

M54

Developing Rates for Small Systems

Second Edition



American Water Works
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Full document details: [AWWA Manual M54 2017](#)

Developing Rates for Small Systems

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If you find errors in this manual, please email books@awwa.org. Possible errata will be posted at www.awwa.org/resources-tools/resource.development.groups/manuals-program.aspx.

Library of Congress Cataloging-in-Publication Data

Library of Congress Cataloging-in-Publication Data

Names: Bradley, Daniel T., author. | Giardina, Richard D., author. | Matthews, Paul L., author.

Title: M54 : developing rates for small systems / by Daniel T. Bradley, Richard D. Giardina, Paul L. Matthews.

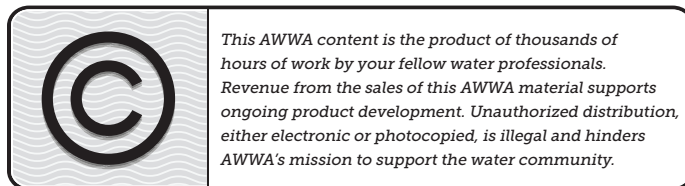
Other titles: Manual 54

Description: Second Edition. | Denver, CO : American Water Works Association, [2017] | Includes bibliographical references and index.

Identifiers: LCCN 2016048765 | ISBN 9781625760159 (alk. paper)

Subjects: LCSH: Water utilities--Rates. | Water utilities--Management.

Classification: LCC HD4456 .B73 2017 | DDC 363.6/10688--dc23 LC record available at <https://lcn.loc.gov/2016048765>



ISBN-13 978-1-62576-015-9

eISBN-13 978-1-61300-276-6

Printed in the United States of America
American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235-3098
awwa.org



Contents



List of Figures, v	
List of Tables, vii	
Preface, ix	
Acknowledgments, xiii	
Chapter 1 Basics of Water Ratemaking.....	1
Basic Premise, 1	
Water Utility Service, 1	
Financial Self Sufficiency, 1	
The Financial Plan, 2	
Cost-of-Service Rate Study, 2	
Implementing Rates, 3	
Periodic Reviews, 4	
Chapter 2 Customer Account and Usage Data.....	5
Customer Information, 6	
Importance of Customer Records, 7	
Customer Classes, 11	
Equivalent Residential Units, 13	
Chapter 3 Preparing a Financial Plan and Evaluating Revenue Sufficiency.....	17
Overview of the Financial Planning Process, 17	
Development of the Financial Plan, 18	
Establishing Target Reserve Balances, 26	
General Overview of Common Industry Practices, 27	
Summary of the Financial Plan, 29	
Overview of the Revenue Sufficiency Evaluation, 29	
Evaluating the Sufficiency of Revenues Projected Under Existing Rates, 31	
Developing a Plan of Rate Revenue Adjustments, 31	
Evaluating Alternative Plans for Rate Revenue Adjustments, 32	
Chapter 4 Rate Design	37
Rate or Pricing Objectives, 38	
Rate Design Concepts, 39	
Rate Evaluation, 43	
Other Considerations, 44	
Chapter 5 The Rate Adoption Process.....	47
Strategic and Procedural Considerations, 47	
Rate Change Phase-In Plans, 48	
Regulatory Approval of Rates, 48	
Customer and Stakeholder Involvement, 49	
Interest Group Meetings, 50	
Putting It All Together, 50	

Appendix A Alternative Cash Flow Plans	53
Appendix B Examples of Financial Policies.....	57
Cost Recovery Policy, 57	
Debt Policy, 58	
Investment Policy, 58	
AWWA Policy—Finance, Accounting, and Rates, 59	
Appendix C Frequently Used Financing Sources for Water Utilities	61
Index, 65	
List of Manuals, 73	

Figures



- 1-1 Schematic of a financial plan, 2
- 1-2 Cost-of-service steps, 3

- 4-1 Alternative rate forms, 38
- 4-2 Example of evaluation, 44

- 5-1 Comparison of monthly residential water bills, 49

- C-1 Funding opportunities from loans, grants, and partnerships flow from a capital network of federal and state agencies to water utilities in local government and the private sector, 62

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Tables



- 2-1 Number of customers by meter size for the example utility, 8
- 2-2 Number of annual water bills sent to customers by meter size, 8
- 2-3 Water use by meter size (1,000 gal), 9
- 2-4 Current rates, 10
- 2-5 Current rate revenues by customer type and meter size, 11
- 2-6 Common ERU values under the meter size ERU calculation approach, 15

- 3-1 Projected rate revenue for the example utility, 20
- 3-2 Summary of projected O&M expenses, 22
- 3-3 Summary of 5-year capital improvement program, 24
- 3-4 Summary financial plan, 30
- 3-5 Summary of alternative revenue increase plans (in thousands of dollars), 33

- 4-1 Illustration of projected revenue from fixed service charge, 42
- 4-2 Illustration of volumetric/usage charge calculation, 43

- 5-1 Basic strategies to winning public support, 51

- A-1 Alternative cash flow plan—just-in-time revenue adjustments, 54
- A-2 Alternative cash flow plan—single increase in year 1, 55
- A-3 Alternative cash flow plan—equal annual increases, 56

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Preface



PURPOSE

In 2012, the American Water Works Association (AWWA) published the sixth edition of [AWWA Manual M1](#), *Principles of Water Rates, Fees, and Charges*. That manual provides comprehensive guidance on establishing rates and charges for water service. The methods and examples contained in [Manual M1](#), while recommended and appropriate for many water utilities, may prove to be overly complex and burdensome for others. This burden applies particularly to the development of cost-of-service rates. Such rates require the determination of revenue requirements by customer class before designing and adopting a rate structure.

Recognizing the limitations [Manual M1](#) may have for smaller systems, or larger systems without sufficient data or rate-making capability, the AWWA Rates and Charges Committee (authors of [Manual M1](#)) developed the idea for a “[Manual M1-type](#)” alternative. A rate manual for small systems provides guidelines for the development of rates for utilities that lack the data and resources needed to apply the methods described in [Manual M1](#). For these utilities, this manual—*Developing Rates for Small Systems*—provides guidance in developing rates when data and information may be lacking. The Rates and Charges Committee encourages all utilities to use [Manual M1](#) as the primary guidance tool but believes this manual fills a need for small systems.

INTENDED AUDIENCE

This manual is intended to serve as a resource for managers (and others) of small water systems in the determination of rates for water service. Other resources, for example, [Manual M1](#) and state and local government agencies, may also be of value in the preparation of rates for small systems. However, this manual focuses on the unique attributes of small systems as related to financial planning and rate design. Managers and operators of small systems and their advisors (financial, accounting, and engineering professionals) should find this manual useful in preparing water rates that recover costs using generally accepted cost-based practices.

For purposes of this manual and for those who might benefit from its use, there is no reason to specifically define a small system in terms of connections or population. Rather than define a small system in either of these terms, and therefore restrict or limit the applicability of this manual, the characteristics of the systems to which this manual may apply are the primary consideration. For example, such factors include

- A lack of or limited customer or demand data
- A system that predominately serves only a single class of customers, e.g., residential accounts
- Limited system peak-day and peak-hour data
- Limited or nonexistent fixed-asset data

Regardless of size, water systems with these and other similar characteristics will likely benefit from this manual. So although this manual is generally written for systems

serving a limited population, any system having one or more of the characteristics listed above may also find it useful.

At the same time, this manual may not be applicable for many water systems. Systems with a rapidly growing or diverse customer base, those with a large industrial customer or customer base with significant outside city or wholesale service arrangements, or those with contracts requiring cost-of-service-based rates should refer to [Manual M1](#) for guidance in financial planning, cost allocation methods, and rate design. Systems seeking to materially modify their rate design approach would also benefit from the information contained in [Manual M1](#). In addition, [Manual M29](#), *Water Utility Capital Financing*, should be reviewed as well when developing a financial plan.

UNDERLYING FINANCE AND RATEMAKING PRINCIPLES

The AWWA has established policies for finance, accounting, and rates. These AWWA policies provide direction to AWWA members and the volunteers that produced this manual. These policies are updated and generally available from AWWA. The policies included in the preparation of this manual were those revised by the Board of Directors on January 17, 2010.

The relevant AWWA policies for this manual include:

1. Water utilities' revenues from water service charges, user rates, and capital charges (e.g., impact fees and system development charges) should be sufficient to enable utilities to provide for:
 - Annual operation and maintenance expenses
 - Capital costs (e.g., debt service and other capital outlays)
 - Adequate working capital and required reserves
2. Water utilities should account for and maintain their funds in separate accounts from other governmental or owning entity operations. Water utility funds should not be diverted to uses unrelated to water utility services. Reasonable taxes, payments in lieu of taxes, and/or payments for services rendered to the water utility by a local government or other divisions of the owning entity may be included in the water utility's revenue requirements after taking into account the contribution for fire protection and other services furnished by the utility to the local government or to other divisions of the owning entity.
3. Water utilities should adopt a uniform system of accounts based on generally accepted accounting principles. Utility practices should generally follow the accounting procedures outlined in AWWA's accounting textbook, *Financial Management for Water Utilities: Principles of Finance, Accounting, and Management Controls*.
4. Modifications may be made to satisfy the financial and management control reporting needs of the utility and to meet the requirements of legislative, judicial, or regulatory bodies.
5. Water rate schedules should be designed to distribute the cost of water service equitably among each type and class of service. Rate-setting practices that are not based on cost of service may be appropriate in some situations, subject to legal review and approval, provided they reflect market conditions, the benefits received by the users of the service, and an appropriate balance of the goals and objectives essential to the public good. Any rate-setting practice not based on cost of service that is implemented by a utility should be fully disclosed to its customers, regulators, and the financial community. Such disclosure should identify each such rate-setting practice, its expected benefit, and its impact on the utility's customers.
6. Water utilities should maintain asset records that detail sufficient information to provide for the monitoring and management of the physical condition of infrastructure. These asset records should also support planned and preventive maintenance programs and budgets adequate to maintain the utility's assets at a level of service consistent with good utility practice. Utilities should annually provide comparative information to customers, the financial community, and

the general public about the utility's sustained capability to provide water service and generate revenue levels necessary to protect the financial investment of others in the utility. Such information could include historical expenditures for renewal and replacement during each of the past several years, as well as the revenues that would be generated under planned and adopted rates to support renewal and replacement during each of the next several years

OVERVIEW OF THE MANUAL

This manual contains five chapters and three appendices:

- Chapter 1: Basics of Water Ratemaking—presents an overview of the rate-setting process.
- Chapter 2: Customer Account and Usage Data—discusses the importance and use of system and customer account and usage data in the rates-setting process and begins a case study that presents this type of data for an example small utility.
- Chapter 3: Preparing a Financial Plan and Evaluating Revenue Sufficiency—discusses the types of costs often encountered in a small water utility, the establishment of reserves, and the process of developing a projection of costs and the compilation of a cash flow statement for use in projecting the need for future revenue adjustments. Continuing the case study, this chapter calculates revenues from current rates based on the customer and usage data contained in chapter 2. This chapter also discusses the process of determining revenue requirements and presents alternatives (as part of the case study) for increasing revenues, with consideration given to the use of reserves and the impact on customers.
- Chapter 4: Rate Design—discusses considerations and alternatives in the design of rates and illustrates a rate-design option based on the case study developed in the previous chapters.
- Chapter 5: The Rate Adoption Process—presents a variety of issues associated with the rate design process, including system development charges and funding of capital infrastructure, rates by customer class, affordability, public involvement, and the regulatory process for approval of rates (for investor-owned and some government-owned utilities).
- Appendix A: Alternative Cash Flow Plans—presents complete alternative cash flow plans.
- Appendix B: Examples of Financial Policies—presents various financial policies that utilities should consider.
- Appendix C: Frequently Used Financing Sources for Water Utilities—presents possible funding alternatives for small water utilities.

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Acknowledgments



The AWWA Management and Leadership Division gratefully acknowledges the contributions made by those volunteers who drafted, edited, and provided the significant and critical commentary essential to updating M54. The Editorial Review Board members dedicated countless hours in the final stages of preparation of this edition to ensure the overall technical quality, consistency, and accuracy of the manual.

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Chapter **1**

Basics of Water Ratemaking

BASIC PREMISE

Water utility services are best provided by autonomous and financially independent utilities. Autonomous service means that the utility does not rely in any substantial way on outside agencies or entities for financial support. This also implies that the revenues collected by the utility are sufficient to operate and maintain the fixed assets as well as meet the ongoing operational needs of the utility over time while minimizing long-term financial costs for the users.

WATER UTILITY SERVICE

Although water itself, whether obtained from surface water or groundwater sources, is often free, the collection, treatment, and distribution of water to customers are not free. Services that are typically provided by water utilities include: water supply, storage, treatment, transmission, distribution, fire protection, metering, administration, billing, and customer service. The cost of each of these functions may be tracked in the utility's cost accounting system by various levels of detail. The cost of water utility service is typically expressed in annual operations and maintenance and annual capital costs.

FINANCIAL SELF SUFFICIENCY

The financing of water utilities in North America relies substantially on rates and fees charged to the utility's customers. Other sources of financing (e.g., property tax revenue,

support from the community's general governmental funds, federal and state grants) have become increasingly less common. Meeting the financial needs of the utility has become an important responsibility of the utility's management and policymakers.

THE FINANCIAL PLAN

A financial plan is (see chapter 3) used by a utility to ensure its long-term capital and operating needs are met by future water rates. Figure 1-1 presents a basic schematic of a financial plan. In addition to annual operation and maintenance costs the plan should also address the capital costs needs of the utility. For utility planning, a multiyear financial plan is recommended that determines the annual revenue needs to prudently fund the utility's operating and capital needs.

An engineering master plan is the ideal starting point for determining capital costs. An engineering study of the infrastructure needed to serve projected levels of water demand in the longer term provides such information. The next step is the development of a capital improvements program (CIP). A CIP is a systematic listing of needed improvements ordered by priority and year. It usually spans a minimum of five years but may be longer. Ongoing operational costs also need to be studied. These include treatment costs, staff, administration, ongoing maintenance, meter reading, billing, and so on.

COST-OF-SERVICE RATE STUDY

Figure 1-2 presents six commonly followed steps to conduct a cost-of-service rate study. These steps are more fully described in [AWWA Manual M1](#). A brief description of the process follows.

The first step in developing cost-of-service rates is to determine the revenue requirements. The revenue requirements for most utilities are taken directly from the utility's financial plan discussed in later in chapter 3 of this manual. The rates calculated by the cost-of-service study are set to generate an amount of revenue equal to the revenue requirements.

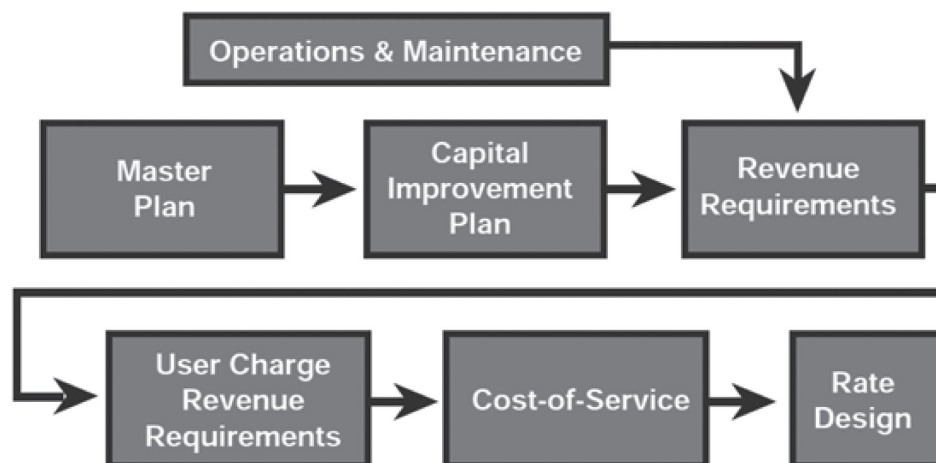


Figure 1-1 Schematic of a financial plan

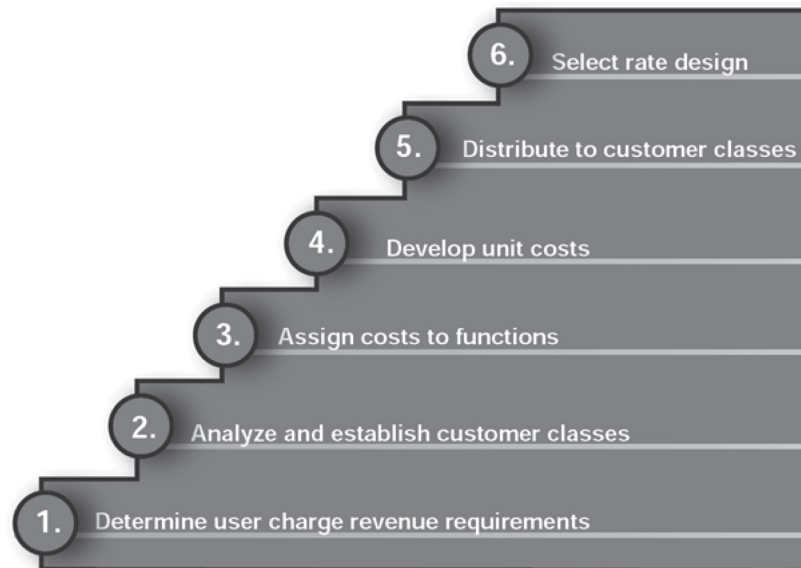


Figure 1-2 Cost-of-service steps

As a next step, in addition to determining revenue requirements, a cost-of-service study will often examine how the utility places customers into classes. Some small systems may have only one class of customers. Others may have separate classes for single-family residential, multifamily residential, commercial, institutional, irrigation, and so on. When a utility separates customers into classes, it generally adopts separate rates for each class to recognize the differences in the costs incurred to serve each class.

The third step in a cost-of-service study is normally to assign costs to functions. Common water system functions include source of supply, treatment, pumping, storage, transmission and distribution, meters and services, customer service, and billing.

After assigning costs to water system functions, the rate analyst develops unit costs for each function based on how the utility's customers use the system. These unit costs serve as the basis for the cost-of-service rates.

Once the unit costs by function are determined for each function, the analyst distributes these costs to each customer class by multiplying the units of service demanded by each customer class by the unit costs for each function. The product resulting from this multiplication is called the *cost-of-service for the customer class*.

The final step in a typical cost-of-service study is to select a rate design. The rate design is the specific set of rates for each class of customer to recover the cost-of-service for that customer class. Most rate designs use the unit costs developed in a cost-of-service study to set the fixed charges (i.e., that part of the rate design that does not vary with the amount of water used but may vary with the size of the meter) and the volume charges. Chapter 4 of this manual discusses the rate design process.

IMPLEMENTING RATES

After a rate design has been selected and rates calculated, the utility should consider engaging its customers in a public process. That process could range from a simple public presentation to more complicated presentations using study/focus groups with representative customers. Chapter 5 discusses the rate adoption process in more detail.

PERIODIC REVIEWS

Regular reviews of the utility's financial status are critically important to stay abreast of revenue needs, meet operational needs, and help the utility to achieve long-term cost efficiencies. Many utilities benefit from conducting these reviews annually as part of their budgeting process. In those cases, the utility may update its financial plan based on changes that have occurred since adopting the current rates. Minimally, the periodic review should include:

- Assessments of revenue received versus expenses
- Operational cost trends versus budgets
- Capital cost expenditures trends versus capital plan
- Maintaining sufficient operational and capital reserves
- Condition assessment of major fixed assets
- Trends in customer use (including the effects of conservation)

Chapter 2

Customer Account and Usage Data

This chapter discusses a utility's customer base, the specific customer information a water utility should consider in order to calculate water rates and charges, and how that information should be applied. This chapter also introduces the example utility that will serve as the case study throughout this manual.

Appropriate water rate setting should embrace the concepts of fairness, equity, and cost causation.¹ These concepts are applicable to both the utility's customers and to the utility itself. First, water rates should be structured so that each class of customer and, to the extent practicable, the individual customers within each class are paying their appropriate share of the cost incurred by the utility in providing service to those customers or classes. Also, the utility should try to avoid situations in which one customer or customer class is unnecessarily subsidizing another. In accomplishing these rate-setting objectives, it is necessary to ensure that the rates are based on accurate customer information and data.

Second, the total revenue that is collected by the water utility should be reflective of the cost of operating the utility. To meet this objective, a utility should collect revenues sufficient to meet its revenue requirements and satisfy covenants associated with its outstanding indebtedness and other legal or self-imposed financial performance measures (e.g., financial performance targets recognized as prudent by the utility industry and credit rating agencies; see chapter 3).

¹ "Cost causation" is the principle of attributing or allocating costs to specific customers based on whether the customers "caused" the costs either because (1) the costs are brought into existence as a direct result of providing service to the customers; or (2) the costs are avoided if the service to the customers is not provided.

A utility should also have a stable rate revenue stream over the long run to enhance its overall financial integrity. For the water utility to successfully meet all of the aforementioned goals when setting water rates, it must have a good foundation of customer account and water usage data on which to establish those rates. At a minimum, in order to promote fairness and equity in the rates, the utility must know the number of customers being served and the amount of water being consumed within a given year or billing cycle. The utility must also know the overall revenue requirements to effectively operate the water utility (see chapter 3). Additional customer information may serve to improve the utility's ability to enhance the fairness and equity of its rates and charges, e.g., water use by class and meter size.

Accurate customer data are critical for establishing supportable water rates that are fair and equitable to customers and that will generate sufficient revenue for the utility. Further, good records are necessary to adequately assess the impact of alternative rate structures on issues such as revenue sufficiency and stability, individual customer or customer class equitability, and conservation goals and objectives. By far the most significant source of revenue for most water utilities is that produced from water sales. The application of a well-designed rate structure to the number of bills and/or metered water usage produces the revenues needed to sustain the utility's financial well-being.

CUSTOMER INFORMATION

The primary source of customer information is the utility's customer billing system. Much of the information that is necessary to produce a utility bill is the same information that is required to establish water rates. The development of a rate structure can be hampered by inaccurate customer billing records, resulting in rates that do not generate sufficient revenue to meet the utility's revenue requirements, satisfy its debt covenants, and provide fair and equitable charges to its customers. In the absence of adequate or accurate customer records, the utility should make an investment to improve its customer information before moving forward with a comprehensive rate review. Prior to such an investment, however, the utility should attempt to identify various shortfalls and problems with its existing customer records. Possible improvements could include a customer profile survey, the re-creation of records, and compilation of other information that could assist in the development of equitable rates and charges (e.g., determining equivalent residential units [ERUs] as discussed later in this chapter) dependent on the particular shortfalls in the utility's customer database.

It is also critical to understand the limitations of the existing billing system in implementing alternative rate structures. Rate structures that require information that is not currently maintained in the existing database or that cannot be collected and entered economically or efficiently should not be considered unless plans exist to modify the billing system.

As previously stated, it is likely that much of the information necessary to develop a schedule of water rates is contained and available within the utility's billing system. However, accessing that data in a timely and cost-effective fashion may not be possible. It is important that, as part of the rate-study process, ample time is allowed for the identification, extraction, compilation, and review of the customer data from the electronic database. There may be technical challenges in each step of this process that slow access to this information. These technical issues should be identified and corrected if possible. Once retrieved from the database, this information should be reviewed and audited for accuracy and reasonableness. This data will be the foundation of the utility's water rates, and errors in the data could result in inappropriate rates or in the utility collecting too little or too much revenue.

IMPORTANCE OF CUSTOMER RECORDS

For the purposes of water rate setting, accurate and detailed customer records are important in the areas of (1) number of customers, (2) metered consumption, (3) billed revenue data, (4) peak-period demand data, and (5) information on public and private fire services. For some utilities, not all of this information is readily accessible or even available. The example illustrated in the balance of this manual is based on the following data:

- Number of customers
- Metered consumption
- Billed revenue

Number of Customers

As a starting point, most utilities maintain certain standard customer-related statistics. This information typically includes a listing of water utility customers and their billing addresses. Along with this information, most utilities will have details related to the size of each customer's meter and, if multiple rate classes are used, the class for each customer. This type of information does not generally change between billing periods and forms the basis of the customer record. Along with the basic information are other data that generally are updated for each billing period. These include metered consumption data, payment history, and service call history. Data for past billing periods may be available on a monthly/quarterly/semiannual or aggregated year-end basis, depending on the sophistication of the utility billing system and the frequency of billing.

A utility should maintain records regarding the number of water bills it has issued in terms of meter size and customer class. This detailed information is necessary to accurately develop customer-related charges such as a minimum charge (which may include some water usage allowance) or service charge (billing or meter units that do not include a water usage allowance). These base or fixed charges are common to almost every type of alternative rate form and may be significant in terms of providing the water utility a stable source of revenue.

Table 2-1 shows an example tabulation of the number of metered accounts by meter size and by customer class, as well as the number of unmetered accounts by class. As discussed below, this information can represent a year-end accounting, annual average, monthly average, or other billing period. The basis of reporting should be clearly specified in the database so the reporting period is clear to the user.

Within any given water utility, it is common to bill all customers on the same frequency, although billing frequencies may vary by classification of customer. For example, residential accounts may be billed quarterly while other accounts are billed monthly. This variation may be done for a variety of reasons, but the result is that there may not be a one-to-one correspondence between the number of customers within a class and the number of water bills generated. For the example illustrated in this manual, all customers are billed monthly. In Table 2-2 all customers (see Table 2-1) are assumed to have been active and receiving service for each month of the year; as such, the number of accounts multiplied by 12 yields the number of bills shown in Table 2-2. In reality this is rarely the case because customers open and close accounts as they move in and out of a community.

Calculating number of customers. The number of customers can be calculated in a variety of ways, depending on the amount of detail available. It is most common to assume that the number of customers is equal to the number of metered and unmetered services.

End of year. The end-of-year customer count may be used to determine the number of customers. An advantage with this count is that it reflects the net number of accounts added throughout the year and, in the absence of a known change in the customer base, forms a reasonable basis for projecting accounts for the coming years. For a smaller utility

Table 2-1 Number of customers by meter size for the example utility

	Residential	Nonresidential	Total
<i>Unmetered Accounts</i>	200	40	240
<i>Metered Accounts</i>			
5/8 in. and 3/4 in.	1,900	80	1,980
1 in.	—	15	15
1 1/2 in.	—	5	5
2 in.	—	4	4
3 in.	—	3	3
4 in.	—	2	2
6 in.	—	1	1
Total metered accounts	1,900	110	2,010
Total all accounts	2,100	150	2,250

Table 2-2 Number of annual water bills sent to customers by meter size

	Residential	Nonresidential	Total
<i>Unmetered Accounts</i>	2,400	480	2,880
<i>Metered Accounts</i>			
5/8 in. and 3/4 in.	22,800	960	23,760
1 in.	—	180	180
1 1/2 in.	—	60	60
2 in.	—	48	48
3 in.	—	36	36
4 in.	—	24	24
6 in.	—	12	12
Total metered accounts	22,800	1,320	24,120
Total all accounts	25,200	1,800	27,000

that does not experience significant turnover in accounts, this method may be adequate for projecting the number of future customers for rate-setting purposes. In a steadily growing system, if the end-of-year values are used to estimate revenues for the year in question, these values may overstate the revenue.

Annual average. The annual-average customer count is the average of the customer count from the beginning of the year and the end of the year and, as such, corresponds more closely with the costs incurred to produce water for that same period of time. However, it has the disadvantage of understating the customer count in a growing utility and overstating the customer count in a utility with a decreasing customer base. The practical risk is that if the average is used for rate setting, the actual revenues received by the utility may not be the same as the forecasted revenues. Care should also be taken if this approach is used by a utility with significant seasonal variations in the number of accounts, i.e., resort and “second home” communities.

Monthly average. The monthly average customer count is calculated by taking the arithmetic average of the 12-month end-customer counts to produce the average number of customers per year. This figure can be more accurate than either the end-of-year or annual-average values because it captures the month-to-month changes in customers that can occur. This approach will produce a more accurate per-customer cost, but it also shares the risk of misstating forecasted revenues if the annual average is quite different

from the year-end customer count balance. If the utility has a significant seasonal population, this approach may be more accurate.

Metered Consumption

In order to design and evaluate alternative rate structures and to determine those that best meet the utility's goals, it is important to have detailed customer consumption records. Available information may be limited to metered volume by customer account for utilities that do not have multiple customer classes or use tiered rates (rates with two or more unit-volume rates and associated usage blocks or steps) and/or seasonal rates. At a minimum, individual customer data should be maintained on an annual basis, but preferably it should be maintained on a billing cycle basis (monthly, bimonthly, quarterly, etc.) for at least one full year.

Metered consumption is of particular importance in areas where weather can vary significantly from year to year, water usage is sensitive to weather patterns, and the utility currently has or is considering a rate structure that reflects this variability of demand. For example, in regions where discretionary uses such as lawn irrigation constitute a large proportion of annual or at least seasonal water sales, the utility may want to institute a water conservation rate structure to encourage efficient use of the system and resource. In such cases, water consumption by customer class by billing period is necessary to establish such a rate structure.

In the illustrative example developed for purposes of this manual, annual metered water consumption data were assumed to be readily available only for total residential and total nonresidential customers (metered). Water consumption information was not available by meter size. To determine the consumption for accounts with meters larger than 3/4 in., the utility manually aggregated the water bills to calculate consumption on the 30 accounts that comprise the 1-in. to 6-in. meter customers. An estimate was used to determine the water use for the unmetered nonresidential accounts based on the known consumption of the total metered accounts. Similarly, the unmetered residential account usage was based on the average usage per account for the metered residential accounts. This information is summarized in Table 2-3.

If possible, this type of billing data (ideally on a monthly basis or the utility's billing frequency) should be maintained for a period of 3 to 5 years in order to provide the

Table 2-3 Water use by meter size (1,000 gal)

	Residential (1,000 gal)	Nonresidential (1,000 gal)	Total (1,000 gal)
<i>Unmetered Accounts</i>	25,300	16,400	41,700
<i>Metered Accounts</i>			
5/8 in. and 3/4 in.	240,000	7,500	247,500
1 in.	—	3,520	3,520
1 1/2 in.	—	2,350	2,350
2 in.	—	3,000	3,000
3 in.	—	4,220	4,220
4 in.	—	7,510	7,510
6 in.	—	16,900	16,900
Total metered accounts	240,000	45,000	285,000
Total all accounts	265,300	61,400	326,700

utility with a database that encompasses a wide range of potential weather conditions and related water usage and demands on the system. The availability of this type of data enables the water utility to “test” various alternative rate structures against a variety of weather conditions. This information further allows for the analyses and establishment of necessary reserves or working capital balances that should be maintained to enhance the revenue stability of the utility during periods of lower-than-normal water usage caused by weather conditions or other events.

Another important reason to keep detailed records of metered consumption by class of customer and/or meter size on a billing period basis is to enable the development of a bill frequency distribution analysis, or bill tabulation analysis.² A bill tabulation analysis is particularly important in the development of block rate structures or in the establishment of lifeline rates, where a different unit rate is assigned to metered consumption that falls in a predetermined consumption or rate block. In these rate designs, it is necessary to know the percentage distribution of the annual water use by class in each of the consumption or rate blocks. Without that knowledge, there is a risk that the calculated water rate will result in revenues that may be significantly different from the utility’s revenue requirements.

Billed Revenue

A third customer parameter (in addition to the number of customers and amount of metered consumption) that is important in the development of rates and that is maintained by most utilities is billed revenue. Most often this information is available by customer class and perhaps by meter size if the rate structure includes a charge that varies by meter size. This information is important for the utility to use as a benchmark when comparing actual billed revenue to the billed revenue anticipated from proposed new rates. In practice, this is done by applying existing rates to the customer account and consumption data to develop a “base” level of billings. The existing rates for the example utility are illustrated in Table 2-4 and are used to develop the revenues illustrated in Table 2-5.

The base billings can then be compared with actual billings. This comparison will allow the water utility a measure of the accuracy of the billing statistics or units of service with which it is working and will provide for a reasonable level of accuracy that the anticipated revenue will be achieved when the proposed rates are applied to these billing units. Table 2-5 shows an example of billings under existing rates based on the number of bills and metered consumption statistics developed in the previous tables. For the example utility, fixed revenues represent revenue from unmetered accounts and the fixed charge assessed all metered accounts. Volume revenues represent the volumetric or consumption portion of the customer’s bill, i.e., the \$1.50-per-1,000-gal rate applied to metered water use for the example utility. For the example, utility total revenues are calculated at \$801,000 for the “base” year.

Table 2-4 Current rates

Type of Account	Rate
<i>Unmetered Accounts</i>	\$25.00 per account per month
<i>Metered Accounts</i>	
Volume rate	\$1.50 per 1,000 gal
Fixed charge	\$12.50 per account per month

² This analysis is described and illustrated in [AWWA Manual M1](#), appendix C.

Table 2-5 Current rate revenues by customer type and meter size

	Residential		Nonresidential		Total		
	Fixed	Variable	Fixed	Variable	Fixed	Variable	Combined
<i>Unmetered Accounts</i>	\$60,000	\$ —	\$12,000	\$ —	\$72,000	\$ —	\$72,000
<i>Metered Accounts</i>							
5/8 in. and 3/4 in.	285,000	360,000	12,000	11,250	297,000	371,250	668,250
1 in.	—	—	2,250	5,280	2,250	5,280	7,530
1 1/2 in.	—	—	750	3,525	750	3,525	4,275
2 in.	—	—	600	4,500	600	4,500	5,100
3 in.	—	—	450	6,330	450	6,330	6,780
4 in.	—	—	300	11,265	300	11,265	11,565
6 in.	—	—	150	25,350	150	25,350	25,500
Total metered accounts	285,000	360,000	16,500	67,500	301,500	427,500	729,000
Total all accounts	\$345,000	\$360,000	\$28,500	\$67,500	\$373,500	\$427,500	\$801,000

When a rate change is made, customer inquiries regarding their bills often increase. To assist staff in responding to such customer calls, it is helpful if the utility's billing database contains readily accessible historical billing information by individual customer. It is also helpful to use this information to establish water use profiles so that customer impacts can be estimated based on changes in rates. These profiles are good tools to have available when addressing and explaining rate adjustments or a new rate structure in public forums.

CUSTOMER CLASSES

Customer account and metered consumption information is used to establish customer classes for the purposes of water utility billing. Rates should be developed so as to assign cost responsibility to each individual customer served by the utility in a way that reflects the cost incurred by the utility in serving each customer. Often, it is neither economically practical nor possible to determine the cost responsibility and applicable rates for each individual customer served by a utility. However, it is common to determine the cost of providing service for classes of customers that have similar water use characteristics and also for special customers that have unusual water use or service requirements. One objective of effective ratemaking is to assign costs to classes of customers in such a manner that rates are equitable by approximating the cost of providing service to each customer class.

To achieve this objective, customers may be divided into classes that share common service characteristics and water use and demand patterns. An example of these characteristics can be found within the residential customer class. The residential customer class primarily consists of single-family or dual-family dwellings. This group typically uses the smallest water meters, commonly 5/8 in. or 3/4 in. In many utilities, lawn irrigation in the summer months by the residential customer class places a significant peak-demand requirement on the system. These characteristics, prevalent across most residential users, provide the common thread for creation of a residential customer class for purposes of aggregating customer data and analyzing costs.

Comparatively, other large water users may not rely on the same extensive network of smaller distribution mains for water service; these customers typically rely on larger

water meters to measure their flow requirements. These customers often use water at a fairly constant rate throughout the day, resulting in a lower peak-demand requirement on the system when compared to the residential class. This distinction illustrates the importance of considering rates by customer class and the need to maintain usage data by customer class.

In very broad terms, the following are common definitions of customer classes:

- Residential:* One- and two-family detached dwelling units
- Commercial:* Multifamily apartment buildings and nonresidential, nonindustrial business enterprises
- Industrial:* Manufacturing and processing business enterprises
- Wholesale:* Master-metered customers that are generally located outside the jurisdictional limits of the water utility and that serve individual customers within their own service areas

As previously noted, one advantage of classifying customers into discrete classes or groupings is that it allows the utility to provide the starting point for considering different rates for each class of customer. This may be useful if the data exist to analyze the different demand characteristics and usage patterns of each class and, as appropriate, establish rates that maintain fairness among the different customer groups. Some utilities break down the four customer classes described above into more specific groups. For example, the commercial customer class may be separated into multifamily residential customers and commercial customers. Similarly, the industrial customer group may be subdivided into small industry, large industry, and special—the latter typified by a customer that is wholly unique to the utility and so significant that it is not reasonable to put that customer into a class with other customers. The special industrial customer could include a petroleum refinery, a pulp mill, or a power plant. Other classes may include consideration of different-sized commercial or municipal accounts.

For some utilities it may not be necessary to establish multiple classes of customers. Based on the principles of common service characteristics, water use and demand patterns, and jurisdictional limits, a small utility may identify only one, two, or perhaps three of these classes as being applicable to its particular circumstance. It is also less likely that a small utility serving a relatively homogeneous group of customers would develop specific groups within the classes. This would only occur if there were very unique and special circumstances for a particular customer or group of customers within that utility (e.g., a large university/college campus).

In some cases, data are not available to establish customer classes. In addition, there can be considerable variation in total use and demand characteristics within the traditional customer classes of residential, commercial, and industrial. For example, a bank with no public restrooms or lawn irrigation requirements will tend to have significantly lower consumption and different peaking patterns than a restaurant; yet both are typically classified as commercial. As an alternative, some utilities use meter size as a method to classify customers or to separate customers into subclasses.

In developing groupings of meter size for classification purposes, it is important to examine the total water use per customer in each class and, to the extent billing data are available, try to group customers that appear to have similar peaking characteristics. As an example, this latter analysis can be approximated by looking at use per customer during peak-demand periods (e.g., the summer) and use during nonpeak periods. An example of such a customer classification may be small class—5/8-in. and 3/4-in. meters; medium class—1-in. to 2-in. meters; large class—3-in. to 6-in. meters; and very large—larger than 6 in. For most smaller utilities, only two or three groupings should suffice.