

**Water Supply Assessment
For The
Crystal Bay Master Plan Development
And Specific Plan**

City of Stockton Municipal Utilities Department

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LIST OF ACRONYMS

AF – Acre-feet
AF/ac/year – Acre-feet per acre per year
Cal-Water – California Water Service Company
CACWD – Calaveras County Water District
CEQA – California Environmental Quality Act
COS – City of Stockton
COSMUD – City of Stockton Municipal Utilities Department
COSMA – City of Stockton Metropolitan Area
CVP – Central Valley Project
DHS – California Department of Health Services
DWR – California State Department of Water Resources
DWSP – Delta Water Supply Project
ESA – Endangered Species Act
GP Update – General Plan Update
GIS – Geographic Information System
IGSM – Integrated Groundwater Surface Water Model
M&I – Municipal and Industrial Uses
mgd – million gallons per day
msl – mean sea level
NEPA – National Environmental Policy Act
OID – Oakdale Irrigation District
Reclamation – United States Bureau of Reclamation
SEWD – Stockton East Water District
SOI – General Plan Sphere of Influence
SSJID – South San Joaquin Irrigation District

SWP – State Water Project

TAF – Thousands of Acre-feet

USBR – United States Bureau of Reclamation

UWMP – Urban Water Management Plan

WSE – Water Supply Evaluation

WSA – Water Supply Assessment (as defined by SB610)

WTP – Water Treatment Plant

WATER SUPPLY ASSESSMENT
FOR THE
CRYSTAL BAY MASTER PLAN DEVELOPMENT AND SPECIFIC PLAN

E1.0 EXECUTIVE SUMMARY

The Crystal Bay Master Plan Development and Specific Plan (Project) is bounded to the north by Eight Mile Road, to the South by Westlake at Spanos Park West, to the west by Bishop Cut and Rio Blanco Road and to the east by Westlake at Spanos Park West (see **Figure E-1** and Exhibit "A" for location map). Crystal Bay Specific Plan is comprised of approximately 173 acres.

The Project is presently located within the unincorporated area of San Joaquin County, near the northwest portion of the City of Stockton. The Project application is for mixed land uses including residential, multi-family, parks, and open space. A detailed breakdown of each land use acreage is provided in **Table E-1** below.

Under Senate Bill 610 (codified as California Water Code, §§ 10910-10915), each public water system responsible for serving proposed projects meeting specified criteria (e.g., residential projects of more than 500 dwelling units) must prepare a "Water Supply Assessment (WSA)" evaluating whether the water system's "total projected water supplies . . . will meet the projected water demand associated with the proposed project," together with existing and other foreseeable planned future uses over a twenty-year horizon. If, as a result of its assessment, the public water system concludes that its water supplies are not sufficient, the assessment must detail any plans that the public water system has to acquire the necessary water supplies.

As one of three retail water providers serving potable water supplies to the City of Stockton Metropolitan Area (COSMA), the City of Stockton Municipal Utilities Department (COSMUD) is responsible for preparing the water supply assessment for the Project. In so doing, COSMUD has relied on and incorporates by reference its prior analysis conducted in the City of Stockton Urban Water Management Plan (Kennedy/Jenks Consultants, Dec. 6, 2005) (UWMP), the Water Supply Evaluations for the General Plan Update Preferred Alternative (MWH Americas, Inc., Amended May 12, 2006) (WSE), and the Delta Water Supply Project Feasibility Report (ESA Consulting, MWH Americas, Inc., April 22, 2003) (DWSP Feasibility Report) and DWSP Environmental Impact Report (ESA Consulting, MWH Americas, Inc., November 2005). This WSA supplements the information provided in the UWMP, WSE, and DWSP Reports. In some cases the information contained in the WSA has been updated from information provided in the aforementioned reports as a result of the COSMA's continual evolutionary change in their water supply portfolio as new information becomes available. Changes typically occur as result of an earlier conservative assumption in the aforementioned documents that has been evaluated and understood to a higher degree allowing the COSMA, in some instances, to account for increased reliability in water supplies. Exceptions to this are explained more fully.

Figure E-1. Project Location Map

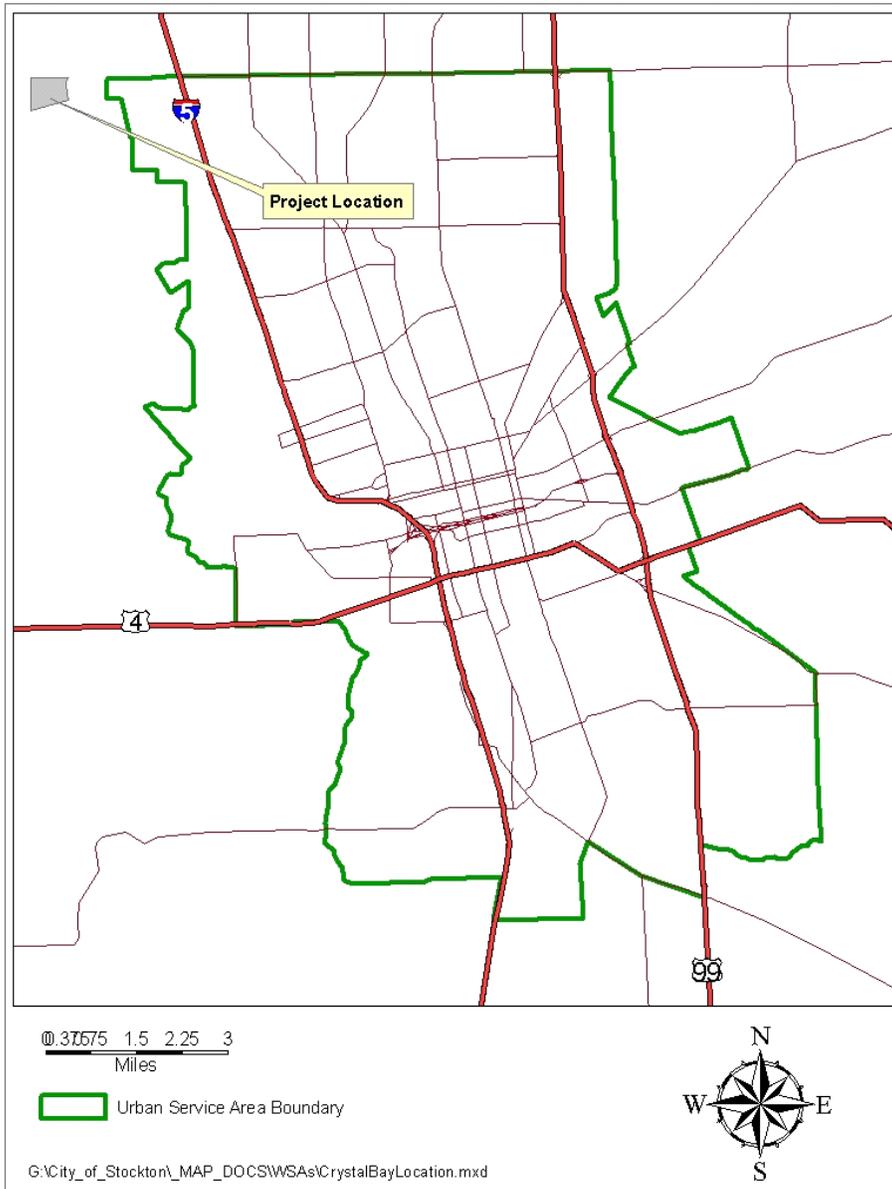


Table E-1. Project Water Demands by Land Use

Land Use	Land Use Area (acres)	Unit Water Demand Factor (AF/acre/year)	Water Demand (AF/year)
High Density Residential	19.50	1.50	29.25
Medium Density Residential	22.10	1.50	33.15
Low Density Residential	65.70	1.50	98.55
Parks	9.30	3.00	27.90
Lake	4.00	3.00	12.00
Public Streets	38.00	1.50	57.00
Private Streets	5.90	1.50	8.85
Pump Stations	0.50	1.50	0.75
Levee/Setback	8.70	1.50	13.05
Total:	173.70		280.50

Projected Service Area Demands

Relying on a combination of surface water and groundwater, the COSMA is served by three water retail providers: (i) the California Water Service Company, (ii) City of Stockton Municipal Utilities Department (COSMUD), and (iii) County Maintenance Districts. Due to the Project's geographic location, it will be served entirely by COSMUD. Because water supply for the entire COSMA is coordinated and relies on the same sources of water, this WSA evaluates demand for the entire COSMA. Based on past water deliveries and the most recent water demand calculations, total water demand for the Stockton Metropolitan Area is currently 68,780 AF/year.

With anticipated growth and development within the COSMA, the total water demand for surface water and groundwater supplies is predicted to increase over the next twenty years. Specific projections of growth have been developed over time under the City's 1990 General Plan. The existing General Plan, for example, estimates that water demand in the COSMA to grow to 85,330 AF/year by the year 2015. Under the Water Code, however, demand and supply must be evaluated over the twenty-year horizon. Therefore, COSMUD also evaluated the revised growth calculations in the City's General Plan Update now underway, which includes the Project water demands as well as water demand from growth over the entire General Plan Update proposed Urban Policy Area. The WSE for the General Plan Update estimates that water demand in the COSMA will grow to 85,330 AF/year to 2015 and then to 156,083 AF/year by the year 2035 (build-out of the General Plan Update). While the period of growth evaluated in

the 2035 General Plan Update is longer than the twenty-year horizon mandated in the Water Code, these more recent projections more accurately reflect anticipated growth in the region and the availability of surface water and groundwater supplies, and therefore are appropriately evaluated here as a “worst case” scenario.

E1.1 Existing Water Supplies

To meet existing demands, COSMA relies on both surface water and groundwater. COSMA currently receives all of its surface water through the wholesale purchase of treated water from Stockton East Water District (SEWD) based on the apportionment criteria set forth in the "Second Amended Contract Among the Stockton East Water District, The California Water Service Company, The City of Stockton, The Lincoln Village Maintenance District, and The Colonial Heights Maintenance District Providing For The Sale of Treated Water." The City of Stockton also has negotiated two interim water supply contracts (described below) on the Stanislaus River that are also conveyed through SEWD. All told, COSMA's available “firm” surface water supplies total 134.17 TAF/year in wet or above normal years and 58.17 TAF/year in critical years. Without interim supplies, SEWD supplies in wet and above normal years total 104.17 TAF/year. It should be noted that the COSMA is served using conjunctive use methods where groundwater and surface water are balanced so as not to exceed accepted groundwater yields over a long term period or in any given year (explained in more detail below and in the WSA). Each surface water source currently delivered to the COSMA is discussed in turn, as follows:

New Hogan Reservoir (40,171 AF/year): SEWD and Calaveras County Water District (CACWD) hold a repayment contract with the Bureau of Reclamation (Reclamation) for water stored in New Hogan Reservoir. Since this water is not part of the Central Valley Project, it is not subject to CVP deficiencies in dry hydrologic years, and has no expiration date. Out of this contract SEWD has a right to divert up to 40,171 AF/year and CACWD has a right to divert up to 30,928 AF/year. The 40,171 AF/year is 56.5 percent of the total contract amount with CACWD holding 43.5 percent.

Calaveras County Water District's Transfer (10,000 AF/year) of Unused New Hogan Reservoir Water: SEWD holds a contract with CACWD for transfer of unused water entitlements under Reclamation repayment contract for New Hogan Reservoir. While water under this contract continues to be delivered at 24,000 AF/year, the contract amount may be reduced to around 10,000 AF/year as competing demands arise from new development in Calaveras County.

Central Valley Project New Melones Reservoir (40,000 AF/year): This Stanislaus River water source is only available in wet and above-normal years. Under a Bureau of Reclamation contract as part of the Central Valley Project, SEWD is entitled to 40,000 AF/year for municipal and industrial uses. The infrastructure to supply this water is complete, but the source is not reliable since the Central Valley Project Improvement Act and other regulatory actions have reduced the quantity of water available from this source.

South San Joaquin Irrigation District (15,000 AF/year): The City of Stockton holds an interim water transfer contract treated and wheeled through SEWD with South San Joaquin Irrigation District (SSJID) for 15,000 AF/year from the Stanislaus River (New Melones). The contract amount is limited to a minimum of 4,000 AF/year in critically dry years. While this contract expires in 2009, COSMUD is pursuing a renewal of the contract. Because SSJID is a senior water rights holder, this supply is considered reliable.

Oakdale Irrigation District (OID) (15,000 AF/year): The City of Stockton also has an interim contract with OID for up to 15,000 AF/year from the Stanislaus River (New Melones) that is wheeled and treated by SEWD to the COSMA. The contract is expected to deliver at least 4,000 AF/year in critically dry years. Because OID is a senior water rights holder on the Stanislaus River, this is considered a reliable source of water. While the contract is due to expire in 2009 (with a possible ten year renewal), the City of Stockton is pursuing a renewal of the contract and OID has indicated in its draft Water Resources Plan that it intends to implement long term water transfer agreements in order to fund improvements to its delivery infrastructure.

Groundwater: As overlying appropriators of groundwater, COSMA water retailers can extract approximately 0.75 AF/(developed) acre/year, on average, of groundwater from the aquifer underlying the COSMA. The source of the groundwater is considered to come from the Eastern San Joaquin sub-basin, a sub-basin of the larger Central Valley Aquifer as identified in State Department of Water Resources Bulletin 118-0 as shown in **Figure E-2**. As part of a regional conjunctive use program, the COSMA's use of groundwater is largely dependent on the availability of surface water supplies. In wet years, the COSMA maximizes its use of surface water supplies and only uses groundwater for the higher demand months. In dry and critical years, surface water supplies are subject to cutbacks and groundwater is used more heavily. This method of conjunctively using groundwater and surface water is not uncommon in the Central Valley where the groundwater basins can essentially store water through in-lieu or direct (e.g., direct injection, recharge basins) recharge for use in dry year conditions. Currently, groundwater extractions are at or below the current self-imposed sustainable yield of the groundwater basin. In the DWSP Feasibility Report, the COSMA developed a long term average groundwater extraction goal of **0.60** AF/acre/year, and an absolute extraction limit of **0.75** AF/acre/year. It is assumed that these goals will be placed into effect once Phase 1 of the DWSP is constructed in 2010/11. In the meantime, the **0.75** AF/acre/year is used.

COSMA's existing water supplies are not adequate to serve the water demands for existing uses, the Project, and all reasonably foreseeable planned future uses creating an insufficiency in water supplies. Given the lack of water available for all planned future uses particularly in critically dry years, this Water Supply Assessment evaluates alternative future water supplies, as described below.

E1.2 Future Water Supplies

Where the public water system's supplies may not be sufficient to meet the demands of the Project and all existing and reasonably foreseeable planned future uses, the Water Supply Assessment must discuss the water retailer's plans for acquiring additional water supplies. Here, the WSA concludes that existing water supplies are not sufficient to meet the water demands from the Project and all existing and reasonably foreseeable planned future uses. Consequently, this Water Supply Assessment outlines several future water supplies.

Delta Water Supply Project (125,900 AF/year): The Delta Water Supply Project (DWSP) includes an application to the State Water Resources Control Board (SWRCB) to divert up to 125,900 AF/year from the Delta, as well as to construct necessary diversion, conveyance, and treatment facilities. On March 8, 2006, the SWRCB issued an appropriate water right permit for diversions from the Delta of up to 33,600 AF/year (or 30 million gallons per day (mgd)) from the Delta by COSMUD for use within the Place of Use identified in the Water Right Application (the so-called "DWSP Phase 1 – 30 mgd" supply)¹.

¹ The Project may not be included in the Place of Use. This can either require amending the Water Right Application or making the argument that this area is served with groundwater.

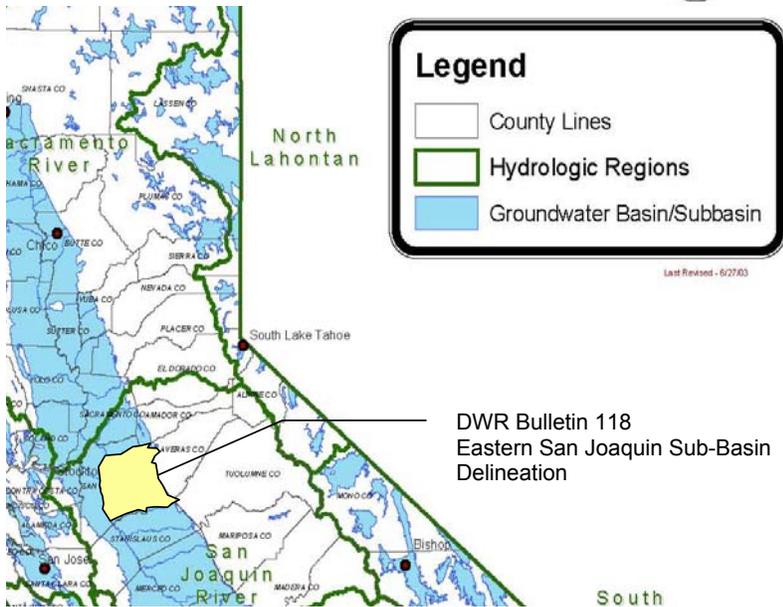
Figure E-2. DWR Bulletin 118-0 Definition of Eastern San Joaquin Sub-Basin

Source:

http://www.groundwater.water.ca.gov/bulletin118/basin_maps/index.cfm

DWR Disclaimer: The basin boundaries for the revised groundwater basin map were primarily defined using geologic contacts and hydrogeologic divides. Specifically the identification of the groundwater basins was initially based on the presence and areal extent of unconsolidated alluvial soils identified on 1:250,000 scale geologic maps provided by the California Department of Conservation, Division of Mines and Geology. The identified groundwater basin areas were then further evaluated through review of relevant geologic and hydrogeologic reports, well completion reports, court-determined adjudicated basin boundaries, and contact with local agencies to refine the basin boundaries.

Groundwater Basins in California



This water right is based on California Water Code Section 1485, which authorizes any municipality disposing of treated wastewater into the San Joaquin River to seek rights to divert a like amount of water, less losses, from the river or Delta downstream of the point of wastewater discharge. This implies a very high level of reliability in even the most critical years. Environmental review under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) has been completed for Phase 1. Phase 1 is expected to be operational by 2010/11 and will be funded through customer user rates, development fees, and federal and state grants. Based on the Water Supply Evaluation completed for the General Plan Update, the Phase 1 water along with the other existing water supplies and their forecasted availability in 2035 will accommodate the build-out water demand of both the 1990 and 2035 General Plans.

Calaveras River (10,000 AF/year): Additionally, SEWD is pursuing its own appropriate water rights to the Calaveras River in the total amount of 50,000 AF/year in wet and above-normal years, but only 15,000 AF/year will be available in below-normal and dry years.

New Hogan Reservoir (40,000 AF/year): Potential supplemental supplies may be available from New Hogan reservoir through excess spill waters and re-operation of the reservoir at an amount of approximately 40,000 AF/year. The New Hogan contract, however, may not be available in critical years and requires authorization from the United States Bureau of Reclamation, which renders this water supply unreliable in all but above normal and wet years.

New Melones Farmington Project (50,000 AF/year): SEWD is also pursuing additional supplies from the Stanislaus River New Melones Farmington Project in the amount of 50,000 AF/year. The reliability of this supply is unknown at this time.

Conjunctive Use of Groundwater (0.75 AF/acre/year): As mentioned above, conjunctive use of groundwater and surface water is critical to addressing the year-to-year and seasonal variability in hydrology and will also help ensure long-term water supplies for the COSMA. Groundwater is available throughout the developed acreage at the rate of **0.75 AF/acre/year** in any one given year and **0.60 AF/acre/year** over a long term average.

E2.0 CONCLUSION

With construction of the DWSP – Phase 1, existing and proposed future water supplies for the three COSMA urban water retailers – COSMUD, California Water Service Company, and County Maintenance Districts – are sufficient to meet existing water demands and the water demands of the Project and all reasonably foreseeable planned future uses in wet and above-normal hydrologic years and in dry and critical years and under sustained drought conditions.

Water Supply Assessment Crystal Bay Master Plan Development and Specific Plan

1. WATER SUPPLY ASSESSMENT INTRODUCTION

1.1 Background

The California Water Code requires coordination between land use lead agencies and public water purveyors. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, anticipated demands of the proposed Project and all existing and reasonable foreseeable planned future uses as set forth under Section 10910(d)(1) of the State Water Code.

Water Code Sections 10910 - 10915 (inclusive) require land use lead agencies: 1) to identify the responsible public water purveyor for a proposed development project, and 2) to request from the responsible purveyor, a "Water Supply Assessment" (WSA). The purpose of the WSA is to demonstrate the sufficiency of the purveyors' water supplies to satisfy the water demands of the proposed development project, while still meeting the current and projected water demands of existing and planned future uses. Water Code Sections 10910 – 10915 delineate the specific information that must be included in the WSA.

This WSA is structured in way that shows which portion of the Water Code Section is being satisfied by stating the section number and title. Additional information is provided where it is useful in the understanding of the Project, its water demands, and its water supplies.

1.2 Project Description

The Crystal Bay Master Plan Development and Specific Plan (Project) is bounded to the north by Eight mile Road, to the South by Westlake at Spanos Park West, to the west by Bishop Cut and Rio Blanco Road and to the east by Westlake at Spanos Park West (see Figure 1 and Exhibit "A" for location map). Crystal Bay Specific Plan is comprised of approximately 173 acres.

The Project is presently located within the unincorporated area of San Joaquin County, near the northwest portion of the City of Stockton. The Project application is for mixed land uses including residential, multi-family, parks, and open space. A detailed breakdown of each land use acreage is provided in **Table 1** below.

The Project application is for predominantly residential, commercial, schools, parks and open space uses. While land use is relevant to water use, it will be explained later in the WSA that a uniform water demand is assigned to this area regardless of land use unless there is a special use requiring significant quantities of water. As a result, a weighted-average method of calculating water demand is preferred over a strict land-use based method. As explained in more detail below and according to the anticipated build-out schedule for the City's General Plan Update, the Project's total anticipated water demand over the 20-year horizon (through 2027) was included under COSMUD's planned future water requirements consistent with the General Plan Update and preferred alternative evaluated in the WSE.

Figure 1. Project Location Map

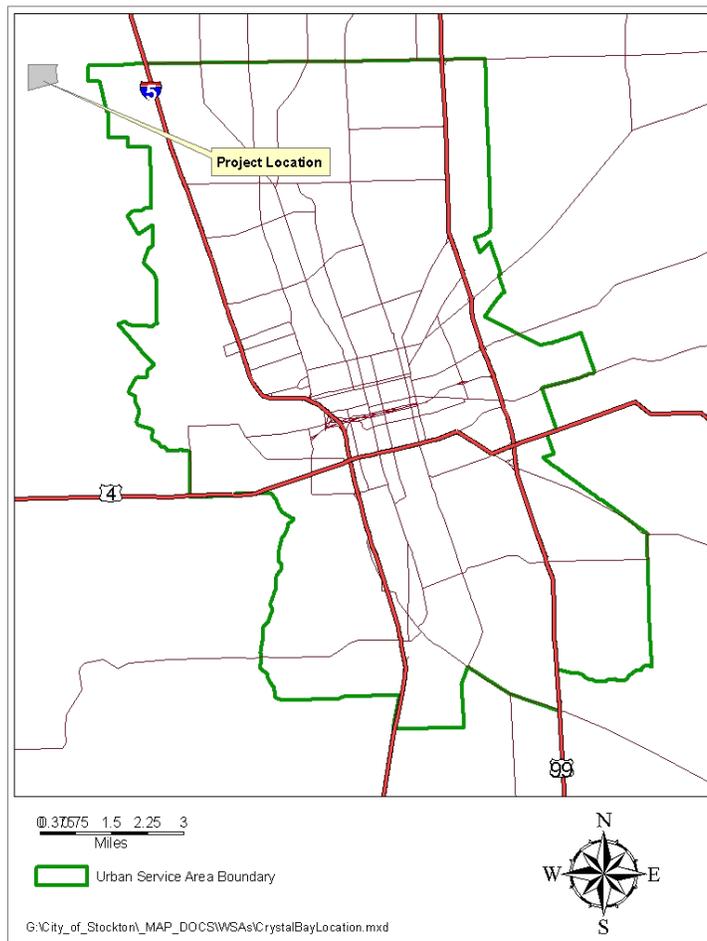


Table 1. Project Water Demands by Land Use

Land Use	Land Use Area (acres)	Unit Water Demand Factor (AF/acre/year)	Water Demand (AF/year)
High Density Residential	19.50	1.50	29.25
Medium Density Residential	22.10	1.50	33.15
Low Density Residential	65.70	1.50	98.55
Parks	9.30	3.00	27.90
Lake	4.00	3.00	12.00
Public Streets	38.00	1.50	57.00
Private Streets	5.90	1.50	8.85
Pump Stations	0.50	1.50	0.75
Levee/Setback	8.70	1.50	13.05
Total:	173.70		280.50

1.3 Project Water Demands by Land Use Overview of Current Water Supply Condition

Like many northern California communities, the City of Stockton Metropolitan Area (COSMA) is experiencing substantial population growth and increasing water demands. At the same time, regulatory pressures, increased water usage in neighboring areas, and saline intrusion affecting groundwater supplies are straining the City's already limited water supplies. This WSA balances the environmental and natural constraints on water supplies with that of the projects and programs that are currently being implemented or that are planned to be in place with increasing increments of water supply facility capacity.

As a result, the City of Stockton (COS) and its three urban water retailers as shown in **Figure 2** have focused attention looking into the future on the availability of existing and future surface water supplies from Stockton East Water District (SEWD) and the Delta Water Supply Project (DWSP) and the need to manage groundwater resources at a sustainable yield. The COS's objective is to achieve a long-term reliable water supply to 2050².

Beyond its cooperative participation in SEWD supplies, a product of the COS's effort in obtaining future long term reliable water supplies for the DWSP is a water

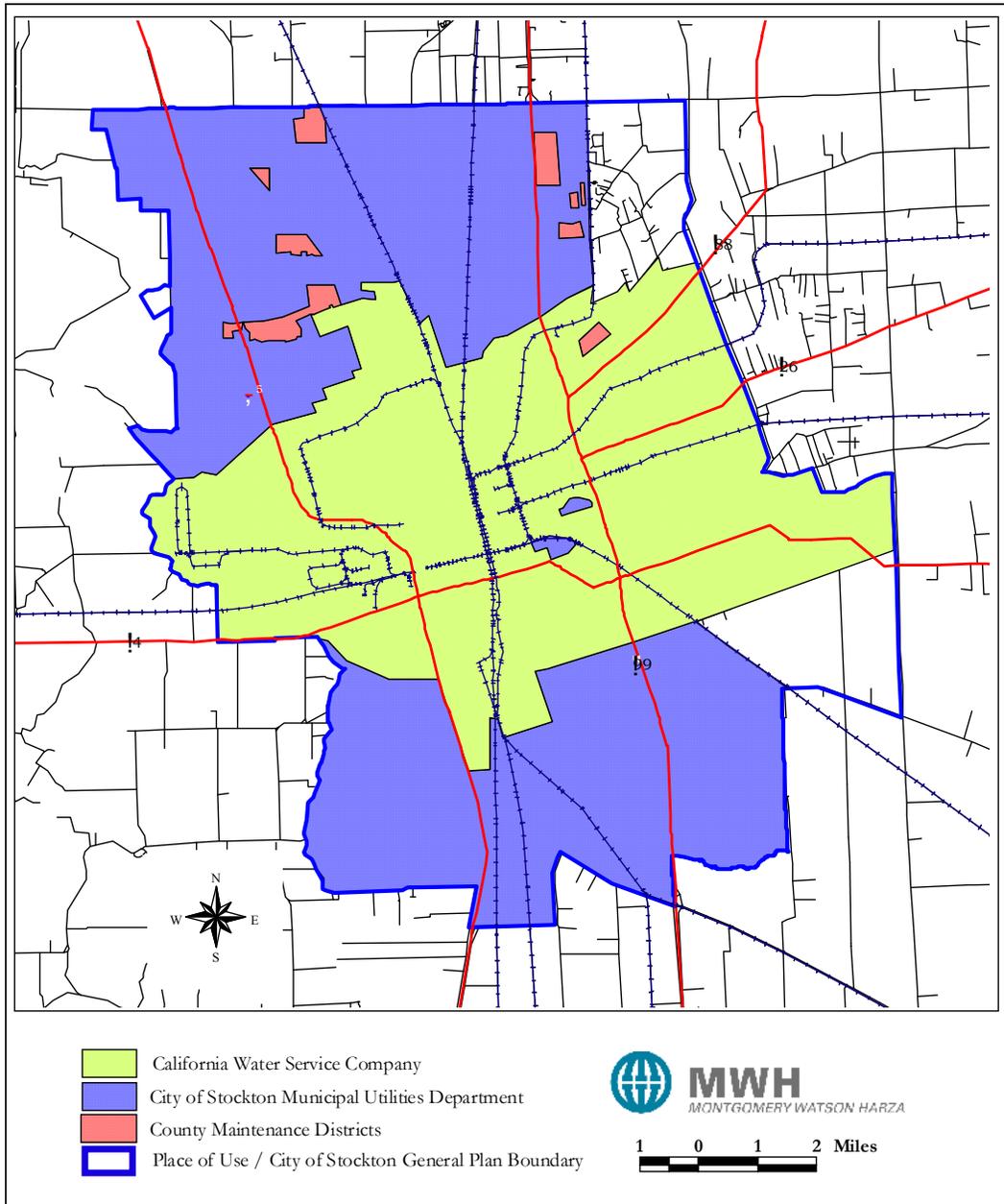
² 2050 is used as the ultimate build out for the DWSP Feasibility Report. 2035 is the build out of the General Plan Update.

right application to the State Water Resources Control Board (SWRCB) on January 6, 1996, that requested an increasing amount of surface water from approximately 20,000 acre-feet per year (AF/year) initially, up to 125,900 AF/year in 2050. To divert and deliver this surface water supply, the COSMUD is pursuing the DWSP. This is a Delta/San Joaquin River diversion and water treatment plant which will provide supplemental surface water supplies to the COSMA if existing supplies are deemed insufficient to meet water demands from existing growth, the Project, and foreseeable growth. It is believed that the DWSP is a critical project to the COSMA's continued economic growth and it is not a matter of if, but when the project is constructed. The DWSP will achieve the following three objectives:

- **managing groundwater resources for environmental benefit and to provide a long-term sustainable yield,**
- **satisfying future demands by conjunctively using groundwater and surface water, and**
- **providing the COSMA with the flexibility to control how and from what sources water demands are met.**

On April 22, 2003, Stockton's City Council approved the DWSP Feasibility Report and directed the City of Stockton Municipal Utilities Department (COSMUD) staff to complete the necessary environmental studies to comply with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). On November 8, 2005, the Stockton City Council certified the EIR and also authorized the City staff to proceed with the project. The certified document was included as part of the water rights application package submitted to SWRCB, which issued a permit for a Delta diversion for Phase 1 in the amount of 33,600 AF/year on March 8, 2006. Additional information on the DWSP is provided later in the WSA and can also be found in the DWSP Feasibility Report and DWSP EIR.

Figure 2. COSMA Water Retail Providers



Phase 1 of the DWSP is planned for construction in 2008/09 and be operational in 2010/11. Once construction of the Phase 1 DWSP is completed, the urban water retailers will continue to rely upon existing surface water supplies through SEWD and existing groundwater supplies that underlie the COSMA service area. The reliability of water supply resources for the COSMA will be secure for some time while plans and agreements are secured for optimum use of water supplies for the long term build-out of the COS General Plan.

(Please note that under Section 10910 of the State Water Code, the DWSP is classified as a planned future project. This WSA does not consider the DWSP as an existing water supply and will only include the DWSP as a future water supply if existing water supplies (i.e., SEWD and groundwater) are insufficient to meet existing water demands plus the Project.)

1.4 OVERVIEW of COSMA's Future Water Demands

In order to evaluate current and projected water demand within the COSMA over the 20-year horizon required by Water Code section 10910, et seq., this WSA relies upon several studies conducted recently in the area, including the UWMP, 2003 DWSP Feasibility Report and EIR, and a 2006 Water Supply Evaluation prepared on behalf of the COS water retail providers for the General Plan Update Preferred Alternative. COSMUD has relied on and incorporates by reference its prior analysis conducted in the City of Stockton Urban Water Management Plan (Kennedy/Jenks Consultants, Dec. 6, 2005) (UWMP), the Water Supply Evaluations for the General Plan Update Preferred Alternative (MWH Americas, Inc., Amended May 12, 2006) (WSE), and the Delta Water Supply Project Feasibility Report (ESA Consulting, MWH Americas, Inc., April 22, 2003) (DWSP Feasibility Report) and DWSP Environmental Impact Report (ESA, MWH Americas, Inc., November 2005).

This WSA supplements the information provided in the UWMP, WSE, the DWSP Report and EIR. In some cases the information contained in this WSA has been updated from information provided in the aforementioned reports as a result of the COSMA's continual evolutionary change in their water supply portfolio as new information becomes available. Changes typically occur as result of an earlier conservative assumption in the aforementioned documents that has been evaluated and understood to a higher degree allowing the COSMA, in some instances, to account for increased reliability in water supplies. Exceptions to this are explained more fully. Each of these studies is available for review at COSMUD or available for download on the City of Stockton's Web Site. In all cases, the WSA should be used as the governing document where any conflict of information exists.

The water demands associated with new growth in the COSMA were evaluated to 2015 as part of the April 2003 DWSP Feasibility Report and have been evaluated to 2035 as part of a Water Supply Evaluation (WSE) completed in May 2006 on

behalf of the three COS water retail providers (COSMUD, California Water Company (Cal Water), and San Joaquin County (County) Maintenance Districts) in order to provide information relevant to the City's pending General Plan Update process. The WSE, which is hereby incorporated by reference herein, has been relied on in this WSA in order to provide all relevant information regarding future water demands, even though the WSE evaluates a period of time (approximately 30 years) that is well beyond that necessary for the WSA (which is 20 years). The WSE also reconciles past documents to provide an understanding of what has changed in the water supply portfolio over the last four years.

As the WSE itself explains on pages 55 through 59, the WSE reflects the City's most recent and best information regarding the amounts of groundwater on which it can reliably depend, and the amounts of surface water from SEWD on which it can reliably depend. This information supplements and, in some cases, complements previously available information found in the DWSP Feasibility Study and in other documents, such as the City's Urban Water Management Plan (UWMP) and previous WSAs for prior development applications. COSMUD makes every attempt to maintain the latest information in the WSAs as a means of providing the latest and most reliable information.

The findings of the DWSP Feasibility Study evaluated current water demands and developed a land use based water demand projection for build-out of the current City General Plan to 2015 and a population based water demand projection to 2050. Water demands within the COS are projected to increase from the present 68,000 Acre-Feet/year (AF/year) in 2005 to 85,330 AF/year by build-out of the current General Plan in 2015. Growth projections included as part of the DWSP Water Right Application were solely population based. As part of the DWSP Feasibility Report, a reconciliation of growth rates with the Water Right Application was completed based on the best available information at the time including:

- *City of Stockton General Plan Background Report*, January 1990, City of Stockton Planning Department.
- *Supplemental Reports for Water Supply*, February 1992, City of Stockton Planning Department.
- *2000 Update Urban Water Management Plan Public Review Draft December 2000*, City of Stockton Department of Municipal Utilities.
- Water Right Application No. 30531, January 30, 1996, City of Stockton Department of Municipal Utilities.
- Existing and Projected Population, *Flows and Wastewater Load Study for Stockton*
- *Regional Wastewater Control Facility Master Plan Update*, 1997, City of Stockton Department of Municipal Utilities

Land use based water demand projections are generally preferred over population based projections. For this reason, the General Plan Update projected water

demands from 2015 to 2035 were used in place of the DWSP water demands in the WSE. For the period from 2015 to 2035, the WSE increases projected demands from 85,330 AF/year in 2015 to 156,083 AF/year in 2035, respectively, as shown in **Figure 3**, where both population growth (left y axis) and water demands (right y-axis) are shown. As noted above, the WSE is used in this WSA as a supporting document for purposes of providing a glimpse at the future water supply condition and the necessary water supply facilities to meet the projected water demand. Four fundamental elements of the Water Supply Evaluation will be used in this WSA as follows:

1. All existing supplies (i.e., SEWD surface water and available groundwater) will be evaluated for determining adequacy prior to making water available from the DWSP (i.e, the DWSP is a planned future water supply). The DWSP will not be used unless existing, reasonably foreseeable, and Project water demands exceed the defined thresholds for sustainable groundwater use and SEWD surface water supplies are being fully utilized to the extent raw and treated water facility capacity allows for its use. Studies are being scoped at the time of this WSA's development to evaluate, at a higher level of detail, the maximum capacity available through SEWD. To date, the best available information is in the DWSP Feasibility Report and the WSE.
2. Water supply conditions are evaluated to 2035 rather than 2027 (the required 20 year projection as required by Water Code Section 10910) and are based on existing SEWD surface water supplies and available groundwater under current groundwater use policies. Surface water supplies for the DWSP will be included only if the WSA analysis requires the DWSP to be constructed to meet projected water demands. This implies that all existing supplies including SEWD and available groundwater supplies will be exhausted prior to making the DWSP available.
3. Groundwater management strategies defined in the WSE will be used in this WSA regardless of whether the DWSP is shown to be needed or not.
4. Water facility requirements (e.g., size, phasing, and location) will be in accordance with the WSE to 2035 (and the DWSP Feasibility Report to 2050, if needed). The growth assumptions and facility phasing contained within DWSP Feasibility Report are consistent with the WSE to 2035; however, Phase 1 is contemplated for use to 2035 as a reference point to evaluate how much water demand (and growth) could be served with the Phase 1 DWSP project. Subsequent phases of the DWSP will be constructed based on the ability of the Phase 1 DWSP, SEWD surface water supplies and groundwater to serve the projected General Plan Update water demands.

In short, while this WSA does not assume approval of the proposed General Plan Update but instead recognizes that the 2015 General Plan remains in place at

present, the WSA nevertheless relies on the WSE prepared for the General Plan Update that is currently receiving public review because (i) it includes the best information and projections currently available about (a) the reliability of groundwater supplies, (b) the reliability of SEWD surface supplies, and (c) the length of time that the first phase of the DWSP project will suffice to serve growth that might be approved under the General Plan Update, and (ii) provides a 30-year time horizon that more than satisfies the 20-year planning horizon called for under Water Code section 10910.

2. ELEMENTS OF A WSA [WATER CODE SECTION 10910]

The format of this WSA is intended to follow Water Code Sections 10910 – 10915 to delineate clearly the specific requirements of a WSA. This WSA is structured according to those requirements. Section 10910 of the Water Code is intended to evaluate if existing water supply sources are adequate to meet existing water demands, the Project demands and the demands of all planned foreseeable future uses within the public water system. What follows is a breakdown of the elements of the Water Code that respond to the adequacy of existing supplies. If under Section 10910 existing water supplies are adequate to serve existing water demands, the Project and all planned future uses within the public water system over the twenty-year horizon, the WSA can move forward with a positive finding of sufficiency in water supplies. If Section 10910 is not satisfied, further evaluation into planned water supply sources and projects need to be included as per Section 10911 of the Water Code.

2.1 Determine if Project is Subject To CEQA [Section 10910(a)]

The COS Planning Department has determined that the Project is subject to CEQA and satisfies the criteria set forth in Section 10912 of the California Water Code requiring the completion of a WSA.

2.2 Identify Responsible Public Water System [Section 10910(b)]

The COS Planning Department has identified COSMUD as the responsible public water system purveyor for the Project. The Planning Department possesses information regarding other approved development applications within the COS that may be provided water by one or more of the three water retailers in the COSMA which should be considered in the preparation of this WSA.

2.3 Determine if UWMP Includes Water Demands [Section 10910(c)]

The 2005 Urban Water Management Plan adopted for the COSMA included a portion of the projected water demand associated with the proposed Project and applied forecasted water supply conditions in 2025. Hence, the 2005 UWMP and the information therein is incorporated by this reference.

The portion of the Project water demands included in the 2005 UWMP water demand projections are to 2015 assuming that water is served on a first come first serve basis. Since the UWMP looks only at the 2015 build-out condition of the currently adopted General Plan while applying 2025 water supply conditions as per the Urban Water Management statute, it is necessary to refer to the WSE for information related to sufficiency in demands that exceed the current General Plan but are included in the General Plan Update WSE. The 2005 UWMP in turn includes the water demand factors adopted by the COS in the DWSP Feasibility Report shown in **Table 2** for the existing General Plan and **Table 3** for the General Plan Update.

This WSA uses land use-based water demands with some modification to maintain consistency as WSAs are prepared over time. In order to measure projected water demands of a particular project, two land use-based methods can be used, including a “weighted average” method and a project specific land use-based method. As mentioned above, the WSA, the WSE, and UWMP each use the land use information from the existing General Plan or, in the case of the WSE, the updated General Plan.

Compliance with SB 610 is simplified greatly by utilizing the land use based methodology. In requesting assurance of a reliable water supply, development projects can be tracked by the General Plan land use map to determine if the lands were included in the water supply analysis and at what levels of assumed water demand. For purposes of the DWSP Feasibility Report, land use based water demand factors were determined and applied to the current 1990 General Plan. This application of land-based unit demand factors totaled approximately **85,330 AF/year** of water demand by 2015 as shown in **Table 2**. If the demand is spread over the **54,500** acres of proposed developed land, the resulting unit water demand factor is 1.6 AF/acre/year for projects that lie within the 1990 General Plan urban policy area. The COSMA is currently producing **68,000 AF/year**.

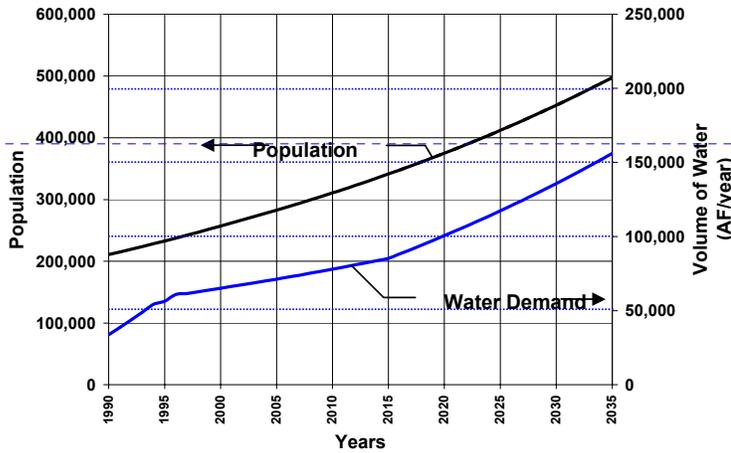
To extrapolate water demands beyond 2015, the recent preferred alternative for the proposed General Plan Update is used as the best available data on how growth may take place into the future. It is believed that the proposed General Plan Update alternative supercedes any published work to-date. The same factors in the DWSP Feasibility Report are applied to the proposed General Plan Update Land use diagram that includes the Project inclusively to consider the build-out water demand as shown in [Error! Reference source not found.](#), showing a build-out water demand of **156,083 AF/year** in 2035. Growth that is assumed to take place after 2015 has a different weighted factor calculated in the same manner as the current General Plan. The additional water demand beyond 2015 is **70,753 AF/year** that is generated from **29,021** acres of developed urban area. The applied weighted unit water demand factor for projects that lie outside of the 1990 General Plan is calculated to be **2.44 AF/acre/year**.

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As mentioned previously, if a project warrants a specific demand calculation by having an intensive water use (i.e., large regional parks, recreational lakes, etc), then another method other than the weighted average method may be used for calculating water demand. In cases where land uses are provided, a check is made to see if the calculated water demand falls close to the **1.60 AF/acre/year** for projects constructed prior to 2015 and **2.44 AF/acre/year** for projects constructed on or after 2015. In the case of this Project, the average demand assuming non-potable uses as well, is **1.61 AF/acre/year** based on the land use categories, acreages, and water demands given in **Table 1**. Assuming project construction prior to 2015, the **1.60 AF/acre/year** factor is considered to be adequate and will be used for purposes of this WSA. This results in a total water demand of **276.80 AF/year** which is only **3.70 AF/year** less than the **280.50 AF/year** shown in [Error! Reference source not found.](#)

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Figure 3. Population and Water Demand Increase Over Time



Comment: Population at 2035 is 580,000

2.4 Identify Existing Water Supplies for the Project [Section 10910(d)(1)]

Section 10910(d)(1) requires identification of existing water supply entitlements, water rights, or water service contracts relevant to the Project and quantification of water obtained by the COS pursuant to those water supply entitlements, water rights, or water service contracts in previous years.

2.4.1 Existing Surface Water Supplies

Stockton East Water District (SEWD) was organized as a public agency on June 7, 1948 under the provisions of the California Water Conservation District Act of 1931. Since 1978, SEWD has been treating and supplying treated surface water up to 45 million gallons per day (mgd) to the region’s urban areas through its three urban contractors (water retailer providers): COSMUD, Cal-Water, and the County (see **Figure 2** for location of service areas).

Table 2. Projected Future Water Demands based on Approved General Plan

General Plan Land Use Designation	Unit Demand Factor (AF/ac/year)	General Plan Urban Services Area at 2015 (Acres)	Future Municipal Water Demands at 2015 (AF/year)
Low-Medium Density Residential	1.5	31,222	47,872
High-Density Residential	3.0	1,368	4,104
Administrative Professional	1.5	841	1,266
Commercial	1.5	3,776	5,749
Performance Industrial/Industrial	1.5	9,582	14,020
Institutional	1.5	6,648	10,235
Park and Recreational	2.0	1,042	2,084
Agricultural/Open Space	-	27,585	-
Total:	-	82,064	85,330

Table 3. Projected Future Water Demands based on Preferred Alternative of General Plan Update

Designated Land Use	Planning Area Acreage (acres)	Unit Water Demand Factor (AF/ac/year)	Water Demand AF/year
Residential Estate	2,460	1.5	3,690
Low Density Residential	26,220	1.5	39,330
Medium Density Residential	1,970	1.5	2,955
High Density Residential	1,150	3.0	3,450
Village	18,430	3.0	55,290
Administrative Professional	1,050	1.5	1,575
Commercial	4,780	1.5	7,170
Mixed Use	1,420	1.9	2,698
Industrial	17,070	1.5	25,605
Institutional	7,160	1.5	10,740
Parks and Recreation	1,790	2.0	3,580
Open Space/Agriculture	38,560	-	-
Total	122,060		156,083

Source: NOP of Draft EIR, May 2005 Table 2. Designated Land Uses...

The historical water demands from 1994 to 2005 from each of the urban contractors are illustrated in **Figure 4**. Both local indigenous groundwater from portions of the regional aquifer underlying each purveyor (groundwater supplies are discussed in some detail after the surface water section) and surface water from SEWD have satisfied the three water retail provider's water demand during this period of time. The split between the two supplies for each water retail provider is illustrated in **Figure 5**. SEWD also provides surface water to San Joaquin County farmers (this amount is not included or considered in this WSA). SEWD is currently pursuing phased efficiency enhancements to their surface water treatment plant (WTP) to increase capacity by 15 mgd for a rated WTP capacity of 60 mgd by 2009. SEWD's recent enhancements have increased capacity in their WTP from 45 mgd to 50 mgd.

Groundwater extraction capacity within the General Plan Boundary is conservatively sized for a certain level of redundancy to meet maximum day demands and fireflow requirements in the event that curtailments in surface water occur in dry and critical years. Prior to construction of the DWSP (first phase assumed to be operational in 2010/11), water demands will exceed available surface water treatment capacity necessitating the on-going use of groundwater facilities until the SEWD expansion and/or the DWSP is operational as a future water supply. But groundwater supplies may be utilized during this period without exceeding the sustainable yield of the underlying aquifer.

Figure 4. COSMA's Water Use By Water Retailer

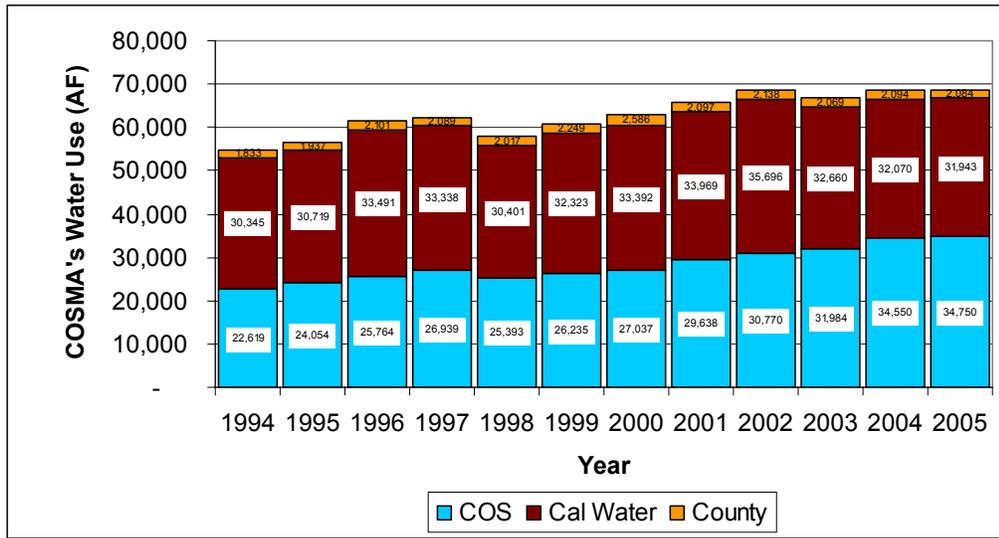
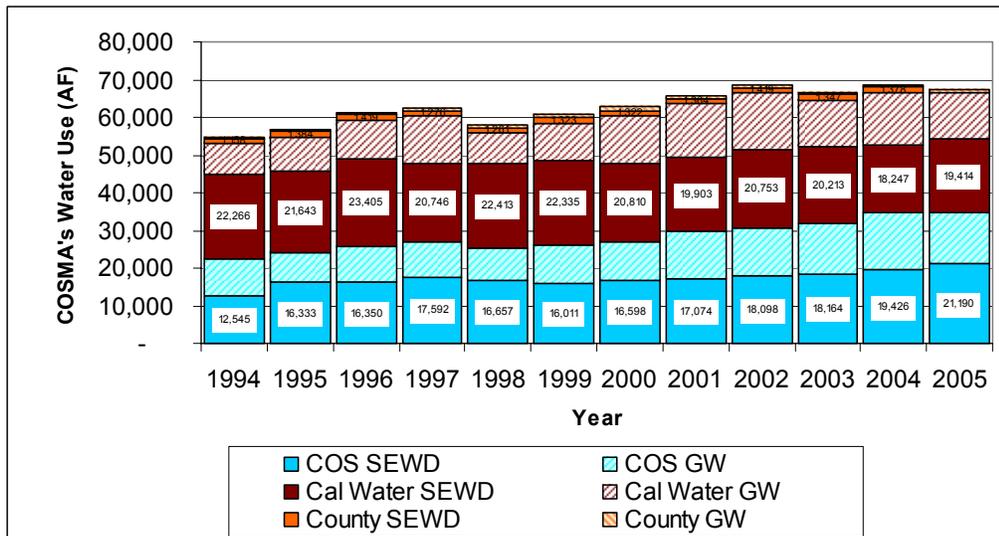


Figure 5. Use of SEWD and Groundwater Supplies by Water Retailer



2.4.2 Existing SEWD Surface Water Contract Entitlements

The COSMA currently receives surface water supplies (via SEWD) from five sources as shown in **Table 4** and **Figure 6**. Surface water supplies can come from many sources in the eastern Sierra Nevada foothills. Total existing “firm” supplies for municipal and industrial (M&I) uses are approximated to yield 104.17 TAF/year under wet and above average hydrologic conditions. Including interim supplies the COSMA currently has 134.17 TAF/year. Their full entitlements in wet years including interim and future supply sources could yield as much as 180 TAF/year. As required by the State Water Code, the WSA only considers existing “firm” surface water contracts or the 104.17 TAF/year.

Currently, SEWD’s ability to use their available water right amount is constrained by one or more of the following in any given year: 1) the hydrologic year type (i.e., dry year curtailment provisions in surface water contracts and reductions in surface water contracted from other agencies), 2) the COSMA M&I water demand, 3) the raw water delivery system to the SEWD WTP, 4) the rated SEWD WTP capacity, and 5) the treated water conveyance capacity from the WTP.

Further clarification on the nature of the Calaveras County Water District (CACWD) and SEWD water contracts came in response to questions posed in comments on the WSE that was contained in the draft EIR of the General Plan Update. A letter from CACWD noted that the WSE wrongly treated as “firm” for water supply planning purposes a certain 10,000 AF/year of New Hogan Reservoir water. (See CACWD comment letter to the City of Stockton on the draft EIR for the General Plan Update, dated, January 26, 2007.) The letter claimed, more specifically, that the WSE erroneously treated unused CACWD water contract entitlements as a firm source of water within the defined place of use as set forth in a Reclamation contract with SEWD and CACWD for New Hogan Reservoir. The CACWD comments also clarified the type of water right that was being addressed in the WSE and in previous water studies.

As the attached response letter from SEWD describes in some detail, COSMUD’s prior understanding of the water right entitlements of the CACWD was in error, as COSMUD believed there were two separate contracts: one with Reclamation, and the other a senior appropriative water right on the Calaveras River. COSMUD now understands that there is only one contract, that being the Reclamation contract, and that SEWD has full entitlements to its apportionment of same. The apportionment of the water under the Reclamation contract is based on SEWD getting 56.5 percent and CACWD getting 43.5 percent of the total 71,100 AF/year of Reclamation contract water (note: this water is not subject to CVP deficiencies in dry hydrologic years and the actual amount of water under the Reclamation contract provides 13,000 AF/yr of water to meet prior riparian rights for agriculture on top of the 71,100 AF/year). With CACWD’s comments, and the written clarification by both CACWD and SEWD regarding the contract and use of any

unused water entitlement, the definition and disposition of the CACWD and SEWD contracts and water entitlements has been revised from previous water studies.

The question of whether the COSMA can claim unused CACWD capacity as a firm water supply is addressed in the following quote from SEWD's response letter:

"There is no alternative use for the C[A]CWD New Hogan supply other than future development within the New Hogan Place of Use within C[A]CWD. The contract among the United States [Reclamation], SEWD and C[A]CWD expressly prohibits the use of New Hogan water outside of the boundaries of the two districts. Further, in Article 10 of the SEWD-C[A]CWD [contract], C[A]CWD expressly agreed that no water from the New Hogan Project shall be used by it or through it by a third party beyond the [Place of Use] boundaries."

Consequently, it is a viable conclusion that if projected growth within Calaveras County does not require its full water entitlements, any unused CACWD water entitlements are available to SEWD pursuant to the New Hogan agreements. For purposes of this WSA, the assumption is that only 10,000 AF/year will be available for transfer at build-out of the Calaveras County General Plan even though currently up to 24,000 AF/year is being used.

SEWD is also a Reclamation Central Valley Project (CVP) contractor and have a contract on the Stanislaus River (New Melones Reservoir). Contract documents, agreements, and applications for these surface water supplies are available for review in Exhibit "D". A full description of each contract is provided below.

2.4.2.1 Calaveras River Contracts

The Reclamation contract for water stored in New Hogan Reservoir is a repayment contract that provides a firm supply of water in all hydrologic year types. The amount available for M&I is approximately 40.171 TAF/year. The reliability of the unused portion of the CACWD contract is also firm; however, as development continues in Calaveras County, less of the CACWD water will be available to SEWD and its customers. CACWD's unused allocation currently yields 24 TAF/year but will diminish over time to an amount approximating 10 TAF/year (i.e., the 10 TAF/year is believed to be consistent with the contract and with the best available information on growth in Calaveras County).

Table 4. Current SEWD Water Sources and Critical Year Availability

Source	Annual Contract Amount Thousand Acre-feet (TAF)	Projected "Critical Year" Annual Availability (AF/year)			
		Planning Year			
		2000	2010	2020	2035
Current and Future "Firm" Sources of Supply					
Reclamation – New Hogan Water Supplies, SEWD entitlement	Total Yield 84.1 TAF ¹ SEWD Entitled to M&I or Ag 40.171 TAF	20,000	12,000	12,000	12,000
Reclamation – New Hogan Water Supplies, CACWD unused entitlement ²	CACWD Entitled to 30,928 TAF and are currently using approximately 3 TAF with SEWD using slightly over 24.0 TAF of CACWD's unused portion. This amount is projected to decrease to 10 TAF at buildout of the General Plans of both Calaveras County and the City of Stockton	24,000	24,000	10,000	10,000
Reclamation – New Melones Interim Water Contract And Section 215 "Spill" Water	Total Contract 75 TAF (M&I) 40 TAF	Not Available in Dry Years			
SSJID Transfer – Stanislaus Water	(Interim M&I 15 TAF)	4,000	4,000	0	0
OID Transfer – Stanislaus River (includes contract renewal to 2025)	(Interim M&I 15 TAF)	4,000	4,000	4,000	0
Total	(Firm M&I 104.1 TAF initially to 94.1 TAF at build-out) (Approximate Max Future M&I 180 TAF)	48,000	30,000	26,000	22,000

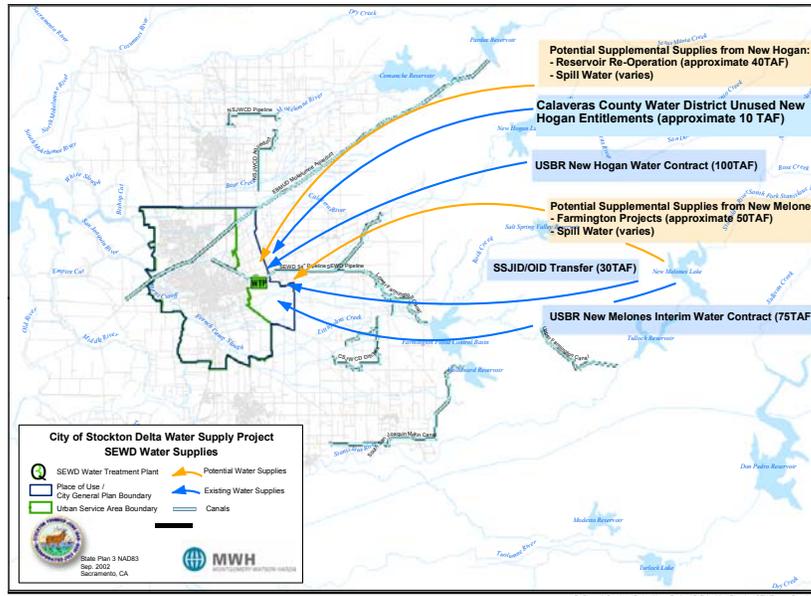
Notes

- SEWD has a right to 56.5 percent of the yield, and CACWD has rights to the remaining 43.5 percent. The estimated New Hogan yield of 84,100 ac-ft is further reduced by 13,000 ac-ft annually for prior riparian rights. CACWD currently uses approximately 3,500 ac-ft of its allocation.
- Based on an agreement between CACWD and SEWD, SEWD currently has use of the unused portion of CACWD's appropriate water rights, and this yielded approximately 28 TAF to SEWD in 2005 and is expected to be reduced to 23 TAF by 2025.

2.4.2.2 Stanislaus River Contracts

In 1983, SEWD contracted with the USBR for 75,000 AF/year of surface water supply from the New Melones Reservoir Project on the Stanislaus River to be

Figure 6. SEWD Existing, Future, and Potential Surface Water Right



delivered at Goodwin Dam. In 1987, SEWD agreed to provide a minimum of 20,000 acre feet of treated water per year to the COS Place of Use in accordance with the contract entitled, "Second Amended Contract Among the Stockton East Water District, The California Water Service Company, The City of Stockton, The Lincoln Village Maintenance District, and The Colonial Heights Maintenance District Providing For The Sale of Treated Water." This agreement provides for a method of apportionment of the surface water supplies based on the percent of total water demand from each of the retail water purveyors. Currently, approximately 47 percent of SEWD's treated surface water supplies go to Cal-Water with the remaining going to the COSMUD and County Maintenance District service areas.

In 1994, SEWD completed construction of the Farmington Canal Project, connecting Goodwin Dam to SEWD's WTP expanding its raw water capacity. This provided access to SEWD's New Melones CVP Project Supply. However, in the mid 1990's implementation of the Central Valley Project Improvement Act (CVPIA) (P.L. 102-575) and other regulatory actions substantially reduced the volumes of

water SEWD could expect to be delivered under its New Melones Project contract, especially in dry years. Given the pending litigation, conservative water supply assumptions from New Melones are assumed in this WSA. No water is assumed in critical years.

Also included on the Stanislaus River are two interim contracts one from OID and the other from SSJID. SEWD and the urban water retailers have arrangements for interim water transfers from OID and SSJID, which hold senior water rights on the Stanislaus River. The OID and SSJID are interim contracts that are both renewable. By contract, negotiations for renewal can take place as late as 2009. There is no guarantee that renewal will take place in both contracts. Based on discussions with both agencies to date, this WSA can reasonably anticipate that at least one of these two contracts will be renewed, particularly since OID, in their draft Water Resources Plan, has called for long term transfer agreements as a means to fund needed infrastructure improvements for OID's water delivery system. This WSA's assumptions are also reflected in the General Plan Update's WSE which is to have only one contract to 2025. The projected variability of supply available to SEWD under the OID/SSJID contract is shown in **Table 5**.

Table 5. Availability of Water Under the OID/SSJID Interim Water Contract

Percentage of Years	Volume Available Annually (AF/year)	
	Prior to 2009	After 2009
85%	30,000	15,000
9%	12,500	6,250
6%	8,000	4,000

2.4.2.3 Other Potential SEWD Surface Water Supplies not Included in WSA

Other water supplies are anticipated through future appropriative water right permits on the Calaveras and Stanislaus Rivers and Littlejohn's Creeks. None of these potential supplies are accounted for in this WSA. Other "potential" water supplies shown in **Figure 6** are also not accounted for as an existing or future supply in this WSA.

2.1.1 Existing Groundwater Supplies

The urban water retailers currently exercise (and will continue to exercise) their rights as overlying owners and groundwater appropriators to extract groundwater from the Eastern San Joaquin Sub-Basin underlying COSMA for delivery to its customers. Groundwater is an extremely important resource for COSMUD and can be managed for long term sustainability and use through conjunctive use with the surface water supplies described above.

Conjunctive use implies that groundwater will be preserved as the last source of supply that is used if surface water supplies are insufficient to meet water demands. In wet years, when surface water is more plentiful, the groundwater basin is allowed to recover through in-lieu recharge (i.e., allowing natural recharge to occur from streams and rivers by pumping at lower extraction amounts), and in the dry years, groundwater is extracted at higher amounts to meet the shortfall of surface water supplies in meeting M&I water demands. The result is that groundwater levels are managed at or near current levels. This WSA recognizes the need to protect the groundwater resource that is already threatened by salinity intrusion, and to provide a plan to protect the groundwater resources indefinitely.

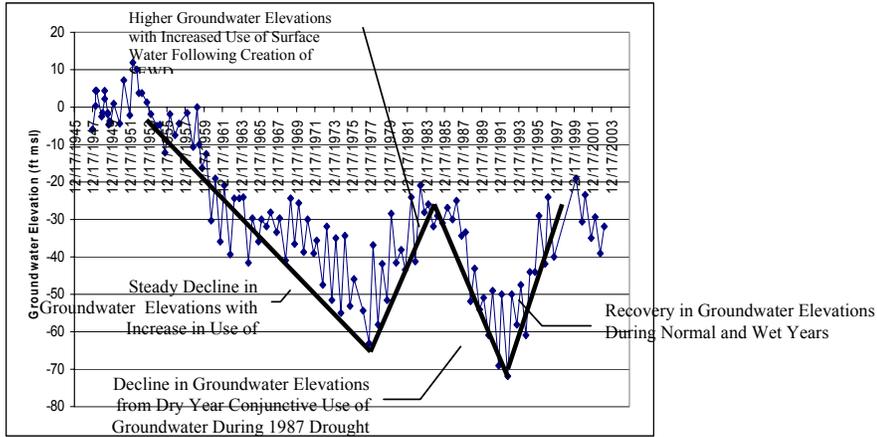
Groundwater use within the broader San Joaquin County region has resulted in a decline of groundwater elevations over the period from 1947 to 2004 as indicated by the three hydrographs shown in **Figure 7**. The figure illustrates groundwater elevations at wells located within and adjacent to the City (see **Figure 8** for well locations and recent groundwater elevations). The short duration fluctuations in **Figure 7** result from the seasonal wet and dry months and irrigation usage within each year. An overall decline in groundwater elevations from 1947 to 1978 is the result of agriculture and urban areas relying entirely on groundwater supplies.

In the late 1970's, SEWD began to provide supplemental supplies of surface water to the Stockton urban water retailers. The use of surface water in the COSMA resulted in an increase in groundwater elevations as shown in the hydrographs in **Figure 7**. Increases in the elevation continued until the drought of the late 1980's and early 1990s. The behavior of the groundwater basin during the drought and subsequent normal year hydrology of the late 1990's indicate that the basin is recovering and is stabilized and operating within a manageable range. The recent stabilization and improvement in groundwater elevations is the result of wet hydrology, active recharge projects, and increased surface water deliveries in areas historically served by groundwater. Stabilization infers that the amount of recharge is keeping up with the amount of extraction on a long term average basis.

Figure 7. Groundwater Elevation Hydrographs for Areas Near the City of Stockton

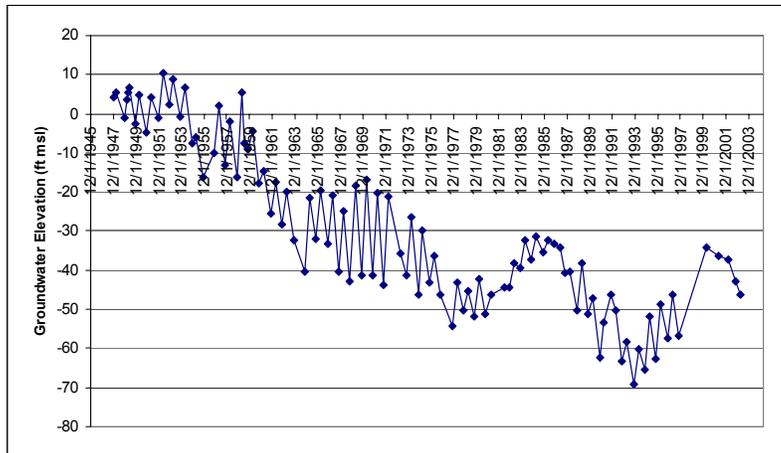
(see Figure 8 for Hydrograph locations)

a) Well 1 (State Well ID No. 02N06E26H001M) Hydrograph from 1947 to 2003



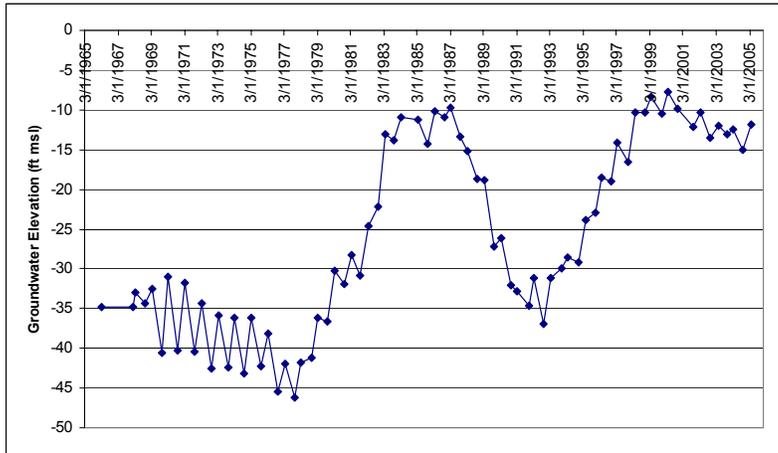
Data Source: State of California DWR State Well Monitoring Program as of November 18, 2005

b) Well 2 (State Well ID No. 02N07E15C001M) Hydrograph from 1947 to 2003



Data Source: State of California DWR State Well Monitoring Program as of November 18, 2005

c) Well 3 (State Well ID No. 01N06E03K001M) Hydrograph from 1947 to 2005



Data Source: State of California DWR State Well Monitoring Program as of November 18, 2005

Over the period from 1947 to present, the change in slope of the groundwater surface in western San Joaquin County has created a condition that has allowed saline water to migrate east-northeast into a portion of the COSMA, degrading water quality and rendering it unsuitable for municipal or agricultural use in some areas. Salinity intrusion is perhaps the most significant concern rendering well useless for potable drinking water and agricultural irrigation. Every measure to reduce the movement of the salinity front further east is being taken by decommissioning public and private wells and through strategic delivery of surface water to areas most impacted by salt water intrusion.

An important constraint on the sustainable yield of the groundwater basin is the change in the rate of movement of the salinity front. Sustainable yield is that rate at which groundwater can be withdrawn from the aquifer, while protecting the aquifer from overdraft and water quality degradation (such as from saltwater intrusion). Over the years, there have been various estimates of the sustainable long-term yield from the groundwater aquifer. The February 1992 Supplemental Report for Water Supply prepared for the COS Special Planning Area Study states:

“about 40,000 acres and an average withdrawal of 0.75 AF/acre/year.

...groundwater can provide from 0.75 to 1.0 AF/acre/year on a long term basis.”

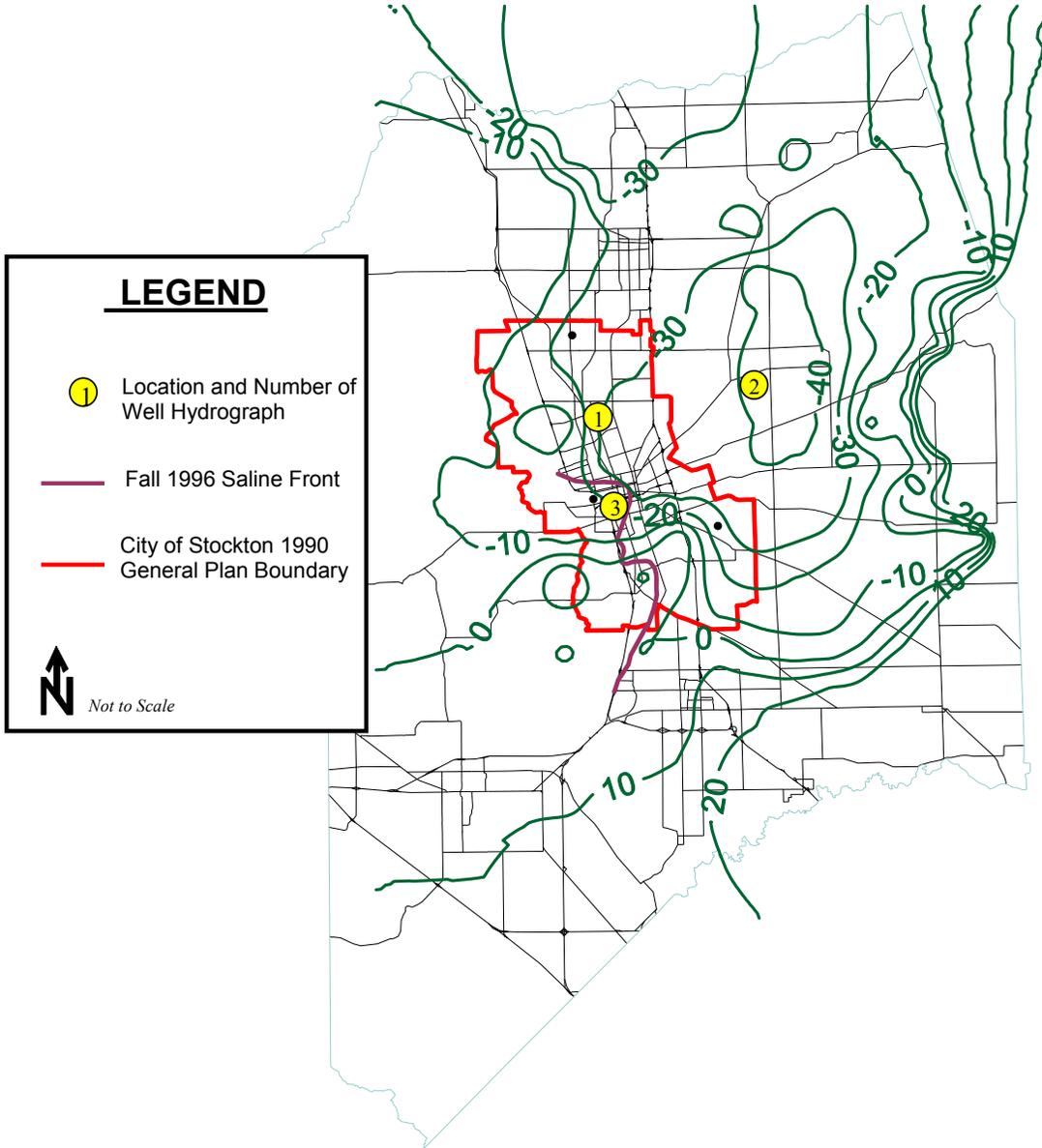
Likewise, the COS 1995 Urban Water Management Plan Update identifies long term (sustainable) firm yield as 1.0 AF/acre/year and the North Stockton Master Plan identifies 0.75 AF/acre/year as sustainable groundwater yield. Although sustainable yield of the groundwater aquifer is calculated at 0.75 to 1.0 AF/acre/year, this WSA conservatively employs a 0.60 AF/acre/year factor

Comment: The developer wants to know if this is true for the entire Eastern SJ Basin, or just COSMA

Comment: It has been a while but I believe that is was done for the Cosma but based on information from studies conducted County-wide. I am sure that I can dig it up in my office if needed.

Figure 8. COSMA Spring 2004 Groundwater Elevation Contours

(Data Source: California State Department of Water Resources)



for evaluating the long term average annual target extraction rate, and a 0.75 AF/acre/year factor for purposes of setting a maximum extraction rate in a single dry year and multi-dry years.

2.1.2 Section 10910(d)(2)(B)

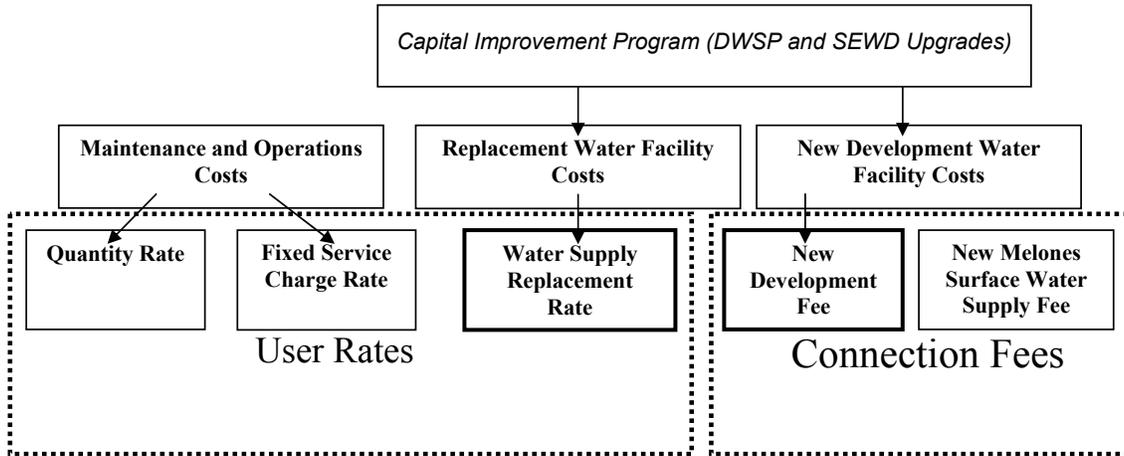
This subsection requires a copy of the capital outlay program for financing the delivery of water to the Project. Generally, the financial program for development of surface and groundwater supplies in the COSMA has been completed at a planning level with the DWSP Feasibility Report, and includes both existing and future capital outlays. Under this WSA, only the SEWD WTP efficiency upgrades and raw water conveyance upgrades are needed to meet the Project's water demands.

Currently, the three COSMA urban water retailers finance their respective capital costs for new and replacement facilities. Groundwater is provided by each water retailer to its respective service area. Surface water is purchased by COSMUD, Cal Water and the County from SEWD. User fees and connection fees pay for each purveyor's water facilities and for each urban contractor's portion of SEWD facilities, water supply and services.

Cal Water and COSMUD rates are similar with both at approximately \$29 per month based on two-thirds of an acre foot per year for a single family home. This analysis assumes that a uniform rate and connection fee are applied over the entire service area to provide for the needed capital improvements.

The current rate structure for COSMUD (see **Figure 9**) assumes that maintenance and operations costs are recovered from revenues generated from quantity and fixed service charge rates. Since replacement water (i.e., water and infrastructure purchased by existing rate payers that require replacement as a result of regulatory reductions in the amount of available water such as the New Melones Project) supplies benefit existing customers, an additional fixed water supply replacement rate component is added to pay for facilities needed to replace lost supplies. Since new growth customers will also be paying this component, they will share in the replacement water supply costs. Costs of capacity constructed for new development is borne entirely by new growth through a development fee. Given the fragile balance in water supplies and the dependency of one supply on the other (i.e., surface water and groundwater) there is no distinction in geographic area on which areas benefit from which supply sources.

Figure 9. Conceptual Rate Design of Water Retailers (COSMUD Model)



2.1.3 Section 10910(d)(2)(C)

This subsection requires identification of any federal, state, and local permits required for construction of any infrastructure associated with delivering water to the Project.

Any new wells for the GP Update will be added to each of the water purveyor’s California Department of Health Services (DHS) permit to serve potable water supplies. The design of those facilities will require coordination with DHS. Expansion of SEWD WTP capacity will also be done in accordance with DHS requirements. Large SEWD WTP efficiency enhancements may require local permitting and possible CEQA action depending on the extent of new construction. No other regulatory approvals are anticipated for meeting existing demands.

2.1.4 Section 10910(d)(2)(D)

This subsection requires identification of any regulatory approvals required for delivery of the water supply to the project.

The groundwater and surface water facilities to serve the Project will be added to the DHS permit to serve potable water supplies within the COSMUD service area. The design of those facilities will require coordination with DHS. No other regulatory approvals are anticipated.

2.4.3 Section 10910(e)

This section states:

“If no water has been received in prior years by the public water system, ..., under the existing water supply entitlements, water rights, or water service contracts [identified to serve the proposed project], the public water system, ... , shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, ... , has identified as a source of water supply within its water supply assessments.”

The intent of this section is to identify any potential conflicts that may arise from the exercise of an existing water supply entitlement, water right, or water service contract to serve a proposed project if such water supply entitlement, water right, or water service contract has not been previously exercised.

Use of Groundwater:

The water demands of the COSMA will be met in part with groundwater. The COSMA urban water retail purveyors have previously exercised their rights as overlying groundwater appropriators to serve the water demands of their customers and will continue to exercise those rights to provide potable water supplies.

Use of Surface Water:

The surface water supplies associated with the conjunctive use program fall into three categories: 1) water supplies derived from the CVP, 2) interim water supply contracts, 3) surplus supplies available on an intermittent basis. Intermittent supplies may be used, if available, but are not considered “firm” and not used in the WSA.

The parties that could most directly be affected by exercise of these water rights are CVP contractors, State Water Project (SWP) contractors, water rights holders subject to Term 91 conditions, and riparian diverters downstream of the points of diversion for each contract.

2.4.4 Section 10910(f)

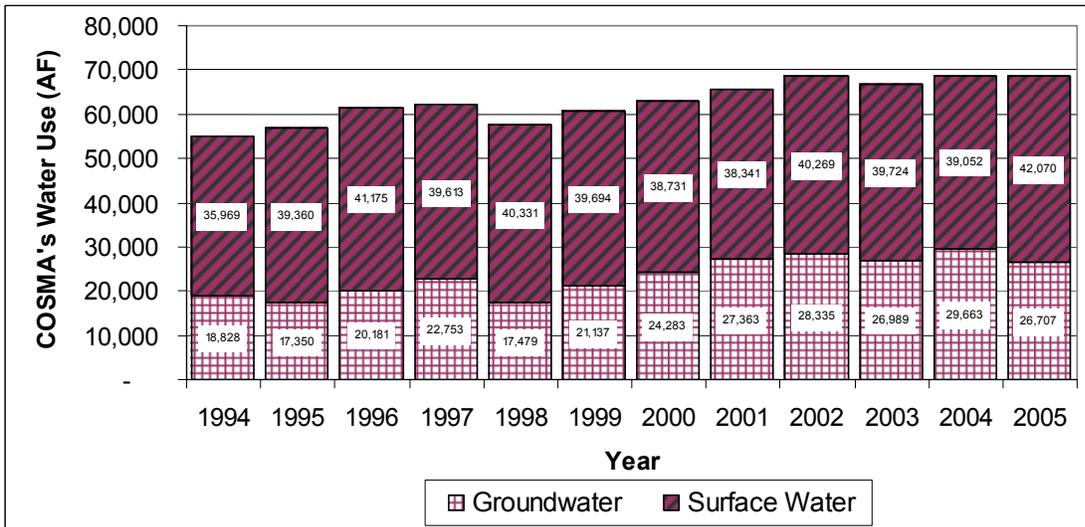
The water demands of the project will be met partially with groundwater. Consequently, Section 10910(f) requires specific additional information.

2.1.5 Section 10910(f)(1)

Section 10910(f)(1) requires a review of groundwater data contained in the UWMP.

The December 2005 UWMP does identify past volumes of groundwater extracted by the COSMA urban water retailers. A graph of historical surface water and groundwater supplies from 1994 to 2005 is provided in **Figure 10**. This same method of water delivery is assumed to occur into the future as demands increase. The limitation in the SEWD infrastructure requires additional groundwater supplies for meeting peak month and day water demands including the Project.

Figure 10. COSMA Historical Groundwater and Surface Water Supplies (1994 to 2005)



Reference: City of Stockton Urban Water Management Plan 2005, December 2005 and COSMUD Staff

2.1.6 Section 10910(f)(2)

Section 10910(f)(2) requires a description of the groundwater basin and the efforts being taken to prevent long-term overdraft.

The groundwater basin underlying San Joaquin County is part of the contiguous Central Valley aquifer system, which supplies groundwater to agricultural, domestic, and industrial water users from Redding to Bakersfield. The basin consists of Pre-Tertiary igneous and metamorphic rocks of the Sierra Nevada that continue west beneath the valley floor. Marine sediments, thousands of feet thick, overlie the basement rocks. Continental deposits overlie the marine rocks and act as the primary freshwater aquifer in the study area. In local areas, fresh water may

be present in both marine and continental deposits, and saline water may be found in continental deposits.

DWR Bulletin 118 and 146 identifies the usable aquifer in the eastern portion of San Joaquin County as the continental deposits of Miocene and younger age. The usable aquifer is present within the boundaries of the county in distinct geologic formations that include the Mehrten Formation, the Laguna Formation, the Victor Formation, flood basin deposits, and alluvial fan and stream channel deposits. The thickness of the usable aquifer ranges from less than 100 feet in the eastern edge of the county to over 3,000 feet in the southwestern edge, and is approximately 1000 feet beneath Stockton.

Groundwater in the San Joaquin County area moves from sources of recharge to areas of discharge. Most recharge to the aquifer system occurs from the Delta and along active stream channels where extensive sand and gravel deposits exist. Consequently, the highest groundwater elevations typically occur near the Delta, the Stanislaus River, and the San Joaquin River. Other sources of recharge within the project area include subsurface recharge from fractured geologic formations to the east, as well as deep percolation from applied surface water and precipitation.

Municipal and agricultural uses of groundwater within San Joaquin County contribute to an overall average yield of groundwater estimated to be 867,000 AF/year. Historically, groundwater elevations have declined from 40 to 60 feet. As a result, a regional cone of depression has formed in Eastern San Joaquin County creating a gradient that allows saline water underlying the Delta region to migrate northeast within the southern portions of the City. Groundwater underlying the City generally flows to the east due to the regional cone of depression. Reducing the hydraulic gradient in the vicinity of the salinity front is a specific groundwater management goal.

In the past, the groundwater basin underlying San Joaquin County has been classified by DWR as being in overdraft, especially in the northeastern portion of the County. The COSMA, however, has been instrumental through its voluntary participation in funding the existing conjunctive use program for the portion of the basin underlying the COSMA that groundwater elevations have stabilized and no significant declines have been recorded since the late 1980's.

In addition to its historical contributions, the COSMA's long-term plan for preventing overdraft of the groundwater basin are embedded in the objectives of the proposed future DWSP to insure systematic, incremental implementation of the on-going conjunctive use program to provide a benefit to the groundwater basin. This benefit extends beyond the political boundaries of the COS. As agricultural lands irrigated by groundwater are fallowed or converted to urban uses, groundwater use is expected to decrease significantly. Another, more costly, recourse to agricultural groundwater pumping is to supply untreated surface water to these lands. SEWD would likely be the water supplier with costs paid

through assessment or by other funding mechanisms. To date, this enforcement type action has not been required in part due to the urbanized areas of the County working towards bringing more surface water into growing areas.

2.1.7 Section 10910(f)(3)

Section 10910(f)(3) requires a description of the volume and geographic distribution of groundwater extractions from the basin for the last five years (See **Figure 10**).

Data for municipal and industrial groundwater usage have been collected and are shown in **Figure 10**. The distribution of groundwater pumping is shown in **Figure 11** where existing well locations are shown. Historical groundwater demands and location of agriculture and private wells have not precisely been identified, measured, and collated; rather, a regional groundwater model of the entire San Joaquin County area was constructed in the early 1990's to evaluate the effects of cumulative groundwater extractions in the San Joaquin County area and surrounding regions that are affected by or affect groundwater elevations in the San Joaquin County area. This groundwater and surface water model estimated through land use and crop types the consumptive use of water that is extracted from groundwater and diverted from surface water supplies. This Integrated Surface Water Groundwater Model (IGSM) was used in the WSE for the General Plan Update to evaluate the cumulative impacts of groundwater extractions from the new growth areas, using the self-imposed groundwater management goals, and the private and agricultural groundwater extractions that have been taking place over the past 20 years. Boundary conditions for the San Joaquin IGSM are either the Sierra Nevada foothills to the east, a similar IGSM model for Sacramento County and Stanislaus County to the north and south, respectively, or from the State's Central Valley IGSM along the western boundary. For any boundary not represented by a high resolution IGSM in the aforementioned county IGSMs, the Central Valley IGSM was used.

As explained later in **Section 3.5.1** on **Page 50**, use of the model was limited to evaluating the effects of removing agricultural extractions from inside the General Plan Update region and replacing this extracting with an amount that does not impact the salinity front or reduce groundwater elevations by more than 2 feet from the without any extraction scenario (i.e., this is very conservative given that agricultural pumping can be as high as 4.0 AF/acre/year and the recommended urban pumping can be as high as 0.87 AF/acre/year. The 0.27 AF/acre/year long term average above the 0.60 AF/acre/year goal is considered to be an agricultural credit in the WSE; likewise the 0.12 AF/acre/year difference with the 0.75 AF/acre/year not-to-exceed extraction in any given critical year or consecutive dry years is considered to be an agricultural credit in the WSE).

Deleted: 49

2.1.8 Section 10910(f)(4)

Section 10910(f)(4) requires a description of the projected volume and geographic distribution of groundwater extractions from the basin. For the existing supplies, this is presented in Section **10910(d)(1)** above and volume and location of groundwater wells are represented in **Figure 10** and **Figure 11**, respectively.

2.4.5 Section 10910(f)(5)

Section 10910(f)(5) requires an analysis of the sufficiency of the groundwater basin to meet the demands associated with the project.

This is presented in Section 10910(d)(1) above and starting on **Page 19** under the heading of "Existing Groundwater Supplies".

2.5 City's On-going Conjunctive Management Program

This section describes how the water supply sources in the COSMA are currently being operated in conjunction with each other to meet its demands. This analysis includes modeling a complete conjunctive management program using all of the existing COSMA water supplies described in the above sections and applying those supplies against existing and reasonably foreseeable water demands plus the Project water demands. For purposes of this WSA, reasonably foreseeable is defined as existing water demands plus all new development demands that have either been approved or have a completed WSA on file (see below). The Project is also included to evaluate if existing supplies can meet the additional Project demand assuming that all other water demands are either existing or have a WSA showing sufficiency of water supplies.

Other (proposed) projects for which WSA's have been prepared together with the proposed project are summarized in **Table 6** include:

Cannery Park: 450-acre located southwest of the Eight Mile Road and Highway 99 interchange.

Paradise (a.k.a. Westlake) Villages: 683 acres located west of Interstate 5 and immediately west of the Spanos Park West, south of Eight Mile Road, east of Bishop Cut and north of Disappointment Slough.

Origone Ranch: 394 acres located in the unincorporated area of San Joaquin County south of Eight Mile Road and east of West Road.

North Stockton Phase III: 237 acres located south of Eight Mile Road and Lower Sacramento Road on the east and the Union Pacific Railroad on the west.

Bear Creek West Specific Plan: 1,149 acres located south of Eight Mile Road, west of West Lane, east of Lower Sacramento Road, and north of Sutherland drive.

Bear Creek East: 318 acres located south of Eight Mile Road, east of West Lane, west of the Union Pacific Railroad, and north of the Bear Creek drainage corridor.

Weston Towne Center: 59.68 acres located north of French Camp Road, west of I-5 at the northwest quadrant of the I-5/French Camp Road interchange, and east of McDougald Boulevard and the existing Weston Ranch residential subdivision.

Tidewater Crossing Specific Plan: 895 acres located immediately south and southwest of the Stockton Metropolitan Airport. The Project bisects South Airport Way. The southwestern portion of the site abuts French Camp Road.

Spanos Business Park Master Plan Development: 219 acres surrounded by Eight Mile Road (north), Interstate 5 (east), approved Residential Component of Spanos Park West (west), and Pixley Slough/Bear creek (south)

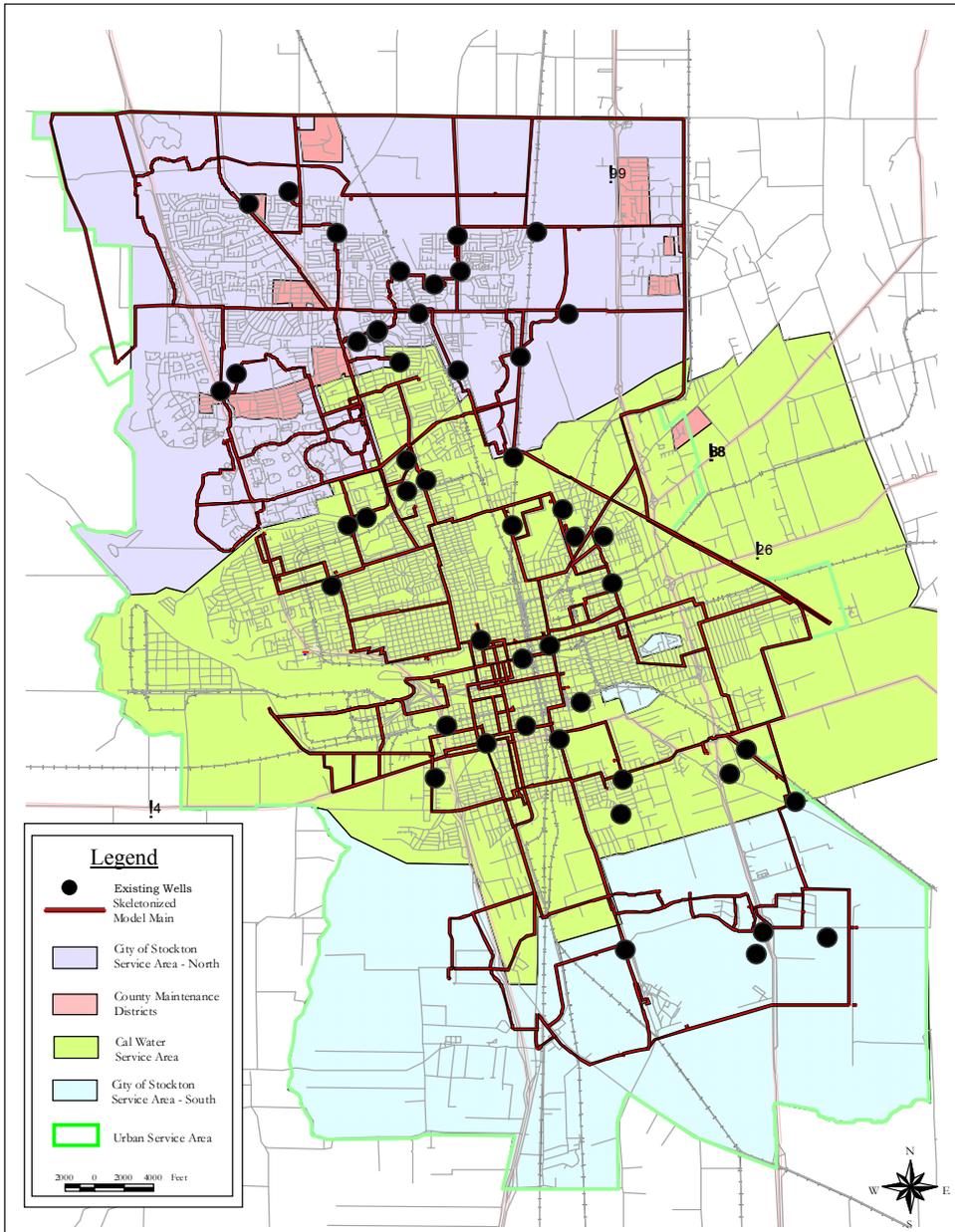
Sanctuary/Shima Tract Specific Plan: 1967 acres located South of I-5, South of Spanos West and north of Lincoln Village West.

Mariposa Lakes Specific Plan Specific Plan: 3810 acres located south of State Route 4 and west of Kaiser Road. This project is located in the unincorporated area of San Joaquin County within the City of Stockton Sphere of Influence but outside the Urban Service Boundary of the 1990 City of Stockton General Plan.

Atlas Tract Specific Plan: 360 acres located south of Eight Mile Road, west of Interstate 5. This Project is a mixed use project proposed for development in the northwest corner of the City of Stockton.

The total existing, foreseeable, and Project water demand is calculated to be **90,949 AF/year** as shown in **Table 6**. The subsequent analysis addresses the question of whether existing supplies can meet water demands over the next 20+ years. Especially, it addresses the concern if groundwater can sustain the projected water demands if curtailments in surface water occur in the dry and critical years. It is also recognized that existing, foreseeable, plus Project water demands place the COS beyond the current General Plan and into the growth regime, for purposes of this WSA, based on the General Plan Update.

Figure 11. Existing COSMA Well Locations



Under existing conditions, groundwater extractions are targeted to not go above the long-term operational yield of the basin (0.75 acre-ft/acre/year) in any one year and not go above 0.60 acre-ft/acre/year over a long term average. For this analysis, it is assumed that SEWD will maintain its existing 50 mgd surface WTP until 2016 when it is assumed that SEWD WTP capacity is expanded to 60 mgd (note: this expansion may occur sooner, but there is no study or report to verify this assumption; therefore, a conservative assumption is applied).

For modeling purposes, CEQA environmental documentation will be needed for the SEWD WTP efficiency and upgrade work; however, it will most likely result in a negative declaration or a mitigated negative declaration due to all activities likely taking place within the existing WTP site. The financing of these improvements will be coordinated in a similar manner as the initial and on-going construction of SEWD capital facilities through state and federal grants, and contributions by COS rate payers. Under Section 10910 of the State Water Code, SEWD supplies and other groundwater facility supplies will be delivered to the COSMA to meet the maximum day municipal water demands from existing growth, the Project, and foreseeable development as listed in **Table 6**.

The operation of the conjunctive use spreadsheet model assumes that water demand is met first by SEWD and lastly by groundwater. Additional enhancements to the design and operations of the SEWD WTP are assumed to minimize the impact of scheduled maintenance, and account for the impact of higher turbidity in the raw water supply especially in the wet months of the wet years.

Groundwater extraction capacity within the existing service area boundary is conservatively sized for a certain level of redundancy for service in critical years, to meet maximum day demands, and to meet fireflow requirements. In the event that surface water is curtailed by contract, especially in dry and critical years, groundwater becomes a significant portion of the urban water retailers' water supply. Under these conditions water demands will exceed available surface water treatment capacity necessitating the on-going use of groundwater facilities within the urban retailers' service areas until the SEWD expansion is operational.

The timing and amount of water assumed available from each SEWD source is based on conservative estimates of the reliable yield of each source and the probability of the various contracts being renewed (See **Figure 12** for the 35 year projection of average surface water supplies and their sources).

Table 6. Water Demand and Groundwater Yield Considered in WSA

	Development	Acreage	Water Demand Factor (Note 1)	Total Water Demand	Groundwater Yield (AF/ac/year)	Groundwater Supply (AF/year)
Existing	Existing Development	46,300	n.a.	68,810	0.6	27,780
Approved	Approved Growth	1,613	1.6	2,581	0.6	967.8
Proposed Projects	Cannery Park	450	1.6	720	0.6	270
	Paradise Village 683	683	1.6	1,093	0.6	409.8
	Origone 394	394	1.6	630	0.6	236.4
	North Stockton Phase 3	237	1.6	379	0.6	142.2
	Bear Creek West Specific Plan	1,149	1.6	1,838	0.6	689.4
	Bear Creek East Specific Plan	318	1.6	509	0.6	190.8
	Weston Towne Center	60	1.6	96	0.6	36
	Tidewater Crossing	895	1.6	1,432	0.6	537
	Spanos Business Park	219	1.6	350	0.6	131.4
	Sanctuary/Shima Tract	1,967	1.6	3,147	0.6	1180.2
	Mariposa Lakes	3,800	2.16	8,208	0.6	2280
	Atlas Tract	360	2.44	878	0.6	216
	Crystal Bay	173	1.6	277	0.6	103.8
Subtotal for Approved and Proposed Projects		12,318		22,139		7,391
Total COSMA		58,618		90,949		35,171

Notes: 1. The Water Demand Factor is approximated for some projects because the build-out period for some projects extend include years prior to 2015 at the 1.6 factor, and years after 2015 at the 2.44 factor. For this reason, the total water demand in this table may differ slightly from other tables in the WSA where an actual calculation is made to determine the appropriate water demand.

As shown **Figure 12** the SSJID contract ends in 2009 and the OID transfer contract is assumed to expire in 2025 and not be renewed. Once all of the OID/SSJID contract water is used, the New Hogan and then the New Melones CVP contracts are used. The New Hogan contract is assumed to be subject to CVP deficiencies which include shortages of up to 40 percent in critical years as

well as provisions that make the New Melones CVP contract water available only in the wet years.

A 70 year historic model of hydrology was used to determine the adequacy of the sum total of water supplies in any given year type. For instance, in dry years, surface water curtailments are considered, so groundwater and rationing are used to make up the difference. The objective is that over the 70 years, the groundwater use does not exceed the predefined sustainable yield of 0.75 AF/acre/year in any one year and 0.60 AF/acre/year over a long term average as described above (note: agricultural groundwater credits are not applied unless it becomes necessary after the construction of planned future water supplies).

Figure 13 shows the results at 2035 on how water demands are met from the above mentioned sources. This figure shows that, in even the driest historical hydrologic periods (say 1976 to 1978 or 1987 to 1992) there is sufficient water supply to meet existing water demands with 2035 surface water supply availability and use of groundwater.

Figure 14 reflects the average water demand and average use of groundwater and surface water based on 70 years of historical hydrology. **Figure 14** shows the build-up of water demand as the top line, the safe sustainable yield as the dashed line and the modeled average yield as the bottom line. From this figure, it shows that the groundwater yield approaches and exceeds the safe sustainable yield of **35,171 AF/year** based on the **0.60 AF/ac/year**.

2.6 Existing Water Supply Assessment

Given the reliability in surface water and the estimate of firm groundwater yield, the adequacy of water supplies can be evaluated for the existing condition. **Table 7** presents a comparison of normal, dry, and consecutive dry year supplies and demands based on a baseline year of 2004 for existing demands. Water supplies are based on existing “firm” surface water entitlements and their availability forecasted to 2035.

The average water demand over 70 years of historic hydrology at 2035 conditions is **87,806 AF/year**. This is less than the water demand shown in **Table 6** because of water conservation. In dry years, slightly more groundwater is available to replace deficiencies in surface water as part of the existing conjunctive use program. The sustainable yield of groundwater is based on the amount of urban developed acreage of **58,618** acres of existing and foreseeable acreage shown in **Table 6**. This results in a maximum long-term average groundwater extraction rate of **35,171 AF/year** based on the 0.60 AF/ac/year factor and a not-to-exceed in any given year extraction rate of **43,964 AF/year** based on the 0.75 AF/acre/year.

Table 7 indicates that, over the 70-year period, average water supplies in 2035 meet existing water demands but exceed the sustainable groundwater yield by **6,889 AF/Year** (42,060-35,171) creating the need for water based on the demand

of the new Project and foreseeable projects. **Figure 15** shows a strong departure from the not-to-exceed goal of 0.75 AF/acre/year with the maximum groundwater extraction in the critical year being **57,557 AF/year** or a difference of **13,593 AF/year** (57,557-43,964).

Figure 12. Projected Average Surface Water Contract Use from 2000 to 2025 Based on Existing Supplies and Water Demands

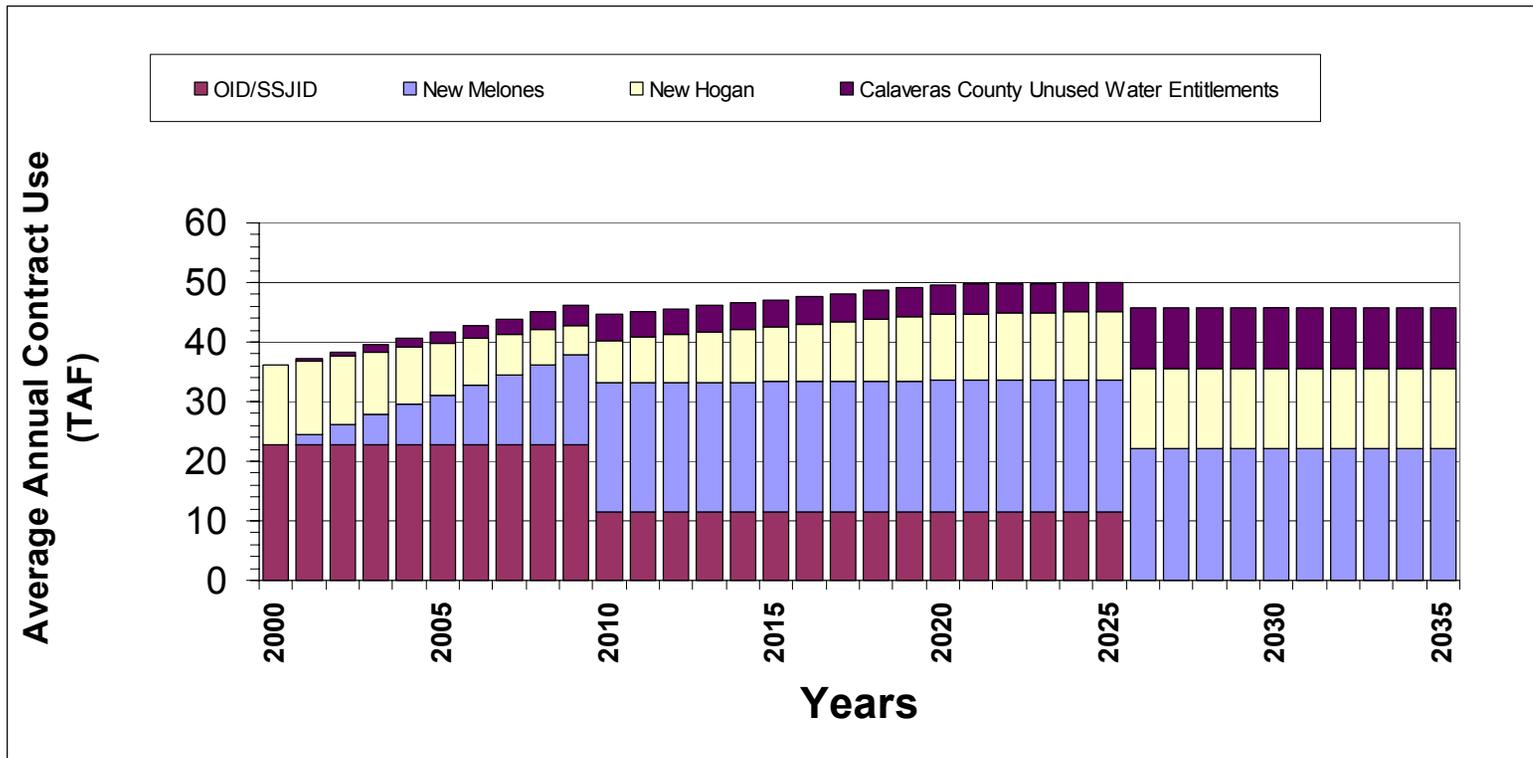


Figure 13. 70-year Historic Hydrologic Period Using Existing and Foreseeable Water Demands and Existing Water Supply Conditions

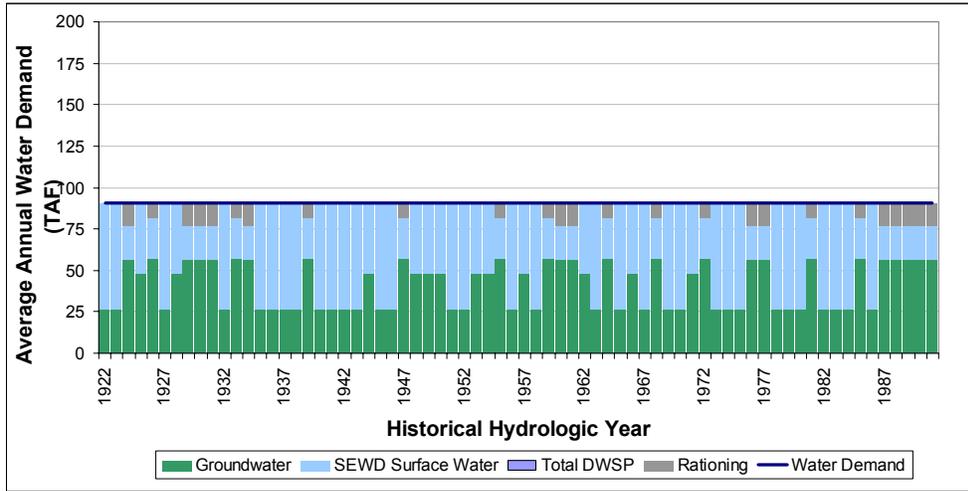
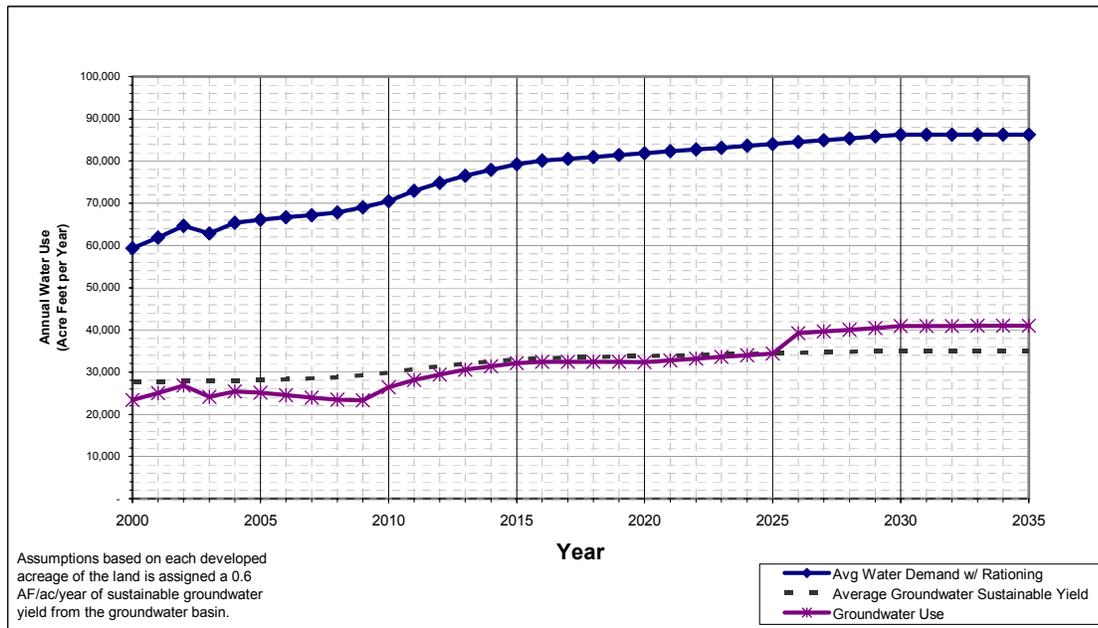


Figure 14. Average Groundwater Use vs. Existing Demand From 2000 to 2035 Using 0.60 AF/ac/year Groundwater Sustainable Yield



**Figure 15. Maximum Groundwater Use vs. Existing Demand From 2000 to 2035
 Using 0.75 AF/ac/year Groundwater Sustainable Yield**

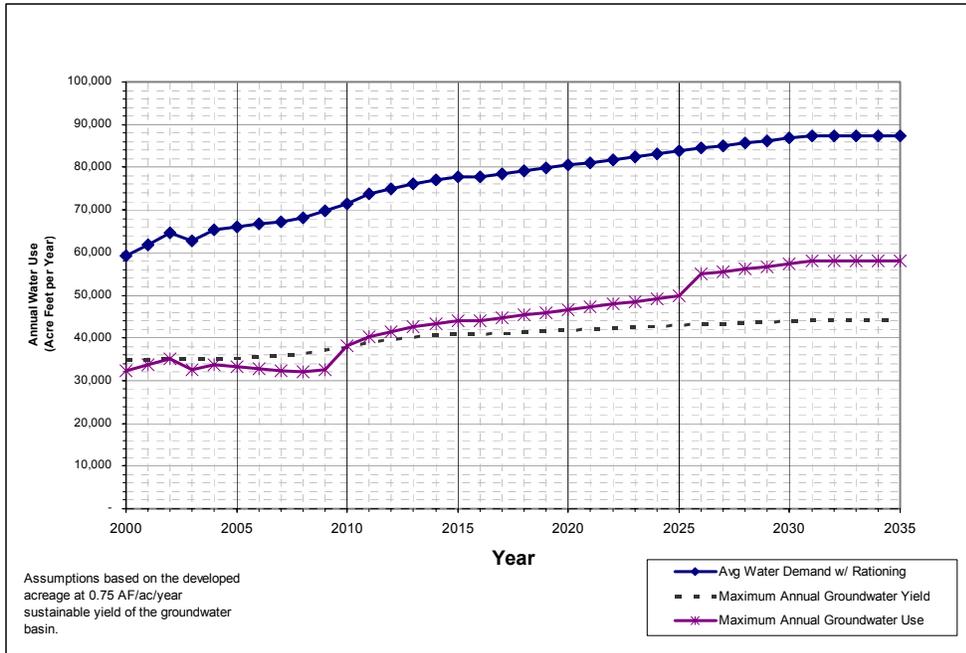


Table 7. Existing (2004) and Foreseeable Water Supplies and Demands for the COSMA by Retail Service Provider

Comment: Segregate to show 2004 and then foreseeable. Define foreseeable

Year Type		Demand Reduction	Existing (2004) (See Note 1)			Foreseeable (See Note 4, 5)			Total Existing (2004) and Foreseeable			Existing (2004) and Foreseeable Demands (AF/year)
			Surface Water	Groundwater	Total	Surface Water	Groundwater	Total	Surface Water	Groundwater	Total	
			(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	
Normal (See Note 3)	COSMUD	0%	19,426	15,124	34,550	25,495	(2,198)	23,298	44,922	12,926	57,848	57,848
	Cal-Water		18,247	13,823	32,070	-	-	-	18,247	13,823	32,070	32,070
	County		1,378	716	2,094	-	-	-	1,378	716	2,094	2,094
	Total		39,052	29,663	68,715	25,495	(2,198)	23,298	64,547	27,465	92,012	92,012
Single Dry (See Note 4)	COSMUD	15%	16,512	12,855	29,368	(12,540)	32,343	19,803	3,972	45,199	49,171	49,171
	Cal-Water		15,510	11,749	27,260	-	-	-	15,510	11,749	27,260	27,260
	County		1,171	609	1,780	-	-	-	1,171	609	1,780	1,780
	Total		33,194	25,213	58,407	(12,540)	32,343	19,803	20,654	57,557	78,210	78,210
Multiple Dry (Hypothetical 3-year Drought Period into the Future (looking at both the 1977 to 1980 Drought Sequence and 1987 to 1990 Drought Sequence))	COSMUD	0% (1 st Year)	19,426	15,124	34,550	25,495	(2,198)	23,298	44,922	12,926	57,848	57,848
	Cal-Water		18,247	13,823	32,070	-	-	-	18,247	13,823	32,070	32,070
	County		1,378	716	2,094	-	-	-	1,378	716	2,094	2,094
	Total		39,052	29,663	68,715	25,495	(2,198)	23,298	64,547	27,465	92,012	92,012
	COSMUD	10% (2 nd Year)	17,484	13,612	31,095	(14,493)	30,860	16,367	2,991	44,472	47,463	47,463
	Cal-Water		16,423	12,441	28,863	-	-	-	16,423	12,441	28,863	28,863
	County		1,240	644	1,885	-	-	-	1,240	644	1,885	1,885
	Total		35,146	26,697	61,843	(14,493)	30,860	16,367	20,654	57,557	78,210	78,210
	COSMUD	10% (3 rd Year)	17,484	13,612	31,095	(14,493)	30,860	16,367	2,991	44,472	47,463	47,463
	Cal-Water		16,423	12,441	28,863	-	-	-	16,423	12,441	28,863	28,863
	County		1,240	644	1,885	-	-	-	1,240	644	1,885	1,885
	Total		35,146	26,697	61,843	(14,493)	30,860	16,367	20,654	57,557	78,210	78,210
Average over 70-Years	COSMUD	5%	19,426	15,124	34,550	6,695	12,397	19,092	26,121	27,521	53,642	53,642
	Cal-Water		18,247	13,823	32,070	-	-	-	18,247	13,823	32,070	32,070
	County		1,378	716	2,094	-	-	-	1,378	716	2,094	2,094
	Total		39,052	29,663	68,715	6,695	12,397	19,092	45,746	42,060	87,806	87,806

Reference: City of Stockton Urban Water Management Plan 2000 Update, December 2000

- Notes:
- 1.) Existing is actual 2004 calendar year usage of surface water and groundwater. The assumption is that 2004 depicts a normal year hydrologic and water supply availability condition.
 - 2.) Dry year surface water amounts assume SEWD's New Hogan Central Valley Project water with deficiencies, and Oakdale Irrigation District and South San Joaquin Irrigation District deficiencies as stipulated in the contract for these water supplies.
 - 3.) Normal year surface water deliveries are restricted to the projected availability of SEWD conveyance and treatment plant capacity (not to exceed 60 mgd).
 - 4.) Foreseeable includes all projects that have been approved or have a WSA as of the date of this WSA.
 - 5.) Negative values imply a decrease in the amount of surface water or groundwater based on the use of both supplies in 2004.

3. IF EXISTING WATER SUPPLIES ARE INSUFFICIENT TO MEET PROJECT DEMANDS [SECTION 10911(A)]

3.1 Section 10911(a)

Sufficiency of supply as per Section 10910 of the State Water Code was not met by the analysis in Section 2 above. Section 10911(a) of the State Water Code requires that if existing water supplies are insufficient as determined under Section 10910, the public water system shall provide to the city or county its plans for acquiring additional water supplies. In describing the plans, Section 10911(a) states

“...the public water system shall provide to the city or county its plans for acquiring additional water supplies setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water supply assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.

(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.

(b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

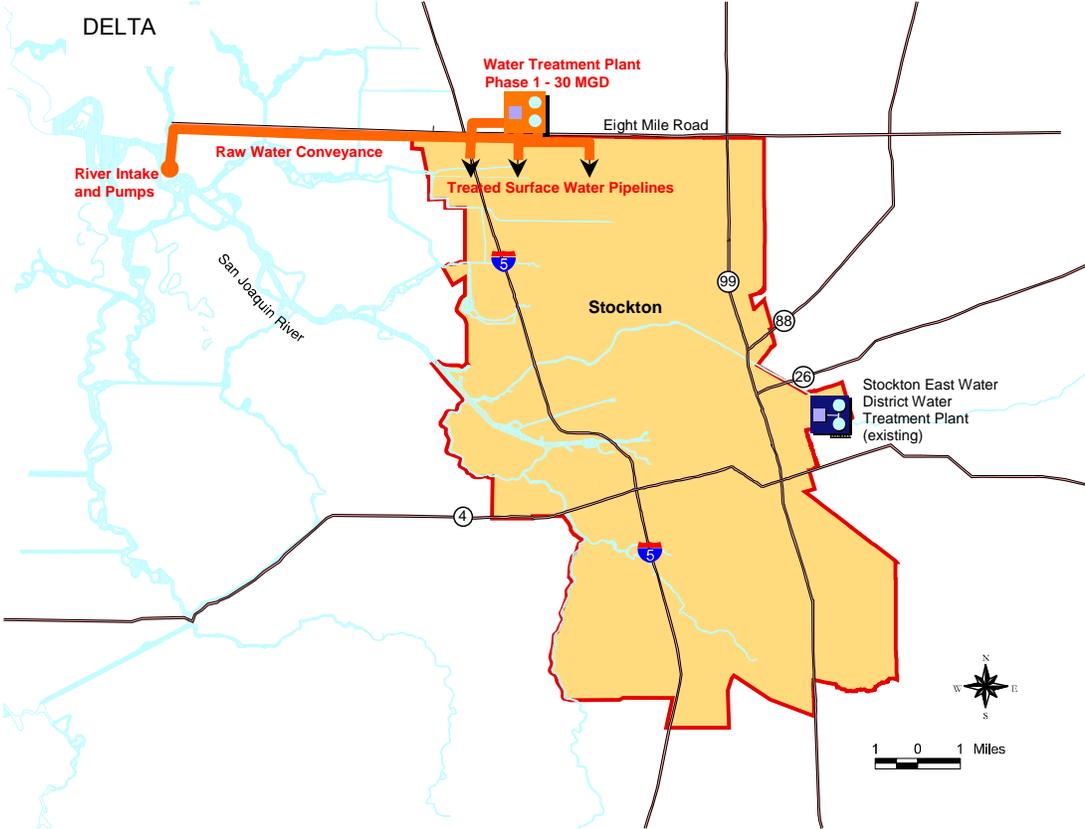
(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

3.2 Planned Implementation of the DWSP

Implementation of the DWSP will require a large diversion structure in the Delta and large raw and treated water conveyance facilities (surface water pipelines) to convey water to the DWSP WTP and then to the distribution systems of the urban water retailers and ultimately to the retail customer. The size and location of the large surface water pipelines are based on serving the area defined by the Urban Service Area of the 1990 General Plan and beyond in terms of water demand. The size and location of the DWSP surface water pipelines are based on the ability to use as much of the existing treated water conveyance capacity as possible.

Figure 16 depicts the approximate location of the preferred DWSP site with the pipelines needed for the first 30 mgd phase and the existing location of the SEWD WTP. In order to achieve the required level of service, additional connections between the Cal Water and COSMUD north and south water systems will be made to move surface water from both SEWD and the DWSP WTPs among the three retail service areas.

Figure 16. COSMA DWSP and SEWD WTPs



Because portions of the COSMA fall within the legally-defined Delta and the area of origin, the City has rights to Delta water. To access water for the DWSP, the City has filed an application for the appropriation of surplus water in the Delta, plus water the City is entitled to pursuant to Water Code Sections 1485 and 11460-11465.

3.2.1 Necessary DWSP Water Right Permits

Section 1485 Water Rights

California Water Code Section 1485 can be summarized as follows: any municipality disposing of treated wastewater into the San Joaquin River may seek a water right to divert a like amount of water, less losses, from the river or Delta downstream of the point of wastewater discharge.

Water losses associated with these discharges once they enter the river system can result from seepage, evaporation, or transpiration between the Regional Wastewater Control Facility and the diversion. The San Joaquin River (River) and associated Delta channels are in balance with the connected groundwater systems, therefore, seepage losses can be estimated at zero. Also, the incremental flow added at the Regional Wastewater Control Facility has no measurable effect on the top width of the River; therefore evaporation from the River surface is not increased. Similarly, transpiration is not measurably affected by the incremental flow since the top width of the water surface is not increased. Therefore, it is assumed that the volume of water loss between the wastewater plant and any diversion point downstream is negligible.

Area of Origin Water Rights

The California Water Code contains a number of sections addressing certain benefits and obligations of areas in which water originates. The "Area of Origin" provisions have not yet been thoroughly interpreted by the courts, so their operation and effect remain unclear.

For purposes of planning for a Delta surface supply, it is assumed that the ability to divert water under the California Water Code Sections 11460 et seq. may be limited by conditions similar to those contained in Water Right Standard Permit Term 91. California Water Code Section 11460 et seq. allows a water user within a watershed or other area of origin to appropriate water that otherwise would be exported and receive water rights senior to the federal Central Valley Project (CVP) and the State Water Project (SWP). Permits for the diversion of water from the Delta under the area of origin statute may be conditioned by the SWRCB to include standard permit Term 91 which prohibits diversions at times when the SWP and/or CVP are required to release stored water from their reservoirs in excess of export diversions, project carriage water, and project in-

basin deliveries³. Under these conditions, the City would be allowed to divert water only at times when Delta outflow is greater than regulatory minimum requirements, or when the CVP and/or SWP are exporting water that has no previously been stored in CVP-SWP reservoirs or imported to the basin by the CVP-SWP.

3.2.2 Financing of DWSP

The cost of the Phase 1 portion of the DWSP as is estimated to be **\$171** Million. This cost is apportioned based on benefits to existing customers and to new development. The financing of the project will be done through customer user rates, development fees, and federal and state grants as described in **Section 10910(d)(2)(B)** starting on **Page 24**.

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3.2.3 Regulatory Permitting for DWSP

Refer to section titled, "Current Water Supply Condition" on **Page 5** regarding the steps taken to date for implementing Phase 1 of the DWSP. Other regulatory approvals beyond the authorization of the water rights by the SWRCB, are the need for a Section 10 Clean Water Act permit from the Army Corps of Engineers, streambed alteration permit from the State Department of Fish and Game, and a DHS permit for including the DWSP in the COSMUD potable water system. The Army Corps of Engineers has been consulted on the Phase 1 project especially as it pertains to work in and around the levee and the Delta regions. COSMUD staff is working very closely with the Army Corps to obtain this permit by summer 2007.

3.3 Necessary SEWD Water Right Permits/Contracts

SEWD is pursuing its own appropriative water rights on the Calaveras River that will likely yield some wet and normal year water but no dry or critical year supply is expected. To date, there is no known contract water right amount since the appropriative water right is junior to many other water rights on the Calaveras River. The Water Right amount will only be known once the SWRCB issues the permit. So, for purposes of the WSA, up to 50 TAF/year is assumed in the wet and above normal hydrologic years, 15 TAF/year in below normal and dry years, and zero in critical year types. This is considered to be a conservative assumption and is reflected in **Table 4** on **Page 17**.

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Other supplies are anticipated through future appropriative water right permits on the Stanislaus and Littlejohn's Creeks. Both of these potential supplies are not accounted for in this WSA or reflected in **Table 4**. Other potential water supplies shown in **Figure 6** on **Page 18** are also not accounted for in this WSA.

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³ The application of Term 91 to diversions under the area of origin statute has not yet been finally concluded in the courts, so the operation and effect of Term 91 and how it impacts area of origin diversions remains unclear. This leaves a significant amount of uncertainty in appropriative water rights in dry year conditions and is therefore not used in critical years in this WSA.

3.4 Summary of Surface Water Utilization for the Project

The COSMA has and will continue to meet annual demands during differing hydrologic periods with surface water, groundwater, water conservation, and other potential water supplies such as non-potable supplies from local communities, raw surface water from local irrigation districts, and water from active groundwater storage projects. Currently, the COS is pursuing raw surface water transfer agreements with local irrigation districts and municipalities and possible use of tertiary treated recycled water from the City of Lodi for use as a non-potable source for irrigation of public landscape areas.

Potable surface water transfer supplies would be diverted for treatment at the SEWD WTP or the DWSP WTP. Water transfers would require mutually agreeable contract terms between the City and another entity transferring water and would require the approval of the SWRCB. Water purchases, treatment facilities and conveyance infrastructure would be funded locally through a combination of rates and fees. Timing of water transfers would coincide with water demands that outpace current supplies through SEWD or the City's water right.

Water Facility Phasing

An important element of the DWSP Feasibility Report was looking beyond the current General Plan to begin to understand how water entitlements will be granted or be diminished over time to meet growing water demands. The certified DWSP EIR referenced the work completed in the DWSP Feasibility Report and provided a firm definition of the DWSP Phase 1 project and defined the programmatic nature of the Phase 2 project and its timing being associated with the build-up of demand as a result of new development.

In the DWSP Feasibility Report, population was used to assume growth and water demand beyond 2015 (build-out of the current 1990 General Plan) and assumptions for water supply entitlements were made in order to forecast the ultimate size of the DWSP project and needed upgrades to the SEWD WTP over time. As a result of this report, a scheduled phasing of the DWSP project, SEWD WTP upgrades, and groundwater facilities was made as shown in **Table 9** below.

Table 8. Phasing of COSMA Water Supply Facilities Based on 1990 General Plan⁴

Phasing	Year	SEWD WTP (mgd)	DWSP Diversion and WTP (mgd) ⁵	Groundwater (mgd)
Immediate Phase	2003	45	0	65
	2009	50	0	83
1-Build-out of General Plan	2010	50	30	83
	2015	50	30	83
2-Interim Milestone	2016	60	30	83
	2020	60	60	90
	2030	60	90	110
3- Build-out of 1990 General Plan Boundary/ POU	2031	60	90	110
	2040	60	135	140
	2050	60	135	140

In the sizing of the different water facilities, the operation of the DWSP and SEWD surface WTPs is assumed to occur simultaneously, and, if water supply is available, the water demand is met first by SEWD and then by the DWSP. Additional enhancements to the design and operations of the SEWD and DWSP treatment plants are assumed to minimize the impact of scheduled maintenance, and account for the impact of higher turbidity in the raw water supply especially in the wet months of the wet years.

To protect larval delta smelt during April through June, when early life history stages of delta smelt and the eggs and larvae of other fish are likely to be in the project area, the potential of the fish screen and diversions to impact these life stages of fish would be reduced operationally (by reducing diversions and thus reducing approach velocities and diversion volume) or physically (by installing an aquatic filter barrier). Either of these options would also reduce the potential for juvenile fish of all sizes to be affected by the diversion and fish screen during the spring (April through June). For purposes of this WSA, curtailment in diversions is assumed to take place during the April through May period (i.e., no water is assumed to be diverted by the DWSP in April and May). Monitoring will be required from April through June to detect the presence of larval delta smelt in the vicinity of the project area and trigger the implementation of impact avoidance and minimization measures.

3.5 Summary of Groundwater Supplies

DWSP planning assumes a maximum long term operational yield objective of the basin underlying the Urban Services Area of the 1990 General Plan reflecting a conservative 0.60 AF/ac/year groundwater extraction rate. This is a 20 percent reduction in the amount of groundwater that the COSMA is currently using based on the 0.75 AF/ac/year extraction rate. The purpose of this reduction is to fulfill

⁴ SEWD efficiency improvements accelerated the increase in rated WTP capacity from 45 mgd in 2009 to 50 mgd.

⁵ DWSP Phases shown in this table are from the DWSP Feasibility Report. This WSA assumes that only Phase 1- 30 mgd will be needed to 2035.

the COS's objective of managing the underlying groundwater basin for the protection of groundwater resources indefinitely.

A deviation from the lower extraction rate can occur if lands within the General Plan Planning Area Boundary are converted from agricultural uses irrigated with groundwater to urban uses (this agricultural credit concept is not in effect until after 2010/11 when the DWSP becomes fully operational). To account for the prior groundwater pumping, an agricultural credit is assumed based on not exceeding a 0.87 AF/acre/year maximum. This is acknowledging that the aquifer was sustaining the agricultural use prior to urbanization and at a rate that was likely 2 or 3 times that of the self-imposed maximum of 0.87 AF/ac/year (i.e. a typical field crop may use up to 3.5 AF/acre/year). The determination of how the agricultural credit concept is summarized below and a detailed technical memorandum is available upon request from COSMUD.

Section 10910(f)(5) requires an analysis of the sufficiency of the groundwater basin to meet the demands associated with the project.

A portion of this discussion is presented in **Section 10910(d)(1)** above and starting on **Page 19**, under the heading of "Existing Groundwater Supplies". The other aspect of considering the sufficiency of groundwater is evaluating the groundwater basin as a whole for purposes of providing for existing growth, foreseeable growth (i.e., proposed and approved growth), the WSA Project growth and projected growth based on the 2035 General Plan Update.

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The general approach taken to determine the adequacy of groundwater from a basin-wide perspective, assuming all existing and future users of the groundwater basin to 2035, is based on using the IGSM for San Joaquin County that :

- Includes urban water use and groundwater extractions based on the General Plan Update,
- calculates agricultural supply requirements given the various parameters of agricultural crops, irrigation efficiencies, soil conditions, and hydrologic conditions, and
- assumes an empirical-based method for including groundwater extractions occurring from residential private wells.

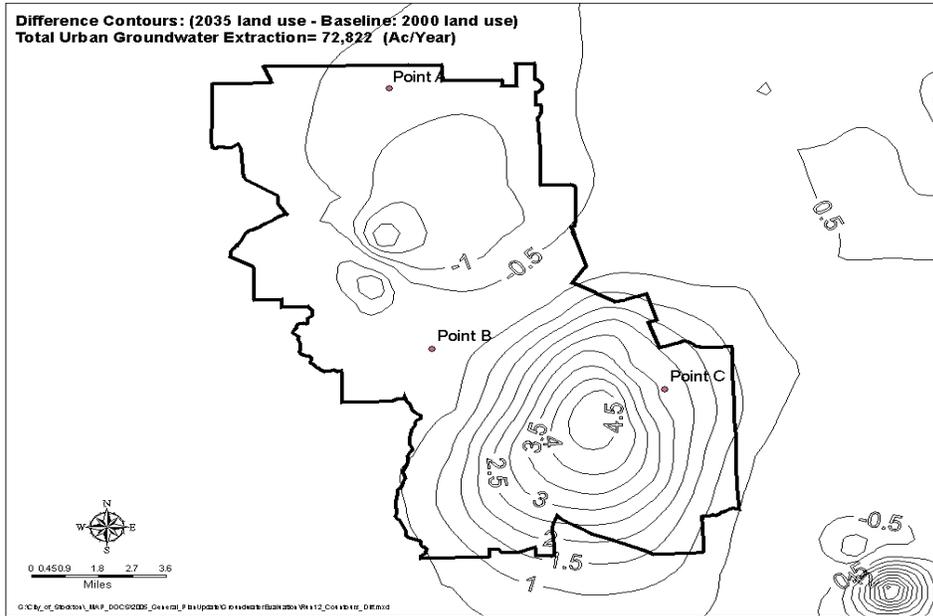
From this information as well as information pertaining to rainfall, runoff, streamflow, urban demands, etc, the IGSM can arrive at a solution regarding where groundwater elevations could be based on the input of the various data in the 70 years of historical hydrology used in the model.

The IGSM was calibrated through the period from 1969 to 1992 and then set up to be able to run the "what if" questions by looking at 2035 land use conditions

and running the model through 70 years of historical hydrology. By doing this, the changes in groundwater elevations can be evaluated for 70 years based on the various scenarios to determine if any problem might exist (e.g., drying out of aquifer, dewatering of wells, movement of the salinity front, etc).

Memorialized as Exhibit “F” of the General Plan Update WSE entitled, “Groundwater Studies Supporting Agricultural Credits,” a thorough analysis was performed to consider full build-out conditions of the 2035 General Plan Update and the use of agricultural credits in urban areas where agriculture currently exists and is irrigating crops with groundwater. The results of this study provided a conservative justification that a slight increase can occur in the groundwater factor of 0.75 AF/acre/year used as a “not- to-exceed” limit in groundwater extraction over the urbanized areas of the General Plan Update in any given year without jeopardizing the groundwater basin. The resulting changes in groundwater elevations at the higher 0.87 AF/acre/year between the 2035 General Plan Update and the modeled 2000 groundwater elevations are shown in **Figure 17**. This figure indicates a significant overall improvement in the southeast portion of the 2035 General Plan Update area due to reduced groundwater extractions through retirement of agricultural lands and a slight decrease in groundwater elevations in the central and north areas located in the current urbanized areas of the COSMA. Changes in groundwater elevations in areas outside the COSMA are considered to be small. The points indicated in the figure represent control points used in the General Plan Update study in the determination of the acceptable extraction amount. Readers are referred to the study for more detailed information on how these points were used in developing the acceptable extraction amount.

Figure 17. Regional Change in Groundwater Elevations based on 2035 General Plan Update



The conclusion from the above-described evaluation is that use of groundwater under full build out conditions of the General Plan Update at a level of 0.87 AF/ac/year or lower (i.e., 0.75 AF/ac/year is the maximum set in this WSA) will not impact the larger groundwater basin; therefore the Project's use of groundwater, if held to the same constraint, will not have a negative effect on regional groundwater elevations, water quality, or groundwater quantity.

3.5.1 Agricultural Groundwater Use Conversion

The approach taken to determine the validity of assuming agricultural credits is based on a proven theoretical approach of determining the agricultural water supply requirement and use of the IGSM for San Joaquin County. The IGSM calculates agricultural supply requirements given the various parameters of agricultural crop types, their irrigation efficiencies, soil conditions, field capacities, root zones, etc. The IGSM is run first applying the agriculture to establish the baseline condition. The second run removes the agriculture to see how the basin rebounds as a result of no agricultural pumping in the urban services boundary. Urban land use and water demand (groundwater and surface water) are then applied and the impacts are evaluated as follows:

3.5.2 Constrained Impacts to the Groundwater

Impacts to the groundwater elevations can occur in three ways:

1. the gradient (or slope) of the groundwater piezometric surface (groundwater table) would not increase in the area of the salinity front (See **Figure 8** on **Page 23** for approximate location of salinity front),
2. groundwater elevations would not drop more than a foot in the agricultural area where the credit is applied, and
3. the lowest elevation of the regional cone of depression would not be impacted by the application of urban groundwater extractions in the agricultural areas.

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Each IGSM scenario that includes urban extractions in areas where agricultural extraction are removed is measured against the three impact constraints listed above. The lesser of the applied groundwater extractions is used as the incremental increase to account for agricultural credits. In no case should groundwater extractions exceed 1.0 AF/ac/year of urban developed area. For purposes of evaluation, the agricultural credit is only applied after it is demonstrated that the 0.60 AF/ac/year factor is exceeded as a result of the existing, the Project, and all foreseeable water demands.

3.6 Future Conjunctive Management

This section describes how the water supply sources in the COSMA can continue to be operated in conjunction with each other to meet future water demands. This analysis includes modeling a complete conjunctive management program similar to conjunctive use program in-place today including all existing and foreseeable COSMA water supplies and projected demands including the Project. The analysis addresses the planning period from 2000 to 2035 to evaluate the adequacy of surface water entitlements and the necessary facility requirements to meet the Project water demands.

As mentioned above, groundwater extractions are targeted to not go above the long-term operational yield of the basin (0.6 acre-ft/acre/year) but not permitted to go beyond the 0.75 AF/ac/year maximum in any one given year. The concept of agricultural credits will also be considered, if applicable.

For this analysis, it is assumed that SEWD will maintain its existing 50 mgd surface WTP until 2016. After that, the analysis considers the option of expanding the SEWD WTP capacity to 60 mgd so that the combined capacity of COSMA, SEWD, and other groundwater facilities will meet maximum day municipal demands. For modeling purposes, it is assumed that SEWD WTP capacity is expanded to 60 mgd in 2016 as shown in **Table 8** on **Page 47**. The SEWD will likely implement planned efficiency enhancements prior to 2016 to

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increase its rated WTP capacity sooner, however, for conservative modeling purposes the timeframe is extended to 2016. The funding of the enhancements will be from the water retailers and any grant funds that SEWD receives.

The operation of the DWSP and SEWD surface WTPs is assumed to occur simultaneously, and, if water supply is available, the water demand is met first by SEWD, then by the DWSP, and lastly by groundwater. Additional enhancements to the design and operations of the SEWD and DWSP treatment plants are assumed to minimize the impact of scheduled maintenance, and account for the impact of higher turbidity in the raw water supply especially in the wet months of the wet years.

Groundwater extraction capacity within the General Plan Boundary is conservatively sized for a certain level of redundancy for service in critical years, to meet maximum day demands, and to meet fireflow requirements. In the event that surface water is curtailed by contract or by Endangered Species Act (ESA) mitigation requirements, especially in dry and critical years, groundwater becomes a significant portion of the urban water retailers' water supply. Prior to construction of the DWSP (first phase assumed to be completed in 2010/11), water demands will exceed available surface water treatment capacity necessitating the on-going use of groundwater facilities within the urban retailers' service areas until the SEWD expansion and/or the DWSP is operational.

The timing and amount of water assumed available from each SEWD source is based on conservative estimates of the reliable yield of each source and the probability of the various contracts being renewed (See **Figure 21** for 35 year projection of average surface water supplies and their sources).

The OID and SSJID transfer contract are assumed to both expire by 2025 and not be renewed. Once all of the OID/SSJID contract water is used, the New Hogan and then the New Melones CVP contracts are used. SEWD's portion of the New Hogan Reclamation contract is assumed to be subject to dry year deficiencies as indicated in **Table 4**. For purposes of maintaining a conservative assumption on supplies from the unused CACWD water entitlement of the New Hogan Reclamation contract, the amounts shown in **Table 4** are subjected to an additional 60 percent reduction in critical years (e.g., 10 TAF/year in 2035 is reduced to 4 TAF/year). Water supply assumptions for the New Melones CVP contract are not changed and allow for water deliveries only in the wet years. SEWD's future appropriative water right on the Calaveras River, Stanislaus River, and Littlejohn's Creek would be used next; however, these likely future water rights are not used in this WSA. Once the SEWD supplies are used, the model turns to DWSP supplies.

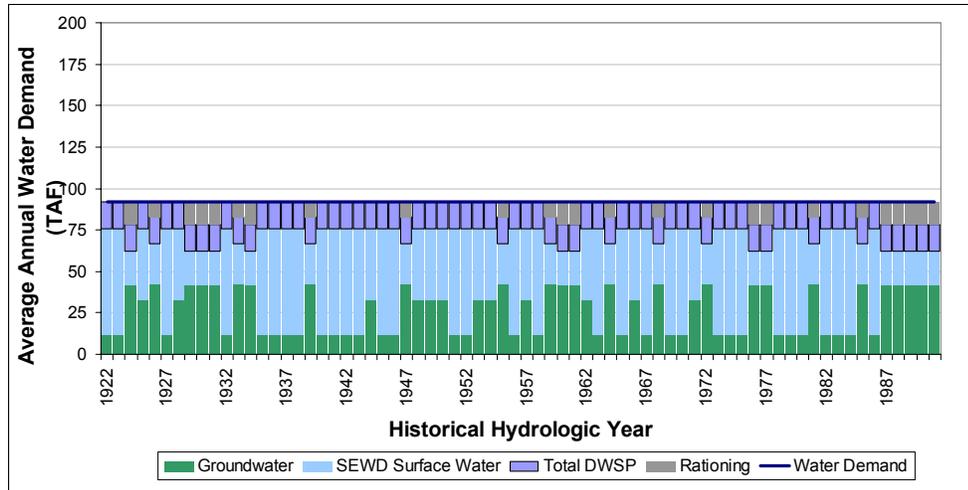
Sources of water supply for the DWSP include Section 1485 water and Area of Origin water, described in sections above. The amount of Section 1485 water depends on the discharge volume from the municipal wastewater treatment plant over time. For the purpose of this study, and to be consistent with the City's water

right application, the amount of Section 1485 water available in a given year is assumed to be 41 percent of the total municipal water use within the 1990 General Plan POU. No reductions of Section 1485 water occur in dry years as a result of water rationing because rationing is assumed to affect only the outdoor uses of water that typically do not enter the wastewater system. The need for Area of Origin water is not expected until beyond 2035 and is not included in this WSA.

A 70 year historic model of hydrology was used to determine the adequacy of the sum total of water supplies in any given year type. For instance, in dry years, surface water curtailments are considered at both WTPs, so groundwater and rationing are used to make up the difference. The objective is that over the 70 years, the groundwater use does not exceed the predefined sustainable yield of the basin as described below. **Figure 18** below shows the results based on 2035 water supplies and on how water demands are met from the above mentioned sources. This figure shows that, in even the driest historical hydrologic periods (say 1976 to 1978 or 1987 to 1991) there is sufficient water supply to meet 2035 water demands.

The operational yield objective of the groundwater basin is based on not allowing the groundwater elevations to drop to a point where impacts could occur as described above or that the annual yield in any given year over the 70-year hydrologic period will not exceed the 0.75 AF/ac/year plus an agricultural credit. The groundwater component is needed to make a final determination of the adequacy of surface water supplies to be able to compare the allowable yield with the calculated yield from the 70-year hydrologic conjunctive use model.

Figure 18. 70-year Historic Hydrologic Period Using 2035 Water Demand and Supply Condition



3.7 Groundwater Model Findings

The impacts to the groundwater basin (The groundwater component is the bottom set of bars shown in **Figure 18**) are measured against the three criteria listed in the **Constrained Groundwater Use Impacts** section above and a finding of the maximum sustainable groundwater yield is made for each year of the simulation. The average and maximum groundwater yield at Project build out is determined to be **26.0 TAF/year** and **43.9 TAF/year**, respectively. **Figure 19** shows the build-up of water demand as the top line, the safe sustainable yield as the dashed line and the modeled average yield as the bottom line. From this figure, it shows that during no time until 2035 does the groundwater yield approach the targeted goal of **0.60 AF/ac/year**. In this case no agricultural credits are needed.

The remaining question is whether the groundwater yield in any given dry year exceeds the DWSP goal of having a maximum of 0.75 AF/ac/year plus the agricultural credits determined above. For the 70 years of historical hydrology, the maximum groundwater yield is extracted for each year of the Project model. This is then compared to the maximum yield of the basin underlying the COSMA. The results of this are shown in **Figure 20**. This graph is the “worst” case scenario and it is anticipated that beyond 2020 there will be active groundwater recharge programs (e.g., aquifer storage and recovery, recharge basins, in-lieu surface water irrigation to agriculture) to make up for the dry year dependency on groundwater. While these programs are very likely to occur, this WSA conservatively assumes that there will be no contribution to COS water supplies.

The conclusion from the figure is that the 0.75 AF/ac/year is not exceeded and no agricultural credits are required.

Figure 19. Average Groundwater Use vs. Demand From 2000 to 2035 Using 0.60 AF/ac/year Average Groundwater Sustainable Yield

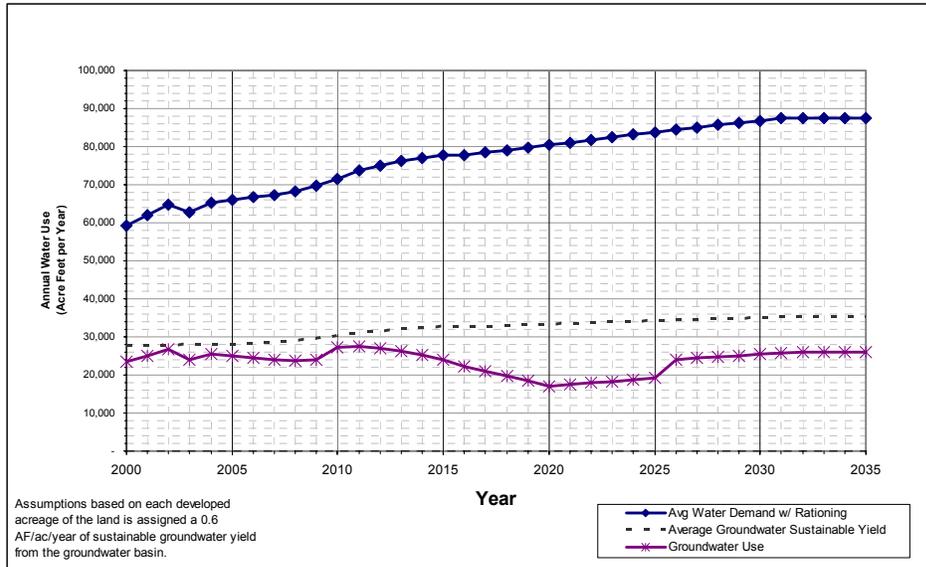
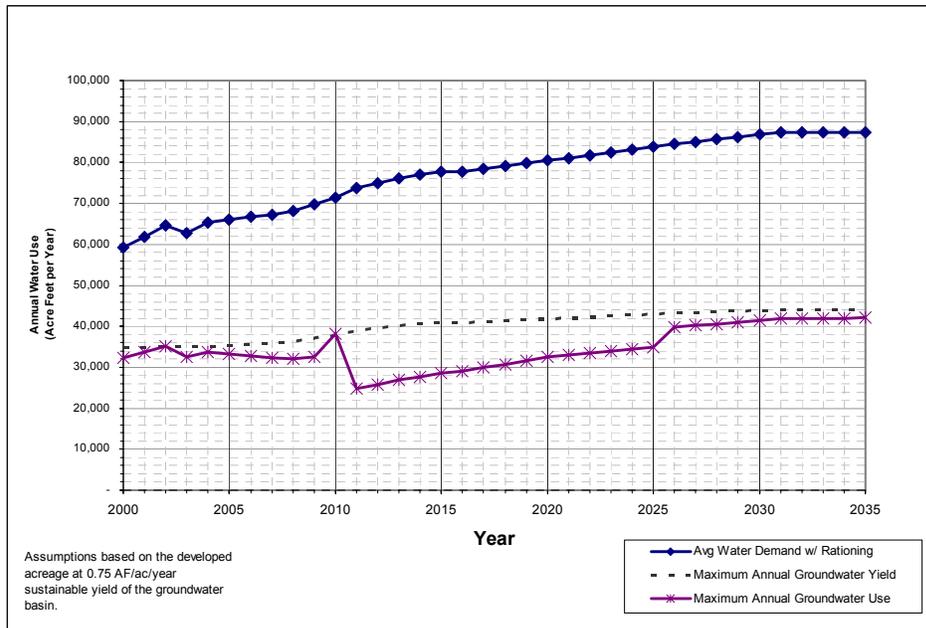


Figure 20. Maximum Single Year Groundwater Use and Water Demand From 2000 to 2035 Using 0.75 AF/acre/year Factor



3.8 Summary of Conjunctive Use Model Findings

Figure 21 illustrates the increase and decrease in surface water supplies “on average” over the period from 2000 to 2035 based on the demands from 2000 to the 2035 of the Project and the conjunctive use program described above. Maximum surface water use is constrained by the SEWD or the DWSP conveyance and WTP capacity and by the various contract entitlements described above. For example, the set of bars for each contract for each year considers 70 years of historical hydrology (i.e., rainfall, stream flows, etc) from 1921 to 1991 and the limitations of the SEWD and DWSP WTPs to treat and deliver potable water supplies for that given year. The decrease in overall surface water for SEWD throughout the planning period reflects the assumption that the annual volume of the CACWD’s unused New Hogan allocation will diminish slightly due to new water demands expected in the CACWD service area.

While this WSA identifies these additional interim surface water supplies as back-up water supplies, those supplies are not necessary for purposes of this WSA and its determination of sufficiency of water supplies to serve the Project and all planned future uses in the service area. A similar table as **Table 7** is provided for the future condition to compare the availability of water supplies with forecasted water demands. **Table 9** indicates that in the dry year conditions, there are adequate water supplies while meeting the average sustainable groundwater yield while not exceeding the maximum groundwater yield in any one hydrologic year type.

Comparing these findings from the evaluation completed under Section 10910, the groundwater requirement reduces from an average need of **42,060 AF/year** to **25,967 AF/year**, a **16,093 AF/year** reduction and **9,204 AF/year** less than the sustainable groundwater yield of **35,171 AF/year** (Please see **Table 6** on **Page 34**). Single dry year maximum groundwater use has a similar decrease as shown in **Figure 20**.

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Figure 21. Projected Average Surface Water Contract Use from 2000 to 2035

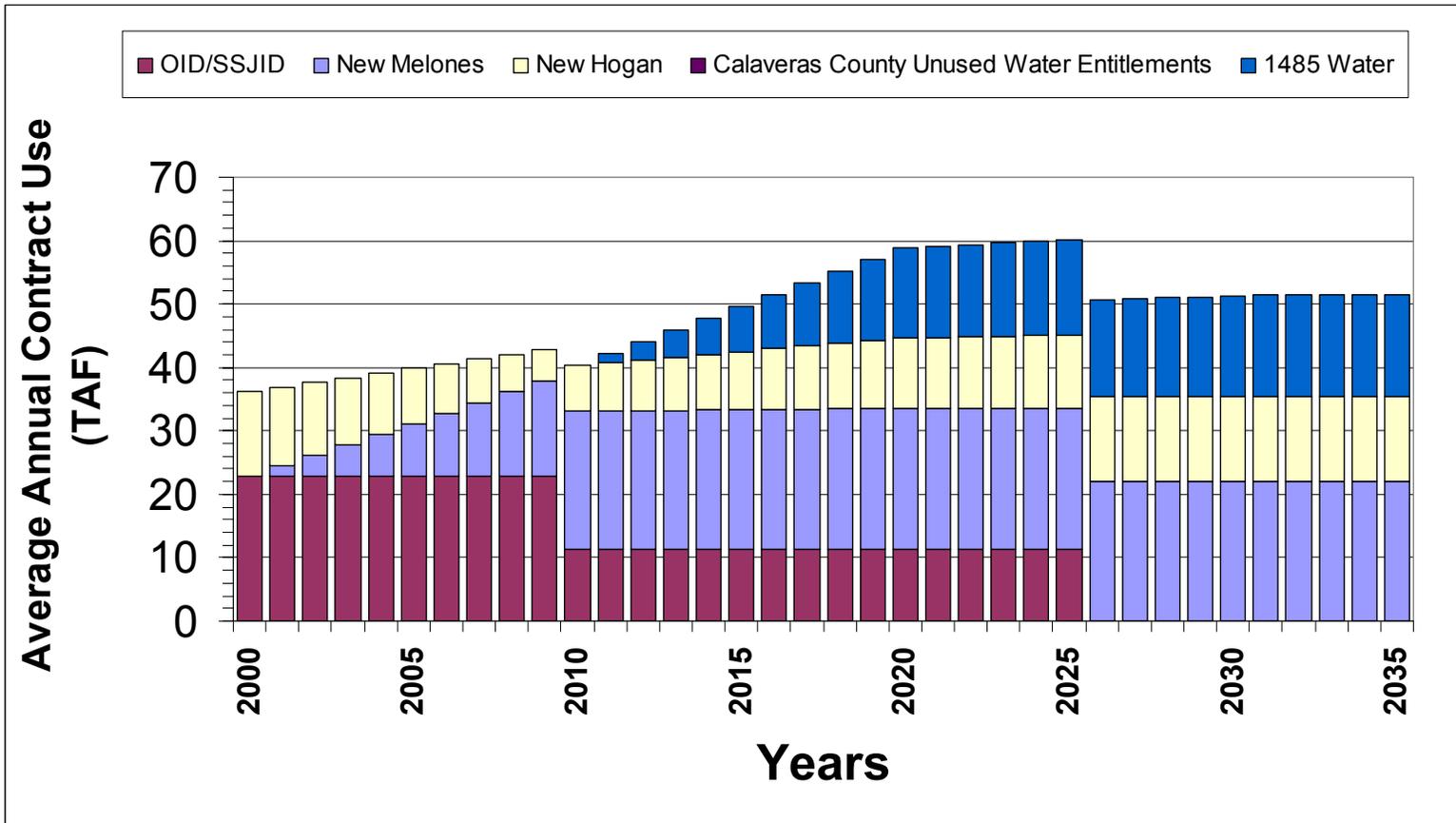


Table 9. Existing (2004) and Foreseeable Water Supplies and Demands for the COSMA by Retail Service Provider

Comment: Segregate to show 2004 and then foreseeable. Define foreseeable

Year Type		Demand Reduction	Existing (2004) (See Note 1)			Foreseeable (See Note 4, 5)			Total Existing (2004) and Foreseeable			Existing (2004) and Foreseeable Demands (AF/year)
			Surface Water	Groundwater	Total	Surface Water	Groundwater	Total	Surface Water	Groundwater	Total	
			(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	(AF/year)	
Normal (See Note 3)	COSMUD	0%	19,426	15,124	34,550	41,588	(18,290)	23,298	61,014	(3,166)	57,848	57,848
	Cal-Water		18,247	13,823	32,070	-	-	-	18,247	13,823	32,070	32,070
	County		1,378	716	2,094	-	-	-	1,378	716	2,094	2,094
	Total		39,052	29,663	68,715	41,588	(18,290)	23,298	80,639	11,373	92,012	92,012
Single Dry (See Note 4)	COSMUD	15%	16,512	12,855	29,368	3,552	16,251	19,803	20,065	29,106	49,171	49,171
	Cal-Water		15,510	11,749	27,260	-	-	-	15,510	11,749	27,260	27,260
	County		1,171	609	1,780	-	-	-	1,171	609	1,780	1,780
	Total		33,194	25,213	58,407	3,552	16,251	19,803	36,746	41,464	78,210	78,210
Multiple Dry (Hypothetical 3-year Drought Period into the Future (looking at both the 1977 to 1980 Drought Sequence and 1987 to 1990 Drought Sequence))	COSMUD	0% (1 st Year)	19,426	15,124	34,550	41,588	(18,290)	23,298	61,014	(3,166)	57,848	57,848
	Cal-Water		18,247	13,823	32,070	-	-	-	18,247	13,823	32,070	32,070
	County		1,378	716	2,094	-	-	-	1,378	716	2,094	2,094
	Total		39,052	29,663	68,715	41,588	(18,290)	23,298	80,639	11,373	92,012	92,012
	COSMUD	10% (2 nd Year)	17,484	13,612	31,095	1,600	14,768	16,367	19,083	28,379	47,463	47,463
	Cal-Water		16,423	12,441	28,863	-	-	-	16,423	12,441	28,863	28,863
	County		1,240	644	1,885	-	-	-	1,240	644	1,885	1,885
	Total		35,146	26,697	61,843	1,600	14,768	16,367	36,746	41,464	78,210	78,210
	COSMUD	10% (3 rd Year)	17,484	13,612	31,095	1,600	14,768	16,367	19,083	28,379	47,463	47,463
	Cal-Water		16,423	12,441	28,863	-	-	-	16,423	12,441	28,863	28,863
	County		1,240	644	1,885	-	-	-	1,240	644	1,885	1,885
	Total		35,146	26,697	61,843	1,600	14,768	16,367	36,746	41,464	78,210	78,210
Average over 70-Years	COSMUD	5%	19,426	15,124	34,550	22,787	(3,695)	19,092	42,213	11,429	53,642	53,642
	Cal-Water		18,247	13,823	32,070	-	-	-	18,247	13,823	32,070	32,070
	County		1,378	716	2,094	-	-	-	1,378	716	2,094	2,094
	Total		39,052	29,663	68,715	22,787	(3,695)	19,092	61,839	25,967	87,806	87,806

Reference: City of Stockton Urban Water Management Plan 2000 Update, December 2000

- Notes:
- 1.) Existing is actual 2004 calendar year usage of surface water and groundwater. The assumption is that 2004 depicts a normal year hydrologic and water supply availability condition.
 - 2.) Dry year surface water amounts assume SEWD's New Hogan Central Valley Project water with deficiencies, and Oakdale Irrigation District and South San Joaquin Irrigation District deficiencies as stipulated in the contract for these water supplies.
 - 3.) Normal year surface water deliveries are restricted to the projected availability of SEWD conveyance and treatment plant capacity (not to exceed 60 mgd).
 - 4.) Foreseeable includes all projects that have been approved or have a WSA as of the date of this WSA.
 - 5.) Negative values imply a decrease in the amount of surface water or groundwater based on the use of both supplies in 2004.

4. DETERMINATION OF SUFFICIENCY

This WSA determines that the COSMUD currently cannot support the Project without the DWSP Phase 1 project based on inadequate surface water entitlements and the infrastructure to divert, treat and convey potable water to the Project along with surface water supplies from SEWD and groundwater. In consideration of the significant steps in the environmental review, permitting, and financing of the DWSP it is reasonable to rely on the DWSP for evaluation of water supply. Once constructed, the DWSP will provide sufficient water supply to meet the Project's build-out water demand as well as all existing and reasonably foreseeable water demands.

COSMUD makes this determination based on the information provided in this WSA and on the following specific facts:

- The existing near-term and long-term reliable supplies of SEWD surface water supplies and indigenous groundwater supplies can deliver a sustainable reliable water supply to meet existing and foreseeable water demands without impacting environmental values and/or impacting the current stabilization of the groundwater basin underlying the COSMA.
- The Project water demands and the self-imposed reductions in groundwater use by the COSMA, make it necessary to supplement current surface water supplies from SEWD through the implementation of the DWSP (i.e., current water supplies are insufficient to meet the projected demands of the Project and all other existing and planned future uses in the service area).
- The existing and future (i.e., DWSP Phase 1) conjunctive use program of using surface water and each of the urban water retailer's groundwater supplies has been extensively analyzed as part of the DWSP Feasibility Report and EIR and as part of this WSA. All studies show that sufficient surface water supplies and available groundwater supplies will exist once Phase 1 of the DWSP is operational for the level of water demand contemplated under the Project.
- The Project area will be served by water supplies made available through the existing and planned future conjunctive use program within the COSMA urban water retailer's service areas.

It should be noted that the determination of sufficiency for this project does not constitute a reservation of supply to serve this project. SB 610 only requires that the Assessment be conducted at the time that the EIR is prepared, and does not require that the Assessment be updated at any point in the future.

EXHIBIT "A"

Project Location Map

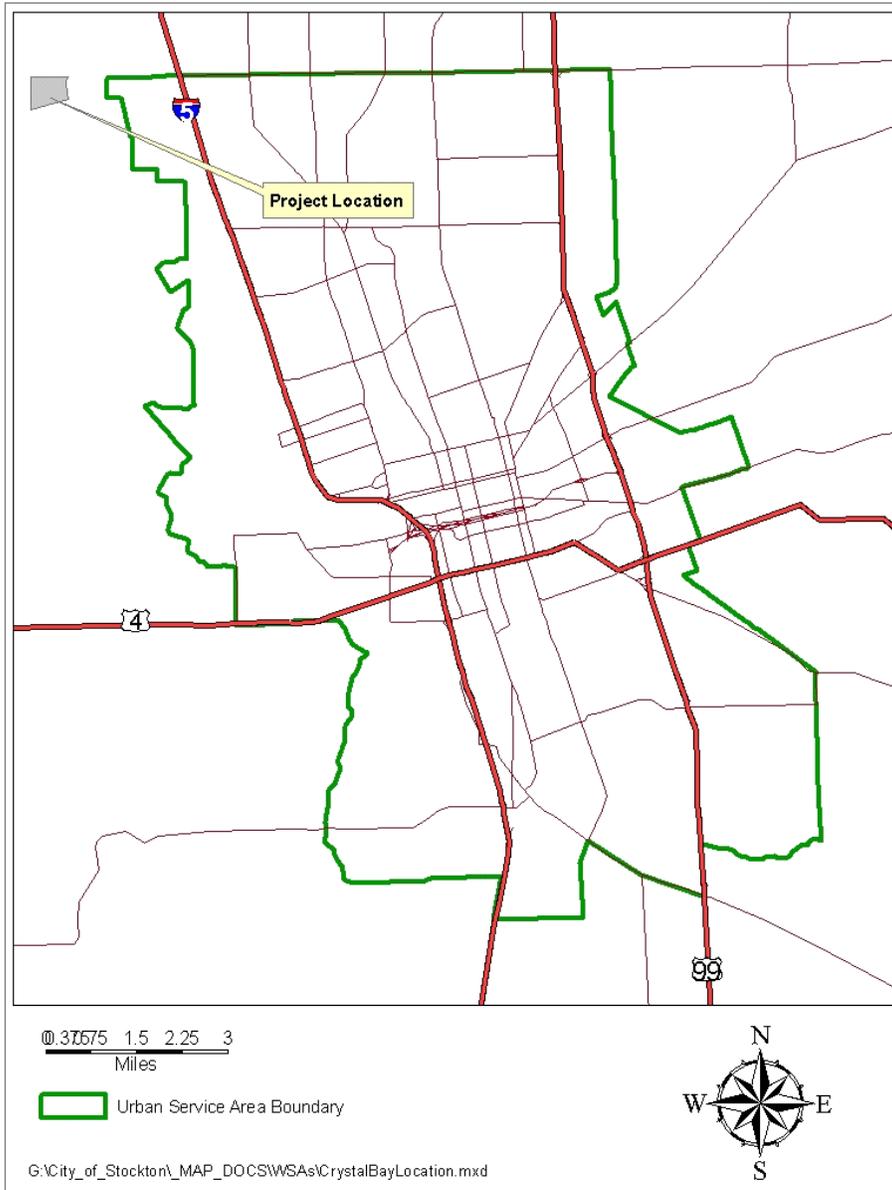


EXHIBIT "B"

Existing Surface Water and Wheeling Contracts

EXHIBIT "C"

LIST of PENDING DEVELOPMENTS

EXHIBIT "D"

[RESPONSE TO] CALAVERAS COUNTY WATER DISTRICT COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT, CITY OF STOCKTON 2035 GENERAL PLAN AND INFRASTRUCTURE STUDIES PROJECT (HERUM, CRABTREE, BROWN ATTORNEYS AT LAW, MARCH 21, 2007)