Banking Project. The agreement allows for a portion of KCWA's annual Table A amounts to be delivered from the California Aqueduct (mile 42.90, Reach 2A,

30 cfs capacity), in exchange for water from the groundwater bank. WHWD petitioned and was approved by the State Water Resources Control Board [20] for annexation of the new service area into the SWP place-of-use to allow delivery of SWP water to Diablo Grande.

The agreement between KCWA and WHWD ensures reliable deliveries of the water under most conditions. KCWA is free to use its Table A water deliveries as it sees appropriate, and could agree to make Diablo Grande a first-priority. According to representatives of Diablo Grande, the development is subject to the same reductions in deliveries as all of KCWA's Table A water.

Although the WHWD water is delivered through the SWP, it is not considered SWP water by the State of California. According to DWR staff, the delivery to Diablo Grande is a *2nd priority* water, and subject to reductions if they have difficulty meeting obligations with SWP contractors. In 2002, the California Aqueduct underwent repairs and Diablo Grande was denied water for a period of approximately 2 months. DWR believes that Diablo Grande needs a reliable "back up" source of supply to ensure reliable deliveries when surface water is unavailable. Diablo Grande currently has a well located east of the California Aqueduct and pipeline that can provide approximately 3,000 gpm of untreated groundwater to the development. This is not likely to meet all of the developments demands at full build-out.

The City is currently involved in discussions with representatives of Diablo Grande regarding the sharing of source supplies, and alternatives to make both systems more stable during periods of limited surface water availability.

Oak Flat Water District - The Oak Flat Water District is a small irrigation district located approximately 4 miles southwest of COP. The district is a SWP contractor, and has 5,700 ac-ft of Table A water for irrigating approximately 1,700 acres of land.

[20] SWPAO #01001, April 21, 2000.

In many years the district does not receive enough water for full operations, due to reductions in deliveries. According to William Harrison, General Manager of Oak Flat Water District, the district does not have surplus water and is in need of additional supplies in many years. The district has no groundwater backup source and distribution system, though some private wells may provide small amounts of supplemental water when needed. The City anticipates that it will continue to have discussions with the Oak Flat Water District to seek exchange opportunities that could benefit both parties.

There are three irrigation districts nearby COP that federal CVP water from the Delta-Mendota Canal, including the Patterson Irrigation District, the Del Puerto Irrigation District, and the West Stanislaus Irrigation District. Each is described herein.

Central Valley Project (USBR) – There are three (3) local contractors with entitlements to water from the Central Valley Project that receive water from the Delta Mendota Canal. These include the Patterson Irrigation District, Del Puerto Water District, and West Stanislaus Irrigation District.

Patterson Irrigation District – The Patterson Irrigation District (PID) consists of approximately 13,500 acres, and is located adjacent to COP, primarily to the east. The district was formed in 1955, originally the Patterson Water District, but later changed its name. PID has 425 landowners, and over 600 water users. PID maintains several miles of lined and unlined canals, pumps, and small storage basins for distribution of water to its users.

PID has an agreement with the BOR for 6,000 acre-feet of exchange, or replacement water. In 1967, PID entered into a long-term contract with the BOR for 16,500 acre-feet of CVP water. [21] According to the BOR, 1,000 acre-feet of this water is classified as M&I water. [22] A long-term renewal contract[23] was executed on March 9, 2005, and is in

[21] Contract 14-06-200-3598A, executed 12/18/67.

[22] Based on classification of water prior to release of the BOR 1995 draft "M&I Water Shortage Policy", thereby subject to lesser reductions during dry periods as compared to irrigation water.

effect for 25 years.

The City has had on-going discussions with the Patterson Irrigation District for several years regarding the exchange of CVP water. These discussions are expected to continue.

Del Puerto Water District – Del Puerto Water District (DPWD) was originally formed in 1947, and is located on the west side of COP. In 1995, the district reorganized and consolidated with ten other districts, increasing its size to approximately 47,400 acres. The district area is about 50 miles long, but is relatively narrow since it stays within 2 miles of the DMC footprint. The district boundaries span Stanislaus, San Joaquin, and Merced Counties.

The district receives its CVP supply directly through turnouts on the Delta-Mendota Canal. DPID does not have any distribution facilities and does not own any pumps, pipelines, or canals to transport the CVP supply. All turnouts, pumps, pipelines, and canals in the district are privately owned, maintained, and operated.

In 1953, DPWD signed a long-term contract[24] with BOR for 10,000 acre-feet of CVP water. After the 1995 consolidation, the water service contracts of the other ten districts were assigned to Del Puerto Water District and were renegotiated as a single contract, bringing its total CVP service contract entitlements to 140,210 acre-feet. DPID water can be used for irrigation or M&I, however, only 20 acre-feet are classified at M&I. [25] A long-term renewal contract [26] was executed on February 25, 2005, and is in effect for 25 years.

The City has discussed options for the exchange of water with representatives of the DPWD. Although no apparent opportunities exist at this time, both water districts have agreed to maintain open communication to look for regional solutions to water shortages.

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[23] Contract No. 14-06-200-3598A-LTR1

[24] Contract 14-06-200-922

[25] Per discussions of 1/30/06 with William Harrison, GM, DPWD.

[26] Contract No. 14-06-200-922-LTR1

West Stanislaus Irrigation District - The West Stanislaus Irrigation District (WSID) is located to the northwest of COP's boundaries. WSID was formed in 1920, with the first water deliveries made in 1929. The current size of the district is 24,800 acres, but only a portion (19,700 acres) is irrigated. WSID has a distribution system of lined canals and laterals to distribute water. The main canal carries water supplied by six pumping plants.

In 1953, WSID signed a long-term contract with BOR for 20,000 acre-feet of CVP service contract water. [27] The contract amount was increased to 50,000 acre-feet in 1976. The contract has no provisions for M&I use. The contract expired in 1994, but a series of interim renewal contracts have been executed since that time. A long-term renewal contract [28] was executed on February 25, 2005, and is in effect for 25 years.

3.5 Water Use by Customer (§ 10631(e))

COP supplies potable groundwater for residential, industrial, and commercial uses through a combination of groundwater wells, storage tanks, and network of piping. Each water service is equipped with a water meter for accounting and billing. The City is responsible to operate and maintain the water system up to the water meter. Water meters for residential services range from 5/8" to 1" in diameter. Commercial services are typically 1" or greater, depending on the type of use. The largest connection is 6" in diameter.

COP municipal and industrial water use includes metered and unmetered connections, although very few connections are not metered. All new connections made to the COP water system will be metered. COP does not separately track different types of water use sectors (e.g. residential, commercial, industrial, landscaping, etc.), so future demands are estimated based on per capita use. These values account for commercial, industrial, common property landscaping (e.g. parks), construction water, unaccounted for losses, etc.

[27] Contract 14-06-200-1072

[28] Contract No. 14-06-200-1072-LTR1

The amount of water used by a property owner is a function of several factors. These include the price of water, income, demographics, conservation measures, and climate. Since a large portion of water goes to outside use to irrigate landscaping, communities located in warmer areas typically consume more water during the year. Although price is a deterrent, it does not always result in sustained reductions in water use.

There are three main water use values that must be considered when planning and designing water supply programs. These include annual demand, maximum day demand, and peak hour demand, as described below:

Annual Demand – The total amount of water a community uses during the year. This value determines the water needed from source supplies, such as groundwater and/or surface water. Communities must plan to secure long-term water availability based on annual demand projections.

Maximum Day Demand – The highest amount of water used in one 24-hour period. This value determines the capacity of water treatment facilities. Although this condition may only occur a few days each year, communities should plan to size treatment facilities (and storage) to meet maximum day conditions assuming an unscheduled maintenance event removes a portion of the treatment capacity from service.

Peak Hour Demand – The highest amount of water the system will move at any given moment. This value determines the storage and pipe (distribution) capacity of the system. [29] This condition is assumed to last for approximately 4 hours during a maximum day demand.

Water use in the State of California varies depending on the location, as expected. Those areas where the climate is warmer and have less rainfall use more water than colder,

[29] Emergency flow conditions (e.g. fire demands) are also taken into account when designing these facilities.

wetter locations. For example, households in the Bay Area and San Diego use less water than those in Sacramento and Bakersfield. Due to the local climate (hot and dry), it would be expected that COP would have higher demands that are similar to other communities in the Central Valley. However, pumping records indicate that the City's household use is much lower the statewide average of 244 gallons per capita per day (gpcd).[30] Figure 3-4 illustrates the City's per capita use from 1998 through 2004.

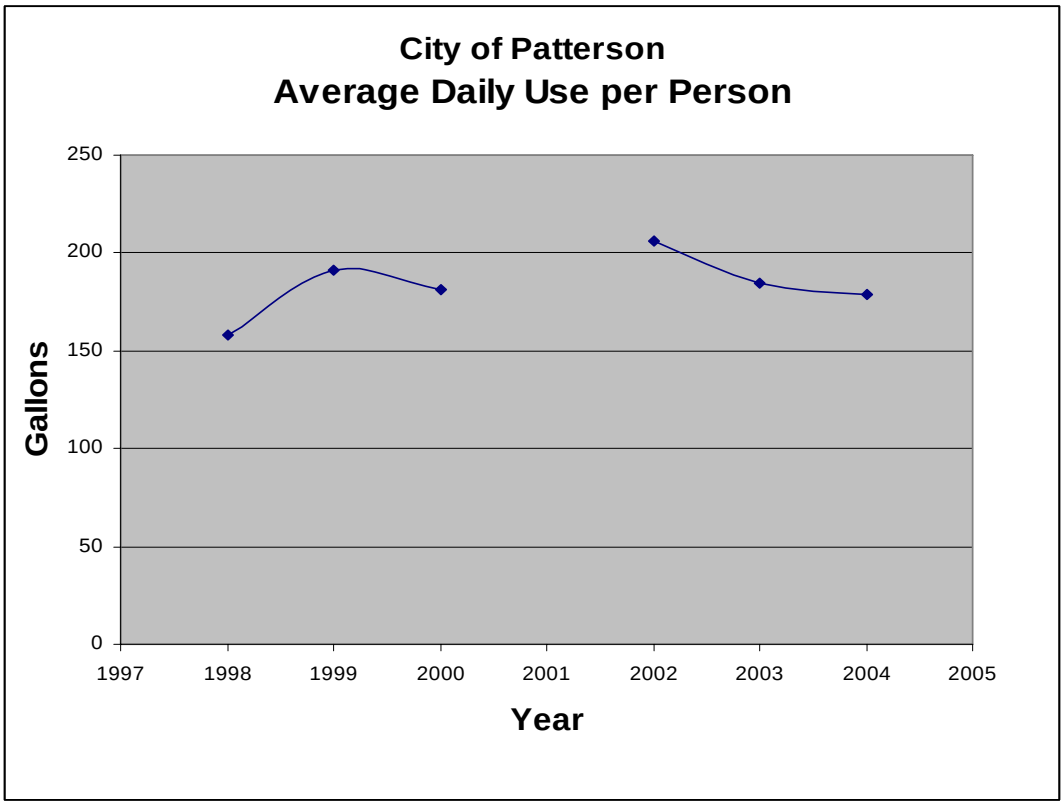

Figure 3-4 ***Pumping records indicated that water use per capita for the City of Patterson is lower than many other Central Valley communities, averaging less than 200 gpcd.***

Annual water use patterns for COP are fairly predictable. Water use increases by approximately 2.5 times from winter to summer, due primarily to residential and commercial landscape irrigation. Figure 3-5 shows monthly City water use from 2002 through 2005. There are monthly variations in use due to increases in population during

[30] Based on total system pumping and includes commercial, industrial, and public uses. Household use of Fresno and Bakersfield range between 250 gpcd and 350 gpcd (DWR, Bulletin 160-98).

the period, [31] and weather (temperature and rainfall). However, the seasonal patterns of use remain constant.

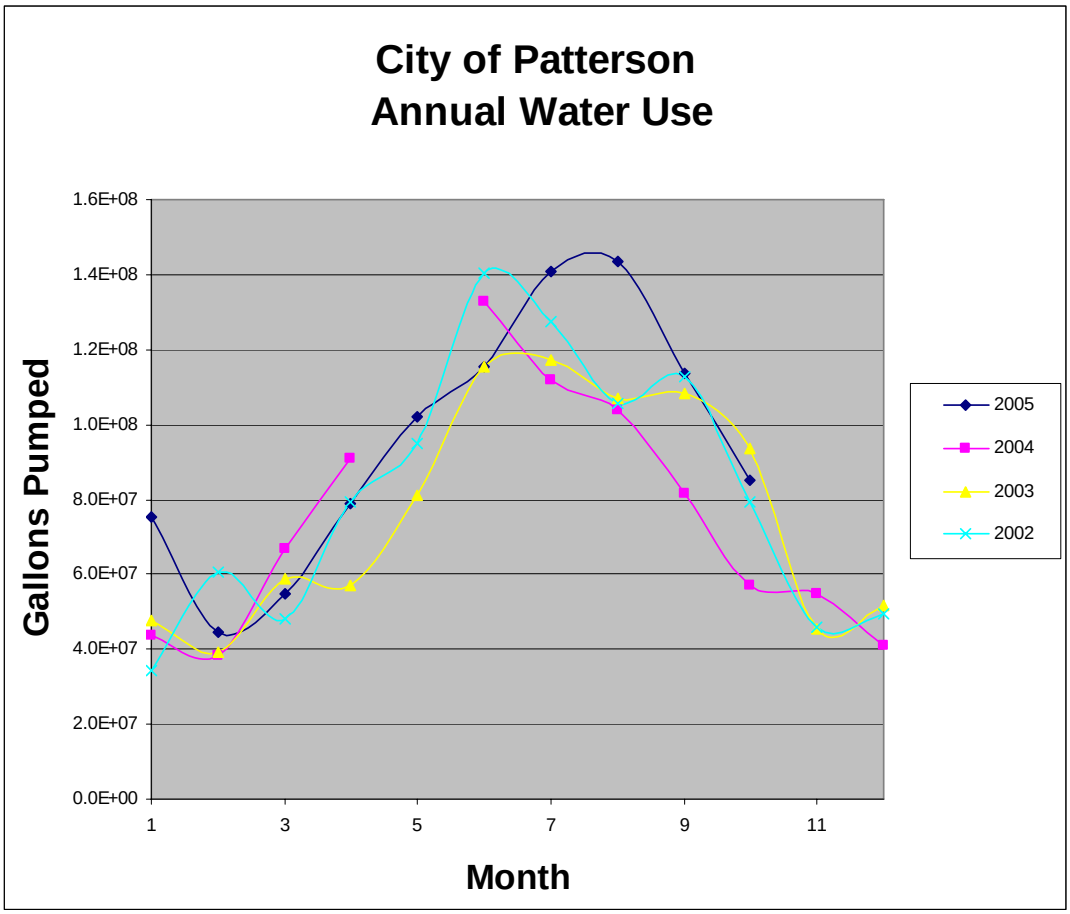

Figure 3-5 ***Annual water use patterns for the City from 2002 through 2005. As shown, peak monthly demands can occur during June, July, or August.***

As shown in the graph, the capacity of proposed treatment facilities must be designed to meet the highest daily demands that occur between June and August. During other periods of the year, much of the treatment capacity goes unused.

One major concern when projecting future water demands is the possibility that unit demands could increase, thereby underestimating the total system demand. In general, there is a trend toward using less water due to higher prices, water availability,

[31] City population increased 8.7% from 2002 to 2004, from 13027 persons to 14263 persons.

acceptance of alternative residential and commercial landscaping, local, state, and national programs to reduce water consumption, general community awareness of resource conservation, etc. The State of California [32] has estimated that the average net water use per household in the state will decrease slightly (2%) to moderately (17%) by the year 2030. This is expected to be the result of competing factors that have a net decrease in overall water use. Although income and demographics are expected to drive water use higher, they will be outweighed by decreases driven by price and conservation measures. [33] The only condition where there could be an increase in unit demands is due to the introduction of water intense industries to an area. At this time, there is no reason to project that the City's unit demands will increase do to this condition. In addition, numbers used to determine unit water demands include miscellaneous use, such as construction water and unmeasured losses. The City has experienced a wave of new construction in the last few years, resulting in a high percentage of construction water use. [34] Once the City has reached build-out, construction related demands will be insignificant. Thus, for purposes of determining water demands for the study, it is conservative to assume that there will be no long-term increases in unit demands.

The following table provides an estimate of population and demand projections through the year 2030.

Table 3-6
Water Demand Projections [35]

	2005	2010	2015	2020	2025	2030
Population	16,150	21,000	25,500	30,000	34,000	35,600
Demand (Ac-ft)	3,250	4,704	5,712	6,720	7,616	8,176

[32] State Water Plan Update, Bulletin 160, 2005

[33] Bulletin 160, 2005, Qualified Scenarios of 2030 California Water Demand, pg 44, 45.

[34] "Construction Water" is system water that is used for grading, compaction of soil beneath roads and foundations, dust control, concrete and stucco work, pipe flushing, street cleaning, etc.

[35] Based on a demand factor of 200 gpcd x 1.15 for factor of safety.

3.6 Demand Management Measures (DMMs) (§ 10631(f-j))

COP is a member of the California Urban Water Conservation Council (CUWCC), and submits annual reports to the council annually in accordance with the *"Memorandum of Understanding Regarding Urban Water Conservation in California,"* dated September 1991. According to the DWR Guidebook for Preparing a 2005 UWMP:

The Urban Water Management Planning Act provides two distinct methods for providing information related to Demand Management Measures (DMMs) and meeting the requirements of Water Code Section 10631 (f) and (g).

1. *A water supplier who is a member of the California Urban Water Conservation Council (Council) may submit their BMP Activity Reports (Annual Reports). Council members agree to make a good faith effort to implement the 14 urban water conservation Best Management Practices (BMPs) that are intended to reduce long-term urban demands. Members are required to submit annual reports every two years identifying their implementation activities on each of the 14 BMPs. These BMPs are functionally equivalent to the Demand Management Measures in Water Code Section 10631. Council members would utilize the following components from the BMP Reporting Database to satisfy the DMM requirements:*

   • The most recent BMP Activity Reports submitted to the Council for reporting years [2005-06].

   • It is recommended that you also include the Annual Reports for [2003-2004] and the Coverage Reports identifying the water supplier's progress on meeting the coverage requirements for quantifiable BMPs

   • It is also recommended that agencies submit the Council Coverage Calculator and any BMP cost-effectiveness forms submitted to the Council in support of exemption submittals.

To use this method of providing demand management measure implementation information, the supplier must have submitted their BMP Activity Reports on implementation of the Council's 14 BMPs using the Council's BMP Reporting Database.

The most recent BMP Activity Reports for reporting years 2005 and 2006 were submitted to the CUWCC in prior to December, 2006. Copies of said reports for all years submitted by the COP can be viewed on http://bmp.cuwcc.org/bmp/default.htm, under "View Submitted Report Data, BMP Reports by Water Supplier", under COP Reporting Units.

3.7 Water Supply Projects and Programs (§ 10631(h))

As discussed in prior sections of this plan, COP is aggressively pursuing source water and treatment alternatives to meet current and projected demands. COP has completed a draft Water Planning Study (WPS) that provides a review of source water supply options, including costs and recommendations for a comprehensive water supply program that will ensure long-term quantity and quality of M&I water for COP. The WPS provides in-depth analysis of surface water treatment of those sources available to COP (SWP and CVP via California Aqueduct and Delta Mendota Canal), and groundwater treatment for high salinity. Both capital cost and life-cycle costs for each of the alternatives were provided.

Although past groundwater studies indicate that it will suffice as the sole source of supply for COP's build-out demands, it is accepted that a conjunctive use program, consisting of both surface and groundwater, provides more reliability and flexibility. Future efforts by COP will include pursuing surface water entitlements, groundwater sustainability (aquifer storage and recovery options), as well as regional solutions whereby the COP partners with other local purveyors to increase supply reliability.

The draft plan is under review by COP staff at this time. Recommendations made in the WPS include:

- Implement a conjunctive use program of surface and groundwater (pending COP's ability to acquire surface water entitlements);

- A portion of the groundwater will be treated for high salinity, and subsequently blended with untreated groundwater and surface water (if and when available);

- Surface water will be treated to meet all present and pending federal and state drinking water standards to remove microbial contamination while limiting disinfection by-products;

- Brine produced through groundwater treatment will be disposed of using a combination of biological and mechanical processes for dewatering, and solar evaporation ponds to solidify salts;

- Investigate the possibility of aquifer storage and recovery to provide ensure long-term sustainability;

- Work with other local purveyors to seek regional opportunities for sharing supplies, reuse and recycling potential, and increasing the reliability of source water for the region.

COP anticipates that it will be pursuing the recommendations in the WPS for the next 12 to 18 months, through surface water entitlement negotiations, pilot testing of treatment alternatives, evaluating brine disposal options, and additional groundwater and surface water monitoring. The UWMP will be updated with pertinent information once the specifics of the water program are identified and adopted by COP.

Because water quality does not presently exceed drinking water standards, it is not critical that COP immediately implement new water supply programs. However, recognizing the time it requires to implement such programs, the COP plans to diligently pursue its water program and recommendations made in the WPS. The WPS identifies numerous tasks that are necessary for the program to progress. A list of tasks that the COP recognizes as important to initiate is shown in Table 3-7.

Table 3-7
Recommended Tasks for COP Water Supply Program Implementation

Task	Purpose	Duration
Acquire Surface Water Entitlement • Negotiations with water contractors • Place-of-use annexations • Environmental Documentation • Applications with state and/or federal agencies for conveyance, transfers, and deliveries • Application for new turn-out on canal	Identify the best option for acquiring surface water entitlements, if surface water is part of a selected program. Begin environmental documentation (CEQA/NEPA). File applications as needed for annexation into service areas, transfers, conveyance of water, and turn-out on canal. If a reasonable cost for water is not identified, the City may choose to select a groundwater only project.	6 months to 2 years
Groundwater Studies and Protection • Conduct a pilot study of ASR • Install sentry wells to monitor upgradient groundwater quality • Increase TSD and level monitoring • Model well spacing	Determine if ASR is feasible and what level of treatment is necessary, per state regulatory agencies. Determine long-term benefit and cost to the City. Install monitoring wells around the City and increase monitoring frequency to determine trends in groundwater quality. Optimize layout of wells around a central facility.	6 months to 1 year
Evaluate TDS Removal Technologies and Brine Disposal Options • Develop groundwater water quality data on a monthly basis • Conduct pilot tests for reverse osmosis	Develop design and operations data for the reverse osmosis membrane process. Collect water quality data during pilot investigations. Investigate ways of combining water treatment residuals and wastewater effluent to enhance both processes and lower overall costs. Brine may be treated using natural process by building a salt marsh complex, which could be less expensive	6 months to 1 year

membrane process to develop design and operational information • Identify options to combine disposal of wastewater and brine • Investigate emerging treatment alternatives (i.e. wetlands) for disposal	than other alternatives and provide wildlife benefits.	
Pilot Study of Treatment • Collect additional surface water quality data • Conduct bench test and pilot studies to confirm treatment options	Continue to monitor and collect data on surface water quality, including data on microbial contamination (data not available at the time of the study). Conduct standard bench test and pilot studies of best treatment alternatives.	1 year to 18 months
Conceptual Design • Provide a site layout of facilities • Develop schematics of processes	Develop a conceptual design (15%) for the treatment and conveyance systems. This will confirm recommended treatment technologies, and determine the area needed for the treatment, storage, and disposal facilities. The conceptual design and review is essential to ensure approval by the City before proceeding with full design.	8 months
Property Acquisition	Begin identifying parcels for location of new facilities, including wells, water treatment plant, and brine ponds. One the conceptual design is completed and approved, purchase properties for program.	6 months

A proposed implementation schedule for the COP water program is shown in Figure 3-6. It is assumed at this time that the program will be phased, with a groundwater treatment facility operational as early as 2010, and a surface water treatment facility operational sometime between 2013 and 2018, depending on population growth.

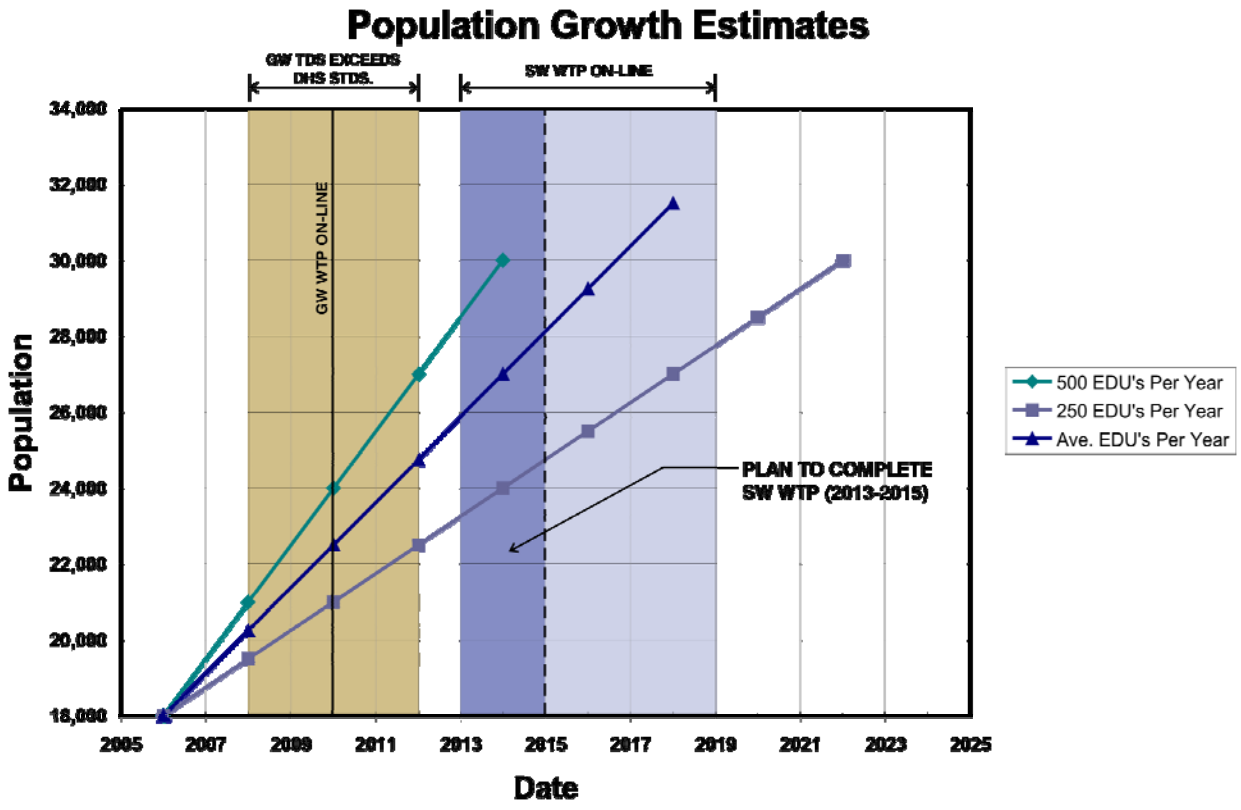

Figure 3-6 ***Implementation schedule for COP conjunctive use water supply program.***

Water Program Funding

The City has policies in place regarding the capital outlay program necessary for funding delivery of the groundwater supply. Under the City's General Plan, new growth must pay to develop new groundwater supplies it requires. Goal IV.A of the General Plan declares a city goal "(t)o maintain an adequate level of service in the City's water system to meet the needs of existing and future development." [36] Policy IV.A.8 under this goal ensures that new development pays for necessary water supplies. This policy states that "The City shall, through a combination of water development fees and other funding mechanisms, ensure that new development pays its share of the costs of water system improvements."[37]

[36] City of Patterson General Plan, Page II-23.

The City implements these policies through a development impact fee program that provides the funding necessary for the City to construct water supply facilities. The City thus secures the resources necessary for funding/capital outlay from this program. An impact fee study was performed by the City in 2005, and new fee schedule adopted in March, 2006, as recommended by the study.[38] The fees collected by this program will adequately fund the water program as recommended by the WPS.

3.8 Desalination Water (§ 10631(i))

As part of the WPS, treatment of groundwater for high levels of TDS is included in all feasible alternatives. Since groundwater provides COP with its most reliable source supply, some treatment of groundwater will likely be pursued. According to the WPS, treatment of up to 60% of total groundwater use will be provided by membrane filtration (40% untreated blend).

As a result of TDS reduction in the wastewater supplies, the levels of salinity in COP's wastewater is expected to decrease significantly due to upstream removal of salt and elimination or reduction of private water softeners. It is expected that the wastewater effluent will be adequate for irrigation or landscaping and crops, so a future water reuse program appears promising.

[37] City of Patterson General Plan, Page II-23.

[38] Crawford Multari & Clark, "City of Patterson, Development Impact Fee Justification Study, 2005/06".

3.9 Potential Use of Recycled Water (§ 10633 (d-g))

COP collects and treats all wastewater generated with City limits, and also receives wastewater from a small development approximately 6 miles west of the City, called Diablo Grande. The collection and transport of wastewater consists of a gravity system that conveys influent to the COP wastewater plant, located approximately 2.5 miles east of the City.

The current treatment facility operates three treatment systems. The first is an activated sludge treatment process consisting of an oxidation ditch and two clarifiers constructed in 1979 and 1986 (north oxidation ditch). The second is an advanced integrated ponds system (AIPS) built in 1999-2000, and the third is an activated sludge process with an oxidation ditch and one clarifier (south oxidation ditch) constructed in 2005. The original design capacity of the three treatment systems is currently:

- North Oxidation Ditch 0.80 mgd
- AIPS 0.50 mgd
- South Oxidation Ditch 1.25 mgd

Excess biosolids (sludge) from the two oxidation ditches receive additional digestion in four aerobic digesters. Digested sludge is then dewatered using chemically enhanced plastic media drying beds.

Current and projected wastewater flow rates are shown in Table 3-8 below.

Table 3-8
Projected Flow rates to the
City of Patterson WWTF

FLOW PROJECTIONS	NUMBER	UNITS
Current Population (2005)	16,200	
Current Average Flow	1.215	mgd
Current Average per Capita Flow	75.0	gal/cap/day
Per Capita Flow Used for Planning	90	gal/cap/day
Population at Build Out (2030)	35,000	
Average Flow at Build Out	2.70	mgd
Average Flow from Diablo Grande at Build Out	0.75	mgd
TOTAL FLOW AT BUILD OUT	**3.45**	mgd

Flow rate at build out is anticipated to average approximately 3.45 mgd. This flow rate is based upon 90 gallons per capita per day. Existing flow measurements correspond to approximately 75 gallons per capita per day flow including the current contribution by the Diablo Grande development. Therefore, 90 gallons per capita per day is a conservative assumption.

At the present time, COP has no recycled water program. Potential uses for recycled water within the City is limited. There are few parks and landscape corridors, no golf courses or other large areas that could benefit from reclaimed wastewater. Most industrial water users include food processing or other activities that are incompatible with reclaimed wastewater. At most, there may be as many as 100 acres compatible with reclaimed water irrigation, representing approximately 3% of the City's 2030 demand. Since there are limited use opportunities for reclaimed water, there are no feasible actions that could be taken to encourage its use (e.g. strategic pricing).

Another disadvantage is the location of the wastewater plant. Because the plant is located downhill and relatively far from potential uses within the City, the cost of simply conveying reclaimed water to points of use would be very expensive.

There are possible opportunities for use of reclaimed water with agricultural activities outside of the City. COP has retained the services of a consulting engineer to conduct study of the feasibility of water reuse and recycling. The results of those studies are expected to be available by late 2006. Opportunities for water recycling identified in this study will be provided in a subsequent UWMP. However, the apparent benefit of a reclaimed wastewater program would be associated with disposal issues rather than water supply.

4- Water Shortage Contingency Plans

Stages of Action (§ 10632(a))

COP has a reliable supply of source water, and is not vulnerable to reductions in deliveries similar to other communities that rely on local or imported surface water, for reasons as described below:

1. COP has sufficient groundwater to meet the needs of the build-out population, and the local groundwater table is not subject to significant impacts due dry or critically dry hydrologic periods; [39]

2. The current UWMP assumes sole use of groundwater to meet current and future M&I demands;

3. Problems associated with groundwater use are associated with quality, and are addressed in the WPS;

4. Assuming a conjunctive use program is initiated by COP at some future time, all recommended alternatives in the WPS include full groundwater use to account for periods when no surface water is available, due to system shortages or conveyance system failures (*e.g. catastrophic interruptions*).

Because COP has access to a firm yield of groundwater, and all alternatives recommended in the WPS include use of local groundwater for either: 1) permanent build-out of the general plan, or 2) to supplement surface water supplies, including

[39] Local groundwater basin is in equilibrium, and is not expected to experience decline due to proposed pumping increase for 2025 population demands, based on groundwater studies by DWR and City of Patterson.

periods when no surface water is available, analysis of water availability during multiple dry year periods is not applicable.

COP has adopted a Drought Contingency Plan ("DCP") in the event an extended drought has an adverse impact on the local groundwater table, or during a catastrophic supply interruption. The DCP consists of three stages, progressively requiring greater reductions in water use. Table 4-1 summarizes the DCP.

Table 4-1 City of Patterson Drought Contingency Plan RATIONING STAGES		
Stage No.	**Actions taken by COP**	**% Shortage**
1	Volunteer Water Rationing	10%
2	Mandatory Water Rationing	20%
3	Mandatory Water Rationing and Water Allocations	20%+

Implementation of the DCP is determined by the COP City Council, as they deem appropriate. It should be noted that the COP may implement water rationing (Stage 1 or Stage 2) even during drought periods when there is no apparent impact to the water table to show support of other Central Valley communities struggling with water shortages.

Catastrophic Supply Interruption Plan (§ 10632 (c))

Scenarios causing catastrophic interruptions to COP source supply are limited due to the COP's direct access to groundwater, and having multiple wells in the system. The probability of an event that could leave COP without water is extremely low. All recommended alternatives in the WPS include the capability to provide 100% of the system's demands with groundwater supplies. Therefore, as COP population increases, additional wells will be constructed to account for those demands, regardless of any decision by COP to implement a conjunctive use program. Currently, COP has six (6)

operational wells, with plans to construct an additional well in the next year. All water planning activities assume that the largest producing well is out of production during a maximum day condition.

Probable events that could limit COP's ability to pump groundwater include:

- Electrical power failure ("blackout" or "brownout");
- Well Pump/motor failure;
- Instrumentation/control system failure;
- Well casing or screen failure.

Of these events, electrical power, mechanical, or control system failures are most probable. The event of most concern is an electrical power failure since it could impact all well and pumping facilities in the system simultaneously, though it typically has the shortest duration. The other failure events are mostly isolated to an individual well facility. The longest repair duration is associated with a well casing or screen failure. Depending on the failure, it could take months to mitigate.

Table 4-2 provides a summary of potential catastrophic events that could impact source production, and COP plans for mitigation.

Table 4-2
Catastrophic Source Water Failures and Mitigation

Failure Event	Probability	Duration of Outage	Mitigation
Power	High	5 minutes to 3 days	• On-site or mobile generators for each well.
Mechanical	Medium	1 to 10 days	• Maintain a spare motor(s) • On-call contract with pump repair service
Control	Medium	1 hour to 10 days	• Capability to operate all wells manually • Spare programs for SCADA/starters • On-call contract with programmer
Well casing or screen	low	1 week to 6 months	• One redundant well in system

COP has backup generators at all well sites in the event of a power failure. COP also presently maintains 4.5 million gallons of storage and plans to construct additional storage as system demands increase. Ultimately, at least 7.5 million gallons of stored capacity are planned. There are no potable water systems directly adjacent to COP, so opportunities for emergency interties are not available.

Revenue Impacts During Shortages (§ 10632 (g))

COP recently adopted a new water service rate structure that includes a "fixed" component to account for base operational costs (i.e. labor, administration, meter reading and billing, etc.). Variable costs, such as power and chemicals, are included in the metered rate. Thus, although reductions in water use will also reduce revenues, it is not expected to have any significant impacts on the water program budget. A new increasing block multi-tier rate structure based on volumetric use is expected to encourage water conservation and reduce COP overall water demands.

5- Water Quality Impacts on Reliability

Although the local groundwater supplies do not contain any chemicals or compounds that pose health concerns[40], salt levels in water pumped from COP wells are relatively high, and may eventually reach concentrations that will require treatment.[41] The source of the salt is erosion of naturally occurring marine and continental deposits found to the east in the Coastal Range. Salts create objectionable aesthetic and taste concerns, and many residents have installed water softeners to reduce the adverse impacts from the salts. The ubiquitous use of softeners adds a significant salt loading to the City's wastewater plant.

Recognizing that salts could exceed the upper drinking water standard at some time in the future, all feasible alternatives in the WSP include treatment of groundwater for salts by either membrane filtration or ion exchange. The plan recommends a blending of treated and untreated groundwater to maintain salts below the recommended secondary drinking water standards. [42] In the event a conjunctive use program is initiated, less groundwater would be used on the average, yet treatment would be sized to account for periods when surface water is either limited or not available.

In addition, COP will design wells to yield water from deeper aquifers, below the Corcoran Clay, to provide added protection of source water from surface contaminants associated with agricultural activities.

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[40] Groundwater from Patterson's wells meet all primary state and federal drinking water standards.

[41] State Department of Health Services requires treatment for salts when concentrations exceed 1,000 mg/l. Salt concentrations in City of Patterson wells range from 630 mg/l to 1,000 mg/l.

[42] 500 mg/l total dissolved solids

6 - Adoption and Implementation

A public hearing was held on the UWMP by the COP on December 5, 2006. The UWMP was subsequently adopted by COP on January 2, 2007, per Resolution No. 2007-03. A copy of the public notice and resolution are included in Appendix C. After adoption of the UWMP, COP provided copies to DWR, agencies listed in Table 1-1, California State Library, and has made a copy of the UWMP available to the public and other interested parties at COP City Hall. COP plans to implement its UWMP in accordance to the schedule set in this document.

APPENDIX A

City of Patterson General Plan

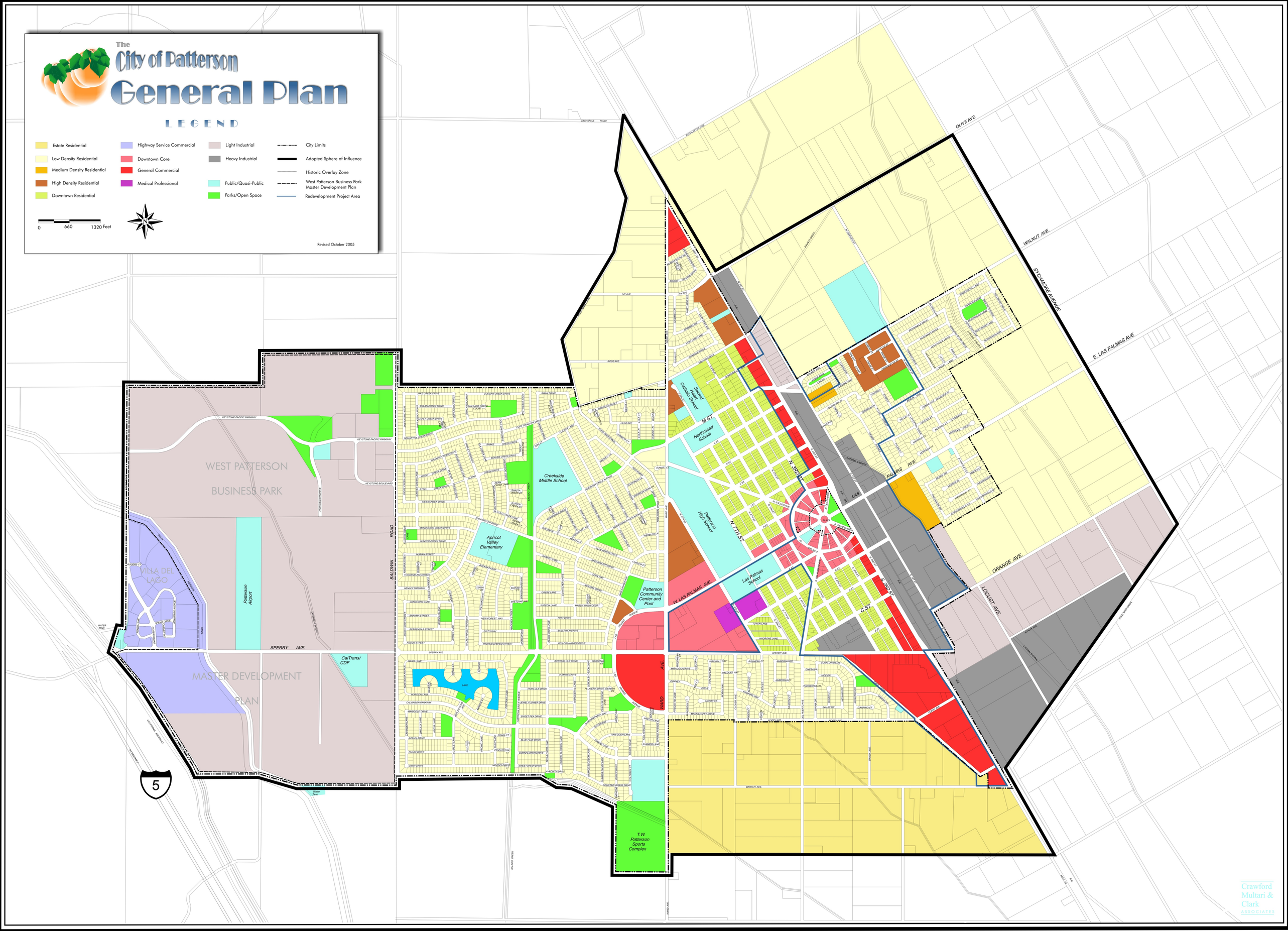
The City of Patterson General Plan

LEGEND

- Estate Residential
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Downtown Residential
- Highway Service Commercial
- Downtown Core
- General Commercial
- Medical Professional
- Light Industrial
- Heavy Industrial
- Public/Quasi-Public
- Parks/Open Space
- City Limits
- Adopted Sphere of Influence
- Historic Overlay Zone
- West Patterson Business Park Master Development Plan
- Redevelopment Project Area

0 660 1320 Feet

Revised October 2005



APPENDIX B

City of Patterson
Drought Contingency Plan

City of Patterson

Public Works Department

DROUGHT CONTINGENCY PLAN

A. DEFINITIONS

As used in this water plan, the word:

1. **"Company"** means the City of Patterson.

2. **"Person"** means any individual, person, firm, partnership, association, corporation, company, organization or government entity;

3. **"Customer"** means any person who uses water supplied by the City of Patterson.

4. **"Water"** means water supplied by the City of Patterson.

5. "**Residential"** means one or two dwelling units per service.

6. **"Water shortage condition"** means the conditions which constitute a determination by the authorizing agency that deliveries of potable water supplies have reached a level such that all consumers are being requested to reduce the use of water by a given amount.

7. **"Authorizing agency"** means the City Council of the City of Patterson.

8. **"Base year"** means the percentage reduction for each customer will be based on the previous year **without** mandatory percent reductions.

B. WATER SHORTAGE CONDITIONS

This water conservation plan shall become effective following notification by the authorizing agency that a shortage of potable water supplies exists. The plan will be implemented in three stages.

STAGE I:
Stage I consists of voluntary water use restrictions and voluntary water conservation of less than or equal to 10% of normal base year. This phase becomes effective upon notification by the authorizing agency that water usage should be reduced by up to 10%.

STAGE II:
Stage II consists of mandatory water use restrictions and voluntary water allocations. This phase becomes effective upon notification by the authoring agency that water usage should be reduced by 20%.

STAGE III:
Stage III consists of mandatory water use restrictions and mandatory water allocations. This phase becomes effective upon notification by the authorizing agency that water usage should be reduced by more than 20%. The allocation of 500 to 350 gallons per day per household will be based on the authorizing agency's percentage reduction.

C. PROBHIBITION OF NONESSENTIAL OR UNAUTHORIZED WATER USE APPLICABLE TO STAGES AS DESGNATED BELOW

The following uses of water are determined to be, and are defined as, nonessential or unauthorized:

1. Any use of water in excess of the following allocations:

STAGE	ALLOCATION
I	**Voluntary**
II	**Voluntary**
III	

Residential:
500 to 350 gallons per day per household based on 3 persons per household and on authorizing agency's percentage reduction. 50 gallons per day will be allocated for each additional person in the household.

All other customers:

a. The allocation for each customer is based on the authorizing agency's percentage reduction of more than 20% and up to 50%. The percentage reduction for each customer will be based on the quantity of water used by such customer during the previous **base year**.

Commercial/Industrial:
100% minus authorizing agency's reduction

Irrigation:
90% minus authorizing agency's reduction

b. For any customer without a prior billing record, or where unusual circumstances dictate a change in allocation, the customer's monthly allocation shall be determined by the Public Works Director on the basis

of usage by similar customers or on such other basis as may be fair and equitable under the circumstances.

STAGE I

- Use of water through any meter when the city has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and customer has failed to effect such repairs within 5 days after receipt of such notice.
- Use of water which results in flooding or runoff in gutters or streets.
- Use of water through a hose for washing cars, buses, boats, trailers, or other vehicles without a positive automatic shut-off valve on the outlet end of the hose.
- Use of water through a hose for washing buildings, structures, sidewalks, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas, except as required for sanitary or safety purposes.
- Use of water to clean, fill or maintain levels in decorative fountains; unless such water is part of a recycling system.
- Use of water for construction purposes, such as consolidation of backfill; unless no other source of water or other method can be used.
- Use of water from fire hydrants except for fire fighting and related activities and other uses necessary to maintain the public health, safety, and welfare.
- There shall be no outdoor watering or irrigation whatsoever between the hours of 10:00 AM and 7:00 PM.

STAGE II

- Use of water for more than minimal landscaping in connection with any new construction.
- Use of water through any meter when the city has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and customer has failed to effect such repairs within 5 days after receipt of such notice.
- Use of water which results in flooding or runoff in gutters or streets.

- Use of water through a hose for washing cars, buses, boats, trailers, or other vehicles without a positive automatic shut-off valve on the outlet end of the hose.

- Use of water through a hose for washing buildings, structures, sidewalks, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas, except as required for sanitary or safety purposes.

- Use of water to clean, fill or maintain levels in decorative fountains; unless such water is part of a recycling system.

- Use of water for construction purposes, such as consolidation of backfill; unless no other source of water or other method can be used.

- Service of water by any restaurant except upon the request of a patron.

- Use of water from fire hydrants except for fire fighting and related activities and other uses necessary to maintain the public health, safety, and welfare.

- There shall be no outdoor watering or irrigation whatsoever between the hours of 10:00 AM and 7:00 PM.

- Person shall water on designated days according to their house address.

STAGE III

- Use of water for more than minimal landscaping in connection with any new construction.

- Use of water through any meter when the city has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and customer has failed to effect such repairs within 5 days after receipt of such notice.

- Use of water which results in flooding or runoff in gutters or streets.

- Use of water through a hose for washing cars, buses, boats, trailers, or other vehicles without a positive automatic shut-off valve on the outlet end of the hose.

- Use of water through a hose for washing buildings, structures, sidewalks, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas, except as required for sanitary or safety purposes.

- Use of water to clean, fill or maintain levels in decorative fountains; unless such water is part of a recycling system.

- Use of water for construction purposes, such as consolidation of backfill; unless no other source of water or other method can be used.

- Service of water by any restaurant except upon the request of a patron.

- Use of water for lawn irrigation during the months of November through February.

- Use of water from fire hydrants except for fire fighting and related activities and other uses necessary to maintain the public health, safety, and welfare.

- There shall be no outdoor watering or irrigation whatsoever between the hours of 10:00 AM and 7:00 PM.

- Person shall water on designated days according to their house address.

D. PENALTY FOR WATER WASTE AND EXCESS WATER USE

STAGE I and II

The City shall, after one written warning, fine the customer $25 for the first violation, $50 for the second violation within one year and a fine of $100 for each additional violation within one year for any nonessential or unauthorized uses defined in Section C above. The City, at its option may discontinue the service after the third violation after giving the customer written notice. In such latter event, a charge of $10 shall be paid to the City as a condition to restoration of service.

STAGE III – In addition to the penalty noted in Section D

1. For residential customers, an excess-use penalty of $2 per 100 cubic feet of water used in excess of the applicable allocation during each billing period shall be charged by the City for all service rendered on and after the effective date of this tariff, except that such excess-use penalty shall not apply to any customer whose total consumption to date during the period this plan has been in effect does not exceed his or her total allocated usage for said period.

2. For all customers except residential an excess-use penalty of $4 per 100 cubic feet of water used in excess of the applicable allocation during each billing period shall be charged by the City for all service rendered on and after the effective date of this tariff, except that such excess-use penalty shall not apply to any customer whole total consumption to the during the period this plan has been in effect does not exceed his or her total allocation usage for the said period.

CITY OF PATTERSON
DROUGHT CONTINGENCY PLAN

Phasing Criteria

Drought Stage		Drought Stage initiating conditions	Reduction Objective
65 feet Normal Well Water Level - 5 year average			
I	78'	120% of normal well water level	Cutback water usage by 10%
II	91'	140% of normal well water level	Cutback water usage by up to 20%
III	130'	200% of normal well water level	Cutback water usage by more than 20% and up to 50%

City of Patterson

DROUGHT CONTINGENCY PLAN

Drought Stage	Public Agency Action	Penalties
I <u>Minimal</u> Up to 10 percent reduction	• Initiate public information campaign. • Implement voluntary water use restrictions. • Adhere to water waste ordinance.	<u>Water Waste Penalties</u> 1. Educational Letter 2. Written warning 3. Citation 4. Shutoff and reconnection fee
II <u>Moderate</u> Up to 20 percent reduction	• Notify public of drought condition. Stage II consists of mandatory water - use restrictions and voluntary water conservation of less than or equal to 20%.	<u>Water Waste Penalties</u> 1. Educational letter or visit 2. Written warning 3. Citation 4. Shutoff and reconnection fee
III <u>Severe</u> Up to 50 percent reduction	• Institute rationing program through fixed allocations of 500 to 350 gallons per day per household. • Adhere to water waste ordinance. • Implement rate changes to penalize use over allotment. • Establish drought surcharge rate.	1. Educational letter 2. Written warning 3. Citation 4. Shutoff and reconnection fee <u>Mandatory Programs</u> Excess use charges Flow Restrictors Fines

APPENDIX C

Public Notices and Resolution Adopting UWMP

The City of Patterson advertised the UWMP public hearing as required by the UWMP Act. The following Notice of Hearing was advertised in the Patterson Irrigator on November 8 and November 15, 2006.

CITY OF PATTERSON
NOTICE OF HEARING OF
2005 URBAN WATER MANAGEMENT PLAN

PUBLIC NOTICE is hereby given that on the date of December 5, 2006, at the hour of 7:00 p.m., a public hearing will be held at the City Council Chambers, 1 Plaza, Patterson, CA, 95363, at which time the City Council will consider the following:

REQUIRED REPORT ON URBAN WATER MANAGEMENT PLAN UPDATE 2005

The purpose of this hearing is to present the report to the Patterson City Council and accept or respond to any public questions or comments regarding the 2005 Urban Water Management Plan. This report was prepared to provide guidelines for long term management of the City's water supply program. Comments on the 2005 Urban Water Management Plan must be presented at the hearing or received by the City of Patterson at the address noted below prior to the Public Hearing on December 5, 2006.

Copies of the 2005 Urban Water Management Plan may be reviewed at the following location:

City Hall
City of Patterson
Public Works Department
Second Floor
1 Plaza
Patterson, CA 95363

Contact Person: Mike Willett, City of Patterson, Deputy Director of Public Works (209) 895-8066.

RESOLUTION NO. 2007-03

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PATTERSON ADOPTING, DIRECTING, FILING, AND IMPLEMENTING THE CITY OF PATTERSON URBAN WATER MANAGEMENT PLAN 2005 UPDATE

WHEREAS, the Urban Water Management Planning Act requires that each water supplier update its plan at least once every five years; and

WHEREAS, each water supplier is required to complete its plan as a condition for eligibility for consideration for financial assistance pursuant to Proposition 50, Chapter 8 grant funds, as well as drought assistance; and

WHEREAS, the City of Patterson may apply for financial assistance from the State of California, Department of Water Resources (DWR) for consideration of Proposition 50, Chapter 8 grant funds; and

WHEREAS, the City of Patterson has prepared a thorough and complete Urban Water Management Plan to assist the City with long-range planning of its water supply; and

WHEREAS, the City of Patterson has properly noticed a public hearing regarding the Plan, which was held by the Patterson City Council on December 5, 2006 and a final Plan prepared.

NOW, THEREFORE, BE IT RESOLVED by the Patterson City Council of the City of Patterson as follows:

1. The Urban Water Management Plan, 2005 Update is hereby adopted and ordered filed with the Secretary; and

2. The Patterson City Manager is hereby authorized and directed to file the Plan Update with the State of California, Department of Water Resources by February 2, 2007, in accordance with the Urban Water Management Planning Act; and

3. The Patterson City Manager is hereby authorized and directed to implement the Urban Water Management Plan, 2005 Update, including recommendations to the Patterson City Council regarding necessary procedures, rules, and regulations to carry out effective and equitable water conservation programs.

The foregoing resolution was introduced at a regular meeting of the City Council of the City of Patterson, held on the 2nd day of January, 2007 by Councilmember Smith, who moved its adoption, which motion was duly seconded by Councilmember Shelton and the resolution adopted by the following vote:

AYES: Councilmembers Smith, Cuellar, Shelton, Farinha and Mayor Campo

NOES: None

EXCUSED: None

APPROVED:

Becky Campo
Mayor, City of Patterson

ATTEST:

Maricela L. Vela
City Clerk, City of Patterson

I hereby certify that the foregoing is a full, correct and true copy of a resolution passed by the City Council of the City of Patterson, a Municipal Corporation of the County of Stanislaus, State of California, at a regular meeting held on the 2nd day of January 2007, and I further certify that said resolution is in full force and effect and has never been rescinded or modified.

DATED:

City Clerk of the City of Patterson

APPENDIX D

Notification Letters to Appropriate Agencies

the H_2O group
water engineering, planning & design

November 13, 2006

(Sent via e-mail)

Ron Freitas
Director
Planning and Community Development
County of Stanislaus
1010 10th Street
Modesto, CA 95354

Subject: City of Patterson Urban Water Management Plan, 2005 Update
Notice of Public Hearing

Mr. Freitas:

The City of Patterson has developed a draft Urban Water Management Plan, 2005 Update. In accordance with the Urban Water Management Plan Act, the City has contacted other local water purveyors and irrigation districts to promote regional solutions to water supply challenges.

Attached is a draft copy of the City's Urban Water Management Plan for your review and comment. The City Council is scheduled to hold a public hearing regarding the draft plan on December 5, 2006, at its regular meeting. Please submit any written comments you may have before said date, if possible.

Should you have any comments or questions, please contact me at (916) 869-4957 or via e-mail at cort@theh2ogroup.com.

Sincerely,

Cort Abney, P.E.
Principal

Attachment (1): Draft UWMP

1090 Jurgens Road
Rescue, CA 95672

(916) 869-4957
Fax (916) 405-3694

the H_2O group
water engineering, planning & design

November 13, 2006

(Sent via e-mail)

William Harrison
General Manager
Del Puerto Irrigation District
P.O. Box 1596
Patterson, CA 95363-1596
wharrison@delpuertowd.org

Subject: City of Patterson Urban Water Management Plan, 2005 Update
Notice of Public Hearing

Mr. Harrison:

The City of Patterson has developed a draft Urban Water Management Plan, 2005 Update. In accordance with the Urban Water Management Plan Act, the City has contacted other local water purveyors and irrigation districts to promote regional solutions to water supply challenges.

Attached is a draft copy of the City's Urban Water Management Plan for your review and comment. The City Council is scheduled to hold a public hearing regarding the draft plan on December 5, 2006, at its regular meeting. Please submit any written comments you may have before said date, if possible.

Should you have any comments or questions, please contact me at (916) 869-4957 or via e-mail at cort@theh2ogroup.com.

Sincerely,

Cort Abney, P.E.
Principal

Attachment (1): Draft UWMP

1090 Jurgens Road
Rescue, CA 95672

(916) 869-4957
Fax (916) 405-3694

the H_2O group
water engineering, planning & design

November 13, 2006

(Sent via e-mail)

Stan Duck
Devlopment Field Coordinator
Diablo Grande
9521 Morton Davis Drive
Diablo Grande, CA 95363
sduck@diablogrande.com

Subject: City of Patterson Urban Water Management Plan, 2005 Update
Notice of Public Hearing

Mr. Duck:

The City of Patterson has developed a draft Urban Water Management Plan, 2005 Update. In accordance with the Urban Water Management Plan Act, the City has contacted other local water purveyors and irrigation districts to promote regional solutions to water supply challenges.

Attached is a draft copy of the City's Urban Water Management Plan for your review and comment. The City Council is scheduled to hold a public hearing regarding the draft plan on December 5, 2006, at its regular meeting. Please submit any written comments you may have before said date, if possible.

Should you have any comments or questions, please contact me at (916) 869-4957 or via e-mail at cort@theh2ogroup.com.

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November 13, 2006

(Sent via e-mail)

John Sweigard
General Manager
Patterson Irrigation District
948 Orange Avenue
Patterson, CA 95363
patwater@evansinet.com

Subject: City of Patterson Urban Water Management Plan, 2005 Update
Notice of Public Hearing

Mr. Sweigard:

The City of Patterson has developed a draft Urban Water Management Plan, 2005 Update. In accordance with the Urban Water Management Plan Act, the City has contacted other local water purveyors and irrigation districts to promote regional solutions to water supply challenges.

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Should you have any comments or questions, please contact me at (916) 869-4957 or via e-mail at cort@theh2ogroup.com.

Sincerely,

Cort Abney, P.E.
Principal

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water engineering, planning & design

November 13, 2006

(Sent via e-mail)

Ronald Roos
General Manager
West Stanislaus Irrigation District
P.O. Box 37 (116 E Street)
Westley, CA 95387
wsid@gvni.com

Subject: City of Patterson Urban Water Management Plan, 2005 Update
Notice of Public Hearing

Mr. Roos:

The City of Patterson has developed a draft Urban Water Management Plan, 2005 Update. In accordance with the Urban Water Management Plan Act, the City has contacted other local water purveyors and irrigation districts to promote regional solutions to water supply challenges.

Attached is a draft copy of the City's Urban Water Management Plan for your review and comment. The City Council is scheduled to hold a public hearing regarding the draft plan on December 5, 2006, at its regular meeting. Please submit any written comments you may have before said date, if possible.

Should you have any comments or questions, please contact me at (916) 869-4957 or via e-mail at cort@theh2ogroup.com.

Sincerely,

Cort Abney, P.E.
Principal

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