

April 10, 2007

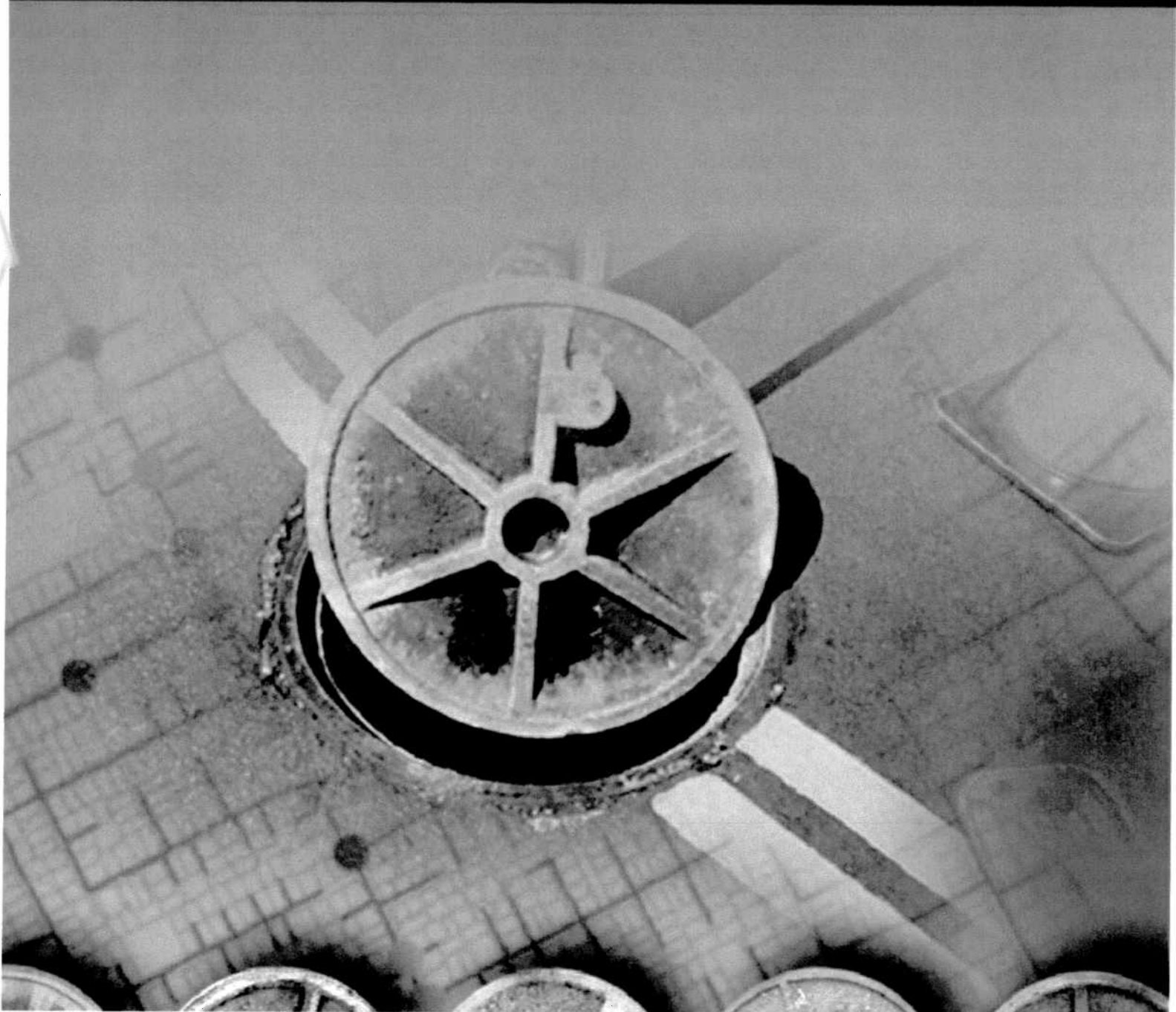
BROWN AND CALDWELL



DRAFT REPORT

City Of Modesto

Sewer Rates



D R A F T R E P O R T

CITY OF MODESTO

SEWER RATES

April 10, 2007

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

CHAPTER 1. INTRODUCTION

CHAPTER 2. CUSTOMER WASTEWATER DISCHARGE CHARACTERISTICS

CHAPTER 3. REVENUE REQUIREMENTS AND COST ALLOCATION

CHAPTER 4. WASTEWATER RATE DEVELOPMENT

APPENDIX A. CUSTOMER WASTEWATER DISCHARGE CHARACTERISTICS

APPENDIX B. REVENUE REQUIREMENTS AND COST ALLOCATION

APPENDIX C. WASTEWATER RATE DEVELOPMENT AND REVENUE BY
CUSTOMER CLASS

APPENDIX D. MODESTO RESOLUTION NO. 2001-433 REVISING SEWER SERVICE
CHARGES AND RESCINDING RESOLUTION NO. 2000-581

LIST OF TABLES
CHAPTERS

Table 2.1	Accounts, Billing Units, Flow, BOD, and TSS
Table 2.2	Current and Proposed Customer Classifications
Table 3.1	Operating Expenditures
Table 3.2	Revenue Required from Rates
Table 3.3	Allocation of Revenue Required from Rates
Table 3.4	Unit Costs
Table 3.5	Rate Revenue by Customer Class
Table 4.1	Single Family Dwelling Unit Rates
Table 4.2	Multiple Family Dwelling Unit Rates
Table 4.3	Apartment Dwelling Unit Rates
Table 4.4	Commercial Quantity Charges
Table 4.5	Commercial Account Charges
Table 4.6	Current and Proposed School Charge Methodology
Table 4.7	School Revenue Requirements
Table 4.8	Major Industrial Revenue Requirements
Table 4.9	Minor Industrial Revenue Requirements
Table 4.10	Septage Hauler Rates

APPENDICES

Table A.1	Flow, MG
Table A.2	BOD, Thousand Pounds
Table A.3	TSS, Thousand Pounds
Table A.4	Billing Units
Table A.5	Accounts
Table A.6	Res.-Com. Billing Units & Discharge
Table A.7	Res.-Com. Accounts
Table A.8	Schools ADA & Wastewater Discharge
Table A.9	Schools Average Daily Attendance and Invoice Amounts
Table A.10	FY 2005-06 Major Industrial Discharge Characteristics
Table A.11	FY 2005-06 Net Minor Industrial Discharge Characteristics
Table A.12	FY 2005-06 Gross Minor Industrial Discharge Characteristics
Table A.13	Septage Hauler Discharge and Revenue
Table B.1	Operating Expenditures
Table B.2	Net Operating Expenditures
Table B.3	Projected New Debt Service and Pay-as-you-go Expenditures
Table B.4	Projected New Debt Service
Table B.5	Operating Expenditures Projected for New Facilities
Table B.6	Revenue Required from Rates
Table B.7	Projected Capacity Charge Revenue
Table B.8	Cash Flow
Table B.9	Debt Service Coverage
Table B.10	Allocation of Revenue Required from Rates
Table B.11	Flow Revenue Requirements
Table B.12	BOD Revenue Requirements
Table B.13	TSS Revenue Requirements
Table B.14	Account Revenue Requirements
Table B.15	Total Revenue Requirements
Table B.16	Unit Costs
Table B.17	Flow \$ Allocation
Table B.18	BOD \$ Allocation
Table B.19	TSS \$ Allocation
Table B.20	Accounts \$ Allocation
Table C.1	Residential Rates and Revenue
Table C.2	Commercial Rates and Revenue
Table C.3	Schools Rates and Revenue
Table C.4	Major Industrial Rates and Revenue
Table C.5	Minor Industrial Rates and Revenue
Table C.6	Septage Hauler Discharge and Revenue

LIST OF FIGURES

- Figure 1.1 Rate Development Methodology
Figure 4.1 FY 2007/08 Single Family Monthly Rate Development

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ABBREVIATIONS AND TERMS

AAF	Average Annual Flow
BC	Brown and Caldwell
BOD	Biochemical Oxygen Demand
CCF	Hundred cubic feet; equal to 748 gallons (see also HCF)
CCI	Construction Cost Index
CIP	Capital improvement program
ENR	Engineering News Record
EDU	Equivalent Dwelling Unit
ES	Executive Summary
ESD	Empire Sanitary District
FY	Fiscal year (July 1 to June 30)
FY 2006/07	July 1, 2006 through June 30, 2007
GPD	Gallons per day
GPM	Gallons per minute
HCF	Hundred cubic feet; equal to 748 gallons (see also CCF)
MGD	Million gallons per day
MG/L	Milligrams per liter
MMC	Modesto Municipal Code
O&M	Operation and maintenance
SFR	Single family residential
SWRCB	State Water Resources Control Board
TSS	Total Suspended Solids

PLEASE TAKE NOTE

This report is intended to provide general discussion of the subject matter covered. To the extent it addresses laws, regulations or court decisions of any jurisdiction, it is not intended as a precise, detailed or thorough summary of the pertinent legal authorities. The reader should note that this report was not prepared or reviewed by an attorney, and it is not intended, and should not be relied upon, as legal advice. Its purpose is to assist in the recognition and analysis of public policy issues. Questions concerning the interpretation or applicability of the legal authorities referenced herein should be referred to an attorney qualified in the specific subject matter.

EXECUTIVE SUMMARY

This report documents the development of a system of wastewater rates for the 15-year period, Fiscal Years (FYs) 2007/08 through 2021/22 for the City of Modesto (City). The first five years of the period are highlighted in the report. The results for the full 15-year period are included in the appendices.

The objective of this rate study is to develop sewer rates that would recover annual revenue requirements in a manner that meets the requirements of the U.S. Environmental Protection Agency (USEPA), the State Water Resources Control Board (SWRCB), and Proposition 218.

BACKGROUND

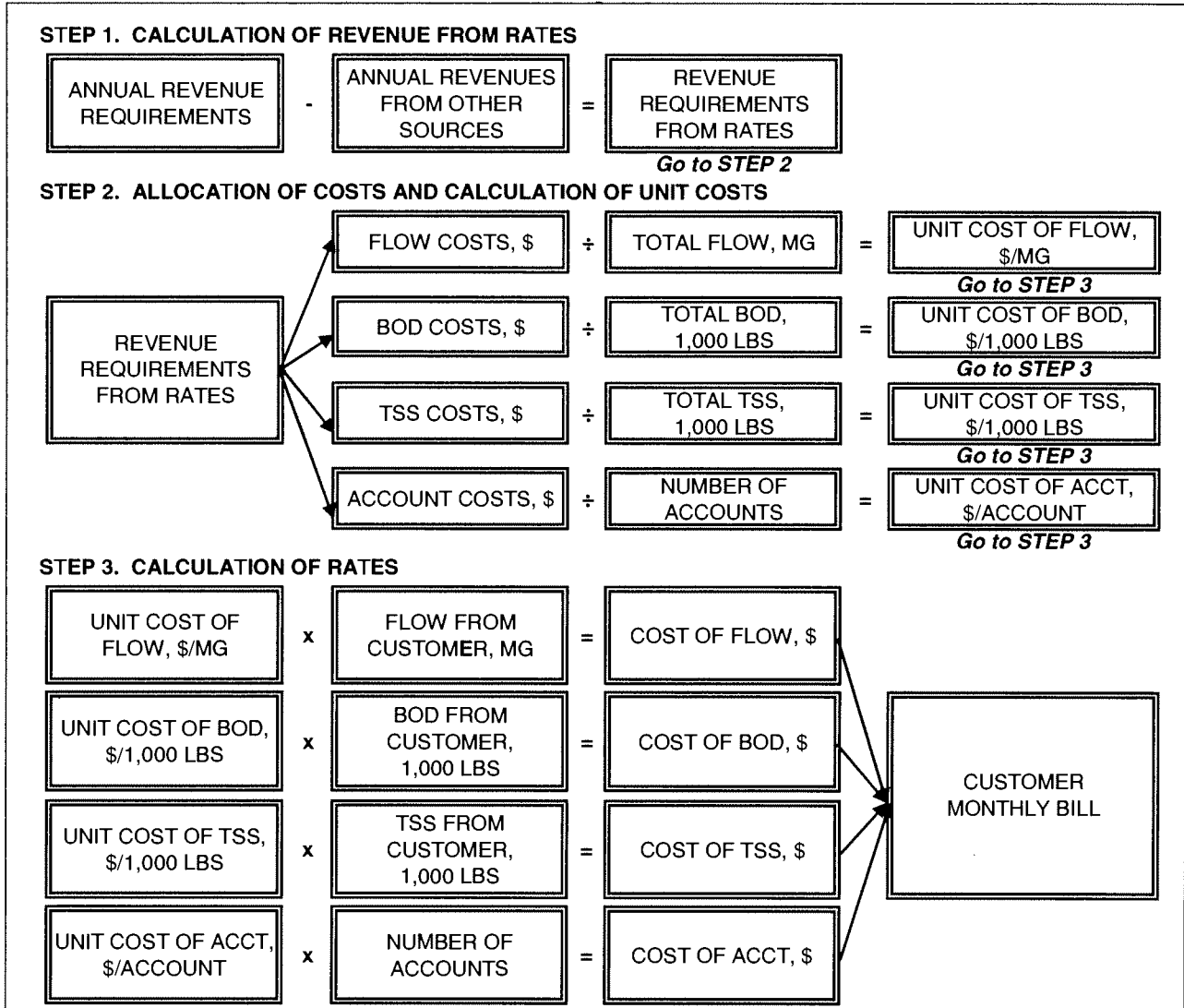
The City currently (FY 2006/07) provides wastewater service to approximately 61,097 accounts (customers) comprising 77,575 billing units which include residential, commercial, and industrial customers, and treats in excess of 30 million gallons per day (mgd) of wastewater discharge on an annual basis. As a result of large planned capital improvement program (CIP) of \$420.6 million (in June 2006 dollars) designed to add needed capacity to the system as well as to rehabilitate and replace existing facilities, annual revenue requirements to be recovered from rates are expected to increase from about \$21.5 million in FY 2006/07 to about \$55.8 million in FY 2011/12. This will necessitate a significant increase in wastewater rates.

RATE DEVELOPMENT METHODOLOGY

On August 9, 2005, the City Council adopted Resolution No. 2005-412 adopting recommendations to use a uniform-service charge approach in cost of service rate calculations. A uniform rate policy applies the same unit costs of service (for flow, BOD, and TSS) to all customers and customer classes and is therefore consistent with Proposition 218 and State Water Resources Control Board cost of service requirements.

Proposed new sewer rates have been calculated using cost methodology that is standard for the industry and acceptable to the State of California for documentation of sewer revenue programs. Figure ES.1 is a schematic diagram of the rate development methodology.¹

Figure ES.1 Rate Calculation Methodology



¹ BOD and TSS are acronyms for Biochemical Oxygen Demand and Total Suspended Solids. BOD and TSS are conventional pollutants (as opposed to toxic pollutants) removed during the wastewater treatment process. These pollutants are used almost universally to develop wastewater rate structures.

REVENUE REQUIREMENTS

The amount of revenue required from rates was developed by summing the projected expenditures for operations and maintenance (O&M), capital, debt service and allocated indirect costs, and subtracting sources of projected revenue. Other sources of revenue include bond proceeds and non-operating revenue. Revenue from capacity charges, sewer subtrunk extension charges and the interest on the fund cash balance were also projected. Revenue required from rates and other sources of revenue for the period FYs 2007/08 through 2011/12 are presented in detail in Chapter 3 and summarized in Table ES.1.

Two key features in the development of annual revenue requirements are: 1) about 40% of the \$420.6 million CIP will be funded directly from revenue from rates; and 2) the City must accrue reserves to fund a \$157.4 million project (in escalated costs) in FY 2019/20.

Table ES.1 Revenue Required from Rates and Other Revenues

Item	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Expenditures					
O&M, Existing Facilities	\$16,469,501	\$17,128,821	\$17,814,513	\$18,527,634	\$19,269,279
O&M, New Facilities	213,751	222,301	231,193	946,228	984,078
Allocated Indirect Costs	1,067,586	1,110,289	1,154,701	1,200,889	1,248,925
Capital, Repair & Replacement	1,800,000	2,200,000	2,500,000	2,800,000	3,100,000
Capital, New Facilities	22,321,505	59,460,121	69,099,703	46,778,199	9,639,583
Debt Service, Existing	4,453,844	4,453,871	4,454,137	4,459,058	4,459,058
Debt Service, New	0	0	6,510,450	10,319,523	10,798,694
Total	\$46,326,186	\$84,575,403	\$101,764,698	\$85,031,531	\$49,499,616
Less:					
Bond Proceeds	\$13,392,903	\$43,103,796	\$51,779,420	\$38,386,517	\$8,675,624
Non-operating Revenue	30,000	30,000	30,000	30,000	30,000
Total	\$13,422,903	\$43,133,796	\$51,809,420	\$38,416,517	\$8,705,624
Add To/(Use Of) Reserves	(\$5,050,000)	(\$750,000)	(\$2,800,000)	\$6,150,000	\$15,050,000
Revenue Required from Rates	\$27,853,284	\$40,691,607	\$47,155,278	\$52,765,014	\$55,843,991

WASTEWATER DISCHARGE CHARACTERISTICS

The current sewer service charge (rate) resolution categorizes customers into classifications which determine what sewer rate is applicable. Data obtained from the utility billing system (with the current number of customers and billing units in each classification) and data obtained from other City data bases was used to characterize the wastewater discharge from customers. The detailed projection of sewer discharge characteristics is shown in Chapter 2 and Appendix A. Estimated customer wastewater discharge characteristics for FY 2007/08 are shown in Table ES.2.

Table ES.2 Customer Wastewater Discharge Characteristics for FY 2007/08

Item	Flow Million Gal	BOD Thou Lbs	TSS Thou Lbs	Billing Units	Accounts	% of Total				
						Flow	BOD	TSS	Bill Units	Accounts
Residential	7,386	12,320	12,320	75,883	58,795	60%	26%	36%	97%	95%
Commercial	1,602	4,831	4,831	2,303	2,759	13%	10%	14%	3%	4%
Schools	128	213	213	59	59	1.0%	0.5%	0.6%	0.1%	0.1%
Industrial										
Minor	777	1,632	1,348	30	30	6%	3%	4%	0%	0%
Major	2,415	27,798	12,184	12	12	20%	59%	36%	0%	0%
Septage	12	479	2,944	40	40	0.1%	1.0%	8.7%	0.1%	0.1%
Total	12,318	47,274	33,841	78,328	61,695	100%	100%	100%	100%	100%

Customer wastewater discharge characteristics for FY 2007/08 through 2011/12 were projected using a growth rate of approximately one percent per year for residential and commercial customers and no growth for schools and industrial customers. Both assumptions are conservative and will help ensure that the revenues needed to be recovered from rates are in fact recovered even if the recent historical levels of growth in customers does not occur.

UNIT COSTS-OF-SERVICE

The unit costs-of-service are calculated by dividing the net revenue requirements associated with each functional cost category by the number of units associated with that particular category. For example, the revenue requirements allocated to the flow category are divided by the amount of flow to yield the unit cost (in units of \$/MG gallons) while those allocated to BOD and TSS are divided by the number of pounds of BOD and TSS discharged by customers to yield the unit costs (in units of \$/1,000 lbs). This is illustrated as Step 2 in Figure ES.1. The unit cost calculations are performed in detail in Chapter 3 and summarized for FYs 2007/08 through FY 2011/12 in Table ES.3.

Table ES.3 Unit Costs

Item	Projected FY 07/08	Projected FY 08/09	Projected FY 09/10	Projected FY 10/11	Projected FY 11/12
Flow Unit Cost					
Flow Net Revenue Requirements	\$18,177,764	\$26,556,241	\$30,774,418	\$33,884,189	\$35,861,273
Flow, million gallons (MG)	12,318	12,413	12,509	12,606	12,704
Flow Unit Cost, \$/MG	\$1,475.657	\$2,139.324	\$2,460.125	\$2,687.907	\$2,822.834
BOD Unit Cost					
BOD Net Revenue Requirements	\$3,450,063	\$5,040,432	\$5,841,240	\$6,920,517	\$7,324,502
BOD, thousand pounds, KLBS	47,274	47,458	47,643	47,830	48,019
BOD Unit Cost, \$/KLBS	\$72.980	\$106.209	\$122.605	\$144.691	\$152.534
TSS Unit Cost					
TSS Net Revenue Requirements	\$4,325,538	\$6,319,391	\$7,323,305	\$8,510,278	\$9,006,978
TSS, thousand pounds, KLBS	33,841	34,022	34,204	34,388	34,574
TSS Unit Cost, \$/KLBS	\$127.818	\$185.745	\$214.106	\$247.476	\$260.511
Account Unit Cost					
Account Net Revenue Requirements	\$1,899,918	\$2,775,543	\$3,216,314	\$3,450,030	\$3,651,237
Accounts	61,695	62,299	62,909	63,526	64,148
Account Unit Cost, \$/Month	\$2.57	\$3.71	\$4.26	\$4.53	\$4.74
Total Rate Revenue Required	\$27,853,284	\$40,691,607	\$47,155,278	\$52,765,014	\$55,843,991

Also shown in Table ES.3 are the total revenues to be recovered from rates. As shown in this table the revenues to be recovered via rates increases from about \$27.8 million in FY 2007/08 to about \$55.8 million in FY 2011/12.

The overall increases in annual revenue requirements to be recovered from sewer rates are summarized in Table ES.4. Note that the current revenue shown in this table is an estimate of the revenue expected from the current rates.

Table ES.4 Annual Revenue Required from Rates

Fiscal Year	Rate Revenue Required, \$	\$ Increase	% Increase
Current	\$21,489,852		-
FY 2008	\$27,853,284	\$6,363,431	30%
FY 2009	\$40,691,607	\$12,838,323	46%
FY 2010	\$47,155,278	\$6,463,671	16%
FY 2011	\$52,765,014	\$5,609,736	12%
FY 2012	\$55,843,991	\$3,078,978	6%

These annual increases are for the system as a whole. The increases for individual customers and customer classes will be different as a result of the changes in the allocations of costs for new facilities to the functional categories of accounts, flow, BOD, and TSS. More of the operating costs associated with new facilities are associated with the sum of BOD and TSS than flow. Individual customers and customer classes with higher BOD and TSS discharges will pay higher rates to recover those costs.

REVENUE BY CUSTOMER CLASS

The unit costs listed in Table ES.3 are used to develop revenue requirements and rates for all customers. The development of revenue requirements for each customer class involves multiplying the flow, BOD and TSS loading, number of billing units for each customer class (shown in ES.2) by the unit costs for flow, BOD, TSS and billing units (shown in ES.3). This is Step 3 as shown schematically in Figure ES.1. Revenue actually recovered from rates for each customer class are summarized for FYs 2006/07 through FY 2011/12 in Table ES.5. These revenues are slightly different from the revenue requirements because of rounding. The difference is about 0.1%.

Table ES.5 Rate Revenue by Customer Class

Item	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	\$11,716,760	\$15,185,739	\$22,233,176	\$25,818,386	\$28,704,615	\$30,445,352
Commercial	3,263,520	3,418,791	5,007,724	5,818,760	6,535,347	6,935,012
Schools	67,881	233,222	338,278	389,208	430,313	452,153
Industrial						
Minor	765,546	1,438,715	2,107,452	2,448,685	2,738,413	2,905,867
Major	5,414,141	7,149,465	10,381,609	11,957,697	13,528,110	14,230,604
Septage	262,004	454,385	649,686	745,906	858,563	903,482
Total	\$21,489,852	\$27,880,317	\$40,717,925	\$47,178,642	\$52,795,361	\$55,872,470

CUSTOMER CLASS SEWER RATES AND REVENUE

The revenue requirements shown in Table ES.4 were used to develop rates for each customer class. Although the revenue requirements for each customer class differ, they are all based on the same unit costs (shown in Table ES.3).

RESIDENTIAL

A summary of current (FY 2006/07) and projected residential monthly rates for FYs 2007/08 through 2011/12 are shown in Table ES.6 (single family dwellings), Table ES.7 (multiple family dwellings), and Table ES.8 (apartments).

Table ES.6 Current and Projected Single Family Monthly Rates

Fiscal Year	Billing Unit \$/Month	Account \$/Month	Billing Units Per Account	Total \$/Month	Increase \$/Month	Increase %
Current	\$14.26	-	1	\$14.26	-	-
FY 2008	\$15.97	\$2.57	1	\$18.54	\$4.28	30%
FY 2009	\$23.17	\$3.71	1	\$26.88	\$8.34	45%
FY 2010	\$26.65	\$4.26	1	\$30.91	\$4.03	15%
FY 2011	\$29.48	\$4.53	1	\$34.01	\$3.10	10%
FY 2012	\$30.98	\$4.74	1	\$35.72	\$1.71	5%

Table ES.7 Current and Projected Multiple Family Monthly Rates

Fiscal Year	Billing Unit \$/Month	Account \$/Month	Billing Units Per Account	Total \$/Month	Increase \$/Month	Increase %
Current	\$11.15	-	2	\$22.30	-	-
FY 2008	\$13.71	\$2.57	2	\$29.99	\$7.69	34%
FY 2009	\$19.89	\$3.71	2	\$43.49	\$13.50	45%
FY 2010	\$22.89	\$4.26	2	\$50.04	\$6.55	15%
FY 2011	\$25.31	\$4.53	2	\$55.15	\$5.11	10%
FY 2012	\$26.60	\$4.74	2	\$57.94	\$2.79	5%

Note: This example is for a multiple family dwelling with two billing units. The total charges are the sum of the billing unit charge times the number of billing units (2), plus the account charge.

Table ES.8 Current and Projected Apartment Monthly Rates

Fiscal Year	Billing Unit \$/Month	Account \$/Month	Billing Units Per Account	Total \$/Month	Increase \$/Month	Increase %
Current	\$9.17	-	10	\$91.70	-	-
FY 2008	\$10.41	\$2.57	10	\$106.67	\$14.97	16%
FY 2009	\$15.10	\$3.71	10	\$154.71	\$48.04	45%
FY 2010	\$17.37	\$4.26	10	\$177.96	\$23.25	15%
FY 2011	\$19.21	\$4.53	10	\$196.63	\$18.67	10%
FY 2012	\$20.19	\$4.74	10	\$206.64	\$10.01	5%

Note: This example is for an apartment with ten billing units. The total charges are the sum of the billing unit charge times the number of billing units (10), plus the account charge.

As shown above, substantial annual increases in single family dwelling rates will be necessary in FYs 2007/08 through 2009/10.

COMMERCIAL

In the case of commercial customers, the annual rate increases for FYs 2008/09 through 2011/12 are similar to those of the residential customers but are less in FY 2007/08. These are summarized in Table ES.9 (quantity charges) and Table ES.10 (account charges) for FY 2007/08 through FY 2011/12.

Table ES.9 Current and Projected Commercial Quantity Charge Rates

Fiscal Year	Quantity Charge, \$/1,000 gallons (a)							
	Group 1		Group 2		Group 3		Group 4	
Current	\$1.73	-	\$2.04	-	\$2.47	-	\$2.98	-
FY 2008	\$1.81	5%	\$2.23	9%	\$2.65	7%	\$3.15	6%
FY 2009	\$2.63	45%	\$3.24	45%	\$3.84	45%	\$4.57	45%
FY 2010	\$3.02	15%	\$3.72	15%	\$4.43	15%	\$5.27	15%
FY 2011	\$3.34	11%	\$4.16	12%	\$4.98	12%	\$5.96	13%
FY 2012	\$3.51	5%	\$4.37	5%	\$5.23	5%	\$6.27	5%

Table ES.10 Current and Projected Commercial Account Charge Rates

<u>Fiscal Year</u>	<u>Fixed Monthly Charge, \$ (a)</u>
Current	\$21.95
FY 2008	\$2.57
FY 2009	\$3.71
FY 2010	\$4.26
FY 2011	\$4.53
FY 2012	\$4.74

Note a: The current fixed monthly charge includes charges for 1,680 cubic feet of water used. The current quantity charges are applied to flow in excess of 1,680 cubic feet of water used per month. The projected fixed monthly account charge includes no charges for flow. The projected quantity charges are applied to all quantities of flow.

SCHOOLS

The annual revenue requirements for schools will increase. The current rate structure for schools bases wastewater charges on Average Daily Attendance (ADA), an assumed discharge per pupil as a function of school category (K-6, K-8, 7-8, High School, College), and a wastewater rate. The projected rate structure places schools in the commercial Group 1 (G1) category. Projected wastewater discharge for schools is based on indoor water use for educational facilities as published by the State Water Resources Control Board and applied to the ADA plus one staff member for every 25 pupils. The rate increase to schools results from both changing the rate to the commercial Group 1 rate (about 2/3 of the increase) and adding staff to the ADA count (about 1/3 of the increase).

The current rate structure and rates for schools is compared to the projected rate structure and rates in Table ES.11. In this table, a hypothetical high school with 3,000 students is used to develop annual wastewater charges.

Table ES.11 Current and Projected Annual Wastewater Charges for a High School

FY 2006/07 Current Rate Development Methodology <i>cf/pupil/month x 12 months x average daily attendance (ADA) ÷ 133.69 cf x rate (\$) = Annual Charges</i>
FY 2006/07 Annual Charges Based on Current Methodology and Current Rates <i>36 cf/pupil/month x 12 months x 3,000 ADA ÷ 133.69 cf x \$0.68 = \$6,592</i>
FY 2007/08 Proposed Rate Development Methodology <i>(flow, mg x \$/mg) + (BOD, Klbs x \$/Klbs) + (TSS, Klbs x \$/Klbs) + (Billing Units x \$/unit) = Annual Charges</i>
FY 2007/08 Annual Charges Based on Proposed Methodology and Proposed Rates
<u>Unit Costs</u> <i>(11.20 mg x \$1,475.66/mg) + (18.69 Klbs x \$72.98/Klbs) + (18.69 Klbs x \$127.82/Klbs) + (12 units x \$2.57/unit) = \$20,316</i>
<u>Commercial Group 1 Rates Based on Unit Costs</u> <i>(11.20 mg x \$1.81/thousand gallons) + 12 units x \$2.57/unit) = \$20,316</i>

Legend: cf = cubic feet (7.481 gallons); mg = million gallons; Klbs = thousand pounds;
3,000 ADA = 9.70 mg; 3,000 ADA plus 1 staff for every 25 pupils = 11.20 mg

The current (FY 2006/07) and projected revenues from all schools for the period FYs 2007/08 through 2011/12 are shown in Table ES.12.

Table ES.12 Current and Projected School Revenue Requirements

Fiscal Year	Total Revenue	Increase \$	Increase %
Current	\$67,881	-	-
FY 2008	\$233,222	\$165,340	244%
FY 2009	\$338,278	\$105,057	45%
FY 2010	\$389,208	\$50,930	15%
FY 2011	\$430,313	\$41,105	11%
FY 2012	\$452,153	\$21,840	5%

INDUSTRIAL

The industrial customers are classified as either major or minor and are assessed rates for both process waste discharge which is monitored via an effluent meter, and sanitary wastewater flow which is estimated based on water use. Annual flows and loadings for these customers are projected to remain constant (at FY 2005/06 levels) throughout the study period. The flows from minor industrial customers are expected to grow at the same rate as that projected for residential customers (one percent per annum). The current (FY 2006/07) and projected revenues from major industrial users for the period FYs 2007/08 through 2011/12 are shown in Table ES.13. The current (FY 2006/07) and projected revenues from minor industrial users for the period FYs 2007/08 through 2011/12 are shown in Table ES.14.

Table ES.13 Current and Projected Major Industrial User Revenue Requirements and Unit Costs

Fiscal Year	Revenue				Unit Costs			Unit Costs % Increase		
	Total	Process	Sanitary	% Inc	Flow per mg	BOD per klbs	TSS per klbs	Flow	BOD	TSS
Current	\$5,414,141	-	-	-	\$892.33	\$105.52	\$97.14	-	-	-
FY 2008	\$7,149,465	\$7,056,377	\$93,088	32.1%	\$1,475.66	\$72.98	\$127.82	65.4%	-30.8%	31.6%
FY 2009	\$10,381,609	\$10,246,582	\$135,027	45.2%	\$2,139.32	\$106.21	\$185.75	45.0%	45.5%	45.3%
FY 2010	\$11,957,697	\$11,802,339	\$155,359	15.2%	\$2,460.12	\$122.61	\$214.11	15.0%	15.4%	15.3%
FY 2011	\$13,528,110	\$13,356,285	\$171,825	13.1%	\$2,687.91	\$144.69	\$247.48	9.3%	18.0%	15.6%
FY 2012	\$14,230,604	\$14,050,052	\$180,552	5.2%	\$2,822.83	\$152.53	\$260.51	5.0%	5.4%	5.3%

Table ES.14 Current and Projected Minor Industrial User Revenue Requirements and Unit Costs

Fiscal Year	Revenue				Unit Costs			Unit Costs % Increase		
	Total	Process	Sanitary	% Inc	Flow per mg	BOD per klbs	TSS per klbs	Flow	BOD	TSS
Current	\$765,546	-	-	-	\$892.33	\$105.52	\$97.14	-	-	-
FY 2008	\$1,438,715	\$1,409,403	\$29,312	87.9%	\$1,475.66	\$72.98	\$127.82	65.4%	-30.8%	31.6%
FY 2009	\$2,107,452	\$2,064,934	\$42,518	46.5%	\$2,139.32	\$106.21	\$185.75	45.0%	45.5%	45.3%
FY 2010	\$2,448,685	\$2,399,765	\$48,920	16.2%	\$2,460.12	\$122.61	\$214.11	15.0%	15.4%	15.3%
FY 2011	\$2,738,413	\$2,684,307	\$54,105	11.8%	\$2,687.91	\$144.69	\$247.48	9.3%	18.0%	15.6%
FY 2012	\$2,905,867	\$2,849,014	\$56,853	6.1%	\$2,822.83	\$152.53	\$260.51	5.0%	5.4%	5.3%

This is a draft and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.

As shown in the above table, the rate increases for the minor industrial customers significantly exceed the basic overall rate increases.

SEPTAGE HAULERS

The rates for the septage haulers are based on the projected volume and number of truckloads of septage delivered to the wastewater treatment plant, and BOD and TSS concentrations of the septage. The current year (FY 2006/07) rates and the rates for FYs 2007/08 through 2011/12 are shown in Table ES.15.

Table ES.15 Current and Projected Septage Hauler Rates

Fiscal Year	Charge, \$/1,000 Gallons	% Increase
Current	\$22.24	-
FY 2008	\$38.94	75%
FY 2009	\$55.68	43%
FY 2010	\$63.93	15%
FY 2011	\$73.59	15%
FY 2012	\$77.44	5%

OVERALL REVENUE INCREASES VERSUS INDIVIDUAL CUSTOMER CLASS CHANGES

The wide range of percentage rate changes for each of these customer classes in FY 2007/08 yields a weighted average increase of approximately 30% as was indicated in Table ES.4.

CHAPTER 1

INTRODUCTION

This report documents the development of a system of wastewater rates for the 15-year period, Fiscal Years (FYs) 2007/08 through 2021/22 for the City of Modesto (City). Although rates have been developed for a 15-year period, the first five-year period, FY 2007/08 through FY 2011/12, are emphasized in the body of the report. The results for the last 10 years are presented in the appendices. The City hired Brown and Caldwell to conduct the subject rate study such that the resulting rates would recover annual revenue requirements in a manner that meets the requirements of the U.S. Environmental Protection Agency (USEPA), the State Water Resources Control Board (SWRCB), and Proposition 218.

BACKGROUND

The City currently (FY 2006/07) provides wastewater service to approximately 61,097 accounts (customers) comprising 77,575 billing units which include residential, commercial, and industrial customers, and treats in excess of 30 million gallons per day (mgd) of wastewater discharge on an annual basis. As a result of large planned capital improvement program (CIP) of \$420.6 million (in June 2006 dollars) designed to add needed capacity to the system as well as to rehabilitate and replace existing facilities, annual revenue requirements to be recovered from rates are expected to increase from about \$21.5 million in FY 2006/07 to about \$55.8 million in FY 2011/12. This will necessitate a significant increase in wastewater rates.

OBJECTIVES

In designing wastewater rates for City consideration, we have endeavored to satisfy six major objectives. These fundamental objectives are the basis upon which the wastewater rates are developed.

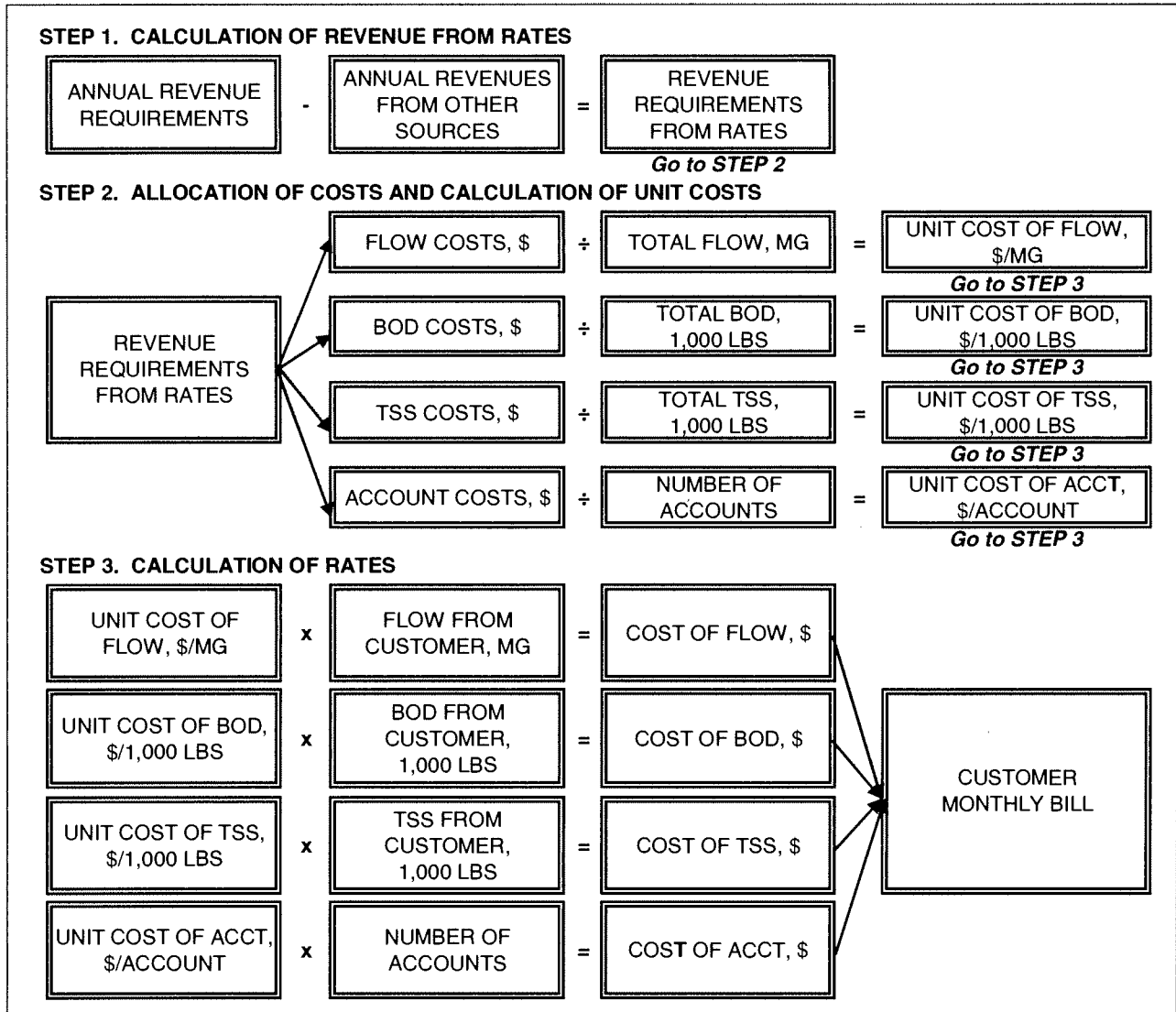
1. **Revenue Sufficient.** Effective in recovering the revenues necessary to meet the operating expenses and capital costs of the wastewater system.
2. **Equitable.** Fair in apportioning the costs of providing wastewater service among different customers (i.e., single family, multiple family, commercial, and industrial) based on their wastewater discharge characteristics.
3. **Practical.** Easy for the customers to understand, publicly acceptable, and feasible for the City to administer.
4. **Acceptable.** In compliance with the SWRCB and USEPA regulations applicable to grant-funded facilities and government code section 66000.
5. **Implementable.** Data upon which the rates and fees are based exists and is available to the City for billing purposes.
6. **Conforms to Adopted City Policy.** Conforms with Resolution 2005-412 (Uniform Service Charge) directives.

RATE DEVELOPMENT METHODOLOGY

We have calculated the sewer rates using a methodology that is standard for the industry and acceptable to the State of California for documentation of sewer revenue programs. Figure 1.1 is a schematic diagram of the rate development methodology. Under this method the following tasks are performed:

- **The annual revenue requirements (both gross and those to be recovered only from rates) were determined.** These annual revenue requirements include both operating expenses and capital costs (costs recovered directly from revenue and debt service requirements). This process is described in Chapter 3.
- **The costs (revenue requirements) are allocated to functional cost categories.** The City's wastewater system was designed to convey, treat wastewater, and dispose of treated effluent. The functional cost categories upon which rates are designed are based on flow, BOD, TSS, accounts, and billing units. This allocation process is described in Chapter 3.
- **The calculation of unit costs of service.** The costs allocated to the functional cost categories are divided by the appropriate (corresponding) discharge characteristics. That is, the costs allocated to flow are divided by the total flow discharged from customers, the costs allocated to BOD are divided by the total pounds of BOD discharged from customers, etc. The calculation of the unit costs is described in Chapter 3.
- **The calculation of rates.** The unit costs developed in the prior step are used, together with the monthly contributions to flow, BOD, TSS and number of accounts and billing units from either a particular customer or customer class, to calculate the rate for that customer or customer class. This process is described in Chapter 4.

Figure 1.1 Rate Calculation Methodology



CHAPTER 2

CUSTOMER WASTEWATER DISCHARGE CHARACTERISTICS

This chapter presents our estimation of existing customer wastewater discharge characteristics and the projection of these same characteristics for the period, fiscal years (FYs) 2007/08 through 2021/22. Customer wastewater characteristics include number of accounts, number of billing units, estimated wastewater flow, and estimated wastewater strength loadings. The applicable wastewater strengths are biochemical oxygen demand (BOD) and total suspended solids (TSS).

Customer wastewater characteristics are estimated in order to determine the wastewater contributions from various customer classes to the City of Modesto's (City) wastewater treatment plant influent. The estimated wastewater contributions (flow, BOD loadings, TSS loadings, billing units and accounts) from each customer class are then used to proportionately allocate the cost of providing sewer service. The determination of the customer wastewater characteristics is, therefore, an indispensable step in the development of equitable wastewater rates. The customer wastewater characteristics developed in this chapter are used to develop the unit costs in Chapter 3 and the wastewater rates in Chapter 4.

The following sections summarize the determination of the number of accounts, number of billing units, estimated residential wastewater characteristics, estimated commercial wastewater characteristics, estimated industrial wastewater characteristics, estimated school wastewater characteristics, and estimated septage hauler characteristics for FYs 2007/08 through 2021/22.

NUMBER OF ACCOUNTS

The City provided sewer service to about 61,097 separate accounts (customers) in FY 2006/07. These 61,097 accounts are comprised of 77,575 billing units. The primary difference between the number of accounts and the number of billing units is the number of multiple family residential dwelling units. For example, in FY 2006/07 (see Tables A.6 and A.7 of Appendix A), the City served 4,069 multiple family residential accounts comprising 21,688 dwelling units.

NUMBER OF BILLING UNITS

The City provided sewer service to about 77,575 billing units in FY 2006/07 approximately 97 percent of which were residential as shown in Table 2.1. The reason the number of billing units are used is because the City currently assesses its monthly sewer service charges to its residential customers based on the number of dwelling units. For example, a ten dwelling unit apartment complex is assessed the monthly charge on each of the ten units. The approximately 77,575 billing units are associated with approximately 61,097 accounts. We developed rates which recover certain fixed costs from each customer account and the costs associated with flow, BOD and TSS loadings from each billing unit. That is the reason we need to know both the number of accounts and the number of billing units.

WASTEWATER CHARACTERISTICS

The quality and quantity of the wastewater discharged by the City's various customer classes varies widely. This is an important fact, as wastewater system costs (both operating and capital) are dependent on both the quality and quantity of discharge from the customer classes. As discussed earlier, the quality and quantity parameters applicable to the City's collection and

treatment system includes average wastewater flow, BOD, and TSS. The quality parameters of BOD and TSS are included because significant portions of the treatment system are designed to reduce their levels to meet regulatory requirements. The residential, commercial, and industrial wastewater characteristics are estimated so that they can be used in subsequent chapters to proportionately allocate the cost of providing sewer service. The projection of wastewater flow, BOD, TSS, billing units and accounts for all customer classes is presented in detail in Tables A.1, A.2, A.3, A.4 and A.5, respectively, in Appendix A. The same results are summarized in Table 2.1 below.

Table 2.1 Number of Billing Units, Accounts, Wastewater Flow, and BOD and TSS Loads

Item	Accounts					
	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	58,223	58,795	59,373	59,957	60,546	61,142
Commercial	2,733	2,759	2,785	2,812	2,839	2,866
Schools	59	59	59	59	59	59
Industrial						
Minor	30	30	30	30	30	30
Major	12	12	12	12	12	12
Septage	40	40	40	40	40	40
Total	61,097	61,695	62,299	62,909	63,526	64,148
Item	Billing Units					
	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	75,152	75,883	76,622	77,368	78,122	78,883
Commercial	2,282	2,303	2,325	2,347	2,370	2,392
Schools	59	59	59	59	59	59
Industrial						
Minor	30	30	30	30	30	30
Major	12	12	12	12	12	12
Septage	40	40	40	40	40	40
Total	77,575	78,328	79,088	79,856	80,632	81,416
Item	Flow, Million Gallons Per Year					
	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	7,315	7,386	7,458	7,531	7,604	7,678
Commercial	1,587	1,602	1,617	1,633	1,648	1,664
Schools	103	128	128	128	128	128
Industrial						
Minor	769	777	784	792	800	808
Major	2,415	2,415	2,415	2,415	2,415	2,415
Septage	6	12	12	12	12	12
Total	12,194	12,318	12,413	12,509	12,606	12,704
Item	BOD, Thousand Pounds Per Year					
	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	12,201	12,320	12,440	12,561	12,684	12,808
Commercial	4,785	4,831	4,879	4,926	4,974	5,023
Schools	171	213	213	213	213	213
Industrial						
Minor	1,616	1,632	1,648	1,665	1,681	1,698
Major	27,798	27,798	27,798	27,798	27,798	27,798
Septage	479	479	479	479	479	479
Total	47,051	47,274	47,458	47,643	47,830	46,019
Item	TSS, Thousand Pounds Per Year					
	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	12,201	12,320	12,440	12,561	12,684	12,808
Commercial	4,785	4,831	4,879	4,926	4,974	5,023
Schools	171	213	213	213	213	213
Industrial						
Minor	1,335	1,348	1,362	1,375	1,368	1,402
Major	12,184	12,184	12,184	12,184	12,184	12,184
Septage	2,944	2,944	2,944	2,944	2,944	2,944
Total	33,621	33,841	34,022	34,204	34,368	34,574

This is a draft and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.

The discharge by residential customers is 100 gallons per day (gpd) per person with both BOD and TSS concentrations of 100 milligrams per liter (mg/l). The BOD and TSS concentrations are based on sampling and analysis conducted by the City of wastewater discharge from residential users.

Based on an analysis of detailed 2000 United States Census data, the average number of persons in a duplex unit or in one additional dwelling unit or in a mobile home on a lot is 2.49 and the average number of persons in each dwelling unit in an apartment complex or mobile home space in a mobile home park is 1.89. This information is used in the calculation of residential monthly charges.

The basic information upon which Tables A.1, A.2, A.3, A.4 and A.5 are based is presented in Table A.6 and A.7 (residential and commercial), Table A.8 and Table A.9 (schools), Table A.10 (major industrial customer process and sanitary discharge characteristics), Table A.11 and A.12 (minor industrial customer process and sanitary discharge characteristics), and Table A.13 (septage hauler discharge characteristics). These tables are also included in Appendix A.

It should be noted that flow and loading estimates in this rate study may differ slightly from those projected in the City's recently completed master plan. The differences result primarily from the fact that the data used for design purposes are long term averages based on projected growth and land use, while the rate study is based on more detailed customer information used in conjunction with revenue requirement projections.

The customer classifications presented in Tables A.1 through A.5 and used in this report are listed in Table 2.2. The table also shows the billing code for each classification (when applicable) used in the City's utility billing system. A description of the current customer classes is shown in sections of the Modesto Municipal Code related to sewer service charges (updated by the City in 2001). These sections of the Modesto Municipal Code are included in Appendix D. The City plans to simplify its billing system codes for residential users. The system proposed by the City and used in this study for FYs 2007/08 through 2021/22 is shown in Table 2.2.

Table 2.2 Current and Proposed Customer Classifications

Customer Class	Current Billing Code	Proposed Billing Categories
Residential		
SF DU	SW1	Single Family
Duplex	SW2	Multiple Family
MF 3-4	SW3	Multiple Family
MF 5+	SW5	Apartment
Add'l DU	SWA	Apartment
Apartment	SW0	Apartment
Schools		
Grade K-6	K-6	G1
Grade K-8	K-8	G1
Grade 7-8	7-8	G1
High School	HS	G1
College	COL	G1
Commercial		
Group 1	G1	G1
Group 2	G2	G2
Group 3	G3	G3
Group 4	G4	G4
Industrial, Minor		
Industrial, Major		
Septage Haulers		

The Schools category contains all schools that are currently billed wastewater charges based on their average daily attendance (ADA) including those located in the Empire Sanitary District. Beginning in FY 2007/08, schools will be classified as commercial Group 1 (G1) customers.

The volume of wastewater discharge from schools for FY 2004/05 through FY 2006/07 shown in Table A.8 was based on the rate methodology described in the Modesto Municipal Code (wastewater charges based on average daily attendance). Beginning with FY 2007/08, school staff are added to the ADA count at a ratio of 1 staff for every 25 students. Also, beginning in FY 2007/08, wastewater discharge is changed from the five categories of volume per pupil to two categories based on volume per pupil-staff. The basis for the two categories of volume per pupil-staff is the State Water Resources Control Board (SWRCB) *Revenue Program Guidelines* which list estimated indoor water consumption at different types of establishments.¹

Churches have been included as a separate class but are billed as a Commercial Group 1 customer. That is, they are assigned the same strength characteristics as those of the Commercial Group 1 (G1) customers. Empire Sanitary District and City of Ceres customers are billed at the same rates as City of Modesto customers.

¹ See SWRCB *Revenue Program Guidelines*, March 1998 Revision, Table G-1, page G-23.

CHAPTER 3

REVENUE REQUIREMENTS AND COST ALLOCATION

This chapter presents the calculation of revenue requirements to be recovered from wastewater rates and the allocation of these revenue requirements to the various functional cost categories. Specifically; this chapter details the following:

- The projection of the City of Modesto's (City) Wastewater Utility revenue requirements to be recovered from wastewater rates (user charges).
- The allocation of these revenue requirements to the various functional cost categories (flow, BOD, TSS, customer, and industrial).
- The calculation of the unit costs of service. The revenue requirements allocated to each functional cost category are divided by the total loadings associated with each functional cost category to calculate unit costs of service. These unit costs are used to develop wastewater in the following chapter (Chapter 4).

REVENUE REQUIREMENTS

In this section the revenue requirements to be recovered from wastewater rates during the 15-year period, fiscal years (FYs) 2007/08 through 2021/22 are projected. Many of the details of these projections are presented in Appendix B while the basic results for the 5-year period, FYs 2007/08 through 2011/12 are presented directly in this chapter.

This historical revenue requirement from the City's financial statements, the budgeted revenue requirements for FY 2006/07, debt service schedules for existing debt, projected debt service schedules for proposed debt issues, and the projection of pay-as-you-go capital expenditures were used as a basis for the projection of revenue requirements.

Operating expenses are summarized in Table 3.1 and are shown in detail in Table B.1 of Appendix B. Operating expenses are projected to increase by 4 percent per year from the adopted budgeted expense for FY 2006/07. As shown in Table 3.1, operating expenses are projected to increase from \$17,252,101 in FY 2007/08 to \$20,182,518 in FY 2011/12. These basic operating expenses do not include operating expenses associated with new facilities yet to be constructed. Net operating expenses (net of interfund labor transfers) are projected in Table B.2 of Appendix B.

Table 3.1 Operating Expenditures

Item	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Capital Improvement Svcs Admin	\$1,773,195	\$1,844,123	\$1,917,888	\$1,994,603	\$2,074,387	\$2,157,363
Wastewater Quality Control Admin	\$464,443	\$483,021	\$502,342	\$522,435	\$543,333	\$565,066
Wastewater Collections	\$4,351,227	\$4,606,809	\$4,791,081	\$4,982,725	\$5,182,034	\$5,389,315
Wastewater Primary Treatment	\$4,303,891	\$4,806,015	\$4,998,255	\$5,198,186	\$5,406,113	\$5,622,357
Wastewater Secondary Treatment	\$2,279,922	\$2,371,119	\$2,465,964	\$2,564,602	\$2,667,186	\$2,773,874
Wastewater Monitoring & Control	\$761,934	\$792,411	\$824,108	\$857,072	\$891,355	\$927,009
Industrial Waste	\$1,332,071	\$1,356,305	\$1,410,557	\$1,466,979	\$1,525,658	\$1,586,684
Wastewater Utility Billing	\$954,134	\$992,299	\$1,031,991	\$1,073,271	\$1,116,202	\$1,160,850
Total	\$16,220,817	\$17,252,101	\$17,942,185	\$18,659,873	\$19,406,268	\$20,182,518

Note: Excludes operating costs associated with new (projected) facilities.

Projected debt service requirements (principal and interest) consist of debt service associated with:

- 2005 Wastewater Refunding Bond – Issues Series 2005A and 2005B
- 2006 DAF/Tertiary issue
- Projected issues in 2008, 2009, 2010, and 2013

As indicated above, the projected debt service on the wastewater utility's existing debt was obtained directly from the official statements associated with the existing issues. The debt service on the projected new issues was based on debt service payment schedules provided to the City by the City's financial advisor.

The projected Capital Improvement Program (CIP), was based on the capital expenditures shown in the Wastewater Utility Capacity Charge Study, Revisions to the timing of capital expenditures shown in the Study were provided by the City and are noted in the tables. Annual capital expenditures in escalated dollars and the amount to be funded by debt are shown in Table B.3 of Appendix B.

As shown in Table B.3 of Appendix B, it is projected that over the 15-year period, \$245,642,257 of projects will be funded on a pay-as-you-go basis and \$360,979,991 will be financed via the issuance of debt. The projected annual debt service associated with the \$360,979,991 to be debt funded is shown in Table B.4 of Appendix B. Capital expenditures, bond proceeds and annual debt service for the period FYs 2007/08 through 2011/12 are summarized in Table 3.2 below.

Table B.5 of Appendix B presents the detailed calculation of the projected operating costs for new facilities. These costs were developed by the City for this study. Projected costs for the period FYs 2007/08 through 2011/12 are presented in Table 3.2 below.

Table B.6 of Appendix B presents the detailed calculation of net revenues required to be recovered from wastewater rates. These calculations for the period FYs 2007/08 through 2011/12 are presented in Table 3.2 below.

Table 3.2 Revenue Required from Rates

Item	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Expenditures					
O&M, Existing Facilities	\$16,469,501	\$17,128,821	\$17,814,513	\$18,527,634	\$19,269,279
O&M, New Facilities	213,751	222,301	231,193	946,228	984,078
Allocated Indirect Costs	1,067,586	1,110,289	1,154,701	1,200,889	1,248,925
Capital, Repair & Replacement	1,800,000	2,200,000	2,500,000	2,800,000	3,100,000
Capital, New Facilities	22,321,505	59,460,121	69,099,703	46,778,199	9,639,583
Debt Service, Existing	4,453,844	4,453,871	4,454,137	4,459,058	4,459,058
Debt Service, New	0	0	6,510,450	10,319,523	10,798,694
Total	\$46,326,186	\$84,575,403	\$101,764,698	\$85,031,531	\$49,499,616
Less:					
Bond Proceeds	\$13,392,903	\$43,103,796	\$51,779,420	\$38,386,517	\$8,675,624
Non-operating Revenue	30,000	30,000	30,000	30,000	30,000
Total	\$13,422,903	\$43,133,796	\$51,809,420	\$38,416,517	\$8,705,624
Add To/(Use Of) Reserves	(\$5,050,000)	(\$750,000)	(\$2,800,000)	\$6,150,000	\$15,050,000
Revenue Required from Rates	\$27,853,284	\$40,691,607	\$47,155,278	\$52,765,014	\$55,843,991

The revenue requirements developed in this chapter will be offset, in part, by revenues from other sources such as capacity charge receipts, interest income, lease/rental income, and miscellaneous income. Most of these sources of other income are small. However, revenue from capacity charges are significant, especially in the latter years of the 15-year study period (after FY 2011/12). As a consequence, a detailed calculation of capacity charge revenues has been developed in Table B.7 of Appendix B. To be conservative, we have assumed a one percent annual growth in new connections with the bulk coming from new applicants for service who are vested under the existing capacity charge of only \$500. As a result, the annual capacity charge revenues are projected to produce an average of \$2.0 million in annual revenues during the period FYs 2007/08 through 2011/12.

The cash flow and ending cash balances resulting from these rate revenues are shown in Table B.8 of Appendix B. It is in this table where the revenues and expenses are balanced and the amount of the rate increase determined. It should be noted that cash balances begin to increase after FY 2011/12. The cash balance is being built so as to fund the \$157.4 million capital project that begins in FY 2019/20.

Table B.9 of Appendix B calculates the net revenues required to meet wastewater revenue bonds net revenue coverage requirements. The bond indenture indicates that net revenues (gross revenues from all fees and charges less operating expenses) must be equal to, or exceed, 1.25 times total debt service. As shown in this table, that requirement is always met. The City's internal requirement is that coverage be equal to, or exceed, 1.40. The City's internal requirement is also met in all years except 2014/15 when the coverage is projected to be 1.38

The calculation of revenues to be recovered from rates (and thus the amount of the annual rate increases) is an iterative process. There are three variables that can be used to meet the net revenue coverage requirement: (1) The amount of the rate increase, (2) the split between how the CIP is funded (the amount financed from the issuance of debt versus the amount funded directly from revenues); and (3) the amount of monies in the wastewater reserve fund(s).

COST ALLOCATION

The purpose of a cost-of-service allocation is to determine the costs incurred to serve each of the City's various customer classes (i.e., single family, multiple family, commercial, industrial customers, septage, etc.). Costs associated with wastewater collection, treatment, disposal, and billing and administration are projected in Tables B.1 through B.6 in Appendix B and are summarized in Table 3.2 above.

These costs can be related to certain wastewater treatment parameters or functional cost categories. For the City, these functional cost categories are annual discharges of flow, biochemical oxygen demand (BOD), total suspended solids (TSS) and number of accounts (customers). The account functional cost category is meant to capture costs which are independent of flow, and BOD and TSS loadings. That is, costs which are the same for each account.

Projections of customer wastewater characteristics for each of these functional categories are developed in Chapter 2 (see tables in Appendix A). In this section, the projected revenue requirements to be recovered from wastewater rates (shown in Tables B.1 through B.6 in

Appendix B and summarized in Table 3.2) are allocated to the applicable functional cost categories based on full cost-of-service philosophy.

The cost-of-service allocation is a process whereby the City's wastewater utility revenue requirements are allocated to the functional cost categories. This allocation is based on engineering judgment of how each line item in the annual revenue requirements should be allocated to the functional cost categories of flow, BOD, TSS, and number of accounts.

REVENUE REQUIREMENTS ALLOCATIONS

The process used to allocate the City's revenue requirements is presented in this section. The first step is to summarize the revenue requirements by function: collection system costs, treatment system costs, customer costs, administrative costs, etc. The second step is to allocate the revenue requirements to the functional cost categories of flow, BOD, TSS, and number of accounts. The third step is to develop the unit costs-of-service for each functional cost category.

The basis for these allocations are set forth in Table B.10 of Appendix B and summarized below in Table 3.3. Costs which are clearly independent of flow or loads (e.g., billing and collection) are allocated to accounts. Costs which are flow dependent (e.g., collection system costs) are allocated to flow. Treatment costs are allocated to flow, BOD, and TSS based on SWRCB guidelines, prior experience, or best professional judgment. Costs which are not clearly assignable directly to a particular functional cost category are assigned based on the composite of the operating cost allocations.

Table 3.3 Allocation of Revenue Required from Rates

Item	Flow	BOD	TSS	Accounts	Total	Method
Current Operations						
Cap Imp Svcs Admin	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
WQC Admin	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Wastewater Collections	100.0%	0.0%	0.0%	0.0%	100.0%	assigned
Wastewater Primary Treatment	70.0%	10.0%	20.0%	0.0%	100.0%	assigned
Wastewater Secondary Treatment	40.0%	30.0%	30.0%	0.0%	100.0%	assigned
Wastewater Monitoring & Control	40.0%	30.0%	30.0%	0.0%	100.0%	assigned
Industrial Waste	40.0%	30.0%	30.0%	0.0%	100.0%	assigned
Wastewater Utility Billing	0.0%	0.0%	0.0%	100.0%	100.0%	assigned
Operating Expenditures, New Facilities	40.0%	30.0%	30.0%	0.0%	100.0%	assigned
Repair and Replacement	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Allocated Indirect Costs	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Capital Expenditures	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Current Debt Service	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
New Debt Service	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Bond Proceeds	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Non-Operating Revenue	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp
Add To/(Use Of) Reserves	65.3%	12.4%	15.5%	6.8%	100.0%	O&M comp

As a consequence of this composite allocation, about 6.8% of the capital improvement services administration and water quality control (WQC) administration operating expense categories are allocated to the account functional cost category. In addition, about 6.8% of all other costs and non-operating revenues get allocated to this functional cost category. The end result of this

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allocation is that about 6.8% of all revenue requirements to be recovered from rates are independent of flow, BOD loadings and TSS loadings and are thus the same for all customers.

The annual revenue requirements, summarized in Table 3.2, are allocated to the functional cost categories and are shown in detail in Tables B.11 through B.15 of Appendix B. The annual revenue requirements may be further split into costs associated with collection and all other costs. This more detailed split is necessary because collection system costs are not recovered from septage haulers.

UNIT COSTS-OF-SERVICE

The unit costs-of-service are calculated by dividing the net revenue requirements associated with each functional cost category by the number of units associated with that particular category. For example, the revenue requirements allocated to the flow category are divided by the amount of flow to yield the unit cost (\$/MG), those allocated to BOD and TSS are divided by the number of pounds of BOD and TSS discharged by customers to yield the unit costs (\$/1,000 lbs), while those allocated to the account category are divided by the number of accounts. The unit cost calculations are summarized for FYs 2007/08 through FY 2011/12 in Table 3.4 and shown in detail for the study period in Table B.16.

Table 3.4 Unit Costs

Item	Projected FY 07/08	Projected FY 08/09	Projected FY 09/10	Projected FY 10/11	Projected FY 11/12
Flow Unit Cost					
Flow Net Revenue Requirements	\$18,177,764	\$26,556,241	\$30,774,418	\$33,884,189	\$35,861,273
Flow, million gallons (MG)	12,318	12,413	12,509	12,606	12,704
Flow Unit Cost, \$/MG	\$1,475.657	\$2,139.324	\$2,460.125	\$2,687.907	\$2,822.834
BOD Unit Cost					
BOD Net Revenue Requirements	\$3,450,063	\$5,040,432	\$5,841,240	\$6,920,517	\$7,324,502
BOD, thousand pounds, KLBS	47,274	47,458	47,643	47,830	48,019
BOD Unit Cost, \$/KLBS	\$72.980	\$106.209	\$122.605	\$144.691	\$152.534
TSS Unit Cost					
TSS Net Revenue Requirements	\$4,325,538	\$6,319,391	\$7,323,305	\$8,510,278	\$9,006,978
TSS, thousand pounds, KLBS	33,841	34,022	34,204	34,388	34,574
TSS Unit Cost, \$/KLBS	\$127.818	\$185.745	\$214.106	\$247.476	\$260.511
Account Unit Cost					
Account Net Revenue Requirements	\$1,899,918	\$2,775,543	\$3,216,314	\$3,450,030	\$3,651,237
Accounts	61,695	62,299	62,909	63,526	64,148
Account Unit Cost, \$/Month	\$2.57	\$3.71	\$4.26	\$4.53	\$4.74
Total Rate Revenue Required	\$27,853,284	\$40,691,607	\$47,155,278	\$52,765,014	\$55,843,991

REVENUE BY CUSTOMER CLASS

The unit costs listed in Table 3.4 for FYs 2007/08 through FY 2011/12 (and shown for the entire study period in Table B.16) are used to develop revenue requirements and rates for all customers.

The calculation of revenue requirements for each customer class using the unit costs is shown in Table B.17 (flow), Table B.18 (BOD), Table B.19 (TSS) and Table B.20 (accounts). The development of revenue requirements for each customer class involves multiplying the flow, BOD and TSS loading, and number of accounts for each customer class (shown in Tables A.1 through A.3 for flow, BOD and TSS; and in Table A.5 for accounts) by the unit costs for flow, BOD, TSS and accounts (shown in Table B.16). Revenue required from rates for each customer class are summarized for FYs 2006/07 through FY 2011/12 in Table 3.5.

Table 3.5 Rate Revenue by Customer Class

Item	Estimated FY 2007	Projected FY 2008	Projected FY 2009	Projected FY 2010	Projected FY 2011	Projected FY 2012
Residential	\$11,716,760	\$15,185,739	\$22,233,176	\$25,818,386	\$28,704,615	\$30,445,352
Commercial	3,263,520	3,418,791	5,007,724	5,818,760	6,535,347	6,935,012
Schools	67,881	233,222	338,278	389,208	430,313	452,153
Industrial						
Minor	765,546	1,438,715	2,107,452	2,448,685	2,738,413	2,905,867
Major	5,414,141	7,149,465	10,381,609	11,957,697	13,528,110	14,230,604
Septage	262,004	454,385	649,686	745,906	858,563	903,482
Total	\$21,489,852	\$27,880,317	\$40,717,925	\$47,178,642	\$52,795,361	\$55,872,470

Revenue required from rates for each customer class are used to develop wastewater rates for each customer class in Chapter 4.

CHAPTER 4

WASTEWATER RATE DEVELOPMENT

The City's wastewater collection, treatment, and disposal systems are designed to serve differing demands placed upon them by the customers tributary to the systems. To provide rate equity among users, it is necessary to allocate the costs of accommodating these demands to users in proportion to their wastewater discharge characteristics. This is accomplished by determining the unit cost of service for each functional cost category and multiplying the resultant values by each user's or user classes' wastewater discharge characteristics. This chapter describes the development of the wastewater rates based on the cost of providing wastewater service. The unit costs of providing wastewater service were developed in Chapter 3. The wastewater discharge characteristics were developed in Chapter 2.

METHOD OF WASTEWATER RATE DERIVATION

The proposed wastewater rates are designed to recover the cost of operating, maintaining, and replacing the wastewater system over the projected annual wastewater loadings discharged to the wastewater system. The wastewater rates for the various customer classes are calculated as follows:

1. The unit costs of service calculated in Table B.16 of Appendix B for each functional cost category are multiplied by the corresponding user characteristics for each functional category for each customer class to yield the revenues that must be recovered from that customer class.
2. For residential customers, the revenue requirements for the flow, BOD and TSS cost categories are totaled and that total divided by the number of billing units to yield the billing unit cost. Separate billing unit costs are developed for single family dwelling units, multiple family dwelling units, and apartment complex dwelling units. The account unit cost is then added to the billing unit cost to determine a total monthly charge.
3. For commercial customers, the revenue requirements for the flow, BOD and TSS cost categories are totaled and that total divided by the wastewater discharge (in thousands of gallons) to yield the unit cost per thousand gallons. Separate unit costs are developed for Group 1, Group 2, Group 3 and Group 4 commercial customers. The unit cost per thousand gallons is multiplied by metered water use for each customer to determine flow-based charges for each customer. The account unit cost is added to the flow-based charge to determine the total charge for each account.
4. For industrial customers, the unit costs of service for flow, BOD, TSS and accounts are applied to the flow, BOD and TSS discharges for each account. The account unit cost is added to the flow, BOD and TSS-based charges to determine the total charge for each account.
5. For septage haulers, the unit cost for flow is adjusted to exclude costs associated with the wastewater collection portion of the City's sewer system (septage haulers deliver wastewater directly to the treatment plant in trucks) and add costs for operation of the trucked waste receiving station. The adjusted unit cost of service for flow, and the uniform unit costs for BOD and TSS, are applied to the flow, BOD and TSS discharges for each account.

The rate derivation process for a single family residential customer is illustrated schematically in Figure 4.1 at the end of this chapter.

Residential and Commercial Rates

Based on the unit costs of service developed in Table B.16, the recommended wastewater rates for residential and commercial customer classes are calculated in Tables C.1 and C.2, respectively, of Appendix C. Also calculated are the revenues derived from these customer classes. As shown on Table C.1, single family dwelling rates are projected to increase from the current \$14.26/month to \$35.72/month in FY 2011/12.

A summary of current (FY 2006/07) and projected single family dwelling monthly rates for FYs 2007/08 through 2011/12 are shown in Table 4.1. As shown in this table, the rate is comprised of a billing unit charge and an account charge. For example, in FY 2007/08 the billing unit charge is \$15.97/month and the account charge is \$2.57/month for a total of \$18.54/month.

Table 4.1 Current and Projected Single Family Monthly Rates

Fiscal Year	Billing Unit \$/Month	Account \$/Month	Billing Units Per Account	Total \$/Month	Increase \$/Month	Increase %
Current	\$14.26	-	1	\$14.26	-	-
FY 2008	\$15.97	\$2.57	1	\$18.54	\$4.28	30%
FY 2009	\$23.17	\$3.71	1	\$26.88	\$8.34	45%
FY 2010	\$26.65	\$4.26	1	\$30.91	\$4.03	15%
FY 2011	\$29.48	\$4.53	1	\$34.01	\$3.10	10%
FY 2012	\$30.98	\$4.74	1	\$35.72	\$1.71	5%

The calculation of the single family monthly rate for FY 2007/08 is illustrated in Figure 4.1. The general rate derivation process was shown in Figure 1.1.

As shown above, substantial annual increases in single family dwelling rates will be necessary in FYs 2007/08 through 2009/10. Similar increases will be necessary for the other residential customer classes. The rates for multiple family dwelling units and apartment dwelling units are presented in Tables 4.2 and 4.3, respectively.

Table 4.2 Current and Projected Multiple Family Monthly Rates

Fiscal Year	Billing Unit \$/Month	Account \$/Month	Billing Units Per Account	Total \$/Month	Increase \$/Month	Increase %
Current	\$11.15	-	2	\$22.30	-	-
FY 2008	\$13.71	\$2.57	2	\$29.99	\$7.69	34%
FY 2009	\$19.89	\$3.71	2	\$43.49	\$13.50	45%
FY 2010	\$22.89	\$4.26	2	\$50.04	\$6.55	15%
FY 2011	\$25.31	\$4.53	2	\$55.15	\$5.11	10%
FY 2012	\$26.60	\$4.74	2	\$57.94	\$2.79	5%

Note: This example is for a multiple family dwelling with two billing units. The total charges are the sum of the billing unit charge times the number of billing units (2), plus the account charge.

Table 4.3 Current and Projected Apartment Monthly Rates

Fiscal Year	Billing Unit \$/Month	Account \$/Month	Billing Units Per Account	Total \$/Month	Increase \$/Month	Increase %
Current	\$9.17	-	10	\$91.70	-	-
FY 2008	\$10.41	\$2.57	10	\$106.67	\$14.97	16%
FY 2009	\$15.10	\$3.71	10	\$154.71	\$48.04	45%
FY 2010	\$17.37	\$4.26	10	\$177.96	\$23.25	15%
FY 2011	\$19.21	\$4.53	10	\$196.63	\$18.67	10%
FY 2012	\$20.19	\$4.74	10	\$206.64	\$10.01	5%

Note: This example is for an apartment with ten billing units. The total charges are the sum of the billing unit charge times the number of billing units (10), plus the account charge.

Projected rates for commercial customers, summarized in Table C.2, are compared to current rates in Table 4.4 (quantity charges) and Table 4.5 (account charges) for FY 2007/08 through FY 2011/12.

Table 4.4 Current and Projected Commercial Quantity Charge Rates

Fiscal Year	Quantity Charge, \$/1,000 gallons (a)							
	Group 1		Group 2		Group 3		Group 4	
Current	\$1.73	-	\$2.04	-	\$2.47	-	\$2.98	-
FY 2008	\$1.81	5%	\$2.23	9%	\$2.65	7%	\$3.15	6%
FY 2009	\$2.63	45%	\$3.24	45%	\$3.84	45%	\$4.57	45%
FY 2010	\$3.02	15%	\$3.72	15%	\$4.43	15%	\$5.27	15%
FY 2011	\$3.34	11%	\$4.16	12%	\$4.98	12%	\$5.96	13%
FY 2012	\$3.51	5%	\$4.37	5%	\$5.23	5%	\$6.27	5%

Table 4.5 Current and Projected Commercial Account Charge Rates

Fiscal Year	Fixed Monthly Charge, \$ (a)
Current	\$21.95
FY 2008	\$2.57
FY 2009	\$3.71
FY 2010	\$4.26
FY 2011	\$4.53
FY 2012	\$4.74

Note a: The current fixed monthly charge includes charges for 1,680 cubic feet of water used. The current quantity charges are applied to flow in excess of 1,680 cubic feet of water used per month. The projected fixed monthly account charge includes no charges for flow. The projected quantity charges are applied to all quantities of flow.

Commercial user rates will increase by about 5% - 9% in FY 2007/08 as compared to 30% for single family residential customers, 34% for multiple family residential customers and 16% for apartment residential customers. The differences are due to the difference in methodology in rate development between the current and projected rates. From FY 2008/09 onward, commercial user rates increase at a rate similar to that of the unit costs for flow, BOD, TSS and accounts.

Schools

The annual revenue requirements for schools will increase. The current rate structure for schools bases wastewater charges on Average Daily Attendance (ADA), an assumed discharge per pupil as a function of school category (K-6, K-8, 7-8, High School, College), and a wastewater rate. The projected rate structure places schools in the commercial Group 1 (G1) category. Projected wastewater discharge for schools is based on indoor water use for educational facilities as published by the State Water Resources Control Board and applied to the ADA plus one staff member for every 25 pupils. The rate increase to schools results from both changing the rate to the commercial Group 1 rate (about 2/3 of the increase) and adding staff to the ADA count (about 1/3 of the increase).

The current rate structure and rates for schools is compared to the projected rate structure and rates in Table 4.6. In this table, a hypothetical high school with 3,000 students is used to develop annual wastewater charges.

Table 4.6 Current and Projected Annual Wastewater Charges for a High School

FY 2006/07 Current Rate Development Methodology	
<i>cf/pupil/month x 12 months x average daily attendance (ADA) ÷ 133.69 cf x rate (\$) = Annual Charges</i>	
FY 2006/07 Annual Charges Based on Current Methodology and Current Rates	
<i>36 cf/pupil/month x 12 months x 3,000 ADA ÷ 133.69 cf x \$0.68 = \$6,592</i>	
FY 2007/08 Proposed Rate Development Methodology	
<i>(flow, mg x \$/mg) + (BOD, Klbs x \$/Klbs) + (TSS, Klbs x \$/Klbs) + (Billing Units x \$/unit) = Annual Charges</i>	
FY 2007/08 Annual Charges Based on Proposed Methodology and Proposed Rates	
<u>Unit Costs</u>	
<i>(11.20 mg x \$1,475.66/mg) + (18.69 Klbs x \$72.98/Klbs) + (18.69 Klbs x \$127.82/Klbs) + (12 units x \$2.57/unit) = \$20,316</i>	
<u>Commercial Group 1 Rates Based on Unit Costs</u>	
<i>(11.20 mg x \$1.81/thousand gallons) + 12 units x \$2.57/unit) = \$20,316</i>	

Legend: cf = cubic feet (7.481 gallons); mg = million gallons; Klbs = thousand pounds;
 3,000 ADA = 9.70 mg; 3,000 ADA plus 1 staff for every 25 pupils = 11.20 mg

The current (FY 2006/07) and projected revenues from all schools for the period FYs 2007/08 through 2011/12 are shown in Table 4.7.

Table 4.7 Current and Projected School Revenue Requirements

Fiscal Year	Total Revenue	Increase \$	Increase %
Current	\$67,881	-	-
FY 2008	\$233,222	\$165,340	244%
FY 2009	\$338,278	\$105,057	45%
FY 2010	\$389,208	\$50,930	15%
FY 2011	\$430,313	\$41,105	11%
FY 2012	\$452,153	\$21,840	5%

Industrial Customers

The industrial customers are classified as either major or minor and are assessed rates for both process waste discharge which is monitored via an effluent meter, and sanitary wastewater flow which is estimated based on water use. Table C.4 shows the projection of process discharges characteristics for (flow, BOD, and TSS) and the projection of the sanitary wastewater discharge characteristics from the major industrial customers. Annual flows and loadings for these customers are projected to remain constant throughout the study period. Similarly, Table C.5 shows both the process and sanitary discharge characteristics for the minor industrial customers. These flow and loadings are also projected to remain constant throughout the entire study period.

The projected revenues from both process discharge and sanitary discharge for the major industrial customers is shown in Table C.4 for the entire period and is summarized in Table 4.8 for the current year (FY 2006/07) and FYs 2007/08 through 2011/12.

Table 4.8 Current and Projected Major Industrial User Revenue Requirements

Fiscal Year	Revenue				Unit Costs			Unit Costs % Increase		
	Total	Process	Sanitary	% Inc	Flow per mg	BOD per klbs	TSS per klbs	Flow	BOD	TSS
Current	\$5,414,141	-	-	-	\$892.33	\$105.52	\$97.14	-	-	-
FY 2008	\$7,149,465	\$7,056,377	\$93,088	32.1%	\$1,475.66	\$72.98	\$127.82	65.4%	-30.8%	31.6%
FY 2009	\$10,381,609	\$10,246,582	\$135,027	45.2%	\$2,139.32	\$106.21	\$185.75	45.0%	45.5%	45.3%
FY 2010	\$11,957,697	\$11,802,339	\$155,359	15.2%	\$2,460.12	\$122.61	\$214.11	15.0%	15.4%	15.3%
FY 2011	\$13,528,110	\$13,356,285	\$171,825	13.1%	\$2,687.91	\$144.69	\$247.48	9.3%	18.0%	15.6%
FY 2012	\$14,230,604	\$14,050,052	\$180,552	5.2%	\$2,822.83	\$152.53	\$260.51	5.0%	5.4%	5.3%

Similarly, the projected revenues from both process and sanitary discharge for the minor industrial customers is calculated in Table C.5. The current year (FY 2006/07) revenue requirements and those for FYs 2007/08 through 2011/12 are summarized in Table 4.9.

Table 4.9 Current and Projected Minor Industrial User Revenue Requirements

Fiscal Year	Revenue				Unit Costs			Unit Costs % Increase		
	Total	Process	Sanitary	% Inc	Flow per mg	BOD per klbs	TSS per klbs	Flow	BOD	TSS
Current	\$765,546	-	-	-	\$892.33	\$105.52	\$97.14	-	-	-
FY 2008	\$1,438,715	\$1,409,403	\$29,312	87.9%	\$1,475.66	\$72.98	\$127.82	65.4%	-30.8%	31.6%
FY 2009	\$2,107,452	\$2,064,934	\$42,518	46.5%	\$2,139.32	\$106.21	\$185.75	45.0%	45.5%	45.3%
FY 2010	\$2,448,685	\$2,399,765	\$48,920	16.2%	\$2,460.12	\$122.61	\$214.11	15.0%	15.4%	15.3%
FY 2011	\$2,738,413	\$2,684,307	\$54,105	11.8%	\$2,687.91	\$144.69	\$247.48	9.3%	18.0%	15.6%
FY 2012	\$2,905,867	\$2,849,014	\$56,853	6.1%	\$2,822.83	\$152.53	\$260.51	5.0%	5.4%	5.3%

As shown in the above table, the rate increases in FY 2007/08 for minor industrial customers significantly exceed the basic overall rate increases.

Septage Haulers

The rates for the septage haulers are calculated in Table C.6 based on the projected volume and number of truckloads of septage delivered to the wastewater treatment plant, and BOD and TSS concentrations of the septage. The current year (FY 2006/07) rates and the rates for FYs 2007/08 through 2011/12 in Table 4.10.

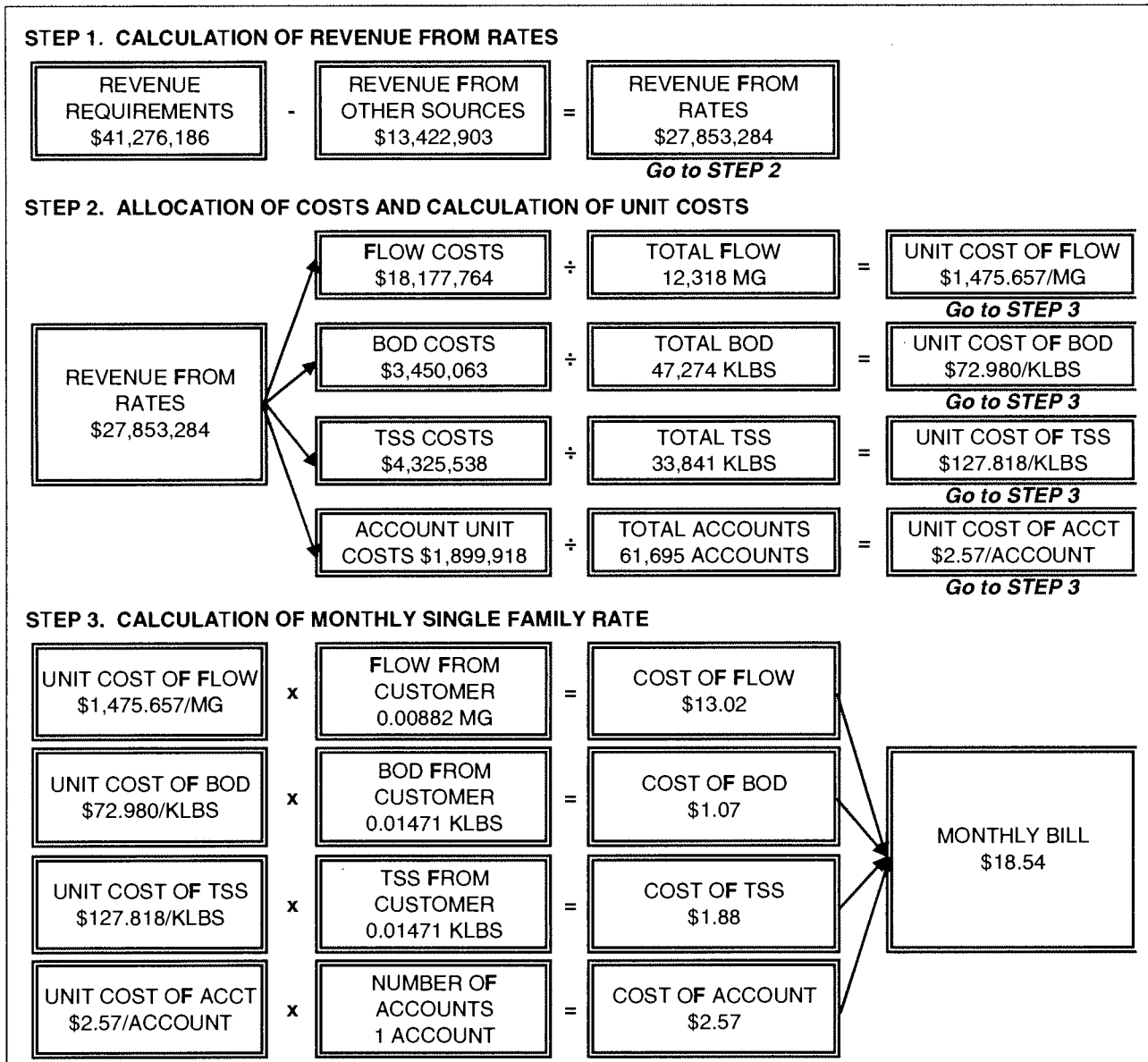
Table 4.10 Current and Projected Septage Hauler Rates

Fiscal Year	Charge, \$/1,000 Gallons	% Increase
Current	\$22.24	-
FY 2008	\$38.94	75%
FY 2009	\$55.68	43%
FY 2010	\$63.93	15%
FY 2011	\$73.59	15%
FY 2012	\$77.44	5%

Current Sewer Service Charges

The sewer service charges currently in place were adopted in 2001 as shown in City of Modesto Resolution No. 2001-433. This resolution, which updated sections of the Modesto Municipal Code related to sewer service charges, is included in its entirety in Appendix D.

Figure 4.1 FY 2007/08 Single Family Monthly Rate Calculation



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