Report to:

City of Stockton
California

Delta Water Supply Project (DWSP) Surface Water Supply Fee (SWSF)

June 2009

Prepared by
HDR, Inc.

June 8, 2008

Ms. Melissa Price
City of Stockton
Municipal Utilities Department (MUD)
2500 Navy Drive
Stockton, CA 95206

Subject: Delta Water Supply Project Surface Water Supply Fee Report

Dear Ms. Price:

HDR, Inc (HDR) was retained by the City of Stockton (City) to develop a cost-based surface water supply fee for the Delta Water Supply Project. Enclosed please find HDR's report on the development of this fee. The conclusions and recommendations contained within this report should enable the City to implement a cost-based surface water supply fee that meets the City's objectives.

This report has been prepared using "generally accepted" financial and engineering principles. The City's financial, budgeting and engineering data were the primary sources for much of the data contained in this report. This fee is based on various engineering reports prepared for the City. Prior to adoption of the proposed fees, HDR recommends that the City have its legal counsel review the report to ensure compliance with California law.

Sincerely,
HDR, Inc.

Randy Goff
Project Principal

Shawn Koorn
Senior Financial Analyst

HDR

500 108th Avenue NE
Suite 1200
Bellevue, WA 98004

Phone: (425) 450-6200
Fax: (425) 453-7107
www.hdrinc.com

Contents

Section 1 Introduction 1–1

1.1 Introduction 1–1
1.2 Organization of Report 1–1
1.3 Disclaimer 1–1

Section 2 Overview of Utility Connection Fees 2-1

2.1 Introduction 2-1
2.2 Defining Connection Fees/Supply Fees 2-1
2.3 Economic Theory and Connection Fees 2-1
2.4 Connection Fee Criteria 2-2
2.5 Overview of the Connection Fee Methodology 2-3
2.6 Summary 2-4

Section 3 Legal Considerations in Establishing Connection Fees for the City 3-1

3.1 Introduction 3-1
3.2 Requirements Under California Law 3-1
3.3 Proposition 218 and Connection Fees 3-2
3.4 Summary 3-2

Section 4 Determination of the City's DWSP Surface Water Supply Fee 4-1

4.1 Introduction 4-1
4.2 Overview of the City's Existing Water Supply and DWSP 4-1
4.3 Present Water Connection Fee 4-2
4.4 Calculation of the City's DWSP Surface Water Supply Fee 4-2
4.5 Net Allowable DWSP Surface Water Supply Fee 4-6
4.6 Key Assumptions 4-7
4.7 Consultant Recommendations 4-7
4.8 Summary 4-7

Technical Appendix A

Exhibit 1 Determination of ERUs

Exhibit 2 Capital Improvement Plan – Membrane Treatment Plant and Infrastructure

Exhibit 3 Debt Service Credit

Exhibit 4 Summary

Technical Appendix B

Surface Water Split Analysis (August 10, 2008) – Montgomery Watson Harza

Technical Appendix C

Intake Facility Tech Memo (January 11, 2008; January 2008) – HDR Engineering, Inc.

Technical Appendix D

Pipeline Percentage Split (January 14, 2009) – HDR Engineering, Inc.

Technical Appendix E

Water Treatment Plant Cost Split (December 31, 2008) – CDM Constructors Inc.

Technical Appendix F

Debt Service Assumptions (April 24, 2009) – Citigroup Global Markets

Section 1
Introduction

1.1 Introduction

HDR, Inc. was retained by the City of Stockton (City) to develop a surface water supply fee (SWSF) for the Delta Water Supply Project (DWSP). The objective of this study is to calculate a cost-based charge for new customers connecting to the City's system. The DWSP surface water supply fee will provide the means of balancing the cost requirements for the new DWSP infrastructure between existing customers and new customers. Only the portion of new surface water supply project costs that will provide service (capacity) to new customers is included in the calculation of these fees. In contrast to this, the City has a separate connection fee for growth related costs of other water system infrastructure. By establishing cost-based connection fees/supply fees, existing utility customers will be sheltered from the financial impacts of growth. To clarify terminology, the SWSF calculated as part of this study is also referred to in this report as connection fee, when describing common methodologies and industry practices.

> ***"The objective of this study is to calculate cost based charges for new customers connecting to the City's system. By establishing cost-based connection fees, existing utility customers will be sheltered from the financial impacts of growth."***

1.2 Organization of Report

This report documents the approach that was used to analyze and develop the City's DWSP SWSF. Our report is divided into four sections. Section 1 provides a brief introduction and overview of the study. Given this brief introduction, Section 2 provides an overview of connection fees and the criteria and general methodology that should be used to calculate and establish cost-based connection charges. Next, Section 3 provides an overview of the requirements under California law for determining connection fees. Section 4 reviews the City specific calculations of the cost-based DWSP SWSF.

1.3 Disclaimer

HDR, in its calculation of the connection fees presented in this report, has used "generally accepted" engineering and ratemaking principles. This should not be construed as a legal opinion with respect to California law. HDR recommends that the City have its legal counsel review the connection fees as set forth in this report to ensure compliance with California law.

Section 2
Overview of Utility Connection Fees

2.1 Introduction

An important starting point in establishing utility connection fees is to have a basic understanding of the purpose of these charges, along with the criteria and general methodology that is used to establish cost-based connection fees. Presented in the section of the report is an overview of connection fees and the criteria and general methodology that is used to develop cost-based fees.

2.2 Defining Connection Fees/Supply Fees

The first step in establishing cost-based connection fees is to gain a better understanding of the definition of a connection fee. For purposes of this report, a connection fee, or the SWSF, is defined as follows:

> *"System development charges (connection fees) are one-time charges paid by new development to finance construction of public facilities needed to serve them."*[1]

Simply stated, connection fees are a contribution of capital to help finance planned future growth-related capacity improvements. At some utilities, connection fees may be referred to as system development charges, impact fees, connection charges, infrastructure investment fees, etc. Regardless of the label used to identify them, their objective is the same. That is, these fees are intended to provide funds to the utility to finance all or a part of the capital improvements needed to serve and accommodate new customer growth.

2.3 Economic Theory and Connection Fees

Connection fees are generally imposed as a condition of service. The objective of a connection fee is not merely to generate money for a utility, but to ensure that all customers seeking to connect to the utility's system bear an equitable share of the cost of capacity that is invested in both the existing system and any future growth-related expansions. Through the implementation of fair and equitable connection fees, existing customers will not be unduly burdened with the cost of new development.

> ***"By establishing cost-based connection fees, the City will be taking an important step in assuring adequate infrastructure to meet growth-related needs, and more importantly, providing this required infrastructure to new customers in a cost-based, fair and equitable manner."***

By establishing cost-based connection fees, the City will be taking an important step in assuring adequate infrastructure to meet growth-related needs, and more importantly, providing this required infrastructure to new customers in a cost-based and equitable manner.

[1] Arthur C. Nelson, System Development Charges for Water, Wastewater, and Stormwater Facilities, Lewis Publishers, New York, 1995, p. 1,

2.4 Connection Fee Criteria

In the determination and establishment of the connection fees, a number of different criteria are often utilized. The criteria often used by utilities to establish connection fees are as follows:

- State/local laws
- System planning criteria
- Financing criteria, and
- Customer understanding

Many states and local communities have enacted laws which govern the calculation and imposition of connection fees. These laws must be followed in the development of the connection fees. Most statutes require a "reasonable relationship" between the fee charged and the cost associated with providing service capacity to the customer. The charges do not need to be mathematically exact, but must bear a reasonable relationship to the cost burden imposed. As discussed above, the utilization of the planning criteria and the actual costs of construction and the planned costs of construction provide the nexus for the reasonable relationship requirement.

> ***"The use of the system planning criteria is one of the more important aspects in the determination of the connection fees. System planning criteria provides the "rational nexus" between the amount of infrastructure necessary to provide service and the charge of the customer."***

The use of system planning criteria is one of the more important aspects in the determination of the connection fees. System planning criteria provides the "rational nexus" between the amount of infrastructure necessary to provide service and the charge of the customer. The rational nexus test requires that there be a connection (nexus) established between new development and the new or expanded facilities required to accommodate new development; and appropriate apportionment of the cost to the new development in relation to benefits reasonably received. An example of using system planning criteria is the determination that a City of Stockton average single-family residential customer requires 497 gallons per day per equivalent residential unit (ERU), or a single family home. The connection fee methodology then calculates the fee for each component of the analysis based on 497 gallons, or the average day use for a typical residential customer in the City of Stockton's service area.

One of the driving forces behind establishing cost-based connection fees is that "growth pays for growth." Therefore, connection fees are typically established as a means of having new customers pay an equitable share of the cost of their required infrastructure. The financing criteria for establishing connection fees relates to the method used to finance infrastructure on the system and assures that customers are not paying twice for infrastructure – once through connection fees and again through rates. The double payment can come in through the imposition of connection fees and then the requirement to pay debt service within a customer's rates.

The component of customer understanding implies that the charge is easy to understand. This criterion has implications on the way that the fee is implemented and assessed to the customer. For water systems, the charge is generally based on meter size or specific customer usage. The

other implication of this criterion is that the methodology is clear and concise in its calculation of the amount of infrastructure necessary to provide service.

2.5 Overview of the Connection Fee Methodology

There are "generally accepted" methodologies that are used to establish connection fees. Within the "generally accepted" connection fee methodologies, there are a number of different steps undertaken. These steps are as follows:

- Determination of system planning criteria
- Determination of equivalent residential units (ERUs)
- Calculation of system component costs
- Determination of any credits

The first step in establishing a cost based connection fee is the determination of the system planning criteria. This implies calculating the amount of water required by a single-family residential customer. Typically, maximum daily demand per ERU is used, since this represents the basis for system design. For the DWSP SWSF, the average daily demand was used to determine the SWSF. Average daily demand was calculated based on total single family residential usage (July 2007 to June 2008), divided by total number of customers, divided by 365, resulting in 497 gallons per ERU per day, including losses.

Once the system planning criteria is determined, the number of ERUs can be determined. For the DWSP SWSF, the number of ERUs is determined by applying a growth factor of 1.9% to the existing ERUs to determine future ERUs. ERUs are calculated for the next 32 year period of 2009 through 2040, which is the period of the debt repayment. This is a very important calculation since it provides the linkage between the infrastructure necessary to provide service to a set number of customers.

Once the number of ERUs has been determined, a component by component analysis is undertaken to determine each components supply fee on a per ERU basis. The calculation of the component supply fee includes only the growth related portion of the planned future assets. Once the total cost of the capital infrastructure is determined, it is then divided by the gallons per ERUs to develop the cost per ERU for the specific infrastructure component.

> *"For the water system, an ERU is generally defined as a ¾ -inch meter. Larger meter sizes are weighted based on the meter capacity."*

After each infrastructure component is analyzed and a cost per ERU is determined, the cost per ERU for each of the infrastructure components is added together to determine the "gross connection fee", or DWSP SWSF. The "gross" is calculated before any credits for debt service.

The last step in the calculation of the fee is the determination of any debt service credits. This is generally a calculation to assure that customers are not paying twice – once through the SWSF and again through debt service included within the water rates.

The final connection fee is determined by taking the "gross supply fee" and subtracting any credits. This results in a "net supply fee" stated in dollars per ERU. For the water system, an ERU is generally defined as a ¾ -inch meter. Larger meter sizes are weighted based on the meter capacity.

2.6 Summary

Presented in this section has been a discussion of the criteria typically used in the determination of connection fees. In addition, an overview of the "generally accepted" methodology used in the calculation of the supply fees has been provided. Given this background, the next section of the report discusses any specific legal criteria that must be used by the City in the establishment of its supply fees.

Section 3
Legal Considerations in Establishing Connection Fees for the City

3.1 Introduction

An important consideration in establishing connection fees is any legal requirements at the state or local level. The legal requirements often establish the methodology around which the fees must be calculated or how the funds must be used. Given that, it is important for the City to understand these requirements. This section of the report provides an overview of the legal requirements for establishing connection fees, or the SWSF under California law. A discussion of the applicability of Proposition 218, as it relates to connection fees, is also provided.

The discussion within this section of the report is intended to be a summary of our understanding of the relevant California law as it relates to establishing connection fees. It in no way constitutes a legal interpretation of California law by HDR.

3.2 Requirements Under California Law

In establishing connection fees, an important requirement is that they be developed and implemented in conformance with local laws. In particular, many states have established specific laws regarding the establishment, calculation and implementation of connection fees. The main objective of most state laws is to assure that these charges are established in such a manner that they are equitable and cost-based. In other cases, state legislation may have been needed to provide the legislative powers to the utility to establish the charges.

The laws for the enactment of connection fees in California are found in the 'Mitigation Fee Act', which is codified as California Government Code 66000-66008, 66010-66011, 66012-66014, 66016-66018.5 and 66020-66025. The Mitigation Fee Act is comprehensive legislation dealing with the various requirements for imposition of connection fees in California. The statutes deal with the requirements for the calculation of the fees, accounting and reporting requirement, and appeal processes.

"The laws for the enactment of connection fees in California are found in the 'Mitigation Fee Act', which is codified as California Government Code 66000-66008, 66010-66011, 66012-66014, 66016-66018.5 and 66020-66025."

A summary of the relevant statutes required in the calculation of the connection fee is as follows:

> *"66013 (a) Notwithstanding any other provision of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed, unless a question regarding the amount of the fee or charge imposed in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue."*

"66013 (B) (3) "Capacity charge" means a charge for facilities in existence at the time a charge is imposed or charges for new facilities to be constructed in the future that are of benefit to the person or property being charged."

In addition to the specific element for the determination of proportional share under California law, the Mitigation Fee Act also requires the following:

- Requires that funds be maintained in a separate account,
- Requires annual accounting requirements on fee collections and expenditures,
- Requirements for public hearing to adopt or modify the fee, and
- Requirements for protest of the fees.

The basic principal that needs to be followed under California law is that the charge be based in a proportionate share of the costs of the system required to provide service and that the requirements for adoptions and accounting be followed in compliance with California law.

3.3 Proposition 218 and Connection Fees

In 1996, the voters of California approved Proposition 218, which required that the imposition of certain fees and assessments by municipal governments require a vote of the people to change or increase the fee of assessment. Of interest in this particular study is the applicability of Proposition 218 to the establishment of connection fees for the City.

In Richmond v. Shasta Community Services Dist., 95 Cal. App.4th 1227 (3rd Dist. 2002), the Third District Court of Appeals held that water connection fees and development fees are not subject to the procedural or substantive requirements of Proposition 218 and that the fee can be enacted by either ordinance or resolution, based on the local equity requirement.

3.4 Summary

This section of the report has reviewed the legal basis for establishing connection fees and supply fees in California. At the same time, a brief discussion of the applicability of Proposition 218 was provided.

The next section of the report will provide a detailed discussion of the specific calculation of the DWSP SWSF for the City.

Section 4
Determination of the City's DWSP Surface Water Supply Fee

4.1 Introduction

This section of the report presents the details and the key assumptions in the calculation of the City's DWSP SWSF. The calculation of the City's DWSP SWSF is based on City specific engineering, financing, and planning information. Specifically, the SWSF is based on numerous engineering reports prepared for the City to determine the infrastructure needed for the Delta Water Supply Project and the associated costs. This final fee is based upon the most recent engineering assumptions and cost estimates, as noted herein. Specifically, the updated Montgomery Watson Harza report titled "*Delta Water Supply Project (DWSP) Surface Water Split Analysis*, completed August 2008. This report is referred to as the Plan within this section and is attached as Appendix B for reference. The Plan identifies the existing demand within the City's service area, projects that will be needed in the future under several scenarios, and determines the infrastructure needed to service that demand. HDR developed cost estimates for the identified infrastructure initially in 2007. The City has updated those costs based on currently available design documents. The total project costs currently are estimated at $217 million. Estimated project costs and Phase I assumptions are provided in the Technical Appendices.

To the extent that the cost and timing of the capital improvements change, then the SWSF presented in this section of the report should be updated to reflect the changes.

4.2 Overview of the City's Existing Water Supply and DWSP

The City's Municipal Utilities Department currently provides water service from the Stockton East Water District (SEWD) water treatment plant (WTP) (sources from Stanislaus and Calaveras rivers) groundwater, and conservation (in dry years).

In order to provide reliable supply to existing customers and meet future planned demands, the City has determined, through engineering studies, that a new source of supply will need to be developed. The Plan indicates that intake pipelines can deliver Sacramento-San Joaquin Delta (Delta) water through a new intake located on the northwest tip of Empire Tract. Water will be treated at a new WTP, which will also include water from the Mokelumne River, transferred under an agreement with Woodbridge Irrigation District, diverted from existing irrigation canals. Major components of the project include a raw water intake pipeline, pumps, a 54-inch raw water pipeline to the treatment plant, the WTP, laboratory, maintenance and administration building, treated water pipelines, and associated structural infrastructure, design, administration and construction costs. This study allocated infrastructure components to existing and future customers. Total project costs are estimated to be approximately $217 million. In addition to providing the estimated costs, the design engineers developed an allocation of infrastructure costs, for each major component, between Phase 1 and Phase 2. The line item detail of the allocation between Phase 1 is provided in the Technical Appendices.

Phase 1 has been designed around providing up to 30 MGD of service, while Phase 2 allows for future expansion of the WTP ultimately up to 160 MGD of service which will be built at a later time. Each of the four components (intake structure, raw water pipeline, WTP, and treated water

pipelines) has portions that are related to both Phase 1 and Phase 2. In addition, each of the components has a portion related to growth. It is important to note that while some river and underground infrastructure built in Phase 1 (intake facilities, pipelines, etc.) are sized to meet future phases, there is a portion designed and planned for construction to the final capacity. As mentioned previously, the project design engineers developed the allocations between Phase 1 and Phase 2 based on the capacity provided by Phase 1 and the total capacity provided by component. Provided in the following sections is a more detailed discussion of the allocation of each component between Phase 1 and other future phases.

Again, it should be noted that the current fee will be based on Phase 1 of the DWSP. Therefore, only the Phase 1 portions of the facilities are included within this calculation of the fee for Phase 1. More details of the allocations are provided within the discussion below.

4.3 Present Water Connection Fee

The City has two existing fees charged to new connections for other components of the City's water system. These are the existing connection fee of $1,836, and the New Melones Surface Water Supply Fee of $3,359. Each of these fees are based on a ¾" meter, or one ERU, with other meter sizes based on the capacity of the meter. The City has plans to review and update the existing connection fee within the next year. It is important to note that the DWSP SWSF will be in addition to the City's existing water connection charge and New Melones fee. This DWSP SWSF is solely based on the cost to provide future supply from the DWSP for future planned growth.

4.4 Calculation of the City's DWSP Surface Water Supply Fee

As was discussed in Section 2, the process of calculating supply fees is based upon a four-step process. In summary form, these steps were as follows:

- Determination of system planning criteria
- Determination of dwelling unit equivalents (ERUs)
- Calculation of the supply fee for system component costs
- Determination of any supply fee credits

Each of these areas is discussed in more detail below.

4.4.1 System Planning Criteria

The number of ERUs was determined based on the planning criteria from the City and the most recent Water Master Plan completed for the City. Annual usage from July 2007 to June 2008 was used to determine an average day demand, including losses, of 497 gallons per day per ERU. This calculation is used in determining the ERU cost share of the infrastructure discussed below.

A summary of the system criteria used in this study are presented in Table 4-1. Details of the determination of water ERU projections are provided in Exhibit 1.

Table 4-1 City of Stockton DWSP Surface Water Supply – Planning Data	
Description	Criteria
Single Family Residential Usage 7/08 to 6/09	9.4 MG
Number of Single Family Residential customers (1)	40,557
Water System losses (1)	4.8%
Single Family Average Day Demand (2)	497 gallons/ERU

(1) From City FY 2008 billing records.

(2) Usage times losses, divided by number of customers, divided by 365 days.

4.4.2 Calculation of Equivalent Residential Units

The planning horizon of this study was 2009-2040, or ultimately the length of the annual debt service related to the financing of the DWSP. As a part of this study, a projection of the number of new/additional ERUs per year must be determined, along with the total number of ERUs in 2040. For this study, the City's total number of ERUs for each year were determined by applying an estimated 1.9 percent growth to the previous year's ERUs. This growth factor was provided in the most recent City of Stockton Water Master Plan.

A summary of the ERUs for 2009 and 2040 are presented in Table 4-2. Details of the determination of ERUs are provided on Exhibit A-1 of the Technical Appendix.

Table 4-2 City of Stockton DWSP Equivalent Residential Units	
Description	Calculated ERUs
Dwelling Unit Equivalents – 2009	69,644
Dwelling Unit Equivalents – 2040	124,819
New Dwelling Unit Equivalents – 2009-40	56,474

Total new ERUs added to the system can be derived from Table 4-2. The difference between 2009 and 2040 ERUs is 56,474 new ERUs.

Given the development of the total ERUs for each year of the planning period, the focus can shift to the calculation of the DWSP SWSF for each infrastructure component. This aspect of the analysis is discussed in detail below.

4.4.3 Calculation of the DWSP SWSF for the Major System Components

The next step of the analysis is to review each major functional infrastructure component of the DWSP to determine the supply fee for that component. The major components of the DWSP that were reviewed for purposes of calculating the SWSF are as follows:

- Raw Water Intake

- Raw Water Pipeline
- Water Treatment Plant (WTP)
- Treated Water Pipelines
- Indirect Project Costs (Administration, Acquisition, Permitting, Other)
- Debt Service Interest

A brief discussion of the supply fee calculated for the various components is provided below.

Raw Water Intake Facility - The total cost for the raw water intake is estimated at $25 million. The total cost was allocated 39% to Phase 1 ($10 million). This is based on the capacity provided by the intake structure for Phase 1 and Phase 2. Phase 1 of the intake structures is currently designed to provide up to 80 MGD. As a result, the intake structure is allocated 37.5% to Phase 1 (30 MGD/80 MGD). The one exception is the vertical turbine pumps. The pumps are designed to provide up to 30 MGD or 100% related to Phase 1. As a result, 39% of the intake structure is allocated to Phase 1. Based on the surface water split analysis in the Plan, 33.3% of the costs are attributed to existing customers, and not included within this fee (10 MGD divided by 30 MGD). A total cost of $6.7 million is allocated to growth. When this cost is divided by the growth related capacity (20 MGD), this results in a $0.34 cost per gallon; multiplied by 497 gallons per ERU derives a fee of $167.00 per ERU for raw water intake facility costs.

Raw Water Pipeline - These facilities include the 54-inch pipeline from the raw water intake to the WTP. These costs are estimated at approximately $54 million. The allocation of the raw water pipeline is based on the available capacity of the pipeline for Phase 1 and future planned growth. The design engineers determined that the 54-inch pipeline would provide a capacity of 60 MGD, with Phase 1 being 30 MGD, the raw water pipeline is allocated 50% to Phase 1 (30 MGD/60 MGD). All of these facilities are allocated 33.3% to existing service and 66.7% to growth. Therefore, $18 million in facility costs related to growth is divided by the growth related capacity (20 MGD) for a cost of $0.89 per gallon; multiplied times the 497 gallons per ERU, this provides a fee of $445.00 per ERU for the raw water intake pipeline.

Water Treatment Plant Facility - This facility and related infrastructure has been estimated to cost almost $102 million. The design engineers provided the detail split of the main project components between Phase 1 and future phases. The major components included site work, piping, pump stations, treatment facilities, and general buildings. For each of these components a review was undertaken to determine the allocation to Phase 1.

For site work, all costs are 100% related to Phase 1 with the exception of the rough grading, roadways, and landscaping which are designed to allow for the expansion up to 160 MGD.

For the majority of the yard piping component, 60% was allocated to Phase 1. This is based on the majority of the yard piping being installed to meet the initial capacity of 30 MGD. It should be noted that all piping estimates after Phase 1 have been excluded from the cost of the project as they will occur in future phases.

The pumps and screens are all sized for Phase 1 capacity and as a result are 100% allocable to Phase 1. All other costs related to the diversion structure are designed for 50 MGD and are then allocated to Phase 1 at 60% (30mgd/50mgd). The treatment facilities are 100% related to Phase 1 as the facility is designed for 30 MGD.

The majority of the buildings are being sized around the future capacity of the WTP of 160 MGD. Therefore, only 18.75% of the facilities are allocated to Phase 1 (30 MGD/160 MGD). The only exception is the ozone facilities which are being built to accommodate future expansion. As a result, 50% of this building is allocated to Phase 1.

The combined allocation of costs to Phase 1 results in 81.4% being allocable to growth. Similar to the previous analyses, 66.7% of Phase 1 costs are allocated to growth, or $55 million, generating a cost per gallon of $2.77, resulting in a cost per ERU of $1,377.00.

Treated Water Pipelines - In order to determine the cost of the treated water pipelines, the design engineers split the analysis between the three pipelines being constructed. The first pipeline is a 54-inch pipeline which would provide up to 60 MGD of capacity. As a result, the 54-inch pipeline is allocated 50% to Phase 1 (30 MGD/60 MGD). The second pipeline is a 42-inch pipeline which would provide up to 24.4 MGD of capacity. Under design criteria, the 42-inch pipeline would provide up to 14.4 MGD of capacity based on Phase 1 capacity of 30 MGD. Therefore, 59.0% (14.4 MGD/24.4 MGD) of the 42-inch pipeline is allocated to Phase 1. The third pipeline is a 36-inch pipeline that can provide up to 26.4 MGD. Given the constraints of the WTP at 30 MGD, the 36-inch pipeline is available to provide the capacity of up to 15.6 MGD. Therefore, 59.0% (15.6 MGD/26.4 MGD) of the 36-inch pipeline is allocated to Phase 1. As a result, 55.2% of the treated water pipeline costs of $16 million are allocated to Phase 1. This results in the allocation of $9 million to Phase 1. Of that amount, 66.7% is related to growth, or $6 million. As calculated above, this cost is divided by the growth related capacity to determine a cost of $0.29 per gallon. Multiplied times 497 gallons per ERU provides the fee of $143.00 per ERU for the treated water pipelines.

Indirect Costs - Indirect costs are made up of the costs of project administration, acquisition and right of way, permitting, and other services necessary to complete the project. To date, the City has incurred approximately $10.7 million for these services. Each of these costs were reviewed and allocated separately to Phase I of the DWSP Project. Project administration and other services were allocated 100% to Phase 1, as these two costs would be expended even if the plant were only built to 30 MGD. Permitting, acquisition and right of way were allocated to Phase I based on the ratio of the allocation of the prior costs (e.g., raw water intake facility, raw and treated pipelines, and the water treatment plant) to Phase I and the total project cost. This resulted in approximately 65% of the permitting, acquisition and right of way costs being allocated to Phase I. Each of these cost components were then allocated 66.7% to growth (20 MGD/30 MGD), or $11 million. As calculated above, this cost is divided by the growth related capacity to determine a cost of $0.55 per gallon. When multiplied times 497 gallons per ERU, a fee of $274.00 per ERU is determined for the indirect costs of Phase 1 of the DWSP.

Interest - The City plans to finance the initial project costs using fixed rate revenue bonds. The interest associated with this financing instrument, is included to represent the true costs of financing the project costs. The interest for this project totals $330 million. These costs are allocated to Phase 1 as a portion of the total project costs in relation to the total Phase 1 costs of the facility elements described above, or approximately 67%. This cost is also 66.7% related to growth (20 MGD/30 MGD), for a total of $147 million eligible for the fee calculation. This cost, when divided by the growth related capacity results in a cost per gallon of $7.36, or $3,657.00 per ERU.

Details of the calculations described are provided in Exhibit 2 in the Technical Appendix.

4.4.4 Debt Service Credits

The final step in calculating the City's DWSP SWSF was to determine if a credit for payment on debt service for the City's financing of these DWSP infrastructure improvements is applicable. As noted earlier, the City plans to use fixed rate revenue bonds to fund the project.

In the determination of the debt service credit, it was assumed that annual SWSF revenue could be used to pay for debt service and hence the total debt paid by rates was netted out against the amount of supply fee revenue projected to be received each year. This net debt service was then divided by the total number of ERUs in each year to determine the debt service credit per ERU. This annual amount was then discounted to 2009 dollars (when the City plans to implement the fee) to reflect the fact that a credit was being given for payments in the future.

In addition, the first three years of SWSF revenue are applied to a sinking fund. The first $7.5 million are set aside in a coverage reserve for the 2009 and 2010 bond issue. The balance is applied to the net debt calculation, to buy down the debt.

Based on the annual debt service and number of ERUs for each year for which future debt service payments will be made, the credit for debt service payments is ($1,654.00) per ERU. Details of the calculation of debt service credits are provided on Exhibit 3 of the Technical Appendix.

4.5 Net Allowable DWSP Surface Water Supply Fee

Based on the sum of the component costs calculated above, the net allowable DWSP surface water supply fee can be determined. "Net" refers to the "gross" supply fee, net of any debt service credits. "Allowable" refers to the concept that the City, as a matter of policy, may charge any amount up to the supply fee shown on Table 4-3. To charge a fee greater than the net allowable supply fee would not meet the nexus test of a cost-based supply fee with a "rational" nexus to the benefit derived from the service. A summary of the calculated net allowable supply fee for the City is shown below in Table 4-3. Details are provided in Exhibit 4 in the Technical Appendix.

Table 4-3
City of Stockton
Net Allowable DWSP Surface Water Supply Fee

Plant Component	Calculation Results
Raw Water Intake Facility	$167.00
Raw Water Pipeline	445.00
Water Treatment Plant	1,377.00
Treated Water Pipelines	143.00
Indirect Costs	274.00
Facility Financing Interest	3,657.00
Debt Service Credit	(1,654.00)
Total	$4,409.00
Net DWSP Supply Fee/ERU	$4,410.00

Meter Size	Supply Fees Weighting Factor (1)	Calculated Fee
3/4"	1.00	$4,410
1	1.67	7,365
1 1/2	4.00	17,640
2	5.33	23,505
3	10.67	47,055
4	16.67	73,515
6	33.33	146,985
8	53.33	235,185

(1) Based on City weighting factors associated with maximum continuous flow based on meter size; meters larger than 8" are formula based.

When combined with the City's existing water system connection charge of $1,836 and the New Melones fee of $3,359, the cost of connecting a new single family residence for water service will be $9,605. Larger connections pay proportionately more for their connections, by use of the weighting factors for larger meters.

4.6 Key Assumptions

In the development of the supply fees for the City's DWSP, a number of key assumptions were utilized. These are as follows:

- The determination of the allocation of costs for the WTP between Phase 1 and future phases was developed by CDM.
- The Surface Water Split Analysis developed by MWH determined the portion of DWSP improvements that were growth-related.
- HDR's recent project cost estimates and capacity analysis of the raw water intake and treated water pipelines were used to determine the costs allocable to Phase 1.
- The base year for the cost estimates was assumed to be 2009, or ultimately when the fee is to be implemented.

4.7 Consultant Recommendations

Based on our analysis and development of the City's DWSP supply fee, HDR makes the following recommendations:

- Once Phase 1 of the DWSP project is completed, the City should update the fee to final actual costs of the project.
- The City should update the fee whenever a major planning effort is completed related to the DWSP. This would include future phases.

4.8 Summary

The DWSP surface water supply fee developed and presented in this section of the report is based on the engineering design criteria of the DWSP, financing considerations, and "generally accepted" ratemaking principles. Adoption of the proposed SWSF will provide multiple benefits to the City and create equitable and cost-based charges for new customers connecting to the City's water system in the future.

Technical Appendix

Appendix A

DWSP SWSF Exhibits

City of Stockton
Exhibit 1
Delta Water Supply Project Surface Water Supply Fee - 2009
Development of ERUs

ERU = Equivalent Residential Unit

9,380,759	Single Family Residential water usage (ccf) from July 2007 to June 2008
40,557	Number of residential customers based on DWSP Water Rate Study (HDR, 2008)
0.6337	CCF/day/ERU
474	Average gallons/ERU/day
4.8%	Water losses based on 5-year average in City Water Master Plan (2008)
497	Average gallons/ERU/day with losses included
15,224,091	Total water usage, July 2007 to June 2008, CCF
11,934	Total water usage plus losses July 2007 to June 2008, MG

Year	Average Day MGD [1]	Total ERUs	Stockton Average Day ERUs [2]	Additional ERUs/Year [3]	Total ERUs	
2007	32.70	65,820	65,820	1,251	67,071	
2008			67,071	1,274	68,345	
2009			68,345	1,299	69,644	
2010			69,644	1,323	70,967	
2011			70,967	1,348	72,315	
2012			72,315	1,374	73,689	
2013			73,689	1,400	75,089	
2014			75,089	1,427	76,516	
2015			76,516	1,454	77,970	
2016			77,970	1,481	79,451	
2017			79,451	1,510	80,961	
2018			80,961	1,538	82,499	
2019			82,499	1,567	84,067	
2020			84,067	1,597	85,664	
2021			85,664	1,628	87,292	
2022			87,292	1,659	88,950	
2023			88,950	1,690	90,640	
2024			90,640	1,722	92,362	
2025			92,362	1,755	94,117	
2026			94,117	1,788	95,905	
2027			95,905	1,822	97,728	
2028			97,728	1,857	99,584	
2029			99,584	1,892	101,476	
2030			101,476	1,928	103,405	
2031			103,405	1,965	105,369	
2032			105,369	2,002	107,371	
2033			107,371	2,040	109,411	
2034			109,411	2,079	111,490	
2035			111,490	2,118	113,608	
2036			113,608	2,159	115,767	
2037			115,767	2,200	117,967	
2038			117,967	2,241	120,208	
2039			120,208	2,284	122,492	
2040			122,492	2,327	124,819	
Total ERUs				56,474		**2009 - 2040**

Notes:

[1] MGD calculated usage (plus losses) July 2007 to June 2008 for City (11,934 MG) divided by 365 days.

[2] ERUs calculated by total usage (including losses) divided by gallons per ERU times 365 days.
City usage from above (11,934 MG);

[3] Growth rate assumed for usage system-wide, of 1.9% per year.

City of Stockton
Exhibit 2
Delta Water Supply Project Surface Water Supply Fee - 2009
Capital Improvement Plan - Membrane Treatment Plant

Capital Projects	Total Estimated Cost [1]	Phase I Portion [2]	Phase I Costs	Phase I Existing [3]	Phase I Growth	Total Growth Eligible Cost	Basis for Phase I Allocation
Raw Water Intake Facility-related							
Design	$2,376,268	39.0%	$926,434	33.3%	66.7%	$617,623	Intake facility sized for 80 mgd - Phase I share = 30 mgd/80 mgd
Construction	23,523,900	39.0%	9,171,250	33.3%	66.7%	6,114,167	Pumps are 100% Phase I, sized for 30 mgd
Total Raw Water Intake-related	**$25,900,168**		**$10,097,685**			**$6,731,790**	
Phase I Growth Related DWSP Raw Water Intake Capacity (MGD) [3]						20.0	66.7% of 30 mgd = 20 mgd
Cost per Gallon						$0.34	
Average Gallons per ERU (Exhibit 1, [4])						497	
Cost per ERU for Raw Water Intake Facility-Related						**$167**	
Raw Water Pipeline Work-related							
Design	$1,849,448	50.0%	$924,724	33.3%	66.7%	$616,483	54" pipeline capacity is 60 mgd, Phase 1 share = 30 MG 30MG/60MG
Construction	51,848,144	50.0%	25,924,072	33.3%	66.7%	17,282,715	
Total Raw Water Intake-related	**$53,697,592**		**$26,848,796**			**$17,899,197**	
Phase I Growth Related DWSP Raw Water Pipeline Capacity (MGD) [3]						20.0	66.7% of 30 mgd = 20 mgd
Cost per Gallon						$0.89	
Average Gallons per ERU (Exhibit 1, [4])						497	
Cost per ERU for Raw Water Intake Pipeline Work-Related						**$444.58**	
Water Treatment Plant Facility-related							
Design	$3,893,580	81.4%	$3,167,581	33.3%	66.7%	$2,111,721	Based on CDM Design Criteria
Construction	98,332,257	81.4%	79,997,179	33.3%	66.7%	53,331,453	
Total WTP-related	**$102,225,837**		**$83,164,760**			**$55,443,173**	
Phase I Growth Related DWSP WTP Capacity (MGD) [3]						20.0	66.7% of 30 mgd = 20 mgd
Cost per gallon						$2.77	
Average Gallons per ERU (Exhibit 1, [4])						497	
Water Treatment Plant Facility-Related Cost per ERU						**$1,377**	

City of Stockton
Exhibit 2
Delta Water Supply Project Surface Water Supply Fee - 2009
Capital Improvement Plan - Membrane Treatment Plant

Capital Projects	Total Estimated Cost [1]	Phase I Portion [2]	Phase I Costs	Phase I Existing [3]	Phase I Growth	Total Growth Eligible Cost	Basis for Phase I Allocation
Treated Pipeline Work-related							
Design	$ 1,542,692	55.2%	$851,670	33.3%	66.7%	$567,780	
54" Construction	5,938,933	50.0%	2,969,467	33.3%	66.7%	1,979,644	54" pipeline capacity is 60 mgd, Phase 1 share = 30 mgd 30MG/60MG
42" Construction	4,550,137	59.0%	2,684,581	33.3%	66.7%	1,789,721	Phase 1 42" pipeline capacity is 24.4 mgd, Phase 1 share = 14.4 mgd 14.4MG/24.4MG
36" Construction	3,601,880	59.0%	2,125,109	33.3%	66.7%	1,416,739	Phase 1 36" pipeline capacity is 26.4 mgd, Phase 1 share = 15.6 mgd 15.6MG/26.4MG
Total Pipeline Work-related	**$15,633,642**		**$8,630,827**			**$5,753,885**	
Phase I Growth Related DWSP Treated Pipeline Capacity (MGD) [3]						20.0	66.7% of 30 mgd = 20 mgd
Cost per gallon						$0.29	
Gallons per ERU (Exhibit 1, [4])						497	
Cost per ERU for Treated Pipeline Work-Related Facilities						**$143**	
Indirect Project Costs							
Project Admin	$4,624,279	100.0%	$4,624,279	33.3%	66.7%	$3,082,853	
Permitting	3,781,434	65.2%	2,465,494	33.3%	66.7%	1,643,663	
Other Services	5,651,944	100.0%	5,651,944	33.3%	66.7%	3,767,963	
Acquisition and ROW	5,844,909	65.2%	3,810,879	33.3%	66.7%	2,540,586	
Total Indirect Project Costs	$19,902,566		$16,552,596			$11,035,064	
Phase I Growth Related DWSP Treated Pipeline Capacity (MGD) [3]						20.0	66.7% of 30 mgd = 20 mgd
Cost per gallon						$0.55	
Average Gallons per ERU (Exhibit 1, [4])						497	
Cost per ERU for Indirect Costs						**$274**	
Interest on Bonds							
Interest on Infrastruture Financing (Comb.) **[5]**	$330,369,269	66.8%	220,836,101	33.3%	66.7%	147,224,067	Phase I/Total project cost
Phase I Growth Related DWSP Capacity (MG) [3]						20.0	66.7% of 30 mgd = 20 mgd
Cost per gallon						$7.36	
Average Gallons per ERU (Exhibit 1, [4])						497	
Cost per ERU for Interest on Project Costs						**$3,657**	
Total Cost per ERU for DWSP Surface Water Supply Fee						**$6,063**	
	Total Cost Above	Facility Cost Est.	Interest Costs				
Check to total Capital costs [2]	$547,729,074	$217,359,805	$330,369,269				

Notes:

[1] Reflects DWSP Cost Study (HDR Design Estimates), CDM Design Estimates, City Cost Update April 2009.
[2] Reflects HDR pipeline Capacity report and CDM design estmates, April 2009
[3] From DWSP Surface Water Supply Analysis (MWH, August 2008).
[4] From Exhibit 1, based on usage and losses from July 2007 to June 2008, 2008 rate study.
[5] Actual interest on 2009 and 2010 bond issues. Allocated as a proportion of all Phase I expenses to the total project cost.

City of Stockton
Exhibit 3
Delta Water Supply Project Surface Water Supply Fee - 2009
Debt Service Credit

Year	Total Existing Debt Service	New Debt [1]	Total Debt Service	Supply Fee Revenue	Excess Supply Fee Revenue [2]	Net Debt Service	ERUs	Debt/ ERU	Debt/ERU ($2009)
2009	$0	$0	$0	$2,862,670	$2,862,670	$0	69,644	$0.00	$0.00
2010	0	1,468,258	1,468,258	5,834,121	4,365,864	0	70,967	0.00	0.00
2011	0	8,496,588	8,496,588	5,944,970	0	2,551,618	72,315	35.28	32.00
2012	0	9,498,888	9,498,888	6,057,924	0	3,440,963	73,689	46.70	40.34
2013	0	16,472,986	16,472,986	6,173,025	0	10,299,962	75,089	137.17	112.85
2014	0	18,605,375	18,605,375	6,290,312	0	12,315,063	76,516	160.95	126.11
2015	0	18,602,788	18,602,788	6,409,828	0	12,192,959	77,970	156.38	116.69
2016	0	18,606,888	18,606,888	6,531,615	0	12,075,273	79,451	151.98	108.01
2017	0	18,604,875	18,604,875	6,655,716	0	11,949,159	80,961	147.59	99.90
2018	0	18,556,000	18,556,000	6,782,174	0	11,773,826	82,499	142.71	92.00
2019	0	18,555,038	18,555,038	6,911,035	0	11,644,002	84,067	138.51	85.03
2020	0	18,557,356	18,557,356	7,042,345	0	11,515,011	85,664	134.42	78.59
2021	0	18,558,363	18,558,363	7,176,150	0	11,382,213	87,292	130.39	72.61
2022	0	18,559,150	18,559,150	7,312,497	0	11,246,653	88,950	126.44	67.05
2023	0	18,559,138	18,559,138	7,451,434	0	11,107,703	90,640	122.55	61.89
2024	0	18,551,950	18,551,950	7,593,011	0	10,958,939	92,362	118.65	57.07
2025	0	18,558,263	18,558,263	7,737,278	0	10,820,984	94,117	114.97	52.67
2026	0	18,558,506	18,558,506	7,884,287	0	10,674,219	95,905	111.30	48.56
2027	0	18,558,163	18,558,163	8,034,088	0	10,524,074	97,728	107.69	44.75
2028	0	18,558,250	18,558,250	8,186,736	0	10,371,514	99,584	104.15	41.21
2029	0	18,560,063	18,560,063	8,342,284	0	10,217,779	101,476	100.69	37.95
2030	0	18,560,338	18,560,338	8,500,787	0	10,059,550	103,405	97.28	34.92
2031	0	18,560,650	18,560,650	8,662,302	0	9,898,348	105,369	93.94	32.11
2032	0	18,557,150	18,557,150	8,826,886	0	9,730,264	107,371	90.62	29.50
2033	0	18,555,975	18,555,975	8,994,597	0	9,561,378	109,411	87.39	27.10
2034	0	18,555,150	18,555,150	9,165,494	0	9,389,656	111,490	84.22	24.87
2035	0	18,556,913	18,556,913	9,339,639	0	9,217,274	113,608	81.13	22.82
2036	0	18,558,338	18,558,338	9,517,092	0	9,041,246	115,767	78.10	20.92
2037	0	20,965,575	20,965,575	9,697,916	0	11,267,659	117,967	95.52	24.37
2038	0	20,965,013	20,965,013	9,882,177	0	11,082,836	120,208	92.20	22.40
2039	0	20,963,313	20,963,313	10,069,938	0	10,893,374	122,492	88.93	20.58
2040	0	20,965,925	20,965,925	10,261,267	0	10,704,658	124,819	85.76	18.90

Total Debt Service Credit ($ per ERU) **$1,654**

Notes:
[1] Assumes debt service for the current financing plan; $212.5 million in revenue bonds, two series 2009 and 2010.
[2] Establishes a sinking fund to reserve $7.5 million to meet coverage requirements (first two years). The balance is used to buy down debt in the initial years.

City of Stockton
Exhibit 4
Delta Water Supply Project Surface Water Supply Fee - 2009
Summary

Current Residential, Single family Water Connection Fee (3/4" meter)	**$1,836**
Calculated DWSP SWSF for 3/4" meter:	**$4,410**
Total Connection Charge (SWSF and DWSP)	**$6,246**

DWSP SWSF Calculation Results	
Raw Water Intake Facility-related	$167
Raw Water Pipeline Work-related	445
Water Treatment Plant Facility-related	1,377
Treated Pipeline Work-related	143
Indirect Project Costs	274
Interest on Bonds	3,657
Debt Service Credit	(1,654)
Total	$4,409
Net Allowable DWSP Fee	$4,409
Rounding for Implementation Purposes	**$4,410**

DWSP SWSF Implementation Method by Meter Size (inches)

Meter Size	**Current Weighting Factor** [1]	**Calculated Fee**
3/4"	1.00	$4,410
1	1.67	7,365
1 1/2	4.00	17,640
2	5.33	23,505
3	10.67	47,055
4	16.67	73,515
6	33.33	146,985
8	53.33	235,185

Notes:
[1] City weighting factors based on standard 3/4" meter. Based on maximum continuous flow.
[2] Formula based for meters greater than 8".

Appendix B

Surface Water Split Analysis-MWH (August 10, 2008)

DRAFT

Delta Water Supply Project (DWSP)
Surface Water Split Analysis

City of Stockton Municipal Utilities Department

August 10, 2008

Prepared by MWH

Table of Contents

Executive Summary 4
Introduction 7
Background 7
Water Supplies to SEWD WTP 8
Calaveras River/New Hogan Reservoir 9
Stanislaus River/New Melones Reservoir 11
New Appropriative Water Rights on the Calaveras River 12
Critical Year SEWD Transfers 12
Summary of SEWD Water Supplies 13
Delta Water Supply Project 13
California Water Code Section 1485 Water 14
Mokelumne River Contracts - Summary of the Woodbridge Irrigation District Water Agreement 15
Cost Allocation of the DWSP 17
General Modeling Approach 19
Water Supply Analysis 20
Recommendation 27

List of Figures

Figure 1. GP Update WSE Phasing Diagram (Long-Term Average Annual Conditions) 18
Figure 2. Base Scenario Groundwater Use Exceedance Diagram 23
Figure 3. Step 1 Groundwater Use Exceedance Diagram (Addition of 10 mgd DWSP Only) 24
Figure 4. Step 2 Groundwater Use Exceedance Diagram (with Critical Year SEWD Transfers and 10 mgd DWSP) 25
Figure 5. Water Supply Combination Bar Graph Indicating Critical Year SEWD Transfers and 10 mgd DWSP 25

List of Tables

Table 1. Current and Future SEWD Water Sources and Critical Year Availability 10
Table 2. Availability of Water Under the OID/SSJID Interim Water Contract 12
Table 3. WID Estimated Delivery Schedule 16
Table 4. Average SEWD 2035 Surface Water Supply Use by Contract and Hydrologic Year at 2009 Levels of the Water Demand and Development – Base Scenario with No DWSP Capacity 22
Table 5. Average DWSP 2035 Surface Water Supply Use Conditions by Contract and Hydrologic Year for 2009 Levels of Water Demand and Development (includes Critical Year SEWD Transfers and 10 mgd DWSP) 26

List of Abbreviations and Acronyms

AF – Acre-feet

AF/ac/year – Acre-feet per acre per year

AF/year – Acre-feet per year

Army Corps – United States Army Corps of Engineers

CACWD – Calaveras County Water District

Cal Water – California Water Service Company

CALSIM II – California Simulation Model II

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

CVPIA – Central Valley Project Improvement Act

DPH – California Department of Public Health

DWSP – Delta Water Supply Project

EIR – Environmental Impact Report

ESA – Endangered Species Act

GP Update WSE – General Plan Update Water Supply Evaluation

M&I – Municipal and Industrial Uses

mgd – million gallons per day

NEPA – National Environmental Policy Act

OID – Oakdale Irrigation District

POU – Place of Use

Purchase Agreement – January 2008 WID Purchase Agreement

Reclamation – United States Department of the Interior, Bureau of Reclamation

SEWD – Stockton East Water District

SSJID – South San Joaquin Irrigation District

SWRCB – State Water Resources Control Board

TAF – Thousands of Acre-feet

USBR – United States Bureau of Reclamation

WID – Woodbridge Irrigation District

WRDA – Water Resources Development Act

WTP – Water Treatment Plant

Executive Summary

The City of Stockton Municipal Utilities Department (COSMUD) is conducting a number of financial activities for the Delta Water Supply Project (DWSP). The title of this report, Surface Water Split Analysis, is intended to consider the DWSP cost allocation through improved water supply reliability throughout COSMUD's service area for existing City of Stockton retail water utility customers and supplemental water supplies for new development.

The analysis undertaken in this report provides supporting data for the financial studies to determine the applicable water utility user rate and new development connection fee (Surface Water Supply Fee) for the DWSP.

The existing sources of water supplies to COSMUD include treated surface water from Stockton East Water District (SEWD) water treatment plant (WTP) (sources from Stanislaus and Calaveras rivers), groundwater, and conservation (dry years only). The COSMUD, along with San Joaquin County and California Water Service Company (Cal Water), share and conjunctively use both surface water and groundwater to serve their respective retail customer water needs. The water associated with water rights/contracts from the Stanislaus and Calaveras river is stored in New Melones Reservoir (operated by the Bureau of Reclamation (Reclamation)) and New Hogan Reservoir (operated by the Army Corps of Engineers (Army Corps)), respectively. The quantity and temporal availability of surface water supplies from these two multi-purpose reservoirs to COSMUD are influenced by hydrologic changes, reservoir operations (for instream flow requirements, flood control, consumptive uses, water quality requirements, etc.) and water facility improvements. Under COSMUD's current conjunctive use program, use of groundwater for municipal purposes is limited to meeting unmet water demands after all surface water supplies have been exhausted. Measures to manage indigenous groundwater supplies underlying the City of Stockton have been implemented since the early 1970's by agriculture and municipal groundwater users to address salt water intrusion from the west and declining groundwater elevations in the east. Continuation of cooperative conjunctive use management programs could avoid permanent loss of groundwater resources from salt water intrusion.

This report also introduces the concept of ***Critical Year SEWD Transfers*** in years when surface water supplies to SEWD's WTP are less than 20 TAF/year. It is anticipated that, in those years (3 out of 70 years of historic hydrologic record or 4 percent of the years), SEWD and the urban water contractors would seek remedies to insure reliable water supplies to optimize the existing SEWD WTP and conveyance capacity through surface water transfers from senior water right holders (e.g., OID/SSJID) or CVP contractors on the Stanislaus River. Other potential programs may include: 1) purchasing groundwater from agricultural groundwater users in-lieu of their use of the water for irrigation, or 2) construction and implementation of a groundwater storage and recovery project where surface water is allowed to percolate into the aquifer in the wet years for recovery in dry years with no net impact to the groundwater elevations.

In addition to treated surface water from the SEWD WTP, groundwater from wells located throughout the water distribution system and ongoing water conservation practices, the COSMUD has identified and gained approval to proceed in the implementation of an additional source of water through the DWSP (See *City of Stockton Urban Water Management Plan*

(Kennedy/Jenks Consultants, Dec. 6, 2005), the *Water Supply Evaluations for the General Plan Update Preferred Alternative* (MWH Americas, Inc., Amended May 12, 2006), the *Delta Water Supply Project Feasibility Report* (ESA Consulting, MWH Americas, Inc., April 22, 2003), and *DWSP Environmental Impact Report* (ESA, MWH Americas, Inc., November 2005)). The DWSP will develop a new supplemental water supply for the COSMUD by taking Sacramento-San Joaquin Delta (Delta) water through a new intake located in the Delta northwest of the City of Stockton on Empire Tract. Waters to be treated at the new WTP will include the Delta water diverted under California Water Code Section 1485 and water from the Mokelumne River transferred under an agreement with Woodbridge Irrigation District diverted from existing irrigation canals.

The DWSP construction is scheduled to begin in 2009 with planned completion and start-up by late 2011. Once in operation, the DWSP WTP will provide additional surface water supplies necessary to enhance the existing conjunctive use program to protect the groundwater resources for existing and future water demands. This increase in water supply reliability from the DWSP benefits both existing rate payers and new urban development alike to ensure that sustainable groundwater supplies will be available in perpetuity.

Based on published reports, and supported with recorded field data, protection of the groundwater basin underneath the City of Stockton, in any year, can be achieved if urban groundwater pumping does not exceed 0.75 acre-feet per developed acre per year (AF/acre/year). In addition, as part of the DWSP Feasibility Report, a second groundwater management objective based on the long term average groundwater pumping (i.e., a rolling 10-year average is used for purposes of this study) was introduced at 0.60 AF/acre/year. In 2009 (the Target Year to represent existing rate payers), the total developed acreage of the City of Stockton is estimated to be 50,000 acres. The not to exceed urban groundwater use is calculated to be 37,500 AF/year (i.e., 50,000 acres * 0.75 acre-feet per acre per year) or 37.5 TAF/year. For COSMUD's service area, **14.5** TAF/year and **18.1** TAF/year are used as the long term average and single year not to exceed extraction amounts, respectively. Use of 2009 as the Target Year is based on the estimated timing of incurring debt for financing the design and construction of the DWSP for its completion by 2011.

This report quantifies how 2009 levels of water demand within COSMUD can be met through SEWD surface water supplies, DWSP surface water supplies, and water conservation. The water supply conditions are assumed to be under the future conditions of 2035; this is based on the planning horizon of the current 2035 General Plan (Updated in December 2007). Surface water facilities assumed to be operational include the SEWD WTP with planned expansions and build-out of the first phase (Phase 1) of the DWSP. ***Critical Year SEWD Transfers*** (as discussed above) of up to **12.5** TAF/year through the SEWD WTP are assumed to supplement existing supplies in **4** percent of the years. Groundwater is used to meet any remaining unmet demand.

With COSMUD's existing (2009) water demands, hydrologic model simulation results (from the 70 years of historical hydrologic conditions) show that if COSMUD's portion (**32.4** mgd of the total future 60 mgd WTP capacity) of the SEWD's WTP is the only surface water supply under 2035 water supply conditions, COSMUD's existing rate payers will have a **14** percent probability of exceeding the annual groundwater pumping limit of **18.1** TAF/year. To eliminate this **14** percent probability of exceedance, **10** million gallons per day (mgd) of treatment capacity

out of the planned 30-mgd Phase 1 DWSP is required, which is equivalent to **33** percent of the Phase 1 DWSP capacity.

Based on the reported results of this report, the recommendation is that existing rate payers be responsible for their pro-rata share of the DWSP cost (e.g., percent of the Phase 1 30-mgd DWSP facility needed for benefit of existing rate payers). The existing rate payers require **10** mgd, or **33** percent of the DWSP WTP capacity; therefore, their fair share cost should be **33** percent of the total DWSP cost. It is recognized that some facilities or portions of facilities of the Phase 1 project will be sized above 30 mgd; the cost associated with the oversized portion of the facilities should be attributed and assessed to existing rate payers based on the pro-rated basis of the facility (e.g., using 10 mgd as the existing rate payer need, a 40 mgd project element would be apportioned based on the ratio 10/40 or 25%). This method of apportionment of costs between existing rate payers and new development (i.e., capacity above 10 mgd) accounts for the economies, or lower unit cost, of building a larger facility at one time.

Introduction

The purpose of this memorandum is listed as follows:

- Provide the steps to addressing the City of Stockton Municipal Utilities Department's (COSMUD's) need for a sound, scientific methodology for determining how costs for the DWSP should be allocated between existing retail water users (rate payers) and future customers (new development) based on a hydrologic analysis of water supplies to the City of Stockton Metropolitan Area (COSMA)[1] utilizing data developed from 70 years of historical hydrologic conditions and the best available information for reservoir operations.

- Develop the extent to which the weight of the factual circumstances in determining the rate and fee methodology demonstrates that there is a direct nexus between the services provided by COSMUD through the DWSP and the amount of the user rate and development fee developed by COSMUD's financial consultant.

- Based on the study, identify the cost share split between COSMUD's existing and future customers of the DWSP.

In consideration of the above objectives, it is necessary to describe the exact disposition of the benefits from the DWSP and other elements of the conjunctive use program currently being implemented and planned for in the COSMA. Firstly, this memorandum provides context for COSMUD's current need for reliably meeting existing customer water demands; then it shows how a fair share distribution of the DWSP costs now and into the future can be equitably split between existing and future customers.

Background

The need for surface water in the COSMA was apparent in the 1960's with dramatically declining groundwater elevations and salinity intrusion into the groundwater aquifer used for potable drinking water and agricultural irrigation. The City of Stockton's first application for Delta water was originally proposed in 1973. The first Water Rights Application for Delta water was submitted to the State Water Resources Control Board (SWRCB) by the City of Stockton in 1976 for up to 45,000 acre-feet per year (AF/year).

In about the same timeframe, the Stockton East Water District (SEWD) in its role to replenish groundwater supplies in eastern San Joaquin County, pursued the acquisition of Sierra Foothill water entitlements and participated with the municipal partner agencies of the COSMA to construct a surface water treatment plant (WTP). 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 gradually increasing their treatment capacity up to 50 million gallons per day (mgd) for delivery of treated surface water to the region's urban areas through its

[1] The use of the term COSMA implies the City of Stockton's three water retailers (COSMUD, California Water Service Company (Cal-Water), and San Joaquin County) and their respective service areas. The term COSMA is used only for convenience when grouping the cooperating water retailers and should not be construed as a legal entity.

three urban contractors (water retail providers): COSMUD, California Water Service Company (Cal Water), and San Joaquin County. SEWD also provides raw surface water to agricultural users to further reduce groundwater use. Over the past five years, SEWD has expanded their WTP to 50 mgd and is planning an additional expansion to 60 mgd no later than 2015.

The City of Stockton prepared an Environmental Impact Report (EIR) in 1980 to support their Water Right Application and held a public hearing on February 3, 1981. Rather than pursue the Delta water, the people of the City of Stockton and the incumbent City Council opted to invest in the SEWD WTP and its sources of water supply. As a result, the Delta Water Right Application lapsed in 1985. In the early 1990's, the concerns over the reliability of City's long-term water supply arose in consideration of water needs of the then-current and future City of Stockton General Plans.

The City of Stockton submitted a new Delta Water Right Application to the SWRCB on January 6, 1996, as amended on September 25, 1997. The determination of inadequacy of SEWD supply sources was based on three factors. The first was on the Central Valley Project Improvement Act (CVPIA) of the early 1990's that reallocated water and reduced supplies for municipal and industrial (M&I) purposes from New Melones Reservoir and that the expected yield of supplies from the New Melones watershed was not as plentiful as originally expected. The second was the economic reality of the significant growth planned to take place in the City of Stockton region outpacing existing, interim, and planned water entitlements by 2015. The third was the threatened groundwater supplies and the need to maximize conjunctive use water programs in the COSMA to reduce reliance on groundwater in the wet years to allow the groundwater basin to recover and stem the salinity intrusion occurring from the west. Only through the continuation and expansion of conjunctive use programs could the region avoid permanent loss of groundwater resources and achieve a sustainable groundwater yield in perpetuity.

To date, the existing conjunctive use program is implemented through using SEWD surface water supplies, water conservation, and use of indigenous groundwater supplies. However, with anticipated diminishing surface water supplies to SEWD and increases in statewide water demand for growth and environmental purposes, protection of the groundwater basin under the existing conjunctive use program is in jeopardy.

Water Supplies to SEWD WTP

In 1987, SEWD agreed to provide a minimum of 20,000 AF/year to the City of Stockton 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 allocates the quantity of treated surface water from the SEWD WTP that each urban water contractor (COSMUD, Cal Water and the County) is to receive based on its percentage of total water used in the COSMA during the previous year. This methodology in capacity allocation accounts for the rate payers being the source of revenue for long-term bonds sold to construct the SEWD WTP. As a retail agency grows, the agency's contribution to paying off the bonds increases, thereby increasing their financial interest in the total WTP capacity. This methodology in allocating SEWD WTP capacity and its supplies amongst the three water retailers is especially relevant in deciding the available SEWD WTP capacity available to COSMUD evaluated as part of this study.

In 2006-2007, SEWD's WTP annual production of 43,640 AF was allocated as follows: 50.28 percent to COSMUD, 47.05 percent to Cal Water, and 2.67 percent County. Because of COSMUD's much more rapid growth in population and hence water demand during the past five years, its percentage of SEWD WTP output has increased by 7.43% from 2000 – 2001 while Cal Water's has declined by 6.68 % during the same period. The County's share has decreased slightly by 0.75 % during the same five-year period.

The COSMA currently receives surface water supplies via SEWD from five sources as shown in **Table 1:** two (2) from New Hogan Reservoir on the Calaveras River and three (3) from New Melones Reservoir on the Stanislaus River. Total existing firm supplies for municipal and industrial (M&I) uses are approximated to yield **74,170 acre-feet per year (AF/year)** under wet and above average hydrologic conditions. Their full entitlements including interim and future supply sources could yield **124,100 AF/year**. Currently, SEWD's ability to use its full 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's M&I water demand, 3) the capacity of the raw water delivery system to the SEWD WTP, 4) the rated SEWD WTP capacity, and 5) the treated water conveyance capacity from the SEWD WTP to the urban contractors. SEWD is currently pursuing a sixth source of water through Area-of-Origin statutes on the Calaveras River. This would be a junior appropriative water right and its reliability in dry year conditions will likely be small.

Calaveras River/New Hogan Reservoir

New Hogan Reservoir is owned and operated by the United States Army Corps of Engineers (Army Corps). Reclamation is responsible for the sale of water stored in the reservoir. Both SEWD and Calaveras County Water District (CACWD) hold riparian water rights along the Calaveras River and hold Reclamation contracts for additional water. The riparian water right is 12,650 AF/year for SEWD and 350 AF/year for CACWD with both considered as firm yields in all hydrologic years; this water is only for agricultural irrigation and it is not considered as a water supply for SEWD's WTP in **Table 1**.

Table 1. Current and Future SEWD Water Sources and Critical Year Availability

Source		Annual Contract Amount Thousand Acre-feet (AF)	Projected "Critical Year" Annual Availability (acre-feet/year) Planning Year			
			2000	2010	2020	2035
Current and Future "Firm" Sources of Supply						
Calaveras River/New Hogan Reservoir[4]	Reclamation New Hogan Water Supplies, CACWD and SEWD	Total Reclamation Contract Yield 84,100 AF [1] SEWD Entitled to M&I or Ag **40,171** AF	19,000	19,000	19,000	19,000
	Reclamation Unused CACWD Appropriative Water Rights	Unused CACWD Portion of 84,100 AF Reclamation Contract[2] (Currently estimated at approximately M&I **24,000** AF to 10,000 AF at build-out)	4,800	4,060	3,240	2,000
Stanislaus River/New Melones Reservoir	CVP New Melones Reservoir Interim Water Contract	Total Contract 75,000 AF[3] (Interim **10,000** AF)	Not Available in Critical Years			
	SSJID Transfer - Stanislaus River	(Interim M&I 15,000 AF) Contract termination assumed to take place in 2009	4,000	0	0	0
	OID Transfer - Stanislaus River	(Interim M&I 15,000 AF) Contract renewal is assumed to take place to 2025.	4,000	4,000	4,000	0
Calaveras River	Future Appropriative Water Rights on the Calaveras River	(Not Yet Determined, Assumed to be M&I available only in Wet and Above Normal years Only)	Not Available in Critical Years			
Critical Year SEWD Transfers	Future Critical Year SEWD Surface Water or Groundwater Transfers	(These are currently unspecified supplies that could be available with a high degree of certainty in select years through transfer agreements[5])	See Note 5			
Total		(Firm M&I **74,170** AF at build-out) (Approximate Max M&I **124,100** AF)	31,800	27,060	26,240	21,000

Notes:

1. This includes SEWD contractual right to 56.5 percent of the yield, and CACWD has rights to the remaining 43.5 percent. CACWD currently uses approximately 3,500 AF of its allocation, and use of their appropriative water rights is 13,000 AF.
2. Based on a legal opinion from SEWD to CACWD on March 21, 2007, SEWD currently has use of the unused portion of CACWD's appropriative water rights that yields approximately 24,000 AF in wet and above average conditions. For planning purposes, this amount is assumed to decrease to 10,000 AF as CACWD's demands increase through 2035; critical year supplies are assumed to be 20% of the wet and above average condition amount.
3. An interim CVP settlement contract for delivery of up 10,000 AF/year in wet and above average conditions is currently in place.
4. Reliability of New Hogan supplies reduce as water demands increase due to the Corp's need to meet carryover storage in New Hogan reservoir from year to year. Values shown may decrease based on the Corp's reservoir operations.
5. Transfer agreements are likely to occur with upstream senior water right holders on the Calaveras and Stanislaus Rivers or through purchase agreements for groundwater from agricultural in-lieu of their use of same for crop irrigation. Additionally, SEWD may develop groundwater banking programs that store surface water supplies in the wet years for use in the dry and critical years with no net impact to the groundwater basin.

On August 25, 1970, SEWD and CACWD entered into an agreement with Reclamation for surface water supplies from New Hogan Reservoir in addition to their riparian water rights. Based on the 1970 agreement, it is estimated that the annual safe yield from the New Hogan Reservoir is 84,100 AF; after the 13,000 AF total riparian water rights, the remaining 71,100 AF is split between SEWD (56.5 percent or up to 40,171 AF in **Table 1** as ***Reclamation New Hogan Water Supplies, CACWD and SEWD***) and CACWD (43.5 percent or up to 30,929 AF) for irrigation and urban uses. The maximum amount of 40,171 AF to SEWD is identified as ***Reclamation New Hogan Water Supplies, CACWD and SEWD*** in **Table 1**.

It is estimated that the CACWD would only use up to 7,000 AF/year of its 30,929 AF from New Hogan Reservoir in 2025; the remaining 23,929 AF/year, shown as ***Reclamation Unused CACWD Appropriative Water Rights*** identified in **Table 1**, could be diverted by SEWD for municipal and agricultural uses. The question of whether the COSMA can claim unused CACWD entitlement as a firm water supply is addressed in the following quote from SEWD's attorney (March 21, 2007, Herum Crabtree, Brown, Attorneys at Law):

> *"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 entitlement can be made available to SEWD pursuant to the New Hogan agreements. For purposes of this analysis, and to remain conservative, the assumption is that only 10,000 AF/year will be available in 2035 for SEWD. Furthermore, over the planning period of 2000 through 2035, only 20 percent of the wet year amount will be available to SEWD in critical years.

For purposes of this analysis, the forecasted availability of water from New Hogan Reservoir is based on data that reflects the operation rules assumed in the September 4, 2006 version of California Simulation Model II (CALSIM II), which is a statewide water resources planning model jointly developed by California Department of Water Resources and Reclamation. Each year, there is a storage target for September to ensure there will be enough water stored going into the next year (i.e., often referred to as carryover storage). Under some extremely dry conditions, monthly deliveries to all users of New Hogan Reservoir are reduced or even cutoff to maintain the necessary carryover storage.

Stanislaus River/New Melones Reservoir

In 1983, SEWD contracted with Reclamation for 75,000 AF/year of surface water supply from the New Melones Project on the Stanislaus River to be delivered at Goodwin Dam.

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 supply. However, as mentioned above, in the mid 1990's, implementation of the CVPIA and other regulatory actions substantially reduced the volumes of water SEWD could expect to be delivered under its New Melones CVP contract, especially in dry years. For purposes of this report, up to 10,000 AF/year of surface water of the original 75,000 AF/year contract will be made available by Reclamation through their New Melones CVP Project in wet years per the 1997 New Melones Reservoir Interim Operation Plan. Under some dry years, SEWD receives no water out of this contract. This CVP supply is identified as ***Reclamation – New Melones Interim Water Contract*** in **Table 1**.

Also included on the Stanislaus River are two interim contracts; one from Oakdale Irrigation District (OID) and the other from South San Joaquin Irrigation District (SSJID); herein referred to as the OID/SSJID contract. SEWD and the urban water retailers have arrangements for interim water transfers from OID and SSJID, which hold senior appropriative water rights on the Stanislaus River. These two interim water contracts are identified as ***SSJID Transfer - Stanislaus River*** and ***OID Transfer - Stanislaus River*** in **Table 1**.

The OID/SSJID contract includes an option to renew for a minimum of a ten-year period upon expiration in 2009, subject to mutually agreed conditions. The OID/SSJID contract is currently for up to 30,000 AF/year, 15,000 AF/yr from each district. The projected variability of supply available to SEWD under the April 1997 OID/SSJID contract is shown in **Table 2**. While both contracts are due to expire in 2009 (with a possible ten year renewal), the City of Stockton is pursuing a renewal of only one of the contractors and OID has indicated in its Water Resources Plan that it intends to implement long term water transfer agreements in order to fund improvements to its delivery infrastructure. Therefore, as part of this work, it is assumed that one of the two contracts will be renewed and that the contract will contain a 10-year renewal option similar to terms of the original agreement. In 2035, there would be no water transfer from either OID/SSJID unless some critical year transfer agreement is made.

Table 2. Availability of Water Under the OID/SSJID Interim Water Contract

Percentage of Years (see note below)	Volume Available Annually Prior to 2009 (AF/year)
85%	30,000
9%	12,500
6%	8,000

Note:
Percentage of years is based on the existing contract that stipulates that 30,000 AF/year of water is available in years in which the Reclamation forecast for inflow to New Melones Reservoir is forecasted to be greater than 500,000 AF, 12,500 AF/year if between 450,000 AF and 499,000 AF, and 8,000 AF/year if less than 450,000 AF.

New Appropriative Water Rights on the Calaveras River

Additionally, this report recognizes that SEWD is pursuing its own appropriative water rights to the Calaveras River in the total amount of 20,000 AF/year in wet and above-normal years. However, because of the uncertainties in obtaining a new water right permit and the special conditions that may be attached to the permit, no amount of this water is used in this report. This water is identified as Future Appropriative Water Rights on the Calaveras River in **Table 1**.

Critical Year SEWD Transfers

Through an initial phase analysis of SEWD's surface water supplies under 2035 conditions, there were years (less than 5 percent probability) when surface water supplies to SEWD's WTP were less than 20 TAF/year. It is anticipated that, in those years, SEWD and the urban water contractors would seek remedies to insure reliable water supplies to optimize the existing SEWD WTP and conveyance capacity through surface water transfers from senior water right holders (e.g., OID/SSJID) or CVP contractors on the Stanislaus River. Other potential programs may include: 1) purchasing groundwater from agricultural groundwater users in-lieu of their use of the water for irrigation, or 2) construction and implementation of a groundwater storage and recovery project where surface water is allowed to percolate into the aquifer in the wet years for recovery in dry years with no net impact to the groundwater elevations.

This water is identified as Critical Year SEWD Transfers in **Table 1**. The amount of water shown in the Critical Years is based on the modeling that follows. This is not considered to be a firm supply, but rather, a contingency supply that is reliable, if needed.

Summary of SEWD Water Supplies

Based on the above discussion, availability of existing water contracts from the Calaveras and Stanislaus rivers would likely be reduced due to dry year shortages, the temporary nature of interim water from OID and SSJID, and the junior status of any new appropriative water right. It is also anticipated that the reliability of these existing and future water supplies will reduce over time.

To address the above shortage, the DWSP has been selected as the environmentally superior alternative to providing a secure, reliable supplemental supply of water for COSMUD to meet the current and future water needs while reducing dependence on and protecting groundwater. Only through additional sources of water supplies like Delta water and Mokelumne River transferred through Woodbridge Irrigation District (WID) can the COSMUD enhance their water supply reliability and conjunctive use opportunities.

Delta Water Supply Project

There are three objectives of the DWSP, each with its own recognized benefits:

- To replace declining and unreliable surface water supplies.
- To protect and restore groundwater resources.
- To provide adequate water supplies to accommodate planned growth.

The DWSP is a multi-phased surface water project that is viewed as having two distinct phases. Phase 1 is the critical phase of the DWSP that has undergone the California Environmental Quality Act (CEQA) evaluation and is depicted in all studies at the project level. Phase 1 is a 30-mgd WTP that achieves the following: 1) meets existing water demands that are threatened by reductions in existing surface water and groundwater supplies, 2) meets flexible and consistent groundwater management of the groundwater basin underlying the COSMA, and 3) meets growing water demands from new development in the COSMUD from present to build-out of the 2035 General Plan. Phase 2 of the DWSP is viewed as the next increment of DWSP capacity based on future water demands and has been evaluated in the planning documents at the programmatic level only. Phase 2 will focus on the latter two objectives (i.e., groundwater management and meeting demands for planned new growth as approved by the City Council). The City will prepare and complete CEQA environmental review for Phase 2 in conjunction with seeking any additional water rights from the SWRCB for water in addition to that provided in Water Right Permit 21176, dated March 8, 2006.

The ultimate capacity of the DWSP is planned for 160 mgd phased over many years to build-out of the water right application. It is important to note that certain elements of the Phase 1 DWSP will be constructed for more capacity than the initial 30 mgd capacity due to economies of being in the river for the intake, having no more than two large raw water pipelines in the right-of-way, and constructing non-treatment related structures at the initial phase for administration and operations.

On April 22, 2003, Stockton's City Council approved the DWSP Feasibility Report and directed the COSMUD staff to complete the necessary environmental studies to comply with the CEQA

and the National Environmental Policy Act (NEPA). An environmental impact report ("EIR") was prepared to satisfy CEQA with respect to the DWSP. 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 the SWRCB, which issued a permit for a Delta diversion for Phase 1 in the amount of 33,600 AF/year (or 30 mgd at 24 hours a day, 7 days a week, 365 days a year) on March 8, 2006. It should be noted that the pattern of use is likely not going to be a steady state, especially in the beginning years, and will follow a typical monthly diurnal pattern with water use higher in the summer months and lower in the winter months, and will be subject to Endangered Species Act (ESA) diversion curtailments in certain times of the year. For purposes of this analysis, ESA curtailment in diversions is assumed to take place during the March through June period. 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. Delta water will likely be replaced by WID water during periods of curtailment.

With certification of the EIR and the SWRCB water right permit issuance, the City is proceeding with design and construction of Phase 1 of the DWSP. Upon start up of the Phase 1 DWSP, a third source of water supply will be made available to the COSMUD to supplement existing treated surface water supplies from the SEWD WTP and existing groundwater supplies from wells located throughout COSMUD's service area. The reliability of water supply resources for the COSMUD will be greatly enhanced for the next 20 or more years while plans and agreements are secured for increased water supplies for the long-term build-out of the COS General Plan and any updates thereto. Phase 2 DWSP will be pursued only when water demands and groundwater supplies require the additional supply capacity. As mentioned above, a separate approval process for Phase 2 DWSP will take place at that time.

There are two sources of water supplies for Phase 1 DWSP WTP: the Delta water diverted under California Water Code Section 1485 through the new DWSP intake and Mokelumne River water transfer from the WID Water Purchase Agreement.

California Water Code Section 1485 Water

Under California Water Code Section 1485, 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. 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 Place of Use (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. Due to the listed status of Delta smelt under the Federal Endangered Species Act, it is assumed that Section 1485 water would not be available through the period from the last half of April through the first half of June; the sensitive Delta smelt migratory periods.

Mokelumne River Contracts - Summary of the Woodbridge Irrigation District Water Agreement

In January 2008, the COSMUD entered into a forty (40) year agreement (with renewal provisions) with WID to effectuate the delivery of WID's surface water supplies to the COSMUD. The agreement, entitled, "Agreement for the Purchase of Water from the Woodbridge Irrigation District (WID) by the City of Stockton", referred to herein as Purchase Agreement, includes a detailed description of this water entitlement and its future use by the COSMUD to serve urban water demands. A summary of the WID water entitlement the Purchase Agreement is provided below.

WID is an irrigation district that is located immediately south and west of the City of Lodi and immediately north of the City of Stockton. WID's water entitlements include: 1) a pre-1914 appropriative water right for diversion from the Mokelumne River at Woodbridge Dam of up to 300 cubic feet per second (cfs), 2) a SWRCB Water Right License for irrigation use for the appropriation of 300 cfs from February 1 to October 31, and 3) a SWRCB Water Right License for the diversion of an additional 114.4 cfs from May 1 to August 31 of each year and from November 1 of each year to January 31 of the succeeding year. The combined water rights are limited to a maximum instantaneous diversion rate of 414.4 cfs.

Water delivered by WID to the COSMUD is termed as surplus water that WID has determined to be available due to increased water efficiency practices in agriculture and the urbanization of agriculture lands within portions of WID's service area. Surplus water is defined as water that is in excess of the needs of the landowners and water users within WID's service area as required by Section 22259 of the State Water Code. Delivery of surplus water to the COSMUD will be accomplished through conveyance facilities that traverse the northerly portion of the COSMUD's north service area as described in the Purchase Agreement. WID has determined that the surplus water made available to the COSMUD implies no permanent right to the water except pursuant to and as limited by the Purchase Agreement.

Delivery of WID water to the COSMUD could occur as early as January 2009, in the amount of 6,500 AF/year. Use of this water by the COSMUD requires the completion and commencement of operation of the DWSP which is planned to occur by 2011. The general terms of the Purchase Agreement require that the COSMUD make quarterly fixed payments (with inflationary increases) to WID commencing on January 2009. In lieu of water deliveries in 2009 (i.e., the DWSP will not be operational until 2011), monies paid in the first year of the Purchase Agreement will pay for capital improvements in WID's conveyance system and any associated right-of-way costs to insure a reliable delivery system to the COSMUD once deliveries begin. The COSMUD is responsible for all costs to design, construct, operate and maintain facilities to measure and deliver water from WID's canal system.

Water from WID will be diverted along the Wilkerson Lateral Canal as shown in Exhibit "A" of the Purchase Agreement. The water will be delivered during the period from March 1 through July 31 of each year at a uniform rate of delivery in accordance with the approved monthly delivery schedule. No later than February 15 of each year the COSMUD will provide WID with their annual estimate of water during each month of that year from March 1 through July 31. The monthly delivery schedule will require WID's approval. As an example, **Table 3** indicates a likely "Estimated Delivery Schedule" for any given year.

Table 3. WID Estimated Delivery Schedule

Month	Amount (AF)
March	1,000±
April	1,000±
May	3,000±
June	1,500±
July	1,000±
Total	6,500[1]

Note:
The monthly delivery allocations are approximated to achieve an overall maximum delivery of 6,500 AF within the five month period.

In the event that the COSMUD does not make use of the entire 6,500 AF within the five month period, the Purchase Agreement includes provisions for WID's delivery of any unused water during the period from August 1 to October 15. Water in excess of 6,500 AF may also occur by mutual agreement of WID and the COSMUD at an additional volume-based cost to the COSMUD. The determination of any additional supplied water to the COSMUD is made solely by WID. Additionally, the COSMUD may request delivery of non-WID Mokelumne River water rights through WID facilities subject to WID having the available additional capacity. The Purchase Agreement also provides for the future purchase of additional firm water up to an additional 6,500 AF/year based upon the COS's annexation of additional lands that lie within WID's service area.

The reliability of WID water is considered to be firm because it is a pre-1914 Water Right. However, in extremely dry years when forecasted runoffs in the Mokelumne Watershed indicate that the inflow to Pardee Reservoir as of July 1 may be less than the total quantity of 375,000 AF, WID may reduce the amount of water to be provided to the COSMUD by up to 50 percent. These forecasts begin in March of each year and extend to July 1 of the same year. Because runoff estimates take place during the period of WID's delivery to the COSMUD, the COSMUD may take 100 percent of their estimated monthly water until and if the estimated July 1 inflow results in less than 375,000 AF of storage in Pardee Reservoir. Conversely, COSMUD may take up to 50 percent of their permitted allocation until the July 1 forecast is greater than 375,000 AF. Any undelivered amount of WID water, as a result of dry year conditions or because of WID maintenance and operations activities, may carryover and credit the COSMUD for the amount of lost water for later delivery at such time as WID has extra water available as determined solely by WID.

For purposes of modeling COSMUD's WID supply, the raw water supply for the DWSP will be a mixture of Delta and WID supplies during the delivery months when both supplies are available. At any given time, operations of the DWSP will need to be evaluated to reduce significant changes in water quality as the two supplies are blended over the delivery period. During the last half of April through the first half of June when curtailments in diversions from the Delta are required for the protection of endangered fish species, the WID water may be the sole source of surface water supply treated by the DWSP. While other Mokelumne River supplies may be purchased and wheeled through WID facilities, these supplies are not firm and are not included in COSMUD's water supply portfolio. A shortage of WID supplies of up to 50 percent or 3,250 AF of water is assumed in the critical hydrologic years. In addition, the WID

supply is given the highest priority for use at the DWSP given that the water supply is paid for regardless of use and its limited five month delivery period.

Cost Allocation of the DWSP

Once in operation, the DWSP WTP will provide the additional surface water supplies necessary to enhance the opportunity of COSMUD's existing conjunctive use program to protect the groundwater resources for existing and future water demands. This increase in water supply reliability from the DWSP benefits both existing rate payers and new urban development alike to ensure that sustainable groundwater supplies will be available in perpetuity.

Based on benefit, the costs for construction of the DWSP need to be allocated among existing rate payers and new development using the following guidelines:

- Water produced from the DWSP is not solely for new planned growth.
- Water treated by the DWSP will be conveyed into a system with groundwater and surface water from SEWD.
- Groundwater vitality and sustainability are critical objectives of the DWSP, but cannot be solely attributed to the DWSP.

While the DWSP will provide additional maximum day capacity, the true benefit of the WTP is in the ability to provide a large volume of surface water throughout the year. Maximum day capacity benefits need to be discounted due to there being other sources, namely groundwater, to meet maximum day demands (i.e., instantaneous capacity for a few days in the year, or for meeting fire-flow protection requirements, is not an objective of the DWSP and can be viewed as capacity that could come from existing wells).

The DWSP WTP is only one of several supplies (SEWD WTP, groundwater, and DWSP WTP) that will be used to meet existing and future potable water demands in the COSMUD service area (note: raw water from irrigation districts may also be a supply to meet non-potable urban demands). An additional supply stems from implementation of firm water conservation policies.

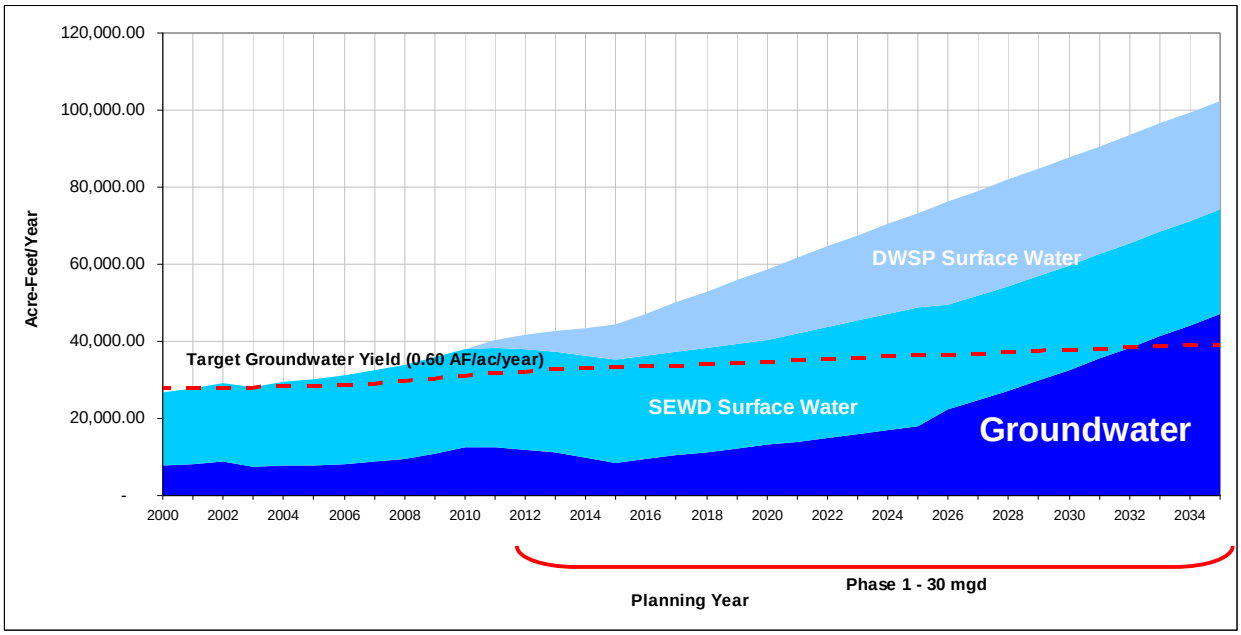
The amount of water from SEWD is viewed as highly variable based on the City's total water demand, the hydrologic year type and its effect on the yield from the various surface water supply contracts, the capacity of the SEWD WTP, and the raw and treated water system capacity and conveyance.

Per the January 2003 DWSP Feasibility Report (MWH, 2003), the DWSP is portrayed as an integral part of the larger conjunctive use program for the City of Stockton, which identified phases of the DWSP, groundwater wells, and increased capacity at the SEWD WTP as a composite solution package in meeting the City of Stockton's 1990 General Plan build-out (2015) water demands and growth to 2050.

The General Plan Update Water Supply Evaluation (GP Update WSE) completed in May 2006 has a simple graph similar to **Figure 1** below showing the long-term average annual conditions for buildup of demand, the first phase of the DWSP (i.e., use of the full DWSP Phase 1 capacity

of 30 mgd), and the contribution from increased capacity at SEWD and from groundwater. The time scale is not as relevant as the water demand y-axis, given that average water demands (i.e., after water conservation) will dictate the second phase of the DWSP regardless of year. This figure shows that groundwater extractions are at or slightly above the sustainable yield at build-out of the GP Update with only Phase 1 of the DWSP, thus necessitating Phase 2 of the DWSP (not shown) at or slightly after General Plan build-out.

Figure 1. GP Update WSE Phasing Diagram (Long-Term Average Annual Conditions)



Note: The upper-most line depicts the average annual water demand with water conservation from rationing already taken out.

If a slice were taken at any time (or level of water demand) in the graph above, the allocation of the DWSP between existing and future customers will vary. This is due to nature not always providing an average rainfall condition. The wet and dry patterns in hydrology can only be described using statistics and levels of probability. For instance, the above graph represents the average contribution from each source over a period of 70 consecutive hydrologic year conditions. In normal to wet hydrologic years, the SEWD WTP is maximized to the extent possible, then the DWSP and then groundwater. This is why there is a gradual buildup of increased contribution from the DWSP even though there is 30 mgd of capacity available in 2011. In dry years, however, the SEWD WTP will be curtailed significantly and the full 30 mgd capacity may be used to the extent that water demands are high enough to use the full 30 mgd 24 hours a day 7 days a week for 365 days out of the year or that the diurnal pattern allows for the full use of the 33,600 AF/year of water right entitlement.

In the early years, existing rate payers benefit most; such as, in extreme dry years when, in the summer months, the SEWD WTP raw surface water supplies are severely curtailed. As demands increase, this reliance becomes greater but more can be attributed to higher demands as a result of new growth more so than any other contributing factor. For this reason, benefits to existing users should be viewed at or near the time the DWSP is constructed. After this period, existing users will continue to benefit to a higher degree but only because water demands have increased as a result of new growth. The apportionment of costs to existing rates and development fees

will compensate for this benefit and new customers will be paying the higher rate once in service and will be receiving the increased benefits over time. Existing customers will still only be paying for their share of the benefit for replacement supplies and maintaining the vitality of the groundwater basin.

In order to provide an equitable allocation of costs between existing rate payers and new development, this report is to address four fundamental objectives:

1. Develop and describe the methodology to determine the share of Phase 1 30-mgd DWSP capacity for existing rate payers.

2. Calculate the cost split of Phase 1 30-mgd DWSP facility between existing and new potable water users within the COSMUD service area. It is recognized that some facilities or portions of facilities of the Phase 1 project will be sized above 30 mgd; the cost associated with the oversized portion of the facilities should be attributed and assessed based on the pro-rated share of the facility using the capacity for existing rate payers as the basis.

3. Provide the calculation tools to support the determination of COSMUD's user rates and development fees (to be completed by COSMUD's financial consultant) based on the cost split determined in the second objective.

4. This report provides one method of apportionment of costs by defining the benefits of all components of the conjunctive use program, of which the DWSP and associated facilities are but one part, and then report only on the DWSP for purposes of securing bond financing for the DWSP project. Costs for other elements of the conjunctive use program will be handled in later documents given that there is no pressing need for these facilities until after the Phase 1 DWSP is constructed and operated for a few years.

General Modeling Approach

Based on published reports, and supported recorded field data, protection of the groundwater basin underneath COSMA, in any year, can be achieved if urban groundwater pumping does not exceed 0.75 acre-feet per developed acre per year (AF/acre/year) in any one given year and 0.60 AF/acre/year over a long-term average (i.e., a rolling 10-year average is used for purposes of this study). For COSMUD, in 2009 (the Target Year to represent existing rate payers), the total estimated developed acreage of the COSMUD service area is estimated to be **24,164** acres. The not-to-exceed in any one year urban groundwater use is calculated to be **18.1** TAF/year (i.e., **24,164** acres * 0.75 acre-feet per acre per year) and the not to exceed long-term average groundwater use is **14.5** TAF/year (i.e., 24,164 acres * 0.60 acre-feet per acre per year).

This report analyzes the adequacy of water supplies based on 2009 levels of water demand using SEWD supplies, groundwater, and water conservation. The analysis projects SEWD WTP water supply conditions and available infrastructure under the future conditions of 2035; this is based on the planning horizon of the 2035 General Plan and build-out of the first phase (Phase 1) of the DWSP. Groundwater is used to meet any remaining unmet demand. If supplies are shown to be inadequate, the DWSP capacity is incrementally included in the water supply mix to achieve the desired levels of sustainable groundwater supplies.

The historical hydrologic conditions of water years 1922 through 1991 are used to simulate the available water supplies to SEWD WTP and DWSP WTP under different hydrologic conditions. Using 2009 water demands and 2035 water supply conditions, the simulation is run to identify years with a groundwater use in exceedance of **18.1** TAF/year. These are years that would require additional surface water either through SEWD or the DWSP to meet existing rate payers' water demand. The exceedance amount is used as an index for the iterative calculation to determine the capacity share of Phase 1 DWSP to be used by the existing rate payers to reduce their groundwater pumping to sustainable levels.

Water Supply Analysis

Details of modeling assumptions are as follows:

- Simulation period: Historical hydrology from water year 1922 through 1991.
- Annual water demand of existing COSMUD rate payers is **37,716** AF to reflect 2009 (the Target Year) development condition.
- Conservation: **10%** in San Joaquin Valley Dry years and **15%** in critical years.
- SEWD WTP capacity is 60 mgd.
  - Assuming 2009 water demand conditions, use of SEWD WTP capacity by COSMUD is limited to 54% of the total WTP capacity (**32.4** mgd) as per the terms of the second amended agreement described in the above discussion titled, *Water Supplies to SEWD WTP*. Cal Water and the County will use the remaining 46% of the capacity. Available surface water supplies are constrained by the allocated SEWD WTP capacity and by curtailments to the water supplies during dry hydrologic conditions.
  - SEWD contract with Reclamation on New Hogan Reservoir of up to 40,171 AF/year.
  - Unused CACWD with Reclamation on New Hogan Reservoir of up to 10,000 AF/year.
  - CVP New Melones Interim Contract of up to 10,000 AF.
- DWSP WTP maximum Phase 1 capacity is 30 mgd.
- Water supplies to DWSP WTP based on 2035 conditions:
  - Section 1485 surface water based on 41 percent of the 2009 water demand; not available during the period from the last half of April through the first half of June.
  - Up to 6,500 AF/year water transfer from Woodbridge ID.
- Based on an apportionment of groundwater using calculated service areas, the maximum one-year groundwater pumping for COSMUD and the County = 18,123 AF/year (or **18.1** TAF/year) (0.75 AF/acre/year* developed acreage of 24,164 acres) and the average groundwater yield using a rolling 10 year average = 14,498 AF/year (or **14.5** TAF/year) (0.60 AF/acre/year* developed acreage of 24,164 acres).

- Development of groundwater facilities are assumed to take place as needed.

The annual results are presented in three formats: (1) an exceedance diagram for groundwater usage, (2) a bar chart for all water supplies for the 70 years of historical hydrology (water year 1922 through 1991), and (3) a summary table of long-term annual average usage of all water supplies for the five San Joaquin Valley water year types (wet, above normal, below normal, dry, and critical).

(Note: Due to forecasting uncertainties, modeling results should provide more conservative water supply conditions under various historical hydrologic settings versus what will likely take place under real-time operations. Actual surface water curtailments will be influenced by real life conditions and other future water supply measures that are not perceived during the development of this report.)

There are three modeling steps in total: (1) Base Case- represents COSMUD's water supply conditions with supplies from only SEWD WTP, groundwater, and conservation; (2) Step 2 represents DWSP supplies needed to reduce single year groundwater exceedances to less than 95 percent of the years (3) Step 3 represents Step 2 conditions plus ***Critical Year SEWD Transfers*** to achieve compliance with groundwater objectives 100 percent of the time. Details are as follows:

Step 1 Base Case

Under the Base Scenario, water supplies to COSMUD include treated water from SEWD's WTP, groundwater, and conservation (rationing). The model run considers how the COSMUD utilizes its available water supplies based on hydrologic and operational conditions. **Table 4** provides a summary of each water supply source based on hydrologic year type. For the Base Scenario model run the long-term average annual groundwater use under each year type does not exceed the sustainable yield goal of **14.5** TAF/year but there are single years with pumping in excess of the single year target yield (see the last two rows of **Table 4**) of **18.1** TAF/year. One reason for the greatest groundwater use occurring in the Below Average Year category is a result of reservoir operations where back-to-back Critical Years with full rationing and reduced reservoir carryover storage are followed by a Below Average Year with no rationing and higher carryover storage requirements forcing Reclamation to hold back reservoir releases for water supply purposes (i.e., CACWD and SEWD).

Figure 2 is an exceedance plot illustrating that groundwater pumping exceeds **18.1** TAF/year in **14** percent of the years or is not exceeded in **86** percent of the years. A corresponding figure for the long term average groundwater extraction rate is not included since the groundwater exceedance is not the overriding constraint for needed DWSP WTP capacity. In the end, the overall hydrologic conditions will be less than the goal of **14.5** TAF/year (the annual target groundwater yield for 2009). The maximum single year groundwater use of **33** TAF/year occurs under average year historic hydrologic condition (Water Year 1962) for the reasons described above. The stair step nature of the exceedance line is an artifact of the differences in availability of surface water for each of the hydrologic year conditions and assumed reservoir operation rules.

Figure 2 clearly illustrates the problem by showing an exceedance in groundwater use above **18.1** TAF/year in **14** percent of the years, but also raises the significant question of how much of

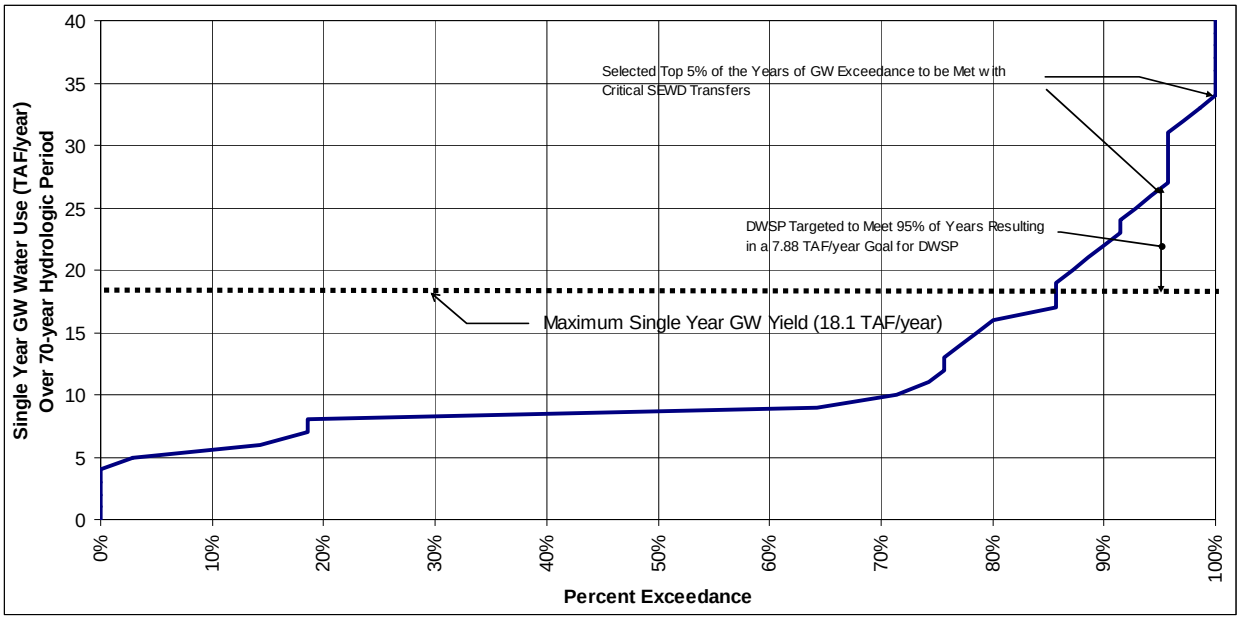
this problem is to be corrected through the DWSP versus applying other more "short term" measures such as water transfers. The solution is based on what is the best value for the existing rate payer to either build more DWSP capacity or seek other alternative sources that may or may not be within the existing fee and rate structure. Based on reasonable expectation of the DWSP WTP serving 2009 water demands, the best value in terms of reducing the number of years of exceeding the **18.1** TAF/year and decreasing overall groundwater use over the long-term is estimated to be at a point where the DWSP is sized to meet water demands and groundwater objectives in all but the last 5 percent of the years. This implies that, for facility design purposes, the capacity of the DWSP for the existing rate payer should be able to maintain the groundwater use below **18.1** TAF/year for **95** percent of the years.

Table 4. Average SEWD 2035 Surface Water Supply Use by Contract and Hydrologic Year at 2009 Levels of the Water Demand and Development – Base Scenario with No DWSP Capacity

SEWD Supplies	Wet (TAF/year)	Above Average (TAF/year)	Below Average (TAF/year)	Dry (TAF/year)	Critical (TAF/year)
CVP New Melones Reservoir Interim Water Contract	4.63	3.47	3.32	2.97	0.94
New Hogan Reclamation Contract	20.71	19.75	18.84	19.31	14.65
Future Appropriative Water Rights on the Calaveras River	0.00	0.00	0.00	0.00	0.00
New Hogan Unused CACWD Reclamation Contract	5.18	4.94	4.71	4.83	3.66
OID/SSJID (not available in 2035)	0.00	0.00	0.00	0.00	0.00
Critical Year SEWD Transfers	0.00	0.00	0.00	0.00	0.00
Total SEWD Surface Water	**30.51**	**28.16**	**26.86**	**27.11**	**19.25**
Total Average Groundwater Use for Hydrologic Year	9.19	11.54	12.84	8.62	14.49
Water Rationing	0.00	0.00	0.00	3.97	5.96
Total Water Supply Plus Water Rationing	39.70	39.70	39.70	39.70	39.70
Total 2009 Water Demand	39.70	39.70	39.70	39.70	39.70
Maximum Single Year Groundwater Use Within Hydrologic Year	**21.17**	**31.92**	**33.19**	**32.88**	**26.60**
Difference with Max Single Year Sustainable Yield of 14.5 TAF/year	**-3.04**	**-13.79**	**-15.06**	**-14.75**	**-8.48**
Difference with Average Annual Long-term Sustainable Yield of 14.1 TAF/year	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note:
Some supplies may not reflect the full entitlement but rather the average amount of water that can be treated by SEWD given the water demand and infrastructure constraints.

Figure 2. Base Scenario Groundwater Use Exceedance Diagram

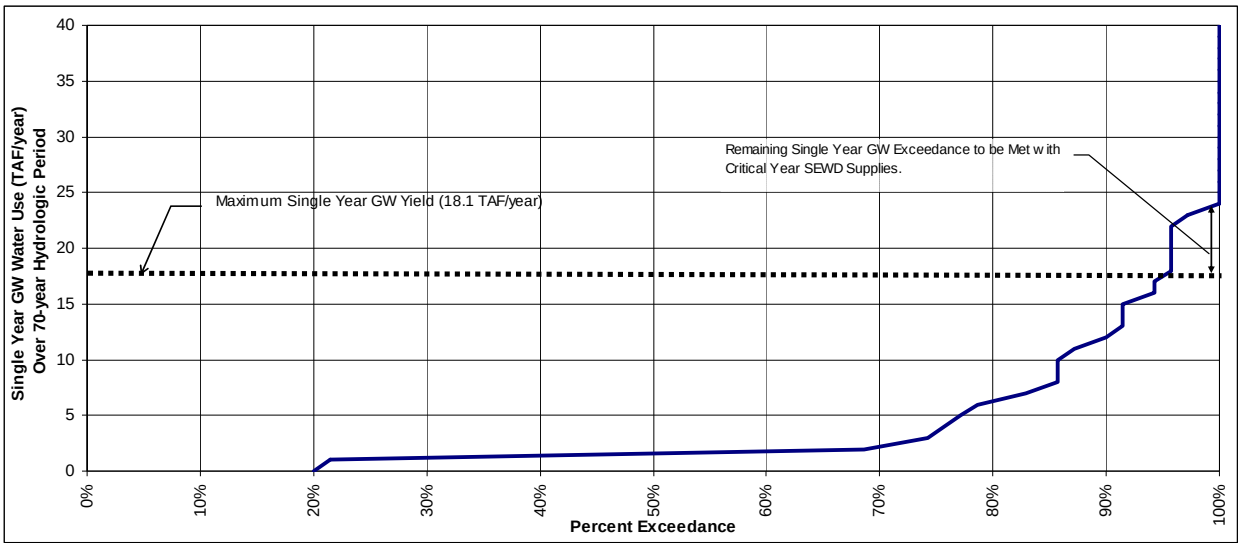


Based on the above, it would be more economical to meet demands for those last **5** percent years through interim "short term" measures, like ***Critical Year SEWD Transfers***, as discussed in the preceding section. Therefore, the approach of meeting **18.5** TAF/year is two-steps: (1) Step 1 - to lower the groundwater use through use of the DWSP so that only the last 5 percent of the years meet the groundwater objectives, (2) Step 2 - lower the remaining years that are above the sustainable yield of groundwater through use of ***Critical Year SEWD Transfers.***.

<u>Step 1 (with 10 mgd DWSP Supplies)</u>

Scenario 1 uses the Base Scenario as a starting point for applying increasing increments of DWSP capacity (in mgd) until the groundwater use, as depicted in the exceedance graphs, falls below **18.1** TAF/year in **95** percent of the hydrologic years. This analysis results in the need to include **10** mgd of DWSP capacity and water supplies to meet the supply requirements for existing customers. This is further illustrated below in **Figure 3**.

Figure 3. Step 1 Groundwater Use Exceedance Diagram (Addition of 10 mgd DWSP Only)



Step 2 (with DWSP Supplies and Critical Year SEWD Transfers)

To maintain the COSMUD's groundwater use to below **18.1** TAF/year in 100 percent of the simulated hydrologic years, **12.5** TAF/year of ***Critical Year SEWD Transfers*** is assumed to be available. This amount reduces the exceedance so groundwater extractions do not exceed **18.1** TAF/year as shown in **Figure 4**. **Figure 5** illustrates the simulated year-by-year water supply conditions from hydrologic water year 1922 through 1991 showing the need for ***Critical Year SEWD Transfers*** in three (3) out of the 70 years of hydrology (or 4 percent of the years). **Table 5** summarizes the long-term annual average water supply conditions for each water year type based on the **10** mgd DWSP and **12.5** TAF/year ***Critical Year SEWD Transfers***.

Figure 4. Step 2 Groundwater Use Exceedance Diagram (with Critical Year SEWD Transfers and 10 mgd DWSP)

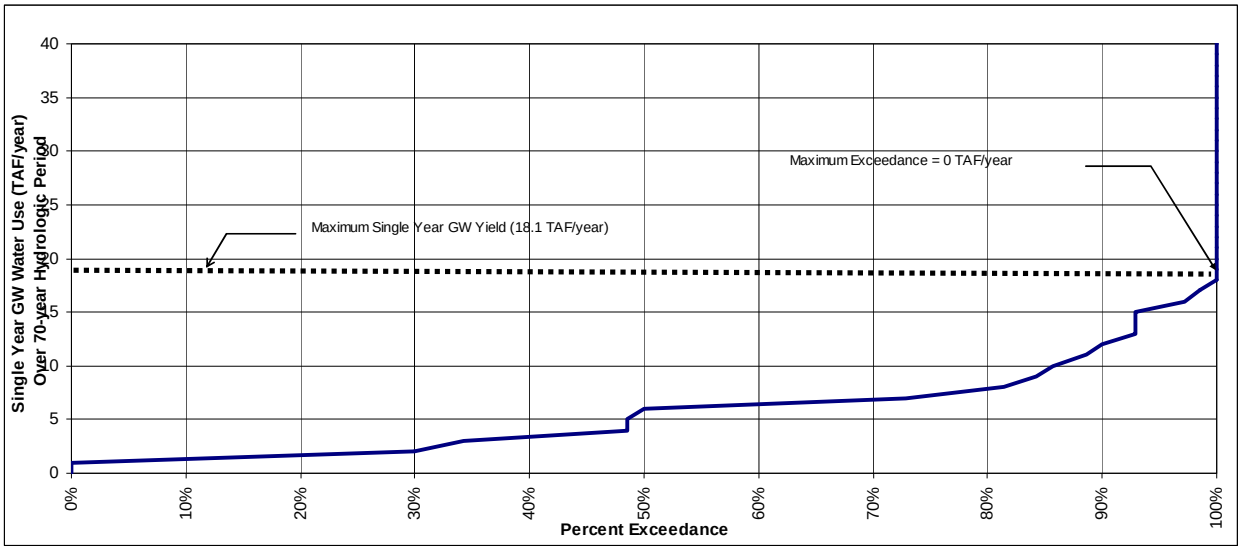


Figure 5. Water Supply Combination Bar Graph Indicating Critical Year SEWD Transfers and 10 mgd DWSP

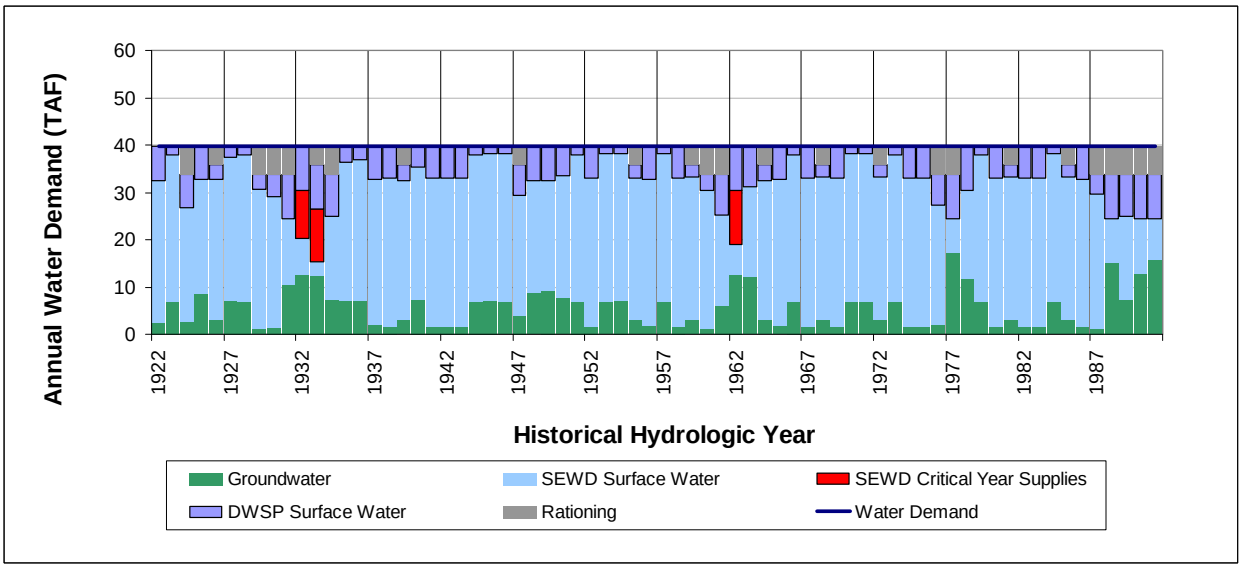


Table 5. Average DWSP 2035 Surface Water Supply Use Conditions by Contract and Hydrologic Year for 2009 Levels of Water Demand and Development (includes Critical Year SEWD Transfers and 10 mgd DWSP)

DWSP Supplies	Wet (TAF/year)	Above Average (TAF/year)	Below Average (TAF/year)	Dry (TAF/year)	Critical (TAF/year)
Section 1485 Water Right	6.05	2.17	3.05	2.71	6.33
Woodbridge Irrigation District Contract	0.93	0.93	0.93	0.93	0.93
Total DWSP Surface Water	**6.98**	**3.10**	**3.98**	**3.65**	**7.26**
Total SEWD Surface Water	30.51	28.88	27.81	28.11	19.25
Total Surface Water	**37.49**	**31.98**	**31.79**	**31.76**	**26.52**
Total Groundwater Use	2.21	7.72	7.91	3.97	7.23
Total Water Supply	**39.70**	**39.70**	**39.70**	**35.73**	**33.75**
Water Rationing	0.00	0.00	0.00	3.97	5.96
Total Water Supply Plus Water Rationing	**39.70**	**39.70**	**39.70**	**39.70**	**39.70**
Total 2009 Water Demand	39.70	39.70	39.70	39.70	39.70
Groundwater Use Beyond the 18.1 TAF Not-To-Exceed Goal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Recommendation

In summary, the combination of SEWD WTP capacity (based on a 54 percent allocation of the future 60 mgd SEWD WTP capacity), DWSP WTP capacity, groundwater facility capacity, and the on-going implementation of water conservation programs will meet the water demands and achieve a sustainable water supply for existing rate payers of the COSMUD to 2035. ***Critical Year SEWD Transfers*** of up to **12.5** TAF/year through the SEWD WTP should continue to be sought by COSMUD. These transfers would occur in **4** percent of the years when dry year curtailments severely reduce SEWD's existing supplies. This will require either the negotiation of critical year water from upstream water right holders on the Calaveras and Stanislaus rivers, or the implementation of in-basin programs that provide critical year supplies.

Based on this evaluation, the conclusion that can be reached regarding strictly the DWSP is as follows:

Existing rate payers from COSMUD will benefit from 10 mgd/30 mgd = 0.33 or 33 percent of the DWSP costs related solely to the 30 mgd phase 1 project.

Appurtances related to project components that are oversized for capacities beyond 30 mgd should be attributed to new growth to provide a clear separation of what is attributable to meeting the replacement needs of existing rate payers and that needed for new (future) development. In cases where both existing and new customers benefit, a pro-rated share can be developed based on the above capacity requirements for existing (2009) customer needs.

Lastly, the findings of this report reflect the best available information regarding water supplies and their reliability. Any changes in the reliability of these sources of water supply can have a significant effect on the results of this report. In addition, the results of this report are time dependent and should only be applied to existing rate payers as of 2009, when bonds are likely to be issued for design and construction of the DWSP. The results of this report are considered to be the "fair share" portion of the DWSP that can be directly associated with increased reliability and replacement of existing municipal water supplies as of 2009. As execution of the financial program of the DWSP moves forward in time, this report should be revisited to insure that the assumptions and design criteria remain consistent with the most current program design elements.

Appendix C

Intake Facility Tech Memo-HDR (January 11, 2008)

DRAFT

TM 10.0 - INTAKE FACILITY

Delta Water Supply Project
Intake and Pump Station Facility ***January 11, 2008***

Reviewed by: Richard Stratton, P.E.
Prepared by: Mason W. Beck, E.I.T.

Background

The City of Stockton Department of Municipal Utilities (City) has gained approval to withdraw water from the San Joaquin River for treatment and distribution to the City of Stockton Metropolitan Area (COSMA). The project, known as the Delta Water Supply Project (DWSP), will consist of a raw water intake and pumping facility, raw water pipeline(s), a surface water treatment plant and treated water pipeline(s) to connect to the City's existing distribution system. The DWSP will be a phased project with the first phase delivering 30 million gallons per day (mgd) to the COSMA with incremental expansions to 160 mgd. The river intake and pump station will be designed and constructed with combined phasing in mind such that entry into the navigable waters of the San Joaquin River would only occur twice to achieve the ultimate intake and pumping capacity.

The intake facility constructed in the initial phases will be located approximately 600 FT east of the southwest tip on the south bank of Empire Tract without disturbing the existing wetland. Space will be provided for future phases to the west. The San Joaquin River flows in both directions at this location.

Basis of Design Criteria

The facility will be capable of delivering 30 mgd of raw surface water from the San Joaquin River to the proposed surface water treatment plant for the first phase. The intake structure shall be designed for a Phase I capacity of 80 mgd with a Phase I mechanical capacity of 30 mgd (i.e., pumps) and an ultimate capacity of 160 mgd with the addition of a future second 80 mgd incrementally added structure.

The raw water intake facilities discussed as part of the DWSP will be constructed in four phases, with an estimated completion in the year 2050, as shown in Table 10- 1. In the initial phase the facility will have a minimum design flow of 8.6 mgd and shall be capable up to the full 30 mgd capacity. It will be designed to accommodate shutdowns on a daily basis with minimal shutdown and startup times. The pumping withdrawal rate from the Sacramento-San Joaquin Delta can not exceed a 15-day running average of 25 to 32 mgd.

Table 10- 1: Intake Facility Phasing Criteria.

Phase	Projected Year	Firm Capacity (mgd)
1a - Initial	2015	30
1b - Interim	2025	60
1 c - General Plan Buildout	2028	80
2a – Construct 2nd Intake	2040	112
2 b – Ultimate Capacity	2050	160

Intake Building

The intake building will serve to house the pumping equipment and all related appurtenances. The CMU building will have six separate rooms including: a mechanical room, a storage room, an electrical room, an office, a restroom, and a main pump room. The entire building covers approximately 4,000 square feet.

The discharge manifold shall be above grade and turned down below grade before exiting the intake building. The pumps will be spaced to provide clearance for operations and maintenance personnel. The roof will be constructed with four hinged skylights for pump installation and removal. The hatches will be located on the river side of the intake building. An electrical control room will be included in a separate room in the pump station building. The room will contain motor control center (MCC), variable frequency drives (VFDs), reduced voltage soft starters (RVSS), and all control equipment.

Access into the electrical room will be provided by one exterior double wide door and one exterior single door to provide access to the outdoor electrical enclosure. Entrance will be obtained into the mechanical room via either an exterior single door or motorized overhead door for movement of equipment in and out of the room. The storage room will have an oversized double door that is large enough for forklift access. The main pump room will include three single doors and a motorized roll-up door. The roll-up door will be large enough to allow equipment maintenance. Interior single doors will be provided linking the main pump room to the restroom, and the office to the pump room.

Architectural Design and Facility Code Review

The facility will be located in the County of San Joaquin and owned by the City of Stockton in the State of California, all of which hold jurisdiction. The project will be subject to regulations in the 2001 California Building Code (CBC), 2001 California Fire Code (CFC), 2005 National Electric Code (NEC), and the City of Stockton Municipal Code (SMC). The facility is classified as a low-hazard factory or industrial facility per the CBC. See sheet A02 for the architectural floor plan and complete facility code review.

The building walls will be 16 feet high and will be constructed of split-face concrete masonry units (CMU). A standing seam metal roof is recommended and will be supported with steel beams and trusses, and a metal deck. Four lockable hinged sky lights will be located on the roof to allow for access to remove the vertical turbine pumps. The finished floor of the building will be 6 inches above grade to prevent water intrusion. Concrete door stoops will be provided outside of all personnel doors. An anti-graffiti coating will be provided on the building exterior. Colors will be neutral and be chosen to blend into the surrounding environment.

Raw Water Pumps

In the immediate phase the facility will have a minimum design flow of 8.6 mgd and shall be capable up to the full 30 mgd capacity. Vertical turbine pumps will be used to move water from the intake facility on the San Joaquin River to the water treatment plant. The initial phase of the facility requires the pumping capability of 20,820 gallons per minute (gpm) or 30 mgd. As previously discussed, the capacity will be incrementally increased to a buildout of 80 mgd.

Pumps, Motors and Drives

For ease of operations and maintenance it is recommended that all pumps be uniform in size. There will be four pumps required to meet the firm capacity requirement of 20,820 gpm (30 mgd). Three of the pumps are required to meet the design flow. The fourth will be a standby pump to provide reliability should a pump be out of service for maintenance or repair. All pumps will be incorporated into the operating strategy in order to equalize wear and operating times on all pumps. Each pump will be sized to handle a maximum flow of 6,950 gpm (10 mgd) at 90 feet total dynamic head (FT TDH). In the initial phase each pump will be operated using a 250 HP motor. Two of the pumps will be operated on a VFD to allow operation over the full range of flows. The other two pumps will be fitted with reduced voltage soft starters (RVSS). Each pump will have a 24-inch discharge that will be immediately increased to 30-inch. Discharge will then flow through a 30-inch check valve and 30-inch gate valve before tying into the 54-inch header.

Sedimentation Suspension System

To keep the facility free from obstructions and to maintain efficient operation, a sedimentation suspension system is required. The San Joaquin River, as is typical with all rivers, contains suspended sediments (silts and fine sand). During river high flow events, the river will have a faster water velocity and to carry more sediments. Sediment that does not settle to the river bed may pass through the fish screen. A sample of river sediments indicates the presence of fine sands and silts with an effective size of 0.05 mm. Buildup of this settled sediment could be harmful to operations and efficiency. To avoid sediment buildup, a re-suspension system will be installed.

The sedimentation re-suspension system will consist of a submersible pump with 304 stainless steel piping and nozzles that will agitate the settled sediment. The sediment will reenter a

suspended state and be pumped through the system. Any sediment that passes through the fish screens and then settles to the floor of the wet well will be removed from the facility.

A non-clog submersible pump rated for a total flow of 1,400 gpm at 97 FT TDH is required for this application. Water from the pump will be circulated through piping to one of 24 eductors, or nozzles, situated at the wet well floor. Each nozzle will be installed with an adjustable ball assembly that will allow positioning discharge in the direction of flow towards the main vertical turbine pumps. Nozzles located near the base of the vertical turbine pumps will be oriented as to avoid hydraulic issues using the adjustable ball assemblies. All nozzles will measure 1.5 inches in diameter and discharge water at a pressure of 30 pounds per square inch (psi).

Heating, Ventilating, and Air Conditioning (HVAC)

Design Criteria

- Outdoor Design Temperatures
  - Winter 35 DegF
  - Summer 102 DegF db/ 71 DegF wb
- Indoor Design Temperatures
  - Evaporative Cooled Spaces (Pump Room)
    - Summer 90 DegF
  - Air Conditioned Spaces (Electrical Room, Bathroom, Control Room, Storage Room)
    - Summer 80 DegF
- Ventilation Rates
  - Rate based on cooling load.

Specific Considerations

Intake Building

The intake building will ultimately include four 900-HP vertical turbine pumps - two operating on VFDs and two on RVSS. To be ready for this future heat load, an evaporative cooler located in the mechanical room will supply air into the space through distribution ductwork. Three (3) wall exhaust louvers shall exhaust the air from the space. The evaporative cooler will be controlled with a wall-mounted thermostat. Table 10- 2 reflects the preliminary equipment and sizing:

Table 10- 2. Intake Building HVAC Equipment.

Equipment Number	Manufacturer	Pressure Drop (in. W.C)	Airflow (CFM)	Motor (HP)	Electrical (Voltage/Phase)
EC-1	Pace (Or equal)	1	19,005	10	480/3

Electrical Room, Bathroom, Storage Room, Office, and Mechanical Room

The electrical room consists of a bank of MCCs along the west wall and two (2) variable frequency drives along the east wall. The electrical room will be provided with a split system air conditioning unit. An air handling unit will be hung from the ceiling of the room and a condensing unit will be mounted on a pad outside the room in the generator enclosure. Outside air will be drawn into the air handling unit through an intake louver. The air conditioning system will be controlled by a wall-mounted thermostat. The equipment is sized based upon all four VFDs running continuously. The bathroom, storage room, and office are cooled by branches off the electrical room cooling system. Table 10- 3 reflects the preliminary equipment and sizing:

Table 10- 3. Electrical HVAC Equipment.

Equipment Number	Manufacturer	Airflow (CFM)	Pressure Drop (in. W.C.)	Motor (HP)	Electrical (Voltage/Phase)
AHU-1	Trane (or equal)	8,450	1	5	480/3

Equipment Number	Manufacturer	Cooling Capacity (TONS)	Motor (HP)	Electrical (Voltage/Phase)
CDU-1	Trane (or equal)	20	20	480/3

Conclusions and Recommendations

The initial phase will include a single intake facility with a pumping capacity of 30 mgd with future incremental expansions to 80 mgd. It is recommended that the building be prepared for buildout conditions to efficiently meet phasing requirements. The pump building is sized for future pump clearances and pipe dimensions. All electrical infrastructure will be planned for future development as is covered in TM 13.0. The ultimate electrical area will be completely enclosed by a 12 FT high concrete block wall in the initial phase and the entire site will be paved and fenced.

Appendix D

Pipeline Percentage Split -HDR (January 14, 2009)

DRAFT

PIPELINE PERCENTAGE SPLIT

City of Stockton Delta Water Supply Project ***January 14, 2009***

Reviewed by: Richard Stratton, P.E.

Prepared by: Mason W. Beck, P.E.

The purpose of this memorandum is to evaluate the appropriate cost split between construction phases for the pipeline portion of the Delta Water Supply Project pipeline for the 50% design phase.

An additional 36-inch pipeline was added to the project per the pipeline evaluation included in the 50% BODR (Section 3.4.2.2). Scenario 1 as shown in Figure 3-2 is the preferred alternative and was used as a basis for phased analysis, and is recreated for reference as shown below in Figure 1.

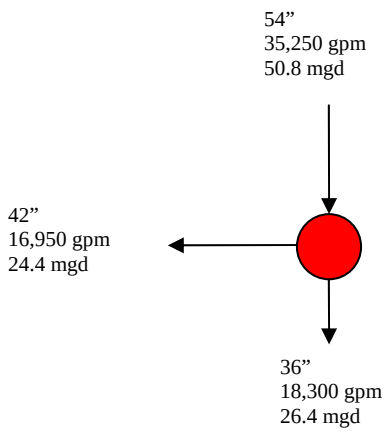


Figure 1 - Recreation of CDM Figure 3-2

Based on the figure, the maximum buildout flow assumed for the treated water pipeline is 35,250 gallons per minute (50.8 million gallons per day (mgd)). The BODR states that a maximum flow of 60 mgd would be provided from the treatment plant in future phases and was used in the model to develop the flow split shown above. Per comments from the City, there will be a future 16-inch connection north of the connection point as shown below in

Figure 2 and Figure 3. This line will handle a future development between I-5 and Davis Road, north of Eight Mile Road and will have a Phase II capacity of 9.2 mgd.

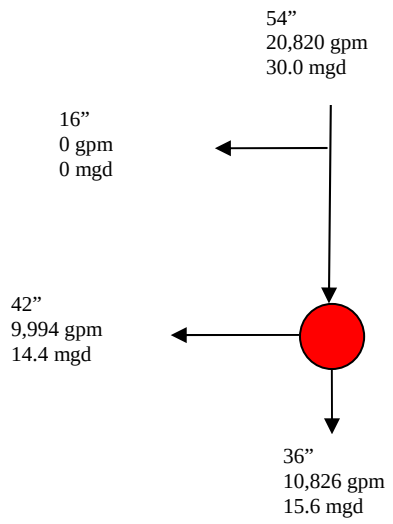


Figure 2 - Updated Phase I Flow Scenario

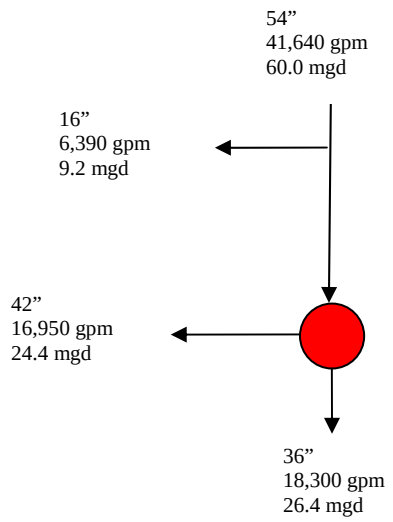


Figure 3 - Updated Phase II Flow Scenario

The initial phase of the project will include treatment of 30 mgd. The figures above show both Phase I and Phase II treatment capacities with Phase I developed using ratios presented by CDM in the BODR. The flow split for Phase I is summarized below in Table 1.

Table 1 - Design Criteria and Phased Split based on Phase II Flow of 60 mgd

Pipeline Section	Phase I Design Criteria (mgd)[1]	Phase II Capacity (mgd)[2]	Phase I Percentage Split
54-inch	30.0	60.0	50%
42-inch	14.4	24.4	59%
36-inch	15.6	26.4	59%
16-inch	0.0	9.2	0%

1. Based on the Scenario 1 flow split, with only 30 mgd in the 54-inch line and maintaining the ratios.
2. Based on the Scenario 1 flow split, with 60 mgd in the 54-inch line and maintaining the ratios. 9.2 mgd will be sent to a future development in Phase II.

The raw water pipeline design and overall phasing plan did not change between the 25% and 50% designs. The raw water pipeline split will remain at 50% for each Phase I and Phase II of the project as the initial phase will provide 30 mgd, with the overall pipeline sized for a total capacity of 60 mgd.

Appendix E

WTP Cost Split-CDM (December 31, 2008)

DRAFT

City of Stockton DWSP

Water Treatment Plant

Estimated Split Between Phase 1 and Future Phases

Item	% Phase I	% Future	Explanation
Site Work			
Earthwork:			Rough grading, access roads, landscaping, etc. are designed to allow future expansion to 160 mgd. Percentage split for these items is 30/160. Drying beds will be phased in current phase sized for 30 mgd only (100 percent Phase 1). Masonry, metals, equipment and mechanical costs support Phase 1 only.
Rough grading, roadways, landscaping	18.75%	81.25%	
Drying beds grading, soil cement	100.00%	0.00%	
Concrete	100.00%	0.00%	
Masonry	100.00%	0.00%	
Metals	100.00%	0.00%	
Equipment	100.00%	0.00%	
Mechanical	100.00%	0.00%	
Yard Piping			
Mechanical	60%	40%	Major site piping is upsized to support future expansion to 60 mgd. Site piping provisions for expansion beyond 60 mgd have not been included. Phase split is approximately 60/40.
WID and Reclaimed Water Pump Station			
Earthwork	60.0%	40.0%	WID Diversion Structure is designed for 50 mgd. Pumps/screens will be installed for 30 mgd firm capacity and replaced with larger pumps in future. Therefore equipment is 100% in Phase I (30/30), the remaining is 60% in Phase I (30/50).
Concrete	60.0%	40.0%	
Metals	60.0%	40.0%	
Equipment	100.0%	0.0%	
Mechanical	60.0%	40.0%	
Electrical	60.0%	40.0%	
Flocculation Sedimentation			
Earthwork	100.0%	0.0%	Flocculation and Sedimentation basins are designed for 30 mgd. Future basins will be built for additional capacity to reach the buildout of 160 mgd. All costs are for the initial Phase I capacity.
Concrete	100.0%	0.0%	
Metals	100.0%	0.0%	
Wood and Plastic	100.0%	0.0%	
Equipment	100.0%	0.0%	
Mechanical	100.0%	0.0%	
Electrical	100.0%	0.0%	
Membrane Building			
Earthwork	100%	0%	All membrane work will be for Phase I as design capacity is 30 mgd.
Concrete	100%	0%	
Masonry	100%	0%	
Metals	100%	0%	
Thermal and Moisture Protection	100%	0%	
Doors and Windows	100%	0%	
Finishes	100%	0%	
Specialties	100%	0%	
Equipment	100%	0%	
Special Construction	100%	0%	
Mechanical	100%	0%	
Electrical	100%	0%	
Solids Drying Bed			
Earthwork	100%	0%	Based on site plan it is assumed that solids drying beds constructed in Phase I can support a treatment plant capacity of 30 mgd. From the BODR it is assumed that the drying beds are not oversized for future phases.
Concrete	100%	0%	
Metals	100%	0%	
Equipment	100%	0%	
Mechanical	100%	0%	
Treated Water Chemical Storage and Feed			
Earthwork	100%	0%	Chemical storage tanks are sized for storage duration based on 30 mgd capacity. Pumps are sized for 30 mgd capacity as

Item	% Phase I	% Future	Explanation
Concrete	100%	0%	well. The building floor plan does not include areas for future tank expansion. Pumps will be replaced with larger sizes in future phases in the same building. Future building expansion will accomodate additional tank volume for future phases; the building in place is sized for 30 mgd storage.
Metals	100%	0%	
Wood and Plastic	100%	0%	
Thermal and Moisture Protection	100%	0%	
Finishes	100%	0%	
Specialties	100%	0%	
Equipment	100%	0%	
Special Construction	100%	0%	
Mechanical	100%	0%	
Electrical	100%	0%	
Treated Water Storage (4 MG Steel Tank)			
Earthwork	100%	0%	additional tanks will be built in future phases. It is assumed that the 4 MG capacity will only serve the 30 mgd treatment capacity.
Concrete	100%	0%	
Special Construction	100%	0%	
Mechanical	100%	0%	
Treated Water Pump Station			
Earthwork	100%	0%	
Concrete	100%	0%	
Equipment	100%	0%	Pumps are sized at 10 mgd for firm capacity of 30 mgd in Phase I
Special Construction	100%	0%	Unknown if additional surge tanks are required for future phases for now, it is assumed these tanks are only for Phase I
Mechanical	100%	0%	All site piping upsized for future use included in Yard Piping section. This pipe is internal to pump station.
Electrical	100%	0%	
Admin/Operations Building			
Earthwork	18.75%	81.25%	Admin/Operations Building is sized for WTP staff and City Water Resources. Size is not capacity dependent. Future phases build out to 160 mgd. Therefore cost attributed to this phase is 30/160.
Concrete	18.75%	81.25%	
Masonry	18.75%	81.25%	
Metals	18.75%	81.25%	
Wood and Plastic	18.75%	81.25%	
Thermal and Moisture Protection	18.75%	81.25%	
Doors and Windows	18.75%	81.25%	
Finishes	18.75%	81.25%	
Specialties	18.75%	81.25%	
Equipment	18.75%	81.25%	
Furnishings	18.75%	81.25%	
Special Construction	18.75%	81.25%	
Mechanical	18.75%	81.25%	
Electrical	18.75%	81.25%	
Maintenance Shop			
Earthwork	18.75%	81.25%	Maintenance Shop is not capacity dependent and will be used for as constructed in Phase I for future phases. Future phases build out to 160 mgd. Therefore cost attributed to this phase is 30/160.
Concrete	18.75%	81.25%	
Masonry	18.75%	81.25%	
Metals	18.75%	81.25%	
Thermal and Moisture Protection	18.75%	81.25%	
Doors and Windows	18.75%	81.25%	
Finishes	18.75%	81.25%	
Specialties	18.75%	81.25%	
Furnishings	18.75%	81.25%	
Special Construction	18.75%	81.25%	
Conveying Systems	18.75%	81.25%	
Mechanical	18.75%	81.25%	
Electrical	18.75%	81.25%	
Sanitary PS and Leach field			

Item	% Phase I	% Future	Explanation
Special Construction	18.75%	81.25%	
Mechanical	18.75%	81.25%	Building and septic leach field are sized for future ultimate plant size. Therefore cost attributed to this phase is 30/160.
Ozone Building			
Earthwork	50%	50%	The ozone building is sized to allow equipment to be changed out to support future expansion to 60 mgd. Equipment costs are 100% Phase 1. Earthwork, concrete, masonry, etc. phase split is 50/50.
Concrete	50%	50%	
Masonry	50%	50%	
Metals	50%	50%	
Thermal and Moisture Protection	50%	50%	
Doors and Windows	50%	50%	
Finishes	50%	50%	
Specialties	50%	50%	
Equipment	100%	0%	
Special Construction	100%	0%	
Mechanical	50%	50%	
Electrical	100%	0%	
LOX Facility			
Earthwork	50%	50%	The LOX Facility is sized to allow equipment to be added or changed out to support future expansion to 60 mgd. Equipment costs are 100% Phase 1. Earthwork, concrete, mechanical, etc. phase split is 50/50.
Concrete	50%	50%	
Special Construction	100%	0%	
Mechanical	50%	50%	
Electrical	100%	0%	
General Electrical			
Earthwork	80%	20%	Per the BODR, "the distribution system will be provided with spare capacity and facilities as appropriate for anticipated future load additions". The total buildout capacity is 160 mgd with present capacity of 30 mgd. It is assumed that electrical conduit is upsized for future conductors. However, the majority of the cost is associated with the 30 mgd expansion.
Concrete	80%	20%	
Mechanical	80%	20%	
Electrical	80%	20%	
WTP Instrumentation and Controls			
Special Construction	80%	20%	See description for electrical.

Appendix F

Debt Service Assumptions-Citi (April, 24, 2009)

DRAFT

City of Stockton
Pro-Forma Debt Service - Uninsured "A" Rated Case - $217M Project Size (Interest Rate + 50bps)
Prepared by Citigroup Global Markets Inc.

	2009 Financing[1]						2010 Financing[2]					
Fiscal Year (June 30)	Principal	Interest Rate (%)	Interest	Debt Service	DSRF Earnings	Net Debt Service	Principal	Interest Rate (%)	Interest	Debt Service	DSRF Earnings	Net Debt Service
2010			$1,468,258	$4,868,258	$149,288	$4,718,969						
2011	$1,680,000	3.50%	6,816,588	8,496,588	209,937	8,286,651						
2012	2,760,000	3.50%	6,738,888	9,498,888	209,937	9,288,951						
2013	1,475,000	3.50%	6,664,775	8,139,775	209,937	7,929,838	$1,875,000	3.50%	$6,458,211	$8,333,211	$271,797	$8,061,415
2014	1,525,000	3.50%	6,612,275	8,137,275	209,937	7,927,338	1,945,000	3.50%	8,523,100	10,468,100	271,797	10,196,303
2015	1,580,000	4.00%	6,553,988	8,133,988	209,937	7,924,051	2,015,000	3.50%	8,453,800	10,468,800	271,797	10,197,003
2016	1,655,000	4.50%	6,485,150	8,140,150	209,937	7,930,213	2,090,000	4.00%	8,376,738	10,466,738	271,797	10,194,941
2017	1,725,000	4.50%	6,409,100	8,134,100	209,937	7,924,163	2,185,000	4.50%	8,285,775	10,470,775	271,797	10,198,978
2018	1,755,000	4.50%	6,330,800	8,085,800	209,937	7,875,863	2,285,000	4.50%	8,185,200	10,470,200	271,797	10,198,403
2019	1,835,000	4.50%	6,250,025	8,085,025	209,937	7,875,088	2,390,000	4.50%	8,080,013	10,470,013	271,797	10,198,216
2020	1,925,000	5.00%	6,160,613	8,085,613	209,937	7,875,676	2,505,000	4.75%	7,966,744	10,471,744	271,797	10,199,947
2021	2,025,000	5.00%	6,061,863	8,086,863	209,937	7,876,926	2,630,000	5.00%	7,841,500	10,471,500	271,797	10,199,703
2022	2,135,000	5.50%	5,952,525	8,087,525	209,937	7,877,588	2,765,000	5.00%	7,706,625	10,471,625	271,797	10,199,828
2023	2,260,000	5.50%	5,831,663	8,091,663	209,937	7,881,726	2,910,000	5.50%	7,557,475	10,467,475	271,797	10,195,678
2024	2,380,000	5.50%	5,704,063	8,084,063	209,937	7,874,126	3,075,000	5.50%	7,392,888	10,467,888	271,797	10,196,091
2025	2,520,000	5.50%	5,569,313	8,089,313	209,937	7,879,376	3,250,000	5.50%	7,218,950	10,468,950	271,797	10,197,153
2026	2,665,000	5.75%	5,423,394	8,088,394	209,937	7,878,457	3,435,000	5.50%	7,035,113	10,470,113	271,797	10,198,316
2027	2,830,000	6.00%	5,261,875	8,091,875	209,937	7,881,938	3,630,000	5.75%	6,836,288	10,466,288	271,797	10,194,491
2028	3,000,000	6.00%	5,086,975	8,086,975	209,937	7,877,038	3,855,000	6.00%	6,616,275	10,471,275	271,797	10,199,478
2029	3,190,000	6.25%	4,897,288	8,087,288	209,937	7,877,351	4,095,000	6.00%	6,377,775	10,472,775	271,797	10,200,978
2030	3,400,000	6.25%	4,691,350	8,091,350	209,937	7,881,413	4,350,000	6.25%	6,118,988	10,468,988	271,797	10,197,191
2031	3,625,000	6.50%	4,467,288	8,092,288	209,937	7,882,351	4,630,000	6.25%	5,838,363	10,468,363	271,797	10,196,566
2032	3,865,000	6.50%	4,223,863	8,088,863	209,937	7,878,926	4,935,000	6.50%	5,533,288	10,468,288	271,797	10,196,491
2033	4,120,000	6.50%	3,964,350	8,084,350	209,937	7,874,413	5,270,000	6.50%	5,201,625	10,471,625	271,797	10,199,828
2034	4,400,000	6.50%	3,687,450	8,087,450	209,937	7,877,513	5,620,000	6.50%	4,847,700	10,467,700	271,797	10,195,903
2035	4,700,000	6.50%	3,391,700	8,091,700	209,937	7,881,763	5,995,000	6.50%	4,470,213	10,465,213	271,797	10,193,416
2036	5,015,000	6.50%	3,075,963	8,090,963	209,937	7,881,026	6,400,000	6.50%	4,067,375	10,467,375	271,797	10,195,578
2037	7,835,000	6.50%	2,658,338	10,493,338	209,937	10,283,401	6,835,000	6.50%	3,637,238	10,472,238	271,797	10,200,441
2038	8,365,000	6.50%	2,131,838	10,496,838	209,937	10,286,901	7,290,000	6.50%	3,178,175	10,468,175	271,797	10,196,378
2039	8,925,000	6.50%	1,569,913	10,494,913	209,937	10,284,976	7,780,000	6.50%	2,688,400	10,468,400	271,797	10,196,603
2040	9,525,000	6.50%	970,288	10,495,288	209,937	10,285,351	8,305,000	6.50%	2,165,638	10,470,638	271,797	10,198,841
2041	10,165,000	6.50%	330,363	10,495,363	10,601,806	-106,443	8,860,000	6.50%	1,607,775	10,467,775	271,797	10,195,978
2042							20,305,000	6.50%	659,913	20,964,913	13,725,746	7,239,166
Total	$114,860,000		$151,442,114	$269,702,114	$17,049,197	$252,652,917	$143,510,000		$178,927,155	$322,437,155	$21,607,858	$300,829,297

1) Preliminary - Subject to Change
Assumes uninsured "A" Rated CA fixed rates with a 10-year par call as of 4/13/09.
Approximate All-in TIC of 2009 Financing: 6.312%.
Assumes $3.4 million of Capitalized Interest in FY 2010.
DSRF interest earnings have been projected at 2.00%

2) Preliminary - Subject to Change
Assumes uninsured "A" Rated CA fixed rates with a 10-year par call as of 4/13/09.
Approximate All-in TIC of 2009 Financing: 6.307%.
Assumes Capitalized Interest through 6/30/2012.
DSRF interest earnings have been projected at 2.00%