RECOMMENDATIONS

Red Oak recommended that AWU recover some or all of its fire-related costs in a fixed monthly charge based on meter size. While meter size may not be the best proxy for fire flow demands, the two alternatives that improve upon meter size have significant implementation issues.

EXECUTIVE TEAM DECISION

The Executive Team decided to recover fire protection costs with a fixed monthly charge based on meter size.

3.4.4. Wastewater Cost Allocations

3.4.4.1. Issue 1: Which Is the Most Appropriate Overall Method for Allocating Costs?

DESCRIPTION

The first wastewater cost allocation policy to resolve is which overall cost allocation method is best for AWU and its customers. The alternative selected will determine the method of allocating costs to each of the customer classes. The Water Environment Federation (WEF) has identified three fundamental cost allocation approaches for allocating a utility's costs and, thereby, determining wastewater rates.

The three available alternative methods are:

1. Design basis (current approach),
2. Functional basis, and
3. Hybrid where O&M costs are allocated based on function, and capital costs based on design.

The primary difference among the alternative methods is that the design basis allocates costs based on engineering design criteria whereas the functional basis allocates costs based on operational or functional purposes. The hybrid allocates O&M costs based on function and the capital costs based on design. Examples of how the allocations would be done under both approaches are discussed in the Issue Paper entitled *Water Cost Allocations and Fire Charges* presented under separate cover as Volume II of this report.

RECOMMENDATIONS

Red Oak recommended AWU use the hybrid approach for allocating costs. This method appears more equitable to AWU's customers and does not introduce significant administrative burden.

EXECUTIVE TEAM DECISION

The Executive Team decided to use the hybrid approach to allocate wastewater costs.

3.4.4.2. Issue 2: What Are the Appropriate Customer Service Characteristics to Use for the Cost Allocation Process (E.g., Flow, BOD, TSS, Etc.)?

DESCRIPTION

Regardless of cost allocation approach selected, the cost-of-service analyses will require the selection of customer service characteristics for the cost allocations. The selection of the customer service characteristics determines which measures of wastewater strength are included in the cost allocations.

In developing an appropriate list of customer service characteristics, the analyst may consider the following standards:

1. Does the utility incur cost to treat the constituent that comprises the customer service characteristic?

2. Do customers vary in their contribution of the constituent under consideration? Is the contribution by customers closely correlated with another customer service characteristic already being used?

3. Can the utility measure the differences in the contributions by customer class with reasonable accuracy?

The first standard considers costs. Since the purpose of identifying a customer service characteristic and the corresponding wastewater constituent is to allocate costs, those constituents that are not treated or controlled may not warrant including in the cost allocations. The constituents that are responsible for costs vary by utility. For example, some utilities are required to control the total heat load they place on their receiving waters. In these cases, utility may incur significant costs to manage the heat of its wastewater discharge and temperature may be an important customer service characteristic. On the other hand, other utilities may not be required to control temperature and spend very little to mitigate this characteristic of wastewater. In some cases, wastewater utilities incur costs to treat a constituent in wastewater even if that constituent is not regulated as part of the utility's discharge permit.

The second standard addresses the variation in contributions of a constituent by customer class. If all customers contribute an equal concentration of the constituent measured by the customer service characteristic in question, then very little benefit would be derived by separating the costs for this additional customer service characteristic. Similarly, if the contribution of a constituent under consideration as a customer service characteristic is correlated to another constituent being measured, then the costs of the correlated constituent can be allocated according to the contributions of the original constituent. In general, because of the administrative cost of conducting testing, etc., adding constituents to the list of customer service characteristics should be carefully considered.

The final standard is the ability to accurately measure variations in wastewater contributions by class. Using tests that are subject to significant sampling error may

reduce the overall accuracy of the resulting cost allocations. Therefore, the impact of the sampling error should be incorporated in any decision regarding the selection of customer service characteristics.

Many alternative measures of wastewater strength exist. However, considering the three standards listed above, three alternatives appear most relevant to AWU. These are:

1. Flow, BOD, and TSS only (current);
2. Add Total Kjeldahl Nitrogen (TKN)[9]; and
3. Add Phosphorus.

For this evaluation, the current approach is compared to approaches that add either TKN or Phosphorus to the list of customer service characteristics included in the cost allocations. The selection of appropriate customer service characteristics for the cost-of-service analysis depends on the design and operation of the wastewater system.

RECOMMENDATIONS

Red Oak recommended that AWU continue allocating wastewater costs based on flow, BOD, and TSS only. Red Oak also recommended that AWU implement a sampling protocol to develop data on TKN and Phosphorus for its industrial pretreatment program. Once data are available, Red Oak recommends that AWU consider adding these customer service characteristics to its cost-of-service methodology. Red Oak further recommends that the cost-of-service model be developed to facilitate the introduction of these customer service characteristics.

EXECUTIVE TEAM DECISION

The Executive Team decided to use flow, BOD, and TSS only as customer service characteristics for wastewater cost allocation but requested that Red Oak develop the model with the capability to add either TKN or Phosphorus allocations in the future. The Executive Team also decided not to implement a sampling protocol to gather data on TKN and Phosphorus in the system until required by future regulations.

3.4.4.3. Issue 3: How Should I/I Be Estimated and Allocated In the Cost Allocation Process?

DESCRIPTION

The total volume of wastewater at AWU's wastewater treatment plants consists of contributed wastewater and inflow and infiltration (I/I). Infiltration is the flow entering the sanitary sewer resulting from high groundwater or precipitation that occurred days or weeks before the observed flow in the sanitary sewer. Inflow results from rainfall that

[9]Total Kjeldahl Nitrogen (TKN) is the sum of organic nitrogen, ammonia, NH_3, and ammonium, NH_{4+} in biological wastewater treatment. TKN is determined in the same manner as organic nitrogen, except that the ammonia is not driven off before the digestion step.

enters the sanitary collection system through a number of direct connections such as catch basins, roof drains, foundation drains, and manhole covers. The I/I in the system may be estimated based on available studies or comparisons of contributed wastewater and metered plant flows[10]. Customers generally cannot influence the level of I/I in the system. Generally, the utility mitigates I/I to reduce the flow-related costs of treatment and allow the flow-related capacity of the facilities to be available to customers, thereby avoiding expansions of capacities. Utilities generally establish a threshold for cost-effectiveness of I/I abatement measures based on the present worth cost of conveying and treating I/I.

The cost associated with collecting, conveying, and treating I/I must be allocated within the cost-of-service methodology. Currently the assumed I/I flow used to determine the cost of service in AWU's wastewater system is 10.5 percent of total flows.

As described in the Wastewater Cost Allocations issue paper (see Volume II of this report), the USEPA has issued guidelines on the allocation and recovery of I/I costs using several approaches. Based on these approaches, four alternatives are evaluated here.[11] These are:

1. Combined connections and volume (Current),
2. Contributed wastewater volume,
3. Number of connections, and
4. Land area.

As described in the Wastewater Cost Allocations issue paper, the primary differences among the alternatives are based on alternative philosophies regarding the appropriate allocation of costs. AWU currently uses the combined approach which attributes 50 percent of the I/I flows to customer classes based on the number of connections and 50 percent based on the class' contributed wastewater flow. The other approaches are consistent with USEPA guidelines.

RECOMMENDATIONS

Red Oak recommended that AWU allocate and recover its I/I cost based on the contributed flow of each customer class. This recognizes the fact that individual customers cannot manage I/I, and that the cost of I/I is primarily in consuming flow-related capacity.

[10] Water Environment Federation, *Financing and Charges for Wastewater Systems*, Manual No. 27, (Alexandria, VA: Water Environment Federation, 2004).

[11] Since AWU does not base its user charges on *ad valorem* property taxes, the value of property would not be consistent with USEPA guidelines. Therefore, it is not considered in this evaluation.

EXECUTIVE TEAM DECISION

The Executive Team decided to allocate I/I as a system cost based on contributed volume. For analytical purposes, the Executive Team requested the model be developed with the capability of allocating I/I as a system cost or based on a ratio of volume and number of connections.

3.4.5. Customer Classification

3.4.5.1. Issue 1: Should the Large-Volume Customer Class Be Disaggregated?

DESCRIPTION

As the name implies, large-volume customers have a significant impact on the total water and wastewater services provided by AWU. In the past, these seven customers have been grouped into one customer class and their demands aggregated to calculate a class-average peaking factor. Accordingly, the cost-of-service rates for these customers were based on the average cost of serving the customer class as a whole.

The 20 wholesale customers, on the other hand, are each treated as a single customer class within AWU's rate setting process. The question addressed here is whether a similar approach should be used for large-volume customers.

Two alternatives are evaluated:

1. Maintain one class (current approach), or
2. Separate classes for each large-volume customer.

RECOMMENDATIONS

Red Oak recommended that AWU disaggregate its large-volume customers and establish individual rates for each customer based on that customer's estimated water and wastewater usage characteristics.

EXECUTIVE TEAM DECISION

The Executive Team decided to disaggregate the large-volume customer class.

3.4.5.2. Issue 2: Should the Threshold for Inclusion in the Large-Volume Class Be Adjusted?

DESCRIPTION

AWU historically has placed customers with demands exceeding 85 million gallons per year in its large-volume class. This threshold was set to balance the administrative burden of managing a large-volume class with the relatively few customers that use water for significant industrial processes. Generally, large industrial customers have lower peaking factors, and therefore, a lower cost of service. The large-volume threshold was set, in part, to identify these types of customers. As industries have implemented conservation measures, concerns have been raised regarding their abilities to meet the threshold requirements with diminished water demands.

Three alternatives are evaluated:

1. Maintain 85 MG per year as the threshold (current approach), or
2. Increase the threshold to 100 MG per year, or
3. Reduce the threshold to 50 MG per year.

During its routine review of customer water sales, AWU has determined that the number of customers potentially impacted by a change in definition of alternative threshold is quite small. No compelling purpose was identified to change the threshold for inclusion as a large-volume customer.

RECOMMENDATIONS

Red Oak recommends AWU maintain its current thresholds.

EXECUTIVE TEAM DECISION

The Executive Team decided to maintain the 85 MG per year threshold.

3.4.5.3. Issue 3: Should an Irrigation Class be Created?

DESCRIPTION

AWU currently uses increasing block rates to send conservation pricing signals to its single-family residential customers. Much of the water consumed in the upper tiers is for lawn irrigation and other outdoor uses. AWU uses seasonal rates to provide a conservation price incentive for its other retail customers.

The City's Water Conservation Task Force has identified water conservation potential from changes in water rate design. Some of the proposals are dependent on implementing a new utility billing system that will support more complex water rate designs. In the interim, however, the Water Conservation Task Force has identified changes in the water rates applied to irrigation accounts as a potential source of water savings.

Since 1998, AWU has required all commercial and multi-family customers connecting to its system to install a separate irrigation meter for water used for outdoor irrigation. As of September 1, 2007, AWU provides these separate irrigation meters to approximately 3,000 customers. Other customers have opted to install separate irrigation meters for various reasons. Some reasons for installing separate irrigation meters include:

1. Eliminate wastewater charges for water that is not returned to the wastewater system.

2. Provide alternative points of connection to AWU's system. This may be true for some residential customers that have large irrigation demands that cannot be met by a single ¾-inch meter.

3. Other reasons identified by the customer.

Because of the mandatory irrigation meter policy for non-residential customers, AWU currently has a mix of customers within each of its customer classes that have, and do not have, separate irrigation meters. The incomplete implementation of the separate irrigation meter policy means that, out of necessity, some customers will use their single connection to AWU's system for both indoor and outdoor uses. Other customers will use two meters. This presents a significant challenge to AWU in implementing an irrigation rate that applies to some members of a class—but not all. The incomplete implementation of its separate irrigation meter policy may require establishing a separate irrigation customer class to assess specific rates for irrigation accounts.

Two alternatives are evaluated:

1. Do not implement an irrigation class (current approach), or
2. Implement an irrigation class.

RECOMMENDATIONS

Red Oak recommended that AWU not create an irrigation class at this time. Rather, Red Oak recommended that AWU consider using rate design alternatives within the existing customer classes until a new utility billing system is in place. Many of the objectives of creating the irrigation class can be addressed through the rate design process. In addition, this approach will allow AWU to be more deliberate in its future policy development on irrigation water use without the implementing alternatives that will likely be significantly revised within a few years.

Implementing a separate irrigation rate and class would introduce inequities between customers having irrigation meters and those that receive their outdoor water through a traditional domestic meter.

EXECUTIVE TEAM DECISION

The Executive Team decided not to create an irrigation customer class. AWU will instead implement a revised rate structure that will encourage conservation among irrigation customers.

3.4.6. Rate Design

3.4.6.1. Issue 1: What Is the Best Method for Providing a Subsidy to Low-Income Customers?

DESCRIPTION

Enhancing the affordability of water and wastewater services for customers of limited financial means has been an ongoing objective of AWU and its citizens. Ultimately, the approach that AWU uses to assist low-income customers must meet the social and political needs of the City rather than technical cost-of-service concerns. The reader should consider the nature of this policy question when reviewing our recommendations.

The two available alternative methodologies are:

1. Provide a discounted rate for consumption in blocks 1 and 2 (current approach).
2. Waive the fixed charge for customers that qualify as low-income households.

The primary difference between the options is the degree of administrative burden and the effectiveness of the policy. The current approach is quite easy to implement and works easily within AWU's current rate structure. However, the benefits are distributed indiscriminately and provide the same discount for users with low incomes and those without. This broad distribution limits AWU's ability to lower the cost of water for customers of limited means in a way that a more focused program would not.

Unfortunately, a more focused program may require substantial effort to pre-qualify customers as "low-income". AWU is collaborating with Austin Energy to identify qualifying customers.

RECOMMENDATIONS

The question of low-income subsidies is inherently a public policy issue. Although our evaluation framework explicitly incorporates the criteria developed by the Executive Team, Red Oak feels less prepared to offer opinions in this area. Considering these caveats, Red Oak recommends AWU consider waiving the fixed charges for low-income customers through a cooperative program with Austin Energy.

EXECUTIVE TEAM DECISION

The Executive Team decided to waive the fixed charge for qualified low-income residential customers. This was implemented November 1, 2008.

3.4.6.2. Issue 2: How Should AWU Recover a Subsidy to Low-Income Customers?

DESCRIPTION

If AWU has a program that reduces the costs for low-income customers, that revenue requirement will need to be recovered from other customers. Like the issue of a low-income subsidy, the allocation of burden of the subsidy is a public policy issue. Essentially, a low-income subsidy does not change the overall cost of operating the utility. Rather it redistributes the burden of the utility to other customers. The question presented here is how that burden should be redistributed.

The two available alternative methods are:

1. Recover the subsidy within the residential class (current approach), or
2. Recover the subsidy from all classes.

The difference between the alternatives is fairly clear. Under the first alternative, the entire cost of a low-income subsidy program is recovered from other single-family residential customers. This is the current policy of AWU. The subsidy incurred to keep blocks 1 and 2 below the cost of service is recovered within blocks three and four.

As an alternative, the burden of the subsidy could be allocated to all customer classes.

RECOMMENDATIONS

Like the question of low-income rates, how a utility recovers a subsidy burden is inherently a public policy issue. Although our evaluation framework explicitly incorporates the criteria developed by the Executive Team, we feel less prepared to offer opinions in this area.

Considering these caveats, Red Oak recommended AWU recover the burden of its low-income program from all customer classes except where prohibited by contract or other legal requirement. There was clear a consensus of the PIC supporting this recommendation through the members' comments and discussions.

EXECUTIVE TEAM DECISION

The Executive Team decided to recover the low-income residential subsidy from all retail customer classes. This was implemented November 1, 2008.

3.4.6.3. Issue 3: Should AWU Introduce a Fifth Block for Single-Family Residential Customers?

DESCRIPTION

The City formed a Water Conservation Task Force as part of its efforts to enhance the conservation of water. This task force produced a set of far reaching proposals for AWU. One of the Task Force's proposals was the implementation of a fifth residential rate block for consumption above 25 thousand gallons (kgal) per month. The Task Force's goal is to implement the new rate block to provide an enhanced incentive to conserve water.

The three alternative methods are:

1. 4-block structure (current);
2. New 5th Block for consumption exceeding 25 kgal per month; and
3. Revised 4-block structure.

The exact details of the rate structure alternatives were developed with staff and presented to the PIC using a conservation-impact model developed by Red Oak. The alternatives described here are hypothetical alternatives, designed to present the general concepts.

The revised 4-block option might be designed to achieve the conservation benefits of a fifth block without the diminishment in customer understanding that a 5-block structure can create. A conservation rate structure is most effective when it serves as an efficient consumer price signal about the true cost of water. Complicated rate structures can reduce the conservation effectiveness if customers do not or cannot understand the relationship between usage and cost. In some regards, a simpler rate structure can

provide greater consumer confidence in that they are interpreting the price signals appropriately and let the price signals influence their consumption decisions.

RECOMMENDATIONS

Red Oak recommends AWU implement a 5-block rate structure for single-family residential customers.

EXECUTIVE TEAM DECISION

The Executive Team decided to implement a fifth block for single-family residential customers.

3.4.6.4. Issue 4: What Conservation Incentives Should Exist for Wholesale Customers?

DESCRIPTION

In addition to providing guidance on residential water rate design, the Water Conservation Task Force also recommended that AWU conduct a cost-of-service study that considers conservation rate structures for wholesale customers.

The three available alternative methods are:

1. Uniform rates by wholesale class (current approach),
2. Seasonal rates, and
3. Excess-use rates.

Each of these rate designs is discussed in the Rate Design issue paper provided in Volume II of this report. Because each wholesale customer is its own customer class, each rate structure alternative will be designed to generate the same revenue requirement consistent with the cost of service. The primary differences will be in the interim incentive to reduce consumption, avoid potentially higher costs, and to decrease both the volatility of costs for the wholesale customers and revenues for AWU.

RECOMMENDATIONS

Red Oak recommends that AWU continue to use its uniform rate by customer class and work with its wholesale customers to achieve greater water conservation through other mechanisms. Red Oak's recommendation considered:

1. Several wholesale customers have implemented conservation rates.

2. Some of the existing wholesale agreements may prohibit the implementation of conservation rates. Introducing an inconsistent rate design for this class of customers may introduce equity concerns.

3. Rates for wholesale customers are based on each wholesale customers individual peaking factors. Since these peaking factors directly affect their rates, it provides

each wholesale customer a direct incentive to manage its water demands during the peak season.

If AWU does pursue a conservation rate for wholesale customers, Red Oak recommends it adopt a seasonal rate until its new billing system is in place.

EXECUTIVE TEAM DECISION

For the reasons stated above, the Executive Team decided to maintain a uniform rate structure for wholesale customers.

3.4.7. Rates for Irrigation Customers

3.4.7.1. Issue 1: If AWU Implements Higher Rates for Irrigation Users, How Should the Excess Revenues Generated by the Higher Rates Be Used?

DESCRIPTION

The Water Conservation Task Force recommends that AWU establish "commercial irrigation rates comparable to highest residential tiers".[12] The highest residential tiers, however, are established to generate sufficient revenues to subsidize the rates of blocks 1 and 2. The highest residential block exceeds the cost of providing irrigation water in the peak season. Since that is the case, pricing irrigation water at the highest residential block will generate excess revenues.

The five available alternative methodologies are:

1. Use the excess revenues to reduce the rate for indoor water use for irrigation customers;
2. Use the excess revenues to reduce the rates for all customers;
3. Set the irrigation rate at the cost of service to eliminate excess revenues;
4. Set the excess revenues aside for other designated purposes; and
5. Do not establish an irrigation rate (current approach).

Alternatives 1 and 3 require AWU to establish a new customer class or classes for its irrigation customers. Although the Water Conservation Task Force discussed irrigation rates for commercial customers only, AWU has irrigation meters for single-family residential, multi-family residential, and industrial customers too. Approximately 1.5 percent of AWU's meters are separate irrigation meters. From a practical standpoint, AWU would likely be required to treat all non single-family residential classes the same.

The first alternative would determine the amount of revenue that irrigation rate generates for each of the irrigation classes (e.g., single-family, multi-family, commercial, etc.). The excess revenue generated from the irrigation rate would then be used to reduce the non-irrigation water used by those irrigation customers as a class.

[12] See Policy CI-3, page 25 of the *Water Conservation Strategies Policy Document, Water Conservation Task Force.*

As an alternative, AWU could use the excess revenues generated from irrigation rates to reduce the rates for all customers within the customer classes to which the irrigation customers belong. Under this approach, AWU would not establish separate irrigation customer classes. Rather, AWU would use the excess revenue generated from, for example, the commercial irrigation rates, to subsidize the other commercial rates.

AWU could establish a cost-of-service rate for irrigation customers that did not generate excess revenues. Under this approach, irrigation meters would be charged their cost of service and other customers would not be affected. This approach requires that AWU create one or more irrigation classes.

AWU could designate specific purposes that the excess revenue would fund. For example, AWU could designate revenue from irrigation customers that exceed the cost of service be dedicated to funding its reuse program.

Finally, AWU could maintain the status quo and not create an irrigation rate.

RECOMMENDATIONS

Red Oak recommended that AWU continue its current practice and not adopt an irrigation rate. Red Oak recommends AWU consider adopting an excess-use rate structure for its non-residential customers that recovers the cost of service when its billing system can accommodate it.

If AWU does adopt an irrigation rate before implementing its new billing system, Red Oak recommends that AWU either set the irrigation rate at the cost of service, or dedicate the excess revenue for a specific purpose.

EXECUTIVE TEAM DECISION

The Executive Team decided not to adopt an irrigation rate pending the implementation of excess-use rates. However, if excess-use rates are not implemented and irrigation rates are adopted, the Executive Team decided to set aside excess revenues received from the irrigation customers for other designated purposes. The Executive Team will decide annually how the excess revenues should be used. Potential uses for the excess revenues are the reclaimed water system, water conservation programs, and a rate stabilization fund.

3.4.7.2. Issue 2: What Is an Appropriate Level for Non-Residential Irrigation Rates?

DESCRIPTION

The Water Conservation Task Force directed AWU to evaluate various strategies to reduce water demand within AWU's service area. One of the strategies the Task Force identified was "establishing commercial irrigation rates comparable to highest residential tiers." In addition, the Water Conservation Task Force directed AWU to "Establish a residential fifth tier for use above 25,000 gallons per month." Determining the irrigation rate, therefore, may require the determination of the residential fifth-block rate. The

residential fifth-block rate was discussed in the Rate Design issue paper provided in Volume II of this report.

Complicating the setting of irrigation rates is the linkage to the highest "residential tiers." The rate for the highest residential tiers currently does not reflect the cost of providing irrigation water. Rather, the rate for the highest residential tiers is determined to recover the total revenue requirement for the residential class. This rate likely exceeds the cost of service to maintain the affordability of water consumed in blocks 1 and 2. As described in the Issue Paper, setting the rate equal to the highest residential rate will likely generate revenues exceeding the cost of service.

The three available alternative methods are:

1. Set the irrigation rate equal to the highest residential block rate;
2. Set the rate equal to the cost-of-service rate for irrigation; or
3. Do not have an irrigation rate (current approach).

These alternatives are closely related to the alternatives presented for Issue 1 in Section 3.4.7.1 on page 3-27. However, the perspective is different. For this issue, we are examining the impact of the rate alone, not the additional revenue it may generate.

The first alternative implements the Water Conservation Task Forces strategy directly. It presents significant equity concerns that may provide difficulty in implementing the approach. The second alternative will provide less conservation incentive than the first, but it ensures that customers pay their fair share of AWU's costs. Finally, the last alternative maintains the status quo.

RECOMMENDATIONS

Red Oak recommended that AWU implement excess-use rates for non-residential customers. However, if excess-use rates cannot be implemented, Red Oak recommends AWU set the non-residential irrigation rate equal to the highest residential block rate.

EXECUTIVE TEAM DECISION

The Executive Team decided to implement excess-use rates for non-residential customers.

3.4.7.3. Issue 3: Should Single-Family Residential Customers with Irrigation Meters Receive Irrigation Water at the Block 1 and 2 Rates?

DESCRIPTION

Currently single-family residential customers with separate irrigation meters receive the advantages of block rates for both their domestic meter (i.e., the meter used to supply their indoor water use) and irrigation meter. In other words, the residential customer with two meters pays the lower block 1 rate for consumption up to 2,000 gallons per month on both meters. This means the customer has the potential to receive a total of 4,000 gallons of water per month priced at the block 1 rate.

AWU currently prices its first two blocks (i.e., consumption from 0 to 2,000 gallons and from 2,000 to 9,000 gallons) at less than the average cost of service to make water more affordable for its customers. Also, the higher block rates are designed to encourage the wise use of water during AWU's peak season. The current rate structure for single-family irrigation accounts sends an improper price signal to those limited number of single-family residential customers with a separate irrigation meter.

Attachment B to the Rates for Irrigation Customers Issue Paper, provided in Volume 2 of this report, presents an analysis of irrigation customers. Of the approximately 180,000 residential customers, approximately than 140, or 0.08 percent, have a separate irrigation meters. Of those single-family residential customers inside the city limits with separate irrigation meters, the average consumption from June 2007 through September 2007 was approximately 19,000 gallons per month. Approximately 47 percent of this water is priced at the discounted block 1 and 2 rates.

The two available alternative methods are:

1. Provide block 1 and 2 discounted water (current approach); or
2. Price all water at the rates for block 3 and above.

The first alternative maintains AWU's current policy. The second method sets the rate for all water at a minimum of AWU's block 3 rate, thereby eliminating the discounted water.

RECOMMENDATIONS

Red Oak recommended that AWU charge the block three rate for all consumption below 9,000 gallons per month for water through a dedicated irrigation meter for single family residential customers. Furthermore, Red Oak recommended that AWU adjust this policy and the rate thresholds to prevent subsidized water being served through irrigation meters.

EXECUTIVE TEAM DECISION

The Executive Team decided to price all water usage in blocks 1 through 3 from a residential irrigation meter at the block 3 rate.

Austin Water Utility
Cost of Service Rate Study 2008

SECTION

4

Water Rate Analysis

REDOAK CONSULTING
A DIVISION OF MALCOLM PIRNIE

2908083 / POR

4. Water Rate Analysis

4.1. Introduction

Figure 4-1 illustrates the basic steps to generate cost-of-service water rates described in the following subsections. These steps are:

1. Establish customer characteristics.
2. Calculate revenue requirements.
3. Allocate costs to water system functions.
4. Allocate costs to customer cost pools[1].
5. Allocate costs by water system functions and cost pools to cost categories.
6. Allocate costs to customer service characteristics.
7. Allocate costs by customer service characteristics to customer classes.
8. Design rates.

4.2. Customer Characteristics

Customers of a water utility are often identified according to customer class. Each customer class has unique water demand and usage characteristics. Table B-1 in Appendix B provides, by customer class, summaries of numbers of accounts, estimated water sales, and estimated water production.[2]

Because cost-of-service is based on the concept of proportionality, customer service characteristics for each customer class must be analyzed to allocate the system revenue requirements equitably.

Determining customer service characteristics varies with the cost allocation methodology used. One such methodology is the base/extra-capacity cost allocation method, which is described by the AWWA. This method often includes the following customer service characteristics:

- Base
- Extra-Capacity Demands (maximum-day and maximum-hour)
- Customer
- Meter
- Fire Flow

[1] A cost pool is a group of customers or group of customer classes that share responsibility in a specific classification of costs. For example, wholesale customers would not be part of a "Retail-only" cost pool, in which facilities and associated costs necessary to serve retail customers are shared only by the retail customer classes.

[2] Estimated water production includes a percentage over water sales to account for water losses.

Base demands are average water demand conditions. They are the demands a water utility would experience if water consumption occurred evenly from day-to-day and hour-to-hour. Base demands can be calculated by dividing the total annual consumption of a customer class by 365 days.

Extra-capacity demands are water demands that exceed average levels of water usage by system customers. Such demands are directly related to customer's water consumption characteristics.

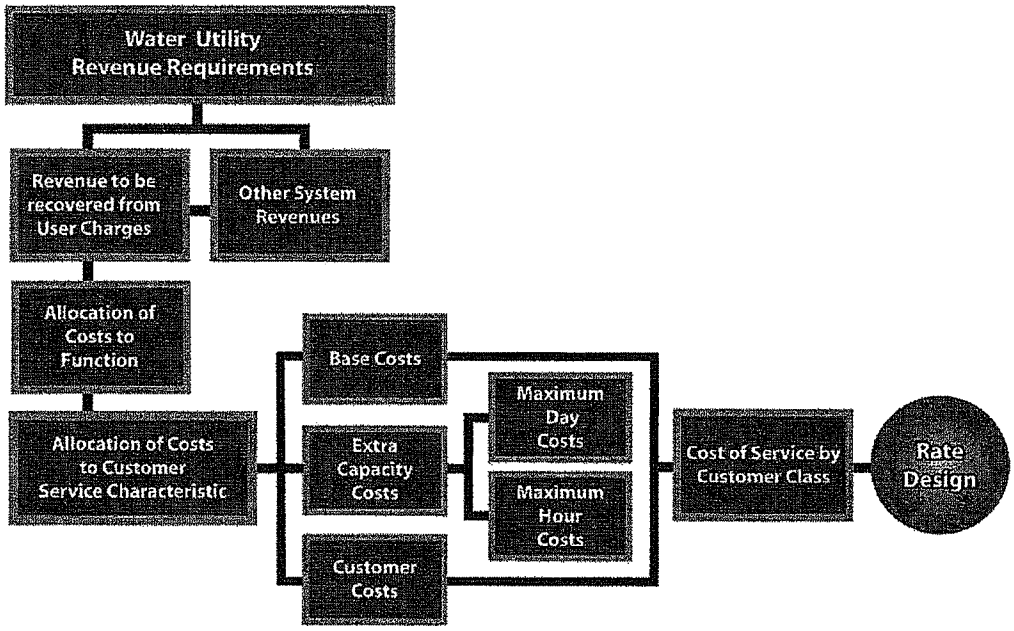

Figure 4-1 Cost-of-Service Process

The customer designation or characteristic represents the number of customers in a customer class. The meter characteristic is the number of equivalent meters served in a customer class. For cost allocation purposes, the number of equivalent meters is calculated to equitably assign the higher costs of larger meters to those customers with meters larger than a standard single-family residential meter.

Each customer class' proportion of the customer service characteristics is calculated to determine each class' demands placed on the water system. AWU's water customer service characteristics are summarized by customer class in Table B-2 in Appendix B.

An additional component of customer characteristics is the cost pools to which a customer class belongs. Customer classes vary in their use of the system, with costs frequently shared among all customer classes. Often, one or more customer classes may

use a part of the system exclusively and therefore would be held responsible for the associated costs. All customers belong to the joint cost pool, but other specific cost pools, such as retail only, wholesale, etc., may exist. A summary of cost pool participation by customer class is provided in Table B-3 in Appendix B.

4.3. Revenue Requirements

The second element of information for a cost-of-service rate analysis is an estimate of system revenue requirements. The AWWA Manual M1 describes two methods of determining the revenue requirements of a water utility. These are:

1. Cash Basis, and
2. Utility Basis

A third method is a hybrid of the two and is called the Utility Basis with Cash Residual. Each method is described below.

4.3.1. Cash Basis

Because government-owned utilities are required to maintain a cash budget, revenues and expenses must balance. Unlike investor-owned utilities, government-owned utilities generally do not have access to sources of capital other than retained earnings and formally issued debt. Therefore, the total revenues collected from all customers must equal budgeted expenses. This balancing of cash revenues with cash expenses for the current period is the foundation for the cash basis. Common cash basis revenue requirements include the following. Each is described in greater detail below:

- Operations & Maintenance (O&M) Costs
- Debt Service
- Capital Expenditures (Not Debt Financed)
- Transfers to Capital Reserves and Other Funds

Implicit in the cash-basis method is the concept of self-regulation. Accordingly, most municipal utilities are regulated by their boards or city councils. Economic regulation by a public service commission (PSC) occurs at times, but is normally not required. As such, the cash basis is a good method for utilities that operate under the oversight of a publicly elected city council or similar government body. The cash basis is a commonly accepted approach to determine revenue requirements for customers within the municipal boundaries that are directly served by the utility and are owners of the system's assets.

4.3.1.1. Operations & Maintenance Costs

O&M costs account for most of the day-to-day expenditures for operating a water utility. O&M costs include, for example, labor, benefits, insurance, utilities, water purchases, etc. The projected annual O&M expenditures for FY2009 are provided in Table B-4 in Appendix B. The O&M expenditures for FY2009 were based on AWU's budget projections. Consistent with industry standards, these expenditures exclude depreciation expenses.

4.3.1.2. Debt Service Costs

Debt service costs are the costs associated with financing major capital improvements which are usually identified in a utility's capital improvements plan (CIP). Utilities frequently finance major capital improvements by issuing long-term financial instruments for two primary reasons. First, the financial resources required for these types of projects typically exceed the utility's available resources from the normal operation of its system. Second, spreading the debt service costs for the project over the repayment period effectively spreads the financial burden of financing large improvements to both existing and future users of the system. This burden sharing allows the utility to better match the cost of improvements with those customers using the improvements. Capital improvement projects are designed to fulfill a range of needs including:

- Compliance with new state and federal regulations,
- Enhancement of the level and reliability of the service provided,
- Meet ongoing demands of system growth and economic development, and
- Replacement and refurbishment of existing system infrastructure.

AWU's debt service requirements include debt service for revenue bonds, commercial paper, G.O bonds, and water district bonds. For FY2009, the total cost is estimated to be over $78.6 million. The total cost is included in Table B-5 in Appendix B.

4.3.1.3. Capital Expenditures (not Debt Financed)

Some capital expenditures may be funded directly from the utilities revenues or operating fund. In fact, AWU's financial policies suggest that 20 percent of capital expenditures be funded by equity rather than debt. AWU's capital expenditures from rates is estimated to be over $12.3 million for FY2009. The total cost is included in Table B-5 in Appendix B.

4.3.1.4. Transfers to Capital Reserves and Other Funds

In addition to funding AWU's Water Construction Fund, AWU's water utility provides funding for the City of Austin General Fund, Sustainability Fund, Radio Communications Fund, Public Improvement District, and Environmental Remediation Fund. For FY2009, these additional transfers are estimated to be nearly $15.5 million. The transfers are included in Table B-5 in Appendix B.

4.3.2. Utility Basis

To protect consumers, investor-owned utilities are subject to economic regulation. Because most privately owned utilities are themselves natural monopolies, a government oversight agency, typically a PSC, regulates their profits to prevent overcharging of their customers.

To implement the economic regulation of investor-owned utilities, PSCs typically require utilities to use the utility basis to determine revenue requirements. This method allows for a fair rate of return that the utility should earn on the investments it makes in providing service to its customers. This return compensates the utility for its investments

and provides cash flow for operations of the utility. The rate of return is often a weighted average of the utility's interest cost on debt and an allowed return on equity. The return is then multiplied by the rate base of the utility to calculate the revenue, in addition to all other allowable expenses the utility must earn in order to provide the return component allowed by the PSC.

In addition to a return on rate base, under the utility basis, an investor-owned utility is allowed to collect revenues to recover O&M costs, depreciation on plant in service, as well as taxes and/or miscellaneous expenses.

Table 4-1 compares the utility and cash basis by showing the comparable category for each method. Both methods recover the utility's O&M costs and taxes, but the two differ in the way they recover capital costs. Using the cash basis, interest and principal on debt and other capital expenditures are explicit in revenue requirements. Using the utility basis, these costs are recovered through annual depreciation and the return on the rate base.

Table 4-1 Comparison of Cash and Utility Basis

Cash Basis	Utility Basis
O&M Costs	O&M Costs
Capital Expenditures	Depreciation Expense
Amortization of Debt	Depreciation Expense
Interest on Debt	Return on Rate Base
Franchise Fees / Taxes	Franchise Fees / Taxes

4.3.3. Utility Basis with Cash Residual

The utility basis with cash residual method is an appropriate method when a municipal utility serves users outside its corporate boundaries, such as a wholesale customer. The AWWA recognizes the use of the utility basis for determining the revenue requirements for these ex-corporate users because "this situation is similar to the relationship of an investor-owned utility to its customers since the owner (municipality) provides service to non-owner customers . . ."

Unlike investor-owned utilities, the municipal utilities are often subject to local governmental budget laws that require balanced budgets. To accommodate this constraint, a hybrid method of calculating revenue requirements is often required. This method uses the utility basis for determining the outside users' revenue requirements and the cash basis for the inside users'. To accommodate the balanced-budget constraint, the rate of return applied to the utility's inside users is determined so that the total revenues equal the utility's residual cash-basis needs. Using this method, the rates for the inside and outside users can vary, recognizing the past investments made by the ratepayers inside the utility's corporate boundaries.

4.3.4. Findings for AWU

As described in Section 3, Red Oak presented the revenue requirement options to both the PIC and Executive Team. Consistent with the Executive Team's decision, Red Oak used the cash-basis method of determining revenue requirements for this study. Also, after detailed analyses, the differences in costs, rates, and revenues between inside- and outside-city retail customers did not justify the continuing segregation of these customers by customer class. Based on this finding, the inside-city and outside-city retail classes were combined. Therefore, the computed rates in this report do not distinguish between inside- and outside-city retail customers and should be applied to all customers regardless of location.[3]

4.4. User Charge Revenue Requirements

The portion of annual system revenue requirements to be recovered through water rates depends on a utility's financing policy and its other sources of income. To determine the amount of revenue that rates must generate annually, the total revenue requirements must be reduced by non-rate or other system revenues. These non-rate revenues may include, but are not limited to, miscellaneous charges and interest earnings on unrestricted fund balances. Capital reserve funds may also provide revenue to offset costs of capital improvements.

The FY2009 non-rate revenues are provided in Table B-6 in Appendix B. Approximately 40 percent of the total non-rate revenues offset O&M costs, the rest offset capital costs in this analysis. A summary of user charge revenue requirements by customer class is provided in Table B-7. The total revenue requirements of $194.3 million presented in Table B-7 equals the total O&M of $94.7 million (Table B-4) plus the total cash basis capital costs of $106.4 million (Table B-5) less the non-rate revenues of $6.8 million (Table B-6).

4.5. Cost Allocations

The cost-of-service methodology described in this section uses the base/extra-capacity method for allocating costs among customer classes, as described in the AWWA Manual M1. In theory, each customer could be charged according to the actual cost of providing water service to that customer; however, it is impractical to estimate the cost of serving each of AWU's customers. As part of a cost-of-service study, analysts classify customers into relatively few, somewhat homogeneous, groups called customer classes, and then estimate the cost of serving each class.

Water systems are designed to meet both the average and peak demands of their customers. Therefore, data on total annual consumption and contributions to system peak demands, as mentioned in the section on customer characteristics, are needed to allocate

[3] Because of the differences in services, wholesale customer class distinctions are maintained in this report. Only retail classes were combined.

costs fairly among customer classes. Data on the number of customers with meters of various sizes must also be available to allocate customer-related and meter-related costs.

Equitably allocating the water system's user charge revenue requirements to the customer classes involves a multi-step process. Beginning with O&M costs, the following steps were completed. Allocations of capital costs and depreciation expenses are described later in this section.

- Step 1 functionalizes the costs;
- Step 2 assigns the functionalized costs to cost pools (e.g., joint—benefiting all customer classes, or as specific—benefiting one or more cost pools);
- Step 3 allocates the joint and specific costs by cost pools to cost categories;
- Step 4 then distributes the categorized costs to customer service characteristics;
- Finally, Step 5 distributes the O&M costs to customer classes by pool based on each class' proportion of the customer service characteristics.

These steps are described in more detail in the following subsection.

4.5.1. Step 1: Functionalization of Costs

A water utility's O&M expenditures may be allocated to functions such as source of supply, transmission and distribution, pumping, customer services, general administration, etc. Functionalizing costs in this manner enhances the accuracy and equity of the water system cost allocation to the customer classes. AWU's O&M expenditures and rate base are allocated to the following system functions:

- Raw Water (Production and Transmission)
- Treatment – Average Day
- Treatment Facilities
- Pump Stations & Booster Stations
- Pump Stations Power
- Tanks/ Reservoirs
- Transmission Mains
- Distribution Mains
- Direct Fire
- Retail Meters & Services
- Meters & Services
- Watershed Land Purchases
- LCRA Water Rights
- Customer Service
- Small Calls

- Wholesale Services
- Revenue-Based Volume Charge
- Indirect Costs (e.g., administrative and general)

Each of these functions is described below.

4.5.1.1. Raw Water (Production and Transmission)

Raw water typically consists of costs related to the procurement and transmission of raw water to a treatment facility.

4.5.1.2. Treatment – Average Day

Costs functionalized as *Treatment – Average Day* include direct costs related to treatment facilities. Treatment plant operations costs, maintenance, power, and chemicals were all included in this function. Costs related to AWU's water conservation program were also included here under the rationale that water conservation reduces the need for treated water, thereby reducing treated water costs.

4.5.1.3. Treatment Facilities

A small portion of treatment plant operations costs, including the indirect costs of utility administration and support, were included in this function. For rate base, laboratory equipment was functionalized as a *Treatment Facilities* asset along with all treatment plant facilities.

4.5.1.4. Pump Stations & Booster Stations

The costs of maintaining pump stations and booster stations were included here with the net plant in service.

4.5.1.5. Pump Stations Power

The cost of electricity is the major cost item included as part of this function.

4.5.1.6. Tanks/ Reservoirs

The costs of maintaining AWU's finished water storage facilities were included here with the net plant in service.

4.5.1.7. Transmission Mains

Transmission main maintenance costs, along with the net plant in service on the mains themselves, constitute this function.

4.5.1.8. Distribution Mains

Distribution main maintenance costs, along with the net plant in service on the mains themselves, constitute this function. These costs are not allocated to wholesale customers.

4.5.1.9. Direct Fire

Maintenance costs associated with fire hydrants, along with the net plant in service on the hydrants, constitute this function.

4.5.1.10. Retail Meters & Services

Costs such as building plan review, land use review, and site inspections were included in this function. These costs were segregated from the next function, *Meters & Services*, because they only apply to retail customers.

4.5.1.11. Meters & Services

The costs of maintaining customer meters, along with the meters and services net plant in service, were included in this function.

4.5.1.12. Watershed Land Purchases

This function includes only a watershed land purchase.

4.5.1.13. LCRA Water Rights

This function represents the costs of raw water from LCRA and a proposed debt service payment from AWU's budget fund summary. The debt service is for refunding subordinate lien bond Series 2001B. Future wholesale customers may provide their own raw water, and in that case, would not pay the cost associated for LCRA Water Rights.

4.5.1.14. Customer Service

The labor and benefits of AWU's billing department are included in this function. This function also includes the charges by Austin Energy to provide certain billing services.

4.5.1.15. Small Calls

The labor and benefits for small call distribution system support are included in this function.

4.5.1.16. Wholesale Services

Operations costs related to AWU's Strategic Resources Services for Wholesale are included in this function. These costs are borne exclusively by AWU's wholesale customers.

4.5.1.17. Revenue-Based Volume Charge

Revenue Allocated Volume Charge is not a system function. This function was included in the analysis as a way of allocating the costs of transfers to the City of Austin General Fund and Sustainability Fund. These costs are allocated to each customer class using the proportionate share of each class' historical revenue as the basis. Historical revenues from the last three fiscal years were used in this part of the analysis.

4.5.1.18. Indirect Costs

Indirect costs that were not directly accountable to any of the functions were allocated proportionally to some or all of the functions based on weighted averages of the costs included in those functions. Costs that were allocated indirectly include most of AWU's administration and support services.

4.5.2. Step 2: Assignment of Costs to Cost Pools

Step 2 assigns costs to cost pools. A cost pool is a grouping of costs and one or more customer classes that share responsibility for that grouping of costs. AWU's costs are assigned to one of the following cost pools:

- Joint
- Retail Only
- Wholesale
- Watershed Land
- LCRA
- Indirect Fire

The *Joint* cost pool includes costs common to all customer classes. Joint costs are those costs that are shared by all customers of the water system in proportion to their respective use of the system. Other cost pools include costs specific to certain groups of customer classes. For example, costs associated with distribution are specific costs associated with serving retail rather than wholesale customer classes. Wholesale customers that provide their own raw water will not participate in the LCRA costs charged to AWU. Watershed land debt service costs are allocated to retail customers only. Specific pools, therefore, can be divided into retail customers and wholesale customers.

Table B-8 in Appendix B provides a summary of functionalized O&M costs by cost pool. Table B-9 provides a summary of specially allocated items by cost pool. Table B-10 shows those costs that are allocated based on historical revenues (as opposed to water use). These costs are described as *Revenue-Based* Volume Chargecosts and were allocated to the Joint cost pool. The general fund transfer is an example of a revenue based cost. The allocation of the cost to customer classes is consistent with the method of determining the amount of the transfer (i.e., three-year historical average revenues). Table B-11 shows how functionalized net plant in service was allocated to cost pool.

4.5.3. Step 3: Allocation of Costs by Pools to Cost Categories

To facilitate the allocation of costs by pools to customer service characteristics, costs are allocated to cost categories in Step 3. AWU's functionalized costs are allocated to the following cost categories:

- Raw Water
- Treatment Facilities
- Chemicals & Power

- Pump & Booster Stations
- Tanks/ Reservoirs
- Transmission Mains
- Distribution Mains
- Fire
- Meters & Services
- Customer Service
- Wholesale Services
- Revenue-Based Fixed Charge
- Revenue-Based Volume Charge
- Indirect Costs (e.g., administrative and general)

Cost categories provide a way to further aggregate similar types of costs after functionalized costs have been disaggregated to cost pools. For example, the functions of *Retail Meters & Services* and *Meters & Services* can both be categorized as *Meters & Services*.

4.5.4. Step 4: Allocation of Costs to Customer Service Characteristics

The assignment of costs to customer service characteristics varies with the allocation methodology used. As described in Section 3, the base/extra-capacity cost allocation method is used in this study. Under this method, costs are assigned to the following customer service characteristics based on an engineering analysis of the system:

- Base
- Extra-Capacity Demands (maximum-day and maximum-hour)
- Customer
- Meter
- Fire Flow (or Indirect Fire)

Base costs vary with water consumption under average demand conditions. They are the costs that would be incurred if water consumption occurred evenly from day-to-day and hour-to-hour and the system did not need to invest in additional capacity to meet peak requirements.

Extra-capacity costs represent costs incurred to meet water demands that exceed average levels of water usage. Extra-capacity costs are incurred because of water usage variations and peak demands imposed on a water system. Such demands are directly related to customer water consumption characteristics and fire-flow demands. Extra-capacity costs are typically divided into costs incurred to meet maximum-day and maximum-hour water demands of system customers.

Customer costs are those incurred in serving customers, regardless of water demand. Such costs include billing, customer service, and meter reading.

Meter costs are those costs that vary with the size of the meter used to serve a customer. Examples of equivalent meter costs include meter replacement and maintenance.

Fire flow costs are those related to the fire protection responsibilities of a water utility. Included in this classification are the costs of fire meters and hydrants, as well as the portion of system capacity reserved for fire suppression.

The distribution of system costs to base and extra-capacity customer service characteristics varies by water utility and can usually be determined by an analysis of the system's design features and operating history. A summary of user charge revenue requirements by customer class and customer service characteristic is provided in Table B-12 in Appendix B.

4.5.5. Step 5: Distribution of Costs to Customer Classes

The next step involves the projections of customer class water demands and their respective consumption characteristics. Typically, there are several customer classes, such as single-family residential, multi-family residential, commercial, and industrial. Table B-1 in Appendix B provides the list of customer classes used for this analysis. Each class uses a different portion of total annual water consumption. In addition, the way in which each customer class uses water is different. Consistent with the direction from the Executive Team, each of AWU's industrial and wholesale customers is identified as a unique customer class. In other words, the industrial customer class was disaggregated so that each industrial customer is now its own customer class. This is consistent with the prior treatment of wholesale customers. Identifying individual large users in this way ensures that each user is only responsible for its impact on and requirements of AWU's system. This improves the equity of the cost-of-service analyses and provides industrial customers with a direct incentive to manage its impact on AWU. Figure 4-2 outlines the procedure for allocating costs to customer classes.

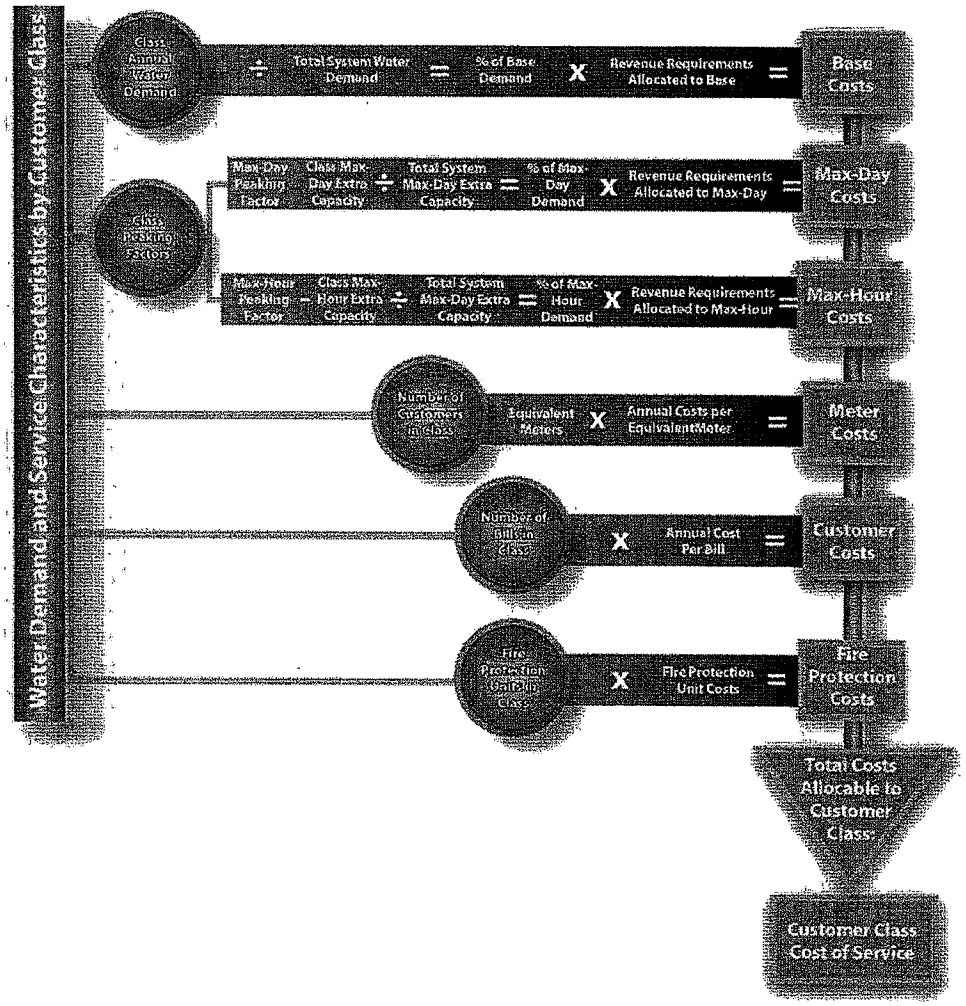

Figure 4-2 Allocation of Costs to Customer Class

Variations in water demand require the installation of sufficient capacity to meet peak uses. If a water utility's customers used water evenly throughout the year, and throughout each day, the costs of service associated with the provision, maintenance, and operation of the system would be lower.

Therefore, peaking factors that describe each customer class' variation in water demand are used to allocate system costs equitably. Generally, a review of water utility consumption and production records and other empirical evidence can be used to estimate each customer class' base, maximum-day, and maximum-hour rates of water use.

Water consumption records are usually available for customer classes only on a monthly bi-monthly, or quarterly basis, and seldom on a daily or hourly basis. Peaking factors are imputed from monthly billing records and system-wide factors and attributed to each customer class. Estimated peaking factors, together with projected water consumption, are then used to establish the costs of service by customer class. A summary of the peaking factors by customer class which are used in this analysis is provided in Table B-13 in Appendix B.

Base costs are allocated to each customer class in proportion to their average daily or annual water consumption (see Figure 4-2). Extra-capacity costs are allocated in proportion to the extra-capacity demands put on the water system above the average daily water use. Peak-usage characteristics are used to determine the portion of extra-capacity costs allocable to each user or class of users. Customer and meter costs are typically allocated on the basis of factors such as number and size of meters and services. In Figure 4-2, meter costs are allocated on the basis of 5/8-inch equivalent meters, while customer costs are allocated based on the number of accounts.

4.6. Additional Steps for Allocating Capital Costs

Allocating capital costs involves steps in addition to those outlined above. Capital costs are allocated by allocating the assets that serve customers. When using the cash-basis method of determining revenue requirements, the cash basis capital costs are recovered in a manner similar to that used for the utility basis. Under the cash-basis method, the total capital costs (e.g., debt service, non-debt finance capital improvements, etc.) is recovered as two elements. These elements include a portion recovered in proportion to the utility's depreciation expense, and a portion that is recovered in proportion to the utility's net fixed assets. The amount recovered based on the utility's net fixed assets equals the cash-basis capital cost recovered from user charges less the utility's estimated depreciation expense. The depreciation portion is based on the estimated depreciation expense. Each of these portions is explained below.

Determining the value of assets that serve each customer class is accomplished by allocating the water system's net fixed assets (i.e., fixed assets net of accumulated depreciation and contributions). Net fixed assets are allocated to functions, pools, categories, and customer service characteristics as in Steps 1 through 5 above. The

following additional steps result in an allocation of the return on rate base to customer classes.

4.6.1. Step 6: Determine Rate Base by Customer Class

The first part of determining the rate base for each customer class is to summarize the net fixed assets allocated by category and cost pool to customer service characteristics and customer class. The fixed assets allocated to each customer class are the net plant in service used and useful for that customer class. The second part of determining rate base by customer class is to calculate an allowance for working capital, or a percentage of the O&M costs allocated to each customer class. The allowance for working capital accounts for the utility's investments in working capital necessary for the operation of the utility.

Adding the net plant in service to the allowance for working capital results in the rate base attributable to each customer class.

4.6.2. Step 7: Determine Rate of Return

Because AWU uses the cash-basis method, the rate of return is determined by dividing the portion of the capital costs by the net plant in service (including the allowance for working capital.)

4.6.3. Step 8: Allocation of Return on Rate Base to Customer Classes

The final step in allocating capital costs is to allocate the return on rate base to each of the customer classes. The return on rate base for each customer class is calculated by multiplying the rate base allocated to each customer class in Step 6 by the respective rate of return from Step 7. Percentages for allocation purposes are calculated by dividing the amount of fixed assets allocated to each customer class by the total fixed assets in the system (i.e. - a prorated share). The result of Step 8 is the return on rate base attributable to each customer class. The total return included in this analysis is nearly $56 million. Table B-7 in Appendix B provides the distribution of this cost to customer class.

4.6.4. Allocating Depreciation Expenses

The portion of its cash-basis capital costs that are recovered in proportion to the depreciation expense are allocated following the same steps as for O&M costs. Depreciation is allocated on the same basis as the asset associated with each line item. Table B-7 in Appendix B shows that the total depreciation expense included in the water analysis is over $23 million.

4.7. Cost-of-Service by Customer Class

After the revenue requirements have been allocated by categories and customer class to the customer characteristics, the O&M, special costs, revenue-based allocation costs, return on rate base, and depreciation expenses are summed to determine the total cost of service by customer class. Appendix B of this report contains detailed calculations for the water cost-of-service rate analysis.

The results presented in this report are based on AWU's revenue requirements for FY2009. These rates depict the impact that changes to AWU's cost-of-service approach would have on its customers. Where appropriate, results (both rates and revenue) from this study are compared to AWU's currently adopted rates and revenue for FY2009. Within this report, the current rates and revenue used for comparison are called AWU's *Existing Rates* or *Existing*. The rates and revenue calculated within this study, using the proposed methodology, are called AWU's *Computed Rates* or *Computed*.

A summary of the existing and computed retail fixed charges is provided in Table 4-2.

Table 4-2 Existing and Computed Fixed Monthly Charges

Meter Size	Existing Rates	Computed Rates
5/8-Inch	$6.25	$6.58
3/4-Inch	7.21	7.78
1-Inch	8.55	9.24
1 1/4-Inch	10.47	11.79
1 1/2-Inch	12.39	14.36
2-Inch	16.23	21.44
3-Inch	33.15	38.92
4-Inch	52.33	75.93
6-Inch	100.35	152.09
8-Inch	148.33	859.64
10-Inch	196.33	897.18
12-Inch	225.13	919.71

Table 4-3 provides a comparison of the existing and computed volume rates by customer class.

Table 4-3 Existing and Computed Volume Water Rates

Volume Rates (per Kgal)	Existing Rates	Computed Rates
Residential		
Block 1	$0.98	$1.10
Block 2	2.59	3.00
Block 3	4.75	6.00
Block 4	8.50	8.62
Block 5	8.50	10.00
Multi Family		
Peak	$3.88	$3.66
Off-Peak	3.54	3.34
Commercial		
Peak	$4.58	$3.90
Off-Peak	4.20	3.56
Industrial		
Hospira		
Peak	$4.28	$5.01
Off-Peak	3.93	4.56
Spansion		
Peak	$4.28	$3.60
Off-Peak	3.93	3.26
Applied Materials		
Peak	$4.28	$3.74
Off-Peak	3.93	3.40
Freescale		
Peak	$4.28	$3.84
Off-Peak	3.93	3.48
Samsung		
Peak	$4.28	$3.76
Off-Peak	3.93	3.41
Sematech		
Peak	$4.28	$3.62
Off-Peak	3.93	3.30
University of Texas		
Peak	$4.28	$3.89
Off-Peak	3.93	3.53

A summary of the existing and computed wholesale rates is provided in Table 4-4.

Table 4-4 Computed Wholesale Water Rates

Charge	Existing Rates	Computed Rates
Monthly Meter Charge – 5/8-inch meter	$6.25	$6.58
Volume Charge by Customer (per Kgal)		
Creedmore-Maha WSC	$2.88	$2.93
High Valley	2.75	2.80
Lost Creek MUD	3.02	3.06
Manor, City of	2.76	3.15
Manville WSC	3.27	3.32
Marsha Water	2.78	2.85
Nighthawk WSC	2.73	2.80
North Austin MUD	3.12	3.24
Northtown MUD	2.92	2.98
Rivercrest WSC	3.10	3.10
Rollingwood	3.33	3.39
Shady Hollow MUD	3.21	3.26
Sunset Valley MUD	3.19	3.29
Travis Co. Water District 10	3.13	3.19
Wells Branch MUD	2.80	2.84
Windermere Utility Co.	6.96	7.06

The computed wholesale rates in the table above were calculated for each individual wholesale customer. The computed volume rates shown for wholesale customers are uniform rates that apply to all levels of water consumed during a billing period.

Note that the computed rates in Table 4-2, Table 4-3, and Table 4-4 are based on the cost-of-service methodologies and calculations described in this section. As such, the computed volume rates shown for multi-family, commercial, and industrial customers are seasonal rates that apply to any level of water consumed during a specific period. Peak months include July through October; off-peak months include November through June.

4.8. Rate Design

Red Oak developed a conservation impact model for AWU that allowed it to measure the likely conservation and revenue impacts of various increasing block rate designs. Based on direction from AWU, Red Oak developed a number of alternative rate analyses using the conservation impact model. Based on the review and decisions of AWU, Red Oak and AWU have identified a solution which is presented in the following subsections.

4.8.1. Residential Customers

4.8.1.1. Source of Data

AWU provided its billing data for the study. The billing data consisted of individual customer accounts for the utility from FY2003 through FY2007. This provided five historical years for the analyses.

Historically, AWU's residential customers were billed a fixed monthly charge that varied by meter size, and an inclining block volume rate for four different blocks of water use. Based on the decisions of the Executive Team, AWU is now considering an increasing block volume rate structure of five blocks for its residential customers.

Based on the proposed methodology, the computed fixed monthly charges by meter size shown in Table 4-2 above. These computed fixed charges by meter size were calculated in the cost-of-service analysis described previously in this section, and did not change as a result of the conservation impact model.

The conservation impact model was designed to calculate volume rates and block thresholds for an increasing block rate structure. Red Oak recommends AWU implement the following thresholds for the residential volume rates:

- Block 1: 0 to 2,000 gallons
- Block 2: 2,001 to 9,000
- Block 3: 9,001 to 15,000
- Block 4: 15,001 to 25,000
- Block 5: Consumption greater than 25,000.

These block thresholds, which were used in the analyses, represent a shift from a four block inclining volume rate towards a more conservation-oriented five block inclining residential rates for AWU. The existing and computed volume rates from the conservation impact model are shown in Table 4-5.

Table 4-5 Existing and Computed Block Rates for Residential Customers

	Volume Rates ($ per Kgal)		Thresholds (Kgal)	
Block	Existing Rates	Computed Rates	Existing Rates	Computed Rates
Block 1	$0.98	$1.10	2	2
Block 2	2.59	3.00	9	9
Block 3	4.75	6.00	15	15
Block 4	8.50	8.62	Over	25
Block 5	-	10.00	NA	Over

4.8.1.2. Limitations

Many assumptions are employed in a study like this. For this reason, results are not concrete in nature but are necessarily estimates. Red Oak assumes that the customer data it received from AWU is accurate and representative of the number and types of customers that are actually in AWU's service areas. This assumption includes the accurate identification of customers by customer class.

The price elasticity of demand is another important assumption in these analyses. The price elasticity of demand is a measure of the responsiveness of AWU's customers to changes in the cost of water. Economic theory suggests that increases in water rates reduce water demands. Similarly, decreases in water rates increase water demands. Although economic theory suggests the direction of these changes in demands, empirical analyses of customer reactions to changes in price are quite difficult to prepare. Many factors other than price affect customers' consumption decisions. The other factors also interact with price and make the determination of the price elasticity of demand quite difficult. A specific impact on sales cannot be predicted within the scope of our analyses. Due to all of the variables involved when changing rates, it will likely take a significant amount of time to get a reliable projection of the results (i.e., more than three years.)

4.8.2. Non-Residential Retail Customers

Red Oak recommends that for the non-residential retail customers AWU use the computed seasonal cost-of-service rates. The computed fixed charges and volume rates for non-residential and seasonal retail customers are shown in Table 4-2 and Table 4-3.

4.9. Findings

4.9.1. Introduction

The methodology used in this study follows the industry standard approaches described by the AWWA in its *Manual of Water Supply Practices: Principles of Water Rates, Fees, and Charges* and the directions from the Executive Team.

Using a cost-of-service analysis, the rates AWU charges will be in proportion to AWU's cost of providing service to each class of customers. This proportionality is a central theme in cost-of-service studies—customers pay in proportion to the cost of serving them, with no customer classes receiving a subsidy from or providing a subsidy to another customer class.

4.9.2. Findings

Calculating cost-of-service rates requires that both the use of the system and the cost of operations be estimated. In ratemaking, the costs of operating the utility are referred to as the utility's revenue requirements. The revenue requirements used in this analysis are described in Section 4.3 of this report.

Based on the analysis presented in this section, is provided below showing a summary of revenues under existing and computed rates. This table is also provided in Appendix B as Table B-14.

Table 4-6 Revenue Under Existing and Computed Rates

Customer Class	Existing Rates	Computed Rates	Percent Difference
Residential	$78,810,693	$86,709,735	10.0%
Multi-Family	34,631,345	33,857,794	(2.2%)
Commercial	61,533,634	53,740,884	(12.7%)
Creedmore-Maha	178,719	179,953	0.7%
High Valley	18,859	18,865	0.0%
Lost Creek	887,545	891,647	0.5%
Manor, City of	729	642	(11.9%)
Manville WSC	280,479	280,725	0.1%
Marsha Water	28,059	28,378	1.1%
Nighthawk	29,375	29,606	0.8%
North Austin MUD	1,170,391	1,190,933	1.8%
Northtown MUD	627,063	629,259	0.4%
Rivercrest	317,685	311,955	(1.8%)
Rollingwood	434,825	434,956	0.0%
Shady Hollow	779,199	782,897	0.5%
Sunset Valley MUD	306,657	307,207	0.2%
Water District 10	2,633,503	2,650,573	0.6%
Wells Branch MUD	1,523,677	1,529,066	0.4%
Windermere	99,340	99,649	0.3%
Hospira	348,548	406,372	16.6%
Spansion	2,092,216	1,771,037	(15.4%)
Applied Materials	373,745	343,021	(8.2%)
Freescale	3,068,951	2,763,541	(10.0%)
Samsung	3,887,156	3,402,853	(12.5%)
Sematech	398,204	345,211	(13.3%)
University of Texas	1,946,422	1,804,453	(7.3%)
Totals	$196,407,020	$194,511,209	(1.0%)

4.9.2.1. Customer Demands

One of the key elements to any cost-of-service analysis is an estimate of the likely customer demands. Estimating these demands, and subsequently, rates, is complex and subject to uncertainty. The forecast of demands in this analysis is based on recent water sales trends that may change due to external factors. External factors that impact water demands for AWU include weather, economic growth or recession, and public attitudes. The factor that varies most dramatically in Austin is the weather. Because AWU, like most water utilities, has primarily fixed costs (i.e., costs the utility incurs regardless of

water sales, such as salaries, capital improvements, etc.), the impact that a cool and/or wet summer has on revenues is not offset by a natural reduction in its costs. Therefore, the revenues of the utility are at risk from unusual summer demands. To mitigate this risk, Red Oak suggests AWU monitor its revenues closely and revise its rates and financial plan as necessary to be consistent with future circumstances.

4.9.2.2. Rate Design

Key findings from the conservation impact model include the following:

1. Due to the nature of the revenue adjustments computed in this study, AWU will need to closely watch its revenues from year-to-year. Many variables can alter a utility's revenue stream, including changes in weather, the local and regional economy, and customers' reaction to rate adjustments.

2. One of the challenges in adjusting rates is accurately predicting a revenue neutral rate design, where revenues earned after a rate adjustment equal those prior to the rate adjustment. Without a precise count of customers by meter size, it is more difficult to project a utility's total revenues.

Although AWU appears to have a solution for conservation-oriented residential rates, AWU should take great care to mitigate risk by following prudent management practices. This includes reviewing rates and revenues at least annually to see if additional adjustments are necessary.

In the process of cost-of-service analysis, Red Oak found that the cost and revenue difference between the inside- and outside-city customers were negligible. The Executive Team agreed with this finding. The computed rates in this report combine the inside- and outside-city customers and should be applied to all customers regardless of location.

Austin Water Utility
Cost of Service Rate Study 2008

SECTION

5

Wastewater Rate Analysis

REDOAK CONSULTING
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5. Wastewater Rate Analysis

5.1. Introduction

As part of its standard business practices, AWU periodically updates its sanitary sewer charges. AWU assesses these charges to fund the cost of wastewater treatment and conveyance. As in the past, AWU follows generally accepted industry standards in setting its wastewater rates. These industry standards were developed so that the resulting rates are proportionate to the cost AWU incurs to serve its customer classes.

Figure 5-1 on the next page illustrates the basic steps to generate cost-of-service water rates. The process is similar for the wastewater utility. The steps are described in the following subsections. These steps are:

1. Establish customer characteristics.
2. Calculate revenue requirements.
3. Allocate costs to wastewater system functions.
4. Allocate costs to customer cost pools.[1]
5. Allocate costs by wastewater system functions and cost pools to cost categories.
6. Allocate costs to customer service characteristics.
7. Allocate costs by customer service characteristics to customer classes.
8. Design rates.

5.2. Customer Characteristics

5.2.1. Customer Classes

Customers of a water utility are often identified according to customer class. Each customer class has unique wastewater flows and strength characteristics. Table C-1 in Appendix C provides a summary of the number of connections by customer class.

Because cost-of-service is based on the concept of proportionality, customer service characteristics for each customer class must be analyzed to allocate the system revenue requirements equitably.

Determining customer service characteristics varies with the cost allocation methodology used. As in the water study, customer and meter are relevant characteristics. The methodology used in this study also focuses on wastewater flows and strengths.

[1] A cost pool is a group of customers or group of customer classes that share responsibility in a specific classification of costs. For example, wholesale customers would not be part of a "Retail-only" cost pool, in which facilities and associated costs necessary to serve retail customers are shared only by the retail customer classes.

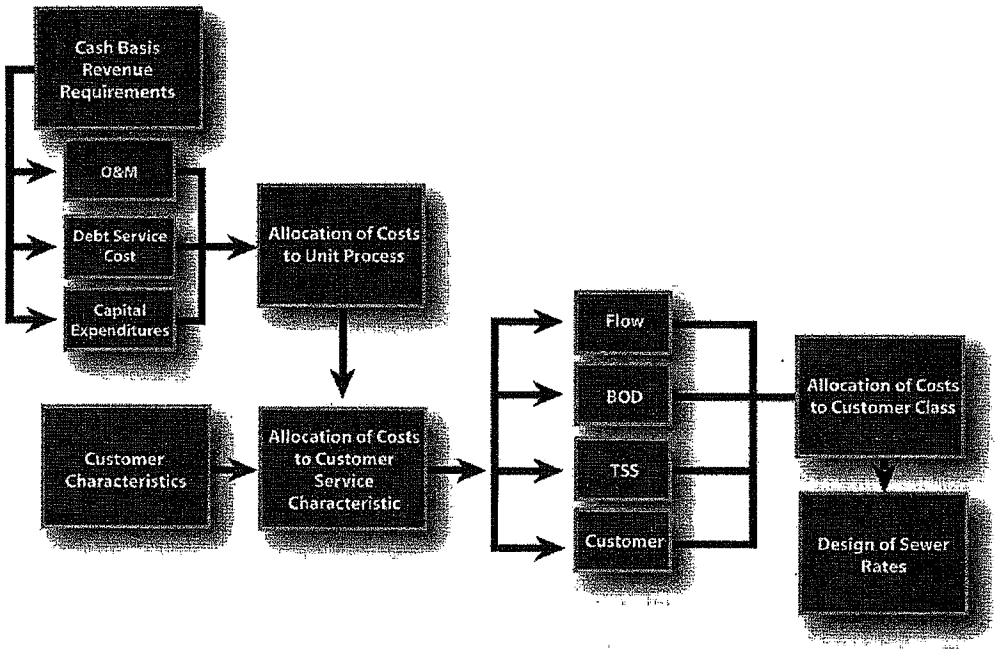

Figure 5-1 Wastewater Cost-of-Service Process

5.2.2. Measures of Wastewater Strength

Following the projection of system revenue requirements is the allocation of revenue requirements to the measures of wastewater strength that drive costs for the utility. These measures of wastewater strengths are sometimes referred to as customer service characteristics or wastewater parameters. In setting wastewater rates, the selected measures of strength are those items that drive the costs of owning and operating the wastewater utility. The wastewater parameters for AWU are:

- Flow
- Biochemical Oxygen Demand (BOD)
- Total Suspended Solids (TSS)
- Customer
- Meter

Flow costs are costs that vary with the volume of flow contributed to the system. Therefore, the relative strength of sewage does not affect flow costs. Typically, flow costs include the cost of operating lift stations and the capital costs for assets that are designed based on flow requirements. A summary of flows by customer class is provided in Table C-1 in Appendix C.

Sewage strength costs, including BOD and TSS, represent costs incurred to treat wastewater of various qualities. Examples of strength-related costs are certain chemicals and electrical costs associated with operation of the aeration basins, etc. Table C-2 in Appendix C provides a summary of wastewater strength by customer class. BOD and TSS are measured in pounds-per-day. The totals provided in Table C-2 include the BOD and TSS of each class' I&I flows.

Customer costs are those costs incurred to serve customers, regardless of wastewater flows or strengths. Customer costs are those costs that vary with the number of customers. The costs of billing and administration are examples of customer costs.

The meter characteristic is the number of equivalent meters served in a customer class. For cost allocation purposes, the number of equivalent meters is calculated to equitably assign the higher costs of larger meters to those customers with meters larger than a standard single-family residential meter.

Each customer class' proportion of the customer service characteristics is calculated to determine each class' demands placed on the water system. AWU's water customer service characteristics are summarized by customer class in Table C-3 in Appendix C.

An additional component of customer characteristics is the cost pools to which a customer class belongs. Customer classes vary in their use of the system, with costs frequently shared among all customer classes. Often, one or more customer classes may use a part of the system exclusively and therefore would be held responsible for the associated costs. All customers belong to the joint cost pool, but other specific cost pools, such as retail only, wholesale, etc., may exist. A summary of cost pool participation by customer class is provided in Table C-4 in Appendix C.

5.3. Revenue Requirements

The second element of information for a cost-of-service rate analysis is an estimate of system revenue requirements. As described in Section 4, the AWWA Manual M1 describes two methods of determining the revenue requirements of a water utility. The same methods are used for a wastewater cost-of-service analysis. These are:

1. Cash Basis, and
2. Utility Basis

A third method is a hybrid of the two and is called the Utility Basis with Cash Residual. Each method is described in Section 4.

5.3.1. Revenue Requirement Cost Components

Because government-owned utilities are required to maintain a municipal-like budget, revenues and expenses must balance. Unlike investor-owned utilities, government-operated utilities generally do not have access to sources of capital other than retained

earnings and formally issued debt. Therefore, the total revenues collected from all customers must equal budgeted revenues. AWU's revenue requirements for its wastewater utility consist of the following cost components. Each is described in greater detail below.

- Operations & Maintenance (O&M) Costs
- Debt Service
- Capital Expenditures (Not Debt Financed)
- Transfers to Capital Reserves and Other Funds

5.3.1.1. Operations & Maintenance Costs

O&M costs account for most of the day-to-day expenditures for operating a water utility. O&M costs include, for example, labor, benefits, insurance, utilities, etc. The projected annual O&M expenditures for FY2009 are provided in Table C-5 in Appendix C. The O&M expenditures for FY2009 were based on AWU's budget projections. Consistent with industry standards, these expenditures exclude depreciation expenses.

5.3.1.2. Debt Service Costs

Debt service costs are the costs associated with financing major capital improvements which are usually identified in a utility's capital improvements plan (CIP). AWU finances approximately 80 percent of its capital expenditures by issuing long-term financial instruments. It funds the remaining 20 percent from current operating revenues. This practice is typical in the utility industry for two primary reasons. First, the financial resources required for these types of projects typically exceed the utility's available resources from the normal operation of its system. Second, spreading the debt service costs for the project over the repayment period effectively spreads the financial burden of financing large improvements to both existing and future users of the system. This burden sharing allows the utility to better match the cost of improvements with those customers using the improvements. Capital improvement projects are designed to fulfill a range of needs including:

- Compliance with new state and federal regulations,
- Enhancement of the level and reliability of the service provided,
- Meet ongoing demands of system growth and economic development, and
- Replacement and refurbishment of existing system infrastructure.

AWU's debt service requirements include debt service for revenue bonds, commercial paper, G.O bonds, and water district bonds. For FY2009, the total cost is estimated to be over $82.8 million. The total cost is included in Table C-6 in Appendix C.

5.3.1.3. Capital Expenditures (not Debt Financed)

Some capital expenditures may be funded directly from the utilities revenues or operating fund. In fact, AWU's financial policies suggest that 20 percent of capital expenditures be funded by equity rather than debt. AWU's, capital expenditures from rates is estimated

to be nearly $35.5 million for FY2009. The total cost is included in Table C-6 in Appendix C.

5.3.1.4. Transfers to Capital Reserves and Other Funds

In addition to funding AWU's Water Construction Fund, AWU's water utility provides funding for the City of Austin General Fund, Sustainability Fund, Radio Communications Fund, Public Improvement District, and Environmental Remediation Fund. For FY2009, these additional transfers are estimated to be nearly $15.3 million. The transfers are included in Table C-6 in Appendix C.

5.3.2. Findings for AWU

As described in Section 3, Red Oak presented the revenue requirement options to both the PIC and Executive Team. Consistent with the Executive Team's decision, Red Oak used the cash-basis method of determining revenue requirements for this study. Also, after detailed analyses, the differences in costs, rates, and revenues between inside- and outside-city retail customers did not justify the continuing segregation of these customers by customer class. Based on this finding, the inside-city and outside-city retail classes were combined. Therefore, the computed rates in this report do not distinguish between inside- and outside-city retail customers and should be applied to all customers regardless of location.[2]

5.4. User Charge Revenue Requirements

The portion of annual system revenue requirements to be recovered through wastewater rates depends on a utility's financing policy and its other sources of income. To determine the amount of revenue that rates must generate annually, the total revenue requirements must be reduced by non-rate or other system revenues. These non-rate revenues may include, but are not limited to, miscellaneous charges and interest earnings on unrestricted fund balances. Capital reserve funds may also provide revenue to offset costs of capital improvements.

The FY2009 non-rate revenues are provided in Table C-7 in Appendix C. Approximately 45 percent of the total non-rate revenues offset O&M costs; the rest offset capital costs in the wastewater analysis. A summary of user charge revenue requirements by customer class is provided in Table C-8. The total revenue requirements of $191.4 million presented in Table C-8 equals the total O&M of $78.2 million (Table C-5) plus the total cash basis capital costs of $133.6 million (Table C-6) less the non-rate revenues of $20.3 million (Table C-7).[3]

5.5. Cost Allocations

The cost-of-service methodology described in this section uses the base/extra-capacity method for allocating costs among customer classes, as described in the AWWA Manual

[2] Because of the differences in services, wholesale customer class distinctions are maintained in this report. Only retail classes were combined.
[3] Amounts summarized within the text of this section include the effects of rounding.

M1. In theory, each customer could be charged according to the actual cost of providing wastewater service to that customer; however, it is impractical to estimate the cost of serving each of AWU's customers. As part of a cost-of-service study, analysts classify customers into relatively few, somewhat homogeneous, groups called customer classes, and then estimate the cost of serving each class.

Equitably allocating the water system's user charge revenue requirements to the customer classes involves a multi-step process. Beginning with O&M costs, the following steps were completed. Allocations of capital costs and depreciation expenses are described later in this section.

- Step 1 functionalizes the costs;
- Step 2 assigns the functionalized costs to cost pools (e.g., joint—benefiting all customer classes, or as specific—benefiting one or more cost pools);
- Step 3 allocates the joint and specific costs by cost pools to cost categories;
- Step 4 then distributes the categorized costs to customer service characteristics;
- Finally, Step 5 distributes the O&M costs to customer classes by pool based on each class' proportion of the customer service characteristics.

These steps are described in more detail in Section 4. The steps taken to allocate user charge revenue requirements do not differ between utilities. Descriptions of the functions developed for the wastewater analysis follow. However, for more detail on the steps listed above, please refer to Section 4.

5.5.1. Step 1: Functionalization of Costs

Functionalizing costs enhances the accuracy and equity of the wastewater system cost allocation to the customer classes. AWU's wastewater O&M expenditures and rate base are allocated to the following system functions:

- Collection
- Interceptors
- Lift Stations (Conveyance)
- Plant Raw Wastewater Pumping
- Preliminary Treatment
- Industrial Waste Control
- Bar Screens
- Grit Removal
- Primary Clarifiers
- Flow Equalization Basins
- Aeration Basins
- Secondary Clarifiers

- Return Sludge Pumping
- Waste Sludge Pumping
- Filters
- Disinfection and Outfall
- Revenue Allocated Costs
- Sludge Thickening
- Biosolids Management
- Wholesale & Industrial Services
- Customer Service
- Indirect Treatment
- Indirect Costs (e.g., administrative and general)

Each of these functions is described below.

5.5.1.1. Collection

O&M costs functionalized as *Collection* include those related to the maintenance of the wastewater collection system. The rate base for this function is calculated based mostly on the value of the pipes, with indirect costs of administration, land, and easements included as well. These costs are not allocated to wholesale customers.

5.5.1.2. Interceptors

This function includes the same types of costs as *Collection*. Engineering is also included in the rate base calculation for *Interceptors*.

5.5.1.3. Lift Stations (Conveyance)

Lift Station O&M includes electricity and maintenance costs. Rate base is calculation on AWU's lift station facilities.

5.5.1.4. Plant Raw Wastewater Pumping

Electricity for pumping and some maintenance costs at AWU's treatment plants are functionalized as *Plant Raw Wastewater Pumping*. The rate base costs are calculated based on influent facilities and primary effluent pumping at the treatment plants.

5.5.1.5. Preliminary Treatment

Preliminary Treatment costs include a portion of O&M at the treatment facilities.

5.5.1.6. Industrial Waste Control

This function includes the O&M costs of AWU's pretreatment program for industrial waste control. No specific assets were allocated to the AWU's rate base for this function.

5.5.1.7. Bar Screens

There are no O&M costs allocated to *Bar Screens*. The value of the screens themselves is the basis for calculating rate base for this function.

5.5.1.8. Grit Removal

There are no O&M costs allocated to *Grit Removal*. The value of the degritters is the basis for calculating rate base for this function.

5.5.1.9. Primary Clarifiers

The cost of *Primary Clarifiers* includes a portion of O&M at the treatment facilities. The value of the primary clarifiers is the basis for calculating rate base for this function.

5.5.1.10. Flow Equalization Basins

The cost of *Flow Equalization Basins* includes a portion of O&M at the treatment facilities. The value of the basins is the basis for calculating rate base for this function.

5.5.1.11. Aeration Basins

Aeration Basins costs include a portion of O&M at the treatment facilities. The value of the basins is the basis for calculating rate base for this function.

5.5.1.12. Secondary Clarifiers

The cost of *Secondary Clarifiers* includes a portion of O&M at the treatment facilities. The value of the secondary clarifiers is the basis for calculating rate base for this function.

5.5.1.13. Return Sludge Pumping

Return Sludge Pumping costs include a small portion of O&M at the treatment facilities. The value of the assets that serve to pump sludge is the basis for calculating rate base for this function.

5.5.1.14. Waste Sludge Pumping

Waste Sludge Pumping costs include a small portion of O&M at the treatment facilities.

5.5.1.15. Filters

The cost of *Filters* includes a portion of O&M at the treatment facilities.

5.5.1.16. Disinfection and Outfall

The cost of chemicals for treatment is allocated to this function, along with the values of the facilities used in the disinfection and outfall processes.

5.5.1.17. Revenue Allocated Costs

Revenue Allocated Costs is not a system function. This function was included in the analysis as a way of allocating the costs of transfers to the City of Austin General Fund and Sustainability Fund. These costs are allocated to each customer class using the proportionate share of each class' historical revenue as the basis. Historical revenues from the last three fiscal years were used in this part of the analysis.