

CHAPTER 14 – FINANCIAL PROGRAM

This chapter documents the water and wastewater revenue requirements for the WRMP CIP. This evaluation will develop appropriate rate-based revenues based on sound fiscal policies, and identify an improved water and wastewater rate structure resulting in community-oriented customer bills.

14.1 Background

GWA provides potable water services to approximately 38,000 accounts, and wastewater services to 23,000 customers. The current water service revenues are based on consumption charges and fixed basic meter service fees. Consumption charges range from \$1.47 to \$4.42 per thousand gallons (Kgal), and the basic meter service fee starts at \$7.46 per month for the smallest 3/4-inch water meter. Wastewater services charges are fixed at \$22 per month for all residential accounts; for all other customers the charges are a percentage of metered water use times a unit rate adjusted for estimated sewage strengths. The unit rate for non-residential wastewater charges ranges from \$2.30 to \$7.78 per Kgal of discharged sewage. Billing surcharges added to each bill are currently equal approximately nine percent. In fiscal year (FY) 2005-06, the rate-based revenues totaled \$49 million.

As detailed in the prior chapters, the GWA water infrastructure consists of production well sites and pump stations, storage tanks and reservoirs, transmission mains and distribution pipes, and services leading to water meters. The wastewater infrastructure includes sewer laterals, local collection systems, sewer interceptors and pump stations, and a series of wastewater treatment plants. Over the next five years, through fiscal year (FY) 2010-11 on September 30, 2011, the WRMP has identified approximately \$185 million in current 2007 year dollar funding requirements for water and wastewater utility infrastructure improvements. This and future capital project funding will require a significant increase in customer service billing. GWA is currently operating under a Stipulated Order, which includes specific financial goals and policies and the funding of projects required for life and safety and improvement of service levels. However, the Stipulated Order does not specify the rate-based revenue requirement for compliance. These financial requirements are identified in this chapter.

14.2 Financial Objectives and Rate Setting Process

The main funding source for municipal utilities is customer rate-based revenues. The rates are based on the concept that each customer receives a benefit from water and wastewater services, and should pay for that benefit. Rate-setting criteria applicable to these utilities are as follows:

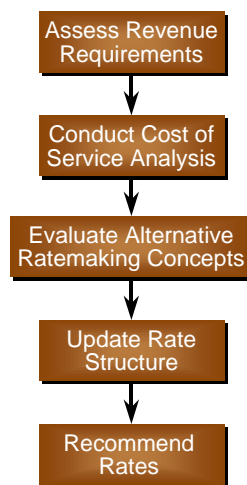
- **Sufficient Revenue** – Charges should generate the revenues necessary to recover the O&M expenses and capital costs of the system consistent with sound fiscal policies, for a service which must last in perpetuity.
- **Equitable** – The charge structure should apportion the costs of providing services among different customers (i.e., residential, commercial, hotel, federal and irrigation) such that each customer class is paying fees commensurate with the services they receive.
- **Implementable** – Data upon which the rates are based is reasonably available for billing purposes, and the rate structure is feasible to administer.
- **Practical** – Proposed rates are easy to understand and the customer bills are publicly acceptable and supported by the elected officials governing the utility.

- **Stable** – The rate structure will result in utility revenues that will not vary greatly from year to year, and will support the fixed and variable costs of utility operations, including debt service.

Rate-setting criteria often conflict. The biggest conflict addressed in this analysis is the need for sufficient rate-based revenues while keeping the bills affordable and at a publicly acceptable level. Brown and Caldwell has made an effort to develop water and wastewater rate schedules that meet the current legal requirements as we currently understand them. However, GWA’s legal counsel must ultimately determine that legality.

In order to achieve the above objectives, a rate setting process endorsed by the AWWA and the WEF is used. The rate process is modeled and illustrated in the tables and figures provided in this chapter. This process is illustrated in Figure 14-1.

Figure 14-1 - Rate Setting Process



- **Assess Annual Revenue Requirements** – To recover revenues sufficient to operate the utility on a sound basis, annual revenue requirements must be projected. The projected revenues will fund O&M expenses and capital expenditures, including debt service. Also, in order to project costs from changes in users demand, the number of accounts must be forecast.
- **Conduct Cost of Service Analysis** – In order to identify the costs of service to the various customer classes, there must be a nexus to the customer’s benefits. To do this, first the costs must be allocated to functional cost categories. These categories include total water demand and sewage discharges, peak water demands, meter service capacities, and customer services (as defined by the AWWA and WEF). The costs allocated to the functional categories are divided by the appropriate demands (i.e., number of customers and their meter sizes, and water use) in order to calculate unit costs of service for rates.
- **Evaluate Alternative Rates** – The unit costs of service and the user characteristics are combined to develop rate structure alternatives. Alternative rate structures include variations of the fixed service charges versus variable commodity rates, and lifeline rates for financially vulnerable residential customers. The unit rates of the rate structures are projected and a comparison of GWA’s current and updated bills is provided for each alternative.

The criteria used for this study includes GWA and CCU policies, Series 2005 bond covenants for additional bonds, and general municipal utility financial standards as described by AWWA and WEF. Background information and data used for development of the rates are presented in Volume 1 Appendix 1M - Financial Program.

14.3 Projected Revenues and Expenditures

The purpose of this section is to: 1) identify the current GWA expenditures for water and wastewater utilities; 2) develop a financial plan for the CIP project expenditures; 3) integrate the projected customer demands for services; 4) develop a budget of future expenses; and 5) calculate the rate-based revenue requirements for funding sustainable utility services. A cashflow proforma of sources and uses of revenues and expenditures is used to identify the appropriate level of rate-based revenues. A detailed proforma of the first six years through FY 2011-12 is followed by a 20-year financial plan through 2026.

GWA operates the water and wastewater utility services as a single self-supporting enterprise. The budget for the two utilities is comprised of two components: O&M expenses and capital-related project expenditures identified in the WRMP CIP. O&M expenses include all costs for employee salaries and services, utilities, purchased water, supplies, equipment, contracts, maintenance, utility billing and collection, and other miscellaneous expenses.

For this cash-based rate analysis, the non-operating expenses, other revenue sources and uses, and transfers to and from restricted reserve funds are employed in the calculation of rates. These include interest earnings on all reserves, pay-as-you-go (pay-go) cash funding of a portion of the CIP, and debt service on bonds issued for funding the remainder of the CIP.

The non-operating revenues and expenses are added to the net operating revenues to obtain the revenue requirements to be derived from rates. Non-cash expenses, such as depreciation, are not used for developing rate-based revenue requirements. Due to GWA's chart of accounts and budgeting practices, GWA commingles operating and non-operating accounts. Moreover, the current GWA operating divisions are not structured along utility lines, further blurring the budgeting and accounting distinctions typically used by municipal utilities.

14.3.1 Projected Costs

This section develops the projected costs of the proposed financial plan. These projected costs are from the approved GWA O&M budget for FY 2005-06 and the final WRMP CIP.

Table 14-1, Financial Assumptions, provides financial assumptions, including inflationary escalations, bond terms, and other factors. For example, customer non-payment of utility bills currently is five percent. However, based on anticipated improved business practices with the new water metering system, that percentage is projected to drop over the next five years to two percent of the total customer bills.

These assumptions have significant impacts of the level of rates required in the projection. A sensitivity analysis on the impacts of changing the key assumptions is presented at the end of this chapter. For example, any reduction in the non-payment of utility bills eliminates the need for an equal increase in rates.

Table 14-1 – Financial Assumptions

Description	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	Future Years (a)
Interest Earnings on Cash Reserves	4.45%	4.45%	4.45%	4.45%	4.45%	4.45%	4.45%	4.5%
Bond Terms		Until 2012						Beyond 2012
Bond Term (years)		30						30
Cost of Issuance, Insurance and Discount		2.55%						2.55%
Debt Interest Rate		6.0%						6.0%
Years of Capitalized Debt (b)		2						0
GWA Cost Inflation (annual)								
Project Construction Costs		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	3.0%
GWA Labor Escalation (including staffing increase (c))		25.0%	4.0%	4.0%	4.0%	4.0%	4.0%	3.0%
O&M (chemicals & supplies, etc.)		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	3.0%
GWA Electrical Power Unit Costs		10.0%	5.0%	5.0%	5.0%	5.0%	5.0%	3.0%
Guam Customers (d)								
Increase in Household Income (HH I/C)		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	1.5%
Increase to the Consumer Price Index (CPI)		1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Increase in Service Demands (Usage)		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	1.5%
Non-payment of Customer Utility Bills (e)								
Percentage of total billing	5.0%	5.0%	5.0%	4.0%	3.0%	2.0%	2.0%	2.0%
Unpaid Utility bills	\$2,507,210	\$2,914,190	\$3,334,812	\$2,927,761	\$2,399,070	\$1,745,284	\$1,862,393	

- a. The long term cost of capital is projected to be 3% over inflation.
- b. The capitalized debt results in no debt service (including interest and principal) for the first two years after bond issuance.
- c. Significant increases to staffing costs in 2007 are required for new construction management staff and for salary grade increases with existing personnel.
- d. The projected Household Income increases have been 1 percent over the consumer price index (CPI). The CPI is projected to be lower than the inflation on GWA costs. No current government information exists on recent and projected CPI or household income changes.
- e. The non-payment of Customer Utility Bills reduces the total rate-based revenues. These non-payments are shown as negative revenues.

Table 14-2, lists GWA’s FY 2005-06 operating budget. The budget is divided between personnel services and other O&M. Supplemental Annuity Retirement (SAR) payments (currently handled as a surcharge to the utility bills) are listed separately. Based on discussions with GWA staff, it is projected that a portion of the GWA labor for project-related services (such as design and construction management) will be capitalized in the fixed assets. As such, they are to be funded from bond proceeds, and are netted out of the projected O&M costs. In the FY 2005-06, the personnel services budget of \$16.4 million includes unfilled positions. Several of these positions remain unfilled, so the current year projected personnel service cost is slightly reduced. A summary of the O&M expenditure categories totaling \$45 million is included at the bottom of the table.

Table 14-2 – Budget Year Operating Expenses – FY 2005-06

Description of Expense	Account	GWA Divisions				Unallocated (1150)	Total Budget
		General Manager (GM/Admin/lab/engr)	CFO (mtr&cust/CFO/data/etc)	Collection & Distribution (pres/pump/etc)	Production & Treatment (grd/sut/disp/etc)		
Current Salaries & Benefits (a)							
Wages & Salaries		\$1,290,253	\$1,703,645	\$4,442,512	\$2,445,176		\$9,881,586
Other Personnel Services (b)		\$33,350	\$52,500	\$904,500	\$145,500		\$1,135,850
Benefits (insurance/etc.)		\$150,022	\$276,218	\$638,454	\$312,807		\$1,377,502
Benefits (retirement)		\$321,144	\$424,037	\$1,105,741	\$608,605		\$2,459,527
Subtotal		\$1,794,769	\$2,456,400	\$7,091,208	\$3,512,088		\$14,854,464
Unallocated (1150)							
Vacant Positions to be Filled (including Certification/Promotions)						\$850,000	
Salary Increments						\$660,000	
Subtotal						\$1,510,000	\$1,510,000
GT Personnel Services		\$1,794,769	\$2,456,400	\$7,091,208	\$3,512,088	\$1,510,000	\$16,364,464
Supplemental Annuities Retirement Surcharge payment for Retirees (c)							\$525,000
Capitalized GWA Labor Costs (fully burdened) (a)							\$702,400
Operations & Maintenance							
Training Off Island	203/204	\$253,230	\$10,000	\$378,000	\$27,970		\$669,200
Advertising Expense	301	\$25,000	\$0	\$60,000	\$31,000		\$116,000
Miscellaneous Expenses 206-311 (d)	Varies	\$27,990	\$11,780	\$54,000	\$97,350		\$191,120
Equipment Rental	313	\$0	\$5,000	\$555,920	\$130,000		\$690,920
Support Services (legal/prof./computer/etc.)	320-323	\$236,000	\$260,000	\$60,000	\$12,500		\$568,500
Regulatory Commission - Other	326	\$200,000	\$0	\$0	\$0		\$200,000
Renovation of Facility	331	\$0	\$0	\$150,000	\$10,000		\$160,000
Miscellaneous Expenses 327-706 (c)	Varies	\$111,306	\$184,399	\$194,900	\$43,678		\$534,283
Insurance Claims (Other/Bond Insurance)	351	\$0	\$1,000,000	\$0	\$0		\$1,000,000
Various Repair Services	365	\$10,000	\$5,600	\$802,500	\$193,664		\$1,011,764
Contractual Services - Lab Analysis (WTOps)	371	\$350,000	\$0	\$0	\$0		\$350,000
Contractual Service Other (routine)	na	\$2,099,974					\$2,099,974
Fuel/Lubricants	402	\$4,000	\$13,500	\$484,980	\$65,904		\$568,384
Office Supplies	405	\$30,500	\$202,781	\$54,447	\$13,700		\$301,428
Supplies/Materials (Ops)	408	\$12,500	\$89,184	\$640,500	\$440,388		\$1,182,572
Safety Equipment & Supplies	419	\$2,500	\$19,015	\$96,766	\$44,008		\$162,289
Vehicle Parts	420	\$0	\$500	\$180,000	\$45,127		\$225,627
Chemicals	430	\$50,000	\$0	\$42,000	\$632,616		\$724,616
Equipment	503	\$5,500	\$21,715	\$152,974	\$51,352		\$231,541
Pumps Motor Spare Parts	504/506			\$450,000	\$238,055		\$688,055
Purchase Power	701	\$65,000	\$150,000	\$2,400,000	\$9,085,000		\$11,700,000
Purchased Water (including Earthtech)	702	\$0	\$0	\$0	\$4,326,930		\$4,326,930
Subtotal Operating Expense		\$3,483,500	\$1,973,474	\$6,756,987	\$15,489,242	\$0	\$27,703,203
Subtotal Personnel Services (a)		\$1,794,769	\$2,456,400	\$7,091,208	\$3,512,088	\$1,510,000	\$16,364,464
Supplemental Annuities Retirement (SAR) Surcharge (e)						\$525,000	\$525,000
Grand Total		\$5,278,269	\$4,429,874	\$13,848,194	\$19,001,330	\$2,035,000	\$44,592,667
Summary of Operations & Maintenance Expenses							
Personnel Services (Salaries and Wages)		\$1,794,769	\$2,456,400	\$7,091,208	\$3,512,088	\$1,510,000	\$16,364,464
Supplemental Annuities Retirement (SAR) Surcharge (e)						\$525,000	\$525,000
Administration & General (Other O&M) (f)		\$648,230	\$506,695	\$2,689,667	\$1,600,120	\$0	\$5,444,712
Insurance Claims			\$1,000,000				\$1,000,000
Contractual (g)		\$2,835,270	\$466,779	\$1,667,320	\$477,192		\$5,446,561
Purchase Power				\$2,400,000	\$9,085,000		\$11,485,000
Purchased Water					\$4,326,930		\$4,326,930
Grand Total		\$5,278,269	\$4,429,874	\$13,848,194	\$19,001,330	\$2,035,000	\$44,592,667
Reduction in FY 2005-06 Budget from Unfilled Vacant Positions & Salary Increments							\$1,208,000

Source: GWA approved budget documents as of 1/06.

O&M cost increases that are due to changes in operating procedures or permits, or from new facilities going on-line, are not included in these projections. This table includes only routine operating expenses. Non-operating expenses are listed separately.

a. The capitalized labor costs listed in the O&M budget are presumed to be duplicated in the capital expenditures.

b. Other personnel services include standby, overtime, hazardous and night premiums, holiday pay, etc. Future year projected personnel expenses are based on an escalation of the grand total personnel costs.

c. Accounts listed in this expense include: 327, 334, 335, 343, 345, 372, 391, 410, 417, 600, 602, 703, 705, 706

d. Accounts listed in this expense include: 206, 302, 303, 304, 305, 306, 311

e. The Supplemental Annuities Retirement (SAR) Surcharge payments for retirees was established by the Mandate in the March Order. This cost is recorded as part of the O&M budget, and not in the personnel budget.

f. Other O&M expenses include all minor costs and miscellaneous capital expenditures not itemized in the other key expense categories. Current budget year recurring costs exclude the one-time Earth Tech Buyout contractual payment.

g. Contractual expenses also include rental, legal and support services, repair charges, and miscellaneous costs.

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The purpose of Table 14-3 is to project the future water and power costs, which are respectively \$4.3 million and \$11.5 million in FY 2005-06. These costs, along with the personnel services, represent a large part of the O&M budget. A critical assumption in this table is that there will be a one percent annual reduction in water production from the repair of leaks in the distribution system, based on the replacement project schedule. Navy supplied water will continue to be required for southern region customer demand, but this supply will drop in volume at one percent annually. As such, the total water supply costs will remain stable. Based on total water production, this table also calculates the annual cost of power for production, treatment, and distribution, which are projected to increase to \$15 million annually by FY 2011-12.

Table 14-3 – Projected Water Supplies and Power Costs

Description	Typical Past Production		FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
	(MGD)	(Kgal)							
Water Production Volume (Kgal/year)									
GWA Ugum River WTP	2.22	810,300	810,300	810,300	810,300	810,300	810,300	810,300	810,300
Deep Wells	31.6	11,546,521	10,977,738	10,846,878	10,717,326	10,589,070	10,462,096	10,336,392	10,211,945
Santa Rita Springs, South	0.24	86,724	0						
Navy (FENA) (a)	4.31	1,574,662	1,500,000	1,485,000	1,470,150	1,455,449	1,440,894	1,426,485	1,412,220
Airforce	0.18	66,165	0						
Earth Tech (contract)	1.78	649,000	649,000	0					
Wells (from Earth Tech buyout)	0.00	0	649,000	1,298,000	1,298,000	1,298,000	1,298,000	1,298,000	1,298,000
Total Water Production	40.37	14,733,372	14,586,038	14,440,178	14,295,776	14,152,818	14,011,290	13,871,177	13,732,465
Annual Reduction from Fixes in Water Leaks (b)			1%	1%	1%	1%	1%	1%	1%
Annual Reduction in Navy water purchases (a)				1%	1%	1%	1%	1%	1%
Total Billed Water		6,616,419	6,868,815	7,377,979	7,505,310	7,599,847	7,696,371	7,794,034	7,646,542
Water Losses (billed vs. produced)		55%	53%	49%	47%	46%	45%	44%	44%
Navy Water Supply Costs									
		FY 2004-05							
Projected Unit Cost (\$ per Kgal)		\$2.30	\$2.30	\$2.44	\$2.58	\$2.74	\$2.90	\$3.08	\$3.26
Navy Production (FENA, Kgal) (a)		1,969,325	1,500,000	1,485,000	1,470,150	1,455,449	1,440,894	1,426,485	1,412,220
Total Navy Water Supply Cost		\$4,531,109	\$3,450,000	\$3,620,430	\$3,799,279	\$3,986,964	\$4,183,920	\$4,390,605	\$4,607,501
Earth Tech Water Supply Costs (c)									
Projected Unit Cost (\$ per Kgal)		\$1.38	\$1.35						
Earth Tech Production (FENA, Kgal)(a)		1,266,440	649,000						
Total Earth Tech Water Supply Cost		\$1,749,126	\$876,930						
Total Water Purchase Costs		\$6,280,235	\$4,326,930	\$3,620,430	\$3,799,279	\$3,986,964	\$4,183,920	\$4,390,605	\$4,607,501
Power Costs for Production & Treatment									
Projected Unit Electrical Cost (\$ per KWhr)			\$0.19	\$0.21	\$0.22	\$0.23	\$0.24	\$0.25	\$0.27
Production Level (Kgal)			14,586,038	14,440,178	14,295,776	14,152,818	14,011,290	13,871,177	13,732,465
Projected Prod & Treatment Power Costs (d)			\$9,085,000	\$9,893,565	\$10,284,361	\$10,690,593	\$11,112,871	\$11,551,830	\$12,008,127
Power Costs for Distribution									
Projected Unit Electrical Cost (\$ per KWhr)			\$0.19	\$0.21	\$0.22	\$0.23	\$0.24	\$0.25	\$0.27
Distribution Level (Kgal)			14,586,038	14,440,178	14,295,776	14,152,818	14,011,290	13,871,177	13,732,465
Projected Distribution Power Costs (d)		FY 2004-05	\$2,400,000	\$2,613,600	\$2,716,837	\$2,824,152	\$2,935,706	\$3,051,667	\$3,172,208
Total Purchase Power		\$8,745,015	\$11,485,000	\$12,507,165	\$13,001,198	\$13,514,745	\$14,048,578	\$14,603,497	\$15,180,335

- a. Navy deliveries are projected to drop by 1 percent annually due to lack of other supplies in the southern service areas.
- b. The reduction in water production from fixes in systemwide Water Leaks is 1 percent annually over 5 years.
- c. Power costs for Earth Tech production is paid by GWA.
- d. Future power cost are based on a ratio of current versus future production and unit power costs. Some power is also used for sewage pump stations.

14.3.2 WRMP CIP Financing Plan

Tables 14-4, Base Case CIP Projects and 14-5, Minimum Pace CIP Projects summarize the CIP expenditures over the next twenty years. Table 14-4 provides the “Base Case” CIP, with \$894 million in total project costs through the year 2026. In the first five years through FY 2010-11, the project expenditures total \$185 million in 2007 dollars, or \$213 million in then-current dollars escalated for inflation. The Base Case CIP is used in the financial program to identify rate-based revenue requirements and annual rate increases.

Table 14-5 provides the “Minimum Pace” CIP, and like the Base Case has \$894 million in total project costs. However, only \$740 million is scheduled through 2026, and \$154 million is anticipated to be built thereafter. As such, it is not appropriate to compare the total costs of the two CIPs. Moreover, in this alternative CIP, some of the projects not essential for life and safety or regulatory compliance are deferred beyond the first five-year window, so through FY 2010-11 the expenditures total \$131 million, or \$148 million in then-current dollars. The reduction in costs scheduled for the first five years is \$21 million. The advantage of project deferral is to delay the initial project funding requirements to reduce the level of required rate increases in the first five years. The disadvantage of delaying improvement projects is that some utility service levels will not be improved without the system reliability and capacity problems addressed in an expeditious manner.

This financial plan uses a cashflow analysis of then-current costs. These then-current costs, including inflated CIP project costs, have been escalated by projected inflation, so that the future rate-based revenue requirements and resulting rate increases are stated accurately. Table 14-6, Base Case CIP Sources of Funds and Capitalized Labor Costs, provides funding details for the first six years of the Base Case CIP. These include the source of project construction funds (bond proceeds, grants, and pay-go cash), the cost of capacity-related projects, and a breakdown of the project costs.

Table 14-6 – Base Case CIP Sources of Funds and Capitalized Labor Costs

Funding Sources	FY 2005-06 (a)	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	Total	
CIP Expenditures in then-current Dollars									
Construction Fund CIP Expenditures Drawdown	\$60,728,653	\$11,748,000	\$25,373,000	\$35,104,660	\$54,655,745	\$42,137,711	\$81,263,769	\$311,011,538	
Grant Funded Expenditures (b)	\$2,100,000	\$9,435,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$18,035,000	
GWA Internally Funded Expenditures	\$250,000	\$4,900,000	\$2,000,000	\$5,000,000	\$4,000,000	\$13,500,000	\$6,000,000	\$35,650,000	
All Projects (including 2005 expenditures)	\$63,078,653	\$26,083,000	\$28,673,000	\$41,404,660	\$59,955,745	\$56,937,711	\$88,563,769	\$364,696,538	
	FY 2004-05								
Total Expansion-related Sewer System Projects		\$0	\$636,000	\$5,618,000	\$3,096,642	\$0	\$5,352,902	\$14,703,544	
CIP Expenditure Allocations by Activity									
	% of Base Cost	Capitalized % of Cost (c)							
Base Cost of Construction	58%			\$15,164,535	\$16,670,349	\$24,072,477	\$34,857,992	\$33,103,320	\$51,490,563
Design	10%	15%		\$1,516,453	\$1,667,035	\$2,407,248	\$3,485,799	\$3,310,332	\$5,149,056
Services during construction	5%	15%		\$758,227	\$833,517	\$1,203,624	\$1,742,900	\$1,655,166	\$2,574,528
Construction Management	7%	15%		\$1,061,517	\$1,166,924	\$1,685,073	\$2,440,059	\$2,317,232	\$3,604,339
Planning Level Adjustment (Const. Contingency)	50%			\$7,582,267	\$8,335,174	\$12,036,238	\$17,428,996	\$16,551,660	\$25,745,282
CIP (Future then-current Dollars)				\$26,083,000	\$28,673,000	\$41,404,660	\$59,955,745	\$56,937,711	\$88,563,769
Capitalized GWA Labor Costs (c)		\$702,400	\$500,430	\$550,122	\$794,392	\$1,150,314	\$1,092,410	\$1,699,189	\$6,489,255

a. FY 2005-06 expenditures are from GWA, and were not developed in the WRMP CIP.

b. The source and level of grant-funding is based on GWA documents dated 9/9/05.

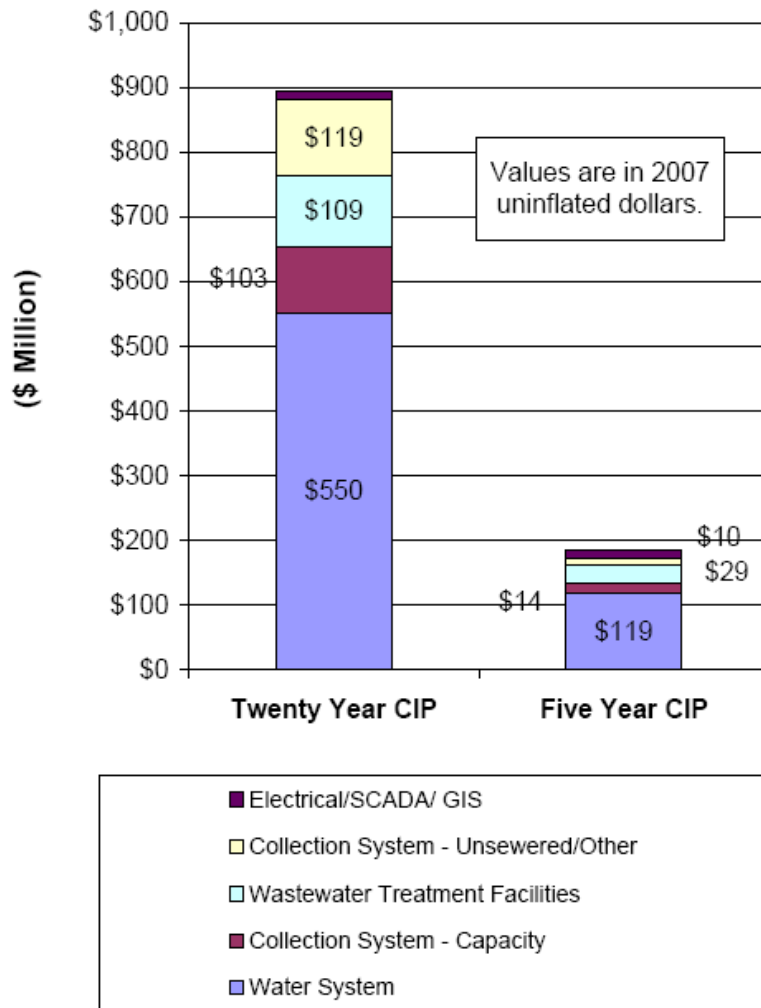
c. GWA capitalized labor costs listed herein are also be include in the O&M personnel budget. This capitalized labor costs is netted from O&M costs. The capitalized labor is based on a percentage of the CM, design and construction service costs.

Costs for design, construction management, and engineering services during construction are estimated at 10%, 7%, and 5% of the base construction cost, respectively; and a planning-level adjustment of 50% is used against the base construction cost. It is assumed that GWA personnel will provide 15% of all labor costs associated with the CIP. Accordingly, these labor costs will be capitalized, and are eligible for funding from bond proceeds instead of operating revenues.

The first year of the CIP is in FY 2006-07. The projects of FY 2005-06 have been developed by GWA staff, and are not part of the CIP. They are, however, included in the financial analysis. These locally developed projects are funded by the Series 2005 Bond proceeds. In addition, the Series 2005 Bond will fund the first \$12 million of project costs in the WRMP CIP.

Capital project costs for FYs 2005-06 through 2011-12 are \$365 million in then-current dollars, or \$315 million in 2007 dollars. In contrast, the total 20-year CIP of the WRMP is in excess of \$1,361 million in then-current dollars, or \$894 million in 2007 dollars. Figure 14-2 illustrates the difference between the 5 and 20-year CIP costs in current 2007 dollar terms. As shown, the majority of the 5-year costs are associated with water system improvements.

Figure 14-2 – Twenty-Year vs. Five-Year Base Case CIP



The current and projected future debt service is tabulated in Table 14-7. Current debt is from the Series 2005 Bond, as well as scheduled repayments to the U.S. Navy and the GEPA of unpaid debt. Note that the Series 2005 Bond uses capitalized debt payments for two years, through FY 2006-07, to enhance GWA’s cashflow for operating expenses. Moreover, capitalizing the first two years of the Series 2005 Bond will delay the need for raising rates until material improvements in the levels of service by GWA are visible. The result of the two-year delay in debt repayment is that in FY 2007-08 the first debt on \$104 million in bonds becomes due. The impact of the debt from the Series 2005 Bond is a seven percent rate increase in FY 2007-08.

All the bonds identified through FY 2011-12 have used capitalization of debt to delay rate increases. The projected annual debt service from anticipated future bond issuances is incorporated in this table. As shown, \$331 million in new bonds (resulting in more than \$28 million per year in new debt payments) will be issued through FY 2011-12.

Table 14-7 – Projected Debt Service

Description	Total (\$million)	Total Debt Service (principal & interest)						
		FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
WRMP CIP Bonds Issued	\$331	\$104,000,000		\$88,000,000		\$139,400,000		\$118,000,000
Short-term Debt Service	Term (yrs)							
Water Meter (a)	na	\$888,999	\$0					
GPA Bridge Loan (a)		\$57,750	\$0					
Current Long-Term Debt Service								
Series 2005 Bond (b)	30	\$0	\$0	\$7,704,794	\$7,706,544	\$7,703,544	\$7,705,794	\$7,700,000
U.S. Navy Loan (repayment)		\$550,061	\$549,996	\$549,996	\$1,074,000	\$1,300,000	\$1,995,000	\$2,000,000
GPA Loan		\$2,303,911	\$2,303,911	\$2,303,911	\$2,303,911	\$2,303,911	\$1,727,934	\$1,700,000
New Debt Service	Annual Debt							
Series 2008 Bond				\$0	\$0	\$7,164,370	\$7,164,370	\$7,164,370
Series 2010 Bond		\$11,349,013				\$0	\$0	\$11,349,013
Series 2012 Bond		\$9,606,769						\$0
Total Annual Debt Service		\$3,800,721	\$2,853,907	\$10,558,701	\$11,084,455	\$18,471,825	\$18,593,098	\$29,913,383
Capitalized Debt Payments from Bond Proceeds to Eliminate the first two years of debt								
Series 2005 Bond	\$9,149,010	\$3,309,216	\$5,839,794					
Series 2008 Bond	\$14,328,740			\$7,164,370	\$7,164,370			
Series 2010 Bond	\$22,698,026					\$11,349,013	\$11,349,013	
Series 2012 Bond	\$9,606,769							\$9,606,769
Total Capitalized Debt	\$55,782,545							

Payment for the \$1.6 million existing liability for SAR payments is included in the annual O&M costs.

a. This debt is decreased with 2005 Bond proceeds.

b. The Series 2005 bond uses capitalized interest to eliminate the first two years of debt service.

Table 14-8 projects fund reserve balances from the operating fund, bond reserve, and construction funds. This critical table supports the analysis of rate-based revenue requirements by identifying and comparing future fund levels against essential needs and bond covenants (also described as the Minimum Required Reserve). One of GWA's essential needs making up the minimum reserve level is that operating cash balance be at least three months' operating costs. Also, the additional bonds test of the Series 2005 bond covenants requires that one year of debt service remain available at all times. While healthy cash reserves are a good indicator of financial health, the financial plan is based on the maintenance of only the minimum cash balances in order to minimize rate increases to customers.

An analysis of the uses of the bond proceeds is provided at the bottom of the table. In this analysis it is assumed that essentially all available bond proceeds will be drawn down by the end of FY 2011-12. The projected reserves, including the construction fund balance and the level of reserves available versus the level pledged by the bond covenant, are illustrated in Figure 14-3. This critical figure, plus the annual debt coverage ratio value, provides documentation of GWA's compliance with its financial covenants and commitments.

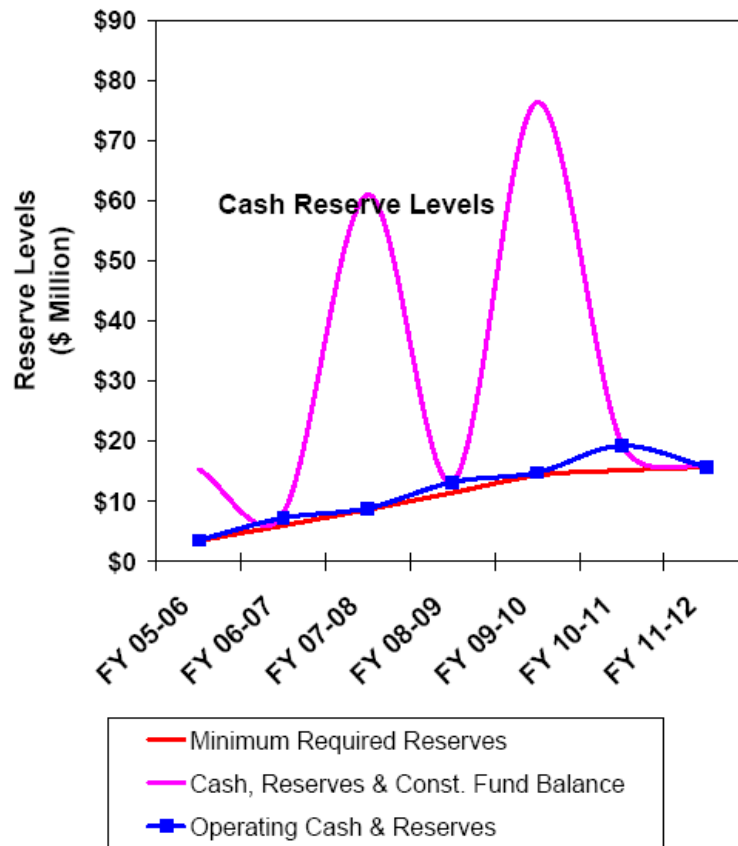
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Table 14-8 – Cash & Construction Fund Balances – Base Case CIP

Description	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
FY Beginning Operating Cash Balance (10/1, a)	\$6,581,534	\$3,562,651	\$8,183,733	\$9,311,917	\$12,110,301	\$14,787,851	\$15,447,688
Additions (reductions) from Net Operating Revenues	(\$3,018,883)	\$4,621,082	\$1,128,183	\$2,798,385	\$2,677,550	\$659,837	\$712,048
Fiscal Year Ending Balance	\$3,562,651	\$8,183,733	\$9,311,917	\$12,110,301	\$14,787,851	\$15,447,688	\$16,159,736
Balance in Restricted Funds (per bond covenants)							
O&M/R&R Fund (3 month's O&M, b)	\$3,470,618	\$6,004,824	\$8,655,192	\$11,427,756	\$14,328,896	\$15,182,307	\$15,711,775
Rate Stabilization Account (c)	\$5,578,272	\$0					
Annual Transfer-in from Op Fund to O&M/R&R Fund	\$2,229,633	\$2,534,206	\$2,650,367	\$2,772,564	\$2,901,140	\$853,411	\$529,467
Transfer-in from Op Fund to Rate Stabilization Fund	\$3,552,790	\$0					
Close-out of Rate Stabilization Fund		(\$5,578,272)					
Total Transfers-in (out) from Operating Fund to Restricted F	\$5,782,424	(\$3,044,066)	\$2,650,367	\$2,772,564	\$2,901,140	\$853,411	\$529,467
Minimum Required Reserves (d)	\$3,470,618	\$6,004,824	\$8,655,192	\$11,427,756	\$14,328,896	\$15,182,307	\$15,711,775
Summary of all Bonds Issued (including Series 2005)							
Series 2005 Bond Size (e)							
Debt Service/Bond Reserve Fund (1 year's debt)	(\$7,707,794)						
Other Use of Proceeds (incd bond defeasance)	(\$946,749)						
Capitalized Interest (use of bond proceeds)	(\$9,149,010)						
Bond Proceeds	\$86,196,447						
Additional Bond Issuances for WRMP CIP from FY 2006-07 and Thereafter							
Series 2008 Bond Size							
Debt Service/Bond Reserve Fund (1 year's debt)			(\$7,164,370)				
Cost of Capitalized Debt			(\$10,560,000)				
Bond Proceeds			\$85,756,000				
Series 2010 Bond Size							
Debt Service/Bond Reserve Fund (1 year's debt)					(\$11,349,013)		
Cost of Capitalized Debt					(\$16,728,000)		
Bond Proceeds					\$135,845,300		
Series 2012 Bond							
Debt Service/Bond Reserve Fund (1 year's debt)							(\$9,606,769)
Cost of Capitalized Debt							(\$14,160,000)
Bond Proceeds							\$114,991,000
Net Bond Proceeds for WRMP	\$86,196,447	\$0	\$68,031,630	\$0	\$107,768,287	\$0	\$91,224,231
Summary of all Bonds Issued (including Series 2005)							
Bond Size			\$88,000,000		\$139,400,000		\$118,000,000
Debt Reserve Fund	\$7,707,794		\$7,164,370		\$11,349,013		\$9,606,769
Cost of Capitalized Debt	\$9,149,010		\$10,560,000		\$16,728,000		\$14,160,000
Gross Bond Proceeds	\$93,904,241		\$85,756,000		\$135,845,300		\$114,991,000
Net Bond Proceeds	\$86,196,447		\$68,031,630		\$107,768,287		\$91,224,231
Construction Fund CIP Expenditures Drawdown							
Beginning Fiscal Year Balance of Const Fund	\$86,196,447	\$19,497,794	\$7,749,794	\$50,408,424	\$15,303,764	\$68,416,305	\$26,278,595
Total Bond Proceeds		\$0	\$68,031,630	\$0	\$107,768,287	\$0	\$91,224,231
Construction Fund CIP Expenditures Drawdown	(\$60,728,653)	(\$11,748,000)	(\$25,373,000)	(\$35,104,660)	(\$54,655,745)	(\$42,137,711)	(\$81,263,769)
Earth Tech Buyout Costs	(\$5,970,000)						
Interest Earnings on Unexpended Funds	\$566,658	\$606,259	\$1,294,020	\$1,462,096	\$1,862,772	\$2,106,962	\$1,391,018
Transfers-out of Interest Earnings to Operations	(\$566,658)	(\$606,259)	(\$1,294,020)	(\$1,462,096)	(\$1,862,772)	(\$2,106,962)	(\$1,391,018)
Ending Fiscal Year Balance of Bond Funds (f)	\$19,497,794	\$7,749,794	\$50,408,424	\$15,303,764	\$68,416,305	\$26,278,595	\$36,239,057
Reqd Bond Reserves on hand for Debt Covenants	\$7,707,794	\$7,707,794	\$14,872,164	\$14,872,164	\$26,221,177	\$26,221,177	\$35,827,946
Available Unappropriated Cash for Projects (g)	\$11,790,000	\$42,000	\$35,536,260	\$431,600	\$42,195,128	\$57,417	\$411,111

- Working Cash Balance includes cash in escrow. Interest earnings on these funds, including restricted funds, are assumed to be available for general operation costs.
- The 2005 Bond covenant requires an Operation, Maintenance, Renewal & Replacement Reserve Fund (O&M/R&R) be built over 5 years and maintained at a level equal to 3 months O&M and R&R. The R&R portion is defined in the Stipulated Order as O&M funded activities to correct pipeline leaks using GWA personnel, supplies, and contractual services. This annual R&R cost is estimated at \$10 million of the total O&M budget. The Rate Stabilization Trust Fund account is used to manage the capital expenditures, and is increased at a rate of 11.3% of rates starting 3/06. However, in order to avoid rate shock, any amount can be used in the future to reduce the level of a required rate increase.
- Bond Counsel has indicated that revenues transferred into the Rate Stabilization Trust Account can be included as available revenues for debt service coverage covenants in the year following the deposit. Note that these monies are also available for midyear cashflow needs per the FY06 Rate Order of the PUC.
- The minimum required cash reserve level for the operating (non-bond) funds equals the level of the O&M/R&R Fund.
- Series 2005 Bond Size: \$101 million, less proceeds used for other debt defeasance and payment of \$5 million of Earth Tech assets.
- The Minimum Reserve Balance is equals one year of debt service for all bonds, and equals the Bonded Debt Reserve Fund.
- Per information from the GWA engineer and WRMP manager on 6/27/06, \$11.8 million of the Series 2005 bond is available for the WRMP CIP starting in FY 2006-07.

Figure 14-3 – Fund Reserve Targets vs. Cash Available



It is critical to understand that a policy of funding the CIP through debt means that utility rates will continue to increase as the WRMP CIP is funded in the years beyond the six-year projection period. As such, the rate increases in this cashflow proforma will continue unabated in the years beyond FY 2011-12. The significant level of these CIP expenditures, and GWA’s customer affordability of the bills to bring the utilities to a sustainable level of operations, is addressed later in this chapter.

14.3.3 Cashflow Proforma and Rate-based Revenue Requirements

A proforma statement is defined herein as a projection of cashflow transactions. In this report the proforma estimates future revenue and expenditure transactions, and serves as a model for the sources and uses of GWA funds (with a focus on rate-based revenue requirements). By projecting the net annual cash available to build adequate cash reserves and fulfill all financial obligations, this summary identifies a feasible financial plan for GWA. This plan meets all “additional bonds” test requirements of the Series 2005 Bond.

The proforma provided in Table 14-9a, Cashflow and Rate Adjustments – Five Year Base Case Proforma, provides the annual revenues, expenditures and fund balances under uniform annual rate increases with the Base Case CIP, through FY 2011-12. The proforma also incorporates debt service schedules from the financial plan for the CIP, and the impacts

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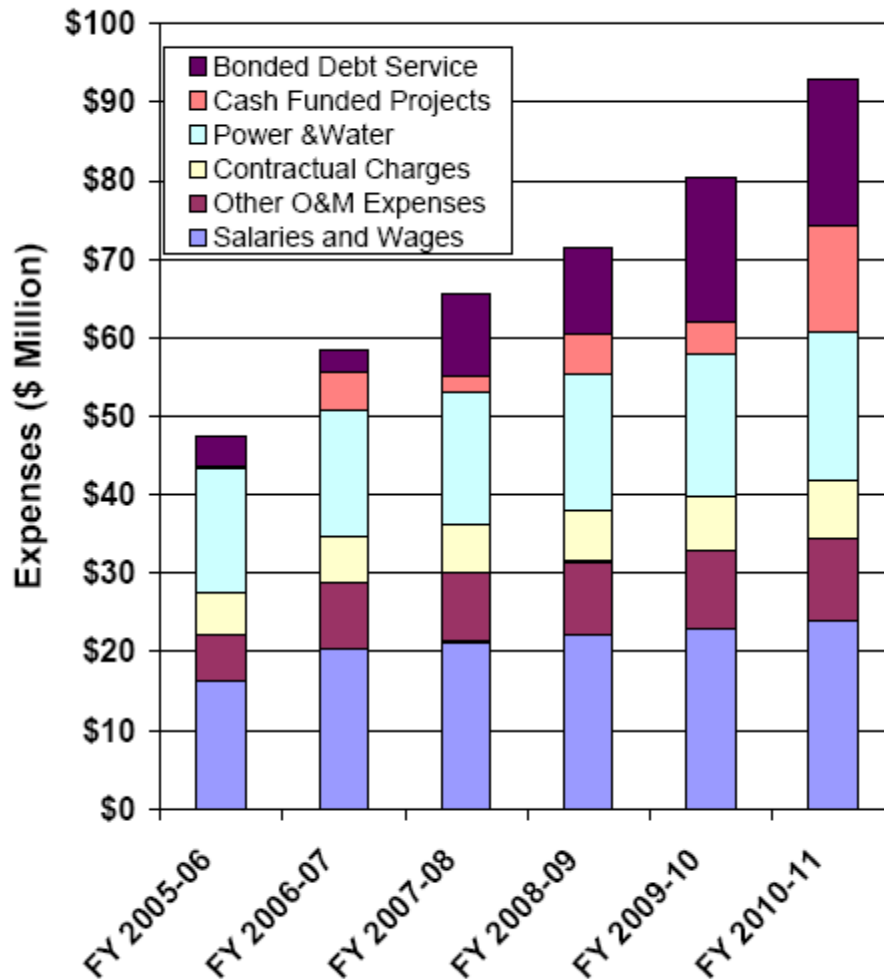
of changes in customer demands (growth) on both costs and rate-based revenues. The proforma table is actually a summary of the detailed analysis tables of the prior and following sections for this chapter. Figure 14-4, GWA Projected Expenditures illustrates the expenses by category. As shown, most of the cost increases are in debt service, with the remaining expenses increasing primarily because of inflation.

Insert Table 14-9a – Cashflow & Rate Adjustments – Five Year Base Case Proforma

Description	Historical FY 2004-05	Budget FY 2005-06	Projected FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Operating Revenues								
Rate-based Utility Bills	\$46,152,352	\$50,144,202	\$58,283,793	\$66,696,241	\$73,194,013	\$79,969,003	\$87,264,214	\$93,119,662
Non-payment of Customer Utility Bills (a)	(\$2,075,693)	(\$2,507,210)	(\$2,914,190)	(\$3,334,812)	(\$2,927,761)	(\$2,399,070)	(\$1,745,284)	(\$1,862,393)
Miscellaneous Revenues (incd changes to AR Balance)(b)	\$1,000,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000
Total Operating Revenues	\$48,636,992	\$55,669,603	\$63,661,429	\$70,566,253	\$77,869,933	\$85,818,930	\$91,557,269	
Increase in Unit Rates (c)			8%	8%	8%	8%	8%	8%
Typical Residential Bill (\$/month)		\$55	\$62	\$67	\$72	\$78	\$84	\$90
Change in Rate-based Revenues (c)		8.6%	16.2%	14.4%	9.7%	9.3%	9.1%	6.7%
Expenses								
Salaries and Wages	\$12,485,205	\$16,364,464	\$20,455,580	\$21,273,804	\$22,124,756	\$23,009,746	\$23,930,136	\$24,887,341
Supplemental Annuity, Retirement (SAR) Surcharge Trans (d)		\$525,000	\$1,256,200	\$1,256,200	\$1,256,200	\$1,256,200	\$1,256,200	\$525,000
Labor Cost Adjustment for Unfilled Vacancies		(\$1,208,000)	\$0	\$0	\$0	\$0	\$0	\$0
Other O&M Expenses (e)	\$4,020,445	\$5,444,712	\$6,071,394	\$6,557,106	\$7,081,674	\$7,648,208	\$8,260,065	\$8,920,870
Insurance Claims (f)		\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
Contractual Charges	\$1,300,628	\$5,446,561	\$5,773,355	\$6,119,756	\$6,486,941	\$6,876,158	\$7,288,727	\$7,726,051
Purchased Power	\$8,745,015	\$11,485,000	\$12,507,165	\$13,001,198	\$13,514,745	\$14,048,578	\$14,603,497	\$15,180,335
Purchased Water	\$6,297,774	\$4,326,930	\$3,620,430	\$3,799,279	\$3,986,964	\$4,183,920	\$4,390,605	\$4,607,501
Subtotal Operating Expenses	\$32,849,067	\$43,384,667	\$50,684,124	\$53,007,343	\$55,451,280	\$58,022,809	\$60,729,230	\$62,847,098
Debt Service (non-operating expense)		\$3,800,721	\$2,853,907	\$10,558,701	\$11,084,455	\$18,471,825	\$18,593,098	\$29,913,383
CIP Projects Costs Funded from Cash		\$250,000	\$4,900,000	\$2,000,000	\$5,000,000	\$4,000,000	\$13,500,000	\$6,000,000
Subtotal Budgeted Expenses	\$47,435,388	\$58,438,032	\$65,566,044	\$71,535,735	\$80,494,634	\$92,822,327	\$98,822,327	\$98,760,481
Net Increase (decrease)		\$1,201,604	(\$2,768,429)	(\$1,904,615)	(\$969,483)	(\$2,624,701)	(\$7,003,397)	(\$7,203,212)
Other Non-Operating Revenues, Adjustments & Transfers								
Interest Earnings from Operating Reserves (g)		\$292,878	\$158,538	\$364,176	\$414,380	\$538,908	\$658,059	\$687,422
Transfers-in (out) to Restricted Reserve Funds (stabilization & OM&R)		(\$5,782,424)	\$3,044,066	(\$2,650,367)	(\$2,772,564)	(\$2,901,140)	(\$853,411)	(\$529,467)
Capitalized Labor Cost Transfer-in (h)		\$702,400	\$500,430	\$550,122	\$794,392	\$1,150,314	\$1,092,410	\$1,699,189
System Development Charge (non-op revenue from growth)			\$3,080,219	\$3,474,847	\$3,869,564	\$4,651,398	\$4,659,216	\$4,667,099
Transfers-in of Bond Fund Interest Earnings		\$566,658	\$606,259	\$1,294,020	\$1,462,096	\$1,862,772	\$2,106,962	\$1,391,018
Total Change in Cash Reserves (net revenues)		(\$3,018,883)	\$4,621,082	\$1,128,183	\$2,798,385	\$2,677,550	\$659,837	\$712,048
Bond Coverage Ratio (1.25 minimum) (i)		2.33	5.22	1.55	1.95	1.52	1.81	1.24
Ending Fiscal Year Operating Cash Reserves Balance		\$3,562,651	\$8,183,733	\$9,311,917	\$12,110,301	\$14,787,851	\$15,447,688	\$16,159,736
Ending FY Construction Fund Available Cash Balance		\$11,790,000	\$42,000	\$35,536,260	\$431,600	\$42,195,128	\$57,417	\$411,111
Target Minimum Reserve Level		\$3,470,618	\$6,004,824	\$8,655,192	\$11,427,756	\$14,328,896	\$15,182,307	\$15,711,775

- The net non-payment of Customer Utility Bills reduces the total rate-based revenues. These non-payments are shown as negative revenues.
- In FY 2005-06 the AR balance will decrease \$700,000 with resolution of problems with the meter replacement program in promptly billing.
- Capitalized labor equals the GWA labor costs in the CIP. This labor cost is netted out to avoid double counting of bond proceeds transferred into the operating funds to net out the direct labor cost.
- The Supplemental Annuities Retirement (SAR) Surcharge annual payment of \$1.3 million was established by the Mandate in the March Order. This annual charge includes \$540,000 plus the amortized \$1.6 million in historical COLA payments which is spread over five years.
- The other O&M expenses are escalated for inflation and for increases in chemicals and supplies required for higher demands.
- Self insurance claims will diminish, but will be replaced with an insurance policy of similar cost.
- Interest Earnings from Operating reserves equals the average annual balance times the assumed interest earnings rate.
- Capitalized labor equals the GWA labor costs in the CIP. This labor cost is netted out to avoid double counting of bond proceeds transferred into the operating funds to net out the direct labor cost.
- While there is a 1.75 coverage ratio target set by the PUC, CCU, and GWA in October 2004, the Series 2005 Bond covenant requires that the coverage be at least 1.25. The covenant ratio is calculated before any transfers-in/out to reserves, and includes connection fees and prior-year Rate Stabilization reserve balance, but excludes other unrestricted cash reserves.

Figure 14-4 – GWA Projected Expenditures



The key finding of Table 14-9a is that annual rate increases of eight percent are needed for every year. The percentage rate increases shown are based on the current rate structure, and reflect many factors. These factors include the effects of a midyear rate adjustment, the meter replacement program, customer growth in accounts and usage, and demand elasticity with the price of utility bills. As such, integrated into the model are increases to the revenues in FY 2006-07 that will occur even without any change to the rates.

Although a recent rate increase was effective February 1, 2006 (mid FY 2005-06), in FY 2006-07 the only effect of that change was to increase revenues by almost three percent (\$1 million) over the prior year. This is due to the mid-year effective date of the increase, which means that a full year of increased revenues does not occur until the fiscal year following the rate adjustment, in FY 2006-05. Note that this effect will also be true for the next rate increase, due to occur late-FY 2006-07 (June 2007), with the GWA fiscal year starting in

October and ending the following year at the end of September. The earliest possible rate increase effective dates of June and October 2007 are separated by only four months. The revenues needed from these rate increases are nevertheless essential, and so there should be no delays in implementation.

Second, the meter replacement program currently underway is projected to increase water metering by an estimated 10%, increasing total revenues by almost seven percent (with a six percent increase occurring in FY 2006-07 alone). Third, annual customer growth results in almost a two percent revenue increase per year.

In contrast, a drop in some revenues will occur in FY 2006-07 when the pass-through costs of the SAR, Navy, and GPA payments drop the rate surcharge from 13.6 to 8.0 percent (a result of increasing the total revenues being surcharged).

The total increase in FY 2006-07 to revenues from the effects described above is 10%, and any increase to the unit rates to customers will be on top of this systematic revenue increase. However, it was noted above that the FY 2006-07 increase in unit rates will be effective June 2007, and will result in only four months of additional revenues in that fiscal year. Thus, the realized increase in revenues in that year will be only one-third of the rate adjustment for that year, and the remaining increase will be realized only in FY 2007-08.

A small but negative effect on revenues will result from the elasticity of demand with price. As the customer bills increase to generate more revenues for GWA, it is assumed that (in the short run) water consumption will drop as a reaction to rising bills. As most revenues are collected from metered water demands, we have estimated, over the six-year projection period, that the higher bills will reduce water usage, causing the overall revenues to be three percent less than would be otherwise expected.

Other assumptions used in building this finding include:

- Based on the October 1, 2005 cash balances, and the estimated revenues and expenditures for this current year, GWA may fail to meet the Series 2005 Bond restricted cash reserve minimum balance. However, it is assumed that GWA can, if needed, issue a revenue anticipation note to be repaid by FY 2007-08 so that all bond covenants will be satisfied. This proforma is based on annualized revenue and expenditure projections for rate projections, and is not designed to accurately calculate short-term cashflows or available reserves for bond covenants. Therefore, the GWA should consider preparing an accounting-based analysis projecting the short-term compliance with Series 2005 Bond covenants.
- In FY 2005-06 the accounts receivable balance will decrease by \$700,000 with resolution of problems with the meter replacement program by promptly billing for services. This will, in effect, increase cash revenues by the same amount in that year. This increase is shown as an operating revenue adjustment.
- Miscellaneous operating revenues will be a flat \$300,000 per year in all years.
- The SAR Surcharge annual payment of \$1.3 million was established by mandate in the March Order of the Guam Legislature. This annual charge is \$540,000, plus the

amortized \$1.6 million in unpaid historical COLA payments, spread over the next five years through FY 2010-11.

- The historical level of insurance claims will diminish. However, the past use of GWA self insurance will be replaced with an insurance policy costing \$1 million per year.
- Interest earnings from reserves equal the average annual balance times the assumed interest earnings rate.
- While there is a 1.75 bonded debt coverage ratio target (set by the PUC, the CCU, and the GWA in October 2004), the Series 2005 bond covenant requires only that the coverage be at least 1.25. This ratio is calculated before any transfers-in/-out to reserves, and includes connection fees and prior-year rate stabilization reserve balance. Note that as the 2005 bond coverage ratio covenant includes connection fees, so to do the following bond coverage ratios. The 1.25 coverage ratio is used for setting minimum future rates, along with reserve requirements set by the bond covenants.
- The net non-payment of customer utility bills will reduce the net rate-based revenues. These non-payments of bills are shown as negative revenues in the proforma cashflow table.

14.4 Base Case Rate Findings

Based on the Base Case CIP described above, we find that the rate-based revenues should be almost doubled over the next six years. This requires rates to be increased by eight percent annually, in addition to the increasing revenues from the other factors described above.

An increase of this magnitude will cause rate shock to many customers, and will result in financial distress for the most financially vulnerable. As such, GWA should couple these revenue increases with an updated lifeline program that targets only residential customers in need of support, and gives them discounts at a level that provides real relief from the required revenue escalations.

In addition to the detailed financial analysis and funding plan for the first six years of the master plan, a 20-year projection of the projected CIP was prepared. This cashflow analysis through 2026 is provided in Table 14-9b, Cashflow & Rate Adjustments – 20 Year Base Case CIP Proforma. As shown, the annual eight percent rate increases of the first six years through FY 2011-12 increase to 14% for two years, and then decline over four years to an average inflationary-based increase of 3.5 percent annually for the remainder of the projection. The average annual rate increases would be slightly less if not for the assumption that, starting in FY 2012-13, the costs of O&M will increase not only from inflation but also from the aging of existing facilities and the addition of new facilities.

Table 14-9b – Cashflow & Rate Adjustments – 20 Year Base Case CIP Proforma

Description	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Typical Residential Bills (\$/month, current rates)	\$90	\$103	\$118	\$123	\$129	\$134	\$139	\$143	\$148	\$153	\$157	\$164	\$168	\$173
Increase in Unit Rates	8.0%	14.1%	14.1%	4.8%	4.6%	3.9%	3.7%	2.8%	3.6%	3.3%	3.0%	3.9%	2.8%	2.6%
Increase in Demands (Sales)	-1.3%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Increase in Rate-based Revenues (including growth)	6.7%	15.6%	15.6%	6.3%	6.1%	5.4%	5.2%	4.3%	5.1%	4.8%	4.5%	5.4%	4.3%	4.1%
Operating Revenues														
Rate-based Utility Bills	\$93,119,662	\$107,679,021	\$124,432,638	\$132,263,566	\$140,354,120	\$147,966,177	\$155,648,433	\$162,308,703	\$170,579,132	\$178,781,542	\$186,819,043	\$196,992,666	\$205,445,147	\$213,954,518
Non-payment of Customer Utility Bills	(\$1,862,393)	(\$2,153,580)	(\$2,488,653)	(\$2,645,271)	(\$2,807,082)	(\$2,959,324)	(\$3,112,969)	(\$3,246,174)	(\$3,411,583)	(\$3,575,631)	(\$3,736,381)	(\$3,939,853)	(\$4,108,903)	(\$4,279,090)
Miscellaneous Revenues	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000
Total Operating Revenues	\$91,557,269	\$105,825,440	\$122,243,985	\$129,918,294	\$137,847,037	\$145,306,853	\$152,835,465	\$159,362,529	\$167,467,549	\$175,505,911	\$183,382,662	\$193,352,812	\$201,636,244	\$209,975,428
Expenses														
Inflationary Increase in Operating Expenses	3.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Increase in O&M costs with aging and expanded facilities		1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Demand-related Increase in Operating Expenses (a)	-0.6%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
Operating Expenses (a)	\$62,847,098	\$65,800,000	\$68,900,000	\$72,200,000	\$75,600,000	\$79,200,000	\$83,000,000	\$86,900,000	\$91,000,000	\$95,300,000	\$99,800,000	\$104,500,000	\$109,500,000	\$114,700,000
Debt Service (non-operating expense, b)	\$29,913,383	\$33,980,732	\$47,476,351	\$52,408,201	\$57,368,124	\$61,436,481	\$65,436,185	\$68,058,511	\$73,073,612	\$76,930,759	\$80,576,990	\$87,009,460	\$89,656,424	\$93,519,023
CIP Projects Costs Funded from Cash	\$6,000,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000	\$13,900,000
Subtotal Expenses	\$98,760,481	\$113,680,732	\$130,276,351	\$138,508,201	\$146,868,124	\$154,536,481	\$162,336,185	\$168,858,511	\$177,973,612	\$186,130,759	\$194,276,990	\$205,409,460	\$213,056,424	\$222,119,023
Net Increase (decrease)	(\$7,203,212)	(\$7,855,292)	(\$8,032,366)	(\$8,589,907)	(\$9,021,087)	(\$9,229,628)	(\$9,500,720)	(\$9,495,982)	(\$10,506,063)	(\$10,624,848)	(\$10,894,328)	(\$12,056,648)	(\$11,420,180)	(\$12,143,595)
Other Non-Operating Revenues, Adjustments & Transfers														
Interest Earnings from Operating & Bond Reserves	\$687,422	\$2,293,518	\$2,507,366	\$2,714,907	\$2,971,087	\$3,229,628	\$3,450,720	\$3,670,982	\$3,831,063	\$4,099,848	\$4,319,328	\$4,531,648	\$4,870,180	\$5,043,595
Capitalized Labor Cost Transfer-in	\$1,699,189	\$1,500,000	\$1,400,000	\$1,700,000	\$1,700,000	\$1,500,000	\$1,400,000	\$1,000,000	\$1,700,000	\$1,400,000	\$1,300,000	\$2,100,000	\$1,000,000	\$1,400,000
System Development Charges (w/ escalation)	\$4,667,099	\$4,800,000	\$4,900,000	\$5,000,000	\$5,200,000	\$5,400,000	\$5,600,000	\$5,800,000	\$6,000,000	\$6,200,000	\$6,400,000	\$6,600,000	\$6,800,000	\$7,000,000
Total Change in Cash Reserves (net revenues)	\$712,048	\$738,225	\$775,000	\$825,000	\$850,000	\$900,000	\$950,000	\$975,000	\$1,025,000	\$1,075,000	\$1,125,000	\$1,175,000	\$1,250,000	\$1,300,000
Bond Coverage Ratio (1.25 minimum)	1.24	1.60	1.43	1.40	1.37	1.35	1.34	1.33	1.31	1.30	1.29	1.27	1.27	1.26
FY Ending O&M Reserves (3 month's O&M)	\$15,711,775	\$16,450,000	\$17,225,000	\$18,050,000	\$18,900,000	\$19,800,000	\$20,750,000	\$21,725,000	\$22,750,000	\$23,825,000	\$24,950,000	\$26,125,000	\$27,375,000	\$28,675,000
CIP Financing Plan – Base Case														
Annual WRMP CIP	\$88,563,769	\$75,893,181	\$73,172,550	\$89,069,620	\$89,497,494	\$75,908,545	\$74,862,146	\$53,868,627	\$90,338,494	\$72,689,346	\$69,474,636	\$111,941,570	\$54,244,147	\$72,772,444
Less Grants	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)
Less Cash Funded CIP (% of total)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Net CIP Funded from Bonds	\$82,563,769	\$61,993,181	\$59,272,550	\$75,169,620	\$75,597,494	\$62,008,545	\$60,962,146	\$39,968,627	\$76,438,494	\$58,789,346	\$55,574,636	\$98,041,570	\$40,344,147	\$58,872,444
Bonds Issued														
Bond Size (b)	\$118,000,000	\$67,789,154	\$64,814,161	\$82,197,507	\$82,665,384	\$67,805,954	\$66,661,723	\$43,705,442	\$83,585,012	\$64,285,780	\$60,770,515	\$107,207,840	\$44,116,071	\$64,376,647
Less Debt Reserve Fund (one year of debt)	(\$9,606,769)	(\$4,067,349)	(\$3,888,850)	(\$4,931,850)	(\$4,959,923)	(\$4,068,357)	(\$3,999,703)	(\$2,622,327)	(\$5,015,101)	(\$3,857,147)	(\$3,646,231)	(\$6,432,470)	(\$2,646,964)	(\$3,862,599)
Less Cost of Issuance	(\$3,009,000)	(\$1,728,623)	(\$1,652,761)	(\$2,096,036)	(\$2,107,967)	(\$1,729,052)	(\$1,699,874)	(\$1,114,489)	(\$2,131,418)	(\$1,639,287)	(\$1,549,648)	(\$2,733,800)	(\$1,124,960)	(\$1,641,605)
Less Capitalized Debt	(\$14,160,000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Bond Proceeds (project funds from bonds)	\$91,224,231	\$61,993,181	\$59,272,550	\$75,169,620	\$75,597,494	\$62,008,545	\$60,962,146	\$39,968,627	\$76,438,494	\$58,789,346	\$55,574,636	\$98,041,570	\$40,344,147	\$58,872,444
New Debt	\$11,320,285	\$4,067,349	\$13,495,618	\$4,931,850	\$4,959,923	\$4,068,357	\$3,999,703	\$2,622,327	\$5,015,101	\$3,857,147	\$3,646,231	\$6,432,470	\$2,646,964	\$3,862,599
Required Bond Reserves for Debt Covenants	\$35,827,946	\$39,895,295	\$43,784,145	\$48,715,995	\$53,675,918	\$57,744,275	\$61,743,979	\$64,366,305	\$69,381,406	\$73,238,553	\$76,884,784	\$83,317,254	\$85,964,218	\$89,826,817

a. Operating expenses are 50% variable as a function of changes in demand for services.
b. For modeling simplicity annual bonds are issued for the capital project expenditures of that year only.

Note, however, that using cashflow analysis to determine utility rates may be inaccurate beyond a five to ten-year projection period. The major cause for the inaccuracies is the large impact of inflation, interest earnings, and growth rates based on values calculated by annual compounding. As such, the 20-year projection must be viewed with caution.

14.5 Minimum Pace CIP Rate Findings

As previously provided in Table 14-5, an alternative CIP with minimum initial project expenditures has been developed. The financial planning results for this alternative are provided in Tables 14-10a, Cashflow & Rate Adjustments – Five Year Minimum Pace Proforma and 14-10b, Cashflow & Rate Adjustments – 20 Year Minimum Pace CIP Proforma. As shown, with minimum initial project expenditures the annual rate increase of between 6.0 and 6.4 percent is needed through FY 2011-12. Higher rate increases of 11.5% are needed for the following two years, before dropping to 3.0 to 4.0 percent per year thereafter.

Table 14-10a – Cashflow & Rate Adjustments – Five Year Minimum Pace Proforma

Description	Historical FY 2004-05	Budget FY 2005-06	Projected FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Operating Revenues								
Rate-based Utility Bills	\$46,152,352	\$50,144,202	\$57,976,245	\$64,495,327	\$69,844,197	\$75,285,945	\$81,040,087	\$85,455,365
Non-payment of Customer Utility Bills	(\$2,075,693)	(\$2,507,210)	(\$2,898,812)	(\$3,224,766)	(\$2,793,768)	(\$2,258,578)	(\$1,620,802)	(\$1,709,107)
Miscellaneous Revenues (incd changes to AR Balance)	\$1,000,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000
Total Operating Revenues	\$48,636,992	\$55,377,433	\$61,570,561	\$67,350,429	\$73,327,366	\$79,719,285	\$84,046,258	\$84,046,258
Increase in Unit Rates			6.0%	6.0%	6.4%	6.4%	6.4%	6.4%
Typical Residential Bill (\$/month)	\$55	\$61	\$64	\$68	\$73	\$77	\$82	\$82
Change in Rate-based Revenues	8.6%	15.6%	11.2%	8.3%	7.8%	7.6%	7.6%	5.4%
Expenses								
Salaries and Wages	\$12,485,205	\$16,364,464	\$20,455,580	\$21,273,804	\$22,124,756	\$23,009,746	\$23,930,136	\$24,887,341
Supplemental Annuity, Retirement (SAR) Surcharge Trans		\$525,000	\$1,256,200	\$1,256,200	\$1,256,200	\$1,256,200	\$1,256,200	\$525,000
Labor Cost Adjustment for Unfilled Vacancies		(\$1,208,000)	\$0					
Other O&M Expenses	\$4,020,445	\$5,444,712	\$6,071,394	\$6,557,106	\$7,081,674	\$7,648,208	\$8,260,065	\$8,920,870
Insurance Claims		\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
Contractual Charges	\$1,300,628	\$5,446,561	\$5,773,355	\$6,119,756	\$6,486,941	\$6,876,158	\$7,288,727	\$7,726,051
Purchased Power	\$8,745,015	\$11,485,000	\$12,507,165	\$13,001,198	\$13,514,745	\$14,048,578	\$14,603,497	\$15,180,335
Purchased Water	\$6,297,774	\$4,326,930	\$3,620,430	\$3,799,279	\$3,986,964	\$4,183,920	\$4,390,605	\$4,607,501
Subtotal Operating Expenses	\$32,849,067	\$43,384,667	\$50,684,124	\$53,007,343	\$55,451,280	\$58,022,809	\$60,729,230	\$62,847,098
Debt Service (non-operating expense)		\$3,800,721	\$2,853,907	\$10,558,701	\$11,084,455	\$18,064,759	\$18,186,031	\$24,800,628
CIP Projects Costs Funded from Cash		\$250,000	\$4,900,000	\$0	\$0	\$0	\$6,800,000	\$2,600,000
Subtotal Budgeted Expenses	\$47,435,388	\$58,438,032	\$63,566,044	\$66,535,735	\$76,087,568	\$85,715,261	\$90,247,726	\$90,247,726
Net Increase (decrease)	\$1,201,604	(\$3,060,599)	(\$1,995,483)	\$814,694	(\$2,760,202)	(\$5,995,976)	(\$6,201,468)	(\$6,201,468)
Other Non-Operating Revenues, Adjustments & Transfers								
Interest Earnings from Operating Reserves		\$292,878	\$158,538	\$351,175	\$391,036	\$579,932	\$649,321	\$677,363
Transfers-in (out) to Restricted Reserve Funds (stabilization & OM&R)		(\$5,782,424)	\$3,044,066	(\$2,650,367)	(\$2,772,564)	(\$2,901,140)	(\$853,411)	(\$529,467)
Capitalized Labor Cost Transfer-in		\$702,400	\$500,430	\$537,919	\$608,998	\$620,173	\$574,060	\$836,500
System Development Charge (non-op revenue from growth)			\$3,080,219	\$3,474,847	\$3,869,564	\$4,651,398	\$4,659,216	\$4,667,099
Transfers-in of Bond Fund Interest Earnings		\$566,658	\$606,259	\$1,177,665	\$1,333,137	\$1,369,138	\$1,596,955	\$1,122,595
Total Change in Cash Reserves (net revenues)	(\$3,018,883)	\$4,328,912	\$895,757	\$4,244,864	\$1,559,299	\$630,164	\$572,622	\$572,622
Bond Coverage Ratio (1.25 minimum)		2.33	5.12	1.34	1.63	1.25	1.46	1.25
Ending Fiscal Year Operating Cash Reserves Balance		\$3,562,651	\$7,891,563	\$8,787,319	\$13,032,183	\$14,591,482	\$15,221,646	\$15,794,268
Ending FY Construction Fund Available Cash Balance		\$11,790,000	\$42,000	\$30,713,893	\$272,193	\$25,688,569	\$3,867,865	\$135,493
Target Minimum Reserve Level		\$3,470,618	\$6,004,824	\$8,655,192	\$11,427,756	\$14,328,896	\$15,182,307	\$15,711,775

This cashflow proforma represents the funding requirements for the minimum pace CIP alternative.

Table 14-10b – Cashflow & Rate Adjustments – 20 Year Minimum Pace CIP Proforma

Description	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25
Typical Residential Bills (\$/month, current rates)	\$82	\$92	\$102	\$108	\$112	\$116	\$121	\$125	\$131	\$135	\$140	\$146	\$151	\$156
Increase in Unit Rates	6.4%	11.5%	11.4%	5.4%	4.2%	3.3%	4.1%	4.1%	4.1%	3.4%	4.0%	3.6%	3.5%	3.5%
Increase in Demands (Sales)	-1.0%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Increase in Rate-based Revenues (including growth)	5.4%	13.0%	12.9%	6.9%	5.7%	4.8%	5.6%	5.6%	5.6%	4.9%	5.5%	5.1%	5.0%	5.0%
Operating Revenues														
Rate-based Utility Bills	\$85,455,365	\$96,537,048	\$109,017,616	\$116,499,205	\$123,126,103	\$129,087,790	\$136,331,109	\$143,945,094	\$152,022,436	\$159,517,110	\$168,292,051	\$176,887,470	\$185,716,185	\$194,992,492
Non-payment of Customer Utility Bills	(\$1,709,107)	(\$1,930,741)	(\$2,180,352)	(\$2,329,984)	(\$2,462,522)	(\$2,581,756)	(\$2,726,622)	(\$2,878,902)	(\$3,040,449)	(\$3,190,342)	(\$3,365,841)	(\$3,537,749)	(\$3,714,324)	(\$3,899,850)
Miscellaneous Revenues	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000
Total Operating Revenues	\$84,046,258	\$94,906,307	\$107,137,264	\$114,469,220	\$120,963,581	\$126,806,034	\$133,904,486	\$141,366,192	\$149,281,987	\$156,626,767	\$165,226,210	\$173,649,721	\$182,301,861	\$191,392,643
Expenses														
Inflationary Increase in Operating Expenses	3.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Increase in O&M costs with aging and expanded facilities	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Demand-related Increase in Operating Expenses	-0.5%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%
Operating Expenses	\$62,847,098	\$65,800,000	\$68,900,000	\$72,200,000	\$75,600,000	\$79,200,000	\$83,000,000	\$86,900,000	\$91,000,000	\$95,300,000	\$99,800,000	\$104,500,000	\$109,500,000	\$114,700,000
Debt Service (non-operating expense)	\$24,800,628	\$27,494,971	\$37,571,902	\$41,074,979	\$44,260,071	\$46,351,681	\$50,249,246	\$54,013,975	\$58,099,240	\$60,926,151	\$65,750,046	\$69,285,117	\$73,164,626	\$78,722,298
CIP Projects Costs Funded from Cash	\$2,600,000	\$8,500,000	\$8,670,000	\$8,843,400	\$9,020,268	\$9,200,673	\$9,384,687	\$9,572,381	\$9,763,828	\$9,959,105	\$10,158,287	\$10,361,453	\$10,568,682	\$9,780,055
Subtotal Expenses	\$90,247,726	\$101,794,971	\$115,141,902	\$122,118,379	\$128,880,339	\$134,752,354	\$142,633,933	\$150,486,356	\$158,863,068	\$166,185,255	\$175,708,333	\$184,146,570	\$193,233,308	\$203,202,353
Net Increase (decrease)	(\$6,201,468)	(\$6,888,664)	(\$8,004,638)	(\$7,649,159)	(\$7,916,758)	(\$7,946,320)	(\$8,729,447)	(\$9,120,163)	(\$9,581,081)	(\$9,558,488)	(\$10,482,123)	(\$10,496,849)	(\$10,931,447)	(\$11,809,710)
Other Non-Operating Revenues, Adjustments & Transfers														
Interest Earnings from Operating & Bond Reserves	\$677,363	\$1,826,889	\$1,979,638	\$2,274,159	\$2,466,758	\$2,646,320	\$2,779,447	\$2,995,163	\$3,206,081	\$3,433,488	\$3,607,123	\$3,871,849	\$4,081,447	\$4,309,710
Capitalized Labor Cost Transfer-in	\$836,500	\$1,000,000	\$1,900,000	\$1,200,000	\$1,100,000	\$800,000	\$1,300,000	\$1,300,000	\$1,400,000	\$1,000,000	\$1,600,000	\$1,200,000	\$1,300,000	\$1,800,000
System Development Charges (w/ escalation)	\$4,667,099	\$4,800,000	\$4,900,000	\$5,000,000	\$5,200,000	\$5,400,000	\$5,600,000	\$5,800,000	\$6,000,000	\$6,200,000	\$6,400,000	\$6,600,000	\$6,800,000	\$7,000,000
Total Change in Cash Reserves (net revenues)	\$572,622	\$738,225	\$775,000	\$825,000	\$850,000	\$900,000	\$950,000	\$975,000	\$1,025,000	\$1,075,000	\$1,125,000	\$1,175,000	\$1,250,000	\$1,300,000
Bond Coverage Ratio (1.25 minimum)	1.25	1.52	1.39	1.37	1.36	1.35	1.33	1.32	1.31	1.30	1.29	1.28	1.28	1.25
FY Ending O&M Reserves (3 month's O&M)	\$15,711,775	\$16,450,000	\$17,225,000	\$18,050,000	\$18,900,000	\$19,800,000	\$20,750,000	\$21,725,000	\$22,750,000	\$23,825,000	\$24,950,000	\$26,125,000	\$27,375,000	\$28,675,000
CIP Financing Plan – Base Case														
Annual WRMP CIP	\$43,599,389	\$49,566,270	\$97,733,767	\$62,236,136	\$57,566,378	\$41,080,283	\$68,790,083	\$66,953,124	\$72,030,073	\$53,045,936	\$83,682,496	\$64,241,827	\$69,698,863	\$94,488,228
Less Grants	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)	(\$1,300,000)
Less Cash Funded CIP (% of/total)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Net CIP Funded from Bonds	\$40,999,389	\$41,066,270	\$89,063,767	\$53,392,736	\$48,546,110	\$31,879,610	\$59,405,396	\$57,380,743	\$62,266,245	\$43,086,831	\$73,524,209	\$53,880,375	\$59,130,182	\$84,708,173
Bonds Issued														
Bond Size	\$52,000,000	\$44,905,708	\$97,390,669	\$58,384,621	\$53,084,866	\$34,860,153	\$64,959,427	\$62,745,482	\$68,087,747	\$47,115,179	\$80,398,261	\$58,917,851	\$64,658,482	\$92,627,855
Less Debt Reserve Fund (one year of debt)	(\$4,233,491)	(\$2,694,342)	(\$5,843,440)	(\$3,503,077)	(\$3,185,092)	(\$2,091,609)	(\$3,897,566)	(\$3,764,729)	(\$4,085,265)	(\$2,826,911)	(\$4,823,896)	(\$3,535,071)	(\$3,879,509)	(\$5,557,671)
Less Cost of Issuance	(\$1,326,000)	(\$1,145,096)	(\$2,483,462)	(\$1,488,808)	(\$1,353,664)	(\$888,934)	(\$1,656,465)	(\$1,600,010)	(\$1,736,238)	(\$1,201,437)	(\$2,050,156)	(\$1,502,405)	(\$1,648,791)	(\$2,362,010)
Less Capitalized Debt	(\$6,240,000)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Bond Proceeds (project funds from bonds)	\$40,200,509	\$41,066,270	\$89,063,767	\$53,392,736	\$48,546,110	\$31,879,610	\$59,405,396	\$57,380,743	\$62,266,245	\$43,086,831	\$73,524,209	\$53,880,375	\$59,130,182	\$84,708,173
New Debt	\$6,614,597	\$2,694,342	\$10,076,931	\$3,503,077	\$3,185,092	\$2,091,609	\$3,897,566	\$3,764,729	\$4,085,265	\$2,826,911	\$4,823,896	\$3,535,071	\$3,879,509	\$5,557,671
Required Bond Reserves for Debt Covenants	\$25,341,914	\$28,036,256	\$33,879,696	\$37,382,773	\$40,567,865	\$42,659,475	\$46,557,040	\$50,321,769	\$54,407,034	\$57,233,945	\$62,057,840	\$65,592,911	\$69,472,420	\$75,030,092

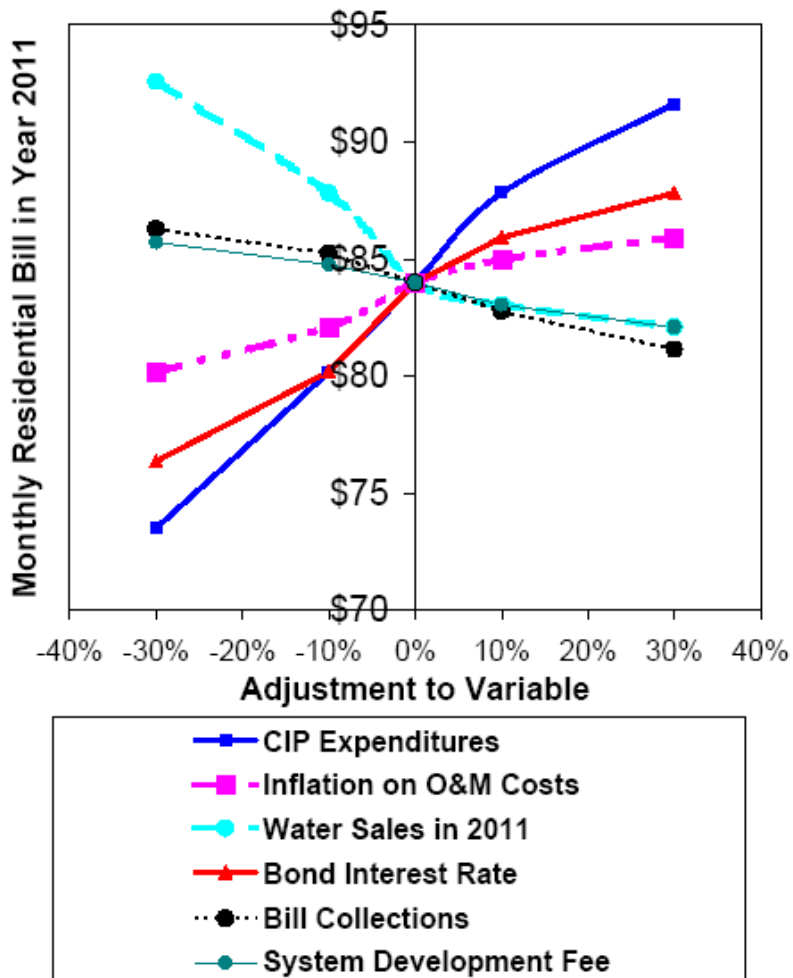
This cashflow proforma represents the funding requirements for the minimum pace CIP alternative.

The following section of this chapter provides an analysis of the cost of service to the different customer classes.

14.6 Sensitivity Analysis

A number of data and assumptions are used in developing the projected rate-based revenue requirements and projected bills. The sensitivity of the projected residential bills to variations in the data is illustrated in Figure 14-5. This figure uses data provided in Volume 1 Appendix 1M - Financial Program to the chapter, and shows that there is little sensitivity of the financial findings to increases in water demand, changes in bill collection, or O&M inflation. However, changes to the level of capital expenditures does have a significant effect on the FY 2010-11 bills, as do changes to the debt service interest rates and decreases in water sales. As shown, if the projected CIP is increased by 30%, the year 2010-11 typical residential bill will increase by an additional \$8 per month.

Figure 14-5 – Residential Bill Sensitivity to Variables



14.7 Cost of Service Analysis

This section addresses cost of service (COS) principles and sets the stage for an alternative rate structure that can result in a higher level of equity and fairness in charges. The results of this COS analysis, if not used to change the existing rate structure, have no effect on customer billing levels. Rate equity may enhance the willingness of certain customers to pay for services they believe to be fair. However, reaching that equity may result in rate shock from the increasing bills required of certain classes, and specifically the residential customers.

In a COS analysis, water and sewer costs are segregated in order to more accurately identify the costs associated with each utility service. These costs of service are allocated to each customer class, based on the utility demands by that class. Finally, the costs are compared to the bills charged to the respective customer classes, and the differences tabulated. Note that there are many residential water customers with no sewer service, and several sewer customers not using GWA water.

Two COS methods are commonly used to allocate water and sewer system costs: the base-extra capacity method and the commodity-demand method. The two differ primarily in the treatment of peaking costs. Both of these methods are endorsed by AWWA and WEF. In this study, the costs are allocated using the water-related base-extra capacity method and the wastewater-related functional cost method. The allocations used in these methods represent system operational objectives to be achieved within the planning period. Independent of the method selected, costs (and revenue requirements) are allocated to the functional cost categories for water services: customer account service, meter capacity-related service, average annual water usage, and peak water consumption. For wastewater services the functional cost categories are for customer account service, estimated sewage discharges (based on water usage and a return to sewer factor), and sewage strength.

The embedded COS method is used to analyze the costs of serving the customers by allocating the revenue requirements to applicable functional cost categories, dividing these costs by the unit demands in each category, and determining the unit costs of service. This method is based on the premise that a water system is designed to serve a variety of demands placed on it by the different users connected to the system. Thus, it allocates costs in proportion to the demands that users make on the system.

The division of GWA costs between water and sewer elements is the first step of the COS analysis. Table 14-11, Utility Expense Functional Allocations, divides the O&M costs between water and sewer accounts. The divisions of costs are itemized among the four primary expenditures of personnel services, water and power costs, other O&M costs, and depreciation of infrastructure costs. Note that for COS evaluations, depreciation costs replace actual annual costs of project expenditures (including debt service), as they represent the long-term average cost of the fixed assets. For this analysis, to better reflect the projected COS over the multi-year master plan, depreciation is based on the depreciated replacement cost of the existing assets instead of book value. As noted, 64% of the FY 2005-06 GWA budget is allocated to the water utility, with the remainder going to the wastewater system.

Table 14-11 – Utility Expense Functional Allocations

Description of Expense	Ratio	GWA Divisions				Unallocated (1150)	FY 2005-06 Total
		General Manager	CFO	Collection & Distribution	Production & Treatment		
		<small>(GM/Admin/lab/etc)</small>	<small>(mtr&cust/CFO/data, etc.)</small>	<small>(pres/pump/etc)</small>	<small>(grd/sut/disp/etc)</small>		
Personnel Service Costs (a)		\$1,794,769	\$2,456,400	\$7,091,208	\$3,512,088	\$1,510,000	\$16,364,464
Water	46%			36%	30%		\$3,643,026
Sewer	54%			38%	44%		\$4,218,352
Both		100%	100%	26%	26%	100%	\$8,503,086
Total	100%	100%	100%	100%	100%	100%	\$16,364,464
Operations & Maintenance (excluding Personnel Services)							
Other O&M		\$3,418,500	\$1,823,474	\$4,356,987	\$2,077,312	\$0	\$11,676,273
Purchase Power	701	\$65,000	\$150,000	\$2,400,000	\$9,085,000	\$0	\$11,700,000
Purchased Water (including Earthtech)	702	\$0	\$0	\$0	\$4,326,930	\$0	\$4,326,930
Subtotal Operating Expense		\$3,483,500	\$1,973,474	\$6,756,987	\$15,489,242	\$0	\$27,703,203
O&M Allocation among Overhead and Utilities (purchased water directly allocated)(a)							
Water				47%	92%		\$18,457,401
Sewer				38%	7%		\$3,104,335
Both (reallocated to both water and sewer)		100%	100%	15%	1%	100%	\$6,141,466
Subtotal Operating Expense		100%	100%	100%	100%	100%	\$27,703,203
Allocation between Utilities							
Water	64%	\$8,321,280	\$7,583,425	\$8,987,725	\$14,726,930	\$23,714,655	\$39,619,360
Sewer (c)	36%	\$9,976,435	\$8,781,039	\$2,688,548	\$1,300,000	\$3,988,548	\$22,746,022
Grand Total Cost of Service	100%	\$18,297,715	\$16,364,464	\$11,676,273	\$16,026,930	\$27,703,203	\$62,365,382

- a. The allocation of costs between utility service (excluding purchased water) is based on the detailed FY 2005-06 budget.
b. The capital costs are based on the annual depreciation of assets in current dollars to better reflect the GWMP CIP.
c. GWA staff provided that 14%, or \$1.3 million, in power costs were used for sewer lift stations and treatment plant motors.

Table 14-12, Cost of Service Expense Allocations further allocates the cost of service into the functions provided by the water and the sewer utilities. These functions can be cross-referenced with the demands placed on the system by each customer classification. These functions are prescribed by the standard COS analysis procedures recommended by AWWA and WEF.

Table 14-12 – Cost of Service Expense Allocations

Functional Allocations	COS		Operations			FY 2005-06	
	Allocation	Capital Depreciation (a) Prod. & Treat. Coll. & Dist.	Admin./Mgmt.	Prod. & Treat.	Coll. & Dist.	Total	
Depreciation		\$5,109,373 \$13,188,342				\$18,297,715	
Personnel			\$4,683,312	\$3,869,102	\$7,812,050	\$16,364,464	
Water & Power			\$215,000	\$13,411,930	\$2,400,000	\$16,026,930	
Other O&M			\$5,241,974	\$2,077,312	\$4,356,987	\$11,676,273	
Grand Total Cost of Service		\$5,109,373 \$13,188,342	\$10,140,287	\$19,358,344	\$14,569,037	\$62,365,382	
Water (b)							
Base Water Demand (V)	53%	70%	50%	80%	40%	\$21,099,825	
Peaking Maximums							
Day (MD)	16%	30%	10%	20%	20%	\$6,334,188	
Hour (MH)	7%		25%		15%	\$2,730,789	
Services							
Customer (WC, c)	9%			58%		\$3,744,000	
Meter (EM)	14%		15%	42%	25%	\$5,710,557	
Total Water	100%	\$2,632,478 \$5,688,802	\$6,420,256	\$16,153,899	\$8,723,926	\$39,619,360	
Sewer (b)							
Sewage Flow (Q)	67%	20%	90%	41%	20%	100%	\$15,242,996
Sewage Strengths (SS)	20%	80%			80%		\$4,545,072
Customer Services (SC, c)	13%		10%	59%			\$2,957,954
Total Sewer	100%	\$2,476,894 \$7,499,541	\$3,720,031	\$3,204,445	\$5,845,111	\$22,746,022	
Grand Total Cost of Service		\$5,109,373 \$13,188,342	\$10,140,287	\$19,358,344	\$14,569,037	\$62,365,382	
Expenditure Allocations		8% 21%	16%	31%	23%	100%	

COS: Cost of service

- a. The capital costs are based on the annual depreciation of assets in current replacement costs to better reflect the GWA after the improvements are done.
- b. Cost allocation sources: AWWA Manual M-1, Principals of Water Rates, Fees and Charges; WEF Manual 27, Financing and Charges for Wastewater Systems. These costs are allocated using the water-related base-extra capacity method and the wastewater-related functional cost method. The values represent system operational objectives and not current conditions.
- c. The O&M-related administrative costs allocated to Customer Services are based on \$8 per month per account of meter reading, billing and account handling.

As shown, most water utility costs are allocated to average water demands (by each class), with the remainder of the costs equally divided between peak demands and utility customer and meter services. The bulk of sewer utility costs are allocated to sewage discharges, with sewage strengths and customer services allocated to the remaining costs.

14.7.1 Water Cost of Service

Table 14-13, Projected Water Demands projects future demands, including the number of meters by size and the water demands by customer classification. This projection is needed both to develop the cost of services and to project future rate-based revenues under different rate alternatives. The changes in the number of accounts and in water demands are driven by the projected growth, as provided at the top of the table. Additional elements affecting billable water demand include the current meter replacement program and the elasticity of water demand with the rising cost of customer bills. The effect of these two elements is shown in the average monthly residential water consumption provided in the water demand section. As shown, water demands grow from 6.6 million Kgal in FY 2004-05 to 8 million Kgal in FY 2010-11. The definitions of the different customer classifications,

and the typical commercial accounts in each class, are provided in Volume 1 Appendix 1M - Financial Program.

Table 14-13 – Projected Water Demands

Class	Current							
	FY 2004-05	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Water Customer Growth								
Increase in Billed Usage (excluding Meter Replacements)(a)			2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Customer Account Activations (b)			1.0%	1%	1%	1%	1%	1%
Annual Increase in Water Usage from Meter Replacements			4%	6%	0%	0%	0%	0%
New Water Connections (residential hook-ups) -- %			0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
New Water Connections (residential hook-ups) -- Number			173	174	176	178	180	181
Water Accounts								
Agricultural	533	533	538	543	548	553	559	565
Golf Course	14	14	14	14	14	14	14	14
Commercial C	2,144	2,144	2,165	2,187	2,209	2,231	2,253	2,276
Commercial D	32	32	32	32	32	32	32	32
Commercial E	192	192	194	196	198	200	202	204
Federal	12	12	12	12	12	12	12	12
Government	435	435	439	443	447	451	456	461
Hotel	56	56	57	58	59	60	61	62
Irrigation	228	228	230	232	234	236	238	240
Residential	34,171	34,171	34,513	34,858	35,207	35,559	35,915	36,274
Total Water Customers	37,817	37,817	38,194	38,575	38,960	39,348	39,742	40,140
New Customers per Year		0	377	381	385	388	394	398
Water Demands (billable Kgal, a)								
Agricultural	165,666	145,544	148,455	151,424	154,452	157,541	160,692	163,906
Golf Course	28,035	16,856	17,193	17,537	17,887	18,245	18,610	18,982
Commercial C	775,486	762,162	835,709	854,640	871,733	889,167	906,951	925,090
Commercial D	136,013	151,088	154,110	157,192	160,336	163,543	166,813	170,150
Commercial E	147,664	147,908	150,866	153,883	156,961	160,100	163,302	166,568
Federal	1,640	3,694	3,768	3,843	3,920	3,999	4,079	4,160
Government	421,535	498,371	566,642	580,192	591,796	603,632	615,704	628,018
Hotel (H)	904,579	943,419	1,020,591	1,043,220	1,064,084	1,085,366	1,107,073	1,129,215
Irrigation	51,041	50,412	51,421	52,449	53,498	54,568	55,659	56,772
Residential (< 5Kgal/month)(a)	380,943	380,943	388,562	396,333	404,260	412,345	420,592	429,004
Residential (> 5Kgal/month)(a)	3,603,818	3,768,417	4,046,771	4,106,588	4,139,136	4,172,575	4,206,040	4,017,050
Residential	3,984,761	4,149,360	4,435,333	4,502,922	4,543,396	4,584,920	4,626,632	4,446,054
Total Billed Water (a)	6,616,419	6,868,815	7,384,086	7,517,301	7,618,063	7,721,081	7,825,516	7,708,915
Total Produced Water	14,733,372	14,586,038	14,440,178	14,295,776	14,152,818	14,011,290	13,871,177	13,732,465
Water Losses (billed vs. produced)	55%	53%	49%	47%	46%	45%	44%	44%
Average Residential Water Use (Kgal/month)	10	10	11	11	11	11	11	10
Typical Residential Water Use (Kgal/month)	8	8	9	9	9	9	9	9
Totals water demand includes impacts of meter replacements, demand elasticity and growth.								
Meter Size								
3/4"	35,651	35,651	36,006	36,365	36,728	37,094	37,466	37,842
1"	884	884	893	902	911	920	929	938
1 1/2"	418	418	422	426	430	434	438	442
2"	554	554	560	566	572	578	584	590
3"	93	93	94	95	96	97	98	99
4"	128	128	129	130	131	132	133	134
6"	64	64	65	66	67	68	69	70
8"	18	18	18	18	18	18	18	18
10"	7	7	7	7	7	7	7	7
12"	0	0	0	0	0	0	0	0
Total Meters	37,817	37,817	38,194	38,575	38,960	39,348	39,742	40,140
Equivalent Meters (3/4" based)	48,228	48,228	48,704	49,184	49,668	50,155	50,648	51,145
New EMs per Year		0	476	480	484	487	493	497

a. The Total Billed Water includes increases due to meter replacements, increasing persons per household, and decreases from the price elasticity of demand.

b. The new Activation of Residential Accounts includes new water connections and reactivation of inactive accounts.

The meter replacement program will increase billable water, as shown in Table 14-14. Over the next three years this program will replace all water meters system-wide. The program is designed to increase the accuracy of meter reading, and will increase the level of billable water from the replacement of broken and under-reading meters. Based on preliminary meter replacements, this impact appears to be most significant with the larger non-residential meters. It is estimated that the program will result in an increase in water sales of between 10 to 20%, but a financially conservative level of 10% overall is used in this projection. The replaced meters, on average, will increase average metered residential water use by 1 Kgal per month, with no actual increase in customer demands for water consumption.

Table 14-14 – Meter Replacement Program

Description	FY 2004-05	FY 2005-06	FY 2006-07	FY 2007-08	Total
<u>Number of Meter Replacements (a)</u>					
Residential		9,400	22,560	2,211	34,171
Commercial and Other		1,427	2,119	100	3,646
Total		10,827	24,679	2,311	37,817
<u>Estimated Increase in Metered Water Per Replaced Meter (b)</u>					
Residential		12%	10%	8%	11%
Commercial and Other		12%	10%	8%	11%
<u>Average Metered Water Use of All Accounts (Kgal/month-account)</u>					
Residential	9.7	10.0	11.0	11.0	
Commercial and Other	60	67	67	67	
<u>Increase in Metered Water Sales (Kgal/year)</u>					
Residential		135,923	281,549	24,516	441,988
Commercial and Other		126,690	174,909	6,652	308,251
Total per year		262,613	456,458	31,167	750,239
Annual Increase in Metered Water Sales		3.8%	6.2%	0.4%	
<u>Cumulative Increase in Metered Water Sales (Kgal/year)</u>					
Residential		135,923	417,472	441,988	
Commercial and Other		126,690	301,599	308,251	
Total		262,613	719,071	750,239	
Total Water Sales per Year (before customer growth)		6,868,815	7,384,086	7,517,301	
Cumulative Increase in Metered Water Sales (c)		4%	10%	10.0%	

The meter replacement program is projected to increase the level of billable water use. The increase in billable water usage will result from the replacement of broken and under-reading meters. It is not anticipated that there are any over-reading meters. The FY 2005-06 increase in water demand is incorporated into the detailed revenue calculations of that year. With the increased accuracy of meter reading, historical water losses are expected to diminish. The higher labor efficiencies from wireless meter reading are not projected to reduce GWA staffing.

- a. The initial meters being replaced will be the largest. Increasing numbers of residential meters in low-density communities will occur towards the end of the program.
- b. The Estimated Average Increase in Metered Water will be highest in the initial period of meter replacement when the oldest and malfunctioning meters are being replaced. The later meter replacements will result in diminishing increases of metered water demands.
- c. Current estimates are that there will be up to a 20% increase in metered water sales.

Table 14-15 examines residential water demand elasticity with price. Economic laws of supply and demand dictate that as price increases, demand will decrease. The drop in demand for water services is due mostly to the customer's perception of the costs of discretionary water. Specifically, if a total billed charge for services increases by 50%, in order to dampen the cost increase, the typical customer will reduce their use of the service by something less than 50%. Note that if the customer's usage cannot be reduced due to practical considerations, their demand is inelastic and will not change. Moreover, the change in demand is often temporary.

Table 14-15 – Residential Water Demand Elasticity with Price

Description	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	Total
Monthly GWA Bill for Residential Customer	\$55	\$62	\$67	\$72	\$78	\$84	
Increase in Total Bill (Alt 1. Rates with uniform increases)		13%	8%	8%	8%	8%	53%
Price Elasticity (based on indoor water use)(a)	-0.13	-13%	-13%	-13%	-13%	-13%	
Projected Residential Water Use Before Decrease (Kgal/year)	4,149,360	4,513,896	4,628,690	4,721,264	4,815,689	4,912,003	
Decrease in Water Demand by Residential Customers (percent)		-1.7%	-1.0%	-1.1%	-1.0%	-1.0%	-6.6%
Decrease in Water Demand by Residential Customers (Kgal/year)		78,564	45,633	49,584	49,344	49,986	273,111

a. A 2000 study in Perth Australia of water demand Price Elasticity based on indoor water use estimated that short-term demands were affected at -0.13. The effects of elasticity of demand are limited to the five-year short-term period.

A 2000 study of water demand price elasticity based on indoor residential water use in Perth, Australia estimated that short-term demands were elastic by -0.13. As the climate of GWA's service area is tropical with high rainfall, there is little outdoor irrigation by residential customers. It is therefore presumed that residential water use is mainly indoors, requiring the use of the indoor price elasticity index. No reduction in commercial water use is incorporated into the analysis. The resulting drop in residential water use over the 5-year projection is shown in the tabulations, which will offset some of the increase in metered water use from the meter replacement program.

Table 14-16 provides the level of revenues from the current meter service (basic charge). The table also provides the meter sizes in use by the three main customer categories. As shown, the current water rates result in \$3.7 million per year in fixed basic charge proceeds. The remaining water utility rate-based revenues are from variable water commodity sales.

Table 14-16 – Water Accounts, Charges & Meter Capacities

Meter Size	Basic Charge (\$/month)	Equivalent Meter Capacity Ratio (a)	Current Revenue Ratio	Customer Meters			Total Meters
				Residential	Commercial/ Industrial	Agriculture/ Irrigation	
3/4"	\$7.46	1.0	1.0	33,494	1,602	555	35,651
1"	\$8.71	1.7	1.2	500	272	112	884
1 1/2"	\$13.67	3.3	1.8	87	286	45	418
2"	\$17.41	5.3	2.3	66	442	46	554
3"	\$31.09	10.7	4.2	6	86	1	93
4"	\$43.52	16.7	5.8	10	117	1	128
6"	\$80.82	33.3	10.8	6	57	1	64
8"	\$118.13	53.3	15.8	2	16		18
10"	\$161.65	76.7	21.7		7		7
Total Meters				34,171	2,885	761	37,817
Monthly Charges				\$257,902	\$41,319	\$6,687	\$305,908
Annual Charge FY 2005-06				\$3,094,818	\$495,826	\$80,247	\$3,670,891
FY 04-05 Annual Charges (based on Prior Rates)				\$2,986,956	\$478,545	\$77,450	\$3,543,151

a. The equivalent meters based on 3/4" revenues represents the number of equivalent 3/4" meters represented by the mix of different meter sizes. GWA Rate Schedule was effective 2/1/06.

The purpose of Table 14-17, Water Commodity Charges is to identify: the water use and water commodity revenues by class, the average year water consumption, and the peak month water demands. To best estimate future water commodity revenues, the water usage for two recent years is used. When compared to total water production, billed water usage for FY 2004-05 suggests a very high water loss rate of 55%. This water loss is due to both the under-reading older water meters and the water distribution system leaks. The meter replacement program will reduce under-reading by the meters, and certain CIP projects should reduce distribution system loss rates.

Table 14-17 – Water Commodity Charges

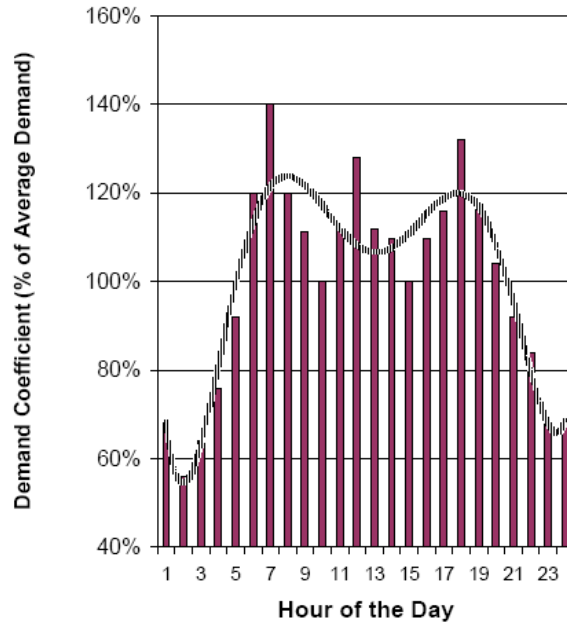
Meter Size	Water Consumption (1,000 Gallons, FY 2004-05)						Demand per Year (Kgal)	Demand per Ye (mgd)
	Residential			Commercial/ Ind/Golf/Fed	Agriculture/ Irrigation	Grand Total		
	0 to 5,000 gallons/month	More than 5,000 gallons/month	Total Residential					
3/4"	249,213	3,436,162	3,685,375	214,730	83,142	3,983,247	10.91	
1"	33,947	43,206	77,153	55,249	37,805	170,206	0.47	
1 1/2"	15,760	20,058	35,817	279,260	36,934	352,010	0.96	
2"	21,717	27,640	49,357	249,027	51,776	350,160	0.96	
3"	13,755	17,507	31,262	186,952	1,385	219,599	0.60	
4"	32,440	41,288	73,728	389,013	5,348	468,089	1.28	
6"	12,572	16,001	28,573	447,613	318	476,504	1.31	
8"	1,538	1,958	3,496	456,740		460,237	1.26	
10"			0	136,368		136,368	0.37	
Total Billable Water Use (Kgals)	380,943	3,603,818	3,984,761	2,414,951	216,707	6,616,419	18.1	
Billing Rate (\$ per Kgal, FY05)	\$2.40	\$3.43		\$4.27	\$1.42			
FY 2004-05 Water Use Bill	\$914,264	\$12,361,095	\$13,275,359	\$10,311,842	\$307,724	\$23,894,925		
FY 2005-06 Billable Water	380,943	3,768,417	4,149,360	2,523,498	195,956	6,868,815	18.8	
Billing Rate (\$ per Kgal, 2/06)	\$2.40	\$3.55		\$4.42	\$1.47			
FY 2005-06 Water Use Bill	\$914,264	\$13,377,881	\$14,292,145	\$11,153,863	\$288,056	\$25,734,063		
Share of Use (FY 2004-05)	6%	54%	60%	36%	3%	100%		
Share of Bills (FY 2004-05)	4%	52%	56%	43%	1%	100%		

Customer Classifications	Annual Water Billed (Kgal)			Most Recent	Max. Month Billed (Kgal)		Max. to Avg. Month
	FY 2003	FY 2004	FY 2005	2 Yr. Avg.	FY 2004	FY 2005	
Agricultural	131,050	125,422	165,666	145,544	14,591	23,024	1.55
Golf Course	17,840	5,677	28,035	16,856	1,119	4,408	1.97
Commercial C	795,544	664,379	775,486	719,932	71,091	152,447	1.86
Commercial D	150,952	166,163	136,013	151,088	15,505	16,132	1.26
Commercial E	128,509	148,152	147,664	147,908	16,242	15,745	1.30
Federal	4,491	5,748	1,640	3,694	683	190	1.42
Government	830,141	490,748	421,535	456,141	47,467	45,573	1.22
Hotel	780,903	897,799	904,579	901,189	88,443	88,470	1.18
Irrigation	62,196	49,784	51,041	50,412	6,243	5,640	1.41
Residential (< 5Kgal/month)(a)			380,943				
Residential (> 5Kgal/month)(a)			3,603,818				
Total Residential	4,051,592	4,042,113	3,984,761	4,013,437	394,585	401,968	1.19
Total Billed Water	6,953,219	6,595,984	6,616,419	6,606,202	655,969	753,597	1.28
Total Produced Water			14,733,372				
Percentage Lost Water			55%				

Values will increase with meter replacement program. Source of metered water use: GWA accounting department, with edits from billing database. Source: DP raw data, with adjustments.

Also shown in the table is estimated peak month water usage, which is used as an indice of customer water demand characteristics. Diurnal peaking factors are used for COS demand costs. Figure 14-6 shows the typical diurnal demands; this demand curve has been adjusted for the estimated 20% system-wide loss rate (not including meter losses).

Figure 14-6 – GWA Water Demands -- Typical Diurnal Curve



Demand Curve includes an estimated 20 percent average water loss in the system (remaining losses are under reading water meters).

Figure 14-7, Residential Billing by Consumption Level illustrates residential water consumption, as billed. The most significant finding of this figure is that the current first tier (Block 1) of the residential customer water consumption, which is described as a lifeline commodity supply, represents only 11% of the total residential water consumption. This minor level of consumption is spread among all customers, regardless of financial vulnerability, and thus dilutes its value as a discounted lifeline water supply. Also shown is that there is two Kgal per month difference between the typical (median) and average (mean) residential usage.

Figure 14-7 – Residential Billing by Consumption Level

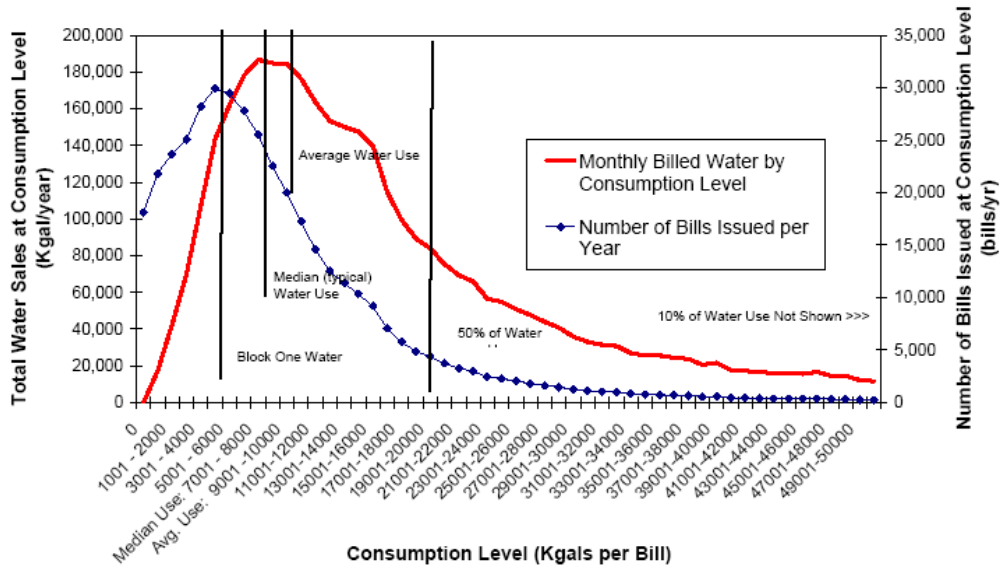


Table 14-8 identifies three water demand characteristics for each customer class. Allocated among the customer classes, the three water demand characteristics are: 1) average annual water consumption, 2) maximum day consumption, and 3) maximum hour consumption. Allocation of GWA utility costs between average and peak water consumption is based on system-wide commodity demands on the average day and month, the maximum day, and the peak (maximum) hour. The reason for defining both peak day and peak hour demands is that water pipe and meter capacities are best sized for instantaneous or hourly peaks, while storage and wellsite pumping facilities are sized for peak daily requirements. Table 14-18 determines the system-wide ratios of hour, day, and average demands. Based on the base-extra capacity method, facility capacities are distributed first to average demand, then to maximum month and peak day demands, and finally to maximum hour demands.

Table 14-18 – Water Demand Factors

Class	FY 2006 Est. Water Billed (Kgal)	Avg Day Factor (AD)	Maximum Month (Kgal)	Maximum to Avg. Month (MM)	Avg. Month to Max Day Ratio (a)	Max Day (MD) Cap Factor	Max Day Demand (mgd)	Customer Max Day to Hour Ratio	Max Hour Demand (mgd)	Max Hour (MH) Cap. Factor
Agricultural	145,544	2.1%	18,807	1.55	1.00	1.55	0.62	1.00	0.62	1.55
Golf Course	16,856	0.2%	2,764	1.97	1.10	2.16	0.10	1.50	0.15	3.25
Commercial C	762,162	11.1%	111,769	1.76	1.00	1.76	3.67	1.33	4.90	2.35
Commercial D	151,088	2.2%	15,819	1.26	1.17	1.47	0.61	1.33	0.81	1.95
Commercial E	147,908	2.2%	15,994	1.30	1.00	1.30	0.53	1.33	0.70	1.73
Federal	3,694	0.1%	436	1.42	1.00	1.42	0.01	1.09	0.02	1.55
Government	498,371	7.3%	46,520	1.12	1.17	1.31	1.78	2.40	4.28	3.14
Hotel	943,419	13.7%	88,457	1.13	1.27	1.43	3.70	1.20	4.44	1.72
Irrigation	50,412	0.7%	5,941	1.41	1.17	1.65	0.23	2.00	0.46	3.30
Residential	4,149,360	60.4%	398,276	1.15	1.08	1.24	14.10	1.50	21.15	1.86
Total Billed Water	6,868,815	100.0%	704,783	1.23	1.00	1.23	25.35	1.40	37.53	1.72
							Average Day Demand (mgd):	18.82	18.82	
							Non-coincidental MD Capacity Factor:	1.35	1.99	
							Coincidental MD Capacity Factor:	1.23	1.72	
							System MD Diversity:	1.09	1.16	

Classes	Million Gallons per Day (mgd)			Agricultural Cust Adj. (b)		Base Water Use AD (%)	Max Day Extra Cap		Max Hour Extra Cap	
	Avg. Annual Water Billed	Estimated Max Day	Estimated Max Hour	Avg. Day AD (%)	Max. Day (mgd)		Month minus Max day (mgd)	MD (%)	Day minus hour (mgd)	MH (%)
Agricultural	0.40	0.62	0.62	1.0%	0.40	0.00	0.00%	0.00	0.00%	
Golf Course	0.05	0.10	0.15	0.2%	0.10	0.05	0.9%	0.05	0.4%	
Commercial C	2.09	3.67	4.90	11.2%	3.67	1.59	25.1%	1.22	10.1%	
Commercial D	0.41	0.61	0.81	2.2%	0.61	0.19	3.1%	0.20	1.7%	
Commercial E	0.41	0.53	0.70	2.2%	0.53	0.12	1.9%	0.18	1.4%	
Federal	0.01	0.01	0.02	0.1%	0.01	0.00	0.1%	0.00	0.0%	
Government	1.37	1.78	4.28	7.3%	1.78	0.42	6.6%	2.50	20.5%	
Hotel	2.58	3.70	4.44	13.9%	3.70	1.12	18%	0.74	6%	
Irrigation	0.14	0.23	0.46	0.7%	0.23	0.09	1.4%	0.23	1.9%	
Residential	11.37	14.10	21.15	61%	14.10	2.73	43%	7.05	58%	
Total Billed Water	18.82	25.35	37.53	100%	25.13	6.32	100%	12.17	100%	

a. The maximum day to weekly average is the ratio of the estimated highest day usage of the week. Residential peaks are assumed minor, hotels are lower on two days per week, government is five of seven days, and all others are active six of seven days. Values are based on FY 2004-05 demands. Cost allocation sources: AWWA Manual M-1, Principals of Water Rates, Fees and Charges These costs are allocated using the water-related base-extra capacity method.

b. Agricultural customers do not require water deliveries that meet potable drinking water standards for safety and reliability, and are the legacy customers of the original water system. As such, these customers are not burdened with utility costs on the basis of demand.

In doing so, the costs of the utility (including both capital-related depreciation and O&M) are spread among the five measurable factors of water customer use. Table 14-19 summarizes these five factors as: three water consumption factors (average, peak day and peak hour demand), the fourth factor of customer services, and lastly the meter service factors associated with each customer class. Table 14-19 summarizes the water consumption factors, the customer service, and the meter service factors associated with each customer

class. As shown, the use of each of these five factors differs by customer classification. For example, residential customers represent 90% of the number of accounts in the system, but use less than half of the peak day system capacity. In contrast, the Guam government represents 1.2 percent of the accounts, but uses 15% of the metered capacity and 21% of the estimated peak hour demand.

Table 14-19 – Water Customer Class Loads

Classification	Customer Factor		Equivalent Meter Factor		Peaking Capacity Factors		
	No. of Accounts	C Factor	Equivalent Meters (est)	Cap EM Factor	Avg. Day (AD)	Max. Day (MD)	Max. Hour (MH)
Agricultural	533	1.4%	631	1.3%	1%	0%	0%
Golf Course	14	0.0%	149	0.3%	0.2%	1%	0%
Commercial C	2,144	5.7%	2,527	5.2%	11%	25%	10%
Commercial D	32	0.1%	171	0.4%	2%	3%	2%
Commercial E	192	0.5%	320	0.7%	2.2%	2%	1%
Federal	12	0.0%	40	0.1%	0%	0%	0%
Government	435	1.2%	7,250	15.0%	7%	7%	21%
Hotel	56	0.1%	1,216	2.5%	14%	18%	6%
Irrigation	228	0.6%	418	0.9%	1%	1%	2%
Residential	34,171	90%	35,507	74%	61%	43%	58%
Total	37,817	100%	48,228	100%	100%	100%	100%

Table 14-20 combines the results of the Table 14-19 with the functional cost allocations identified in the prior water system tables. This combination results in a weighted average of the total water system demands identified for each of the customer classes. These total service allocations by customer class are used for both comparison with current revenues and for development of rate structure alternatives. As shown, residential customers are allocated 63% of the costs of service.

Table 14-20 – Water Customer Cost of Service Allocations

User Class	Base Water	Peaking Maximums		Basic Service Charge		Service
	Demand (AD)	Day (MD)	Hour (MH)	Customer (C)	Meter (EM)	Allocations by User Class
Agricultural	1.0%	0.0%	0.0%	1.4%	1.3%	0.8%
Golf Course	0.2%	0.9%	0.4%	0.0%	0.3%	0.3%
Commercial C	11.2%	25.1%	10.1%	5.7%	5.2%	12.0%
Commercial D	2.2%	3.1%	1.7%	0.1%	0.4%	1.8%
Commercial E	2.2%	1.9%	1.4%	0.5%	0.7%	1.7%
Federal	0.1%	0.07%	0.01%	0.03%	0.08%	0.1%
Government	7.3%	6.6%	20.5%	1.2%	15.0%	9%
Hotel	13.9%	17.7%	6.1%	0.1%	2.5%	11%
Irrigation	0.7%	1.4%	1.9%	0.6%	0.9%	0.9%
Residential	61%	43%	58%	90%	74%	63%
Total	100%	100%	100%	100%	100%	100%
Functional COS Allocations (a)	53%	16%	7%	9%	14%	100%

a. The functional COS Allocations are based on the spread of expenditures among the allocation elements. The cost allocation source is the AWWA Manual M-1, Principals of Water Rates, Fees and Charges; These costs are allocated using the water-related base-extra capacity method.

The water revenues from current bills to each customer class are compared with the equitable allocation of water system costs to each customer class in Table 14-21. This key table indicates that residential customers are paying approximately four percent less for water

services than is equitable. In contrast, hotels are paying 20% too much. Not all commercial accounts are overpaying; for example, landscape irrigation accounts are paying approximately half their equitable cost of service. Similarly, golf courses are paying 20% less than is appropriate. The primary reason for the undercharging of landscape and golf course irrigation customers is that the current rates fail to adequately recognize the system-wide cost of delivering peak water demand. Note also that agricultural customers are the legacy customers of the original water system, and provide a critical food service function on the island. Therefore, these customers are not burdened with all the utility costs.

Table 14-21 - Water Cost of Service Charges vs. Current

User Billing Classifications	FY 2005-06 Revenues (Revenue Neutral)			FY 2006-07 COS-based Costs
	Current Revenues	Cost of Service Change from Current Rates	Cost of Service-based Costs	
Agricultural (a)	\$265,860	0%	\$265,927	\$309,093
Irrigation	\$152,679	95%	\$297,406	\$345,682
Subtotal Agricultural & Irrigation	\$418,539	35%	\$563,333	\$654,775
Golf Course	\$91,764	20%	\$109,821	\$127,647
Commercial (C) I	\$4,591,554	-17%	\$3,816,060	\$4,435,497
Commercial (D) II	\$805,013	-27%	\$588,318	\$683,816
Hotel (H) II	\$4,416,559	-20%	\$3,511,725	\$4,081,761
Commercial (E) III	\$818,201	-33%	\$544,231	\$632,573
Federal	\$21,786	-19%	\$17,635	\$20,498
Guam Government	\$2,493,829	11%	\$2,758,768	\$3,206,581
Subtotal Non-residential	\$13,238,706	-14%	\$11,346,557	\$13,188,372
Residential	\$19,098,713	4.4%	\$19,945,622	\$23,183,268
Total (b)	\$32,755,958	-2.7%	\$31,855,512	\$37,026,416
Percent of Total Revenues	65%		64%	

Revenue requirement reflects a midyear rate adjustment.

a. Agricultural customers do not require water deliveries that meet potable drinking water standards for safety and reliability, and are the legacy customers of the original water system. As such, these customers are not burdened with utility costs associated with safety and reliability. This does not apply to irrigation customers.

b. Current sewer rates collect less revenue than the costs of operating the sewer utility, with the difference transferred in from the water revenues.

The current rate structure is shown to be imbalanced between water and sewer utility services, as well. Total water bills are approximately three percent in excess of appropriate levels, with those additional charges being used to offset underbilling of sewer services.

Regardless of current inequities among the customer classes, or even between the two utilities, GWA's total rate-based revenue requirements are increasing. For this reason, the \$33 million of water service revenues for FY 2005-06 need to be increased to approximately \$37 million for FY 2006-07.

14.7.2 Wastewater Cost of Service

The wastewater system costs assigned to each customer class is determined by the contribution to the wastewater flow and strength loadings, as well as the administrative burden. The first step in the cost allocation analysis is to identify the flow, biochemical oxygen demand, total suspended solids, and account allocation parameters for the different utility processes. The second step is to allocate the sewer utility costs among these parameters.

Table 14-22 identifies future wastewater customer loading. The two elements include the number of accounts by classification and their wastewater discharges. As wastewater discharges are not directly monitored, the billable water use multiplied by a calculated water use return-to-sewer factor is used as a proxy for direct metering. The wastewater customer growth used in this projection is higher than that for water, as a significant number of existing residential accounts are currently using septic systems. In order to protect groundwater supply sources, many of the residents on septic systems will be required to hook up to the wastewater collection system over the projection period.

Table 14-22 – Projected Wastewater Customer Loads

Class	FY 2004-05	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
New Residential Sewer Connections (including unsewered areas)(a)			450	525	600	750	750	750
New Activation of Residential Accts (b)		200	650	725	800	950	950	950
New Non-residential Account & Incr. Sewage Flow		0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Increase in Customer Loading		0.9%	2.0%	2.1%	2.2%	2.5%	2.5%	2.4%
Increased Meter Readings from Meter Replacement Program		3.8%	6.2%	0.4%	0.0%	0.0%	0.0%	0.0%
Wastewater Accounts								
Commercial I (C) Regular Strength	1,699	1,707	1,716	1,725	1,734	1,743	1,752	1,761
Commercial II (D/H) Hotels & Ind. Laundry	84	84	84	84	84	84	84	84
Commercial III (E) High Strength	188	189	190	191	192	193	194	195
Navy and Airforce (Federal)	9	9	9	9	9	9	9	9
Government	312	314	316	318	320	322	324	326
Residential	20,389	20,589	21,239	21,964	22,764	23,714	24,664	25,614
Total Wastewater Customers	22,681	22,892	23,554	24,291	25,103	26,065	27,027	27,989
New Customers per Year		211	662	737	812	962	962	962
Equivalent Dwelling Unit	40,282	40,643	41,443	42,317	43,267	44,367	45,466	46,566
New EDUs per Year		361	800	875	950	1,100	1,100	1,100
Sewage Discharges (metered water use is greater than sewage discharges, Kgal, FY 2004-05 is based on old assumptions)								
C. Commercial I Low Strength	442,247	490,292	523,203	527,999	530,639	533,292	535,959	538,638
D. Commercial II Hotels & Laundry	728,544	807,691	861,908	869,809	874,158	878,529	882,922	887,336
E. Commercial III High Strength	120,560	133,657	142,629	143,937	144,656	145,380	146,107	146,837
Navy and Airforce (Federal)	756,810	690,964	737,346	744,105	747,825	751,565	755,322	759,099
Government	313,219	326,820	348,758	351,955	353,715	355,484	357,261	359,047
Subtotal Discharges	2,361,380	2,449,425	2,613,844	2,637,805	2,650,994	2,664,249	2,677,570	2,690,958
Residential Discharges	2,444,554	2,242,548	2,456,348	2,550,728	2,643,634	2,753,960	2,864,285	2,974,611
Total Wastewater Discharge	4,805,934	4,691,973	5,070,192	5,188,533	5,294,628	5,418,208	5,541,855	5,665,569
Billable Metered Water Use (Kgal/year)								
Commercial I (C) Regular Strength	552,809	576,814	615,533	621,175	624,281	627,403	630,540	633,692
Commercial II (D/H) Hotels & Ind. Laundry	910,680	950,225	1,014,010	1,023,305	1,028,421	1,033,563	1,038,731	1,043,925
Commercial III (E) High Strength	150,700	157,244	167,799	169,337	170,184	171,035	171,890	172,749
Total Commercial	1,614,189	1,684,283	1,797,341	1,813,817	1,822,886	1,832,001	1,841,161	1,850,367
Navy and Airforce (Federal)	946,013	987,092	1,053,351	1,063,007	1,068,322	1,073,664	1,079,032	1,084,427
Government	391,524	408,525	435,948	439,944	442,144	444,354	446,576	448,809
Residential	3,055,692	3,203,639	3,509,069	3,643,898	3,776,620	3,934,228	4,091,836	4,249,444
Total Customer Discharge	6,007,417	6,283,540	6,795,709	6,960,666	7,109,972	7,284,247	7,458,605	7,633,047

a. The new Sewer Connections in the unsewered areas is estimated at 15,000 by year 2025.
b. The new Activation of Residential Accounts includes new sewer connections and reactivation of inactive sewer accounts.

Table 14-23 develops a mass balance among recent water use, estimated wastewater discharges, sewer pipe inflow and infiltration, and wastewater treatment plant influent. The

most critical factor in the balance is an accurate estimate of the water return-to-sewer ratio, which varies from 70% for residential customers to 85% for commercial accounts. This mass balance applies not only to flows but also to the sewage strength of biochemical oxygen demand and total suspended solids. Note that the metered water volumes in this table have been adjusted upward for the older under-reading meters in use in FY 2004-05.

Table 14-23 – Wastewater System Mass Balance

Customer Classifications	Water		FY 2004-05 Discharge (Kgals/yr)	Sewage Strengths (a)			Sewage Loads		Wastewater Discharge (mgd)
	FY 2004-05 Water Use (Kgals/yr)(b)	Return to Sewer Ratio		BOD (ppm)	TSS (ppm)	Avg. Strength	BOD (ppd)	TSS (ppd)	
Commercial I (C) Regular Strength	635,730	85%	540,371	150	100	125	1,852	1,235	1.48
Commercial II (D/H) Hotels & Ind Laundry	1,047,282	85%	890,190	310	400	355	6,305	8,136	2.44
Commercial III (E) High Strength	<u>173,305</u>	85%	<u>147,309</u>	900	500	700	<u>3,029</u>	<u>1,683</u>	<u>0.40</u>
Total Commercial	1,856,317		1,577,870				11,187	11,054	4.32
Navy and Airforce (Federal)	1,087,914	70%	761,540	230	100	165	4,002	1,740	2.09
Government	450,252	80%	360,202	130	80	105	1,070	658	0.99
Residential	<u>3,514,046</u>	70%	<u>2,459,832</u>	190	120	155	<u>10,679</u>	<u>6,745</u>	<u>6.74</u>
Total Customer Discharge	6,908,530		5,159,444				26,938	20,197	14.1
		<i>VI as % of Influent</i>							
Avg. Inflow & Infiltration		28%	1,963,775	(3)	4	1	(114)	171	5.38
WW Treatment Plant Influent				598	454	526	26,824	20,368	19.5

WWTP Influent (c)	Influent Flow (mgd)			BOD (ppm)	TSS (ppm)	Avg. Flow (mgd)
	April-05	May-05	June-05			
Umatac	0.43	0.39	0.40	163	127	0.41
Baza Gardens	0.47	0.34	0.40	221	151	0.40
Agat	0.99	0.97	1.08	129	106	1.01
Hagatna	6.62	7.05	7.76	111	113	7.14
Rita Station	1.00	1.00		145	129	1.00
North District Station	9.60	9.50		209	135	9.55
Total WWTP Influent (ppd, mgd)				26,824	20,368	19.5

- a. The sewage strengths are provided in Appendix 1M.
- b. The meter readings are adjusted upwards by 15% for under-reading meters.
- c. Pago Socio drying beds serving less than 20 EDUs are excluded as immaterial.

The purpose of Table 14-24 is to summarize the wastewater loading factors among the customer classifications. As shown, residential customers represent 90% of the sewer customers, but only 40% of the wastewater volume and 37% of the sewage strengths. In contrast, high-strength commercial customers are one percent of the total customer base, but discharge three percent of the wastewater and 10% of the sewage strength. This demonstrates that higher-strength customers, such as restaurants, should be burdened with a proportionally higher share of the cost than low-strength and residential customers.

Table 14-24 – Wastewater Customer Class Loads

Type of Use	FY 2005-06 Wastewater Discharges		Sewage Strengths (Average of BOD & TSS)			Customer Factor	
	Volume (Kgal/year)	Q Factor	Strengths (ppm)	Loads (ppd)	SS Factor	No. of Accounts	CS Factor
Commercial I (C) Regular Strength	490,292	10%	125	1,543	6.5%	1,707	7.5%
Commercial II (D/H) Hotels & Ind. Laundry	807,691	17%	355	7,221	31%	84	0.4%
Commercial III (E) High Strength	133,657	2.8%	700	2,356	10%	189	0.8%
Total Commercial	1,431,641	31%		11,120	47%	1,980	8.6%
Navy and Airforce (Federal)	690,964	15%	165	2,871	12%	9	0.04%
Government	326,820	7.0%	105	864	3.7%	314	1.4%
Residential (a)	2,242,548	48%	155	8,712	37%	20,589	90%
Total	4,691,973	100%		23,567	100%	22,892	100%

a. The 2000 census identifies that the 39,800 households on Guam had an average of 3.89 persons per household (PPH). Of that total, there are 33,000 single-family dwellings. These SFD typically have larger pph, which are estimated at 4 pph. Typical wastewater discharges are between 50 and 100 gpcd, with these residential customers discharging 62 gpcd.

Table 14-25 combines the results of the prior table with the functional cost allocations identified for the wastewater system. With this combination, a weighted average of the total wastewater system demands is identified for each of the customer classes. These total service allocations by customer class are used for both comparison with current revenue and for calculation of alternative rate structures. The table also identifies equivalent dwelling units (EDUs) allocated to each customer class. An EDU represents the flow, strength, and customer service load of the typical single-family dwelling (SFD). With approximately 20,600 residential customers receiving 51% of the system-wide wastewater burden, the EDUs for all other customer classification can be calculated. As such, a total of approximately 40,300 EDUs are served by the wastewater system.

Table 14-25 – Wastewater Customer Cost of Service Allocations

User Class	Sewage Flow (Q)	Sewage Strength (SS)	Customer Service (SC)	Service Allocations by User Class	Equivalent Dwelling Units
Commercial I (C) Regular Strength	10%	7%	7.5%	9%	3,739
Commercial II (D/H) Hotels & Ind Laundry	17%	31%	0.4%	18%	7,132
Commercial III (E) High Strength	3%	10%	0.8%	4%	1,617
Total Commercial	31%	47%	8.6%	31%	12,488
Navy and Airforce (federal)	15%	12%	0.04%	12%	4,958
Government	7%	4%	1.4%	6%	2,247
Residential	48%	37%	90%	51%	20,589
Total	100%	100%	100%	100%	40,282
Sewer Costs Functional Allocations (a)	67%	20%	13%	100%	

a. The cost allocations are based on WEF Manual 27, Financing and Charges for Wastewater Systems. These costs are allocated using the wastewater-related functional cost method.

As shown in Table 14-26, for each customer class the revenues from current sewer service bills are compared with the equitable allocation of system cost. The table indicates that residential customers are paying 57% less for sewer services than is equitable, and commercial accounts are paying 32 to 38% too much. The main reason for the inequities in the current wastewater rate structure is the legislative mandate to maintain current residential charges at a fixed \$22 per month, regardless of revenue requirements or COS equity. This legislative mandate was enacted in a misguided attempt to provide lifeline services to the financially vulnerable sewer service customers. It is unclear why this charge is fixed, while the residential tier 1 water rate is allowed to escalate. Finally, the current rate structure is shown to be imbalanced between water and sewer utility services revenues. As provided in the table, total billed wastewater services are five percent below appropriate levels, with the shortfall being supplemented by excess water revenues. Regardless of current inequities among the customer classes, or even between the two utilities, the total rate-based revenue requirements are increasing for GWA, so that the \$17 million in FY 2005-06 sewer service charges need to be increased to approximately \$21 million for FY 2006-07.

Table 14-26 – Wastewater Equitable Charges vs. Current Revenues

User Billing Classifications	FY 2005-06 Revenues (Revenue Neutral)			FY 2006-07 COS-based Costs
	Current Revenues	Cost of Service Change from Current Rates	Cost of Service-based Costs	
Commercial C I	\$1,281,485	32%	\$1,697,363	\$1,972,885
Commercial (D only) II	\$552,986	-37%	\$347,756	\$404,205
Hotel (H) II	\$4,596,212	-37%	\$2,890,420	\$3,359,604
Subtotal Commercial Class II	\$5,149,198	-37%	\$3,238,177	\$3,763,809
Commercial (E) III	\$1,181,691	-38%	\$734,112	\$853,275
Federal	\$2,583,347	-13%	\$2,251,012	\$2,616,405
Guam Government	\$1,221,901	-16%	\$1,020,316	\$1,185,938
Federal & GuamGov	\$3,805,248	-14%	\$3,271,329	\$3,802,343
Residential	\$5,970,622	57%	\$9,347,710	\$10,865,065
Total (a)	\$17,388,244	5%	\$18,288,690	\$21,257,377
Percent of Total Revenues	35%		36%	

Revenue requirement reflects a midyear rate adjustment.

a. Current sewer revenues are less than the costs of operating the sewer utility, with the difference transferred in from the water revenues.

14.7.3 GWA Cost of Service versus Current Bills

Table 14-27, Total Sewer and Water Equitable versus Current Rates, combines the COS finding for the water and sewer utilities. As shown, the FY 2005-06 revenues are used for the cost of services (approximately \$50 million). Under the combined water and sewer bills,

residential customers are shown to be underpaying by 17%, whereas commercial customers are overpaying by an average of 16%. More significantly, the irrigation and golf course customers are shown to be underpaying by 95% and 20%, respectively. Also provided are the FY 2006-07 COS-based revenue requirements and the changes from the current rate-based revenues. Although the overall revenues are projected to increase 16%, due to the concurrent cost of service adjustments, some commercial customer accounts will experience rate reductions, while other classifications will see dramatic increases.

Table 14-27 – Total Sewer & Water Equitable vs. Current Rates

Customer Class	Water and Sewer FY 2005-06 Revenues (Revenue Neutral)			Water and Sewer FY 2006-07 Rev Requirement	
	Current Total Revenues	Cost of Service Change from Current Rates	Cost of Service Based Costs	Cost of Service Change from Current Rates	COS-based Costs
Agricultural (a)	\$265,860	0%	\$265,927	16%	\$309,093
Golf Course	\$91,764	20%	\$109,821	39%	\$127,647
Commercial (C) I	\$5,873,039	-6%	\$5,513,423	9%	\$6,408,382
Commercial (D only) II	\$1,357,999	-31%	\$936,074	-20%	\$1,088,021
Commercial (E) III	\$1,999,891	-36%	\$1,278,343	-26%	\$1,485,848
Total Commercial	\$9,230,929	-16%	\$7,727,840	-3%	\$8,982,251
Federal	\$2,605,133	-13%	\$2,268,647	1%	\$2,636,902
Guam Government	\$3,715,730	2%	\$3,779,084	18%	\$4,392,519
Total Government	\$6,320,863	-4%	\$6,047,732	11%	\$7,029,421
Hotel (H) II	\$9,012,771	-29%	\$6,402,145	-17%	\$7,441,365
Irrigation	\$152,679	95%	\$297,406	126%	\$345,682
Residential	\$25,069,335	17%	\$29,293,332	36%	\$34,048,333
Grand Total	\$50,144,202	0%	\$50,144,202	16%	\$58,283,793

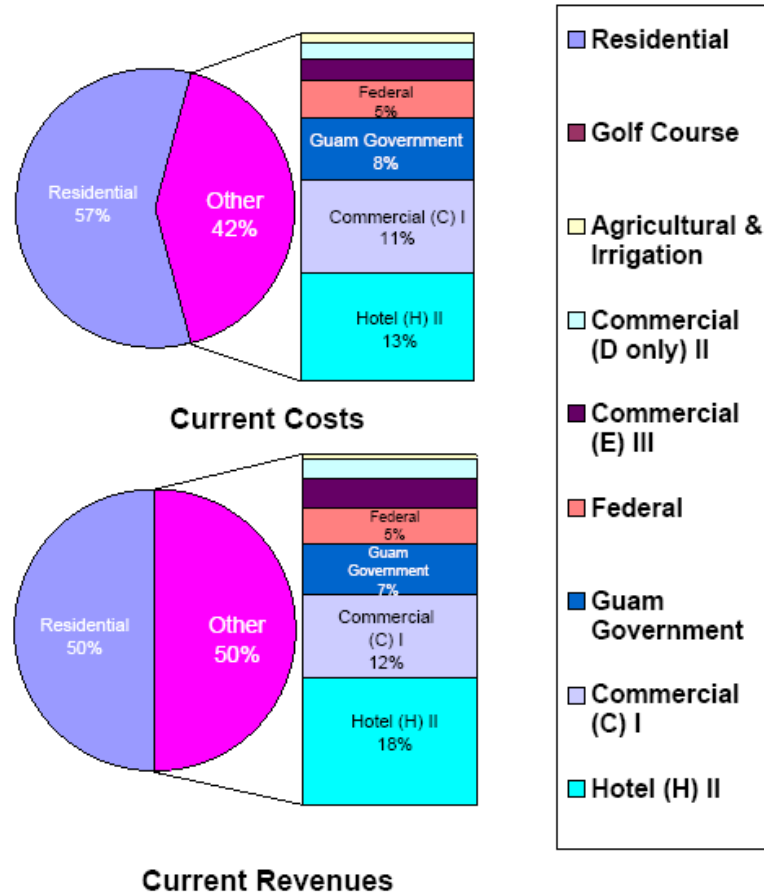
Revenue requirement reflects a mid-year rate adjustment.

The allocation of costs between water and sewer utility service is based on the detailed FY 2006 budget.

The share of revenues is based on billed charges.

Figure 14-8, FY 2005-06 Costs & Revenues, illustrates that the majority of utility costs are borne by residential customers, with the remaining costs split amongst hotel, commercial, government and other customers. As the current rate-based rates for residential customers are significantly less than the costs, and it is recommended that the current rate structure be updated to create customer class equity.

Figure 14-8 – FY 2005-06 Costs & Revenues



14.8 System Development Charges and Miscellaneous Service Fees

This section develops new system development charges (SDCs), and updated miscellaneous service fees. The new SDC proceeds are used in the rate-based revenue calculations shown in prior tables, and offset the utility service rate-based revenue requirements.

14.8.1 System Development Charges

Table 14-28 develops new SDCs based on the buy-in cost of the existing facilities. Specifically, the buy-in costs are based on the 2006 reproduction cost of assets identified in GWA's fixed asset schedule net of current depreciation (reproduction cost new less depreciation or RCNLD). This SDC calculation does not use the CIP project costs. The exclusion of CIP costs is due to the fact that the projects are primarily bond-funded. Based on municipal utility standards, SDCs cannot include any portion of the CIP that is funded by outstanding debt, in order to avoid double charging the new customers for the facilities. In contrast, existing and un-depreciated fixed assets can be used for calculation of buy-in costs, even when the original asset book values are escalated to current reproduction (replacement) costs.

Table 14-28 – SDCs – Buy-in Costs

Existing Fixed Asset Type Description	Portion Currently Depreciated	2006 Replacement Cost New Less Depreciation		
		Total Sewer Assets	Total Water Assets	Grand Total
Collection Sewer Gravity	49%	\$154,401,316	\$0	\$154,401,316
Pumping Equipment	45%	\$30,946,574	\$2,608,259	\$33,554,833
Structures & Improvements	66%	\$23,345,249	\$0	\$23,345,249
Service to customer	43%	\$22,082,050	\$0	\$22,082,050
Outfall Sewer	33%	\$16,651,078	\$0	\$16,651,078
Collection Sewer Force	33%	\$9,569,184	\$0	\$9,569,184
Sewage Treatment Plant Equipment	59%	\$6,571,593	\$0	\$6,571,593
Power Gen Equipment		\$1,343,316	\$1,343,316	\$2,686,632
Structures & Improvements TD: Collection System		\$1,336,223	\$0	\$1,336,223
TD Mains	38%	\$0	\$159,111,293	\$159,111,293
Dist. Res. & Standpipe	42%	\$0	\$22,998,822	\$22,998,822
TD Services	37%	\$0	\$18,033,832	\$18,033,832
Wells & Springs	36%	\$0	\$17,825,518	\$17,825,518
Meter & Inst.	47%	\$0	\$9,179,531	\$9,179,531
Structures. & Imp. - SSPP (water)	30%	\$0	\$8,018,544	\$8,018,544
Structures. & Imp. - General Plant	55%	\$3,259,461	\$3,259,461	\$6,518,922
Hydrants & TD	80%	\$0	\$4,716,512	\$4,716,512
Lake, River		\$0	\$3,904,025	\$3,904,025
Water Treatment		\$0	\$1,667,601	\$1,667,601
Power Gen. Equipment		\$763,984	\$763,984	\$1,527,969
All Other Assets		\$2,137,644	\$4,820,694	\$6,958,338
Grand Total (RCNLD)(a)	61%	\$272,407,672	\$258,251,392	\$530,659,064
Projected Equivalent Residential Dwelling Units (b)		52,785	58,800	
System Development Charge per 3/4 " Residential		\$5,161	\$4,392	\$9,553

The CIP is primarily bond-funded. System development charges can include only the portion of the CIP that is not bond-funded with debt outstanding. However, the RCNLD-valued assets can be used as the buy-in cost without inclusion in the CIP.

a. RCNLD: Replacement cost new less depreciation.

b. The projected build out Equivalent Dwelling Units & Meters in Utility System equals the year 2010 numbers plus a growth of 1 percent through the year 2025. For sewer service connections, the System Development Charge is based on the equivalent water meter sized for indoor water use, and excludes fixtures not drained to the sewer.

The system capacity is based on sewer equivalent dwelling units (EDUs) and water equivalent meters (EMs). The water system buildout capacity equals the projected year 2010 EM values, plus a very conservative customer growth of one percent through the year 2026. For sewer service connections, the SDC is based on the equivalent water meters sized for indoor water use, excluding fixtures not draining to the sewers.

Due to the age and the condition of the water and sewer facilities, the overall GWA facility depreciation stands at 61% of the original assets. Nevertheless, the remaining system value, when escalated to replacement cost and divided by the projected capacity, equals approximately \$4,400 and \$5,200 per residential connection for the water and the sewer facilities, respectively. In other words, a new residential dwelling seeking to connect into the sewer system and to receive water services would pay approximately \$9,600 for the use of the existing facilities, plus GWA's additional costs of a lateral sewer connection, water service and meter, and administrative costs for new accounts. The financial model utilizes growth-related revenues by including the SDC revenues in the cashflows proforma. These revenues offset rate-based revenue requirements during the projection period by as much as \$4.7 million per year.

14.8.2 Miscellaneous Service Fees

Development of updated miscellaneous service fees is based on a calculation of the resources required for each service, using the fully burdened hourly costs of each resource times the average hours required. Table 14-29, Miscellaneous Charges – Labor Rates, provides the average hourly rate for staffing resources (including labor and benefits) and for service vehicles. Table 14-30, Miscellaneous Service Charges, provides the hours required for each service, along with the updated fees for the service.

Table 14-29 – Miscellaneous Charges – Labor Rates

Staff	Staffing Resources					
	Salary Load	Customer Services/Admin. (Unit 3150)	Maintenance Technician (Unit 4285)	Meter Reader (Unit 4285)	Clerk (Unit 4200)	Equipment (Small Truck)
Average Labor Rate (\$/hour, 2006)		\$30.00	\$27.00	\$27.00	\$28.00	\$10.00
Salary Loads (a)	28%	\$8.39	\$7.55	\$7.55	\$7.83	\$2.80
Burdened Costs (\$/hour)		\$38.39	\$34.55	\$34.55	\$35.83	\$12.80
Avg R/T Travel to Customer (hrs)		1.5				1.5

a. Salary Loads refer to employee benefits and applicable overhead costs allocated to each employee.
R/T: Round trip.

Significantly higher charges than are currently used have been identified for most services. In particular, new or higher deposits are proposed when opening new customer accounts. These account charges are needed to stem the unacceptably high level of unpaid bills. For example, for new residential accounts we recommend a deposit equal to two months' typical charges (equaling at least \$100) for water and for sewer services. Moreover, we recommend one-time fees of \$210 for new water accounts requiring meter turn-ons, and lesser charges for water and sewer accounts not requiring the site visits. All of these charges include both the immediately needed turn-on activity, and the cost to GWA of the eventual turn-off the service (so that no fees are assessed at the end of service). Finally, in addition to increasing the true costs of the many miscellaneous services, we also recommend new charges be imposed for notices delivered for delinquency in payment and/or service suspension.

While these overall charges appear to be severe, they in fact represent GWA's true cost of servicing accounts, and will reduce the burden on GWA's reliable and steady customers from unreliable or transient customers.

Table 14-30 – Miscellaneous Service Charges

Item	Service Description	Service Scope	GWA Resources Required	Staffing Resources Required (hours)				Current Fee	Updated Fee		
				Cust. Services/ Admin.	Maint Tech	Meter Reader	Clerk			Small Truck (hours)	
A	Service Reconnection (all meter sizes)	Charge for both original disconnection following reconnection	Customer Service. R/T travel w/ truck; meter disconnect or reconnect 0.5 hr; Admin. paperwork 0.5 hr.	4.0			1.0	4.0	\$45	\$241	
B	Special Reading at customer request	No Charge if GWA error	Reader R/T travel w/ truck; Customer Service billing 0.5 hr				1.5	0.5	1.5	\$15	\$89
C	Bill Analysis at customer request		Minimum Charge: Customer Service Rep. @ 30 min	0.5						\$10	\$19
D	Verification time test	Unknown	Meter Reader I @ 1 hours; small truck for R/T travel 1 hour				2.0		2.0	\$45	\$95
E.1	Meter Calibration by Bench Test (Up to 2" meters)	No charge if meter is inaccurate	R/T travel w/ truck twice; meter disconnect & reconnect: 0.5 hr each; bench test w/ tech. 1 hr; Clerk paperwork 0.5 hr.	4.0	1.0		0.5		3.0	\$175	\$244
E.2	Meter Calibration in Field (> 2" meters with testing valve in place)	No charge if meter is inaccurate	Pre-calib by Tech 1 hr; R/T travel w/ truck; set up & demobilize 1.5 hrs; field test w/ tech. .5 hr; Clerk paperwork 0.5 hr.		4.5		0.5		3.5	\$175	\$218
F.	Fire Hydrant Fee									\$25/month	same
G.	Bulk Water Sales		Max. Updated Rate per Kgal							\$3/kgal	\$5
H	Meter Relocation									At cost	same
I	Return Check Charge		Clerk: 30 min; Customer Service call: 30 min; Payment process: 15 min.	0.3			1.0			\$30	\$45
K1.	Bulk Sewage Dumping Annual Permit									\$200/truck-year	same
K2.	Bulk Sewage Dumping less than 5,000 gallons									\$25/truck	same
K3.	Bulk Sewage Dumping more than 5,000 gallons									\$5/Kgal > 5kgal	same
L	Meter Installation									Actual GWA cost	at cost
M	Water Service Deposit	All accounts	Two months of typical bill (use standard bill times meter capacity ratio)							\$32 to \$773 based on meter size	\$100 min for res (FY 07 rate); Max \$50K for Hotel
N	Sewer Service Deposit	All accounts	Two months of typical Customer bills for comparable customers							\$20 to \$5k based on cust. Class	\$100 min for res (FY 07 rates); Max \$50K for Hotel
P	Direct (New Utility) Service (aka System Development Charge, for both water and sewer services)									\$60 to \$720 based on meter size	See System Development Charges analysis
Q	Illegal Connection Penalty									Varies	Use SDC times Two
Q	Illegal Connection Information Leading to Penalty (bounty)									\$500	same
R	Meter Tampering Penalty									\$500 plus losses	same
S	Illegal Sewage Dumping Penalty									\$500	same
New	New Water Account Start-up requiring meter turn on	Charge for both turn on and ultimate turn off	Customer Service Rep RT travel w/ truck; turn on 0.2 hr; Admin 0.5 hr; See also deposit	3.4			1.0		3.4	na	\$210
New	New Water Acct Initiation not requiring turn-on	Charge for ultimate turn off	Customer Service. Rep RT travel w/ truck; turn on 0.2 hr; Admin 0.5 hr; See also deposit	1.7			1.0		1.7	na	\$123
New	New Sewer Account Initiation (or reactivation)	Charge for both initiation and ultimate deactivation	30 minute Admin. See also deposit.				1.0			na	\$36
New	New Account Data Change	Requested by Customer (No charge for GWA error)	30 minute customer service	0.5						na	\$19
New	Temporary or permanent Acct & Meter Turn-off		No charge - costs collected with account turn-on							na	\$0
New	First/Final Notice of Delinquency (by mail)		30 minute Admin	0.5						na	\$19
New	48 Hour Notice of Service Suspension	Meet with Customer and/or place door hanger	Cust. Svc. Rep R/T travel w/ truck; 30 minute clerical	1.5			0.5		1.5	na	\$95

14.9 Rate Alternatives for Billing Services

This section describes current and updated service rates. In it, we identify cost of service charges, propose a new and robust lifeline service discount, and provide a rate structure alternative. All of the alternatives generate exactly the same level of revenues for GWA.

Table 14-31 identifies the current rate structure for water and for sewer customers. Water accounts include a basic charge by water meter size; 3/4-inch water meters are currently charged a fixed \$7.46 per month.

Water services also include water consumption (usage) charges. These charges are based on unit rates that vary by customer class due to different peaking costs. Currently the water consumption charge is based on a two-tiered rate for residential accounts. Although the first tier of the residential account rates is treated as a lifeline rate, it is in fact provided to all residences regardless of economic need.

Table 14-31 – Current Tariff Sheet for Water & Sewer Rates

Description	2005 Charge (\$/month)	2006 Charge (\$/month, effective 2/1/06)
Basic (Service) Charge by Water Meter Size (all classes)(a)		
3/4"	\$7.20	\$7.46
1"	\$8.41	\$8.71
1 1/2"	\$13.20	\$13.67
2"	\$16.81	\$17.41
3"	\$30.02	\$31.09
4"	\$42.02	\$43.52
6"	\$78.04	\$80.82
8"	\$114.06	\$118.13
10"	\$156.08	\$161.65
12"	\$186.09	\$192.73
Water Consumption Charges		
	Consumption (\$/1,000 gallons)	
Commercial & Government & Golf Course	\$4.27	\$4.42
Agriculture and Irrigation	\$1.42	\$1.47
Residential		
0 to 4,999 gallons per month (Lifeline)(b)	\$2.40	\$2.40
5,000 and greater per month	\$3.43	\$3.55
Wastewater Charge (\$ per 1,000 gallons of estimated Sewage Discharges)(c)		
Commercial I (C) Low Strength	\$2.19	\$2.30
Commercial II (D/H) Hotels & Ind. Laundries	\$5.35	\$5.61
Commercial III (E) High Strength	\$7.42	\$7.78
Navy and Airforce (federal)	\$3.14	\$3.29
Government	\$3.14	\$3.29
WW - Residential (\$/month-account, lifeline)(b)	\$22.00	\$22.00
Surcharges on Non-lifeline Portion of Utility Bills (b)		
Public Utilities Surcharge 2001	9.51%	9.51%
Supplemental Annuity (to GUAM Legislature)	2.59%	4.13%
Commercial I (C. regular strength)		
Commercial II (D. hotels & laundry)		
Bars without Dining Facilities	Hotels	
Car Wash	Commercial and Industrial Laundry	
Department and Retail Stores		
Hospital and Convalescent		
Laundromat	Commercial III (E. high strength)	
Professional Offices	Auto Steam Cleaning	
Repair Shops and Service Stations	Bakery and Wholesale	
School and Colleges	Markets with Garbage Disposal	
Soft Water Service	Mortuaries	
Markets Without Garbage Disposal	Restaurants (including bars-with Dining Facilities)	
	Poultry Farms	

a. The fixed monthly basic water charge applies to all accounts, regardless of water usage

The GWA Rate Schedule provided herewith went into effect for the billing cycle beginning on February 1, 2006 pursuant to the PUC's Decision and Order dated February 2, 2006.

b. The lifeline portion of the residential bills is the first 5,000 gallons per month of water use, plus the flat \$22 per month wastewater charge.

c. The wastewater charge rate is for estimated sewage discharged at 80% of metered water consumption for all user classes

Wastewater charges consist of a flat \$22 per month for residential accounts, and commodity-based rates for all other customers. These water-use-based unit rates vary by the estimated sewage strength for the different customer classifications, and range from \$2.30/kgal of estimated sewage discharge for low-strength dischargers to \$7.78/kgal for high-strength customers. Also provided in the table are the typical commercial classifications under each of the sewer strength categories.

The current wastewater rates are unfair for two reasons. The first is that the residential rate is treated as a lifeline charge by legislative decree, and cannot be modified for revenue requirements or equity. Secondly, wastewater services inherently are mostly fixed in nature, so billing of non-residential accounts solely on a variable basis is inequitable.

Not included in any alternative is a proposed “cap” on the volume of metered water use for wastewater billing. A cap is typically used with residential accounts to limit the volumetric portion of a sewer bill to the presumed maximum level of indoor water use. The indoor water use is the only water believed to be returned to the sewers. In this study we are not recommending the use of caps because we are unsure of the accuracy of the billing information associated with the very high water use residential accounts. Specifically, it is possible that the high water use is due to multiple dwelling units not known to be on the account, or because the account is not actually residential. It is recommended that GWA conduct a formal customer database audit to identify inconsistent water demand patterns for accounts in different customer classes. It is likely that such an audit will expose significant database corrections, most of which are likely to increase billed charges.

In addition to the volumetric-based and mixed service charges, the non-lifeline portion of all utility bills currently has two surcharges. The first is a “public utilities” surcharge, which in fact generates revenues for repaying the existing GWA debt to the U.S. Navy and to the GPA. As such, this so-called surcharge is in fact a non-operating expense repayment, and could be funded as any other GWA expense rather than treated as a surcharge. The second SAR surcharge is mandated (imposed) by the Guam legislature, and is to be approximately \$1.3 million per year over the projection period. The legality of this charge is currently being reviewed by the Guam judicial branch of government.

Table 14-32 provides a projection of billable customer characteristics, as summarized from the prior tables. These characteristics include number of water meters by size, water consumption by class, and the metered water levels of wastewater customers. This information is the sole data needed for customer billing under all the following rate alternatives.

Table 14-32 – Projected Billable Service Loads

Description	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Water Meters (Accounts)							
3/4"	35,651	36,006	36,365	36,728	37,094	37,466	37,842
1"	884	893	902	911	920	929	938
1 1/2"	418	422	426	430	434	438	442
2"	554	560	566	572	578	584	590
3"	93	94	95	96	97	98	99
4"	128	129	130	131	132	133	134
6"	64	65	66	67	68	69	70
8"	18	18	18	18	18	18	18
10"	7	7	7	7	7	7	7
Residential Total Accounts	34,171	34,513	34,858	35,207	35,559	35,915	36,274
Eligible Residential Water Lifeline Accts	5,126	5,177	5,229	5,281	5,334	5,387	5,441
Metered Water Consumption (Kgal/yr)							
Golf Course Only	16,856	17,193	17,537	17,887	18,245	18,610	18,982
Commercial, Government & Golf Course	2,523,498	2,748,878	2,810,507	2,866,717	2,924,051	2,982,532	3,042,183
Agriculture only	145,544	148,455	151,424	154,452	157,541	160,692	163,906
Agriculture & Irrigation	195,956	199,875	203,873	207,950	212,109	216,352	220,679
Residential							
0 to 4,999 gallons/month-account	380,943	388,562	396,333	404,260	412,345	420,592	429,004
5,000 and greater/month-account	3,768,417	4,046,771	4,106,588	4,139,136	4,172,575	4,206,040	4,017,050
Total Residential	4,149,360	4,435,333	4,502,922	4,543,396	4,584,920	4,626,632	4,446,054
Current Billing Amount for Wastewater Loads (80% of non-irrigation water use, Kgal/year)							
Commercial I (C) Low Strength	511,127	550,820	563,298	574,564	586,055	597,776	609,732
Commercial II (D/H Hotels)	842,015	954,046	973,127	992,590	1,012,442	1,032,690	1,053,344
Commercial III (E) High Strength	139,337	142,359	145,206	148,110	151,073	154,094	157,176
Navy and Airforce (Federal)	874,683	874,683	892,177	910,020	928,221	946,785	965,721
Government	362,003	486,617	498,253	508,218	518,383	528,750	539,325
Metered Water for Wastewater Billing (Kgal/year)							
Commercial I (C) Low Strength	638,909	688,525	704,123	718,205	732,569	747,220	762,165
Commercial II (D/H Hotels)	1,052,518	1,192,558	1,216,409	1,240,737	1,265,552	1,290,863	1,316,680
Commercial III (E) High Strength	174,172	177,949	181,508	185,138	188,841	192,618	196,470
Navy and Airforce (federal)	1,093,354	1,093,354	1,115,221	1,137,525	1,160,276	1,183,481	1,207,151
Government	452,504	608,271	622,817	635,273	647,978	660,938	674,157
Residential	3,203,639	3,509,069	3,643,898	3,776,620	3,934,228	4,091,836	4,249,444
Wastewater Accounts							
Commercial I (C) Low Strength	1,707	1,716	1,725	1,734	1,743	1,752	1,761
Commercial II (D/H Hotels)	84	84	84	84	84	84	84
Commercial III (E) High Strength	189	190	191	192	193	194	195
Navy and Airforce (federal)	9	9	9	9	9	9	9
Government	314	316	318	320	322	324	326
Residential Total Accounts	20,589	21,239	21,964	22,764	23,714	24,664	25,614
Eligible Residential WW Lifeline Accts	3,088	3,186	3,295	3,415	3,557	3,700	3,842

The following are descriptions of three rate alternatives. Each generates the same total annual revenue, but has a different impact on customer classes.

14.9.1 Current Rates Services (Alternative 1)

Table 14-33 presents current (Alternative 1) rates based on the current rate structure. The projected unit rates are increased by the eight percent annual used in the cashflow proforma analysis for rate increases required to generate sufficient rate-based revenues. However, the

current unit rates classified as “lifeline” services are also increased with the other rates in this projection. Increasing the lifeline rate is, in fact, legislatively illegal. However, given the current GWA financial circumstances, the gross inequities of (1) maintaining a \$22 per month rate for all residential sewer customers, and of (2) providing a discounted Tier 1 water rate for all residential water customers, are undesirable when viable alternatives exist.

Table 14-33 – Current Rate Structure Update (Alternative 1)

Description	2006 Charge	FY 2006-07					
	(\$/month)	Mid year Adj.	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Projected Unit Rate Increase		8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Average Annual Bill Increase Over Five Years (not including increased water metering)						8.0%	8.0%
Basic (Service) Charge by Water Meter Size (all classes)							
3/4"	\$7.46	\$8.06	\$8.70	\$9.40	\$10.15	\$10.96	\$11.84
1"	\$8.71	\$9.41	\$10.16	\$10.97	\$11.85	\$12.80	\$13.82
1 1/2"	\$13.67	\$14.76	\$15.94	\$17.22	\$18.60	\$20.09	\$21.69
2"	\$17.41	\$18.80	\$20.31	\$21.93	\$23.69	\$25.58	\$27.63
3"	\$31.09	\$33.58	\$36.26	\$39.16	\$42.30	\$45.68	\$49.34
4"	\$43.52	\$47.00	\$50.76	\$54.82	\$59.21	\$63.95	\$69.06
6"	\$80.82	\$87	\$94	\$102	\$110	\$119	\$128
8"	\$118.13	\$128	\$138	\$149	\$161	\$174	\$187
10"	\$161.65	\$175	\$189	\$204	\$220	\$238	\$257
Consumption (\$/1,000 gallons)							
Water Consumption Charges							
Commercial & Government & Golf Course	\$4.42	\$4.77	\$5.16	\$5.57	\$6.01	\$6.49	\$7.01
Agriculture and Irrigation	\$1.47	\$1.59	\$1.71	\$1.85	\$2.00	\$2.16	\$2.33
Residential							
0 to 4,999 gallons per month	\$2.40	\$2.59	\$2.80	\$3.02	\$3.27	\$3.53	\$3.81
5,000 and greater per month	\$3.55	\$3.83	\$4.14	\$4.47	\$4.83	\$5.22	\$5.63
Weighted Average Unit Rate	\$3.44	\$3.73	\$4.02	\$4.34	\$4.69	\$5.06	\$5.46
Wastewater Charge (\$ per 1,000 gallons of WW)							
Commercial I (C) Low Strength	\$2.30	\$2.48	\$2.68	\$2.90	\$3.13	\$3.38	\$3.65
Commercial II (D/H Hotels)	\$5.61	\$6.06	\$6.54	\$7.07	\$7.63	\$8.24	\$8.90
Commercial III (E) High Strength	\$7.78	\$8.40	\$9.07	\$9.80	\$10.58	\$11.43	\$12.35
Navy and Airforce (federal)	\$3.29	\$3.55	\$3.84	\$4.14	\$4.48	\$4.83	\$5.22
Government	\$3.29	\$3.55	\$3.84	\$4.14	\$4.48	\$4.83	\$5.22
WW - Residential (\$/month-acct)	\$22.00	\$23.76	\$25.66	\$27.71	\$29.93	\$32.33	\$34.91
Surcharges on Non-lifeline Portion of Utility Bills							
Public Utilities Surcharge 2001	9.5%	5.3%	4.6%	4.9%	4.8%	4.5%	5.1%
Sup. Annuity Retirement (SAR)	4.1%	2.3%	2.0%	1.8%	1.7%	1.5%	0.7%
Total	13.6%	7.6%	6.6%	6.8%	6.5%	6.1%	5.9%
Alt. Residential WW (\$/Kgal Water Use)	\$2.82	\$2.73	\$2.95	\$3.10	\$3.25	\$3.40	\$3.58

The current lifeline rates are increased with all other rates in this alternative. Alt. 1 rates are not based on cost of service. These projected revenues are used in the cashflow proforma to estimate annual rate-based revenues.

These current and projected rates are not based on cost of service. However, the projected revenues from the current rates are used in the proforma cashflow statement to estimate annual rate-based revenues. This is done due to established legacy of the current rate structure; while not conforming to cost of service principles it is difficult to change significantly from an established rate structure without significant complaints from

customers and other utility stakeholders. Note that in the projection of the current rate structure, over the next six years the surcharges vary to make the surcharge revenue proceeds equal the GWA equivalent expenses.

The rate-based revenue proceeds under the current rate structure are contained in Table 14-34, Projected Revenues from Current Rate Update (Alternative 1). The proceeds are determined by multiplying the unit rates of the prior table by the projected customer loads. These rate-based revenues are used in the cashflow projections summarized at the beginning of this chapter. Note that the FY 2006-07 rate increase will occur in June 2007 and will generate only four months of higher revenues in that year.

Table 14-34 – Projected Revenues from Current Rate Update (Alternative 1)

Description	FY 2006-07						
	FY 2005-06	Midyear Incr	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Effective months for the FY 2006-07 rate adjustment		4					
Water Meter Revenues (by meter size)							
3/4"	\$3,191,478	\$3,309,211	\$3,797,092	\$4,141,795	\$4,517,714	\$4,928,062	\$5,375,721
1"	\$92,396	\$95,825	\$109,965	\$119,947	\$130,822	\$142,670	\$155,577
1 1/2"	\$68,569	\$71,071	\$81,509	\$88,857	\$96,858	\$105,571	\$115,057
2"	\$115,742	\$120,115	\$137,925	\$150,538	\$164,287	\$179,272	\$195,603
3"	\$34,696	\$36,005	\$41,340	\$45,117	\$49,234	\$53,721	\$58,611
4"	\$66,847	\$69,165	\$79,188	\$86,181	\$93,786	\$102,056	\$111,050
6"	\$62,070	\$64,721	\$74,661	\$81,855	\$89,723	\$98,326	\$107,731
8"	\$25,516	\$26,197	\$29,762	\$32,143	\$34,714	\$37,491	\$40,491
10"	\$13,579	\$13,941	\$15,838	\$17,105	\$18,474	\$19,951	\$21,548
Total Meter Service Charges	\$3,670,891	\$3,806,250	\$4,367,281	\$4,763,539	\$5,195,613	\$5,667,121	\$6,181,387
Water Commodity Revenues (by customer class)							
Commercial & Government & Golf Course	\$11,153,863	\$12,474,040	\$14,489,534	\$15,961,671	\$17,583,377	\$19,369,848	\$21,337,824
Agriculture and Irrigation	\$288,056	\$301,652	\$349,562	\$385,078	\$424,201	\$467,300	\$514,778
Residential							
0 to 4,999 gallons per month (lifeline)	\$914,264	\$957,417	\$1,109,480	\$1,222,203	\$1,346,379	\$1,483,171	\$1,633,861
5,000 and greater per month	\$13,377,881	\$14,749,130	\$17,004,232	\$18,510,122	\$20,152,434	\$21,939,187	\$22,629,663
Total Water Commodity Sales	\$25,734,063	\$28,482,239	\$32,952,808	\$36,079,073	\$39,506,390	\$43,259,506	\$46,116,126
Total Water Utility Revenues	\$29,404,954	\$32,288,489	\$37,320,089	\$40,842,612	\$44,702,003	\$48,926,627	\$52,297,514
Wastewater Service Revenues							
Commercial I (C) Low Strength	\$1,175,592	\$1,300,670	\$1,511,171	\$1,664,706	\$1,833,840	\$2,020,158	\$2,225,406
Commercial II (D/H Hotels)	\$4,723,703	\$5,494,925	\$6,367,662	\$7,014,616	\$7,727,301	\$8,512,395	\$9,377,254
Commercial III (E) High Strength	\$1,084,044	\$1,137,088	\$1,317,688	\$1,451,565	\$1,599,044	\$1,761,507	\$1,940,476
Navy and Airforce (federal)	\$2,877,708	\$2,954,446	\$3,423,689	\$3,771,536	\$4,154,724	\$4,576,844	\$5,041,852
Government	\$1,190,989	\$1,643,662	\$1,912,025	\$2,106,287	\$2,320,286	\$2,556,027	\$2,815,719
Total Sewer Commodity Sales	\$11,052,035	\$12,530,792	\$14,532,235	\$16,008,710	\$17,635,195	\$19,426,931	\$21,400,707
WW - Residential Accounts (lifeline)	\$9,021,144	\$9,354,404	\$10,733,810	\$11,708,580	\$12,771,694	\$13,931,522	\$15,196,442
Total Wastewater Revenues	\$20,073,179	\$21,885,196	\$25,266,045	\$27,717,290	\$30,406,888	\$33,358,453	\$36,597,149
Surcharge Revenues (on non-lifeline Portion of Utility Bills)							
Public Utilities Surcharge 2001	\$3,760,513	\$2,853,907	\$2,853,907	\$3,377,911	\$3,603,911	\$3,722,934	\$3,700,000
Supplemental Annuity Retirement (SAR)	\$1,633,115	\$1,256,200	\$1,256,200	\$1,256,200	\$1,256,200	\$1,256,200	\$525,000
Total Surcharge Revenues	\$5,393,628	\$4,110,107	\$4,110,107	\$4,634,111	\$4,860,111	\$4,979,134	\$4,225,000
Grand Total Annual Rate-based Revenues	\$54,871,761	\$58,283,793	\$66,696,241	\$73,194,013	\$79,969,003	\$87,264,214	\$93,119,662
Unit Rate Increases		8%	8%	8%	8%	8%	8%
Revenue Increase (a)		6.2%	14.4%	9.7%	9.3%	9.1%	6.7%

a. The revenue increase differs from the unit rate increase due to growth in customers, demand elasticity with price, increased billing from meter replacements and the mid-year rate increase in FY 2006-07. These projected revenues are used in the cashflow proforma to estimate future revenue requirements. Revenues in FY 2006-07 rate increase will occur in May/June 2007, and will result in only four months of new revenues.

Table 14-35 summarizes the typical residential bills under the current rates. These typical bills also increase for the changes in water consumption due to the meter replacement program. As shown, the typical bill increases from the current \$55 month for combined water and wastewater services to \$84 by FY 2010-11, which represents an average annual billing increase of nine percent, including the result of new water meters.

Table 14-35 – Bills Under Updated Current Rates (Alternative 1)

Description	FY 2006-07 After Rate						
	FY 2005-06	Increase	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12
Projected Typical Residential Water Use (Kgal/month)	8	9	9	9	9	9	9
Annual Increase in Unit Rates		8%	8%	8%	8%	8%	8%
Typical Monthly Residential Charge							
Water Service (Cust & Meter, 3/4 inch)	\$7.46	\$8.06	\$8.70	\$9.40	\$10.15	\$10.96	\$11.84
Water Usage (lifeline to 5 Kgal/month)	\$12.00	\$12.96	\$14.00	\$15.12	\$16.33	\$17.63	\$19.04
Water Usage (over 5 Kgal/month)	\$10.65	\$15.34	\$16.56	\$17.89	\$19.32	\$20.86	\$22.53
Wastewater Flat Rate	\$22.00	\$23.76	\$25.66	\$27.71	\$29.93	\$32.33	\$34.91
Public Utilities Surcharge 2001 (a)	\$1.72	\$1.23	\$1.15	\$1.34	\$1.41	\$1.44	\$1.76
Suppl Annuity Retirement (SAR, a)	\$0.75	\$0.54	\$0.51	\$0.50	\$0.49	\$0.49	\$0.25
Total Monthly Bill	\$54.58	\$62	\$67	\$72	\$78	\$84	\$90
Bill Increase (including increased water metering)		13%	8%	8%	8%	8%	8%
Average Annual Bill Increase Over Five Years (including increased water metering)						9%	8%
Summary Bills of Key Customers							
Lifeline Customers	\$55	\$62	\$67	\$72	\$78	\$84	\$90
Residential	\$55	\$62	\$67	\$72	\$78	\$84	\$90
Golf Course	\$231	\$262	\$280	\$303	\$326	\$351	
Commercial C Accounts	\$159	\$185	\$198	\$214	\$230	\$248	
Typical Hotels	\$8,756	\$10,451	\$11,253	\$12,132	\$13,082	\$14,109	
Large Hotels	\$50,651	\$58,258	\$62,322	\$67,429	\$72,627	\$78,128	

The FY 2006-07 bill increase reflects both the unit rate increase and the projected increase in billable water from the meter replacement program.

Current lifeline rates are increased with all other rates, in violation of current regulations. Surcharges are adjusted to generate sufficient proceeds for SAR, GPA, and Navy obligations only. The overall bill increase is less than the increase in unit rates due to the downward adjustment in surcharges. These rates are not based on cost of service, and are not equitable.

a. The surcharges under alt 1 are not assessed to the wastewater or first tier water rates, unlike Alternative 4.

14.9.2 Current Rates with Updated Lifeline Services (Alternative 2)

The very large rate increases identified in the rate-based revenue findings will impose significant increases in bills on the residential customers. As such, this Alternative 2 is developed to provide updated lifeline rates.

This new lifeline program has been identified to provide billing relief to financially vulnerable residential customers, and would create a new lifeline customer classification. The program is based on limiting the bill increases for these customers to the rate of change of the consumer price index inflation only. The program would be available only for residential customers who are the GWA account holders, are in good standing with GWA, and are on either GuamGov welfare or food stamps. The eligibility would be proven by

presentation to GWA of current welfare or “Quest” food stamp card, and would last no more than 12 months before expiring.

Based on the current number of households using Quest Cards, it is estimated that 15% of the residential customers would qualify for the GWA lifeline program. It would not be possible to apply the program to any account with multiple households on a master water meter, as the discount would by necessity apply to the entire bill, even when eligibility may not.

Under the current assumptions, the program would result in lifeline billing rates increasing no more than 2.5 percent each year. As such, the typical residential lifeline bill would increase from the current \$55 to \$59 per month by FY 2010-11. In contrast, residential bills are projected to climb to \$84 per month in the same period.

The costs of subsidizing the lifeline customer bills will be collected as a billing surcharge to all other customers. The estimated lifeline surcharge will vary depending on the number of lifeline customers. As shown in Table 14-36, New Residential Lifeline Discount, the lifeline program surcharge increases from 1.0 to 1.9 percent.

Table 14-36 – New Residential Lifeline Discount

Description	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Projected Percentage of Residential Customers with Lifeline Exemptions (all years)(a)					15%
Increase in CPI (% per year)	2.5%	2.5%	2.5%	2.5%	2.5%
Typ. Lifeline Bill (Water & Sewer, \$/month)	\$53	\$55	\$56	\$58	\$59
Updated Lifeline Program Subsidies (Alternative 2)					
Discounts (\$/acct-month, adjusted by the CPI)					
Water Services	\$7.86	\$9.93	\$12.52	\$15.22	\$18.13
Sewer Services	\$1.21	\$2.55	\$4.02	\$5.65	\$7.43
Total	\$9.07	\$12.48	\$16.54	\$20.87	\$25.57
Required Subsidies					
Water Services	\$488,551	\$623,249	\$793,431	\$974,180	\$1,172,186
Sewer Services	\$46,259	\$100,698	\$164,805	\$241,038	\$330,044
Total	\$534,809	\$723,947	\$958,236	\$1,215,218	\$1,502,230
Surcharge on all (non-lifeline) bills	1.0%	1.2%	1.4%	1.6%	1.9%
Customers on Lifeline Services (a)					
Persons in Poverty (as of 1999)			34,792		
Persons on Food stamps (as of 2004)			28,000		
Persons per Household (as of 2003)			3.56		
Est. Guam Households Eligible for Lifeline Subsidy (Quest Customers)			9,000		
Est. GWA Account holders Eligible for Lifeline Subsidy			58%		
Accounts Eligible for Lifeline Subsidy			5,220		
Percentage of Total Water Accounts			15%		

a. All water and/or sewer customers of record demonstrating current participation in the following GuamGov programs for economically disadvantage residents (welfare or food stamp program) will be exempt from the water and the wastewater customer service charge for 12 months. The lifeline rate is designed to keep these customers at the same billing levels as in 2006, with annual escalations for the Consumer Price Index.

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As shown in Table 14-37, Current Rate Structure with Updated Lifeline Service Costs (Alternative 2), the lifeline discount identified in Table 14-36 is added to the current rates of Alternative 1. The funding for the subsidy is derived from a new lifeline surcharge. As shown in the table, the projected unit rates are identical to the Alternative 1 unit rates with the exception of the billing surcharges, which reflect the addition of a new lifeline program cost.

Table 14-37 – Current Rate Structure with Updated Lifeline Service Costs (Alternative 2)

Description	2006 Charge (\$/month)	FY 2006-07				
		Mid year Adj.	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Projected Unit Rate Increase		8%	8%	8%	8%	8%
Basic (Service) Charge by Water Meter Size (all classes)						
3/4"	\$7.46	\$8.06	\$8.70	\$9.40	\$10.15	\$10.96
1"	\$8.71	\$9.41	\$10.16	\$10.97	\$11.85	\$12.80
1 1/2"	\$13.67	\$14.76	\$15.94	\$17.22	\$18.60	\$20.09
2"	\$17.41	\$18.80	\$20.31	\$21.93	\$23.69	\$25.58
3"	\$31.09	\$33.58	\$36.26	\$39.16	\$42.30	\$45.68
4"	\$43.52	\$47.00	\$50.76	\$54.82	\$59.21	\$63.95
6"	\$80.82	\$87.29	\$94.27	\$101.81	\$109.95	\$118.75
8"	\$118.13	\$127.58	\$137.79	\$148.81	\$160.71	\$173.57
10"	\$161.65	\$174.58	\$188.55	\$203.63	\$219.92	\$237.52
Consumption (\$/1,000 gallons)						
Water Consumption Charges						
Commercial & Government & Golf Course	\$4.42	\$4.77	\$5.16	\$5.57	\$6.01	\$6.49
Agriculture and Irrigation	\$1.47	\$1.59	\$1.71	\$1.85	\$2.00	\$2.16
Residential						
0 to 4,999 gallons per month	\$2.40	\$2.59	\$2.80	\$3.02	\$3.27	\$3.53
5,000 and greater per month	\$3.55	\$3.83	\$4.14	\$4.47	\$4.83	\$5.22
Wastewater Charge (\$ per 1,000 gallons of WW)						
Commercial I (C) Low Strength	\$2.30	\$2.48	\$2.68	\$2.90	\$3.13	\$3.38
Commercial II (D/H Hotels)	\$5.61	\$6.06	\$6.54	\$7.07	\$7.63	\$8.24
Commercial III (E) High Strength	\$7.78	\$8.40	\$9.07	\$9.80	\$10.58	\$11.43
Navy and Airforce (federal)	\$3.29	\$3.55	\$3.84	\$4.14	\$4.48	\$4.83
Government	\$3.29	\$3.55	\$3.84	\$4.14	\$4.48	\$4.83
WW - Residential (\$/month-acct)	\$22.00	\$23.76	\$25.66	\$27.71	\$29.93	\$32.33
Surcharges on Entire Utility Bill						
	Old	New				
Public Utilities Surcharge 2001	9.5%	7.6%	5.3%	4.6%	4.9%	4.5%
Sup. Annuity Retirement (SAR)	4.1%	3.3%	2.3%	2.0%	1.8%	1.5%
Lifeline Surcharge on Bills		0.0%	1.0%	1.2%	1.4%	1.9%
Total	13.6%	10.9%	8.6%	7.7%	8.2%	7.9%

Table 14-38 provides the projected bills using the current rate structure with updated lifeline program. As shown, there is a relatively little difference between Alternative 1 and 2 bills, except for lifeline service customers. As previously shown, these lifeline customers will receive a discount of up to \$26 per month below other residential accounts.

Table 14-38 – Projected Bills Using Updated Lifeline Services (Alternative 2)

Description	FY 2006-07 After Rate					
	FY 2005-06	Increase	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Projected Typical Residential Water Use (Kgal/month)	8	9	9	9	9	9
Annual Increase in Unit Rates		8%	8%	8%	8%	8%
Typical Monthly Residential Charge						
Water Service (Cust & Meter, 3/4 inch)	\$7.46	\$8.06	\$8.70	\$9.40	\$10.15	\$10.96
Water Usage (lifeline to 5 Kgal/month)	\$12.00	\$12.96	\$14.00	\$15.12	\$16.33	\$17.63
Water Usage (over 5 Kgal/month)	\$10.65	\$15.34	\$16.56	\$17.89	\$19.32	\$20.86
Wastewater Flat Rate	\$22.00	\$23.76	\$25.66	\$27.71	\$29.93	\$32.33
Public Utilities Surcharge 2001	\$1.72	\$1.23	\$1.15	\$1.34	\$1.41	\$1.44
Supplemental Annuity Retirement (SAR)	\$0.75	\$0.54	\$0.51	\$0.50	\$0.49	\$0.49
Lifeline Surcharge on Bills		\$0.60	\$0.65	\$0.70	\$0.76	\$0.82
Total Residential Monthly Bill	\$55	\$62	\$67	\$73	\$78	\$85
Bill Increase (including increased water metering)		14%	8%	8%	8%	8%
Average Annual Bill Increase Over Five Years (including increased water metering)						9%
Lifeline Customer Monthly Residential Charge (water & sewer services)						
Increase in CPI (% per year)		2.5%	2.5%	2.5%	2.5%	2.5%
Customer & Meter Service Chg, 3/4 inch)	\$7.46	\$7.65	\$7.84	\$8.03	\$8.23	\$8.44
Water Usage (lifeline to 5 Kgal/month)	\$12.00	\$12.30	\$12.61	\$12.92	\$13.25	\$13.58
Water Usage (over 5 Kgal/month)	\$10.65	\$10.92	\$11.19	\$11.47	\$11.76	\$12.05
Wastewater Customer Charge	\$22.00	\$22.55	\$23.11	\$23.69	\$24.28	\$24.89
Public Utilities Surcharge 2001	\$1.72	na	na	na	na	na
Supplemental Annuity Retirement (SAR)	\$0.75	na	na	na	na	na
Total Lifeline Household Monthly Bill	\$55	\$53	\$55	\$56	\$58	\$59
Bill Change (including increased water metering)			2.5%	2.5%	2.5%	2.5%
Lifeline Discount (\$/month)		\$9	\$12	\$17	\$21	\$26
Average Annual Bill Increase Over Four Years (including increased water metering)						1.6%
Lifeline customer unit rates are held at 2005 rates plus annual escalations from the Consumer Price Index.						
Summary Bills of Key Customers						
Lifeline Customers	\$55	\$53	\$55	\$56	\$58	\$59
Residential	\$55	\$62	\$67	\$73	\$78	\$85
Golf Course		\$264	\$283	\$307	\$331	\$357
Commercial C Accounts		\$186	\$200	\$217	\$234	\$252
Typical Hotels		\$10,553	\$11,382	\$12,301	\$13,294	\$14,367
Large Hotels		\$58,798	\$63,007	\$68,325	\$73,749	\$79,498

The FY 2006-07 bill increase reflects both the unit rate increase and the projected increase in billable water from the meter replacement program. Surcharges are adjusted to generate sufficient proceeds for SAR, GPA, and Navy obligations only. These rates are not based on cost of service, and are not equitable. The current lifeline rates is replaced with a true lifeline discount in this alternative. Alt. 2 rates are not based on cost of service.

14.9.3 Cost of Service Rates (Alternative 3)

The COS findings of the previous section of this chapter are integrated with rate-based revenue requirements to develop Alternative 3, with equitable cost of service-based charges. These equitable unit rates include a new customer service charge to bring the fixed revenues in proportion with GWA’s fixed costs, for financial stability. With the addition of new debt, the fixed portion of utility costs is escalating rapidly, and should be balanced with an increasing proportion of fixed rate-based revenues.

Customer and Meter Services

Typically, the customer service charge should reflect GWA’s monthly fixed costs of service for management, administration, and the fixed costs of facility reliability and safety. This customer service charge (aka a readiness-to-serve charge) is by definition equal for all customer accounts. The customer service rate is set at a very high \$20 per month to enhance the level of stable revenues. The second element is a meter service charge that equals GWA’s cost of providing instantaneous peak flows, and is based on the size of the meter connection.

Table 14-39 – Cost of Service Meter Ratios & Customer Service Charges (Alternative 3)

Meter Size	Meter Capacity Ratio		Current Rates Eff. 2/06		FY 2006-07 Full Year Revenues			Partial Yr. (4 Months)
	gpm (a)	3/4"	GWA Ratio	Meter Rate (b)	Meter Service Rate	COS Customer Service Charge (\$/month)	Combined Meter & Cust. Service Charges	
1. New Customer Service Charge for all services (\$/month for water & for sewer)					\$20.00			
2. Revised Capacity-based Meter Service and Customer Service Charges (b)								
3/4"	30	1.0	1.0	\$7.46	\$9.13	\$20.00	\$29.13	\$30.64
1"	50	1.7	1.2	\$8.71	\$15.22	\$20.00	\$35.22	\$37.05
1 1/2"	100	3.3	1.8	\$13.67	\$30.43	\$20.00	\$50.43	\$53.05
2"	160	5.3	2.3	\$17.41	\$48.70	\$20.00	\$68.70	\$72.26
3"	320	10.7	4.2	\$31.09	\$97.39	\$20.00	\$117	\$123
4"	500	16.7	5.8	\$43.52	\$152	\$20.00	\$172	\$181
6"	1,000	33.3	10.8	\$80.82	\$304	\$20.00	\$324	\$341
8"	1,600	53.3	15.8	\$118	\$487	\$20.00	\$507	\$533
10"	2,300	76.7	21.7	\$162	\$700	\$20.00	\$720	\$757
3. New Wastewater Customer Service Charge				<u>Sewer Accts</u>	<u>Customer Charge (\$/month)</u>			
				22,892	\$20.00			

a. All meter flow and service capacities are from AWWA Manual M-1. The 3" to 8" meter capacities shown above are for compound meters. The California Public Utility Commission’s Water Branch Memorandum dated January 18, 1991 (pursuant to D.85-06-064) uses the AWWA meter ratios for regulating meter capacity charges.

b. The monthly fixed charge for water service includes both a customer service charge and a meter service charge. These charges apply to all accounts, regardless of water usage. All sewer accounts will have a customer service charge, in addition to sewage discharge fee based on estimated wastewater flows.

A capacity-based meter service charge reflecting GWA’s cost of providing instantaneous peak water flows is used. The meter service charge is based on the size of the meter connection. The current meter service rates are therefore updated to reflect the meter capacity ratios for the different meters used by the water customers. All meter flow and

service capacities are from AWWA Manual M-1, with compound meters used for the three- to ten-inch meter sizes.

The resulting monthly fixed water service charges include both a customer service charge and a meter service charge. These fixed charges apply monthly to all accounts, regardless of water usage. All sewer accounts will also have a customer service charge, in addition to commodity-based sewage discharge fee based on estimated wastewater flows.

As shown Table 14-39, the current basic (meter) charge of \$7.46 per month for a 3/4-inch meter will increase to \$29.13, due mostly to the new customer service charge. The non-residential customers with larger meters will experience far higher increases than most residential connections with 3/4-inch meters. The largest customers on 10-inch water meters will see an increase in fixed charges from the current \$162 to \$720 per month. All sewer customers will also have the new \$20 customer service charge.

Tables 14-40 and 14-41 develop the unit rates for cost of service-based charges. In Table 14-40 the unit rates for water services are developed. Note that the customer classifications have been consolidated into comparable billing groups with similar unit rates. Also, these unit rates are increased for the mid-year rate adjustment. Table 14-41 provides a similar analysis for sewer services. The calculations in both tables are based on the class-level COS allocations of FY 2006-07 revenue requirements, divided first by the fixed service loads and then by the variable demands and discharge loads.

Table 14-40 – Water Cost of Service-based Revenues (Alternative 3)

User Billing Classifications	FY 2006-07 Revenue Requirements	Customer Service Accounts (CS)	Water Use Demands (Kgal/year)	Customer Service Revenues & Rates (\$/Month-Account)	Meter Service Revenues & Rates (\$/Month-EM) (a)	Water Demand Charges (\$/year)	Water Use Rates (\$/Kgal, eff. 12 months)	Water Use Rates (\$/Kgal, eff. 4 months)
Stable revenues with consolidated classes and cost of service								
Agricultural (b)	\$309,093	538	148,455	\$20.00	\$9.13	\$110,240	\$0.74	\$0.78
Residential	\$23,183,268	34,513	4,435,333	\$20.00	\$9.13	\$10,970,916	\$2.47	\$2.60
Other Non-residential	\$13,060,725	2,899	2,731,685	\$20.00	\$9.13	\$11,089,648	\$4.06	\$4.27
Irrigation (including Golf)	\$473,329	244	68,613	\$20.00	\$9.13	\$352,230	\$5.13	\$5.40
Total FY 2006-07	\$37,026,416	38,194	7,384,086	\$9,166,560	\$5,336,822	\$22,523,034		
Percentage Fixed Revenues	39%							

All revenues, including surcharges, are collected from Customer and Meter Service charges, and Water Usage Rates.

- a. The Meter Service (EM) charges are billed to each account's water meter based on the capacity of the meter. The rate shown per EM is for a 3/4 inch meter.
- b. The Agricultural unit rates exclude potable service costs.

Table 14-41 – Sewer Cost of Service-based Revenues (Alternative 3)

User Billing Classifications	FY 2006-07 Revenue Requirement	FY 2006-07 Customer Service Accounts (CS)	Metered Water Use Billable for Wastewater (Kgal/year)(a)	Customer Service Revenues & Rates (\$/Month-Acct, CS)	Sewer Discharge Charges (\$/year)	Metered Water Rate (\$/Kgal eff 12 months) (a)	Metered Water Rate (\$/Kgal eff 4 months)
Residential	\$10,865,065	21,239	3,509,069	\$20.00	\$5,767,705	\$1.64	\$1.73
Commercial C/Federal/Government	\$5,775,228	2,041	2,104,832	\$20.00	\$5,285,388	\$2.51	\$2.64
Commercial (D/Hotel) II	\$3,763,809	84	1,014,010	\$20.00	\$3,743,649	\$3.69	\$3.88
Commercial (E) III	\$853,275	190	167,799	\$20.00	\$807,675	\$4.81	\$5.06
Total	\$21,257,377	23,554	6,795,709	\$5,652,960	\$15,604,417		
Percentage Fixed Revenues:	27%						

All revenues, including surcharges, are collected from the Customer Service charges, and Water Usage Rates.

- a. The Metered Water Use Billable for Wastewater is the total metered water use, with no adjustment for water use returned to sewer ratios. The reduction ratio is incorporated into the unit rate, and the water use billable for sewer discharges is set at 100%.

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A summary of the resulting unit rates for the COS Alternative 3 is shown in Table 14-42. Note that the two-tiered water rates for residential customers are eliminated.

Table 14-42 – Cost of Service-based Rates (Alternative 3)

Description	Cur. Rates FY 2005-06	FY 2006-07		FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
		Rates with Mid- Year Adj.					
Water Customer Unit Rates							
1. Customer Service Charge (\$/month-account)		\$20.81		\$22.48	\$24.28	\$26.22	\$28.32
2. Meter Service Charge (\$/month-meter)							
3/4"	\$7.46	\$9.50		\$10.26	\$11.08	\$11.97	\$12.93
1"	\$8.71	\$15.84		\$17.10	\$18.47	\$19.95	\$21.55
1 1/2"	\$13.67	\$31.67		\$34.21	\$36.94	\$39.90	\$43.09
2"	\$17.41	\$50.68		\$54.73	\$59.11	\$63.84	\$68.95
3"	\$31.09	\$101		\$109	\$118	\$128	\$138
4"	\$43.52	\$158		\$171	\$185	\$199	\$215
6"	\$80.82	\$317		\$342	\$369	\$399	\$431
8"	\$118	\$507		\$547	\$591	\$638	\$689
10"	\$162	\$728		\$787	\$850	\$918	\$991
3. Water Consumption Charges by Customer Classification (\$/Kgal metered)							
Agricultural	\$1.47	\$0.78		\$0.83	\$0.90	\$0.97	\$1.05
Irrigation	\$1.47	\$5.40		\$5.77	\$6.23	\$6.73	\$7.27
Golf Irrigation	\$4.42	\$5.40		\$5.77	\$6.23	\$6.73	\$7.27
Comm, Govern & Other Non-residential	\$4.42	\$4.27		\$4.56	\$4.93	\$5.32	\$5.75
Agriculture and Irrigation	\$1.47						
Residential							
0 to 4,999 gallons per month	\$2.40	\$2.60		\$2.78	\$3.00	\$3.24	\$3.50
5,000 and greater per month	\$3.55	\$2.60		\$2.78	\$3.00	\$3.24	\$3.50
Wastewater Customer Unit Rates							
1/2. New Cust. Service Charge (\$/month-acct, lifeline)		\$20.81		\$22.48	\$24.28	\$26.22	\$28.32
3. Wastewater Discharges (\$ per Kgal)							
Commercial I (C) Low Strength	\$2.30	\$2.64		\$2.82	\$3.05	\$3.29	\$3.56
Navy and Airforce (federal)	\$3.29	\$2.64		\$2.82	\$3.05	\$3.29	\$3.56
Government	\$3.29	\$2.64		\$2.82	\$3.05	\$3.29	\$3.56
Commercial II (D/H) Hotels & Ind. Laundries	\$5.61	\$3.88		\$4.15	\$4.48	\$4.84	\$5.23
Commercial III (E) High Strength	\$7.78	\$5.06		\$5.41	\$5.84	\$6.31	\$6.81
Residential (\$/month-account)	\$22.00	na		na	na	na	na
Residential (\$/Kgal)	na	\$1.73		\$1.85	\$2.00	\$2.15	\$2.33
Surcharges (rolled into unit rates in FY 2007)							
Public Utilities Surcharge 2001	9.51%			na	na	na	na
Supplemental Annuity (to GUAM Legislature)	4.13%			na	na	na	na

Table 14-43 provides the typical residential bills under fair and equitable COS rates. As shown, with the COS-based rates fully implemented in FY 2006-07, there is a 65% increase in the typical residential bills. This increase is followed by increases for revenue enhancements in each of the following years.

Table 14-43 – Typical Bills with Cost of Service-based Rates (Alternative 3)

Description	FY 2006-07 with Midyear						
	FY 2004-05	FY 2005-06	Adjustment	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Projected Typical Res Water Use (Kgal/month)	8	8	9	9	9	9	9
Water Rate Increase			Varies	8%	8%	8%	8%
Wastewater Rate Increase			Varies	8%	8%	8%	8%
Consolidated Typical Monthly Residential Bill							
Water Service (Cust. & Meter, 3/4 inch)	\$7.46	\$30.32	\$32.74	\$35.36	\$38.19	\$41.24	
Basic Water Usage Rates	\$12.00	\$23.42	\$25.29	\$27.31	\$29.50	\$31.86	
Water Usage (over 5 Kgal/month)	\$10.65	na	na	na	na	na	
Wastewater Customer Charges	\$22.00	\$20.81	\$22.48	\$24.28	\$26.22	\$28.32	
Wastewater Variable Charges	na	\$15.56	\$16.81	\$18.15	\$19.60	\$21.17	
Public Utilities Surcharge 2001	\$1.72	na	na	na	na	na	
Supplemental Annuity Retirement (SAR)	\$0.75	na	na	na	na	na	
Total Monthly Bill	\$55	\$90	\$97	\$105	\$114	\$123	
Bill Increase (including increased water metering)			65%	8%	8%	8%	8%
Average Annual Bill Increase Over Five Years (including increased water metering)							18%
Summary Bills of Key Customers							
Residential	\$55	\$90	\$97	\$105	\$114	\$123	
Golf Course		\$835	\$894	\$965	\$1,042	\$1,126	
Commercial C Accounts		\$223	\$239	\$258	\$279	\$301	
Typical Hotels		\$8,784	\$9,387	\$10,138	\$10,949	\$11,825	
Large Hotels		\$46,011	\$49,161	\$53,094	\$57,342	\$61,929	

Lifeline rates are not part of cost of service rates due to subsidies between classes.

A billing increase in excess of even 15% is likely to cause rate shock among certain residential customers. Regardless of essential project needs, any rate recommendations with severe hikes in bills should be accompanied by lifeline rates for financially vulnerable customers. While fair and equitable, the COS rates may not be viable for implementation due to the severe rate shock that a 65% increase will cause.

In order to mitigate the 65% billing increase in FY 2006-07, while still implementing cost of service charges, a phase-in of COS-based changes was evaluated. The results of the phase-in were unsatisfactory, as the billing increase for residential customers still remained excessively high at 48%. These calculations are tabulated in Volume 1 Appendix 1M - Financial Program to this chapter.

14.10 Utility Service Affordability

Table 14-44 evaluates the affordability of the projected bills, using a projected range of household incomes from the 2000 Census against the proposed residential bill. A number of governmental studies opine that an appropriate marker for utility affordability in typical western communities is that the water and sewer utility costs should be two percent or less than the median household income. While it could be argued that the Guam community is atypical, with a larger number of households on subsistence income, it is reasonable to believe that utility charges below two percent

of median household income are reasonable and that most residents can tolerate charges of three to four percent of income.

Table 14-44 – Affordability for Households with Alternative 2 Updated Lifeline Rates

Annual Household Income (HH I/C per 2000 Census (a))	Avg. HH I/C in 2005 (est)	No. of Households (b)	Affordable Bill at 2% of HH I/C (\$/month)(c)	FY 05-06 Current Typ. Bill (\$/month)		FY 2005-06
				Current Typ. Bill (\$/month)	Cumulative Percentage	Cur. Bill as % of Income
No Income	\$0	2,074				
Less than \$10,000	\$8,000	3,502	\$13	\$55	10%	8.2%
\$10,000 to \$15,000	\$14,000	2,183	\$23	\$55	16%	4.7%
\$15,000 to \$20,000	\$19,000	2,183	\$32	\$55	21%	3.4%
\$20,000 to \$25,000	\$24,000	2,483	\$40	\$55	28%	2.7%
\$25,000 to \$30,000	\$29,000	2,483	\$48	\$55	35%	2.3%
\$30,000 to \$35,000	\$35,000	2,379	\$58	\$55	41%	1.9%
\$35,000 to \$40,000	\$40,000	2,179	\$67	\$55	47%	1.6%
\$40,000 to \$45,000	\$44,000	2,199	\$73	\$55	53%	1.5%
\$45,000 to \$50,000	\$48,000	1,999	\$80	\$55	59%	1.4%
\$50,000 to \$60,000	\$55,000	3,370	\$92	\$55	68%	1.2%
\$60,000 to \$70,000 (est)	\$63,000	5,000	\$105	\$55	82%	1.0%
\$70,000 to \$80,000 (est)	\$73,000	3,000	\$122	\$55	90%	0.9%
\$80,000 to \$90,000 (est)	\$83,000	1,000	\$138	\$55	93%	0.8%
More than \$90,000 (est)	\$93,000	621	\$155	\$55	94%	0.7%
Total		36,652				
Median (2000 Census)		\$39,317				
Median (2005 estimate)		\$40,295				
			Typical Bill	Bill as % of HH I/C		
			\$55	1.6%		

Fiscal Year	Increases in Annual Income	Future Median Household Income	Alt. 2 Lifeline Bill	Typical Alt. 2 Regular Bill	Households Paying less than 2% (c)	Typical Bill as % of Median Income
FY 2005-06		\$40,295	\$55	\$55	65%	1.6%
FY 2006-07	2.5%	\$41,300	\$53	\$62	59%	1.8%
FY 2007-08	2.5%	\$42,300	\$55	\$67	59%	1.9%
FY 2008-09	2.5%	\$43,400	\$56	\$73	53%	2.0%
FY 2009-10	2.5%	\$44,500	\$58	\$78	53%	2.1%
FY 2010-11	2.5%	\$45,600	\$59	\$85	47%	2.2%
FY 2011-12	2.5%	\$46,700	\$60	\$91	47%	2.3%
FY 2012-13	1.5%	\$47,400	\$61	\$104	41%	2.6%
FY 2013-14	1.5%	\$48,100	\$62	\$119	32%	3.0%
FY 2014-15	1.5%	\$48,800	\$63	\$125	32%	3.1%
FY 2015-16	1.5%	\$49,500	\$64	\$130	18%	3.2%
FY 2016-17	1.5%	\$50,200	\$64	\$135	18%	3.2%
FY 2017-18	1.5%	\$51,000	\$65	\$140	18%	3.3%
FY 2018-19	1.5%	\$51,800	\$66	\$144	18%	3.3%
FY 2019-20	1.5%	\$52,600	\$67	\$149	18%	3.4%
FY 2020-21	1.5%	\$53,400	\$68	\$154	18%	3.5%
FY 2021-22	1.5%	\$54,200	\$69	\$159	18%	3.5%
FY 2022-23	1.5%	\$55,000	\$70	\$165	18%	3.6%
FY 2023-24	1.5%	\$55,800	\$72	\$170	10%	3.7%
FY 2024-25	1.5%	\$56,600	\$73	\$174	10%	3.7%

- a. The 2000 Census did not segregate annual household income above \$60,000; the allocations above \$60,000 are estimates.
- b. Economic information is from the 2000 Census.
- c. The assumed affordable bill is less than or equal to two percent of the median

As shown in Table 14-44, current combined utility bills are 1.6 percent of the median income. However, as shown in the table, more than 21% of residential customers have charges greater than three percent of their household income. It has been previously estimated that the proposed lifeline program will support 15% of the household customers.

It is reasonable to accept that if the median household pays two percent of their income on utilities, then 50% of the households will pay more, and 50% less. Table 14-44 indicates that currently a full 65% of households pay less than two percent.

Unfortunately, by 2010 the median household will have gone from paying 1.6 percent to more than two percent of income on water and sewer utilities, and by 2014 the percentage of median income will rise to three percent. Fortunately, over the 20-year projection, the cost of utilities never rises over 3.7 percent of the median household income. In conclusion, it appears that the 20-year financial plan is affordable, but with three caveats.

First, the Guam community has a disproportionately high level of low-income households, so a vigorous lifeline program is essential if those customers are to continue receiving utility services unabated.

Second, it may be difficult for elected utility managers to enact continuous rate increases of over five percent annually. While a public outreach information campaign will create some support for rate increases, either the Base Case CIP or the Minimum Pace CIP funding will be challenging to implement if approval by elected officials is required. The needs and benefits of the improvements will need to be clearly communicated to GWA's customers to gain support.

Third, it is likely that under Guam community practices the current inequitable billing structure can remain in effect. While it has been shown in the cost of service analysis that the current rates impose a higher-than-equitable financial burden on hotels, the effect of this burden is to lower the bills to residents by "exporting" some of the utility costs offshore through the tourist industry.

14.11 Survey of Projected Bills under Rate Alternatives

To demonstrate the billing effects of all alternatives on a mix of customers, Table 14-45 develops the estimated typical water demands for the most common customer classes of residential, Commercial C class, hotels large and typical, and golf courses. Tables 14-46 through 14-50 tabulate the current and projected bills for both utility services for all rate alternatives. Figures 14-9 through 14-14 illustrate the results in bar chart format.

Table 14-45 - Typical Water Demands of Customer Classes

Class	Avg. Demand (Kgal/month) FY 2004-05	Est. Typical to Avg Demand Ratio	Typical FY 2004-05		Number of Accounts
			Water Use (Kgal/month)	Meter Size	
Golf Course	167	70%	117	3"	14
Commercial C	30	70%	21	1"	2,144
Hotel (H)	1,346	70%	942	2"	56
Residential	10	82%	8	3/4"	34,171

Table 14-46 - Summary of Residential Rate Alternatives

Description	Current	Updated				
	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Increase in Unit Rates of Current Alternative 1		8%	8%	8%	8%	8%
Typical Monthly Bill for Residential Customer (both water & sewer services, 9 Kgal/month)						
Current Rates with Increased Unit Charges						
Alt. 1 Current Rate Structure	\$55	\$62	\$67	\$72	\$78	\$84
Change in Bills (a)		13%	8%	8%	8%	8%
Alt. 2 Current Rates with Lifeline Services	\$55	\$62	\$67	\$73	\$78	\$85
Change in Bills (a)		14%	8%	8%	8%	8%
<i>Current Lifeline Customer</i>	\$55	\$62	\$67	\$72	\$78	\$84
<i>Alt. 2 Lifeline Customer</i>		\$53	\$55	\$56	\$58	\$59
Cost of Service-based Rate Structure						
Alt. 3 Cost of Service	\$55	\$90	\$97	\$105	\$114	\$123
Change in Bills (a)		65%	8%	8%	8%	8%
City of Honolulu Single-family Rates (\$/month)(b)						
Water	\$16	\$20	\$23	\$25	\$27	\$28
Sewer	\$39	\$44	\$49	\$54	\$59	\$65
Total Monthly Bill in Honolulu	\$55	\$64	\$71	\$78	\$86	\$93
Annual Increase in Honolulu		17%	11%	10%	9%	8%
Average Annual Bill Increase Over Five Years (including increased water metering)						11%

a. The annual change in bills differs from the change in rates due to automatic changes in the surcharges, the level of typical water consumption, the implementation of the lifeline program and cost of service rate restructuring.

b. On 5/15/06 the Honolulu Board of Water Supply Approved water Rates for the Next Five Years. In 2005 the sewer rates for the next five years were also enacted.

Figure 14-9 – Projected Residential Water and Sewer Bills

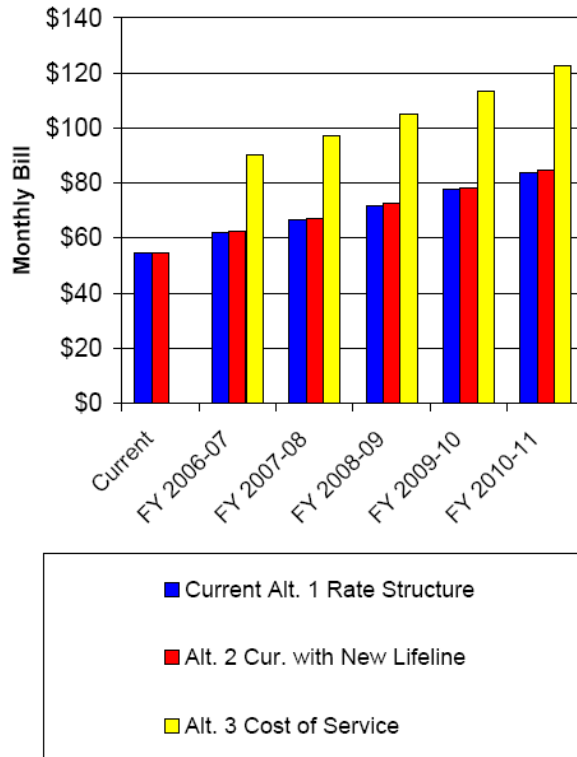


Figure 14-10 – Projected Lifeline Bills

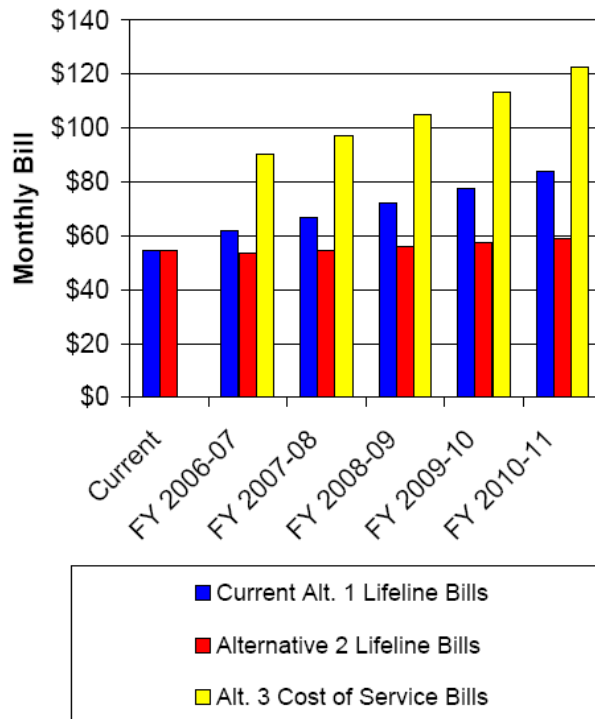


Table 14-47 – Survey of Rates - Large Hotel

Description	Current	Updated				
	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Water Demands (Kgal/month)	5,000	5,625	5,625	5,625	5,625	5,625
Water Meter Size	3"					
Current Rates with Increased Unit Charges (\$/month)						
Alt. 1 Current Rate Structure	\$50,651	\$58,258	\$62,322	\$67,429	\$72,627	\$78,128
Change in Bills (a)		15%	7%	8%	8%	8%
Alt. 2 Current Rates with Lifeline Services		\$58,798	\$63,007	\$68,325	\$73,749	\$79,498
Change in Bills (a)		16%	7%	8%	8%	8%
Cost of Service-based Rate Structure (\$/month)						
Alt. 3 Cost of Service Rates		\$46,011	\$49,161	\$53,094	\$57,342	\$61,929
Change in Bills (a)		-9%	7%	8%	8%	8%

a. The annual change in bills differs from the change in rates due to automatic changes in the surcharges, the implementation of the lifeline program and cost of service rate restructuring.

Figure 14-11 – Large Hotel Water and Sewer Bills

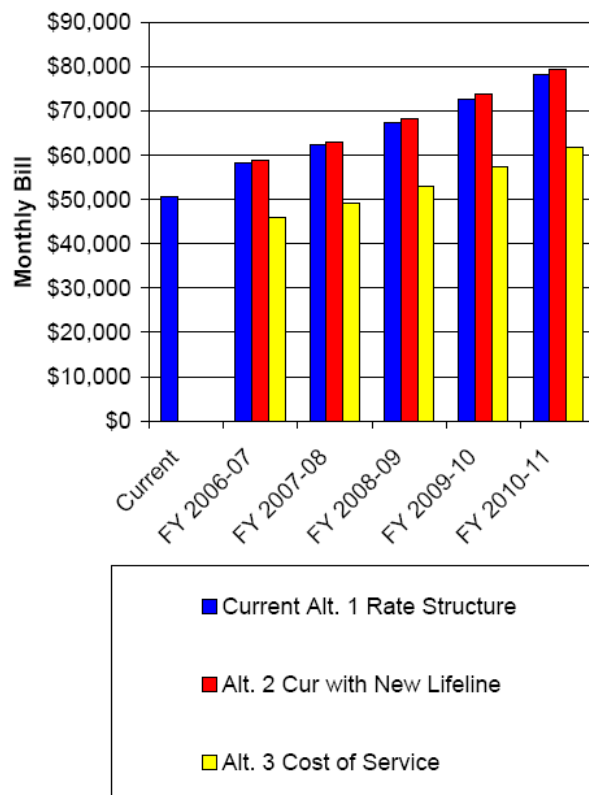


Table 14-48 – Survey of Rates - Typical Hotel

Description	Current	Updated				
	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Water Demands (Kgal/month)	942	1,060	1,060	1,060	1,060	1,060
Water Meter Size	3"					
Current Rates with Increased Unit Charges (\$/month)						
Alt. 1 Current Rate Structure	\$8,756	\$10,451	\$11,253	\$12,132	\$13,082	\$14,109
Change in Bills (a)		19%	8%	8%	8%	8%
Alt. 2 Current Rates with Lifeline Services		\$10,553	\$11,382	\$12,301	\$13,294	\$14,367
Change in Bills (a)		21%	8%	8%	8%	8%
Cost of Service-based Rate Structure (\$/month)						
Alt. 3 Cost of Service Rates without Lifeline		\$8,784	\$9,387	\$10,138	\$10,949	\$11,825
Change in Bills (a)		0%	7%	8%	8%	8%

a. The annual change in bills differs from the change in rates due to automatic changes in the surcharges, the implementation of the lifeline program and cost of service rate restructuring.

Figure 14-12 – Typical Hotel Water and Sewer Bills

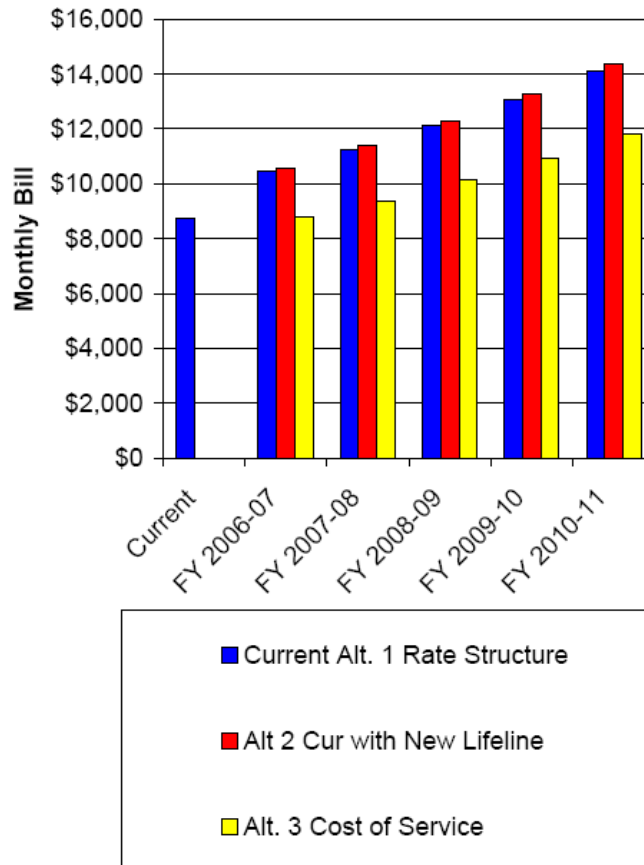


Table 14-49 – Survey of Rates - Typical Golf Course

Description	Current	Updated				
	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Increase in Unit Rates of Current Alternative 1		9%	9%	9%	9%	9%
Water Demands (Kgal/month)	117	132	132	132	132	132
Water Meter Size	3"					
Current Rates with Increased Unit Charges (\$/month)						
Alt. 1 Current Rate Structure	\$231	\$264	\$285	\$311	\$338	\$366
Change in Bills (a)		14%	8%	9%	9%	9%
Alt. 2 Current Rates with Lifeline Services		\$267	\$288	\$315	\$343	\$374
Change in Bills (a)		15%	8%	9%	9%	9%
Cost of Service-based Rate Structure (\$/month)						
Alt. 3 Cost of Service Rates		\$842	\$909	\$991	\$1,080	\$1,177
Change in Bills (a)		265%	8%	9%	9%	9%

a. The annual change in bills differs from the change in rates due to automatic changes in the surcharges, the implementation of the lifeline program and cost of service rate restructuring.

Figure 14-13 – Typical Golf Course Water Bills

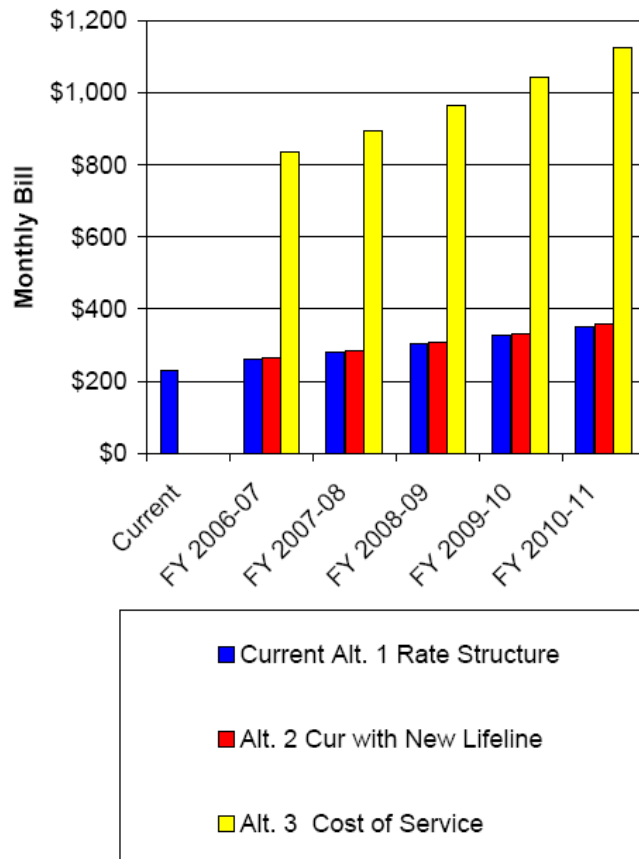


Table 14-50 – Survey of Rates - Commercial "C" Bills

Description	Current	Updated				
	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11
Water Demands (Kgal/month)	21	24	24	24	24	24
Water Meter Size	1"					
Current Rates with Increased Unit Charges (\$/month)						
Alt. 1 Current Rate Structure	\$159	\$185	\$198	\$214	\$230	\$248
Change in Bills (a)		16%	7%	8%	8%	8%
Alt. 2 Current Rates with Lifeline Services		\$186	\$200	\$217	\$234	\$252
Change in Bills (a)		17%	7%	8%	8%	8%
Cost of Service-based Rate Structure (\$/month)						
Alt. 3 Cost of Service Rates		\$223	\$239	\$258	\$279	\$301
Change in Bills (a)		40%	7%	8%	8%	8%

The cost of service charges are higher than current charges due to a consolidation of similar classifications.
a. The annual change in bills differs from the change in rates due to automatic changes in the surcharges, the implementation of the lifeline program and cost of service rate restructuring.

Figure 14-14 – Typical Commercial "C" Water and Sewer Bills

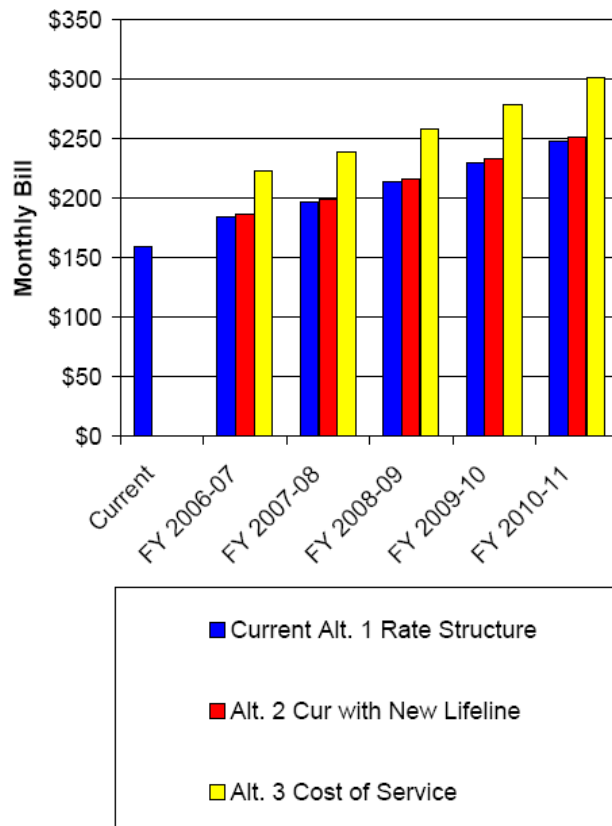


Table 14-51 provides a summary of five-year bill increases for Alternatives 1, 2, and 3. As shown, the least billing increases for residential accounts are achieved with Alternatives 1 and 2, while the largest increases are with the cost of service alternative (Alternative 3).

Table 14-51 – Summary of Current versus Five-Year Increase with Different Rate Alternatives

Description	Customer Classification					
	Residential		Commercial	Hotel		Golf
	Lifeline	Typical	Class C	Typical	Large	Course (a)
Current 2006 Bills (Water & Sewer)	\$55	\$55	\$159	\$8,756	\$50,651	\$231
FY 2010-11 Bills (% increase from over five years)						
Alt. 1 Current Rate Structure	\$84 (53%)	\$84 (53%)	\$248 (55%)	\$14,109 (61%)	\$78,128 (54%)	\$351 (52%)
Alt. 2 Cur. Rates with New Lifeline	\$59 (8%)	\$85 (55%)	\$252 (58%)	\$14,367 (64%)	\$79,498 (57%)	\$357 (55%)
Alt. 3 Cost of Service Rates	\$123 (125%)	\$123 (125%)	\$301 (89%)	\$11,825 (35%)	\$61,929 (22%)	\$1,126 (388%)

a. Bill is for water service only.

14.12 Summary of Findings and Conclusions

The assumptions, findings and conclusions of this chapter are summarized in this final section. Once the appropriateness and legality of the updated rate structure, system development charges and miscellaneous fee findings are approved by the elected officials of GWA, CCU, and the Guam government and GWA counsel, the conclusions can be implemented.

14.12.1 Projected Expenditures and Revenue Findings

Annual O&M expenses of \$43 million in FY 2004-05, plus \$4 million in debt service, will climb to \$63 million by FY 2011-12 due to inflation and growth in customer service, plus \$30 million in debt service for project funding. The WRMP CIP identifies \$894 million in total project costs. There are two alternatives to the pace of construction, with the differences due to a delay in certain construction of projects not essential for life and safety. The alternatives are described as the “Base Case” CIP and the “Minimum Pace” CIP.

- **Base Case CIP.** In the first five years through FY 2010-11, the project expenditures total \$185 million in 2007 dollars, or \$213 million in then-current dollars escalated for inflation. To fund the CIP, rate-based revenues should be almost doubled by FY 2011-12. User rates must be increased by eight percent annually for seven years. A 20-year cashflow analysis through 2026 finds that rates must then increase to 14% per year for two years, and then decline to an annual increase of between three to four percent for the remainder of the 20-year cashflow analysis.
- **Minimum Pace CIP.** The first five years of the CIP totals \$132 million, or \$148 million in then-current dollars escalated for inflation. User rates must be increased by 6 to 6.4 percent annually for six years, and then 11% per year for two years before dropping to three to four percent per year for the remaining years of the 20-year period.

- **Conclusion.** The “Minimum Pace” CIP should be implemented. In doing so, the project funding requirements will limit the short-term rate-based revenue requirements to increases of six percent per year. While the result of these limited increases to revenues will delay projects required for reliability and capacity, it is likely that higher utility billing increases required for the Base Case CIP will not be acceptable to the Guam community. Under the existing economic conditions, we recommend that multiple rate increases over six percent annually be postponed whenever possible.

14.12.2 Cost of Service Findings

The current rate structure is imbalanced between water and sewer utility services, with wastewater services funded in part by water service revenues. 64% of all costs are for the water utility, with the remainder going to the wastewater system.

Residential customers are underpaying by 17%, overall. These customers are paying approximately four percent too little for water services and 57% too little for sewer services. Hotels are paying 29% too much overall, and other commercial customers are overpaying by an average of 16%.

Nevertheless, our conclusion is that the current rate structure, with an updated lifeline program, should continue to be used for the next ten years. Thereafter, starting in 2016, cost of service-based rates should be phased-in. Typically, it is desirable to enhance billing equity, revenue stability and rate structure simplicity concurrent with other changes to billings. However, with high increases in revenues required over the next ten years, any improvement in equity will cause extreme increases to residential bills. In delaying the implementation of rate equity, billing increases to residential customers can be kept to a level that will minimize rate-shock and maximize affordability.

14.12.3 Sensitivity Analysis Findings

The typical single-family residential bill is currently \$55 per month. Due to the replacement of the water meters, these bills will increase to \$62 per month by FY 2010-11 without any changes in the rates. A six percent annual increase under the Minimum Pace CIP will result in a \$77 per month bill.

Changes to certain modeling assumptions have a significant effect on the FY 2010-11 residential bills, which are projected to be \$84 per month under the Base Case CIP:

- O&M inflation is currently projected at six percent per year. If inflation is four percent, then the bill will be \$4 less per month, and if it is eight percent then the bill will be \$2 more.
- Water sales are projected at 7.8 million Kgal per year. If the water sales are only 6 million Kgal, then the bill will be \$9 more per month, and if it is 10 million Kgal then the bill will be \$2 less.
- Bond interest rates are projected at six percent per year. If interest rates are only four percent, then the bill will be \$8 less per month, and if rates are eight percent then the bill will be \$4 more.

Other variables have less of an impact on projected bills, including level of system development charges and nonpayment of customer bills.

14.12.4 Affordability Findings

Current combined utility bills are 1.6 percent of the median income, with more than 21% of residential customers having charges greater than three percent of their household income, and 65% of households paying less than two percent. The Guam community has a disproportionately large number of low-income households.

By 2010 the median household will pay more than two percent of income on water and sewer utilities, by 2014 the payments will rise to three percent. Over 20 years the cost of utilities never rises over 3.7 percent of the median household income, which represents a high but probably affordable level for the median household.

Second, it may be difficult for elected utility managers to enact continuous rate increases of over five percent annually. While a public outreach information campaign will create some support for rate increases, either the Base Case CIP or the Minimum Pace CIP funding will be challenging to implement if approval by elected officials is required. The needs and benefits of the improvements will need to be clearly communicated to GWA's customers to gain support.

14.12.5 Conclusions

The following is a summary of the financial plan conclusions:

- **Create a New Lifeline Program.** To reduce rate shock to the most financially vulnerable 15% of the residential customers, a new lifeline program should be implemented, to limit future rate increases to changes in the Consumer Price Index. The program would be funded with a surcharge to all other customer bills.
- **Fund the Minimum Pace CIP.** The funding of the Minimum Pace CIP, with multiple annual rate increases of six percent through FY 2011-12, provides the best balance between implementation of the WRMP recommendations and the community affordability concerns.
- **Continue with the Current Rate Structure.** Based on community affordability findings, the current rate structure with an updated lifeline program (Alternative 2) should be used as the basis for rate increases, until 2015. All unit rates, including the current "lifeline" rates for tier 1 water use and the residential sewer services, should be increased equally each year.
- **Phase-in Cost of Service Rates.** To enhance billing equity in 2016 or when the annual rate-based revenue increases decline below five percent annually, the cost of service rate structure (Alternative 3) should be phased in.
- **Update the Financial Plan Every Three Years.** A five year projection of rate-based revenue requirements should be prepared every three years, to verify that the financial plan rate-based revenue changes are appropriate. The GWA should not attempt to make financial decisions based on single "test" year

budgets, as CCU policies, including debt funding with capitalization of debt service, result in material changes to rate-based revenue requirements beyond that single-year evaluation period.

- **Public Information Program.** An increase is needed in public information and outreach activities to inform and persuade customers and utility stakeholders of the critical issues affecting GWA services. The outreach efforts should be based on building a compelling case for the essential need of more funding, by emphasizing the value of service reliability, quality and the environmental and economic benefits of protecting the beaches of Guam.