Proposal for Water and Sewer Rate Analyses
City of Tonganoxie, Kansas

Purpose and Need

This proposal describes the need, responsibilities, timing, investment and other issues for rate analyses (later referred to as "analyses") of the water and sewer utilities for the City of Tonganoxie, Kansas (later referred to as "you"). These analyses will be performed by GettingGreatRates.com (later referred to as "I"). To adequately fund operation of your utilities, build and maintain reserves, fund capital improvements and related debt service, and establish rates that are fairly structured for ratepayers, you need to analyze your rates and fees, set them appropriately and periodically reset them. The services proposed are intended to support you as you satisfy those needs.

Expected Results

With completion of the analyses:

1. You will discover at what level your utilities need to be funded to accomplish needed system development, refurbishment, repair, maintenance and operation.
2. You will have the "proof" you need to convince council members, ratepayers and property owners why rates and fees should be set as modeled.
3. You will have the "proof" you need to show funding agencies and the lending market why your systems deserve the grants, loans and loan terms you desire.
4. You will successfully comply with your permit to dispense water, NPDES permit and other requirements from the regulatory agencies.

Firm Revenues, Qualifications and References

One-hundred percent of the firm's revenues come from rate analysis and related work. Visit gettinggreatrates.com/ggr/freebies/ReferenceList.pdf and see the attached for detailed qualifications and references. The list includes all rate analysis clients since 2013. GettingGreatRates.com has one office in Jefferson City, Missouri but we operate nation-wide.

Carl Brown, President, will perform all analysis work for this project. He has been doing rate analysis work since 1993. For most of that time he has also been teaching practitioners all over the U.S. on rate analysis and rate setting, writing the rate setting book called, "How to Get Great Rates" and designing rate analysis software.

Jacki Hicks, the firm's Vice-president, will likely assist in these analyses by doing data testing and data input. Ms. Hicks prepares analysis models, especially those for analyses that require databases. Ms. Hicks has approximately 23 years of experience in accounting, financial assurance and complex spreadsheet and database design. Seven of those years have been devoted to utility rate analysis.

GettingGreatRates.com serves as the rate analyst for the Kansas RATES Program https://krwa.net/TECHNICAL-ASSISTANCE/Rate-Reviews. Kansas Rural Water Association (KRWA) member systems qualify for a 25 percent discount on all fees. The Association verified that Tonganoxie is a member system of KRWA, therefore, you qualify for this discount.

You may expect your analysis results package to look much like the rate analysis report package attached and others that can be found at the bottom of this Webpage https://gettinggreatrates.com/freebies/freebies.shtml.

Form of Agreement

This proposal and your acceptance (probably by e-mail message) of one or more service packages is all the agreement I need. Nearly all my clients acquire my services this way. However, if you prefer to attach a cover "letter of agreement" or signature page to this proposal, you are welcome to do so.

Guarantee

If you are not satisfied with our work, don't pay us.

Details: If you are unsatisfied with our work, simply tell me about it. I will do my best to make it right by you. If I still am not able to satisfy you, notify me by mail or e-mail. I will cease the services in question at that point, you will owe me nothing for those services and I will refund any payments you may have already made for those services.

This has been my guarantee policy from the day the company was formed. No client has invoked this guarantee to date and I don't plan to have you be the first.

Scope of Services That You May Select or Decline, at Your Option

The following service packages are intended to satisfy your rate analysis and rate setting needs.

- Service package 1 is analysis of your water utility's user charge and other fee adjustment needs. Analysis will include output from modeling of your current financial situation and, perhaps, several proposed rate scenarios that depict rate structures and other variables you may want to consider. All potentially productive scenarios that you or I conceive of will be modeled and reported to you.
- Service package 2 is the same as service package 1, except it is for the sewer utility.
- Service package 3 is for on-site visits. Each visit will be one instance of this service package. (I generally recommend one on-site visit to present the completed analyses and recommendations and to answer questions at a public council meeting. That is especially useful when I analyze more than one utility, or the analyses and rate adjustments are complex.)

You may add or drop service packages at any time.

Approach and Timeline

For most of my clients, rate analysis and eventual rate adjustments take about six months from start to finish. That is mainly because clients must gather data for the analysis and make some interim decisions as the project proceeds – that takes time. Completion time is only slightly affected by my workload. Generally, we are able to move analyses along almost as fast as data and guidance are available. If we start soon and you are able to gather data very quickly, we can have your analyses and report done by January 1, 2019.

Most analyses include the same basic elements, but they do not necessarily get completed in the same order. And, each situation calls for special considerations and treatments. However, your project will likely proceed approximately as follows:

1. I will call your contact person, probably the day I am notified that I will be doing the analyses, to discuss data needs and get the contact started on initial data retrieval.
2. Your staff will assemble and send to me data and information, most of which is described in the "Data Needs Sheet," attached. I will guide your staff through the entire process. Where data is missing, I will create estimates or help you to create estimates. Initial data retrieval will be accomplished early on, preferably within a few weeks. But, some data will be acquired throughout the project.
3. I will analyze this data and information and build your rate analysis models.
    a. Coordinating with your contact, I will target a set of goals ten years in the future. These will include, at least, covering all costs, including capital improvements over that time period, and building appropriate reserves.
    b. I will model rates on a "cost-to-serve" basis to satisfy those goals. You may request other structures and I will model those, as well.
    c. Key model building will probably be completed about three months into the project, if you collect data quickly. Some modeling will continue through nearly the end of the project.
    d. Once models have been built, "what-if" scenarios will be run to find the optimum mix of rate and fee levels and structures, capital improvement funding options, reserve levels, etc. to suit the needs of your utilities.
4. During the last half of the project I will examine as many scenarios of your possible future as it makes sense. I will share with you all that are potentially useful.
5. You will likely choose to consider adopting rates and funding levels from the one or two most promising scenarios for each utility.

6. Final output will include a cover letter, a narrative report of my findings and recommendations and copies of the analysis scenarios that interest you.
    a. The project is "complete" when you say it is. Until then, I will reanalyze and issue supplemental reports until you are satisfied.
7. If you choose the on-site visit service package, I will present my final analysis results and recommendations to your council in person. While there I would also like to meet with staff to discuss how to make needed changes to billing, equipment replacement scheduling and any other administration or operational issues that are discovered.
8. As you draft proposed amendments to your ordinances and budgets to make the rate, fee and other changes, at your request I will review those changes to assure that they will accomplish what you intend to accomplish.
9. The council will pass ordinance amendments to set new rates and fees and make budget revisions and other changes. From this point forward, your utilities will be headed to a better financial future.

Work Coordination and Contacts

Generally, I will only communicate with your designated contact(s) about the analysis. There are degrees of exceptions:

1. I keep KRWA informed of my activities through the RATES Program. Therefore, I copy them on proposals, invoices, rate analysis reports and similar importance level communications. But, I have an understanding with them that they will not divulge to others, information I share with them. Other than, perhaps, using your project as a teaching example, they have little call for discussing your situation anyway.
2. It is rarely, but sometimes, beneficial for me to contact funding or permitting agencies, and similar entities, about funding options and such. But, I would discuss that with your contact first.
3. On occasion, a ratepayer, developer or someone else who would be affected by new rates will call or e-mail me direct. In those situations, I speak courteously with people and give them general information about how I perform analysis and the like. But, I do not divulge important specific information about the client's analyses. I leave that up to the client. I apply Point Number 3 above to council members, staff and other people who are not designated contacts but who are concerned about the rate analysis or they want to "guide" the analysis even though they are not one of my contacts.

Early on you will probably designate your finance director and public works director or delegated staff to be my contacts. This stage is primarily a data gathering and modeling function. When we progress to the reporting out stage you may want to also designate a policy-related staff person or governing member as I prepare rate, fee and proposed policy action recommendations.

I sum up my contacts policy like this. You are my client. I work for you. When I give my work product to your designated contact, it becomes your property and no one else's until you make it public.

Use of Electronic Technology

I do almost all analysis work electronically and remotely, receiving and sharing data and information by e-mail attachment. I prefer to receive numerical data in a spreadsheet format and textual material in a word processor format, but we can work with other formats, too. When I return material to you that you need to manipulate further, such as a revised ordinance, I will return it electronically in a format you can conveniently use. You will receive my analysis reports, the analyses and my recommendations electronically as PDF documents.

Investment

Because Tonganoxie is a member system of KRWA, you qualify for the 25 percent Kansas RATES Program discount. Therefore, following are your complete investments for my services, materials and travel costs, based upon the service descriptions above:

- **Service package 1**, water rate analysis – full fee of $7,703, less the Kansas RATES Program 25 percent discount of $1,926 yields a **net fee of $5,777**
- **Service package 2**, sewer rate analysis – full fee of $7,703, less our multi-study discount of $1,155, and less the Kansas RATES Program discount of $1,637 yields a **net fee of $4,911**
- **Service package 3**, on-site visits – $887, less the Kansas RATES Program discount of $222 yields a **net fee of $665 per visit**

If you choose service packages 1, 2 and one visit from package 3, the group of services you most likely need, the total investment will be $11,353, including total multi-study and Kansas RATES Program discounts of $3,784.

Once the project gets started you may add or drop service packages as your needs become clearer.

Proposal Acceptance

This proposal is effective through December 31, 2019, if you choose at least one service package by November 1, 2018. Once you tell me what service packages you desire, and you provide data to work with, I will immediately start to produce the analyses.

Promptly given the data I need, there is no good reason why I cannot complete the analysis part of the project by January 1, 2019.

Action item: If you accept this proposal call me to tell me what services you desire. Or, give me the same information in writing by e-mail message.

Payment

I will first invoice you the day of, or perhaps the day after I am notified you want me to do the analyses. In that invoice you will have the opportunity to pre-pay (make payment by the 30-day due date) and capture an additional 2.5 percent pre-payment discount. **For packages 1, 2 and one visit from package 3, that discount would amount to $284.**

If you choose not to pre-pay (about two-thirds of my clients select that option), I will re-invoice you for one-half of the project dollar amount after 90 days from proposal acceptance and the balance when I submit the final report package. You shall promptly pay the full amounts of those invoices. If you request and pay for services but later cancel those services, I will refund those fees to you. If I cancel any services in this proposal (I have yet to do such a thing), you will owe me no fees for those services and I will refund any fees you have already paid for those services.

In Closing

I am looking forward to the opportunity to conduct your rate analyses, so you can get your utility rates and finances set on an excellent course.

Best regards,
GettingGreatRates.com

Carl E. Brown
President

June 4, 2019

The Honorable Jason Ward, Mayor
City of Tonganoxie
P O Box 326
Tonganoxie, KS 66086

Subject: Utility Rate Analysis Report – Updated

Dear Mayor Ward:

Attached is the rate analysis report package for the City's water and sewer utilities. Before I address the report package, I have some important housekeeping to do.

Rate analysis is data intensive, using large volumes of information and many kinds of data. When my calculations indicate that I have the "wrong" data or that something else is amiss, I ask for more data, different data and verification from the City's contacts that I finally have data as right as can be determined.

My almost exclusive data collection contacts with the City have been Dan Porter, Assistant City Manager and Kent Heskett, Public Works Director. Both have been wonderful to work with. They know so much about the utilities and their finances and have fielded many data and information requests from me. They also gave me lots of suggestions and guidance, based upon their knowledge of needs of the utilities and the ratepayers, too. That enabled me to get an accurate picture of the City's rate setting needs.

Through it all, these gentlemen got what we needed without any fuss. To them I want to say, Thank You. To you and everyone else who will read this, I want to say I really appreciate the great help they gave me. Having contacts like that makes this work a joy. But more important, it makes it accurate. I think the City is fortunate to have staff like Dan and Kent.

I have another thank you to offer, this time to Elmer Ronnebaum and Greg Duryea of the Kansas Rural Water Association (KRWA). Elmer and Greg, and KRWA could take the path of many other water associations and focus on the building, permitting, compliance and running of water and sewer utilities. That is, after all, the core mandate of such associations. But Elmer and Greg go the extra mile to see to it that all the needs of utilities are met, not just the core. Importantly, that includes funding and rates. They offer the Kansas RATES Program, through which I served you. Their expert work in this effort is a value-added proposition. I think when you have a chance, you should thank them, too.

Now, I have a report package to get to. The package is a bit long. Covering all the bases does that. The report contains lots of details. However, each rate analysis was done using, essentially, the same spreadsheet template. Once you get acquainted with the water rates model, you will find the sewer rate analysis to be familiar. The resulting rates of each are quite different from each other, but the same methodology was used to calculate each set of rates.

Still, there is a lot to digest. Do not feel like you must understand everything right away. When the Council is ready to consider the results and my recommendations, I will attend a Council meeting to go over everything. At that meeting, you, the Council, staff and the public will learn many things about what needs to happen to your utility rates and why. I look forward to that.

Finally, I am sure you and the Council members know of other cities, towns and utility districts that also need rate setting help. As you run into these folks at rural water association meetings, municipal league meetings and other venues, I hope you will tell them about my services. I get much of my business by referrals from past clients and I hope to be able to trace several future clients back to my work with Tonganoxie.

Best regards,
GettingGreatRates.com

Carl E. Brown
President

Enclosure

City of Tonganoxie, Kansas

Water and Sewer

Rate Analysis Report

Prepared June 4, 2019

Carl Brown, President
GettingGreatRates.com, LLC

Table of Contents

The Meaning of This Report, in a Nutshell

This report is quite detailed. The math behind the report is complex. Both make interpreting the report difficult. Following is the "Cliff's Notes" version of what the calculated rates will do and what they mean.

The notion the rate calculations in this report are based on is called, "cost-of-service" rates. This is the prime industry standard for utility rate analysis. Quite simply, if a customer causes the utility to incur a cost, that customer should reimburse the utility for that cost. With just a few exceptions which will be discussed later, that is how rates were calculated. One could reasonably say that the calculated rates will be adequate and fair.

Everyone will naturally want to compare the calculated rates with the current rates to see "What will happen to me?" The bills of many customers will go up under the calculated rates compared to their current bills. Bills for other customers will go down, or not go up as much.

When customers whose bills will go up the most make this comparison, many will think the calculated rates are not fair. In fact, those customers are currently being subsidized by others who will see their bills go down, or not go up as much. Thus, everyone needs to change their benchmark for what is fair. It is not the current rates. It is the cost to serve them.

As to how much rates, overall, need to go up, the sewer system needs almost no revenue increase, initially. The water system needs a modest revenue increase, initially. Both will need small rate increases in future years to keep up with inflation. But that inflation rate is expected to be lower than the rate at which incomes are projected to rise, so rates will become more affordable with time. And, the utilities will be well-funded, enabling them to provide good, dependable service to customers.

Introduction

The City of Tonganoxie, Kansas, later called "the City" or "you," hired GettingGreatRates.com, later called "me," "we" or "I," to perform rate analysis of its water and sewer utilities, collectively called "the utilities," to produce a report of my findings and recommendations and to provide you with guidance on rate setting.

Adequate rates are job one in rate setting and the City has been handling that well. The utilities' revenues are generally adequate to cover current needs, with reserves somewhat lower than I recommend. Each has unique issues, but they have more issues in common. All will be discussed in detail later.

Job two is setting rates in a fair structure, preferably in a cost-to-serve structure. The recommended rates will bring you very close to that structure for sewer rates. They will not be quite so close for water rates because, in consultation with City staff, I made an across the board adjustment to reduce the cost-to-serve minimum charges by $5.00 per month. I did that to reduce "rate shock;" the abruptness of the rate changes for many customers. Therefore, by adopting the rates in this report, you will go almost immediately to cost-to-serve sewer rates. Arriving at cost-to-serve water rates will take another round or two of structure adjustments over the next several years. I recommend you pursue such additional changes during the next one or two rounds of water rate analysis.

As to the analysis methodology, this report is the culmination of a process where I submitted numerous information and data requests to the City, almost always to my primary contact, Dan Porter, Assistant City Manager; and sometimes to Kent Heskett, Public Works Director. Both replied promptly and thoroughly.

We went through several iterations of this step. I subsequently modeled the City's finances and rates for each utility using that data and submitted those items for review and feedback. Mr. Porter reviewed those draft submittals to assure accuracy, and in some instances, he corrected data. With that feedback, I prepared and submitted a draft full report. Again, Mr. Porter reviewed and gave me feedback, from which I revised the full report slightly to arrive at this final report.

The report is in two parts. The first is this narrative report that tells readers what should be done to the utilities' rates and why. The second is a printout of the spreadsheets, later simply called the "models" when referring to all of them. The models, nearly identical to each other, are a set of integrated calculations that mathematically depict each utility's situation and how I arrived at the recommended rates.

As you read this report, please keep this in mind. The report does not *direct* the City to do anything. Actions you take or do not take are strictly up to you. The report is meant to inform and educate so you can then make well-informed decisions about actions to take. And the report and models are not legal recommendations. For legal issues consult your attorney.

Finally, a note about water meter sizes and the water and sewer rates. For most systems, I recommend meter size-based system development fees and minimum charges from a five-eighths inch water meter up to a ten-inch meter. Why different rates for different meter sizes? Quite simply, "big" customers cost the utility more, in terms of capacity to serve. Thus, "big" customers would be assessed higher system development fees and minimum charges.

I recommend you adopt the full slate of meter size-based rates. That way, if you have a large business or plant that wants to locate in the City, you will have appropriate rates in place for them. Then, if they want to negotiate less than full price for the six-inch meter they need, for example, you will be on firm footing to stand your ground, if that is what you want to do. And if you are willing to "give," you will be able to show the prospective new customer, and all other ratepayers, just how much you are giving up, to get them to locate in your service area. If you start off with no adopted fee for a six-inch meter, you place yourself at a disadvantage when a prospect tries to negotiate lower fees.

Rate Analysis, in a Nutshell

At its simplest, rate analysis helps a utility arrive at rates and fees that are adequate – they will pay all the utility's costs. The next level of complexity is to arrive at rates that, on an average cost basis, will enable the utility to recover fixed and variable costs "fairly." Most small water and sewer utility need analysis only to this level of complexity – doing more results in rates that are overly complex.

Another level of complexity includes calculation of meter size-based minimum surcharges and system development (connection) fees. Another includes calculation of rates on a "marginal" cost basis, for special groups of customers. Yet another level is marginal cost basis calculation of rates for individual customers, such as a wholesale customer. These facets of analysis result in accurate but complex rate structures; appropriate for a larger utility with diverse customers.

Analysis can and should provide a sound basis for advising the utility to "go or don't go" concerning various actions it might take. Some of these actions are purely financial. Some, like the decision to enter into, or not enter into, a wholesale supply agreement, for example, include "hassle factor" and other non-financial issues.

Rate Setting Resources Beyond This Report

Over the years, I have found that several topics are common to lots of utilities. I used to specifically write such things into each rate analysis report, stretching the length of those reports. Now, I cover such things in separate guides, all available for FREE download at https://gettinggreatrates.com/freebies/freebies.shtml. Following is a listing of several guides and resources:

1. How to Get Great Rates© (e-book)
2. Rate Setting Issues Guide©
3. Replacement Scheduler©
4. CIP Scheduler©

The first two give guidance on rate setting and related issues. The last two are spreadsheet applications that enable users to build their own equipment repair and replacement and capital improvement schedules, calculating their costs and calculating revenue needs to pay those costs. In fact, these spreadsheets were extracted from my model template and made a bit more user-friendly for do-it-yourselfers. You will see these same sheets in the models in this report.

Later in this report, when I leave explanation of something to one of the above resources, I will tell you in which resource you can find the detailed discussion of that issue discussed.

There are other guides and resources on that site. All are FREE, so I invite you to check them out.

"Front-loaded" Rate Adjustments

For several reasons, I have modeled rate adjustments that are front-loaded. That simply means, the initial rate adjustments (overall increases) will be greater than would appear to be needed right now. That will kick-start the building of reserves. Across-the-board increases will be less than the rate of inflation in the future. Thus, inflation will overtake future rate increases and draw reserves back down to the target levels after ten years.

Why have I done that?

- When the price for a service goes up, some customers change their behavior – they use less. That causes the calculated revenues to be higher than you will end up collecting. I made assumptions about how much conservation would "cost" the water utility, and calculated rates that are that much higher. But only time will tell how much customers conserve. I chose a more cautious approach regarding conservation. Note: Water conservation can reduce sewer use, too. But sewer bill reductions tend to follow attempts at water conservation rather than the other way around.
- Capital improvement costs, and how they will get paid, are big wildcards. To be conservative, I assumed you would receive no State or federal grants. If you do get grants, you will be able to slow down future rate increases to compensate.
- I found that the system development fees (connection fees) you booked during the test year, which were accounted for as other types of fees, were less than the fees I calculated at the then current rate of growth and the fees in place at that time. To be conservative, I assumed a similar reduction in revenues for the fees I modeled. Plus, system development fee revenues are quite speculative anyway.
- In future years, if you find you are retaining and accumulating reserves faster than I projected, or you receive grants that I assumed you would not, you can take several actions:
    - You can slow down future rate increases to slow down reserve accumulation. You will never get complaints about slower increases. But, were I to recommend only slight rate increases now, and next year you discover I was being too optimistic, it would be more difficult for you to increase rates to "catch up." Or,
    - You can accelerate capital improvement programs. That will enable you to over-deliver on service quality and system resilience.

Delayed Rate Adjustments

For rate modeling purposes, your rate adjustments have been delayed. Granted, you will adjust rates on a schedule that suits the City, so adjustments are not being delayed in your frame of reference. However, all calculations in my modeling template have been set up with the assumption that rates will be adjusted within the one-year period that follows the test year. The test year was January 1, 2017 through December 31, 2017, so the template assumes rates would have been adjusted on a date during calendar year 2018, with the actual date of adjustment specified by me.

I have now assumed that all rates will be adjusted in time to be in effect for the July 1, 2019, billing. Therefore, revenue increases to be generated by the adjusted rates have been delayed by the same number of months. Likewise, the overall initial rate increases have been raised proportionately so you will reach the reserve goals by the end of the modeling period on December 31, 2028.

This information is granular detail. It may be esoteric to most readers. But I wanted you to know about this important set of assumptions that affect the calculated rates.

Cost-based Rate Calculations

To give you a synopsis of rate analysis, as I do it, and to make it easier for you to read and understand my findings and recommendations, a tutorial on my methodology is in order. This description uses water and sewer as the example media, but the notions generally apply to the other utilities, too.

When I analyze rates for a government-owned water-based utility, and other utilities that are empowered to assess cost-of-service rates, I use the cost-needs approach. This approach is exhaustively described in the American Water Works Association's "M1 Manual, Principles of Water Rates, Fees and Charges." This manual, in use since the 1960s and periodically updated, is considered by many to be the "Bible" of water rate setting best practices. The cost-needs approach is a static (one year) rate calculation. I enhance that approach by projecting costs and revenues into the future, so rates and revenues can keep track with inflation and other changing factors.

The cost-needs approach results in rates that are called, "cost-to-serve" or "cost-of-service" rates. Simply stated, the costs for a targeted time period, usually in the near future, are classified as "fixed," "variable," "capacity to serve" or some combination of the three. Fixed costs are converted to a minimum charge. Variable costs are converted to a unit charge. Capacity costs are converted to some combination of system development fees and surcharges to the minimum charge.

The first cut of this classification process is done in Table 8, page 47, for water (and in the same table number for sewer). Your water rates situation is somewhat complex so the "Average Fixed Cost/User/Month" from Table 8 of the Model is used for calculating the base minimum charge. Also, from that table, the "Average Variable Cost to Produce/1,000 gallons" is the basis for calculating unit charges.

The second cut at rate structuring is to arrive at capacity costs. For water and sewer, these were calculated in Table 11, page 55, and distributed to system development (tap-on) fees and surcharges to the minimum charge in Tables 13, page 57, and 15, page 59, respectively. The capacity "share" of costs of each meter size is based upon the calculated shares in Table 12, page 56.

The third cut is to project costs ten years into the future. Generally, this is done by applying an expected inflationary factor to each cost. Some expenses, like postage, permit fees, taxes, treatment chemicals and electricity, rise with inflation plus growth in the customer base or use. Those were increased in future years by both factors.

The fourth cut is to set reserve goals and project those through the tenth year. Those goals will only be met if (primarily) rates are set, and periodically reset, high enough.

The fifth cut is to arrive at the full suite of rates needed to fully fund each utility. This is a dynamic set of calculations, too complex to completely explain here. I will leave out some details. The "Cliff's Notes" version is this:

- The calculated bases for fixed costs and variable costs (Table 8) establish a ratio of the revenues that each rate component would generate.
- To increase overall revenues to a target, each revenue stream is increased by the same percentage. Thus, the revenue streams remain in the same ratio to each other. That maintains the cost-to-serve nature of the resulting rates.
- Once the overall revenue increase need is established, the base minimum charge is "back calculated" from the minimum charge revenue stream. The unit charge is "back calculated" from the unit charge revenue stream. The resulting rates are the starting rates, what you will (hopefully) adopt initially. In later years, you will increase these starter rates and fees by an inflationary factor. With each round of across-the-board increases the rate structure will diverge from a true cost-to-serve structure. But, until you reach a total increase of around 20 percent, the rate structure will be close enough to cost-to-serve that a new comprehensive rate analysis will not yet be needed.
- Of course, system development fees, minimum charge surcharges, investment earnings, penalties and other income sources generate smaller revenues, which are added to rate revenues. And, I assumed future inflationary rate increases, so those revenues are added over the years, as well. Without explaining the details, you should have a sense that, while the math is complex, the rates are calculated to be proportionate to the costs each customer causes and the revenues will be adequate to cover all costs for the next ten years. That is, if our projection of costs and other things turn out to be accurate.

Cost-to-serve rates are considered by many, including me, to be the most mathematically fair and defensible rate structure. However, there are often good reasons to adopt rates that are at least somewhat different from true cost-to-serve rates. Thus, a cost-based rate analysis often is just the starting point for calculating the rates that a utility may eventually decide to adopt.

I usually recommend meter size-based minimum charges composed of two parts:

- One is the basic cost to make any level of service available to any customer. These are the so-called, "fixed costs." Billing, general administration and similar costs that are the same for all customers, regardless of "size," make up the base minimum charge. To make it easier to understand this concept, and related concepts, I use catch phrases. For this type of cost, the phrase is: *These costs are related to the fact that you have customers.* For every customer you have, you incur one increment, or "share," of this type of cost.
- The other part of the minimum charge is a surcharge intended to recover all or part of peak flow or unusual capacity costs. These are almost always based upon water meter size because the larger a meter is, the greater is its capacity to sustainably pass peak flows (as determined by American Water Works Association studies). This peak flow capacity relates well to the cost of building infrastructure "big enough" to handle peak flows. *Capacity costs are related to the fact that a particular customer has a certain capacity to demand flow or service, regardless of how much flow or service they actually use.* The surcharges are added to the base minimum charge to arrive at the surcharged minimum charge for each meter size.

With this structure, the smallest meter size customers end up paying the lowest minimum charge. As meter size goes up, a larger capacity surcharge is added to the base minimum charge resulting in ever higher total minimum charges for larger meter size customers. Remember: It's not just how much water such customers use that determines how much they cost the utility. It's how big and robust they cause the utility to be built, because it must be built robust enough to handle their maximum demand should they someday draw it.

Unit charges are related to the volume of service received. While unit charges can be structured in various ways, the revenues they generate should be adequate to pay those costs that are related to the flow that customers actually use.

There are three main unit charge structures that I recommend in different situations:

- Some systems need "conservation rates," or, their administrations simply like the notion of encouraging customers to use less of the utility's services. In this rate structure, the unit charge goes up as volume used goes up. Most of us respond to, or at least we think twice about it, when we are assessed a higher price to buy more of something. Conservation rates are most appropriate in areas with limited water supplies or in utility that are bumping up against their capacity to produce water.

- Most systems use, and should use, level unit charges – a unit charge that is the same regardless of how much volume a customer uses. With level unit charges, everyone is assessed unit charges at the average unit cost. Such rates are the easiest to calculate, they are the easiest for a clerk to explain to a complaining customer on the phone and the revenues such rates will produce next year are the easiest to accurately predict. I like to tell most of my clients that if they are going to err either on the side of complex rates that precisely assess costs to each customer or simpler rates that round off some of the accuracy corners but are easier to administer, choose simple rates. Most water service, and almost all sewer service is billed using level unit charges. I am recommending such a structure for you, too.
- The last major unit charge structure is called, "declining" rates. These are the reverse of conservation rates. I often call them, "use encouragement" rates. It is popular these days for many to belittle those who do not conserve resources at every opportunity. Declining rates are often scorned for that reason. However, if a system has an ample water supply and ample infrastructure to produce and distribute it, doing so will not cause unintended bad (mostly environmental) consequences; and if the governing body wants to encourage high use (which often entails such users hiring more or better paid workers), declining rates make good sense. Declining rates are most appropriate in areas that have a high concentration of high water - using industries or in an area where folks want to attract such users.

To complicate the aforesaid just a bit, rate setting is, indeed, about recovering costs. Job one of utility rates is to pay the utility's costs. But usually proper rate setting is also about building adequate reserves; funding a capital improvements program (CIP); catching up on needed equipment repair and replacement (R&R); and covering similar needs. Thus, these soon-to-be-experienced costs or likely-to-be-experienced costs need to be factored into rates and fees, as well. Because time marches on and costs usually inflate over time, rate setting should account for future incremental increases to cover inflation. And, you cannot just assume that because the utility needs more revenue that your ratepayers will be glad to pay higher rates. Rate affordability, and the public's perception of affordability, must be addressed, too.

Even the simplest rates situation requires some complex and integrated calculations to account for these factors. For that reason, I build a spreadsheet for each analysis that depicts, in virtual reality, the utility's real-life financial and rates situation.

These models are dynamic. When the initial rate increase is set higher, future inflationary increases can be lower. When minimum charges are set lower, unit or other charges need to be set higher to make up the revenue shortfall. When system development fees are assessed, the utility's other charges can be lower. When future expenses need to be higher, or lower, or of a different nature, the model adjusts rates and fees accordingly. Such modeling enables me to do dynamic "what-if" scenario calculations. That enables me to arrive at the "best fit" rates for the utility.

Coincidentally, such a dynamic model makes it easy to calculate rate and other changes over the next two or three years, too. If, in the next two or three years, you find that something is going to be different from what we initially assumed, and you think it will affect rates and revenues, just give me a call. I can adjust the model and re-run the rates. Most adjustments like that take me a day or less to do, so the fee for that additional service usually runs less than $500. And, oftentimes, I find I can just talk clients through most situations for no fee. I am here to help you keep your rates in great shape, so bear this in mind over the next few years and just call when you don't know how to approach a situation.

Two final thoughts on this topic:

- Almost always, rate adjustments include revenue increases. Thus, time is money, often big money, to the utility. A rate increase delayed is a rate increase that must be even higher to reach the same reserve target. Get to know this report well but do not spend months mulling it over. Time will not make your rate setting task easier. Proceed deliberately but quickly and make the needed changes. If you cannot make all the needed changes at the same time, make those that you can as soon as you can.
- You will get complaints from some customers about their bills going up. In my experience, most of the time, when the math is laid out for all to see, most people are understanding. Cost-to-serve rate analysis does not arrive at unfair rates. It arrives at fair rates. The degree by which some customers' bills will change highlights the fact that rates are unfairly structured right now.

Please keep the above summary of cost-based rate calculations in mind as you read on.

Principles

I use several guiding principles when I help systems set their utility rates, fees and policies. As you read the report and models, keep in mind that my recommendations have been weighed against these principles:

1. Water, sewer and all other utilities are businesses, regardless of who owns them. Businesses must cash flow properly. Otherwise, they go out of business and your customers do not want that.
2. In addition to functioning in a business-like manner, a utility has a responsibility to its customers to strive to guarantee its long-term prosperity for their benefit. The customers expect the service to be there whenever they want to use it. Thus, a utility must err on the conservative side by building and maintaining strong reserves that will enable it to weather financial storms.

3. If a service costs the utility money, the utility should recover that cost from the most logical "person" if that makes good business and community administration sense. For example, generally "growth should pay for growth." Developers should fairly pay for their consumption of utility capacity by paying commensurate system development fees. Likewise, service users should pay for what they use. Each user or class of users should pay their fair share of service costs.

4. Sometimes contradicting point 3 above, if adjusting a rate, fee or policy will turn currently "good" customers into "bad" customers, or discourage development that the community desires, consider the necessity of the change carefully before making it. For example, while it may be warranted, raising the minimum charge markedly to your residential customers may make it very difficult for fixed, low-income customers to pay their utility bill. That may cause more of them to pay late or not pay at all. That may trigger the utility's attorney to write collection letters to those customers and eventually require shutoff of service. Thus, in the attempt to generate more net revenue by raising rates, net revenues may go down due to non-payment and payment collection costs. Likewise, stifling development with uncompetitive system development fees costs a utility in the form of additional paying customers. That forces existing customers to pay all the costs of the utility rather than sharing them with new customers.

For the techie reader, the analysis model we use – a Microsoft Excel spreadsheet application we call, "CBGreatRates" – is usually 3.8 mega-bites in size. Each rate analysis includes one of these sheets.

For a 1,000-connection utility, for example, we use another spreadsheet, 12.1 mega-bites in size, to sort and calculate customer volume use. We use one of these sheets for each rate class. There are usually five or so for the simplest rates. Each of these sheets is linked to the client's usage data file, usually a few mega-bites in size, for importing usage data. Thus, an analysis for a 1,000 connection utility totals 65 or so mega-bites in size.

For some of our larger client utility with more rate classes and more customers, total size of all the linked spreadsheets runs over 250 mega-bites. We run computers with lots of RAM and memory but some of the calculations for larger utility can take around 90 minutes to run. When usage data sheet runtimes get long, we usually switch to a database format application to speed up the heavy number crunching.

General Issues

Concerning construction of the models, they were built to match the systems' actual financial statements and other data as much as possible. However, the intent of rate modeling is to see to it that the resulting rates are adequate to pay all system expenses for the next ten years, build and maintain responsible reserves and collect fees from customers on a fair basis. Because incomes and expenses in your financial statements, and other data, were not always grouped in such a way as to enable the required rate calculation methodology, tables in the models do not always match your statements.

For modeling purposes, it does not matter whether funds are held in the general system account, a debt service sinking fund, repair and replacement fund, etc. Therefore, the models account for funds in a more simplified way than you probably will. When it comes to segregating funds, staff knows best how to do that, so the models do little in this regard and leave the segregating up to staff.

Several line graph charts in the models graphically depict some things which would be difficult to pick out of the tables. In all the charts, the **blue line** represents what would happen under the **recommended** rates and the **red line** under the **current** rates. Financial trends for the red lines are (generally) bad. Those for the blue lines are (generally) good. Review the definitions section of the water model (definitions were left out of the other models to keep the report shorter) to learn the meaning of terms used in the charts.

I will say it simply, like this. Chart 8 depicts reserve levels under the existing rates (red line) and the modeled rates (blue line). When the blue line goes up, that is a good thing for the utility. When the red line goes down, that is a bad thing, at least, if you decide to keep your current rates. If either line is headed down toward zero, that is a very bad thing that needs to change by reducing costs, if you prudently can, or increasing rates.

In contrast to Chart 8, Charts 3 and 4 in the models depict user rates. When the Chart 3 and 4 blue lines go up, meaning rates are going up, customers don't like that. But the utility will be better funded as a result of those higher rates and that benefits ratepayers because it makes their utility more resilient and able to make improvements that will serve them better.

One thing you will notice in viewing the charts in the models is this. Sometimes, only one of the lines shows up. When that occurs, it means that all the lines are taking the same path (one line is covering up the others). For example, sometimes Chart 5 shows only one line – the working capital goal amount. When that happens both the current rates and the modeled rates' net revenues are adequate to satisfy the goal, so those two lines are hidden by the line for the goal. That is because, in the models, I programmed all funds that exceed what is needed to meet the working capital goal to "spill over" into the CIP and Debt Service fund reserve. When that happens, rest assured, the other two lines are underneath the goal line and that is a good thing.

Charts 6 and 7 can do the same thing, making it seem like the current rates are "just as good as" the modeled rates. But, Chart 8 will spell the difference between the two sets of rates. The modeled rates will generate more revenue and, thus, produce stronger total reserves. Since the working capital reserve gets truncated at a certain level, the differences in the total reserves show up in the CIP and Debt Service fund balances. These balances appear near the bottom of Table 6, page 45, and they are included in the Chart 8 amounts on page 69.

As you set and later reset rates, I suggest you follow the guidance I give in my book, "How to Get Great Rates." I gave a copy to Mr. Porter so check with him about reviewing it. You may also want to use the "Replacement Scheduler©" spreadsheet for future equipment replacement scheduling. This is one of the free downloads I mentioned earlier.

Action Recommendations for Policy and General Issues

Use the following as a checklist of "to-do" tasks. Many if not all these things you are already doing but they bear repeating. The first three items are a bit specific. Items after that are more general in nature:

1. Billing of multiple "units" and multiple minimum charges: The City assesses multiple minimum charges to customers in certain situations.
    a. The first has to do with water rates, with names such as, "1 Minimum," "4 Minimums," and so on. This means that a four-plex, for example, that has one meter serving the building would be assessed four minimum charges; one for each living unit in the four-plex. Though it is a rather blunt instrument, this billing practice makes sense on a capacity-to-serve basis. Generally, a four-plex has a greater potential to exert high peak demand on the system than a single-family home. However, not all costs that are recovered by minimum charges are capacity-related. In fact, most are not. Thus, assessing full multiple minimum charges when there really is only one customer over charges in such situations. Minimum charges with a capacity costs surcharge based on meter size is a more accurate and fair way of equating demand capacity with the cost of that capacity. Therefore, I recommend you stop assessing multiple minimum charges when there is only one meter involved and start using meter size-based minimum charges in these situations. I have calculated such rates.
    b. The second is for sewer billing when a second meter (or more) is used to meter consumptive use of water (usually irrigation). That is water that does not get returned to the sewer system. Thus, the second meter, often called a "deduct" meter, measures the consumptive use and is used for calculating the net flow that went back into the sewer. The City assesses one additional minimum charge for each such additional meter. On the negative side, the City does not incur two increments of basic fixed costs, like billing costs, for the additional meters. On that count, assessing two full minimum charges to the one account may seem to over-charge the account. But on the positive side, it takes extra work and programming for the City to set up its billing program to handle the billing details, and some fixed costs are duplicative when multiple meters are involved. Plus, the purpose of the extra meter is to reduce the customer's sewer bill, reducing the City's revenue. One might think it is only fair that the customer should pay something for the infrastructure and work involved in reducing their bill. I do not know how the costs would play out, but it seems reasonable to me to bill customers something extra when extra meters are involved. There are few customers in this situation, so either way, it will only affect a few customers and it will have little effect on revenues.

2. Winter averaged-billing: Residential sewer use is commonly billed based on winter-averaged water use. Much more will be said about this process later in the report. Here I want to stress that, while you currently winter-average bill residential customers, you also bill them the lesser of their winter average use, or their actual water use in a given month, whichever is less. Winter-averaged billing for residential sewer use is so common that it is almost a rule. However, I have never had another client also bill for less volume when a customer uses less water than their winter-averaged volume. I recommend you cease that practice, but I understand the rationale for it. More will be said about winter-averaged use billing in the sewer subsection of the report.
3. Debt surcharges: You currently assess minimum charge surcharges of $9.50 and $2.00 per month to pay debt service on some loans. This also is a fairly common practice, but I recommend you cease the practice. However, if a lender requires recovery of their debt service in this way, continue it. In that case, earmark the $9.50 and $2.00 surcharges for water and sewer debt service, respectively, but be sure to reduce all the minimum charges I have recommended by those amounts and adopt those adjusted minimum charges. Here is my rationale for dropping the debt surcharges. Assessing a flat fee to all customers equally is not fair to those customers that do not cause high capacity costs, for which at least part of the debt was incurred. Therefore, I have calculated a set of system development fees and minimum charge surcharges that take such varying costs into account. These fees and surcharges distributed the debt costs more accurately.
4. Periodically determine how long, on average, it takes to perform the various services you provide in the field, such as after-hours service, meter disconnects and reconnects, special meter readings, delivery and pick up of bins and dumpsters, etc. Be sure to include all the time you actually pay staff for performing these services. Then determine how much it costs the utility per hour, on average, to have staff perform these services. This includes benefits, taxes, use of utility vehicles, tools and minor equipment, etc. It should also include a fair amount to cover the time that office staff devotes to working on these services to track them, bill for them, etc. This should be the hourly rate or a set fee you will charge for these services. In addition, set a minimum that you will charge for showing up, whether the service takes an hour to perform or 10 minutes. In essence, set your fees in the same way plumbers and similar technicians do – a set fee for showing up, which buys the customer a set amount of time, and an hourly rate if the job takes longer than the show up charge will cover. While accounting for time and other investments in the various functions is important, do not make the process burdensome. For many functions you likely can just estimate your time occasionally and charge fees based upon those estimates.
5. Retain required funds in interest bearing debt service and debt reserve accounts when required by your lender(s).
6. Have me conduct a full rate analysis again when the actual financial performance and my projection of future performance significantly diverge. Conditions should dictate rate analysis frequency.

7. Fully adopt management strategies that are included in what is most commonly called, "advanced asset management." These strategies can yield better service and reduced costs for utilities, especially those looking to build new facilities or replace existing facilities soon, which is a critical issue for yours.
8. Track volume usage, incomes and expenses on a regular basis so the data and information you generate will support future rate analyses.
9. As a reminder, check with your attorney for language and legality of all charges and issues discussed.

The remaining sections of this report cover each of the utilities that were analyzed. Each section discusses important issues for that utility. At the end of each section is a set of recommendations, in addition to those above, and a table that shows the recommended rates and fees.

Starting in the first section, and continuing through the rest of the report, I call each model by the following names:

- The water model is called, "Tonganoxie KS; Water Rates, Model 2019-1,"
- The sewer model is called, "Tonganoxie KS; Sewer Rates, Model 2019-2."

To abbreviate, I will call each the "Water Model" and the "Sewer Model," respectively. Within each section, I will sometimes just say, "the Model."

Water Rates Discussion

Introduction

In this section on water rates, I discuss issues at some length. The sewer utility experiences many of these same issues and needs to do the same things to deal with them. When that is the case, in the sewer section, I only mention such an issue and refer readers back to this section for how to deal with the issue. This was done to shorten and simplify the report.

Water user charge revenues need to go up 18 percent. Bills for some customers need to go down while those for others need to go up. That is simply a function of the current rates being far from a cost-to-serve rates structure.

Capital improvements will be a major driver of rates, so I start with that issue.

Capital Improvements and Debt

Capital improvement and repair and replacement planning are discussed at length in Chapter 13 of the "Rate Setting Issues Guide." That chapter also gives guidance on how to use the related spreadsheets.

Mr. Porter gave me information about a short but expensive slate of capital improvements (CIP) for the industrial park. It has not yet been determined if these improvements will be pursued at all. If they are pursued, the City might pay all or part of these costs or companies that benefit will pay all or part of them. However, it seems reasonable to assume that others, such as the companies themselves and/or economic development funding agencies will fund half of the cost of these improvements and the City would shoulder the other half. And, I assumed the City would pay for 75 percent of its share with a market-rate loan and the other 25 percent from reserves. These things are shown in the Water Model in Table 5, page 44.

While you may think you could scale back on these assumptions and, thereby, slow the increase in rates, I caution you about that. The rate modeling assumes ten-year's worth of capital improvement costs. Other than the business park project, there are several more years with no capital improvement needs assumed. I suspect you will need to do additional CIP over the next ten years, so my assumptions are not as conservative as they appear.

Equipment Repair and Replacement

Mr. Porter sent to me the City's equipment repair and replacement (R&R) schedule. I incorporated that data into Table 6, page 45, of the Water Model. I also added to those costs an item I called, "Unspecified R&R" at $20,000 per year to bring your average annual R&R costs up to a level I more commonly see. Thus, as you tackle R&R items that are not on the list, there are additional funds built into the R&R reserve to cover them.

The Model calculated the annual annuity in Table 7, page 46. The annual annuity, or annual deposit amount needed to fund the R&R schedule, was then entered into Table 4, page 42, as an annual operating cost, with rates calculated to cover that cost along with all others.

A technical note: I model R&R separate from capital improvements (CIP). You handle both together. It is quite acceptable that you handle these costs together. I bring this up only to make all readers aware that I account for these costs, and balances meant to pay for them differently, so one cannot compare my R&R and CIP data, calculations and balances side by side with yours. However, I have entered all your data into the models, so all costs are being accounted-for and rates calculated to handle all costs.

The take-away is this: do all the R&R and CIP projects that are needed, which should be what you gave me to model, plus some, and continue handling these costs as you customarily do. The results I modeled should closely match your actual cost, revenue and balance results for several years to come.

System Development Fees and Capacity Surcharges

These fees are discussed at length in Chapter 12 of the "Rate Setting Issues Guide."

To pay for part of the coming improvements and debt costs, I assumed you would assess and collect system development fees and minimum charge surcharges, later just called, "SDFs" and "surcharges." You already assess new connection fees, so you are partway there.

However, you currently assess level minimum charges, with multiple minimum charges to some customers. I recommend you instead use a meter size-based structure for minimum charges, too.

SDFs and minimum charge surcharges should be based upon water meter size, as further described in the following:

1. You should assess SDFs that recover as much of the peak capacity costs as possible, while keeping the connection fees reasonably competitive with those of other water systems in the area. (SDFs are the only important fees where I suggest competing with other systems' fees.) To that end, Mr. Porter canvassed other cities to get a sense of the connection fees they assess. Your current connection fee for the smallest meter is $2,500. Mr. Porter recommended that be increased in the model to $3,000. I have done that.
2. Larger meter sizes would be assessed higher system development fees based upon the maximum sustainable flow rate of each meter as determined by flow studies done by the American Water Works Association. Those capacity "shares" are shown in Table 12, page 56. These share factors require larger meter new connections to be priced higher than you currently price them, but that is only fair.
3. As shown in Table 11, page 55, recovery of peak flow capacity costs, at 3.0 percent per year, is very modest. Recovery of base flow capacity costs, in that same table, will be more aggressive. The result of these recovery percentages, as shown in Table 13, page 57, will be system development fees that do not go up very fast as meter size (capacity) goes up. Said simply, the system development fees will be fairly flat across the meter sizes. However, this structure has little effect on revenues because almost all new connections are made with one-inch or smaller meters.

4. In calculation of SDFs, I included only a nominal $150 per new connection to defray administration and connection inspection costs. I did not include out of pocket costs the City incurs for equipment and supplies the City uses when making new connections. Essentially, these are separate fee for service propositions, so you should recover out of pocket costs, and at least come close to recovering costs of new connection-related services, in addition to collecting the calculated SDFs.

5. Even though revenue generation from these fees is not a major issue, the important reason for assessing meter size-based SDFs is to charge each new customer or developer proportionately for what they get from the utility. That is capacity to serve the property. That is related to the size of the meter. In addition, you should be ***seen*** by all ratepayers as attempting to recover costs from each based upon the costs that each causes the utility to incur.

6. The same thing applies to minimum charge surcharges. SDFs and surcharges do the same thing – they recover capacity costs. The difference between the two is, SDFs recover those costs "up front," while surcharges recover them over time. Or to say it very simply, development fees buy capacity with cash and surcharges buy capacity on "the easy payment plan."

System Development Fees

In this report and elsewhere, you will see the terms "tap fee," "tap-on fee" and "connection charges." There are other names for these and similar fees. I call these, "system development fees."

Most small systems set such fees anecdotally, and almost always too low, as well. They almost never attempt to recover the full cost of the infrastructure capacity they dedicate to each customer when they authorize them to "tap on." Rarely do they even have much of an idea what that capacity costs.

Failing to assess development costs to development is a problem because with each dedication of capacity to customers, the capacity of the utility gets "used up." That hastens the day when new capacity must be built. If that capacity cost is not assessed to those who cause it, it will be assessed by default to all customers. That forces existing customers to subsidize development, and that is a rate structure fairness issue.

I recommend you handle system development costs with a combination of system development fees and surcharges to minimum charges based upon meter size. **And, in your ordinances and elsewhere: call new connection charges by the name, "system development fees."** This descriptively tells developers and new customers what they are paying for. It is not just an arbitrary fee. They are actually buying something of great value. Then, **assess as much of the full cost of system development as you can and still be competitive with comparable systems.**

Later in this report when you see "tap-on fee" and those other terms, think, "system development fee." And when you talk with customers and others about this fee, make sure they know this is not just "government assessing another kind of tax." This is a utility having customers fairly pay for what they are buying – capacity to serve them.

As shown on the left-hand side of Table 11, page 55, between SDFs and system development surcharges, I modeled rates that will recover 53 percent of system development costs. The rest will be recovered by regular user charge fees.

The Model calculated SDFs from the smallest customer meter to a ten-inch meter. I recommend you adopt this set of fees and, as a matter of policy, you should let the standard fees for all meter sizes below a chosen size be controlling. In other words, let City staff handle the "retail stuff" of small meter new connections. I suggest that all connections with meters of two inches or less be paid for off the system development fees table you adopt. Almost all larger meter connections should be handled that way, as well.

However, the Council has the authority and should, when warranted, exercise its prerogative to accept (grant a variance for) new connections for some other system development fee amount and/or for other considerations offered by a potential new customer. Translation: if you are willing to negotiate fees to bring in a big employer, for example, that is your call. Most commonly, the issue will be economic development and job creation by a new customer needing a large meter size. There can be City-wide benefits to allowing such new customers to build or expand in the City, at a discounted fee, that outweigh the reduction in SDF revenues. Just be careful about giving up too much in the hope that it will bring greater benefits to all other customers, and the City. Often, the discounting-for-economic-development strategy does not pan out.

I recommend you assess the same system development fee to three quarter-inch and smaller meters because these are the most common meter sizes for residential customers in most systems. Setting the same SDF for these meter sizes will simplify administration of the system development fee program. To make minimum charges consistent with the SDF structure, you should assess minimum charges on a meter size basis, as well. The rates I recommend at the end of this section are set up in that structure.

Recommended Rate Structure

In your case, I recommend cost-of-service based rates (with one exception) for minimum and unit charges with no usage allowance. The exception is an across-the-board reduction of all minimum charges of $5.00, to reduce the abruptness of bill changes with the initial rate adjustments.

Unbilled-for Water

The "Marginal Variable Cost" calculations in Table 9, page 49, apply to "unbilled-for" water. Calculation of this cost is completed in the bottom right corner of Table 8, page 47. This unbilled-for water, much of which is lost water, is a substantial cost to the utility. It is likely you can find some of this leakage, repair it and recover the cost of the repairs in cost savings over a fairly short period of time.

Out-of-City Sales

I assumed you serve no customers outside of the City. Generally, I do not recommend out of city limits service – it commonly leads to problems. But, if you connect and serve outside customers, it should be for higher rates than those in-City customers pay. Why? It generally costs more, in dollars, risk and hassle factor, to connect and serve out of City connections. Therefore, I recommend you assess a premium to out of City new connections. That premium is commonly "priced" at 25 to 100 percent more than in-City rates. I assumed you would assess a 50 percent out of City premium. The column entitled, "Out of City Multiplier," in Table 13, page 57, reflects that difference.

The relationships you have with in-City versus out of City customers is different in another way.

There is at least an implied obligation on the part of the City to supply water to in-City properties. When water is made available to such properties, those property owners are also obligated to pay for at least the capacity costs the City incurred on their behalf to build the water system, even if they do not use the system. And, in-City properties are subject to Ad Valorem taxes that could be authorized to pay for water system construction and improvements. These are significant obligations that in-City customers cannot escape.

The relationship between out of City property owners and the City is different. Out of City properties are not obligated to hook up to the City's water system. And, the City is not obligated to serve out of City customers. Aside from specific State laws that govern such sales, the relationship between the City and out of City customers is, essentially, the "willing seller, willing buyer" relationship. The parties come together and agree upon service to be rendered and a price for that service.

The City's primary obligation is to serve its in-City customers well. It would not serve them well if the City sold water to out of City customers below cost. That would shift costs to the in-City customers. (Generally, it costs more to serve out of City customers than in-City customers.) It would serve in-City customers well if water sales outside of the City made a "profit." Around the U.S., I find this profit margin to range from 10 percent on the low side to 200 percent on the high side for out of City sales versus in-City retail sales.

Wholesale Sales

This issue is discussed at length in Chapter 10 of the "Rate Setting Issues Guide."

Wholesale sales and out of City sales often go together. Though I do not recommend it, the City may decide to sell water on a wholesale basis. If you do, I recommend you charge rates on a marginal cost, plus profit margin basis. If the day comes when you decide to do that, call me about pricing of those sales.

Target Reserve Levels

Your current total reserves are below what I recommend for systems in your situation. Most systems serving fewer than 5,000 connections, including yours, should have reserves at least as high as the sum of the following:

1. Unobligated cash and cash equivalent reserves equal to at least 35 percent of the annual operating costs, not including debt service and general administration costs. *I recommend 50 percent in your case, due to the City's relatively small size. As budgets go down, it takes a higher percentage of savings to set aside enough cash to weather a financial emergency;*
2. A 20-year repair and replacement (R&R) schedule reserve, in the 20th year equal to at least one average year's cost of R&R. *In your case, I factored in a discretionary increase to the standard deposit that will enable this fund to have an inflation-adjusted balance after 20 years that would be double the average annual R&R cost. Even still, in the early years you will run a negative balance; and*

3. Capital improvement reserves at the end of the tenth year, after debt is paid, equal to that year's debt payments plus cash-paid capital improvement expenses.

The test year balance was lower than this amount. Thus, by the tenth year, the balance will rise significantly to the target.

The lines on the bottom of Table 17, page 61, and several of the charts at the end of the Water Model show your reserve balances expected for the next ten years. The last line of Table 17, the "Sum of All Reserves," is the critical one.

A caution: Projecting budgets and ending balances for next year is difficult. Doing the same five years out, I can usually get close. Ten-years out, there are so many assumptions we must make now that will not pan out years from now that you should not bank on those numbers. But they serve as good planning targets. In most cases, a utility will see big cost, income, growth, debt and other changes looming on the horizon a few years out. When that happens, it is time to do a new rate analysis to get rates back on track to meet those challenges. Thus, target balances give you something to aim for, but the target will move over time. With each new rate analysis, we bring you back on course.

A Technical Note About How Reserves Are Shown in the Model

In Table 17, at the bottom of the table, find the reserve balances. These deserve a bit of discussion.

From your balance sheet, I extracted the starting cash balance. As funds flow through the rate analysis Model, they first fund up the operating reserve. Other deposits attempt to fund up the R&R reserve. Finally, net revenue exceeding the operating reserve requirements flow into the CIP and debt service reserve. Funding the various reserves that I model is done this way mainly to make the modeling easier and predictable. Therefore, in all years after the test year, balances in the Water Model will be different than how you will likely separate them. That is OK. Separate reserves as you see fit.

The take-away is this. The "Sum of All Reserves" at the bottom of Table 17, is the key balance to track. That balance will end positive and strong.

Rate Affordability

This issue is discussed at length in Chapter 3 of the "Rate Setting Issues Guide." Related to that, Chapter 4 discusses bill assistance programs. I am not recommending you start such a program. But I wanted you to be aware of this guidance, too.

Rate affordability, often measured by the Affordability Index, is an important indicator to which you should pay attention.

> Affordability Index: The monthly charge for (typically) 5,000 gallons of residential service divided by the median monthly household income for the area served by the system. An index of 1.0, meaning a household pays one percent of its income to pay its bill for 5,000 gallons of service, is generally considered affordable. Affordability index is a primary factor in determining grant and loan eligibility and grant amount.

In Table 17, page 61, near the top, I show the estimated Affordability Index for the current rates in the first column, at 0.91 percent. The Affordability Index of the modeled rates shows in

the following column, at 0.99 percent. The current and recommended rates are close to the national average, about 1.0 percent. The same thing is shown graphically in Chart 4, page 67. Because incomes are projected to rise faster than the inflationary increases for rates, the Affordability Index will fall in future years. In ten years, on an Affordability Index basis, rates will be significantly cheaper than they are now.

The Affordability Index is useful, but it does not depict how new rates will affect customers using different volumes. Table 18, page 62, shows how bills at different volumes of use for three example meter sizes will be affected by the recommended rates. I chose these sets of comparisons between the current rate structure and the recommended structure because they capture nearly all your customers and to depict all the possible combinations of current and recommended rates would require dozens of tables, making this report unnecessarily confusing.

To make comparisons even simpler, in the table I highlighted in yellow the volumes on each side of the average residential water use of 4,452 gallons per month. The average residential customer will see a bill change on this order.

This table is the one thing most ratepayers want to see. I recommend you copy and bring it to the Council meeting and pass it out to all who want to see the rate change effects on them.

Recommendations for Adjusting Water Rates

The Water Model contains all my rates-related recommendations and shows what they are built upon. However, the Model is complex, components of the rates and fees are calculated and shown in different tables and the Model does not spell out policy issues. Therefore, I have summarized most of my recommendations as follows:

1. You should assess the system development fees, monthly minimum charges and unit charge as shown in Table A, that follows this list. These rates will move you close to a cost-to-serve structure. You should plan on continuing the transition to cost-to-serve rates by having the next rate analysis done in about five years.
2. As to system development fees:
    a) I recommend that almost all new connections, especially all those made with water meters two inches in diameter or less, be paid for at the rates included in the new system development fee rate table you will adopt. Ideally, larger meter system development fees would be paid for in that way, too. However, the Council retains the authority to waive the standard system development fee or adjust that charge for certain larger meter size customers that, due to other offsetting values they would bring to the service area (primarily economic development) that would substantially benefit the City and its customers.

b) Continue to bill for equipment and services that the City provides to facilitate making new connections. Call these whatever you want but be clear that these charges are to pay for materials, supplies and services you sell to owners of developing properties. These are separate from system development fees that pay for capacity dedicated to new customers.

3. The calculations assumed you would have made these adjustments early enough to enable you to collect at these rates for the July 1, 2019, billing. You would need to satisfy all Statutory requirements for making rate adjustments in advance of the adjustment date. That is coming up soon, so if you want to make that date, you will need to move promptly.
4. I recommend a late payment fee of $10.00 or ten percent of the outstanding total bill amount owed to the City for all services provided, whichever is greater, each month. Note: I do not consider this to be a late payment "penalty." Rather, I consider it to be a fee assessed for providing lending services, extra billing services and taking on the risk of such customers not paying or paying late or in installments. I believe you should refer to it in similar terms, too. Some utilities call this a "payment convenience fee."
5. If costs, incomes and balances accrue close to those I assumed in the Model, about one year from now and each year for about five years, raise all rates and significant fees by 2.0 percent.
6. If balances do not accrue as shown at the bottom of Table 17, page 61, but they are not egregiously too low, follow the instructions in Chapter 9 of the book, "How to Get Great Rates" for how to make inflationary increases correctly.

Table A: Recommended In-City Water Fees and Charges

Table A: Tonganoxie, KS Water System Development Fees; Minimum Charges; Usage Allowance and Unit Charge

Water Meter Size in Inches	Meter Type	System Development Fee	Monthly Minimum Charge	Usage Allowance in Gallons	Unit Charge per 1,000 Gallons
0.625	Displacement	$3,000	$18.73	0	$6.32
0.750	Displacement	$3,000	$18.73	0	$6.32
1.000	Displacement	$3,538	$30.68	0	$6.32
1.500	Displacement	$4,434	$50.61	0	$6.32
2.000	Displacement	$5,510	$74.51	0	$6.32
2.500	Displacement	$7,124	$110.38	0	$6.32
3.000	Singlet	$8,379	$138.27	0	$6.32
3.000	Compound, Class I	$8,379	$138.27	0	$6.32
3.000	Turbine, Class I	$8,917	$150.22	0	$6.32
4.000	Singlet	$11,607	$209.99	0	$6.32
4.000	Compound, Class I	$11,607	$209.99	0	$6.32
4.000	Turbine, Class I	$13,759	$257.81	0	$6.32
6.000	Singlet	$20,573	$409.23	0	$6.32
6.000	Compound, Class I	$20,573	$409.23	0	$6.32
6.000	Turbine, Class I	$25,952	$528.77	0	$6.32
8.000	Compound, Class I	$31,331	$648.32	0	$6.32
8.000	Turbine, Class I	$52,849	$1,126.48	0	$6.32
10.000	Turbine, Class II	$77,953	$1,684.35	0	$6.32

Water Rates Discussion Closing

I recommend you adopt the rates calculated in the Water Model and shown in the table immediately above. Bills for customers that use low volumes but are served by medium to large size meters would go up the most, on a percentage basis. However, there are very few such customers. The varying bill adjustments occur because the current structure is not in a cost-to-serve rate structure, while the recommended rate structure is very close to such a structure. Continue to move in the direction of cost-to-serve rates each time you have a good opportunity to do so and your water rates will be spot-on in one or two more rounds of analysis and adjustment.

***

Sewer Rates Discussion

Introduction

Generally, the same kinds of changes I recommended for water rates apply to sewer rates. Therefore, I will only mention those issues that are essentially the same for sewer and for water and refer you back to the water subsection for detailed discussion. In this, the sewer section of the report, I expand coverage of winter-averaged billing and consumptive use of water.

While sewer revenues need to go up 5.7 percent, some customers' bills would go up while others would go down.

Capital Improvements and Debt

Capital improvement issues are the same for water and sewer. The modeled sewer rates were set to pay for all planned and assumed CIP costs, as well as all other costs. These things are shown in Table 5, page 82.

Equipment Repair and Replacement

I incorporated sewer R&R data into Table 6, page 83, of the Sewer Model. The Model calculated the annual annuity in Table 7, page 84. The average annual cost of the R&R items I received was lower than what I commonly find to be needed. Therefore, I added an "Unspecified R&R" annual expense of $30,000 to bring the R&R annuity up to a more usual level. The annual annuity, or annual deposit amount needed to fund the R&R schedule, was then entered into Table 4, page 80, as an annual operating cost, with rates calculated to cover that cost along with all others.

In the water subsection for R&R, I included a technical note. That applies here, too.

System Development Fees and Capacity Surcharges

These fees mirror those for water. Their calculations were done the same way and the resulting amounts are shown in Tables 11 and 13 through 16, starting on page 91.

Recommended Rate Structure

With the main exception of winter-averaged use rates, I recommend the same basic rate structure for sewer as for water. Thus, I recommend the following.

- You should continue billing for residential sewer use based on water volume used during several winter months – "winter-averaged billing." ***You currently also bill such customers for their winter-averaged use, or their monthly <u>actual</u> use, whichever is lower each month. This is the first time I have seen sewer billing on the "lower of each" basis before. There are positives and negatives of such a billing policy. Continue the practice or discontinue it, as you please.***

- You bill for sewer service to other types of customers based on water use each month, a common and acceptable practice. These are primarily commercial customers. Some will have substantial water use but little of that flow returns to the sewer system. For such customers, you can use two other averaging systems that are somewhat related. These billing systems are discussed at length in Chapter 4 of the "Rate Setting Issues Guide."
- I understand that the City serves several multi-family, apartment or condo-style customers. Such customers are normally handled like commercial customers but if you desire, you could also offer winter-averaged billing to these customers, as well.
- If you start, continue or cease any of these practices, they should have little effect on user charge revenues. The main issue with these is rate structure fairness.

Inflow and Infiltration

The "Marginal Variable Cost" calculations, started in Table 9, apply to the cost of "Inflow and Infiltration," (I&I). Calculation of the cost of I&I is completed in the bottom right corner of Table 8, page 85. I&I is a substantial cost to the utility. It is likely you can find some I&I sources, repair them and recover the cost of the repairs in cost savings over a fairly short period of time.

Target Reserve Levels

I calculated target sewer reserves in the same way as I did for water. Lines on the bottom of Table 17, page 96, and several of the charts at the end of the Sewer Model show your reserve balances expected for the next ten years.

The take-away is this. The "Sum of All Reserves" at the bottom of Table 17, is the key balance to track. That balance will dip very low in 2024, but it will end positive and strong in 2028. You may well be able to reschedule CIP or R&R items or fund CIP differently to avoid the dip in 2024. If it looks like this balance may go lower, call me to discuss the situation.

Rate Affordability

In Table 17, page 96, near the top, I show the estimated Affordability Index for the current rates in the first column, at 1.10 percent, and the modeled rates in the following column, at 1.05 percent, slightly lower than the current Affordability Index. This is an interesting phenomenon because the bill for 5,000 gallons of use would go up by $0.14 per month. But because incomes are projected to rise substantially, the affordability of that bill improves.

The Affordability Index is also shown graphically in Chart 4, page 103 of the Model. On an Affordability Index basis, your current rates are approximately at the national average. After the initial rate adjustments, they will be a bit lower and they will continue to fall over the next 10 years.

Table 18, page 97, shows how bills at different volumes of use for three example meter sizes will be affected by the recommended rates. In the table I highlighted in yellow the 4,000-gallon use volume, which is close to the average residential sewer use of 4,019 gallons per month. The average residential customer will see a bill change on this order.

This table is the one thing most ratepayers want to see. I recommend you copy and bring it to the Council meeting and pass it out to all who want to see the rate change effects on them.

Recommendations for Adjusting Sewer Rates

I cover all the same recommendations here that I covered in the water section of the report:

1. You should assess the system development fees, monthly minimum charges and unit charge as shown in Table B, that follows this list. These rates will move you quite close to a cost-to-serve structure. You should plan on continuing the transition to cost-to-serve rates by having the next rate analysis done in about five years.
2. As to system development fees:
    a) I recommend that almost all new connections, especially all those made with water meters two inches in diameter or less, be paid for at the rates included in the new system development fee rate table you will adopt. Ideally, larger meter system development fees would be paid for in that way, too. However, the Council retains the authority to waive the standard system development fee or adjust that charge for certain larger meter size customers that, due to other offsetting values they would bring to the service area (primarily economic development) that would substantially benefit the City and its customers.
    b) Continue to bill for equipment and services that the City provides to facilitate making new connections. Call these whatever you want but be clear that these charges are to pay for materials, supplies and services you sell to owners of developing properties. These are separate from system development fees that pay for capacity dedicated to new customers.
3. The calculations assumed you would have made these adjustments early enough to enable you to collect at these rates for the July 1, 2019, billing. You would need to satisfy all Statutory requirements for making rate adjustments in advance of the adjustment date. That is coming up soon, so if you want to make that date, you will need to move promptly.
4. I recommend a late payment fee of $10.00 or ten percent of the outstanding total bill amount owed to the City for all services provided, whichever is greater, each month. Note: I do not consider this to be a late payment "penalty." Rather, I consider it to be a fee assessed for providing lending services, extra billing services and taking on the risk of such customers not paying or paying late or in installments. I believe you should refer to it in similar terms, too. Some utilities call this a "payment convenience fee."

5. If costs, incomes and balances accrue close to those I assumed in the Model, about one year from now and each year for about five years, raise all rates and significant fees by 2.0 percent.
6. If balances do not accrue as shown at the bottom of Table 17, page 96, but they are not egregiously too low, follow the instructions in Chapter 9 of the book, "How to Get Great Rates" for how to make inflationary increases correctly.

Table B: Recommended Sewer Fees and Charges

Table B: Tonganoxie, KS Sewer System Development Fees; Minimum Charges; Usage Allowance and Unit Charge

Water Meter Size in Inches	Meter Type	System Development Fee	Monthly Minimum Charge	Usage Allowance in Gallons	Unit Charge per 1,000 Gallons
0.625	Displacement	$3,000	$15.94	0	$4.49
0.750	Displacement	$3,000	$15.94	0	$4.49
1.000	Displacement	$3,733	$32.24	0	$4.49
1.500	Displacement	$4,956	$59.40	0	$4.49
2.000	Displacement	$6,423	$92.01	0	$4.49
2.500	Displacement	$8,624	$140.91	0	$4.49
3.000	Singlet	$10,335	$178.94	0	$4.49
3.000	Compound, Class I	$10,335	$178.94	0	$4.49
3.000	Turbine, Class I	$11,069	$195.24	0	$4.49
4.000	Singlet	$14,736	$276.74	0	$4.49
4.000	Compound, Class I	$14,736	$276.74	0	$4.49
4.000	Turbine, Class I	$17,670	$341.95	0	$4.49
6.000	Singlet	$26,962	$548.42	0	$4.49
6.000	Compound, Class I	$26,962	$548.42	0	$4.49
6.000	Turbine, Class I	$34,297	$711.43	0	$4.49
8.000	Compound, Class I	$41,632	$874.43	0	$4.49
8.000	Turbine, Class I	$70,973	$1,526.45	0	$4.49
10.000	Turbine, Class II	$105,204	$2,287.14	0	$4.49

Sewer Rates Discussion Closing

I recommend you adopt the rates calculated in the Sewer Model and shown in the table immediately above. Bills for many customers will change little, but a few will change markedly. That is the result of rate restructuring to improve fairness. Thus, the restructuring is not introducing unfairness. Rather, it is correcting the unfairness of the current rates.

***

Conclusion

"Conclusion" is a misnomer here. This report provides information upon which the City can make decisions. Thus, it begins the process by which you will initially adjust rates and fees and take other actions. I will continue to help you as you do that. I feel sure you will want to contact me occasionally over the next year or so just to get all the details worked out.

As time passes you will need to adjust rates incrementally as recommended in this report and as described in more detail in my book and the Rate Setting Issues Guide. Eventually, you will start this cycle over.

As you take on the initial adjustments, keep the following in mind. Everyone impacted by the City's water rates should at least be made aware of the results of this report.

- My default recommendation is that you give any customer as much information as they want. If they want a copy of the full report, give them that.
- Give the media a copy of the full report so they can quote the report directly and accurately rather than be forced to "figure things out." Much of this is very complex. Few people know how to, or have the time to, calculate utility rates. Make it easy for everyone to get the facts right.
- For most customers, what would happen to their bills is as much as they will care to know about this analysis. To satisfy those information needs, the City can publicize the current and recommended rates and/or the bill comparisons.
- A few customers will want to know more, especially high-volume customers. Give them the full report, if that is what they want.
- A good way to accomplish these things is to post the report on the City's Web site so everyone can see for themselves what the report says. That way, no one would have to print out a very long document, unless they wanted to. Publicize the Web posting widely and publicly. Information is a good thing. ***Being seen as*** trying hard to get information out to folks is also a good thing.

You have engaged me to pay one visit to the Council to discuss my findings and recommendations. That should take care of this part of the rate adjustments task, but if you need me to attend more than one public meeting, we can arrange that.

I look forward to meeting with the Council and helping you get on your way to the next generation of utility rates.

Tonganoxie, KS; Water Rates, Scenario 2019-1

This model depicts rates and major fees in a cost-to-serve structure except that all minimum charges were reduced by $5.00 to reduce the degree of rate structure changes initially.

June 4, 2019

This rate analysis scenario was produced by
Carl E. Brown, GettingGreatRates.com
1014 Carousel Drive, Jefferson City, Missouri 65101
(573) 619-3411
https://gettinggreatrates.com
carl1@gettinggreatrates.com

Note: This document is a print out of the spreadsheet model used to calculate new user charge and other rates and fees for the next 10 years. These calculations are complex and are based upon many conditions and assumtions. These issues, and others, are described in a narrative report that accompanies this model.

Index of Tables and Charts

Note: When a numbered table or chart listed below is not in the package, that was not a mistake. It simply means that table or chart from our master program was not needed in this situation so it was left out to prevent confusion.

Definitions

Affordability Index	The monthly charge for (typically) 5,000 gallons of residential service divided by the median monthly household income for the area served by the system. An index of 1.0, meaning a household pays one percent of its income to pay its bill for 5,000 gallons of service, is generally considered affordable. Affordability index is often a factor in determining grant and loan eligibility and grant amount.
Analysis Year	The year following the "test year." Generally, rate analysis is done during the year following the "test year" and intial rate adjustments are done later still during the analysis year or sometime during the following year once the analysis shows how rates should be adjusted. See related "test year."
Capital Improvement Plan or Program (CIP)	A schedule of anticipated capital improvements. These are the more expensive items such as treatment plants, lines and other expensive infrastructure that generally requires bond or grant funding.
Capital Improvement Reserves	Cash reserves dedicated to funding the CIP
Comprehensive Rate Analysis	A thorough examination of a system's operating, capital improvement, equipment replacement and other costs, revenues, current rates, number of users and their use of the system, growth rates and all other key issues surrounding the system. This examination will determine how rates and fees should be set in the future to cash-flow the system properly, to build appropriate reserves and to be fair to ratepayers. It also will determine how policies should be adjusted to enable the system to operate well now, operate well in the medium-range future (about 10 years) and prepare for expected and expectable events such as capital improvements and equipment replacement.
Connection Charge	See system development fee
Conservation (Inclining) Rates	Unit charges that go up as the volume used goes up
Cost to Produce	There are several ways to define and calculate cost to produce. Each is acceptable for different purposes. Generally, cost to produce is the total of all variable costs required to get service to a utility's customers during one year divided by the total units of service delivered during that year. This calculation will yield the average cost to produce. In a proportional to use rate structure, this is the unit charge. See "Cost Calculations" at the bottom of Chart 19.
Cost to Serve Rates	Rates where fixed and variable costs generated by each user class are paid by that class with minimum and unit charges, respectively. Similar to and sometimes the same as "proportional to use" rates.
Cost Types; Fixed and Variable	The two main types of costs are fixed - those that are related to the fact that someone is a customer; and variable - those that are related to the volume of the commodity delivered to customers. Generally, fixed costs should be recovered with minimum charges and variable costs with unit charges.
Coverage Ratio (CR)	Incomes available to pay debt divided by the amount of the debt for that year. Most systems should have a CR of 1.25 or higher.
Current Position	For purposes of this report, for one year, the sum of all incomes and undedicated reserves minus all current financial obligations for that year. Future obligations (next year's loan payments) and depreciation are not included. Current position is a good measure of overall financial health.
Declining Rates	Rates where unit charges go down as the volume used goes up
Flat Rates	Rates where all users pay exactly the same fee regardless of the volume of service they use
Equivalent Dwelling Unit (EDU) or Equivalent Residential Unit (ERU)	Based upon number of water using fixtures, average flow, potential flow or similar criteria; the consumption rate of the average single family home is rated at one EDU. All other types of customers are then compared on this measuring basis and the EDUs are calculated. Generally the purpose of this exercise is to calculate fees that each EDU must pay.
Incremental Rate Increases (Inflationary Increases)	Rate increases done, generally annually, following the initial rate adjustment. The usual goal of such increases is to keep the system's incomes on track to meet reserve targets. Rate structure fairness is a small issue, if it is an issue at all. Such increases are usually small, in the two to five percent per year range.
Initial Rate Adjustments	Rate adjustments done in follow up to the comprehensive rate analysis. Generally, the goal of such adjustments is to establish rates that cover the system's short-term expected costs and do it with a structure that is fair to ratepayers. Initial adjustments should be followed in subsequent years with incremental rate increases.
Inflow & Infiltration (I&I)	In a sewer system, water that gets into the collection system by way of illicit connections (inflow) such as gutter downspouts, plus leaks in manholes and sewer lines (infiltration)
Infrastructure	Most commonly thought of as the hard assets, such as buildings, treatment plants and lines needed to provide service to customers connected to the system. In reality, staff, software and other "soft" assets should be thought of as infrastructure, as well.

Definitions

Life-cycle Cost	The total cost to design, build, operate, maintain and eventually dispose of an asset. One asset may cost less to build but it may be more expensive to operate and maintain, yielding a higher total life-cycle cost.
Marginal Costs	The parts of a utility's costs that are unavoidable in the course of serving a particular customer, a group of customers, more volume to all customers or some other marginal use of the system. Such customer(s) or extra use could be added at a discounted but still profitable fee, if desired. Generally marginal costs are less than the average costs but when extra use requires a system upsizing, they can be greater. These costs are especially useful when considering selling service at wholesale or charging "snow birds" while they are away.
Operating Costs	Definitions and calculations vary. For rate setting purposes operating costs are costs incurred because a system is operated. Such costs are usually recovered primarily through unit charges.
Operating Reserves or Working Capital	Analogous to current position, this is the net revenues retained to fund operating costs during times when costs exceed incomes.
Operating Revenues	Revenues collected in the form of user fees and similar operating cost-related fees
Operating Ratio (OR)	Current incomes divided by current expenses, not including debt. An OR of 1.0 is "break even." Most systems should have an OR of 1.25 or higher.
Payback Period	In this case, time required for the investment made to get this analysis to return that investment through increased user and other fees
Potential Demand	The volume of service that a user could demand for a short period of time at full volume use. The potential demand limiting factor is usually the size of the customer's meter or service line.
Proportional to Use Rates	Rates where the minimum charge recovers all fixed costs, the unit charge recovers all variable costs, the unit charge is the same for all volume sold, and there is no usage allowance in the minimum charge. This rate structure is similar to and often the same as cost to serve rates.
Replacement Schedule	A timetable that describes equipment replacement and important repairs that are too infrequent and/or too expensive to cover as annual operating costs but not so expensive that they need to be covered as capital improvements.
Replacement Reserves	Cash reserves used to fund the Replacement Schedule
Return on Investment	In this case, the dollar amount or percentage of revenue gain enabled by this rate analysis. Related to payback period.
Snow Bird	A customer, usually residential, that goes away during part of the year. Most commonly, people of "means" who live in the north who "fly south" for the winter. But, this category includes everyone who is absent for a significant part of the year but returns to their permanent residence.
System Development Charge, or Fee	Fee assessed to pay for at least part of the cost to build system capacity. For purposes of this model, all charges related to connecting new customers will be "rolled together" into a system development charge, usually including a charge that buys a new customer system capacity. This combined charge may be a few hundred dollars for a residential customer, if little or no capacity costs are included, to many thousands of dollars for a large industrial customer with capacity costs included. Similar terms in common use include "tap-on fee," "connection fee or charge," "hook-up fee," "impact fee," "availability charge," and "capacity charge."
Test Year	The one year period from which data was gathered to be the basis of the rate analysis, which is usually the last completed fiscal year. See related "analysis year."
Usage Allowance	The volume, if any, that is "given away" with the minimum charge. Most systems give away no volume. Those that give away an unlimited volume have what are called "flat rates" - a minimum charge only.
User Fee, User Charge, User Rates	Fees assessed to customers for use of the system. Does not system development charges, late payment penalties or other types of charges.
Water Loss	Measured by volume or percent, the part of a water system's net water production that does not reach customers or is not billed to customers. This loss also includes billable volume lost due to under-registering customer meters.
Working Capital, Net Income	The amount left in the operating fund after paying all costs due during that month, year or other time period. Working capital of $0 is "break even." Related to "current position."
Working Capital Goal or Operating Reserves Goal	The desired operating fund reserve, in dollars or percent, at a stated point in time. Small systems (1,000 connections) generally should target 35 percent or greater. Larger systems can target a lower percentage. The goal for each system should be based upon the needs of that system and the risk the customers are willing to take.

Return on Investment

Tonganoxie, KS; Water Rates, Scenario 2019-1

The rates depicted in this model will produce various returns on investment or paybacks. Usually the most important payback, at least to ratepayers, is a rate structure that is demonstrably fair. For the system, however, making sure that revenue will be adequate to pay all expected, expectable and many unexpectable costs is the the most important return. If revenue will increase as a result of this analysis, which is almost always the case, one can calculate a dollar and percentage return on investment.

The following calculations show what was invested and what the returns will be over two periods; five years and 10 years. Five years is a reasonable period for return projections. Ten years is a good basic planning horizon but you should not bank on amounts or returns projected that far out. Besides, most systems should have their analyses redone long before then.

Consider these key points about return on investment. Higher rates will fund more improvements, better repair and replacement and more. Most increases in revenue end up being used for such expenses. Thus, few systems end up with a dramatic increase in their cash reserves but they do markedly improve their financial position. In addition, fairer and higher rates generally enable systems to qualify for grant and loan funding that they otherwise would not. That increases the importation of "other people's money," which is a drain on the state and federal funds, where the money comes from, but it is very desirable at the utility level. The calculation below ignores any "outside" funds the utility may capture.

Also note that rates in this model have been modeled to be adjusted during the year following the test year or even later. That year is included in the first five-year return on investment calculation. Thus, the first year of returns calculated below include most or all of one year where rates will not have been changed yet. Thus, the real rate of return will be greater than the calculation reflects.

Calculations

$6,110	Fees to GettingGreatRates.com
$500	Estimated value of system staff time and incidentals to assemble needed information
$6,610	Total Investment for This Analysis
$1,568,294	Five-year Increase in Revenue Due at Least Partly to This Analysis
23,727%	Five-year Return on Investment (increase in revenues / investment)
$4,175,632	Ten-year Improvement in Cash Position Due at Least Partly to This Analysis
63,173%	Ten-year Return on Investment (increase in revenues / investment)

Table 1 - Rates

Tonganoxie, KS; Water Rates, Scenario 2019-1

Rates were recently changed. The rates in this table are those in effect during the test year. If a volume range was left out of the table, in order to make it shorter, the unit charge that shows for the next lowest volume range also applies to the hidden volume range.

Rates in Effect at End of Test Year

Customer Type, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Billing Cycle Minimum Charge	Usage Allowance in 1,000 Gallons	Unit Charge per 1,000 Gallons
1 Minimum	0	$20.63	1.000	$5.54
	140,000	$20.63	1.000	$5.54
2 Minimums	0	$41.26	2.000	$5.54
	145,000	$41.26	2.000	$5.54
4 Minimums	0	$82.52	4.000	$5.54
	145,000	$82.52	4.000	$5.54
6 Minimums	0	$123.78	6.000	$5.54
	145,000	$123.78	6.000	$5.54
8 Minimums	0	$165.04	8.000	$5.54
	145,000	$165.04	8.000	$5.54
12 Minimums	0	$247.56	12.000	$5.54
	145,000	$247.56	12.000	$5.54

Table 2 - Test Year Usage
Tonganoxie, KS; Water Rates, Scenario 2019-1

This table shows usage by all customers during the test year. Residential meter readings per year: 12 Date this scenario created: 3/15/2019

Test year = the one-year period being analyzed starts: 1/1/2017 Other customer readings per year: 12 Bills per year: 12

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
1 Minimum	-111,000	-1	1,000	-55.500	-222,000	0	-222,000	0	0.0%	-0.2%
	0	999	1,000	0.935	23,210,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	0.881	20,459,000	2,751	2,751,000	229	11.6%	2.6%
	2,000	2,999	1,000	0.796	16,287,000	4,172	8,344,000	348	17.7%	7.8%
	3,000	3,999	1,000	0.721	11,742,000	4,545	13,635,000	379	19.2%	12.8%
	4,000	4,999	1,000	0.666	7,818,000	3,924	15,696,000	327	16.6%	14.7%
	5,000	5,999	1,000	0.645	5,041,000	2,777	13,885,000	231	11.8%	13.0%
	6,000	6,999	1,000	0.653	3,293,000	1,748	10,488,000	146	7.4%	9.8%
	7,000	7,999	1,000	0.672	2,212,000	1,081	7,567,000	90	4.6%	7.1%
	8,000	8,999	1,000	0.702	1,553,000	659	5,272,000	55	2.8%	4.9%
	9,000	9,999	1,000	0.721	1,119,000	434	3,906,000	36	1.8%	3.7%
	10,000	14,999	1,000	2.524	2,824,000	760	8,629,000	63	3.2%	8.1%
	15,000	19,999	1,000	3.326	1,194,000	185	3,099,000	15	0.8%	2.9%
	20,000	24,999	1,000	4.075	709,000	49	1,064,000	4	0.2%	1.0%
	25,000	29,999	1,000	4.344	543,000	29	788,000	2	0.1%	0.7%
	30,000	39,999	1,000	8.063	774,000	28	934,000	2	0.1%	0.9%
	40,000	49,999	1,000	9.294	632,000	9	402,000	1	0.0%	0.4%
	50,000	59,999	1,000	8.864	523,000	10	533,000	1	0.0%	0.5%
	60,000	69,999	1,000	9.653	473,000	6	403,000	1	0.0%	0.4%
	70,000	79,999	1,000	9.302	400,000	5	370,000	0	0.0%	0.3%
	80,000	89,999	1,000	9.500	361,000	2	161,000	0	0.0%	0.2%
	90,000	99,999	1,000	9.361	337,000	3	277,000	0	0.0%	0.3%
	100,000	109,999	1,000	9.970	329,000	1	109,000	0	0.0%	0.1%
	110,000	119,999	1,000	8.969	287,000	6	687,000	1	0.0%	0.6%
	120,000	129,999	1,000	9.038	235,000	5	625,000	0	0.0%	0.6%
	130,000	139,999	1,000	9.143	192,000	4	542,000	0	0.0%	0.5%
	140,000	276,000	1,000	59.647	1,014,000	17	3,394,000	1	0.1%	3.2%
			Monthly and Annual Subtotals:		103,339,000	23,210	103,339,000	1,934	98.2%	96.7%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
2 Minimums	0	999	1,000	0.766	183,000	56	0	5	0.2%	0.0%
	1,000	1,999	1,000	0.847	155,000	28	28,000	2	0.1%	0.0%
	2,000	2,999	1,000	0.884	137,000	18	36,000	2	0.1%	0.0%
	3,000	3,999	1,000	0.825	113,000	24	72,000	2	0.1%	0.1%
	4,000	4,999	1,000	0.814	92,000	21	84,000	2	0.1%	0.1%
	5,000	5,999	1,000	0.902	83,000	9	45,000	1	0.0%	0.0%
	6,000	6,999	1,000	0.928	77,000	6	36,000	1	0.0%	0.0%
	7,000	7,999	1,000	0.870	67,000	10	70,000	1	0.0%	0.1%
	8,000	8,999	1,000	0.985	66,000	1	8,000	0	0.0%	0.0%
	9,000	9,999	1,000	0.970	64,000	2	18,000	0	0.0%	0.0%
	10,000	14,999	1,000	3.359	215,000	35	420,000	3	0.1%	0.4%
	15,000	19,999	1,000	4.172	121,000	7	116,000	1	0.0%	0.1%
	20,000	24,999	1,000	3.727	82,000	8	172,000	1	0.0%	0.2%
	25,000	29,999	1,000	4.286	60,000	3	80,000	0	0.0%	0.1%
	30,000	34,999	1,000	4.091	45,000	4	130,000	0	0.0%	0.1%
	35,000	44,999	1,000	7.571	53,000	4	163,000	0	0.0%	0.2%
	45,000	54,999	1,000	8.333	25,000	1	50,000	0	0.0%	0.0%
	55,000	64,999	1,000	0.500	1,000	2	111,000	0	0.0%	0.1%
			Monthly and Annual Subtotals:		1,639,000	239	1,639,000	20	1.0%	1.5%
4 Minimums	0	999	1,000	0.972	140,000	4	0	0	0.0%	0.0%
	1,000	1,999	1,000	0.993	139,000	1	1,000	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	139,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	0.978	136,000	3	9,000	0	0.0%	0.0%
	4,000	4,999	1,000	0.949	129,000	7	28,000	1	0.0%	0.0%
	5,000	5,999	1,000	0.891	115,000	14	70,000	1	0.1%	0.1%
	6,000	6,999	1,000	0.835	96,000	19	114,000	2	0.1%	0.1%
	7,000	7,999	1,000	0.615	59,000	37	259,000	3	0.2%	0.2%
	8,000	8,999	1,000	0.712	42,000	17	136,000	1	0.1%	0.1%
	9,000	9,999	1,000	0.786	33,000	9	81,000	1	0.0%	0.1%
	10,000	14,999	1,000	2.727	90,000	18	195,000	2	0.1%	0.2%
	15,000	19,999	1,000	3.467	52,000	8	137,000	1	0.0%	0.1%
	20,000	24,999	1,000	3.143	22,000	5	112,000	0	0.0%	0.1%
	25,000	29,999	1,000	3.500	7,000	1	27,000	0	0.0%	0.0%
	30,000	34,999	1,000	5.000	5,000	0	0	0	0.0%	0.0%
	35,000	44,999	1,000	10.000	10,000	0	0	0	0.0%	0.0%
	45,000	54,999	1,000	6.000	6,000	1	51,000	0	0.0%	0.0%
			Monthly and Annual Subtotals:		1,220,000	144	1,220,000	12	0.6%	1.1%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
6 Minimums	0	999	1,000	0.583	7,000	5	0	0	0.0%	0.0%
	1,000	1,999	1,000	0.429	3,000	4	4,000	0	0.0%	0.0%
	2,000	2,999	1,000	0.667	2,000	1	2,000	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	2,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	2,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	0.500	1,000	1	5,000	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	7,000	7,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	8,000	8,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	2.000	2,000	1	12,000	0	0.0%	0.0%
			Monthly and Annual Subtotals:		23,000	12	23,000	1	0.1%	0.0%
8 Minimums	0	999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	7,000	7,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	8,000	8,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	5.000	60,000	0	0	0	0.0%	0.0%
	15,000	19,999	1,000	5.000	60,000	0	0	0	0.0%	0.0%
	20,000	24,999	1,000	4.750	57,000	2	47,000	0	0.0%	0.0%
	25,000	29,999	1,000	5.000	50,000	0	0	0	0.0%	0.0%
	30,000	34,999	1,000	3.100	31,000	6	191,000	1	0.0%	0.2%
	35,000	44,999	1,000	3.500	14,000	3	109,000	0	0.0%	0.1%
	45,000	54,999	1,000	4.000	4,000	1	49,000	0	0.0%	0.0%
			Monthly and Annual Subtotals:		396,000	12	396,000	1	0.1%	0.4%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
	0	999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
12 Minimums	7,000	7,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	8,000	8,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	4.250	51,000	3	36,000	0	0.0%	0.0%
	15,000	19,999	1,000	3.667	33,000	4	68,000	0	0.0%	0.1%
	20,000	24,999	1,000	2.200	11,000	4	86,000	0	0.0%	0.1%
	25,000	29,999	1,000	1.000	1,000	1	26,000	0	0.0%	0.0%
				Monthly and Annual Subtotals:	216,000	12	216,000	1	0.1%	0.2%
				Grand Totals:	106,833,000	23,629	106,833,000	1,969	100%	100%

Table 3 - Operating Incomes and Basic User Data

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table depicts user statistics, customer growth, and system incomes and across the board "inflationary" style rate increases through the 10th year.

Annual Median Household Income (AMHI)

$49,514 Census Bureau estimate of AMHI for the year: 2016

$46,994 Census Bureau estimate of AMHI for the year: 2015

$2,520 AMHI growth during this time period

5.36% Simple annual income growth rate during this time period (used to project incomes into the future)

Test Year Growth of Customer Base and Average Tap Fee Paid per Connection

32 Number of new connections made during the test year

$1,344 Average tap or installation fee assessed during the test year

This model is programmed to assume that rates will be reset in the "Analysis (This) Year" column below (heading highlighted blue). Revenues will be collected at the now-current rates for the first part of the analysis year and the modeled rates for the last part of the analysis year. The change-over from the current rates to new rates is modeled to happen on the date near the top of Table 10. Thus, the revenues shown in the last column of that table are "blended" revenues; part collected at the old rates and part collected at the new rates. It was then assumed that all rate adjustments made after the initial (major) adjustment will be done annually on approximately the anniversary of the first adjustment.

Basic User (Customer) Data

(First year balances and incomes are actual, subsequent years are projected.)	Inflation or Deflation (–) Factor	Test Year	Analysis (This) Year	Years Following the Analysis Year (for Which Results Have Been Projected)									
				1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year
		Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting
		1/1/17	1/1/18	1/1/19	1/1/20	1/1/21	1/1/22	1/1/23	1/1/24	1/1/25	1/1/26	1/1/27	1/1/28
Rate Increases Projected for Future Years	N.A.	N.A.	N.A.	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
The row above shows the rate at which user charge fees should be increased for each year beyond the initial rate adjustment year. Unless stated otherwise, these should be across-the-board increases to all rates and fees and that should continue until a new rate analysis is done.													
Average Number of Customers for the Year	N.A.	1,969	2,001	2,033	2,065	2,097	2,129	2,161	2,193	2,225	2,257	2,289	2,321
Customers Added or Lost (-) During the Year	N.A.	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Customer Growth or Loss (-) Rate	N.A.	1.63%	1.60%	1.57%	1.57%	1.53%	1.50%	1.48%	1.46%	1.44%	1.42%	1.40%	1.38%
Actual (Test Year) and Projected Volumes, in Gallons	N.A.	106,833,000	108,569,166	110,305,332	112,041,499	113,777,665	115,513,831	117,249,997	118,986,164	120,722,330	122,458,496	124,194,662	125,930,829
How User Charge Fees Were Calculated, Accounting for New Customers and Future Rate Increases													
Actual or Calculated Sales Revenues		$968,313	$968,791	$1,142,689	$1,183,888	$1,226,573	$1,270,195	$1,315,072	$1,361,235	$1,408,720	$1,457,559	$1,507,788	$1,559,443
Additional Sales Revenues From New Customers			$42	$17,986	$18,634	$18,717	$19,091	$19,473	$19,862	$20,259	$20,665	$21,078	$21,500
Total Calculated Revenues (User Charge Fees)		$968,313	$968,833	$1,160,675	$1,202,522	$1,245,289	$1,289,286	$1,334,544	$1,381,098	$1,428,979	$1,478,223	$1,528,866	$1,580,943
Operating Incomes													
User Charge Fees + 210 43 DEBT SURCHARGE	N.A.	$1,010,413	$1,010,955	$1,211,137	$1,254,804	$1,299,431	$1,345,340	$1,392,566	$1,441,144	$1,491,107	$1,542,492	$1,595,336	$1,649,677
Late Payment Charge	N.A.	$47,598	$48,359	$49,120	$49,893	$50,654	$51,416	$52,177	$52,938	$53,700	$54,461	$55,222	$55,984
New Taps or Connections (Current Rate Structure)	% Above	$43,000	$42,882	$0	$0	$0	$0	$0	$0	$0	$0	$1	$2
Meter Size-based System Development Fees (Table 14)	% Above	$0	$267	$97,428	$99,377	$101,365	$103,392	$105,460	$107,569	$109,720	$111,915	$114,153	$116,436
Interest Income	N.A.	$0	$5,035	$5,238	$5,680	$6,160	$6,384	$6,546	$6,749	$6,996	$7,175	$7,399	$7,672
210 41 WATER/POOL SALES TAX	N.A.	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669	$5,669
210 43 DEBT COLLECTIONS & SETOFF	N.A.	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651	$10,651
210 43 CONNECT/RECONNECT FEES	N.A.	$20,497	$20,497	$5,497	$5,497	$5,497	$5,497	$5,497	$5,497	$5,497	$5,497	$5,497	$5,497
210 43 METER READ CHARGE	N.A.	$369	$369	$369	$369	$369	$369	$369	$369	$369	$369	$369	$369
210 43 METER PIT - RING - LID	N.A.	$21,500	$21,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500
210 43 WATER HAULING	N.A.	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078	$6,078
210 45 INSUFFICIENT CHECK FEE	N.A.	$560	$560	$560	$560	$560	$560	$560	$560	$560	$560	$560	$560
210 46 REIMBURSED EXPENSE	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 46 ONLINE CONVENIENCE FEE	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 46 LEASE RECEIPTS	N.A.	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750	$5,750
210 46 BOND PROCEEDS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
440 46 REIMBURSED EXPENSE	N.A.	$286	$286	$286	$286	$286	$286	$286	$286	$286	$286	$286	$286
440 46 SALE OF PROPERTY	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
440 46 LEASE RECEIPTS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
440 46 BOND PROCEEDS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
440 46 BOND PREMIUM	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
440 49 TRANSFER FROM OTHER FUNDS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Revenue Loss Because Rate Adjustments Made # Months Late	6.0	$0	$0	-$87,188	$0	$0	$0	$0	$0	$0	$0	$0	$0
Revenue Loss (-) Due to Conservation	2.5%	$0	$0	-$5,005	-$1,092	-$1,116	-$1,148	-$1,181	-$1,214	-$1,249	-$1,285	-$1,321	-$1,359
Total Operating Incomes		**$1,172,369**	**$1,178,858**	**$1,312,090**	**$1,450,022**	**$1,497,853**	**$1,546,743**	**$1,596,928**	**$1,648,545**	**$1,701,633**	**$1,756,118**	**$1,812,150**	**$1,869,771**

Table 4 - Operating Costs and Net Income

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table depicts expenses during the test year, this year and for the next 10 years. Some future costs will experience inflation. Those costs that go up as use goes up are increased by the cost inflation factor plus the growth rate in users.

(First year costs and net incomes are actual, subsequent years are projected.)

	Inflation or Deflation (–) Factor	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	Years Following the Analysis Year (for Which Results Have Been Projected)									
				1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
210 61 CHARGE IN OF SALARIES	3.0%	$411,034	$423,365	$436,065	$449,147	$462,622	$476,500	$490,795	$505,519	$520,685	$536,305	$552,395	$568,966
210 61 OVERTIME	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 AUTOMOTIVE MAINTENANCE	3.0%	$694	$714	$736	$758	$781	$804	$828	$853	$879	$905	$932	$960
210 62 CREDIT CARD PROCESSING FEES	3.0%	$20,218	$20,824	$21,449	$22,092	$22,755	$23,438	$24,141	$24,865	$25,611	$26,379	$27,171	$27,986
210 62 DUES & MEMBERSHIPS	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 ELECTRICITY	3.0%	$25,661	$26,854	$28,095	$29,393	$30,737	$32,135	$33,589	$35,101	$36,674	$38,310	$40,011	$41,779
210 62 ENGINEERING SERVICES	3.0%	$1,500	$1,545	$1,591	$1,639	$1,688	$1,739	$1,791	$1,845	$1,900	$1,957	$2,016	$2,076
210 62 EQUIPMENT REPAIR SERVICES	3.0%	$825	$850	$875	$901	$929	$956	$985	$1,015	$1,045	$1,076	$1,109	$1,142
210 62 INSPECTION & CLEANING SERVICES	3.0%	$224	$231	$238	$245	$252	$260	$267	$275	$284	$292	$301	$310
210 62 INTERNET/CABLE/PHONE	3.0%	$1,790	$1,844	$1,899	$1,956	$2,015	$2,075	$2,137	$2,201	$2,267	$2,335	$2,406	$2,478
210 62 IT SERVICES	3.0%	$95	$98	$101	$104	$107	$110	$113	$117	$120	$124	$128	$132
210 62 LABORATORY SERVICES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 LEASE OF OFFICE EQUIPMENT	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 LEGAL SERVICES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 LIABILITY INSURANCE	3.0%	$12,500	$12,875	$13,261	$13,659	$14,069	$14,491	$14,926	$15,373	$15,835	$16,310	$16,799	$17,303
210 62 MAINTENANCE SERVICES	3.0%	$10,884	$11,211	$11,547	$11,894	$12,250	$12,618	$12,997	$13,386	$13,788	$14,202	$14,628	$15,067
210 62 MILEAGE REIMBURSEMENT	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 NATURAL GAS/PROPANE	3.0%	$2,120	$2,183	$2,249	$2,316	$2,386	$2,457	$2,531	$2,607	$2,685	$2,766	$2,849	$2,934
210 62 OTHER PROFESSIONAL SERVICES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 PERMITS & FEES	3.0%	$6,812	$7,016	$7,227	$7,443	$7,667	$7,897	$8,134	$8,378	$8,629	$8,888	$9,155	$9,429
210 62 POSTAGE	3.0%	$13,254	$13,870	$14,511	$15,182	$15,876	$16,598	$17,349	$18,130	$18,943	$19,788	$20,666	$21,580
210 62 PRINTING & MARKETING	3.0%	$3,729	$3,841	$3,956	$4,075	$4,197	$4,323	$4,452	$4,586	$4,723	$4,865	$5,011	$5,161
210 62 PUBLIC NOTICES & ADVERTISING	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 RETURNED PAYMENTS AND FEES	3.0%	$2,878	$2,964	$3,053	$3,144	$3,239	$3,336	$3,436	$3,539	$3,645	$3,755	$3,867	$3,983
210 62 SALES TAX PAYMENT TO STATE	3.0%	$6,895	$7,102	$7,315	$7,534	$7,761	$7,993	$8,233	$8,480	$8,735	$8,997	$9,266	$9,544
210 62 SAMPLING & ANALYSIS	3.0%	$2,781	$2,864	$2,950	$3,039	$3,130	$3,224	$3,320	$3,420	$3,523	$3,628	$3,737	$3,849
210 62 SOFTWARE LICENSING	3.0%	$3,550	$3,657	$3,766	$3,879	$3,996	$4,115	$4,239	$4,366	$4,497	$4,632	$4,771	$4,914
210 62 TRAINING & CERTIFICATIONS	3.0%	$960	$989	$1,018	$1,049	$1,080	$1,113	$1,146	$1,181	$1,216	$1,253	$1,290	$1,329
210 62 TRAVEL EXPENSES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 62 WATER PURCHASES	3.0%	$208,035	$217,703	$227,763	$238,288	$249,182	$260,515	$272,304	$284,566	$297,318	$310,579	$324,368	$338,705
210 63 CHEMICALS	3.0%	$6,111	$6,395	$6,690	$7,000	$7,320	$7,652	$7,999	$8,359	$8,734	$9,123	$9,528	$9,949
210 63 CLOTHING	3.0%	$309	$319	$328	$338	$348	$359	$369	$380	$392	$404	$416	$428
210 63 EDUCATIONAL SUPPLIES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 63 FUEL & OIL	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 63 JANITORIAL SUPPLIES	3.0%	$158	$162	$167	$172	$177	$183	$188	$194	$200	$206	$212	$218
210 63 MEDICAL & DRUG SUPPLIES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 63 MEETING AND MEAL EXPENSES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 63 OFFICE AND MEETING SUPPLIES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 63 OPERATING SUPPLIES	3.0%	$3,943	$4,061	$4,183	$4,308	$4,438	$4,571	$4,708	$4,849	$4,995	$5,145	$5,299	$5,458
210 63 TOOLS & MAINTENANCE SUPPLIES	3.0%	$2,997	$3,087	$3,179	$3,275	$3,373	$3,474	$3,578	$3,686	$3,796	$3,910	$4,027	$4,148

Table 4 - Operating Costs and Net Income

	Inflation or Deflation (–) Factor	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
210 64 AUTOMOTIVE EQUIPMENT	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 64 CAPITAL IMPROVEMENTS	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 64 EQUIPMENT RENTAL	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 64 MACHINERY & EQUIPMENT	3.0%	$5,704	$5,875	$6,051	$6,233	$6,420	$6,612	$6,811	$7,015	$7,225	$7,442	$7,665	$7,895
210 64 OFFICE/COMPUTER EQUIPMENT	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 64 OTHER EQUIPMENT	3.0%	$1,285	$1,324	$1,364	$1,404	$1,447	$1,490	$1,535	$1,581	$1,628	$1,677	$1,727	$1,779
210 65 EXPENDITURE CONTROL	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
210 68 DEBT SERVICE	0.0%	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5
210 69 TRANSFER TO OTHER FUNDS	3.0%	$250,080	$257,582	$265,310	$273,269	$281,467	$289,911	$298,609	$307,567	$316,794	$326,298	$336,087	$346,169
One-time Reduction of R&R Annuity	0.0%	-$118,317	-$118,317	-$59,158	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Payment to Repair & Replacement (Table 7)	0.0%	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317	$118,317
User Charge Analysis Services	5.0%	$0	$6,110	$0	$0	$6,736	$0	$0	$7,427	$0	$0	$8,188	$0
Total CIP-related Payouts	N.A.	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5
Total Operating Costs		**$1,007,024**	**$1,047,512**	**$1,136,096**	**$1,232,054**	**$1,276,758**	**$1,309,266**	**$1,349,828**	**$1,399,178**	**$1,435,082**	**$1,479,866**	**$1,534,340**	**$1,573,991**
Net Income (or Loss)		$165,346	$131,345	$175,994	$217,968	$221,095	$237,477	$247,100	$249,367	$266,551	$276,251	$277,810	$295,781
Working Capital Goal: 50%	In Dollars, That is:	$503,512	$523,756	$568,048	$616,027	$638,379	$654,633	$674,914	$699,589	$717,541	$739,933	$767,170	$786,995

Notes: The yellow highlighted cost items above will rise due to inflation and due to the additional cost of serving new customers.

Table 5 - Capital Improvement Program (CIP)

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table depicts capital improvements and their funding. Costs reflect inflation.

	Test Year	Analysis (This) Year	Years Following the Analysis Year (for Which Improvement Projects, Costs, Funding, etc. Have Been Projected)									
	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year		
	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting
	1/1/17	1/1/18	1/1/19	1/1/20	1/1/21	1/1/22	1/1/23	1/1/24	1/1/25	1/1/26	1/1/27	1/1/28
Planned Spending, Debt-paid Portion of Projects (CIP costs to be funded with loans are shown in this section.)												
Smiley Rd and Hatchell Rd Area Booster Station	$0	$0	$0	$0	$61,466	$0	$0	$0	$0	$0	$0	$0
Additional Water Line to the Business Park	$0	$0	$0	$0	$143,420	$0	$0	$0	$0	$0	$0	$0
New Water Tower at Business Park	$0	$0	$0	$0	$614,659	$0	$0	$0	$0	$0	$0	$0
Loan Closing Costs, Estimated at: 2.5%	$0	$0	$0	$0	$11,194	$0	$0	$0	$0	$0	$0	$0
Total Debt-paid Portion of Projects	$0	$0	$0	$0	$830,739	$0	$0	$0	$0	$0	$0	$0
Planned Spending, Cash-paid Portion of Projects (CIP costs to be funded from reserves are shown here.)												
Smiley Rd and Hatchell Rd Area Booster Station	$0	$0	$0	$0	$20,489	$0	$0	$0	$0	$0	$0	$0
Additional Water Line to the Business Park	$0	$0	$0	$0	$47,807	$0	$0	$0	$0	$0	$0	$0
New Water Tower at Business Park	$0	$0	$0	$0	$204,886	$0	$0	$0	$0	$0	$0	$0
Total Cash-paid Portion of Projects	$0	$0	$0	$0	$273,182	$0	$0	$0	$0	$0	$0	$0
Total CIP Costs	**$0**	**$0**	**$0**	**$0**	**$1,103,921**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt Repayment												
Existing Debt Payments (Following is debt that was initiated during the test year or earlier.)												
210 68 DEBT SERVICE	$153,722	$151,335	$152,048	$151,149	$196,719	$194,828	$192,906	$195,603	$196,626	$54,956	$55,377	$54,211
New Debt Payments (Following are payments for projects to be paid with new debt. It is assumed these will be loan/lease-financed for a term of: 20 years at a 4.5% interest rate.)												
Business Park Water Improvements						$63,864	$63,864	$63,864	$63,864	$63,864	$63,864	$63,864
Total Debt Payments	$153,722	$151,335	$152,048	$151,149	$196,719	$258,692	$256,770	$259,467	$260,490	$118,820	$119,241	$118,075
Total CIP-related Payouts	**$153,722**	**$151,335**	**$152,048**	**$151,149**	**$1,300,640**	**$258,692**	**$256,770**	**$259,467**	**$260,490**	**$118,820**	**$119,241**	**$118,075**
(This is the total cash required for this CIP and debt payment schedule. These amounts must come from utility income, reserves or outside sources, as shown in the next section.)												
CIP Fund Sources (Following are the sources and amounts of funds expected to pay for the above CIP schedule.)												
Cash Reserves (Internal Funds)												
Debt and CIP Reserves Starting Balance	$266,770	$148,245	$110,976	$92,849	$113,546	-$155,341	-$195,917	-$229,786	-$269,156	-$286,431	-$157,120	-$28,931
Working Capital Transferred in	$35,197	$111,101	$131,702	$169,989	$198,743	$221,223	$226,820	$224,692	$248,599	$253,859	$250,573	$275,955
Debt and CIP Reserves Interest Earned (or Paid)	$0	$2,965	$2,220	$1,857	$2,271	-$3,107	-$3,918	-$4,596	-$5,383	-$5,729	-$3,142	-$579
Total Available Internal Funds	$301,967	$262,311	$244,897	$264,695	$314,560	$62,775	$26,985	-$9,689	-$25,941	-$38,300	$90,310	$246,446
Grant and Loan Proceeds (External Funds)												
Business Park Water Improvements					$830,739	$0	$0	$0	$0	$0	$0	$0
Total Available External Funds	$0	$0	$0	$0	$830,739	$0	$0	$0	$0	$0	$0	$0
Total Available Funds	**$301,967**	**$262,311**	**$244,897**	**$264,695**	**$1,145,299**	**$62,775**	**$26,985**	**-$9,689**	**-$25,941**	**-$38,300**	**$90,310**	**$246,446**
Outcomes (This CIP spending and funding plan will result in the following cash needs and ending balances each year.)												
Total Available Funds	**$301,967**	**$262,311**	**$244,897**	**$264,695**	**$1,145,299**	**$62,775**	**$26,985**	**-$9,689**	**-$25,941**	**-$38,300**	**$90,310**	**$246,446**
Total CIP-related Payouts	**$153,722**	**$151,335**	**$152,048**	**$151,149**	**$1,300,640**	**$258,692**	**$256,770**	**$259,467**	**$260,490**	**$118,820**	**$119,241**	**$118,075**
Debt and CIP Reserves Ending Balances	**$148,245**	**$110,976**	**$92,849**	**$113,546**	**-$155,341**	**-$195,917**	**-$229,786**	**-$269,156**	**-$286,431**	**-$157,120**	**-$28,931**	**$128,371**

Notes: These improvements are for the business park infrastructure and are not likely grant or SRF loan eligible. It is assumed these will be 75% funded with market rate bonds and 25% with reserves.

Table 6 - Equipment Replacement Schedule - Detailed

Tonganoxie, KS; Water Rates, Scenario 2019-1

Year Beginning	Unspecified R&R	Water tower inspections, maintenance, and repairs	Replace Monitoring System at Water Plant	Chemical Pump Upgrades	Upgrade Chemical Testing Equipment	Well Pump Replacements/ Rebuilds	VFDs - Replace High Service Pumps	Replace Pressure Filter Media (Plant)		**Total Annual Replacement Costs**
1/1/18	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/19	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/20	$20,000	$50,000	$4,000	$10,000	$1,500	$0	$0	$0	$0	$85,500
1/1/21	$20,000	$50,000	$0	$0	$0	$20,000	$15,000	$40,000	$0	$145,000
1/1/22	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/23	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/24	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/25	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/26	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/27	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/28	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/29	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/30	$20,000	$50,000	$4,000	$10,000	$1,500	$0	$0	$0	$0	$85,500
1/1/31	$20,000	$50,000	$0	$0	$0	$20,000	$15,000	$0	$0	$105,000
1/1/32	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/33	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/34	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/35	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/36	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/37	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/38	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/39	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000
1/1/40	$20,000	$50,000	$4,000	$10,000	$1,500	$0	$0	$0	$0	$85,500
1/1/41	$20,000	$50,000	$0	$0	$0	$20,000	$15,000	$40,000	$0	$145,000
1/1/42	$20,000	$50,000	$0	$0	$0	$0	$0	$0	$0	$70,000

Table 7 - Equipment Replacement Annuity Calculation

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table calculates the annual annuity (savings deposit) needed to build replacement (R&R) reserves. This annuity amount should actually be deposited in a savings account. The annuity amount, called the "Required Annual Deposit (Annuity) to Replacement Account" below, should be included in the utility's general budget as a cost. As a result, all replacement and refurbishment scheduled in Table 6, the detailed replacement schedule, would be paid for out of R&R reserves and not out of the utility's general budget.

In simple terms, the annuity at the bottom of this table should be deposited into an account each year and R&R projects should be paid for out of that account.

3.00% Average Inflation Rate for the Following Water System Equipment for the Term of This Replacement Schedule

2.00% Average Interest Rate on Balances Invested for the Term of This Replacement Schedule

2.00% Average Interest Rate on Amounts Borrowed for the Term of This Replacement Schedule

Year Beginning	Schedule Year	This Year's Costs in Current Dollars	Future Annual Inflated Net Costs	Interest Earned on Prior Balance	End of Year Balance in Future Dollars	Minimum Desired End of Year Balance in Future Dollars
1/1/18	Analysis Year	$70,000	$70,000	$0	-$70,000	$294,200
1/1/19	1st Year	$70,000	$72,100	-$1,400	-$25,183	$303,026
1/1/20	2nd Year	$85,500	$90,707	-$504	$1,923	$312,117
1/1/21	3rd Year	$145,000	$158,445	$38	-$38,167	$321,480
1/1/22	4th Year	$70,000	$78,786	-$763	$601	$331,125
1/1/23	5th Year	$70,000	$81,149	$12	$37,780	$341,058
1/1/24	6th Year	$70,000	$83,584	$756	$73,269	$351,290
1/1/25	7th Year	$70,000	$86,091	$1,465	$106,960	$361,829
1/1/26	8th Year	$70,000	$88,674	$2,139	$138,742	$372,684
1/1/27	9th Year	$70,000	$91,334	$2,775	$168,500	$383,864
1/1/28	10th Year	$70,000	$94,074	$3,370	$196,112	$395,380
1/1/29	11th Year	$70,000	$96,896	$3,922	$221,455	$407,242
1/1/30	12th Year	$85,500	$121,903	$4,429	$222,298	$419,459
1/1/31	13th Year	$105,000	$154,196	$4,446	$190,865	$432,043
1/1/32	14th Year	$70,000	$105,881	$3,817	$207,118	$445,004
1/1/33	15th Year	$70,000	$109,058	$4,142	$220,519	$458,354
1/1/34	16th Year	$70,000	$112,329	$4,410	$230,917	$472,105
1/1/35	17th Year	$70,000	$115,699	$4,618	$238,153	$486,268
1/1/36	18th Year	$70,000	$119,170	$4,763	$242,063	$500,856
1/1/37	19th Year	$70,000	$122,745	$4,841	$242,475	$515,881
				Starting Account Balance	$0	$294,200
				Minimum Annual Annuity	$107,701	Minimum Desired Balance in Today's Dollars
				Discretionary Annuity	$10,616	

Notes: There is currently no R&R schedule. Average R&R costs were instead estimated. A Discretionary Annuity amount was added so that at the end of the 20-year modeling period, the balance will equal the average of the annual replacement cost amounts, less interest paid for borrowing during the negative balance years.

Required Annual Deposit (Annuity) to Replacement Account **$118,317**

(This amount is included in Table 4 as an operating cost.)

Table 8 - Average Cost Classification

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table distributes costs from a representative year (the "average rate structure basis year) to fixed and variable categories (see Definitions) in order to calculate the "cost of service" rate structure for that year.

The average rate structure basis year runs from: 1/1/2022 through 12/31/2022

Cost Items	Cost During Average Rate Structure Basis Year	Fixed Cost Percentage	Variable Cost Percentage	Average Fixed Cost	Average Variable Cost
210 61 CHARGE IN OF SALARIES	$476,500	25.0%	75.0%	$119,125	$357,375
210 61 OVERTIME	$0	25.0%	75.0%	$0	$0
210 62 AUTOMOTIVE MAINTENANCE	$804	25.0%	75.0%	$201	$603
210 62 CREDIT CARD PROCESSING FEES	$23,438	100.0%	0.0%	$23,438	$0
210 62 DUES & MEMBERSHIPS	$0	25.0%	75.0%	$0	$0
210 62 ELECTRICITY	$32,135	0.0%	100.0%	$0	$32,135
210 62 ENGINEERING SERVICES	$1,739	32.0%	68.0%	$556	$1,182
210 62 EQUIPMENT REPAIR SERVICES	$956	25.0%	75.0%	$239	$717
210 62 INSPECTION & CLEANING SERVICES	$260	25.0%	75.0%	$65	$195
210 62 INTERNET/CABLE/PHONE	$2,075	100.0%	0.0%	$2,075	$0
210 62 IT SERVICES	$110	100.0%	0.0%	$110	$0
210 62 LABORATORY SERVICES	$0	100.0%	0.0%	$0	$0
210 62 LEASE OF OFFICE EQUIPMENT	$0	100.0%	0.0%	$0	$0
210 62 LEGAL SERVICES	$0	100.0%	0.0%	$0	$0
210 62 LIABILITY INSURANCE	$14,491	100.0%	0.0%	$14,491	$0
210 62 MAINTENANCE SERVICES	$12,618	25.0%	75.0%	$3,155	$9,464
210 62 MILEAGE REIMBURSEMENT	$0	25.0%	75.0%	$0	$0
210 62 NATURAL GAS/PROPANE	$2,457	100.0%	0.0%	$2,457	$0
210 62 OTHER PROFESSIONAL SERVICES	$0	25.0%	75.0%	$0	$0
210 62 PERMITS & FEES	$7,897	32.0%	68.0%	$2,527	$5,370
210 62 POSTAGE	$16,598	100.0%	0.0%	$16,598	$0
210 62 PRINTING & MARKETING	$4,323	100.0%	0.0%	$4,323	$0
210 62 PUBLIC NOTICES & ADVERTISING	$0	100.0%	0.0%	$0	$0
210 62 RETURNED PAYMENTS AND FEES	$3,336	32.0%	68.0%	$1,067	$2,268
210 62 SALES TAX PAYMENT TO STATE	$7,993	32.0%	68.0%	$2,558	$5,435
210 62 SAMPLING & ANALYSIS	$3,224	100.0%	0.0%	$3,224	$0
210 62 SOFTWARE LICENSING	$4,115	100.0%	0.0%	$4,115	$0
210 62 TRAINING & CERTIFICATIONS	$1,113	25.0%	75.0%	$278	$835
210 62 TRAVEL EXPENSES	$0	25.0%	75.0%	$0	$0
210 62 WATER PURCHASES	$260,515	0.0%	100.0%	$0	$260,515
210 63 CHEMICALS	$7,652	0.0%	100.0%	$0	$7,652
210 63 CLOTHING	$359	25.0%	75.0%	$90	$269

Table 8 - Average Cost Classification

Cost Items	Cost During Average Rate Structure Basis Year	Fixed Cost Percentage	Variable Cost Percentage	Average Fixed Cost	Average Variable Cost
210 63 EDUCATIONAL SUPPLIES	$0	25.0%	75.0%	$0	$0
210 63 FUEL & OIL	$0	25.0%	75.0%	$0	$0
210 63 JANITORIAL SUPPLIES	$183	100.0%	0.0%	$183	$0
210 63 MEDICAL & DRUG SUPPLIES	$0	25.0%	75.0%	$0	$0
210 63 MEETING AND MEAL EXPENSES	$0	100.0%	0.0%	$0	$0
210 63 OFFICE AND MEETING SUPPLIES	$0	100.0%	0.0%	$0	$0
210 63 OPERATING SUPPLIES	$4,571	25.0%	75.0%	$1,143	$3,428
210 63 TOOLS & MAINTENANCE SUPPLIES	$3,474	25.0%	75.0%	$869	$2,606
210 64 AUTOMOTIVE EQUIPMENT	$0	25.0%	75.0%	$0	$0
210 64 CAPITAL IMPROVEMENTS	$0	50.0%	50.0%	$0	$0
210 64 EQUIPMENT RENTAL	$0	25.0%	75.0%	$0	$0
210 64 MACHINERY & EQUIPMENT	$6,612	25.0%	75.0%	$1,653	$4,959
210 64 OFFICE/COMPUTER EQUIPMENT	$0	100.0%	0.0%	$0	$0
210 64 OTHER EQUIPMENT	$1,490	25.0%	75.0%	$372	$1,117
210 65 EXPENDITURE CONTROL	$0	32.0%	68.0%	$0	$0
210 68 DEBT SERVICE	$0	50.0%	50.0%	$0	$0
210 69 TRANSFER TO OTHER FUNDS	$289,911	100.0%	0.0%	$289,911	$0
Annual Payment to Repair & Replacement (Table 7)	$118,317	25.0%	75.0%	$29,579	$88,738
User Charge Analysis Services	$0	32.0%	68.0%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	$166,064	0.0%	100.0%	$0	$166,064
Grand Total Costs, Weighted Avg Percentages	$1,475,330	35.5%	64.5%	$524,402	$950,928

Bases for Cost to Serve Rate Structure

		100%		$1,475,330	
Number of Customers During Year Defined Above =	2,129	Unbilled-for Water is Estimated at			30%
Billed Volume, in Gallons, During Year Defined Above =	115,513,831	Unbilled-for Water is Estimated at This Percentage of Average Cost			60%
Average Fixed Cost per User per Month During Year Defined Above =	$20.53	Resulting Cost of Unbilled-for Water			$246,481
Average Variable Cost to Produce per 1,000 Gallons During Year Defined Above =	$8.23	Test Year Customer Metered Volume, in Gallons			106,833,000
Gallons per Billing Cycle Used by Average Residential Customer =	4,452	+ Test Year Unbilled-for Water, in Gallons			46,360,000
		Total Test Year Volume, in Gallons, From Master Meter Readings			153,193,000

Table 9 - Marginal Cost Classification

Tonganoxie, KS; Water Rates, Scenario 2019-1

The utility incurs "marginal" costs. These costs are unavoidable. Thus, the utility must collect minimal fees from various customers to "break even" on a marginal cost basis. Costs vary by customer type and volume used.

In the calculations below, it is assumed that marginal fixed costs are being calculated for: Not Applicable

In the calculations below, it is assumed that marginal costs are being calculated for: Cost of Water Loss

The marginal rate structure basis year runs from: 1/1/2022 through 12/31/2022

Cost Items	Average Fixed Cost	Average Variable Cost	Marginal Fixed Cost Percentage	Marginal Variable Cost Percentage	Marginal Fixed Cost	Marginal Variable Cost
210 61 CHARGE IN OF SALARIES	$119,125	$357,375	50%	0%	$59,563	$0
210 61 OVERTIME	$0	$0	50%	0%	$0	$0
210 62 AUTOMOTIVE MAINTENANCE	$201	$603	50%	0%	$101	$0
210 62 CREDIT CARD PROCESSING FEES	$23,438	$0	100%	0%	$23,438	$0
210 62 DUES & MEMBERSHIPS	$0	$0	100%	0%	$0	$0
210 62 ELECTRICITY	$0	$32,135	0%	100%	$0	$32,135
210 62 ENGINEERING SERVICES	$556	$1,182	50%	0%	$278	$0
210 62 EQUIPMENT REPAIR SERVICES	$239	$717	50%	0%	$120	$0
210 62 INSPECTION & CLEANING SERVICES	$65	$195	50%	0%	$32	$0
210 62 INTERNET/CABLE/PHONE	$2,075	$0	100%	0%	$2,075	$0
210 62 IT SERVICES	$110	$0	100%	0%	$110	$0
210 62 LABORATORY SERVICES	$0	$0	100%	100%	$0	$0
210 62 LEASE OF OFFICE EQUIPMENT	$0	$0	100%	0%	$0	$0
210 62 LEGAL SERVICES	$0	$0	100%	0%	$0	$0
210 62 LIABILITY INSURANCE	$14,491	$0	100%	0%	$14,491	$0
210 62 MAINTENANCE SERVICES	$3,155	$9,464	50%	100%	$1,577	$9,464
210 62 MILEAGE REIMBURSEMENT	$0	$0	50%	0%	$0	$0
210 62 NATURAL GAS/PROPANE	$2,457	$0	100%	0%	$2,457	$0
210 62 OTHER PROFESSIONAL SERVICES	$0	$0	100%	0%	$0	$0
210 62 PERMITS & FEES	$2,527	$5,370	100%	0%	$2,527	$0
210 62 POSTAGE	$16,598	$0	100%	0%	$16,598	$0
210 62 PRINTING & MARKETING	$4,323	$0	100%	0%	$4,323	$0
210 62 PUBLIC NOTICES & ADVERTISING	$0	$0	100%	0%	$0	$0
210 62 RETURNED PAYMENTS AND FEES	$1,067	$2,268	50%	0%	$534	$0
210 62 SALES TAX PAYMENT TO STATE	$2,558	$5,435	50%	0%	$1,279	$0
210 62 SAMPLING & ANALYSIS	$3,224	$0	100%	0%	$3,224	$0
210 62 SOFTWARE LICENSING	$4,115	$0	100%	0%	$4,115	$0
210 62 TRAINING & CERTIFICATIONS	$278	$835	100%	0%	$278	$0
210 62 TRAVEL EXPENSES	$0	$0	100%	0%	$0	$0

Table 9 - Marginal Cost Classification

Cost Items	Average Fixed Cost	Average Variable Cost	Marginal Fixed Cost Percentage	Marginal Variable Cost Percentage	Marginal Fixed Cost	Marginal Variable Cost
210 62 WATER PURCHASES	$0	$260,515	0%	100%	$0	$260,515
210 63 CHEMICALS	$0	$7,652	0%	100%	$0	$7,652
210 63 CLOTHING	$90	$269	50%	0%	$45	$0
210 63 EDUCATIONAL SUPPLIES	$0	$0	50%	0%	$0	$0
210 63 FUEL & OIL	$0	$0	50%	0%	$0	$0
210 63 JANITORIAL SUPPLIES	$183	$0	50%	0%	$91	$0
210 63 MEDICAL & DRUG SUPPLIES	$0	$0	50%	0%	$0	$0
210 63 MEETING AND MEAL EXPENSES	$0	$0	100%	0%	$0	$0
210 63 OFFICE AND MEETING SUPPLIES	$0	$0	100%	0%	$0	$0
210 63 OPERATING SUPPLIES	$1,143	$3,428	50%	100%	$571	$3,428
210 63 TOOLS & MAINTENANCE SUPPLIES	$869	$2,606	50%	0%	$434	$0
210 64 AUTOMOTIVE EQUIPMENT	$0	$0	50%	0%	$0	$0
210 64 CAPITAL IMPROVEMENTS	$0	$0	100%	0%	$0	$0
210 64 EQUIPMENT RENTAL	$0	$0	50%	0%	$0	$0
210 64 MACHINERY & EQUIPMENT	$1,653	$4,959	50%	0%	$827	$0
210 64 OFFICE/COMPUTER EQUIPMENT	$0	$0	100%	0%	$0	$0
210 64 OTHER EQUIPMENT	$372	$1,117	50%	0%	$186	$0
210 65 EXPENDITURE CONTROL	$0	$0	100%	0%	$0	$0
210 68 DEBT SERVICE	$0	$0	100%	0%	$0	$0
210 69 TRANSFER TO OTHER FUNDS	$289,911	$0	100%	0%	$289,911	$0
Annual Payment to Repair & Replacement (Table 7)	$29,579	$88,738	50%	100%	$14,790	$88,738
User Charge Analysis Services	$0	$0	100%	100%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	$0	$166,064	100%	100%	$0	$166,064
Grand Total All Costs	$524,402	$950,928			$443,975	$567,995
	$1,475,330				$1,011,970	

Marginal Fixed and Variable Cost Bases (For the Customer Type Listed Above)

	Monthly Marginal Fixed Cost per Customer	Marginal Variable Cost per 1,000 Gallons
	$17.38	
Marginal Fixed Cost as a Percent of Total Fixed Cost:	85%	$4.92
Marginal Variable Cost as a Percent of Total Variable Cost:		60%

Table 10 - Initial Rate Adjustments and Resulting Revenues

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table calculates a new set of user charge rates and the revenues they would generate.

After rate adjustments are made, customers will be billed monthly.

Sales to be billed this year: Sales at the current (Test Year) rates (gray highlighted column) will apply until rates are adjusted. Sales at the modeled rates (yellow highlighted column) would apply if the modeled rates are adopted. The grand total "blended" sales revenues are the total revenues generated by the two different sets of rates. Those revenues show in the right-most column.

Customer Class, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Sales This Year at Current Rates	Customers Within This Volume Range	Minimum Charge for Calculation Purposes	New Usage Allowance in 1,000 Gallons	New Unit Charge per 1,000 Gallons	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
	-111,000	-1	-$1,227	0	$15.76	0.000	$6.32	-$4	-$1,230
	0	999	$0	0	$15.76	0.000	$6.32	$402	$402
	1,000	1,999	$169,630	229	$15.76	0.000	$6.32	$473	$170,103
	2,000	2,999	$175,815	348	$15.76	0.000	$6.32	$462	$176,277
	3,000	3,999	$158,379	379	$15.76	0.000	$6.32	$400	$158,778
	4,000	4,999	$123,923	327	$15.76	0.000	$6.32	$305	$124,228
	5,000	5,999	$84,983	231	$15.76	0.000	$6.32	$207	$85,190
	6,000	6,999	$54,156	146	$15.76	0.000	$6.32	$132	$54,288
	7,000	7,999	$34,461	90	$15.76	0.000	$6.32	$85	$34,546
	8,000	8,999	$22,138	55	$15.76	0.000	$6.32	$55	$22,193
	9,000	9,999	$15,111	36	$15.76	0.000	$6.32	$38	$15,149
	10,000	14,999	$31,238	63	$15.76	0.000	$6.32	$82	$31,320
	15,000	19,999	$10,403	15	$15.76	0.000	$6.32	$29	$10,431
1 Minimum	20,000	24,999	$4,925	4	$15.76	0.000	$6.32	$14	$4,940
	25,000	29,999	$3,597	2	$15.76	0.000	$6.32	$11	$3,607
	30,000	39,999	$4,852	2	$15.76	0.000	$6.32	$15	$4,867
	40,000	49,999	$3,677	1	$15.76	0.000	$6.32	$11	$3,688
	50,000	59,999	$3,095	1	$15.76	0.000	$6.32	$9	$3,105
	60,000	69,999	$2,737	1	$15.76	0.000	$6.32	$8	$2,745
	70,000	79,999	$2,313	0	$15.76	0.000	$6.32	$7	$2,320
	80,000	89,999	$2,036	0	$15.76	0.000	$6.32	$6	$2,042
	90,000	99,999	$1,924	0	$15.76	0.000	$6.32	$6	$1,930
	100,000	109,999	$1,838	0	$15.76	0.000	$6.32	$6	$1,844
	110,000	119,999	$1,709	1	$15.76	0.000	$6.32	$5	$1,714
	120,000	129,999	$1,401	0	$15.76	0.000	$6.32	$4	$1,405
	130,000	139,999	$1,143	0	$15.76	0.000	$6.32	$3	$1,147
	140,000	276,000	$5,952	1	$15.76	0.000	$6.32	$18	$5,970

Table 10 - Initial Rate Adjustments and Resulting Revenues

Customer Class, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Sales This Year at Current Rates	Customers Within This Volume Range	Minimum Charge for Calculation Purposes	New Usage Allowance in 1,000 Gallons	New Unit Charge per 1,000 Gallons	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
	0	999	$2,304	5	$15.76	0.000	$6.32	$6	$2,310
	1,000	1,999	$2,008	2	$15.76	0.000	$6.32	$4	$2,012
	2,000	2,999	$1,498	2	$15.76	0.000	$6.32	$3	$1,501
	3,000	3,999	$1,612	2	$15.76	0.000	$6.32	$3	$1,615
	4,000	4,999	$1,372	2	$15.76	0.000	$6.32	$2	$1,375
	5,000	5,999	$829	1	$15.76	0.000	$6.32	$2	$831
	6,000	6,999	$672	1	$15.76	0.000	$6.32	$2	$674
	7,000	7,999	$782	1	$15.76	0.000	$6.32	$2	$783
	8,000	8,999	$406	0	$15.76	0.000	$6.32	$1	$407
	9,000	9,999	$436	0	$15.76	0.000	$6.32	$1	$437
	10,000	14,999	$2,628	3	$15.76	0.000	$6.32	$5	$2,633
	15,000	19,999	$957	1	$15.76	0.000	$6.32	$2	$959
	20,000	24,999	$782	1	$15.76	0.000	$6.32	$2	$784
2 Minimums	25,000	29,999	$455	0	$15.76	0.000	$6.32	$1	$456
	30,000	34,999	$413	0	$15.76	0.000	$6.32	$1	$414
	35,000	44,999	$457	0	$15.76	0.000	$6.32	$1	$458
	45,000	54,999	$179	0	$15.76	0.000	$6.32	$0	$180
	55,000	64,999	$88	0	$15.76	0.000	$6.32	$0	$88
	65,000	74,999	$0	0	$15.76	0.000	$6.32	$0	$0
	75,000	84,999	$0	0	$15.76	0.000	$6.32	$0	$0
	85,000	94,999	$0	0	$15.76	0.000	$6.32	$0	$0
	95,000	104,999	$0	0	$15.76	0.000	$6.32	$0	$0
	105,000	114,999	$0	0	$15.76	0.000	$6.32	$0	$0
	115,000	124,999	$0	0	$15.76	0.000	$6.32	$0	$0
	125,000	134,999	$0	0	$15.76	0.000	$6.32	$0	$0
	135,000	144,999	$0	0	$15.76	0.000	$6.32	$0	$0
	145,000	56,000	$0	0	$15.76	0.000	$6.32	$0	$0
	0	999	$329	0	$15.76	0.000	$6.32	$3	$332
	1,000	1,999	$850	0	$15.76	0.000	$6.32	$2	$853
	2,000	2,999	$768	0	$15.76	0.000	$6.32	$2	$770
	3,000	3,999	$998	0	$15.76	0.000	$6.32	$2	$1,001
	4,000	4,999	$1,289	1	$15.76	0.000	$6.32	$3	$1,291
	5,000	5,999	$1,787	1	$15.76	0.000	$6.32	$3	$1,790
	6,000	6,999	$2,094	2	$15.76	0.000	$6.32	$2	$2,096
	7,000	7,999	$3,371	3	$15.76	0.000	$6.32	$3	$3,373
	8,000	8,999	$1,631	1	$15.76	0.000	$6.32	$1	$1,633
	9,000	9,999	$923	1	$15.76	0.000	$6.32	$1	$924
	10,000	14,999	$1,979	2	$15.76	0.000	$6.32	$2	$1,981
	15,000	19,999	$946	1	$15.76	0.000	$6.32	$1	$947
	20,000	24,999	$533	0	$15.76	0.000	$6.32	$1	$534
4 Minimums	25,000	29,999	$121	0	$15.76	0.000	$6.32	$0	$121
	30,000	34,999	$28	0	$15.76	0.000	$6.32	$0	$28
	35,000	44,999	$55	0	$15.76	0.000	$6.32	$0	$55
	45,000	54,999	$115	0	$15.76	0.000	$6.32	$0	$116
	55,000	64,999	$0	0	$15.76	0.000	$6.32	$0	$0
	65,000	74,999	$0	0	$15.76	0.000	$6.32	$0	$0
	75,000	84,999	$0	0	$15.76	0.000	$6.32	$0	$0
	85,000	94,999	$0	0	$15.76	0.000	$6.32	$0	$0
	95,000	104,999	$0	0	$15.76	0.000	$6.32	$0	$0
	105,000	114,999	$0	0	$15.76	0.000	$6.32	$0	$0
	115,000	124,999	$0	0	$15.76	0.000	$6.32	$0	$0
	125,000	134,999	$0	0	$15.76	0.000	$6.32	$0	$0
	135,000	144,999	$0	0	$15.76	0.000	$6.32	$0	$0
	145,000	51,000	$0	0	$15.76	0.000	$6.32	$0	$0

Table 10 - Initial Rate Adjustments and Resulting Revenues

Customer Class, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Sales This Year at Current Rates	Customers Within This Volume Range	Minimum Charge for Calculation Purposes	New Usage Allowance in 1,000 Gallons	New Unit Charge per 1,000 Gallons	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
	0	999	$617	0	$15.76	0.000	$6.32	$0	$618
	1,000	1,999	$510	0	$15.76	0.000	$6.32	$0	$511
	2,000	2,999	$134	0	$15.76	0.000	$6.32	$0	$135
	3,000	3,999	$11	0	$15.76	0.000	$6.32	$0	$11
	4,000	4,999	$11	0	$15.76	0.000	$6.32	$0	$11
	5,000	5,999	$129	0	$15.76	0.000	$6.32	$0	$129
	6,000	6,999	$6	0	$15.76	0.000	$6.32	$0	$6
	7,000	7,999	$6	0	$15.76	0.000	$6.32	$0	$6
	8,000	8,999	$6	0	$15.76	0.000	$6.32	$0	$6
	9,000	9,999	$6	0	$15.76	0.000	$6.32	$0	$6
	10,000	14,999	$134	0	$15.76	0.000	$6.32	$0	$135
	15,000	19,999	$0	0	$15.76	0.000	$6.32	$0	$0
	20,000	24,999	$0	0	$15.76	0.000	$6.32	$0	$0
6 Minimums	25,000	29,999	$0	0	$15.76	0.000	$6.32	$0	$0
	30,000	34,999	$0	0	$15.76	0.000	$6.32	$0	$0
	35,000	44,999	$0	0	$15.76	0.000	$6.32	$0	$0
	45,000	54,999	$0	0	$15.76	0.000	$6.32	$0	$0
	55,000	64,999	$0	0	$15.76	0.000	$6.32	$0	$0
	65,000	74,999	$0	0	$15.76	0.000	$6.32	$0	$0
	75,000	84,999	$0	0	$15.76	0.000	$6.32	$0	$0
	85,000	94,999	$0	0	$15.76	0.000	$6.32	$0	$0
	95,000	104,999	$0	0	$15.76	0.000	$6.32	$0	$0
	105,000	114,999	$0	0	$15.76	0.000	$6.32	$0	$0
	115,000	124,999	$0	0	$15.76	0.000	$6.32	$0	$0
	125,000	134,999	$0	0	$15.76	0.000	$6.32	$0	$0
	135,000	144,999	$0	0	$15.76	0.000	$6.32	$0	$0
	145,000	12,000	$0	0	$15.76	0.000	$6.32	$0	$0
	0	999	$0	0	$15.76	0.000	$6.32	$0	$0
	1,000	1,999	$66	0	$15.76	0.000	$6.32	$0	$67
	2,000	2,999	$66	0	$15.76	0.000	$6.32	$0	$67
	3,000	3,999	$66	0	$15.76	0.000	$6.32	$0	$67
	4,000	4,999	$66	0	$15.76	0.000	$6.32	$0	$67
	5,000	5,999	$66	0	$15.76	0.000	$6.32	$0	$67
	6,000	6,999	$66	0	$15.76	0.000	$6.32	$0	$67
	7,000	7,999	$66	0	$15.76	0.000	$6.32	$0	$67
	8,000	8,999	$66	0	$15.76	0.000	$6.32	$0	$67
	9,000	9,999	$66	0	$15.76	0.000	$6.32	$0	$67
	10,000	14,999	$331	0	$15.76	0.000	$6.32	$1	$333
	15,000	19,999	$331	0	$15.76	0.000	$6.32	$1	$333
	20,000	24,999	$644	0	$15.76	0.000	$6.32	$1	$645
8 Minimums	25,000	29,999	$276	0	$15.76	0.000	$6.32	$1	$277
	30,000	34,999	$1,159	1	$15.76	0.000	$6.32	$1	$1,160
	35,000	44,999	$571	0	$15.76	0.000	$6.32	$0	$571
	45,000	54,999	$187	0	$15.76	0.000	$6.32	$0	$187
	55,000	64,999	$0	0	$15.76	0.000	$6.32	$0	$0
	65,000	74,999	$0	0	$15.76	0.000	$6.32	$0	$0
	75,000	84,999	$0	0	$15.76	0.000	$6.32	$0	$0
	85,000	94,999	$0	0	$15.76	0.000	$6.32	$0	$0
	95,000	104,999	$0	0	$15.76	0.000	$6.32	$0	$0
	105,000	114,999	$0	0	$15.76	0.000	$6.32	$0	$0
	115,000	124,999	$0	0	$15.76	0.000	$6.32	$0	$0
	125,000	134,999	$0	0	$15.76	0.000	$6.32	$0	$0
	135,000	144,999	$0	0	$15.76	0.000	$6.32	$0	$0
	145,000	49,000	$0	0	$15.76	0.000	$6.32	$0	$0

Table 10 - Initial Rate Adjustments and Resulting Revenues

Customer Class, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Sales This Year at Current Rates	Customers Within This Volume Range	Minimum Charge for Calculation Purposes	New Usage Allowance in 1,000 Gallons	New Unit Charge per 1,000 Gallons	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
	0	999	$0	0	$15.76	0.000	$6.32	$0	$0
	1,000	1,999	$66	0	$15.76	0.000	$6.32	$0	$67
	2,000	2,999	$66	0	$15.76	0.000	$6.32	$0	$67
	3,000	3,999	$66	0	$15.76	0.000	$6.32	$0	$67
	4,000	4,999	$66	0	$15.76	0.000	$6.32	$0	$67
	5,000	5,999	$66	0	$15.76	0.000	$6.32	$0	$67
	6,000	6,999	$66	0	$15.76	0.000	$6.32	$0	$67
	7,000	7,999	$66	0	$15.76	0.000	$6.32	$0	$67
	8,000	8,999	$66	0	$15.76	0.000	$6.32	$0	$67
	9,000	9,999	$66	0	$15.76	0.000	$6.32	$0	$67
	10,000	14,999	$1,022	0	$15.76	0.000	$6.32	$1	$1,023
	15,000	19,999	$1,170	0	$15.76	0.000	$6.32	$1	$1,171
	20,000	24,999	$1,048	0	$15.76	0.000	$6.32	$0	$1,049
12 Minimums	25,000	29,999	$252	0	$15.76	0.000	$6.32	$0	$252
	30,000	34,999	$0	0	$15.76	0.000	$6.32	$0	$0
	35,000	44,999	$0	0	$15.76	0.000	$6.32	$0	$0
	45,000	54,999	$0	0	$15.76	0.000	$6.32	$0	$0
	55,000	64,999	$0	0	$15.76	0.000	$6.32	$0	$0
	65,000	74,999	$0	0	$15.76	0.000	$6.32	$0	$0
	75,000	84,999	$0	0	$15.76	0.000	$6.32	$0	$0
	85,000	94,999	$0	0	$15.76	0.000	$6.32	$0	$0
	95,000	104,999	$0	0	$15.76	0.000	$6.32	$0	$0
	105,000	114,999	$0	0	$15.76	0.000	$6.32	$0	$0
	115,000	124,999	$0	0	$15.76	0.000	$6.32	$0	$0
	125,000	134,999	$0	0	$15.76	0.000	$6.32	$0	$0
	135,000	144,999	$0	0	$15.76	0.000	$6.32	$0	$0
	145,000	26,000	$0	0	$15.76	0.000	$6.32	$0	$0
Total Rate Revenue at Current Rates			$965,660		Total Rate Revenue at Modeled Rates			$2,870	
Prorated capacity surcharges from Table 16 (minimum charges above do not include them)									$261
Total Blended Rate Revenues for the Year [2]									$968,791

Note 1, New Minimum Charge Base Rates: If meter or connection size-based minimum charges are to be used, and the user classes modeled above include meter or connection sizes, the amounts shown in this column include meter or connection size surcharges as calculated in Table 16. Either way, the narrative report includes the rates and surcharges to assess.

Note 2, Blended Rate Revenues: During the year when rates will be adjusted, rate revenues generated will be "blended" revenues - part collected at the current rates and part collected at the adjusted rates. The table above calculates both kinds of revenue and totals them in the right-most column. Therefore, the anticipated timing of rate adjustment shown at the top of this table will cause rates to be charged as follows:

12.0	months at the old user charge rates	and	0.0	months at the new user charge rates.

Water Bill Effect of Not Adopting the Higher SDFs That are Cost-to-Serve Based

SDF Revenue at Higher Fee Rate:	$97,428
SDF Revenue at Lower Fee Rate:	$42,882
Annual Difference:	$54,546
Average Monthly Bill Increase Needed From Each Customer to Equal SDF Revenue Increase:	$2.31

Table 11 - Capacity Costs

Tonganoxie, KS; Water Rates, Scenario 2019-1

System capacity and connection costs WILL be recovered in one way by default, or a combination of ways by design. That could be through regular user fees, in which case existing customers pay the costs to bring on new customers. It could be through system development or connection fees, in which case new customers pay "up front" for the capacity they are granted. It could be through on-going capacity surcharges added to minimum charges, preferably based on meter or connection size, in which case each customer pays for the capacity they are granted over time. Or, it could be by a combination of these. This table shows capacity costs to expect. From these costs, system development fees and surcharges were developed in Tables 13 through 16.

Peak and Base Flow Capacity Costs

	Fixed Assets Original Value (Capacity Cost)	% of Value Attributable to Peak Flow Capacity	Peak Flow Capacity Cost	Annual Peak Flow Capacity Cost (40-year Depreciation)	% of Value Attributable to Base Flow Capacity	Base Flow Capacity Cost	Annual Base Flow Capacity Cost (40-year Depreciation)
	$14,768,125	50.0%	$7,384,063	$430,330	50.0%	$7,384,063	$430,330
Totals	$14,768,125		$7,384,063	$430,330		$7,384,063	$430,330

How Capacity Costs Will Be Recovered

These costs are modeled to be recovered from system development fees in Table 14

Peak Flow Capacity Costs to be Recovered by System Development Fees

3.00%	Target Percentage of Costs to Recover
$12,910	Target Portion of Costs to Recover
$359	Cost per Peak Flow Capacity Share

Base Flow Capacity Costs to be Recovered by System Development Fees

18.525%	Target Percentage of Costs to Recover
$79,719	Target Portion of Costs to Recover
$2,491	Base Capacity Cost per New Customer Connected

In addition to calculation of the capacity cost for each new connection based on the unit cost above, the system development fee for each new connection should also include recovery of the following costs:

$100	Average Field Cost per New Connection
$50	Average Administration Cost per New Connection
$150	Field and Admin Cost per New Connection
$2,641	Base Cost to Recover per New Connection

These costs are modeled to be recovered from minimum charge surcharges in Table 16

Peak Flow Capacity Costs to be Recovered by Minimum Charge Surcharges

50.0%	Target Percentage of Costs to Recover
$215,165	Target Portion of Costs to Recover in One Full Year
$17,930	Target Portion of Costs to Recover in Monthly Surcharges
$7.97	Monthly Surcharge per Peak Flow Capacity Share

Base Flow Capacity Costs to be Recovered by Minimum Charge Surcharges

0.0%	Target Percentage of Costs to Recover
$0	Target Portion of Costs to Recover in One Full Year
$0	Target Portion of Costs to Recover in Monthly Surcharges
$0.00	Monthly Base Flow Surcharge per Bill

Note: Non-capital costs, such as field costs for inspection of connections and administration costs, should be recovered by fees charged for providing the services involved. These costs are in addition to peak flow capacity costs. If your system's basic costs to sign up and connect new customers is different than assumed above, adjust your final fees accordingly.

Table 12 - AWWA Safe Operating Capacities by Meter Size

Tonganoxie, KS; Water Rates, Scenario 2019-1

Data source: Table VII.2-5, page 338, AWWA Manual M1 Principles of Water Rates, Fees and Charges, Seventh Edition

This table calculates the meter equivalent ratio, which is used for calculating peak flow capacity-based system development fees, surcharges and revenues in Tables 13 through 16.

Meter Size, in Inches	Meter Type	Maximum-Rated Safe Operating Flow, in gallons per minute	Meter Equivalent Ratio (Capacity Shares)
Five Eighths	Displacement	20	1.0
Three Quarters	Displacement	30	1.5
One Inch	Displacement	50	2.5
One & a Half Inch	Displacement	100	5.0
Two Inch	Displacement	160	8.0
Three	Singlet	320	16.0
Three	Compound, Class I	320	16.0
Three	Turbine, Class I	350	17.5
Four	Singlet	500	25.0
Four	Compound, Class I	500	25.0
Four	Turbine, Class I	630	31.0
Six	Singlet	1,000	50.0
Six	Compound, Class I	1,000	50.0
Six	Turbine, Class I	1,300	65.0
Eight	Compound, Class I	1,600	80.0
Eight	Turbine, Class I	2,800	140.0
Ten	Turbine, Class II	4,200	210.0
Twelve	Turbine, Class II	5,300	265.0

Table 13 - System Development Fees
Tonganoxie, KS; Water Rates, Scenario 2019-1

This table calculates system development fees to charge each meter size.

Note: Larger meter sizes are available in two or more types, each having different flow capacities. To be conservative when projecting revenues, it was assumed all meters in use are of the lowest capacity types. However, when setting fees, they should be based upon the type of meter in use at each location.

Meter Size	Meter Type	Meter Size in Inches	Meter Size in Square Inches	AWWA Capacity "Share" Factor, Compared to 5/8 Inch Meter	Economy of Scale Adjustment to Peak Capacity Factors	Capacity Shares After Economy of Scale Adjustments	Foot Notes	Adjusted Peak Capacity Cost Each Meter Size	Base Capacity Cost From Table 11	Peak Plus Base Capacity Cost	Field and Admin Cost per New Connection	System Development Fee
In-City Meters												
Five Eighths	Displacement	0.625	0.307	1.0	100%	1.0		$359	$2,491	$2,850	$150	$3,000
Three Quarters	Displacement	0.750	0.442	1.0	100%	1.0	1	$359	$2,491	$2,850	$150	$3,000
One Inch	Displacement	1.000	0.785	2.5	100%	2.5		$897	$2,491	$3,388	$150	$3,538
One & a Half Inch	Displacement	1.500	1.767	5.0	100%	5.0		$1,793	$2,491	$4,284	$150	$4,434
Two Inch	Displacement	2.000	3.142	8.0	100%	8.0		$2,869	$2,491	$5,360	$150	$5,510
Two & a Half Inch	Displacement	2.500	4.909	12.5	100%	12.5	2	$4,483	$2,491	$6,974	$150	$7,124
Three Inch	Singlet	3.000	7.069	16.0	100%	16.0		$5,738	$2,491	$8,229	$150	$8,379
Three Inch	Compound, Class I	3.000	7.069	16.0	100%	16.0		$5,738	$2,491	$8,229	$150	$8,379
Three Inch	Turbine, Class I	3.000	7.069	17.5	100%	17.5		$6,276	$2,491	$8,767	$150	$8,917
Four Inch	Singlet	4.000	12.566	25.0	100%	25.0		$8,966	$2,491	$11,457	$150	$11,607
Four Inch	Compound, Class I	4.000	12.566	25.0	100%	25.0		$8,966	$2,491	$11,457	$150	$11,607
Four Inch	Turbine, Class I	4.000	12.566	31.0	100%	31.0		$11,117	$2,491	$13,609	$150	$13,759
Six Inch	Singlet	6.000	28.274	50.0	100%	50.0		$17,931	$2,491	$20,423	$150	$20,573
Six Inch	Compound, Class I	6.000	28.274	50.0	100%	50.0		$17,931	$2,491	$20,423	$150	$20,573
Six Inch	Turbine, Class I	6.000	28.274	65.0	100%	65.0		$23,311	$2,491	$25,802	$150	$25,952
Eight Inch	Compound, Class I	8.000	50.266	80.0	100%	80.0		$28,690	$2,491	$31,181	$150	$31,331
Eight Inch	Turbine, Class I	8.000	50.266	140.0	100%	140.0		$50,208	$2,491	$52,699	$150	$52,849
Ten Inch	Turbine, Class II	10.000	78.540	210.0	100%	210.0		$75,312	$2,491	$77,803	$150	$77,953
Out of City Meters												
Five Eighths	Displacement	0.625	0.307	1.0	150%	1.0		$538	$2,491	$3,029	$150	$3,179
Three Quarters	Displacement	0.750	0.442	1.0	150%	1.0	1	$538	$2,491	$3,029	$150	$3,179
One Inch	Displacement	1.000	0.785	2.5	150%	2.5		$1,345	$2,491	$3,836	$150	$3,986
One & a Half Inch	Displacement	1.500	1.767	5.0	150%	5.0		$2,690	$2,491	$5,181	$150	$5,331
Two Inch	Displacement	2.000	3.142	8.0	150%	8.0		$4,304	$2,491	$6,795	$150	$6,945
Two & a Half Inch	Displacement	2.500	4.909	12.5	150%	12.5	2	$6,724	$2,491	$9,215	$150	$9,365
Three Inch	Singlet	3.000	7.069	16.0	150%	16.0		$8,607	$2,491	$11,098	$150	$11,248
Three Inch	Compound, Class I	3.000	7.069	16.0	150%	16.0		$8,607	$2,491	$11,098	$150	$11,248
Three Inch	Turbine, Class I	3.000	7.069	17.5	150%	17.5		$9,414	$2,491	$11,905	$150	$12,055
Four Inch	Singlet	4.000	12.566	25.0	150%	25.0		$13,448	$2,491	$15,940	$150	$16,090
Four Inch	Compound, Class I	4.000	12.566	25.0	150%	25.0		$13,448	$2,491	$15,940	$150	$16,090
Four Inch	Turbine, Class I	4.000	12.566	31.0	150%	31.0		$16,676	$2,491	$19,167	$150	$19,317
Six Inch	Singlet	6.000	28.274	50.0	150%	50.0		$26,897	$2,491	$29,388	$150	$29,538
Six Inch	Compound, Class I	6.000	28.274	50.0	150%	50.0		$26,897	$2,491	$29,388	$150	$29,538
Six Inch	Turbine, Class I	6.000	28.274	65.0	150%	65.0		$34,966	$2,491	$37,457	$150	$37,607
Eight Inch	Compound, Class I	8.000	50.266	80.0	150%	80.0		$43,035	$2,491	$45,526	$150	$45,676
Eight Inch	Turbine, Class I	8.000	50.266	140.0	150%	140.0		$75,312	$2,491	$77,803	$150	$77,953
Ten Inch	Turbine, Class II	10.000	78.540	210.0	150%	210.0		$112,967	$2,491	$115,458	$150	$115,608

Foot Notes, which apply to Tables 14, 15 and 16, as well:

[1] The Three-Quarter-Inch meter capacity share factor is 1.5. However, it was set equal to the Five-eighths-Inch meter because most such meters are used for residential connections. This enables a uniform system development fee for almost all residential customers.

[2] These meter sizes were not included in AWWA study results, so these values are estimates.

Table 14 - Revenues From System Development Fees
Tonganoxie, KS; Water Rates, Scenario 2019-1

This table calculates total fee revenues that would be generated during one full year at the fees in Table 13.

Meter Size	Meter Type	Mix of New Taps in a Typical Year	Capacity Shares After Economy of Scale Adjustments	Projected Annual Growth in Capacity Shares, Adjusted for Economy of Scale	Adjusted Peak Capacity Cost Fees for One Full Year	Base Capacity Cost Fees for One Full Year	Combined Capacity-only Fee Revenues to Collect in One Year	Adjusted Admin and Field Cost Fees to Collect in One Year	**System Development Fee Revenues for One Full Year**
In-City Meters									
Five Eighths	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
Three Quarters	Displacement	31.4	1.0	31.4	$11,276	$78,327	$89,603	$4,716	**$94,319**
One Inch	Displacement	0.0	2.5	0.0	$0	$0	$0	$0	**$0**
One & a Half Inch	Displacement	0.1	5.0	0.7	$237	$330	$567	$20	**$587**
Two Inch	Displacement	0.4	8.0	3.1	$1,096	$952	$2,049	$57	**$2,106**
Two & a Half Inch	Displacement	0.0	12.5	0.0	$0	$0	$0	$0	**$0**
Three Inch	Singlet	0.0	16.0	0.5	$169	$73	$242	$4	**$246**
Three Inch	Compound, Class I	0.0	16.0	0.0	$0	$0	$0	$0	**$0**
Three Inch	Turbine, Class I	0.0	17.5	0.0	$0	$0	$0	$0	**$0**
Four Inch	Singlet	0.0	25.0	0.4	$132	$37	$168	$2	**$171**
Four Inch	Compound, Class I	0.0	25.0	0.0	$0	$0	$0	$0	**$0**
Four Inch	Turbine, Class I	0.0	31.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Singlet	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Compound, Class I	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Turbine, Class I	0.0	65.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Compound, Class I	0.0	80.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Turbine, Class I	0.0	140.0	0.0	$0	$0	$0	$0	**$0**
Ten Inch	Turbine, Class II	0.0	210.0	0.0	$0	$0	$0	$0	**$0**
	Subtotal:	32.0		36.0	$12,910	$79,719	$92,628	$4,800	**$97,428**
Out of City Meters									
Five Eighths	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
Three Quarters	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
One Inch	Displacement	0.0	2.5	0.0	$0	$0	$0	$0	**$0**
One & a Half Inch	Displacement	0.0	5.0	0.0	$0	$0	$0	$0	**$0**
Two Inch	Displacement	0.0	8.0	0.0	$0	$0	$0	$0	**$0**
Two & a Half Inch	Displacement	0.0	12.5	0.0	$0	$0	$0	$0	**$0**
Three Inch	Singlet	0.0	16.0	0.0	$0	$0	$0	$0	**$0**
Three Inch	Compound, Class I	0.0	16.0	0.0	$0	$0	$0	$0	**$0**
Three Inch	Turbine, Class I	0.0	17.5	0.0	$0	$0	$0	$0	**$0**
Four Inch	Singlet	0.0	25.0	0.0	$0	$0	$0	$0	**$0**
Four Inch	Compound, Class I	0.0	25.0	0.0	$0	$0	$0	$0	**$0**
Four Inch	Turbine, Class I	0.0	31.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Singlet	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Compound, Class I	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Turbine, Class I	0.0	65.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Compound, Class I	0.0	80.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Turbine, Class I	0.0	140.0	0.0	$0	$0	$0	$0	**$0**
Ten Inch	Turbine, Class II	0.0	210.0	0.0	$0	$0	$0	$0	**$0**
	Subtotal:	0.0		0.0	$0	$0	$0	$0	**$0**
	Total:	32.0		36.0	$12,910	$79,719	$92,628	$4,800	**$97,428**

This is the amount used to calculate the "Meter Size-based System Development Fees" income in Table 3.

Table 15 - Minimum Charge Fees, Including Capacity Surcharges
Tonganoxie, KS; Water Rates, Scenario 2019-1

This table does, essentially, the same thing as Table 13, except costs are recovered over time as minimum charge surcharges.

Uniform Adjustment to Peak Capacity Cost	-$5.00

Meter Size	Meter Type	Current Number Meters This Size	Total Adjusted Capacity Shares in Each Meter Size Group	Monthly Peak Capacity-only Costs (Surcharge per Capacity Share, Including Out of City Multiplier)	Cost to Serve Minimum Calculated in Table 10	Monthly Minimum Charge	Monthly Snowbird Fee
In-City Meters							
Five Eighths	Displacement	0	0	$7.97	$15.76	$18.73	$15.86
Three Quarters	Displacement	1,965	1,965	$7.97	$15.76	$18.73	$15.86
One Inch	Displacement	0	0	$19.92	$15.76	$30.68	$25.98
One & a Half Inch	Displacement	8	41	$39.85	$15.76	$50.61	$42.84
Two Inch	Displacement	24	191	$63.76	$15.76	$74.51	$63.09
Two & a Half Inch	Displacement	0	0	$99.62	$15.76	$110.38	$93.45
Three Inch	Singlet	2	29	$127.51	$15.76	$138.27	$117.06
Three Inch	Compound, Class I	0	0	$127.51	$15.76	$138.27	$117.06
Three Inch	Turbine, Class I	0	0	$139.47	$15.76	$150.22	$127.18
Four Inch	Singlet	1	23	$199.24	$15.76	$209.99	$177.79
Four Inch	Compound, Class I	0	0	$199.24	$15.76	$209.99	$177.79
Four Inch	Turbine, Class I	0	0	$247.05	$15.76	$257.81	$218.27
Six Inch	Singlet	0	0	$398.47	$15.76	$409.23	$346.47
Six Inch	Compound, Class I	0	0	$398.47	$15.76	$409.23	$346.47
Six Inch	Turbine, Class I	0	0	$518.02	$15.76	$528.77	$447.68
Eight Inch	Compound, Class I	0	0	$637.56	$15.76	$648.32	$548.88
Eight Inch	Turbine, Class I	0	0	$1,115.73	$15.76	$1,126.48	$953.72
Ten Inch	Turbine, Class II	0	0	$1,673.59	$15.76	$1,684.35	$1,426.02
Out of City Meters							
Five Eighths	Displacement	0	0	$11.95	$15.76	$22.71	$19.23
Three Quarters	Displacement	0	0	$11.95	$15.76	$22.71	$19.23
One Inch	Displacement	0	0	$29.89	$15.76	$40.64	$34.41
One & a Half Inch	Displacement	0	0	$59.77	$15.76	$70.53	$59.71
Two Inch	Displacement	0	0	$95.63	$15.76	$106.39	$90.07
Two & a Half Inch	Displacement	0	0	$149.43	$15.76	$160.19	$135.62
Three Inch	Singlet	0	0	$191.27	$15.76	$202.03	$171.04
Three Inch	Compound, Class I	0	0	$191.27	$15.76	$202.03	$171.04
Three Inch	Turbine, Class I	0	0	$209.20	$15.76	$219.96	$186.22
Four Inch	Singlet	0	0	$298.86	$15.76	$309.61	$262.13
Four Inch	Compound, Class I	0	0	$298.86	$15.76	$309.61	$262.13
Four Inch	Turbine, Class I	0	0	$370.58	$15.76	$381.34	$322.85
Six Inch	Singlet	0	0	$597.71	$15.76	$608.47	$515.15
Six Inch	Compound, Class I	0	0	$597.71	$15.76	$608.47	$515.15
Six Inch	Turbine, Class I	0	0	$777.02	$15.76	$787.78	$666.96
Eight Inch	Compound, Class I	0	0	$956.34	$15.76	$967.09	$818.77
Eight Inch	Turbine, Class I	0	0	$1,673.59	$15.76	$1,684.35	$1,426.02
Ten Inch	Turbine, Class II	0	0	$2,510.38	$15.76	$2,521.14	$2,134.48

Table 16 - Revenues From Minimum Charges
Tonganoxie, KS; Water Rates, Scenario 2019-1

This table calculates total minimum charge surcharge revenues that would be generated during one full year at the fees in Table 15.

Meter Size	Meter Type	Capacity Shares After Economy of Scale Adjustments	Current Number Meters This Size	Total Adjusted Capacity Shares	Adjusted Annual Peak Capacity-only Surcharge Revenues	Annual Base Capacity-only Surcharge Revenues	Capacity Surcharges for One Full Year
In-City Meters							
Five Eighths	Displacement	1.0	0	0	$0	$0	$0
Three Quarters	Displacement	1.0	1,965	1,965	$70,023	$0	$70,023
One Inch	Displacement	2.5	0	0	$0	$0	$0
One & a Half Inch	Displacement	5.0	8	41	$3,458	$0	$3,458
Two Inch	Displacement	8.0	24	191	$16,841	$0	$16,841
Two & a Half Inch	Displacement	12.5	0	0	$0	$0	$0
Three Inch	Singlet	16.0	2	29	$2,701	$0	$2,701
Three Inch	Compound, Class I	16.0	0	0	$0	$0	$0
Three Inch	Turbine, Class I	17.5	0	0	$0	$0	$0
Four Inch	Singlet	25.0	1	23	$2,141	$0	$2,141
Four Inch	Compound, Class I	25.0	0	0	$0	$0	$0
Four Inch	Turbine, Class I	31.0	0	0	$0	$0	$0
Six Inch	Singlet	50.0	0	0	$0	$0	$0
Six Inch	Compound, Class I	50.0	0	0	$0	$0	$0
Six Inch	Turbine, Class I	65.0	0	0	$0	$0	$0
Eight Inch	Compound, Class I	80.0	0	0	$0	$0	$0
Eight Inch	Turbine, Class I	140.0	0	0	$0	$0	$0
Ten Inch	Turbine, Class II	210.0	0	0	$0	$0	$0
		Subtotal:	2,000	2,250	$95,165	$0	$95,165
Out of City Meters							
Five Eighths	Displacement	1.0	0	0	$0	$0	$0
Three Quarters	Displacement	1.0	0	0	$0	$0	$0
One Inch	Displacement	2.5	0	0	$0	$0	$0
One & a Half Inch	Displacement	5.0	0	0	$0	$0	$0
Two Inch	Displacement	8.0	0	0	$0	$0	$0
Two & a Half Inch	Displacement	12.5	0	0	$0	$0	$0
Three Inch	Singlet	16.0	0	0	$0	$0	$0
Three Inch	Compound, Class I	16.0	0	0	$0	$0	$0
Three Inch	Turbine, Class I	17.5	0	0	$0	$0	$0
Four Inch	Singlet	25.0	0	0	$0	$0	$0
Four Inch	Compound, Class I	25.0	0	0	$0	$0	$0
Four Inch	Turbine, Class I	31.0	0	0	$0	$0	$0
Six Inch	Singlet	50.0	0	0	$0	$0	$0
Six Inch	Compound, Class I	50.0	0	0	$0	$0	$0
Six Inch	Turbine, Class I	65.0	0	0	$0	$0	$0
Eight Inch	Compound, Class I	80.0	0	0	$0	$0	$0
Eight Inch	Turbine, Class I	140.0	0	0	$0	$0	$0
Ten Inch	Turbine, Class II	210.0	0	0	$0	$0	$0
		Subtotal:	0	0	$0	$0	$0
		Total:	2,000	2,250	$95,165	$0	$95,165

Table 17 - Financial Capacity Indicators and Reserves

Tonganoxie, KS; Water Rates, Scenario 2019-1

This table depicts the affordability of future rates, the financial health of the system and the ending balances in various (assumed) accounts for the test year and the next 10 years.

Capacity Indicators	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
The Normal Affordability Index: Equivalent Final Monthly Bill for a 5,000 gal per Month Residential Customer	$44.07	$50.33	$50.33	$51.33	$52.36	$53.41	$54.48	$55.57	$56.68	$57.81	$58.97	$60.15
Annual Median Household Income (AMHI) Within Service Area (Projected from last available Census survey or estimated income data)	$57,914	$61,020	$64,292	$67,739	$71,372	$75,199	$79,232	$83,480	$87,957	$92,673	$97,643	$102,879
Affordability Index: Current Rates First Column, Then Proposed Rates	0.91%	0.99%	0.94%	0.91%	0.88%	0.85%	0.83%	0.80%	0.77%	0.75%	0.72%	0.70%

Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the percent of AMHI needed by a 5,000 gallon per month residential user to pay their bill. Rates near 1.0% are common in the U.S. and are generally considered affordable. Federal grant agencies generally will not consider awarding grants if this indicator is less than 2.0%. The above index is only for a 1 share customers but it should be fairly representative of all residential customers.

Low-income, Low-volume Affordability Index												
Equivalent Final Monthly Bill for a 2,000 gal per Month, Low-income Residential Customer	$26.96	$31.37	$31.37	$31.99	$32.63	$33.29	$33.95	$34.63	$35.32	$36.03	$36.75	$37.49
Income at One-half the AMHI Above	$28,957	$29,733	$30,531	$31,349	$32,190	$33,053	$33,939	$34,849	$35,783	$36,743	$37,728	$38,740
Affordability for Low-income, Low-volume: Current Rates First Column, Then Proposed Rates	1.12%	1.27%	1.23%	1.22%	1.22%	1.21%	1.20%	1.19%	1.18%	1.18%	1.17%	1.16%

This additional indicator of affordability assumes a residential customer with income at one-half of the median household income above, that income is growing at one-half the rate of the median household income and the customer uses 2,000 gallons per month. Such a customer is likely either a minimum wage, or near-minimum wage worker, or is retired and living on Social Security-only.

Estimated Operating Ratio: Current Rates First Column, Then Proposed Rates	1.16	1.13	1.15	1.18	1.17	1.18	1.18	1.18	1.19	1.19	1.18	1.19

Operating ratio (OR) goes to the ability of the utility to pay its operating expenses. A 1.0 OR is break even. Below 1.0 indicates operating in the "red." Generally, the OR should be at least 1.15 for large systems, 1.30 or more for medium systems and perhaps as high as 2.0 for small systems. Note: If the utility has or will have reserves (below,) it has more ability to pay its operating costs than the OR implies.

Estimated Coverage Ratio: Current Rates First Column, Then Proposed Rates	0.23	0.73	0.87	1.12	1.01	0.86	0.88	0.87	0.95	2.14	2.10	2.34

Coverage Ratio (CR) goes to the ability of the utility to pay its debt payments. OR applies only to years with debt service. 1.0 is break even. Generally, the CR should be at least 1.25. Note: If the utility has or will have reserves (below,) it has more ability to make debt payments than the CR implies.

Reserves	Balance Ending on 12/31/16	Balance Ending on 12/31/17	Balance Ending on 12/31/18	Balance Ending on 12/31/19	Balance Ending on 12/31/20	Balance Ending on 12/31/21	Balance Ending on 12/31/22	Balance Ending on 12/31/23	Balance Ending on 12/31/24	Balance Ending on 12/31/25	Balance Ending on 12/31/26	Balance Ending on 12/31/27	Balance Ending on 12/31/28
Cash and Cash Equivalents	$373,363	$503,512	$523,756	$568,048	$616,027	$638,379	$654,633	$674,914	$699,589	$717,541	$739,933	$767,170	$786,995
Other Liquid Assets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Undedicated Cash Assets	$373,363	$503,512	$523,756	$568,048	$616,027	$638,379	$654,633	$674,914	$699,589	$717,541	$739,933	$767,170	$786,995
Total Cash Assets Discounted for Inflation (Future Unrestricted Purchasing Power)	$373,363	$503,512	$523,756	$551,007	$579,620	$582,631	$579,542	$579,571	$582,738	$579,761	$579,918	$583,227	$598,298
Repair & Replacement	$0	-$70,000	-$25,183	$1,923	-$38,167	$601	$37,780	$73,269	$106,960	$138,742	$168,500	$196,112	$221,455
Debt and CIP Reserves	$266,770	$148,245	$110,976	$92,849	$113,546	-$155,341	-$195,917	-$229,786	-$269,156	-$286,431	-$157,120	-$28,931	$128,371
Sum of All Reserves	$640,133	$581,757	$609,549	$662,820	$691,406	$483,639	$496,497	$518,397	$537,393	$569,852	$751,313	$934,352	$1,136,821

Table 18 - Comparison of Bills Before and After Rate Adjustments

Tonganoxie, KS; Water Rates, Scenario 2019-1

The weighted-average revenue (bill) increase, as compared to the test year rates, for all customers combined will be 18.0%

Note: the revenue increase rate above includes the effect of some increased system development fees shown in Table 13, and escalating meter size-based minimum charge surcharges calculated in Table 15. The recommended rate structure does not include multiple minimum charges. Therefore, several example comparisons are shown in the table.

In addition, the City increased rates after the test year completed, therefore, bill increases in this table are compared to the now current rates.

Comparison of a Current Rate Class With a Meter Size-based Rate Class They May Be In After Adjustments	Gallons of Use	Customers at or Above This Volume and Below Next	Cumulative Customers	The Now Current Bill for This Volume	Modeled Bill for This Volume	Bill Increase or Decrease (-)	Percent Increase or Decrease (-)
1 Minimum Now, Assume 3/4 Inch Meter Minimum After Adjustment	0	0	0	$21.25	$18.73	-$2.52	-12%
	1,000	229	229	$21.25	$25.05	$3.80	18%
	2,000	348	577	$26.96	$31.37	$4.41	16%
	3,000	379	956	$32.66	$37.69	$5.03	15%
	4,000	327	1,283	$38.37	$44.01	$5.64	15%
	5,000	231	1,514	$44.07	$50.33	$6.25	14%
	6,000	146	1,660	$49.78	$56.65	$6.87	14%
	8,000	55	1,805	$61.19	$69.29	$8.09	13%
	9,000	36	1,841	$66.90	$75.61	$8.71	13%
	15,000	15	1,920	$101.14	$113.53	$12.39	12%
	25,000	2	1,926	$158.20	$176.73	$18.53	12%
	40,000	1	1,929	$243.79	$271.53	$27.74	11%
	80,000	0	1,931	$472.04	$524.33	$52.29	11%
	140,000	1	1,934	$814.41	$903.53	$89.12	11%
6 Minimums Now, Assume 2 Inch Meter Minimum After Adjustment	0	0	0	$127.49	$74.51	-$52.98	-42%
	1,000	0	1	$127.49	$80.83	-$46.66	-37%
	3,000	0	1	$127.49	$93.47	-$34.02	-27%
	6,000	0	1	$127.49	$112.43	-$15.06	-12%
	15,000	0	1	$178.85	$169.31	-$9.54	-5%
	20,000	0	1	$207.38	$200.91	-$6.47	-3%
	35,000	0	1	$292.97	$295.71	$2.74	1%
	105,000	0	1	$692.41	$738.11	$45.71	7%
	125,000	0	1	$806.53	$864.51	$57.98	7%
	145,000	0	1	$920.66	$990.91	$70.26	8%
8 Minimums Now, Assume 4 Inch Meter Minimum After Adjustment	0	0	0	$169.99	$209.99	$40.00	24%
	2,000	0	0	$169.99	$222.63	$52.64	31%
	5,000	0	0	$169.99	$241.59	$71.60	42%
	7,000	0	0	$169.99	$254.23	$84.24	50%
	8,000	0	0	$169.99	$260.55	$90.56	53%
	9,000	0	0	$175.70	$266.87	$91.18	52%
	15,000	0	0	$209.93	$304.79	$94.86	45%
	45,000	0	1	$381.12	$494.39	$113.27	30%
	145,000	0	1	$951.74	$1,126.39	$174.65	18%

Table 19 - User Statistics
Tonganoxie, KS; Water Rates, Scenario 2019-1

This table shows measures of equitability, or "fairness," of the rates as modeled in Table 10. If debt, capacity or other surcharges were also calculated but not included in Table 10, this table does not take those fees into account.

If your rates were based only on volume of service, your % of Usage and % of Revenues figures would be the same within all the classes. While rates are not set up that way, it is still useful to make comparisons on that basis. This table does that, among other things.

Normally, the % of usage figure will be lower than the % of revenue for the lower volumes of use. That will switch for the higher volumes of use. Even for declining rate structures, this switch should occur near the volume of the average residential user, typically near 5,000 gallons/month (668 cu ft).

In urban and suburban areas the average monthly use for residential or general customers can be twice that used by their rural and "old town" counterparts. Use is largely dependent upon who lives in a community. Older people living in longer established neighborhoods tend to use less volume than younger people living in more recently developed areas. As you make comparisons between different customers and customer classes, keep that, and the following statistics about your rates in mind:

4,452 **Gallons: This is the average residential customer's usage per Monthly billing cycle.**

Usage allowance is the volume "given away" with the minimum charge. The higher the allowance, the less volume the utility can sell to generate income.

106,833,000 **Gallons: This is the volume metered through customer meters that was available to be sold by the utility during the test year.**

23,564,000 **Gallons: This is the volume metered through customer meters that was given away as a usage allowance during the test year.**

$130,545 **Revenue Loss: At the unit charge rate in effect during the test year, the usage allowance 'cost' the utility this much.**

$0 **Revenue Loss: At the modeled (recommended) unit charge rates and usage allowance (if any), over a full year, that allowance would 'cost' the utility this much.**

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
	-111,000	-1	-55.50	-222,000.00	0.0	-0.2%	100.0%	0.0%	-0.2%	-0.1%	-0.1%
	0	999	0.935	0	0.0	-0.2%	100.2%	0.0%	0.0%	0.0%	14.0%
	1,000	1,999	0.881	2,751,000	229.3	2.4%	100.2%	11.6%	2.6%	17.6%	16.5%
	2,000	2,999	0.796	8,344,000	347.7	10.5%	97.6%	17.7%	7.8%	18.2%	16.1%
	3,000	3,999	0.721	13,635,000	378.8	23.7%	89.5%	19.2%	12.8%	16.4%	13.9%
	4,000	4,999	0.666	15,696,000	327.0	38.9%	76.3%	16.6%	14.7%	12.8%	10.6%
	5,000	5,999	0.645	13,885,000	231.4	52.3%	61.1%	11.8%	13.0%	8.8%	7.2%
	6,000	6,999	0.653	10,488,000	145.7	62.5%	47.7%	7.4%	9.8%	5.6%	4.6%
	7,000	7,999	0.672	7,567,000	90.1	69.8%	37.5%	4.6%	7.1%	3.6%	3.0%
	8,000	8,999	0.702	5,272,000	54.9	74.9%	30.2%	2.8%	4.9%	2.3%	1.9%
	9,000	9,999	0.721	3,906,000	36.2	78.7%	25.1%	1.8%	3.7%	1.6%	1.3%
	10,000	14,999	2.524	8,629,000	63.3	87.0%	21.3%	3.2%	8.1%	3.2%	2.8%
	15,000	19,999	3.326	3,099,000	15.4	90.0%	13.0%	0.8%	2.9%	1.1%	1.0%
1 Minimum	20,000	24,999	4.075	1,064,000	4.1	91.1%	10.0%	0.2%	1.0%	0.5%	0.5%
	25,000	29,999	4.344	788,000	2.4	91.8%	8.9%	0.1%	0.7%	0.4%	0.4%
	30,000	39,999	8.063	934,000	2.3	92.7%	8.2%	0.1%	0.9%	0.5%	0.5%
	40,000	49,999	9.294	402,000	0.8	93.1%	7.3%	0.0%	0.4%	0.4%	0.4%
	50,000	59,999	8.864	533,000	0.8	93.6%	6.9%	0.0%	0.5%	0.3%	0.3%
	60,000	69,999	9.653	403,000	0.5	94.0%	6.4%	0.0%	0.4%	0.3%	0.3%
	70,000	79,999	9.302	370,000	0.4	94.4%	6.0%	0.0%	0.3%	0.2%	0.2%
	80,000	89,999	9.500	161,000	0.2	94.5%	5.6%	0.0%	0.2%	0.2%	0.2%
	90,000	99,999	9.361	277,000	0.3	94.8%	5.5%	0.0%	0.3%	0.2%	0.2%
	100,000	109,999	9.970	109,000	0.1	94.9%	5.2%	0.0%	0.1%	0.2%	0.2%
	110,000	119,999	8.969	687,000	0.5	95.6%	5.1%	0.0%	0.6%	0.2%	0.2%
	120,000	129,999	9.038	625,000	0.4	96.2%	4.4%	0.0%	0.6%	0.1%	0.1%
	130,000	139,999	9.143	542,000	0.3	96.7%	3.8%	0.0%	0.5%	0.1%	0.1%
	140,000	276,000	59.647	3,394,000	1.4	100.0%	3.3%	0.1%	3.2%	0.6%	0.6%
	Totals for Class			103,339,000	1,934.2			98.2%	96.7%	95.3%	97.3%

Table 19 - User Statistics

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
2 Minimums	0	999	0.766	0	4.7	0.0%	100.0%	0.2%	0.0%	0.2%	0.2%
	1,000	1,999	0.847	28,000	2.3	1.7%	100.0%	0.1%	0.0%	0.2%	0.1%
	2,000	2,999	0.884	36,000	1.5	3.9%	98.3%	0.1%	0.0%	0.2%	0.1%
	3,000	3,999	0.825	72,000	2.0	8.3%	96.1%	0.1%	0.1%	0.2%	0.1%
	4,000	4,999	0.814	84,000	1.8	13.4%	91.7%	0.1%	0.1%	0.1%	0.1%
	5,000	5,999	0.902	45,000	0.8	16.2%	86.6%	0.0%	0.0%	0.1%	0.1%
	6,000	6,999	0.928	36,000	0.5	18.4%	83.8%	0.0%	0.0%	0.1%	0.1%
	7,000	7,999	0.870	70,000	0.8	22.6%	81.6%	0.0%	0.1%	0.1%	0.1%
	8,000	8,999	0.985	8,000	0.1	23.1%	77.4%	0.0%	0.0%	0.0%	0.0%
	9,000	9,999	0.970	18,000	0.2	24.2%	76.9%	0.0%	0.0%	0.0%	0.0%
	10,000	14,999	3.359	420,000	2.9	49.8%	75.8%	0.1%	0.4%	0.3%	0.2%
	15,000	19,999	4.172	116,000	0.6	56.9%	50.2%	0.0%	0.1%	0.1%	0.1%
	20,000	24,999	3.727	172,000	0.7	67.4%	43.1%	0.0%	0.2%	0.1%	0.1%
	25,000	29,999	4.286	80,000	0.3	72.3%	32.6%	0.0%	0.1%	0.0%	0.0%
	30,000	34,999	4.091	130,000	0.3	80.2%	27.7%	0.0%	0.1%	0.0%	0.0%
	35,000	44,999	7.571	163,000	0.3	90.2%	19.8%	0.0%	0.2%	0.0%	0.0%
	45,000	54,999	8.333	50,000	0.1	93.2%	9.8%	0.0%	0.0%	0.0%	0.0%
	55,000	64,999	0.500	111,000	0.2	100.0%	6.8%	0.0%	0.1%	0.0%	0.0%
	Totals for Class			1,639,000	19.9			1.0%	1.5%	1.9%	1.3%
4 Minimums	0	999	0.972	0	0.3	0.0%	100.0%	0.0%	0.0%	0.0%	0.1%
	1,000	1,999	0.993	1,000	0.1	0.1%	100.0%	0.0%	0.0%	0.1%	0.1%
	2,000	2,999	1.000	0	0.0	0.1%	99.9%	0.0%	0.0%	0.1%	0.1%
	3,000	3,999	0.978	9,000	0.3	0.8%	99.9%	0.0%	0.0%	0.1%	0.1%
	4,000	4,999	0.949	28,000	0.6	3.1%	99.2%	0.0%	0.0%	0.1%	0.1%
	5,000	5,999	0.891	70,000	1.2	8.9%	96.9%	0.1%	0.1%	0.2%	0.1%
	6,000	6,999	0.835	114,000	1.6	18.2%	91.1%	0.1%	0.1%	0.2%	0.1%
	7,000	7,999	0.615	259,000	3.1	39.4%	81.8%	0.2%	0.2%	0.3%	0.1%
	8,000	8,999	0.712	136,000	1.4	50.6%	60.6%	0.1%	0.1%	0.2%	0.1%
	9,000	9,999	0.786	81,000	0.8	57.2%	49.4%	0.0%	0.1%	0.1%	0.0%
	10,000	14,999	2.727	195,000	1.5	73.2%	42.8%	0.1%	0.2%	0.2%	0.1%
	15,000	19,999	3.467	137,000	0.7	84.4%	26.8%	0.0%	0.1%	0.1%	0.0%
	20,000	24,999	3.143	112,000	0.4	93.6%	15.6%	0.0%	0.1%	0.1%	0.0%
	25,000	29,999	3.500	27,000	0.1	95.8%	6.4%	0.0%	0.0%	0.0%	0.0%
	30,000	34,999	5.000	0	0.0	95.8%	4.2%	0.0%	0.0%	0.0%	0.0%
	35,000	44,999	10.000	0	0.0	95.8%	4.2%	0.0%	0.0%	0.0%	0.0%
	45,000	54,999	6.000	51,000	0.1	100.0%	4.2%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			1,220,000	12.0			0.6%	1.1%	1.8%	1.0%

Table 19 - User Statistics

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
6 Minimums	0	999	0.583	0	0.4	0.0%	100.0%	0.0%	0.0%	0.1%	0.0%
	1,000	1,999	0.429	4,000	0.3	17.4%	100.0%	0.0%	0.0%	0.1%	0.0%
	2,000	2,999	0.667	2,000	0.1	26.1%	82.6%	0.0%	0.0%	0.0%	0.0%
	3,000	3,999	1.000	0	0.0	26.1%	73.9%	0.0%	0.0%	0.0%	0.0%
	4,000	4,999	1.000	0	0.0	26.1%	73.9%	0.0%	0.0%	0.0%	0.0%
	5,000	5,999	0.500	5,000	0.1	47.8%	73.9%	0.0%	0.0%	0.0%	0.0%
	6,000	6,999	1.000	0	0.0	47.8%	52.2%	0.0%	0.0%	0.0%	0.0%
	7,000	7,999	1.000	0	0.0	47.8%	52.2%	0.0%	0.0%	0.0%	0.0%
	8,000	8,999	1.000	0	0.0	47.8%	52.2%	0.0%	0.0%	0.0%	0.0%
	9,000	9,999	1.000	0	0.0	47.8%	52.2%	0.0%	0.0%	0.0%	0.0%
	10,000	14,999	2.000	12,000	0.1	100.0%	52.2%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			23,000	1.0			0.1%	0.0%	0.2%	0.0%
8 Minimums	20,000	24,999	4.750	47,000	0.2	11.9%	100.0%	0.0%	0.0%	0.1%	0.0%
	25,000	29,999	5.000	0	0.0	11.9%	88.1%	0.0%	0.0%	0.0%	0.0%
	30,000	34,999	3.100	191,000	0.5	60.1%	88.1%	0.0%	0.2%	0.1%	0.0%
	35,000	44,999	3.500	109,000	0.3	87.6%	39.9%	0.0%	0.1%	0.1%	0.0%
	45,000	54,999	4.000	49,000	0.1	100.0%	12.4%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			396,000	1.0			0.1%	0.4%	0.4%	0.3%
12 Minimums	10,000	14,999	4.250	36,000	0.3	16.7%	100.0%	0.0%	0.0%	0.1%	0.0%
	15,000	19,999	3.667	68,000	0.3	48.1%	83.3%	0.0%	0.1%	0.1%	0.0%
	20,000	24,999	2.200	86,000	0.3	88.0%	51.9%	0.0%	0.1%	0.1%	0.0%
	25,000	29,999	1.000	26,000	0.1	100.0%	12.0%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			216,000	1.0			0.1%	0.2%	0.4%	0.1%
	Grand Totals			106,833,000				100.00%	100.00%	100.00%	100.00%

Chart 1 - Operating Ratio

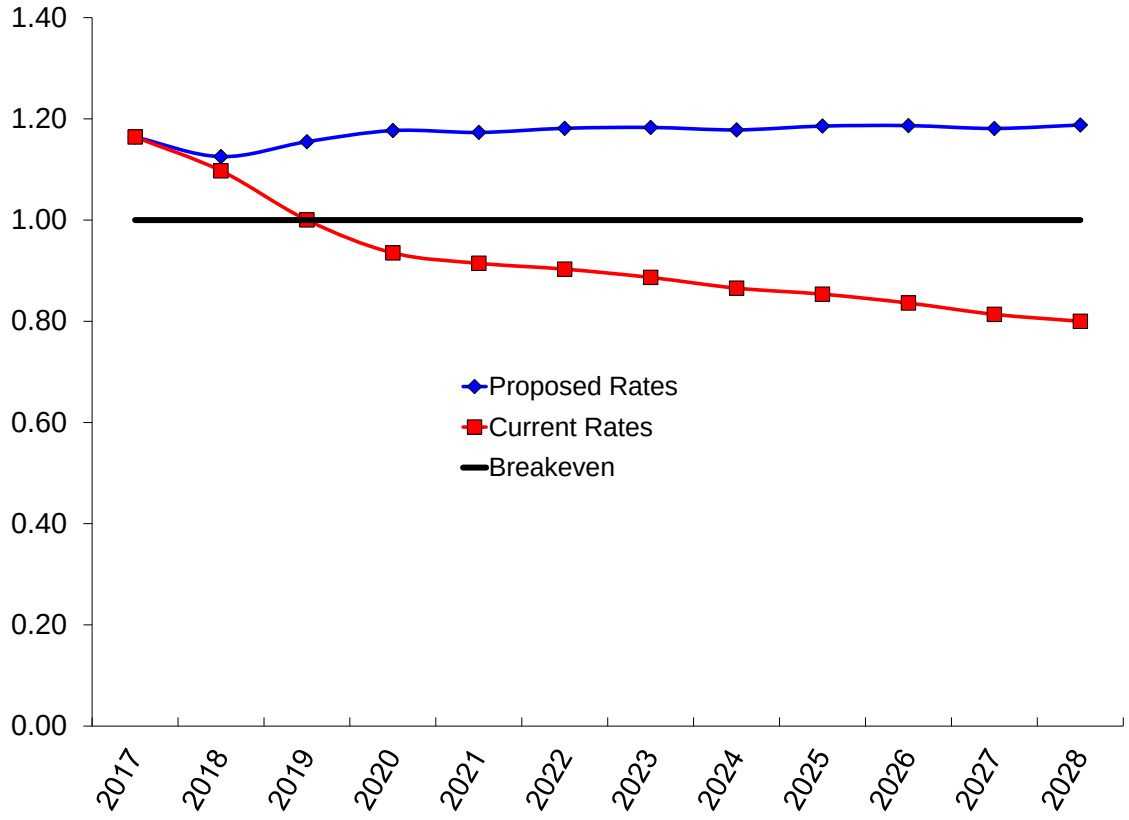


Chart 2 - Coverage Ratio

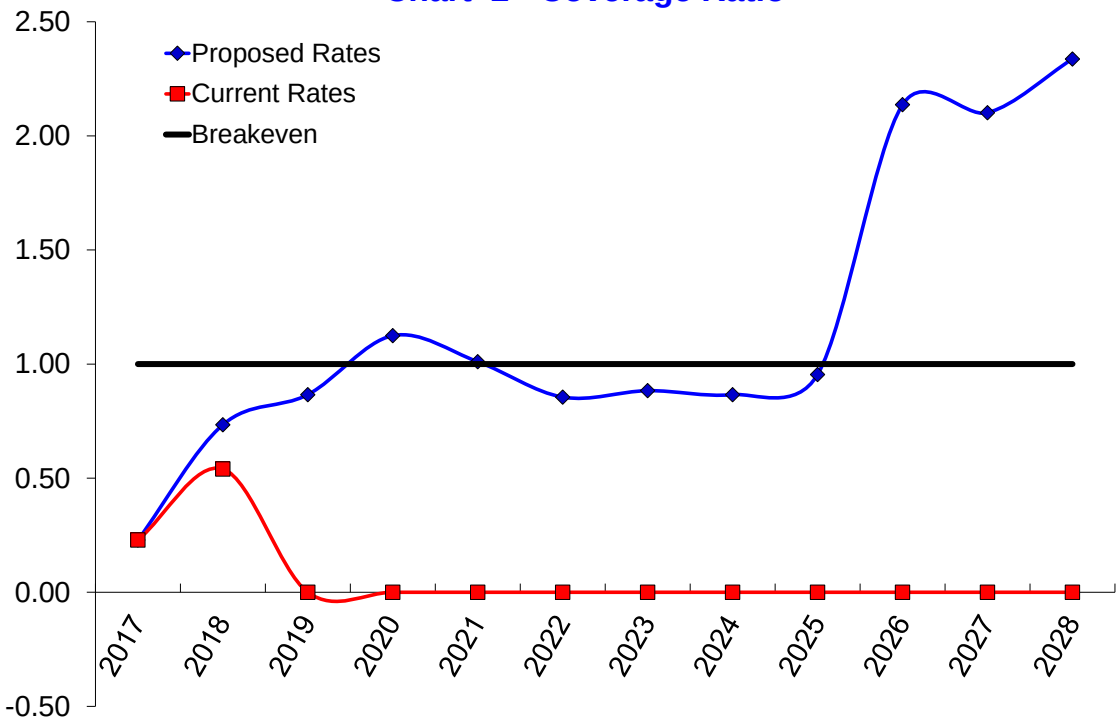


Chart 3 - Residential Users' Bills

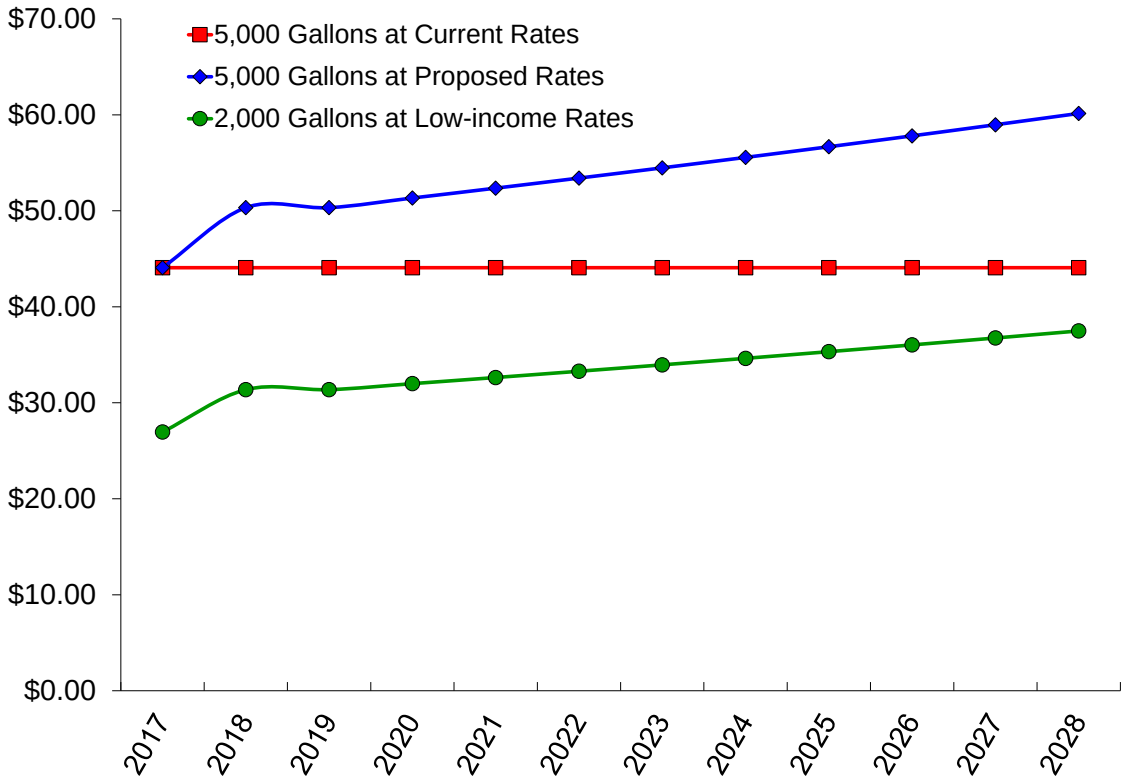


Chart 4 - Affordability

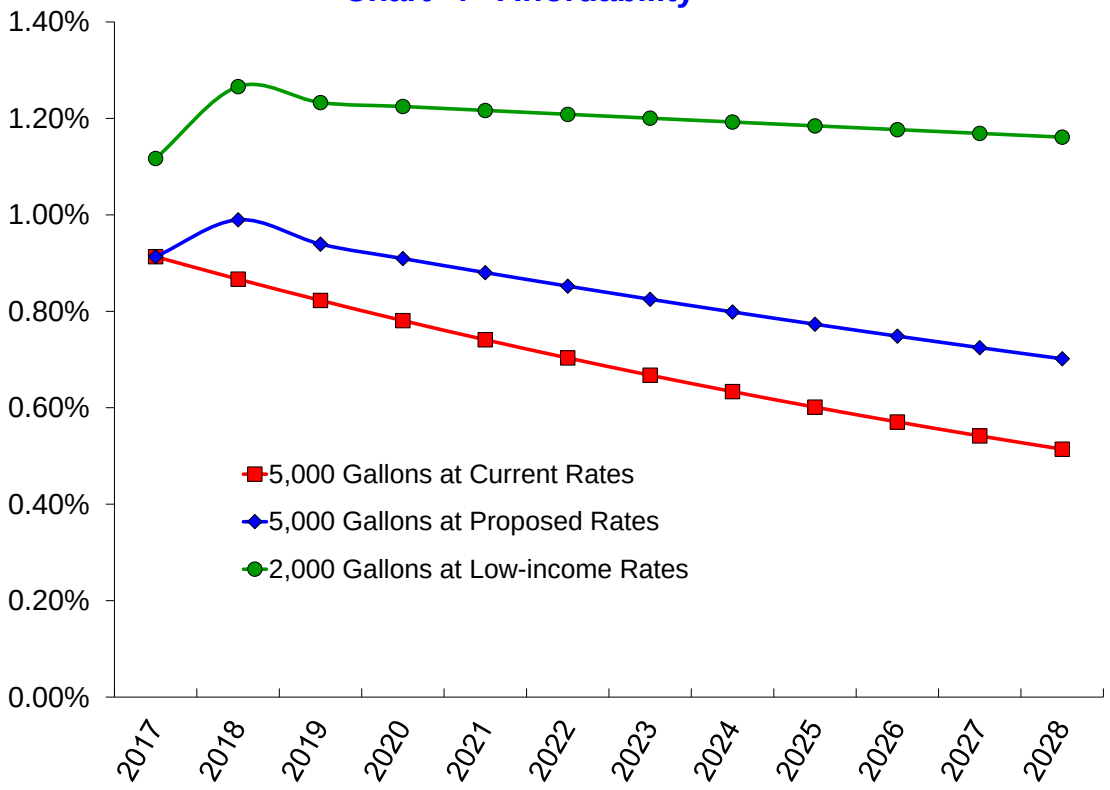


Chart 5 - Working Capital vs Goal

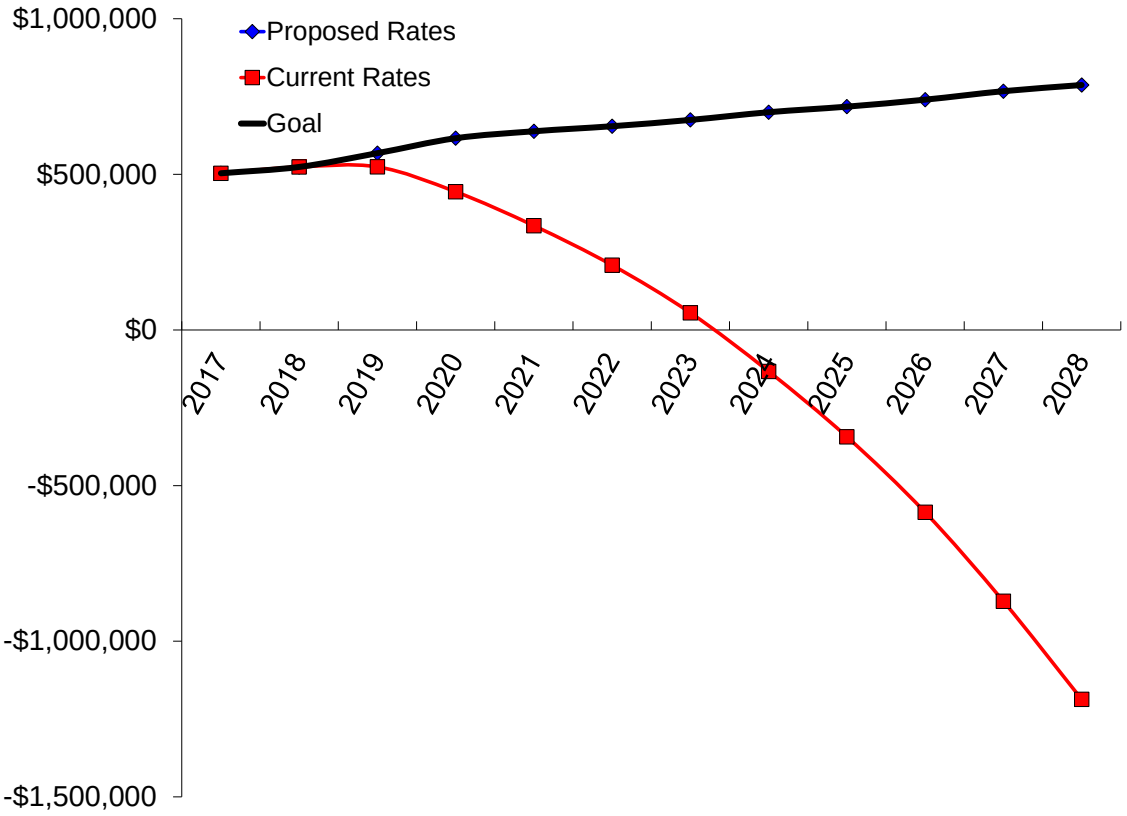


Chart 6 - Value of Cash Assets Before Inflation

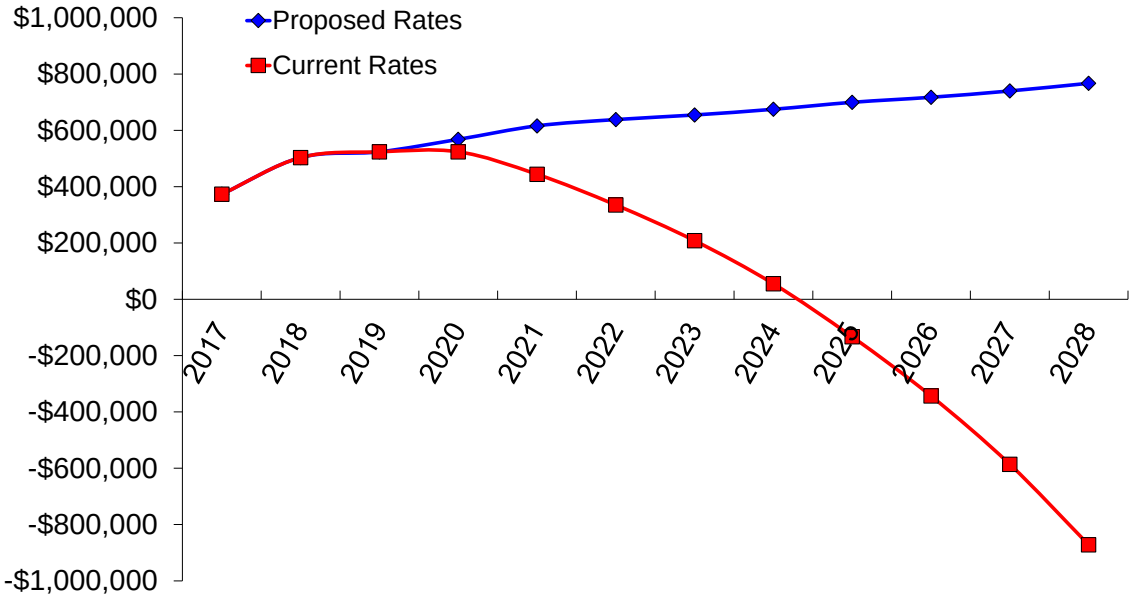


Chart 7 - Value of Cash Assets After Inflation

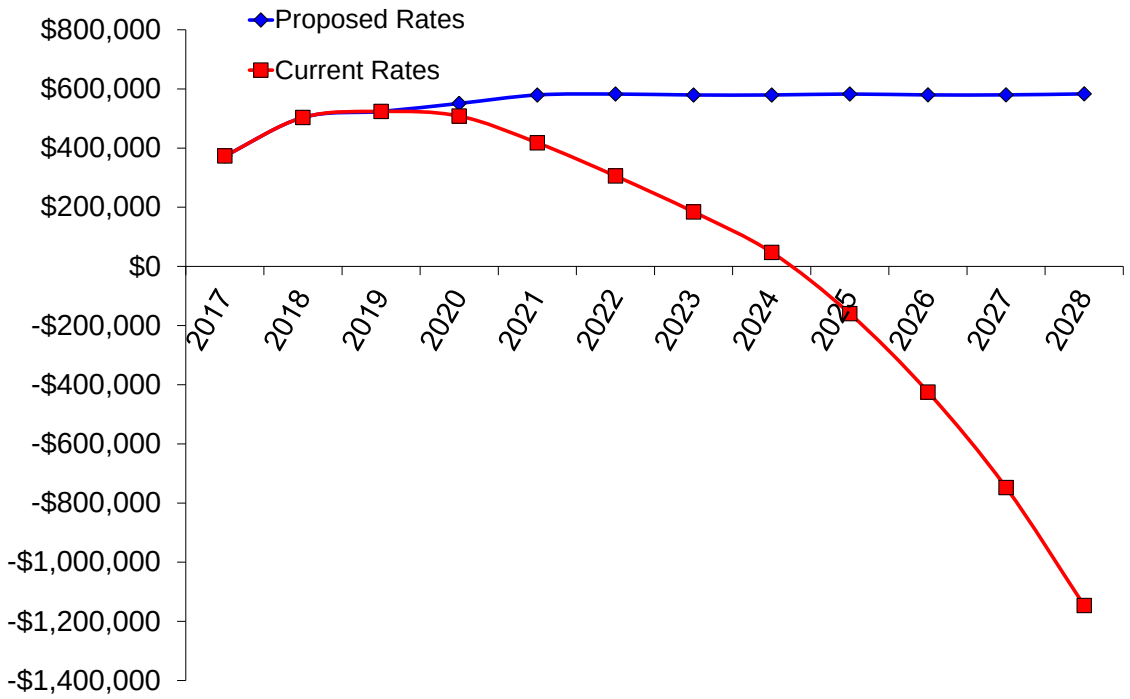
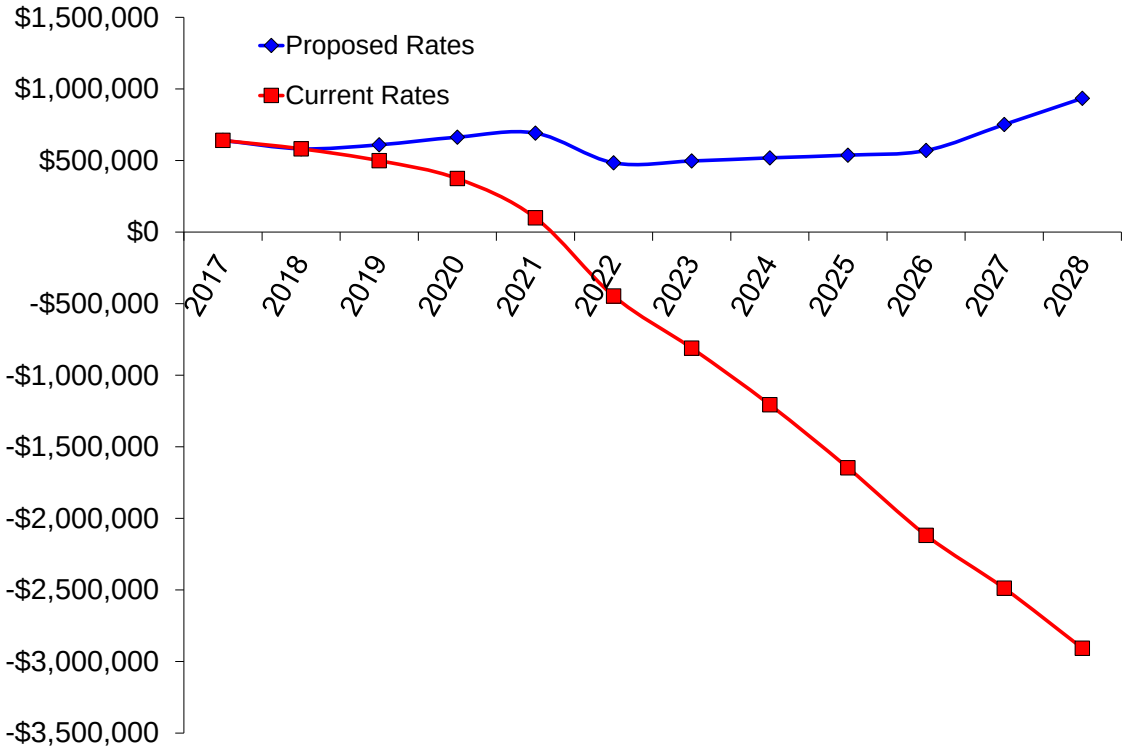


Chart 8 - Sum of All Reserves



Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This model depicts rates and major fees in a cost-to-serve structure with only minor exceptions.

June 4, 2019

This rate analysis scenario was produced by
Carl E. Brown, GettingGreatRates.com
1014 Carousel Drive, Jefferson City, Missouri 65101
(573) 619-3411
https://gettinggreatrates.com
carl1@gettinggreatrates.com

Note: This document is a print out of the spreadsheet model used to calculate new user charge and other rates and fees for the next 10 years. These calculations are complex and are based upon many conditions and assumtions. These issues, and others, are described in a narrative report that accompanies this model.

Return on Investment

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

The rates depicted in this model will produce various returns on investment or paybacks. Usually the most important payback, at least to ratepayers, is a rate structure that is demonstrably fair. For the system, however, making sure that revenue will be adequate to pay all expected, expectable and many unexpectable costs is the the most important return. If revenue will increase as a result of this analysis, which is almost always the case, one can calculate a dollar and percentage return on investment.

The following calculations show what was invested and what the returns will be over two periods; five years and 10 years. Five years is a reasonable period for return projections. Ten years is a good basic planning horizon but you should not bank on amounts or returns projected that far out. Besides, most systems should have their analyses redone long before then.

Consider these key points about return on investment. Higher rates will fund more improvements, better repair and replacement and more. Most increases in revenue end up being used for such expenses. Thus, few systems end up with a dramatic increase in their cash reserves but they do markedly improve their financial position. In addition, fairer and higher rates generally enable systems to qualify for grant and loan funding that they otherwise would not. That increases the importation of "other people's money," which is a drain on the state and federal funds, where the money comes from, but it is very desirable at the utility level. The calculation below ignores any "outside" funds the utility may capture.

Also note that rates in this model have been modeled to be adjusted during the year following the test year or even later. That year is included in the first five-year return on investment calculation. Thus, the first year of returns calculated below include most or all of one year where rates will not have been changed yet. Thus, the real rate of return will be greater than the calculation reflects.

Calculations

$6,110	Fees to GettingGreatRates.com
$500	Estimated value of system staff time and incidentals to assemble needed information
$6,610	Total Investment for This Analysis
$112,990	Five-year Increase in Revenue Due at Least Partly to This Analysis
1,709%	Five-year Return on Investment (increase in revenues / investment)
$783,790	Ten-year Improvement in Cash Position Due at Least Partly to This Analysis
11,858%	Ten-year Return on Investment (increase in revenues / investment)

Table 1 - Rates
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

Rates were recently changed. The rates in this table are those in effect during the test year. If a volume range was left out of the table, in order to make it shorter, the unit charge that shows for the next lowest volume range also applies to the hidden volume range.

Rates in Effect at End of Test Year

Customer Type, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Billing Cycle Minimum Charge	Usage Allowance in 1,000 Gallons	Unit Charge per 1,000 Gallons
Residential 1 Minimum	0	$19.29	1.000	$4.46
	140,000	$19.29	1.000	$4.46
Residential 2 Minimums	0	$38.58	2.000	$4.46
	145,000	$38.58	2.000	$4.46
Residential 4 Minimums	0	$77.16	4.000	$4.46
	145,000	$77.16	4.000	$4.46
Residential 6 Minimums	0	$115.74	6.000	$4.46
	145,000	$115.74	6.000	$4.46
Residential 8 Minimums	0	$154.32	8.000	$4.46
	145,000	$154.32	8.000	$4.46
Residential 12 Minimums	0	$231.48	12.000	$4.46
	145,000	$231.48	12.000	$4.46
Commercial 1 Minimum	0	$19.29	1.000	$4.46
	145,000	$19.29	1.000	$4.46
Commercial 2 Minimums	0	$38.58	2.000	$4.46
	145,000	$38.58	2.000	$4.46
Commercial 4 Minimums	0	$77.16	4.000	$4.46
	145,000	$77.16	4.000	$4.46
Commercial 6 Minimums	0	$115.74	6.000	$4.46
	145,000	$115.74	6.000	$4.46

Table 2 - Test Year Usage
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table shows usage by all customers during the test year. Residential meter readings per year: 3 Date this scenario created: 3/15/2019

Test year = the one-year period being analyzed starts: 1/1/2017 Other customer readings per year: 12 Bills per year: 12

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
	-111,000	-1	1,000	-55.500	-222,000	0	-222,000	0	0.0%	-0.2%
	0	999	1,000	0.945	22,532,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	0.887	19,976,000	2,556	2,556,000	213	10.6%	2.5%
	2,000	2,999	1,000	0.789	15,760,000	4,216	8,432,000	351	17.4%	8.2%
	3,000	3,999	1,000	0.703	11,072,000	4,688	14,064,000	391	19.4%	13.6%
	4,000	4,999	1,000	0.644	7,132,000	3,940	15,760,000	328	16.3%	15.3%
	5,000	5,999	1,000	0.603	4,300,000	2,832	14,160,000	236	11.7%	13.7%
	6,000	6,999	1,000	0.607	2,608,000	1,692	10,152,000	141	7.0%	9.8%
	7,000	7,999	1,000	0.618	1,612,000	996	6,972,000	83	4.1%	6.8%
	8,000	8,999	1,000	0.633	1,020,000	592	4,736,000	49	2.4%	4.6%
	9,000	9,999	1,000	0.667	680,000	340	3,060,000	28	1.4%	3.0%
	10,000	14,999	1,000	2.047	1,392,000	540	6,092,000	45	2.2%	5.9%
	15,000	19,999	1,000	3.057	428,000	84	1,408,000	7	0.3%	1.4%
Residential 1 Minimum	20,000	24,999	1,000	3.643	204,000	20	424,000	2	0.1%	0.4%
	25,000	29,999	1,000	3.556	128,000	16	428,000	1	0.1%	0.4%
	30,000	39,999	1,000	6.400	128,000	8	248,000	1	0.0%	0.2%
	40,000	49,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	50,000	59,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	60,000	69,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	70,000	79,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	80,000	89,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	90,000	99,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	100,000	109,999	1,000	10.000	120,000	0	0	0	0.0%	0.0%
	110,000	119,999	1,000	9.000	108,000	4	468,000	0	0.0%	0.5%
	120,000	129,999	1,000	10.000	80,000	0	0	0	0.0%	0.0%
	130,000	139,999	1,000	10.000	80,000	0	0	0	0.0%	0.0%
	140,000	276,000	1,000	86.500	692,000	8	1,812,000	1	0.0%	1.8%
				Monthly and Annual Subtotals:	90,550,000	22,532	90,550,000	1,878	93.2%	87.8%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
Residential 2 Minimums	0	999	1,000	0.811	172,000	40	0	3	0.2%	0.0%
	1,000	1,999	1,000	0.791	136,000	36	36,000	3	0.1%	0.0%
	2,000	2,999	1,000	0.882	120,000	16	32,000	1	0.1%	0.0%
	3,000	3,999	1,000	0.767	92,000	28	84,000	2	0.1%	0.1%
	4,000	4,999	1,000	0.870	80,000	12	48,000	1	0.0%	0.0%
	5,000	5,999	1,000	0.900	72,000	8	40,000	1	0.0%	0.0%
	6,000	6,999	1,000	0.944	68,000	4	24,000	0	0.0%	0.0%
	7,000	7,999	1,000	0.882	60,000	8	56,000	1	0.0%	0.1%
	8,000	8,999	1,000	0.933	56,000	4	32,000	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	56,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	3.214	180,000	28	320,000	2	0.1%	0.3%
	15,000	19,999	1,000	4.429	124,000	4	64,000	0	0.0%	0.1%
	20,000	24,999	1,000	3.333	80,000	12	260,000	1	0.0%	0.3%
	25,000	29,999	1,000	3.667	44,000	4	104,000	0	0.0%	0.1%
	30,000	34,999	1,000	4.500	36,000	4	136,000	0	0.0%	0.1%
	35,000	44,999	1,000	8.000	32,000	4	172,000	0	0.0%	0.2%
			Monthly and Annual Subtotals:		1,408,000	212	1,408,000	18	0.9%	1.4%
Residential 4 Minimums	0	999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	0.917	11,000	1	5,000	0	0.0%	0.0%
	6,000	6,999	1,000	0.636	7,000	4	24,000	0	0.0%	0.0%
	7,000	7,999	1,000	0.286	2,000	5	35,000	0	0.0%	0.0%
	8,000	8,999	1,000	0.500	1,000	1	8,000	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	0.000	0	1	10,000	0	0.0%	0.0%
			Monthly and Annual Subtotals:		82,000	12	82,000	1	0.0%	0.1%
Residential 6 Minimums	0	999	1,000	1.000	4,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	0.000	0	4	4,000	0	0.0%	0.0%
			Monthly and Annual Subtotals:		4,000	4	4,000	0	0.0%	0.0%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
Residential 8 Minimums	0	999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	7,000	7,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	8,000	8,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	5.000	60,000	0	0	0	0.0%	0.0%
	15,000	19,999	1,000	5.000	60,000	0	0	0	0.0%	0.0%
	20,000	24,999	1,000	4.000	48,000	8	188,000	1	0.0%	0.2%
	25,000	29,999	1,000	5.000	20,000	0	0	0	0.0%	0.0%
	30,000	34,999	1,000	0.000	0	4	120,000	0	0.0%	0.1%
				Monthly and Annual Subtotals:	308,000	12	308,000	1	0.0%	0.3%
Residential 12 Minimums	0	999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	7,000	7,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	8,000	8,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	5.000	60,000	0	0	0	0.0%	0.0%
	15,000	19,999	1,000	3.000	36,000	8	136,000	1	0.0%	0.1%
	20,000	24,999	1,000	1.000	4,000	4	84,000	0	0.0%	0.1%
				Monthly and Annual Subtotals:	220,000	12	220,000	1	0.0%	0.2%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
	0	999	1,000	0.714	952,000	381	0	32	1.6%	0.0%
	1,000	1,999	1,000	0.645	614,000	338	338,000	28	1.4%	0.3%
	2,000	2,999	1,000	0.699	429,000	185	370,000	15	0.8%	0.4%
	3,000	3,999	1,000	0.776	333,000	96	288,000	8	0.4%	0.3%
	4,000	4,999	1,000	0.793	264,000	69	276,000	6	0.3%	0.3%
	5,000	5,999	1,000	0.879	232,000	32	160,000	3	0.1%	0.2%
	6,000	6,999	1,000	0.914	212,000	20	120,000	2	0.1%	0.1%
	7,000	7,999	1,000	0.915	194,000	18	126,000	2	0.1%	0.1%
	8,000	8,999	1,000	0.943	183,000	11	88,000	1	0.0%	0.1%
	9,000	9,999	1,000	0.951	174,000	9	81,000	1	0.0%	0.1%
	10,000	14,999	1,000	4.069	708,000	48	558,000	4	0.2%	0.5%
	15,000	19,999	1,000	4.270	538,000	30	508,000	3	0.1%	0.5%
	20,000	24,999	1,000	4.698	451,000	10	221,000	1	0.0%	0.2%
Commercial 1 Minimum	25,000	29,999	1,000	4.395	378,000	19	518,000	2	0.1%	0.5%
	30,000	34,999	1,000	4.642	311,000	8	256,000	1	0.0%	0.2%
	35,000	44,999	1,000	9.390	554,000	5	189,000	0	0.0%	0.2%
	45,000	54,999	1,000	9.093	491,000	9	446,000	1	0.0%	0.4%
	55,000	64,999	1,000	9.600	432,000	2	112,000	0	0.0%	0.1%
	65,000	74,999	1,000	9.209	396,000	6	416,000	1	0.0%	0.4%
	75,000	84,999	1,000	9.243	342,000	5	397,000	0	0.0%	0.4%
	85,000	94,999	1,000	9.875	316,000	1	91,000	0	0.0%	0.1%
	95,000	104,999	1,000	10.000	310,000	0	0	0	0.0%	0.0%
	105,000	114,999	1,000	9.516	295,000	3	330,000	0	0.0%	0.3%
	115,000	124,999	1,000	8.893	249,000	5	594,000	0	0.0%	0.6%
	125,000	134,999	1,000	8.565	197,000	6	777,000	1	0.0%	0.8%
	135,000	144,999	1,000	8.294	141,000	4	551,000	0	0.0%	0.5%
	145,000	256,000	1,000	56.154	730,000	13	2,615,000	1	0.1%	2.5%
				Monthly and Annual Subtotals:	10,426,000	1,333	10,426,000	111	5.5%	10.1%

Table 2 - Test Year Usage

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Conversion Factor for Billable Units	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Count of Bills Where Volume "Maxed Out" in Each Range	Volume of Bills Where Volume "Maxed Out" in Each Range	# of Customers With Volume That "Maxed Out" in Each Range	% of Customers That Averaged This Volume of Use	% of Total Use at This Average Volume
Commercial 2 Minimums	0	999	1,000	0.500	12,000	12	0	1	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	0.917	11,000	1	3,000	0	0.0%	0.0%
	4,000	4,999	1,000	0.273	3,000	8	32,000	1	0.0%	0.0%
	5,000	5,999	1,000	0.333	1,000	2	10,000	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	7,000	7,999	1,000	0.000	0	1	7,000	0	0.0%	0.0%
				Monthly and Annual Subtotals:	52,000	24	52,000	2	0.1%	0.1%
Commercial 4 Minimums	0	999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	1,000	1,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	2,000	2,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	12,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	0.917	11,000	1	5,000	0	0.0%	0.0%
	6,000	6,999	1,000	0.636	7,000	4	24,000	0	0.0%	0.0%
	7,000	7,999	1,000	0.286	2,000	5	35,000	0	0.0%	0.0%
	8,000	8,999	1,000	0.500	1,000	1	8,000	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	0.000	0	1	10,000	0	0.0%	0.0%
				Monthly and Annual Subtotals:	82,000	12	82,000	1	0.0%	0.1%
Commercial 6 Minimums	0	999	1,000	0.583	7,000	5	0	0	0.0%	0.0%
	1,000	1,999	1,000	0.571	4,000	3	3,000	0	0.0%	0.0%
	2,000	2,999	1,000	0.500	2,000	2	4,000	0	0.0%	0.0%
	3,000	3,999	1,000	1.000	2,000	0	0	0	0.0%	0.0%
	4,000	4,999	1,000	1.000	2,000	0	0	0	0.0%	0.0%
	5,000	5,999	1,000	0.500	1,000	1	5,000	0	0.0%	0.0%
	6,000	6,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	7,000	7,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	8,000	8,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	9,000	9,999	1,000	1.000	1,000	0	0	0	0.0%	0.0%
	10,000	14,999	1,000	2.000	2,000	1	12,000	0	0.0%	0.0%
				Monthly and Annual Subtotals:	24,000	12	24,000	1	0.0%	0.0%
				Grand Totals:	103,156,000	24,165	103,156,000	2,014	100%	100%

Table 3 - Operating Incomes and Basic User Data

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table depicts user statistics, customer growth, and system incomes and across the board "inflationary" style rate increases through the 10th year.

Annual Median Household Income (AMHI)

$49,514 Census Bureau estimate of AMHI for the year: 2016

$46,994 Census Bureau estimate of AMHI for the year: 2015

$2,520 AMHI growth during this time period

5.36% Simple annual income growth rate during this time period (used to project incomes into the future)

Test Year Growth of Customer Base and Average Tap Fee Paid per Connection

32 Number of new connections made during the test year

$1,933 Average tap or installation fee assessed during the test year

This model is programmed to assume that rates will be reset in the "Analysis (This) Year" column below (heading highlighted blue). Revenues will be collected at the now-current rates for the first part of the analysis year and the modeled rates for the last part of the analysis year. The change-over from the current rates to new rates is modeled to happen on the date near the top of Table 10. Thus, the revenues shown in the last column of that table are "blended" revenues; part collected at the old rates and part collected at the new rates. It was then assumed that all rate adjustments made after the initial (major) adjustment will be done annually on approximately the anniversary of the first adjustment.

Basic User (Customer) Data

(First year balances and incomes are actual, subsequent years are projected.)	Inflation or Deflation (–) Factor	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	Years Following the Analysis Year (for Which Results Have Been Projected) 1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
Rate Increases Projected for Future Years	N.A.	N.A.	N.A.	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
The row above shows the rate at which user charge fees should be increased for each year beyond the initial rate adjustment year. Unless stated otherwise, these should be across-the-board increases to all rates and fees and that should continue until a new rate analysis is done.													
Average Number of Customers for the Year	N.A.	2,014	2,046	2,078	2,110	2,142	2,174	2,206	2,238	2,270	2,302	2,334	2,366
Customers Added or Lost (-) During the Year	N.A.	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Customer Growth or Loss (-) Rate	N.A.	1.59%	1.56%	1.54%	1.54%	1.49%	1.47%	1.45%	1.43%	1.41%	1.39%	1.37%	1.35%
Actual (Test Year) and Projected Volumes, in Gallons	N.A.	103,156,000	104,795,226	106,434,453	108,073,679	109,712,905	111,352,132	112,991,358	114,630,584	116,269,811	117,909,037	119,548,263	121,187,490

How User Charge Fees Were Calculated, Accounting for New Customers and Future Rate Increases

Actual or Calculated Sales Revenues		$832,047	$832,176	$879,078	$910,470	$942,982	$976,212	$1,010,395	$1,045,554	$1,081,716	$1,118,906	$1,157,151	$1,196,478
Additional Sales Revenues From New Customers			$36	$13,539	$14,022	$14,089	$14,371	$14,658	$14,952	$15,251	$15,556	$15,867	$16,184
Total Calculated Revenues (User Charge Fees)		$832,047	$832,212	$892,617	$924,492	$957,071	$990,583	$1,025,053	$1,060,506	$1,096,967	$1,134,461	$1,173,017	$1,212,662

Operating Incomes

User Charge Fees + 220-43109 DEBT SURCHARGE	N.A.	$756,746	$756,896	$811,834	$840,824	$870,455	$900,934	$932,285	$964,529	$997,690	$1,031,791	$1,066,858	$1,102,914
Late Payment Charge	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220-43110 SEWER INSPECTIONS (System Development Fees)	% Above	$61,850	$61,681	$0	$0	$0	$0	$0	$0	$0	$0	$1	$2
Meter Size-based System Development Fees (Table 14)	% Above	$0	$268	$97,953	$99,912	$101,910	$103,948	$106,027	$108,148	$110,311	$112,517	$114,767	$117,062
Interest Income	N.A.	$0	$2,425	$2,523	$2,897	$3,304	$3,413	$3,456	$3,536	$3,655	$3,703	$3,790	$3,922
430-43110 SEWER INSPECTIONS	N.A.	$59,100	$59,100	$34,100	$34,100	$34,100	$34,100	$34,100	$34,100	$34,100	$34,100	$34,100	$34,100
220-41101 PROPERTY TAX	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220-46401 REIMBURSED EXPENSE	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220-46608 LEASE RECEIPTS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
430-46301 GRANT RECEIPTS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
430-46501 SALE OF EQUIPMENT & VEHICLES	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
430-46610 BOND PROCEEDS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
430-46616 BOND PREMIUM	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
430-49100 TRANSFER FROM OTHER FUNDS	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Revenue Loss Because Rate Adjustments Made # Months Late	6.0	$0	$0	-$23,516	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Operating Incomes		**$877,696**	**$880,370**	**$922,895**	**$977,733**	**$1,009,769**	**$1,042,395**	**$1,075,868**	**$1,110,312**	**$1,145,755**	**$1,182,111**	**$1,219,516**	**$1,258,001**

Table 4 - Operating Costs and Net Income

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table depicts expenses during the test year, this year and for the next 10 years. Some future costs will experience inflation. Those costs that go up as use goes up are increased by the cost inflation factor plus the growth rate in users.

(First year costs and net incomes are actual, subsequent years are projected.)

	Inflation or Deflation (–) Factor	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	Years Following the Analysis Year (for Which Results Have Been Projected) 1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
220 61 CHARGE IN OF SALARIES	3.0%	$288,942	$297,610	$306,539	$315,735	$325,207	$334,963	$345,012	$355,362	$366,023	$377,004	$388,314	$399,963
220 62 AUTOMOTIVE MAINTENANCE	3.0%	$2,056	$2,118	$2,181	$2,247	$2,314	$2,384	$2,455	$2,529	$2,605	$2,683	$2,763	$2,846
220 62 CREDIT CARD PROCESSING FEES	3.0%	$946	$974	$1,003	$1,033	$1,064	$1,096	$1,129	$1,163	$1,198	$1,234	$1,271	$1,309
220 62 DUES & MEMBERSHIPS	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 ELECTRICITY	3.0%	$67,959	$71,093	$74,353	$77,763	$81,293	$84,964	$88,783	$92,754	$96,883	$101,177	$105,642	$110,283
220 62 ENGINEERING SERVICES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 EQUIPMENT REPAIR SERVICES	3.0%	$1,887	$1,944	$2,002	$2,062	$2,124	$2,188	$2,253	$2,321	$2,391	$2,462	$2,536	$2,612
220 62 INSPECTION & CLEANING SERVICES	3.0%	$3,402	$3,504	$3,609	$3,717	$3,829	$3,944	$4,062	$4,184	$4,310	$4,439	$4,572	$4,709
220 62 INTERNET/CABLE/PHONE	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 IT SERVICES	3.0%	$143	$147	$151	$156	$160	$165	$170	$175	$181	$186	$192	$197
220 62 LABORATORY SERVICES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 LEASE OF OFFICE EQUIPMENT	3.0%	$679	$699	$720	$742	$764	$787	$811	$835	$860	$886	$912	$940
220 62 LIABILITY INSURANCE	3.0%	$7,400	$7,622	$7,851	$8,086	$8,329	$8,579	$8,836	$9,101	$9,374	$9,655	$9,945	$10,243
220 62 MAINTENANCE SERVICES	3.0%	$3,280	$3,379	$3,480	$3,585	$3,692	$3,803	$3,917	$4,034	$4,155	$4,280	$4,408	$4,541
220 62 MILEAGE REIMBURSEMENT	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 NATURAL GAS/PROPANE	3.0%	$1,909	$1,966	$2,025	$2,086	$2,148	$2,213	$2,279	$2,348	$2,418	$2,490	$2,565	$2,642
220 62 OTHER PROFESSIONAL SERVICES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 PERMITS & FEES	3.0%	$40	$41	$42	$44	$45	$46	$48	$49	$51	$52	$54	$55
220 62 POSTAGE	3.0%	$200	$209	$219	$229	$239	$250	$261	$273	$285	$298	$311	$325
3110 SEWER INSPECTIONS (System Development Fees)	3.0%	$3,729	$3,841	$3,956	$4,075	$4,197	$4,323	$4,452	$4,586	$4,723	$4,865	$5,011	$5,161
220 62 PUBLIC NOTICES & ADVERTISING	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 REIMBURSED EXPENSES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 62 SAMPLING & ANALYSIS	3.0%	$6,203	$6,389	$6,580	$6,778	$6,981	$7,191	$7,406	$7,628	$7,857	$8,093	$8,336	$8,586
220 62 SLUDGE REMOVAL	3.0%	Above	Above	Above	Above	Above	Above	Above	Above	Above	Above	Above	Above
220 62 SOFTWARE LICENSING	3.0%	$3,200	$3,296	$3,395	$3,497	$3,602	$3,710	$3,821	$3,936	$4,054	$4,175	$4,301	$4,430
220 62 TRAINING & CERTIFICATIONS	3.0%	$185	$191	$196	$202	$208	$214	$221	$228	$234	$241	$249	$256
220 62 TRAVEL EXPENSES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 63 CHEMICALS	3.0%	$5,541	$5,797	$6,063	$6,341	$6,628	$6,928	$7,239	$7,563	$7,900	$8,250	$8,614	$8,992
220 63 CLOTHING	3.0%	$299	$307	$317	$326	$336	$346	$356	$367	$378	$389	$401	$413
220 63 EDUCATIONAL SUPPLIES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 63 FUEL & OIL	3.0%	$5,293	$5,452	$5,616	$5,784	$5,958	$6,136	$6,320	$6,510	$6,705	$6,906	$7,114	$7,327
220 63 JANITORIAL SUPPLIES	3.0%	$784	$808	$832	$857	$883	$909	$937	$965	$994	$1,023	$1,054	$1,086
220 63 MEDICAL & DRUG SUPPLIES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 63 MEETING AND MEAL EXPENSES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 63 OFFICE AND MEETING SUPPLIES	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 63 OPERATING SUPPLIES	3.0%	$6,766	$6,969	$7,178	$7,393	$7,615	$7,844	$8,079	$8,321	$8,571	$8,828	$9,093	$9,366
220 63 TOOLS & MAINTENANCE SUPPLIES	3.0%	$1,581	$1,628	$1,677	$1,727	$1,779	$1,832	$1,887	$1,944	$2,002	$2,062	$2,124	$2,188
220 64 AUTOMOTIVE EQUIPMENT	3.0%	$22	$23	$23	$24	$25	$25	$26	$27	$28	$29	$30	$30

Table 4 - Operating Costs and Net Income

	Inflation or Deflation (–) Factor	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
220 64 CAPITAL IMPROVEMENTS	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 64 EQUIPMENT RENTAL	3.0%	$3	$3	$3	$3	$4	$4	$4	$4	$4	$4	$4	$4
220 64 MACHINERY & EQUIPMENT	3.0%	$14	$15	$15	$16	$16	$17	$17	$18	$18	$19	$19	$20
220 64 OFFICE/COMPUTER EQUIPMENT	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 64 OTHER EQUIPMENT	3.0%	$26	$26	$27	$28	$29	$30	$30	$31	$32	$33	$34	$35
220 65 EXPENDITURE CONTROL	3.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
220 68 DEBT SERVICE	0.0%	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5
220 69 TRANSFER TO OTHER FUNDS	0.0%	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540	$72,540
One-time Reduction of R&R Annuity	0.0%	-$133,773	-$133,773	-$66,887	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Payment to Repair & Replacement (Table 7)	0.0%	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773	$133,773
User Charge Analysis Services	5.0%	$0	$6,110	$0	$0	$6,736	$0	$0	$7,427	$0	$0	$8,188	$0
Total CIP-related Payouts	N.A.	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5	Table 5
Total Operating Costs		**$485,028**	**$504,699**	**$579,481**	**$660,848**	**$682,518**	**$691,203**	**$707,127**	**$730,996**	**$740,547**	**$758,079**	**$784,369**	**$794,874**
Net Income (or Loss)		$392,669	$375,670	$343,414	$316,885	$327,251	$351,192	$368,741	$379,316	$405,208	$424,032	$435,147	$463,127
Working Capital Goal: 50%	In Dollars, That is:	$242,514	$252,350	$289,740	$330,424	$341,259	$345,601	$353,563	$365,498	$370,274	$379,039	$392,185	$397,437

Notes: The yellow highlighted cost items above will rise due to inflation and due to the additional cost of serving new customers.

Table 5 - Capital Improvement Program (CIP)

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table depicts capital improvements and their funding. Costs reflect inflation.

	Test Year	Analysis (This) Year	Years Following the Analysis Year (for Which Improvement Projects, Costs, Funding, etc. Have Been Projected)									
	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year		
	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting	Starting
	1/1/17	1/1/18	1/1/19	1/1/20	1/1/21	1/1/22	1/1/23	1/1/24	1/1/25	1/1/26	1/1/27	1/1/28
Planned Spending, Debt-paid Portion of Projects (CIP costs to be funded with loans are shown in this section.)												
Interceptor Sewer Line to the Business Park	$0	$0	$0	$0	$1,421,419	$0	$0	$0	$0	$0	$0	$0
Loan Closing Costs, Estimated at: 2.5%	$0	$0	$0	$0	$38,831	$0	$0	$0	$0	$0	$0	$0
Total Debt-paid Portion of Projects	$0	$0	$0	$0	$1,460,250	$0	$0	$0	$0	$0	$0	$0
Planned Spending, Cash-paid Portion of Projects (CIP costs to be funded from reserves are shown here.)												
Interceptor Sewer Line to the Business Park	$0	$0	$0	$0	$473,806	$0	$0	$0	$0	$0	$0	$0
Total Cash-paid Portion of Projects	$0	$0	$0	$0	$473,806	$0	$0	$0	$0	$0	$0	$0
Total CIP Costs	**$0**	**$0**	**$0**	**$0**	**$1,934,056**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt Repayment												
Existing Debt Payments (Following is debt that was initiated during the test year or earlier.)												
220 68 DEBT SERVICE	$292,568	$288,025	$289,382	$287,671	$374,401	$370,802	$367,144	$372,277	$374,224	$104,594	$105,395	$103,176
New Debt Payments (Following are payments for projects to be paid with new debt. It is assumed these will be loan/lease-financed for a term of: 20 years at a 4.5% interest rate.)												
Interceptor Sewer Line to the Business Park						$112,258	$112,258	$112,258	$112,258	$112,258	$112,258	$112,258
Total Debt Payments	$292,568	$288,025	$289,382	$287,671	$374,401	$483,060	$479,402	$484,535	$486,482	$216,852	$217,653	$215,435
Total CIP-related Payouts	**$292,568**	**$288,025**	**$289,382**	**$287,671**	**$2,308,457**	**$483,060**	**$479,402**	**$484,535**	**$486,482**	**$216,852**	**$217,653**	**$215,435**
(This is the total cash required for this CIP and debt payment schedule. These amounts must come from utility income, reserves or outside sources, as shown in the next section.)												
CIP Fund Sources (Following are the sources and amounts of funds expected to pay for the above CIP schedule.)												
Cash Reserves (Internal Funds)												
Debt and CIP Reserves Starting Balance	$300,263	$463,542	$550,623	$578,277	$578,373	$58,149	-$76,898	-$197,059	-$318,153	-$410,566	-$220,364	-$20,422
Working Capital Transferred in	$455,847	$365,834	$306,023	$276,201	$316,416	$346,850	$360,780	$367,382	$400,432	$415,266	$422,002	$457,875
Debt and CIP Reserves Interest Earned (or Paid)	$0	$9,271	$11,012	$11,566	$11,567	$1,163	-$1,538	-$3,941	-$6,363	-$8,211	-$4,407	-$408
Total Available Internal Funds	$756,110	$838,647	$867,658	$866,044	$906,356	$406,162	$282,343	$166,382	$75,916	-$3,512	$197,231	$437,044
Grant and Loan Proceeds (External Funds)												
Interceptor Sewer Line to the Business Park					$1,460,250	$0	$0	$0	$0	$0	$0	$0
Total Available External Funds	$0	$0	$0	$0	$1,460,250	$0	$0	$0	$0	$0	$0	$0
Total Available Funds	**$756,110**	**$838,647**	**$867,658**	**$866,044**	**$2,366,606**	**$406,162**	**$282,343**	**$166,382**	**$75,916**	**-$3,512**	**$197,231**	**$437,044**
Outcomes (This CIP spending and funding plan will result in the following cash needs and ending balances each year.)												
Total Available Funds	**$756,110**	**$838,647**	**$867,658**	**$866,044**	**$2,366,606**	**$406,162**	**$282,343**	**$166,382**	**$75,916**	**-$3,512**	**$197,231**	**$437,044**
Total CIP-related Payouts	**$292,568**	**$288,025**	**$289,382**	**$287,671**	**$2,308,457**	**$483,060**	**$479,402**	**$484,535**	**$486,482**	**$216,852**	**$217,653**	**$215,435**
Debt and CIP Reserves Ending Balances	**$463,542**	**$550,623**	**$578,277**	**$578,373**	**$58,149**	**-$76,898**	**-$197,059**	**-$318,153**	**-$410,566**	**-$220,364**	**-$20,422**	**$221,609**

Notes: These improvements are for the business park infrastructure and are not likely grant or SRF loan eligible. It is assumed these will be 75% funded with market rate bonds and 25% with reserves.

Table 6 - Equipment Replacement Schedule - Detailed

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

Year Beginning	Unspecified R&R	Pump & Motor Maintenance Costs	UV Bulb Replacement	Clarifier Repainting (2)	Barscreen Rebuild (sewer plant)	SCADA System Upgrade	Lift Station Mobile Generators (2)			Total Annual Replacement Costs
1/1/18	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/19	$30,000	$30,000	$5,000	$0	$50,000	$0	$0	$0	$0	$115,000
1/1/20	$30,000	$30,000	$0	$0	$0	$0	$100,000	$0	$0	$160,000
1/1/21	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/22	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/23	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/24	$30,000	$30,000	$0	$0	$0	$50,000	$0	$0	$0	$110,000
1/1/25	$30,000	$30,000	$5,000	$95,000	$0	$0	$0	$0	$0	$160,000
1/1/26	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/27	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/28	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/29	$30,000	$30,000	$5,000	$0	$50,000	$0	$0	$0	$0	$115,000
1/1/30	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/31	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/32	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/33	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/34	$30,000	$30,000	$0	$0	$0	$50,000	$0	$0	$0	$110,000
1/1/35	$30,000	$30,000	$5,000	$95,000	$0	$0	$0	$0	$0	$160,000
1/1/36	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/37	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/38	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000
1/1/39	$30,000	$30,000	$5,000	$0	$50,000	$0	$0	$0	$0	$115,000
1/1/40	$30,000	$30,000	$0	$0	$0	$0	$100,000	$0	$0	$160,000
1/1/41	$30,000	$30,000	$5,000	$0	$0	$0	$0	$0	$0	$65,000
1/1/42	$30,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$60,000

Table 7 - Equipment Replacement Annuity Calculation

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table calculates the annual annuity (savings deposit) needed to build replacement (R&R) reserves. This annuity amount should actually be deposited in a savings account. The annuity amount, called the "Required Annual Deposit (Annuity) to Replacement Account" below, should be included in the utility's general budget as a cost. As a result, all replacement and refurbishment scheduled in Table 6, the detailed replacement schedule, would be paid for out of R&R reserves and not out of the utility's general budget.

In simple terms, the annuity at the bottom of this table should be deposited into an account each year and R&R projects should be paid for out of that account.

3.00% Average Inflation Rate for the Following Sewer System Equipment for the Term of This Replacement Schedule

2.00% Average Interest Rate on Balances Invested for the Term of This Replacement Schedule

2.00% Average Interest Rate on Amounts Borrowed for the Term of This Replacement Schedule

Year Beginning	Schedule Year	This Year's Costs in Current Dollars	Future Annual Inflated Net Costs	Interest Earned on Prior Balance	End of Year Balance in Future Dollars	Minimum Desired End of Year Balance in Future Dollars
1/1/18	Analysis Year	$60,000	$60,000	$0	-$60,000	$336,000
1/1/19	1st Year	$115,000	$118,450	-$1,200	-$45,877	$346,080
1/1/20	2nd Year	$160,000	$169,744	-$918	-$82,765	$356,462
1/1/21	3rd Year	$65,000	$71,027	-$1,655	-$21,674	$367,156
1/1/22	4th Year	$60,000	$67,531	-$433	$44,136	$378,171
1/1/23	5th Year	$65,000	$75,353	$883	$103,439	$389,516
1/1/24	6th Year	$110,000	$131,346	$2,069	$107,936	$401,202
1/1/25	7th Year	$160,000	$196,780	$2,159	$47,088	$413,238
1/1/26	8th Year	$60,000	$76,006	$942	$105,797	$425,635
1/1/27	9th Year	$65,000	$84,810	$2,116	$156,876	$438,404
1/1/28	10th Year	$60,000	$80,635	$3,138	$213,152	$451,556
1/1/29	11th Year	$115,000	$159,187	$4,263	$192,002	$465,103
1/1/30	12th Year	$60,000	$85,546	$3,840	$244,070	$479,056
1/1/31	13th Year	$65,000	$95,455	$4,881	$287,270	$493,427
1/1/32	14th Year	$60,000	$90,755	$5,745	$336,033	$508,230
1/1/33	15th Year	$65,000	$101,268	$6,721	$375,259	$523,477
1/1/34	16th Year	$110,000	$176,518	$7,505	$340,020	$539,181
1/1/35	17th Year	$160,000	$264,456	$6,800	$216,139	$555,357
1/1/36	18th Year	$60,000	$102,146	$4,323	$252,089	$572,018
1/1/37	19th Year	$65,000	$113,978	$5,042	$276,926	$589,178
				Starting Account Balance	$0	$336,000
				Minimum Annual Annuity	$121,649	Minimum Desired Balance in Today's Dollars
				Discretionary Annuity	$12,124	

Notes: There is currently no R&R schedule. Average R&R costs were instead estimated. A Discretionary Annuity amount was added so that at the end of the 20-year modeling period, the balance will equal the average of the annual replacement cost amounts, less interest paid for borrowing during the negative balance years.

Required Annual Deposit (Annuity) to Replacement Account **$133,773**

(This amount is included in Table 4 as an operating cost.)

Table 8 - Average Cost Classification

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table distributes costs from a representative year (the "average rate structure basis year) to fixed and variable categories (see Definitions) in order to calculate the "cost of service" rate structure for that year.

The average rate structure basis year runs from: 1/1/2022 through 12/31/2022

Cost Items	Cost During Average Rate Structure Basis Year	Fixed Cost Percentage	Variable Cost Percentage	Average Fixed Cost	Average Variable Cost
220 61 CHARGE IN OF SALARIES	$334,963	25.0%	75.0%	$83,741	$251,222
220 62 AUTOMOTIVE MAINTENANCE	$2,384	25.0%	75.0%	$596	$1,788
220 62 CREDIT CARD PROCESSING FEES	$1,096	100.0%	0.0%	$1,096	$0
220 62 DUES & MEMBERSHIPS	$0	25.0%	75.0%	$0	$0
220 62 ELECTRICITY	$84,964	0.0%	100.0%	$0	$84,964
220 62 ENGINEERING SERVICES	$0	20.9%	79.1%	$0	$0
220 62 EQUIPMENT REPAIR SERVICES	$2,188	25.0%	75.0%	$547	$1,641
220 62 INSPECTION & CLEANING SERVICES	$3,944	25.0%	75.0%	$986	$2,958
220 62 INTERNET/CABLE/PHONE	$0	100.0%	0.0%	$0	$0
220 62 IT SERVICES	$165	100.0%	0.0%	$165	$0
220 62 LABORATORY SERVICES	$0	100.0%	0.0%	$0	$0
220 62 LEASE OF OFFICE EQUIPMENT	$787	100.0%	0.0%	$787	$0
220 62 LIABILITY INSURANCE	$8,579	100.0%	0.0%	$8,579	$0
220 62 MAINTENANCE SERVICES	$3,803	25.0%	75.0%	$951	$2,852
220 62 MILEAGE REIMBURSEMENT	$0	25.0%	75.0%	$0	$0
220 62 NATURAL GAS/PROPANE	$2,213	100.0%	0.0%	$2,213	$0
220 62 OTHER PROFESSIONAL SERVICES	$0	25.0%	75.0%	$0	$0
220 62 PERMITS & FEES	$46	20.9%	79.1%	$10	$37
220 62 POSTAGE	$250	100.0%	0.0%	$250	$0
220-43110 SEWER INSPECTIONS (System Development Fees)	$4,323	100.0%	0.0%	$4,323	$0
220 62 PUBLIC NOTICES & ADVERTISING	$0	100.0%	0.0%	$0	$0
220 62 REIMBURSED EXPENSES	$0	100.0%	0.0%	$0	$0
220 62 SAMPLING & ANALYSIS	$7,191	100.0%	0.0%	$7,191	$0
220 62 SLUDGE REMOVAL	$0	0.0%	100.0%	$0	$0
220 62 SOFTWARE LICENSING	$3,710	100.0%	0.0%	$3,710	$0
220 62 TRAINING & CERTIFICATIONS	$214	25.0%	75.0%	$54	$161
220 62 TRAVEL EXPENSES	$0	25.0%	75.0%	$0	$0
220 63 CHEMICALS	$6,928	0.0%	100.0%	$0	$6,928
220 63 CLOTHING	$346	25.0%	75.0%	$87	$260
220 63 EDUCATIONAL SUPPLIES	$0	25.0%	75.0%	$0	$0

Table 8 - Average Cost Classification

Cost Items	Cost During Average Rate Structure Basis Year	Fixed Cost Percentage	Variable Cost Percentage	Average Fixed Cost	Average Variable Cost
220 63 FUEL & OIL	$6,136	25.0%	75.0%	$1,534	$4,602
220 63 JANITORIAL SUPPLIES	$909	100.0%	0.0%	$909	$0
220 63 MEDICAL & DRUG SUPPLIES	$0	25.0%	75.0%	$0	$0
220 63 MEETING AND MEAL EXPENSES	$0	100.0%	0.0%	$0	$0
220 63 OFFICE AND MEETING SUPPLIES	$0	100.0%	0.0%	$0	$0
220 63 OPERATING SUPPLIES	$7,844	25.0%	75.0%	$1,961	$5,883
220 63 TOOLS & MAINTENANCE SUPPLIES	$1,832	25.0%	75.0%	$458	$1,374
220 64 AUTOMOTIVE EQUIPMENT	$25	25.0%	75.0%	$6	$19
220 64 CAPITAL IMPROVEMENTS	$0	50.0%	50.0%	$0	$0
220 64 EQUIPMENT RENTAL	$4	25.0%	75.0%	$1	$3
220 64 MACHINERY & EQUIPMENT	$17	25.0%	75.0%	$4	$12
220 64 OFFICE/COMPUTER EQUIPMENT	$0	100.0%	0.0%	$0	$0
220 64 OTHER EQUIPMENT	$30	25.0%	75.0%	$7	$22
220 65 EXPENDITURE CONTROL	$0	20.9%	79.1%	$0	$0
220 68 DEBT SERVICE	$0	50.0%	50.0%	$0	$0
220 69 TRANSFER TO OTHER FUNDS	$72,540	100.0%	0.0%	$72,540	$0
Annual Payment to Repair & Replacement (Table 7)	$133,773	25.0%	75.0%	$33,443	$100,330
User Charge Analysis Services	$0	20.9%	79.1%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	$389,907	0.0%	100.0%	$0	$389,907
Grand Total Costs, Weighted Avg Percentages	$1,081,110	20.9%	79.1%	$226,147	$854,963

Bases for Cost to Serve Rate Structure

			100%	$1,081,110	
Number of Customers During Year Defined Above =	2,174	Inflow and Infiltration is Estimated at			34%
Billed Volume, in Gallons, During Year Defined Above =	111,352,132	Inflow and Infiltration is Estimated at This Percentage of Average Cost			69%
Average Fixed Cost per User per Month During Year Defined Above =	$8.67	Resulting Cost of Inflow and Infiltration			$298,096
Average Variable Cost to Produce per 1,000 Gallons During Year Defined Above =	$7.68	Test Year Customer Metered Volume, in Gallons			103,156,000
Gallons per Billing Cycle Used by Average Residential Customer =	4,019	+ Test Year Inflow and Infiltration, in Gallons			52,043,000
		Total Test Year Volume, in Gallons, From Master Meter Readings			155,199,000

Table 9 - Marginal Cost Classification

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

The utility incurs "marginal" costs. These costs are unavoidable. Thus, the utility must collect minimal fees from various customers to "break even" on a marginal cost basis. Costs vary by customer type and volume used.

In the calculations below, it is assumed that marginal fixed costs are being calculated for: Not Applicable

In the calculations below, it is assumed that marginal costs are being calculated for: Cost of I&I

The marginal rate structure basis year runs from: 1/1/2022 through 12/31/2022

Cost Items	Average Fixed Cost	Average Variable Cost	Marginal Fixed Cost Percentage	Marginal Variable Cost Percentage	Marginal Fixed Cost	Marginal Variable Cost
220 61 CHARGE IN OF SALARIES	$83,741	$251,222	50%	0%	$41,870	$0
220 62 AUTOMOTIVE MAINTENANCE	$596	$1,788	50%	0%	$298	$0
220 62 CREDIT CARD PROCESSING FEES	$1,096	$0	100%	0%	$1,096	$0
220 62 DUES & MEMBERSHIPS	$0	$0	100%	0%	$0	$0
220 62 ELECTRICITY	$0	$84,964	0%	100%	$0	$84,964
220 62 ENGINEERING SERVICES	$0	$0	50%	0%	$0	$0
220 62 EQUIPMENT REPAIR SERVICES	$547	$1,641	50%	0%	$273	$0
220 62 INSPECTION & CLEANING SERVICES	$986	$2,958	50%	0%	$493	$0
220 62 INTERNET/CABLE/PHONE	$0	$0	100%	0%	$0	$0
220 62 IT SERVICES	$165	$0	100%	0%	$165	$0
220 62 LABORATORY SERVICES	$0	$0	100%	100%	$0	$0
220 62 LEASE OF OFFICE EQUIPMENT	$787	$0	100%	0%	$787	$0
220 62 LIABILITY INSURANCE	$8,579	$0	100%	0%	$8,579	$0
220 62 MAINTENANCE SERVICES	$951	$2,852	50%	100%	$475	$2,852
220 62 MILEAGE REIMBURSEMENT	$0	$0	50%	100%	$0	$0
220 62 NATURAL GAS/PROPANE	$2,213	$0	100%	0%	$2,213	$0
220 62 OTHER PROFESSIONAL SERVICES	$0	$0	100%	0%	$0	$0
220 62 PERMITS & FEES	$10	$37	100%	0%	$10	$0
220 62 POSTAGE	$250	$0	100%	0%	$250	$0
220-43110 SEWER INSPECTIONS (System Development Fees)	$4,323	$0	100%	0%	$4,323	$0
220 62 PUBLIC NOTICES & ADVERTISING	$0	$0	100%	0%	$0	$0
220 62 REIMBURSED EXPENSES	$0	$0	50%	0%	$0	$0
220 62 SAMPLING & ANALYSIS	$7,191	$0	50%	0%	$3,595	$0
220 62 SLUDGE REMOVAL	$0	$0	0%	100%	$0	$0
220 62 SOFTWARE LICENSING	$3,710	$0	100%	0%	$3,710	$0
220 62 TRAINING & CERTIFICATIONS	$54	$161	100%	0%	$54	$0
220 62 TRAVEL EXPENSES	$0	$0	100%	0%	$0	$0

Table 9 - Marginal Cost Classification

Cost Items	Average Fixed Cost	Average Variable Cost	Marginal Fixed Cost Percentage	Marginal Variable Cost Percentage	Marginal Fixed Cost	Marginal Variable Cost
220 63 CHEMICALS	$0	$6,928	0%	100%	$0	$6,928
220 63 CLOTHING	$87	$260	50%	0%	$43	$0
220 63 EDUCATIONAL SUPPLIES	$0	$0	50%	0%	$0	$0
220 63 FUEL & OIL	$1,534	$4,602	50%	0%	$767	$0
220 63 JANITORIAL SUPPLIES	$909	$0	50%	0%	$455	$0
220 63 MEDICAL & DRUG SUPPLIES	$0	$0	50%	0%	$0	$0
220 63 MEETING AND MEAL EXPENSES	$0	$0	100%	0%	$0	$0
220 63 OFFICE AND MEETING SUPPLIES	$0	$0	100%	0%	$0	$0
220 63 OPERATING SUPPLIES	$1,961	$5,883	50%	100%	$980	$5,883
220 63 TOOLS & MAINTENANCE SUPPLIES	$458	$1,374	50%	0%	$229	$0
220 64 AUTOMOTIVE EQUIPMENT	$6	$19	50%	0%	$3	$0
220 64 CAPITAL IMPROVEMENTS	$0	$0	50%	0%	$0	$0
220 64 EQUIPMENT RENTAL	$1	$3	50%	0%	$0	$0
220 64 MACHINERY & EQUIPMENT	$4	$12	50%	0%	$2	$0
220 64 OFFICE/COMPUTER EQUIPMENT	$0	$0	100%	0%	$0	$0
220 64 OTHER EQUIPMENT	$7	$22	50%	0%	$4	$0
220 65 EXPENDITURE CONTROL	$0	$0	100%	0%	$0	$0
220 68 DEBT SERVICE	$0	$0	100%	0%	$0	$0
220 69 TRANSFER TO OTHER FUNDS	$72,540	$0	100%	0%	$72,540	$0
Annual Payment to Repair & Replacement (Table 7)	$33,443	$100,330	50%	100%	$16,722	$100,330
User Charge Analysis Services	$0	$0	100%	100%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	$0	$389,907	100%	100%	$0	$389,907
Grand Total All Costs	$226,147	$854,963			$159,936	$590,864
	$1,081,110				$750,801	

Marginal Fixed and Variable Cost Bases (For the Customer Type Listed Above)

	Monthly Marginal Fixed Cost per Customer	Marginal Variable Cost per 1,000 Gallons
	$6.13	
Marginal Fixed Cost as a Percent of Total Fixed Cost:	71%	$5.31
Marginal Variable Cost as a Percent of Total Variable Cost:		69%

Table 10 - Initial Rate Adjustments and Resulting Revenues
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table calculates a new set of user charge rates and the revenues they would generate.

After rate adjustments are made, customers will be billed monthly.

Sales to be billed this year: Sales at the current (Test Year) rates (gray highlighted column) will apply until rates are adjusted. Sales at the modeled rates (yellow highlighted column) would apply if the modeled rates are adopted. The grand total "blended" sales revenues are the total revenues generated by the two different sets of rates. Those revenues show in the right-most column.

Customer Class, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Sales This Year at Current Rates	Customers Within This Volume Range	Minimum Charge for Calculation Purposes	New Usage Allowance in 1,000 Gallons	New Unit Charge per 1,000 Gallons	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
Residential 1 Minimum	-111,000	-1	-$987	0	$5.07	0.000	$4.49	-$3	-$990
	0	999	$0	0	$5.07	0.000	$4.49	$277	$277
	1,000	1,999	$138,019	213	$5.07	0.000	$4.49	$281	$138,300
	2,000	2,999	$151,201	351	$5.07	0.000	$4.49	$252	$151,453
	3,000	3,999	$139,430	391	$5.07	0.000	$4.49	$201	$139,631
	4,000	4,999	$107,516	328	$5.07	0.000	$4.49	$142	$107,658
	5,000	5,999	$73,605	236	$5.07	0.000	$4.49	$92	$73,697
	6,000	6,999	$44,149	141	$5.07	0.000	$4.49	$56	$44,205
	7,000	7,999	$26,330	83	$5.07	0.000	$4.49	$34	$26,364
	8,000	8,999	$15,925	49	$5.07	0.000	$4.49	$21	$15,946
	9,000	9,999	$9,565	28	$5.07	0.000	$4.49	$13	$9,578
	10,000	14,999	$16,579	45	$5.07	0.000	$4.49	$25	$16,604
	15,000	19,999	$3,520	7	$5.07	0.000	$4.49	$6	$3,526
	20,000	24,999	$1,292	2	$5.07	0.000	$4.49	$3	$1,295
	25,000	29,999	$877	1	$5.07	0.000	$4.49	$2	$879
	30,000	39,999	$723	1	$5.07	0.000	$4.49	$2	$725
	40,000	49,999	$534	0	$5.07	0.000	$4.49	$1	$535
	50,000	59,999	$534	0	$5.07	0.000	$4.49	$1	$535
	60,000	69,999	$534	0	$5.07	0.000	$4.49	$1	$535
	70,000	79,999	$534	0	$5.07	0.000	$4.49	$1	$535
	80,000	89,999	$534	0	$5.07	0.000	$4.49	$1	$535
	90,000	99,999	$534	0	$5.07	0.000	$4.49	$1	$535
	100,000	109,999	$534	0	$5.07	0.000	$4.49	$1	$535
	110,000	119,999	$557	0	$5.07	0.000	$4.49	$1	$559
	120,000	129,999	$356	0	$5.07	0.000	$4.49	$1	$357
	130,000	139,999	$356	0	$5.07	0.000	$4.49	$1	$357
	140,000	276,000	$3,232	1	$5.07	0.000	$4.49	$9	$3,240
Residential 2 Minimums	0	999	$1,539	3	$5.07	0.000	$4.49	$3	$1,542
	1,000	1,999	$1,990	3	$5.07	0.000	$4.49	$2	$1,992
	2,000	2,999	$1,149	1	$5.07	0.000	$4.49	$2	$1,151
	3,000	3,999	$1,486	2	$5.07	0.000	$4.49	$2	$1,488
	4,000	4,999	$818	1	$5.07	0.000	$4.49	$1	$819
	5,000	5,999	$628	1	$5.07	0.000	$4.49	$1	$629
	6,000	6,999	$456	0	$5.07	0.000	$4.49	$1	$457
	7,000	7,999	$575	1	$5.07	0.000	$4.49	$1	$576
	8,000	8,999	$403	0	$5.07	0.000	$4.49	$1	$404
	9,000	9,999	$249	0	$5.07	0.000	$4.49	$1	$250
	10,000	14,999	$1,878	2	$5.07	0.000	$4.49	$3	$1,880
	15,000	19,999	$705	0	$5.07	0.000	$4.49	$2	$707
	20,000	24,999	$818	1	$5.07	0.000	$4.49	$1	$819
	25,000	29,999	$350	0	$5.07	0.000	$4.49	$1	$350
	30,000	34,999	$314	0	$5.07	0.000	$4.49	$0	$315
	35,000	44,999	$296	0	$5.07	0.000	$4.49	$0	$297

Table 10 - Initial Rate Adjustments and Resulting Revenues

Customer Class, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Sales This Year at Current Rates	Customers Within This Volume Range	Minimum Charge for Calculation Purposes	New Usage Allowance in 1,000 Gallons	New Unit Charge per 1,000 Gallons	Sales This Year at Modeled Rates	Grand Total "Blended" Sales This Year
Residential 4 Minimums	0	999	$0	0	$5.07	0.000	$4.49	$0	$0
	1,000	1,999	$53	0	$5.07	0.000	$4.49	$0	$54
	2,000	2,999	$53	0	$5.07	0.000	$4.49	$0	$54
	3,000	3,999	$53	0	$5.07	0.000	$4.49	$0	$54
	4,000	4,999	$53	0	$5.07	0.000	$4.49	$0	$54
	5,000	5,999	$126	0	$5.07	0.000	$4.49	$0	$126
	6,000	6,999	$339	0	$5.07	0.000	$4.49	$0	$339
	7,000	7,999	$394	0	$5.07	0.000	$4.49	$0	$394
	8,000	8,999	$81	0	$5.07	0.000	$4.49	$0	$81
	9,000	9,999	$4	0	$5.07	0.000	$4.49	$0	$4
	10,000	14,999	$77	0	$5.07	0.000	$4.49	$0	$77
Residential 6 Minimums	0	999	$0	0	$5.07	0.000	$4.49	$0	$0
	1,000	1,999	$462	0	$5.07	0.000	$4.49	$0	$462
Residential 8 Minimums	0	999	$0	0	$5.07	0.000	$4.49	$0	$0
	1,000	1,999	$53	0	$5.07	0.000	$4.49	$0	$54
	2,000	2,999	$53	0	$5.07	0.000	$4.49	$0	$54
	3,000	3,999	$53	0	$5.07	0.000	$4.49	$0	$54
	4,000	4,999	$53	0	$5.07	0.000	$4.49	$0	$54
	5,000	5,999	$53	0	$5.07	0.000	$4.49	$0	$54
	6,000	6,999	$53	0	$5.07	0.000	$4.49	$0	$54
	7,000	7,999	$53	0	$5.07	0.000	$4.49	$0	$54
	8,000	8,999	$53	0	$5.07	0.000	$4.49	$0	$54
	9,000	9,999	$53	0	$5.07	0.000	$4.49	$0	$54
	10,000	14,999	$267	0	$5.07	0.000	$4.49	$1	$268
	15,000	19,999	$267	0	$5.07	0.000	$4.49	$1	$268
	20,000	24,999	$1,445	1	$5.07	0.000	$4.49	$1	$1,445
	25,000	29,999	$89	0	$5.07	0.000	$4.49	$0	$89
	30,000	34,999	$616	0	$5.07	0.000	$4.49	$0	$616
Residential 12 Minimums	0	999	$0	0	$5.07	0.000	$4.49	$0	$0
	1,000	1,999	$53	0	$5.07	0.000	$4.49	$0	$54
	2,000	2,999	$53	0	$5.07	0.000	$4.49	$0	$54
	3,000	3,999	$53	0	$5.07	0.000	$4.49	$0	$54
	4,000	4,999	$53	0	$5.07	0.000	$4.49	$0	$54
	5,000	5,999	$53	0	$5.07	0.000	$4.49	$0	$54
	6,000	6,999	$53	0	$5.07	0.000	$4.49	$0	$54
	7,000	7,999	$53	0	$5.07	0.000	$4.49	$0	$54
	8,000	8,999	$53	0	$5.07	0.000	$4.49	$0	$54
	9,000	9,999	$53	0	$5.07	0.000	$4.49	$0	$54
	10,000	14,999	$267	0	$5.07	0.000	$4.49	$1	$268
	15,000	19,999	$2,007	1	$5.07	0.000	$4.49	$1	$2,007
	20,000	24,999	$941	0	$5.07	0.000	$4.49	$0	$941
Total Rate Revenue at Current Rates			$829,768			Total Rate Revenue at Modeled Rates		$1,605	
Prorated capacity surcharges from Table 16 (minimum charges above do not include them)									$804
Total Blended Rate Revenues for the Year [2]									$832,176

Note 1, New Minimum Charge Base Rates: If meter or connection size-based minimum charges are to be used, and the user classes modeled above include meter or connection sizes, the amounts shown in this column include meter or connection size surcharges as calculated in Table 16. Either way, the narrative report includes the rates and surcharges to assess.

Note 2, Blended Rate Revenues: During the year when rates will be adjusted, rate revenues generated will be "blended" revenues - part collected at the current rates and part collected at the adjusted rates. The table above calculates both kinds of revenue and totals them in the right-most column. Therefore, the anticipated timing of rate adjustment shown at the top of this table will cause rates to be charged as follows:

12.0	months at the old user charge rates	and	0.0	months at the new user charge rates.

Table 11 - Capacity Costs

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

System capacity and connection costs WILL be recovered in one way by default, or a combination of ways by design. That could be through regular user fees, in which case existing customers pay the costs to bring on new customers. It could be through system development or connection fees, in which case new customers pay "up front" for the capacity they are granted. It could be through on-going capacity surcharges added to minimum charges, preferably based on meter or connection size, in which case each customer pays for the capacity they are granted over time. Or, it could be by a combination of these. This table shows capacity costs to expect. From these costs, system development fees and surcharges were developed in Tables 13 through 16.

Peak and Base Flow Capacity Costs

	Fixed Assets Original Value (Capacity Cost)	% of Value Attributable to Peak Flow Capacity	Peak Flow Capacity Cost	Annual Peak Flow Capacity Cost (40-year Depreciation)	% of Value Attributable to Base Flow Capacity	Base Flow Capacity Cost	Annual Base Flow Capacity Cost (40-year Depreciation)
	$20,137,500	50.0%	$10,068,750	$586,788	50.0%	$10,068,750	$586,788
Totals	$20,137,500		$10,068,750	$586,788		$10,068,750	$586,788

How Capacity Costs Will Be Recovered

These costs are modeled to be recovered from system development fees in Table 14

Peak Flow Capacity Costs to be Recovered by System Development Fees

3.00%	Target Percentage of Costs to Recover
$17,604	Target Portion of Costs to Recover
$489	Cost per Peak Flow Capacity Share

Base Flow Capacity Costs to be Recovered by System Development Fees

12.875%	Target Percentage of Costs to Recover
$75,549	Target Portion of Costs to Recover
$2,361	Base Capacity Cost per New Customer Connected

In addition to calculation of the capacity cost for each new connection based on the unit cost above, the system development fee for each new connection should also include recovery of the following costs:

$100	Average Field Cost per New Connection
$50	Average Administration Cost per New Connection
$150	Field and Admin Cost per New Connection
$2,511	Base Cost to Recover per New Connection

These costs are modeled to be recovered from minimum charge surcharges in Table 16

Peak Flow Capacity Costs to be Recovered by Minimum Charge Surcharges

50.0%	Target Percentage of Costs to Recover
$293,394	Target Portion of Costs to Recover in One Full Year
$24,450	Target Portion of Costs to Recover in Monthly Surcharges
$10.87	Monthly Surcharge per Peak Flow Capacity Share

Base Flow Capacity Costs to be Recovered by Minimum Charge Surcharges

0.0%	Target Percentage of Costs to Recover
$0	Target Portion of Costs to Recover in One Full Year
$0	Target Portion of Costs to Recover in Monthly Surcharges
$0.00	Monthly Base Flow Surcharge per Bill

Note: Non-capital costs, such as field costs for inspection of connections and administration costs, should be recovered by fees charged for providing the services involved. These costs are in addition to peak flow capacity costs. If your system's basic costs to sign up and connect new customers is different than assumed above, adjust your final fees accordingly.

Table 13 - System Development Fees
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table calculates system development fees to charge each meter size.

Note: Larger meter sizes are available in two or more types, each having different flow capacities. To be conservative when projecting revenues, it was assumed all meters in use are of the lowest capacity types. However, when setting fees, they should be based upon the type of meter in use at each location.

Meter Size	Meter Type	Meter Size in Inches	Meter Size in Square Inches	AWWA Capacity "Share" Factor, Compared to 5/8 Inch Meter	Foot Notes	Adjusted Peak Capacity Cost Each Meter Size	Base Capacity Cost From Table 11	Peak Plus Base Capacity Cost	Field and Admin Cost per New Connection	System Development Fee
In-City Meters										
Five Eighths	Displacement	0.625	0.307	1.0		$489	$2,361	$2,850	$150	$3,000
Three Quarters	Displacement	0.750	0.442	1.0	1	$489	$2,361	$2,850	$150	$3,000
One Inch	Displacement	1.000	0.785	2.5		$1,223	$2,361	$3,583	$150	$3,733
One & a Half Inch	Displacement	1.500	1.767	5.0		$2,445	$2,361	$4,806	$150	$4,956
Two Inch	Displacement	2.000	3.142	8.0		$3,912	$2,361	$6,273	$150	$6,423
Two & a Half Inch	Displacement	2.500	4.909	12.5	2	$6,113	$2,361	$8,474	$150	$8,624
Three Inch	Singlet	3.000	7.069	16.0		$7,824	$2,361	$10,185	$150	$10,335
Three Inch	Compound, Class I	3.000	7.069	16.0		$7,824	$2,361	$10,185	$150	$10,335
Three Inch	Turbine, Class I	3.000	7.069	17.5		$8,558	$2,361	$10,919	$150	$11,069
Four Inch	Singlet	4.000	12.566	25.0		$12,225	$2,361	$14,586	$150	$14,736
Four Inch	Compound, Class I	4.000	12.566	25.0		$12,225	$2,361	$14,586	$150	$14,736
Four Inch	Turbine, Class I	4.000	12.566	31.0		$15,159	$2,361	$17,520	$150	$17,670
Six Inch	Singlet	6.000	28.274	50.0		$24,451	$2,361	$26,812	$150	$26,962
Six Inch	Compound, Class I	6.000	28.274	50.0		$24,451	$2,361	$26,812	$150	$26,962
Six Inch	Turbine, Class I	6.000	28.274	65.0		$31,786	$2,361	$34,147	$150	$34,297
Eight Inch	Compound, Class I	8.000	50.266	80.0		$39,121	$2,361	$41,482	$150	$41,632
Eight Inch	Turbine, Class I	8.000	50.266	140.0		$68,462	$2,361	$70,823	$150	$70,973
Ten Inch	Turbine, Class II	10.000	78.540	210.0		$102,693	$2,361	$105,054	$150	$105,204
Out of City Meters										
Five Eighths	Displacement	0.625	0.307	1.0		$734	$2,361	$3,094	$150	$3,244
Three Quarters	Displacement	0.750	0.442	1.0	1	$734	$2,361	$3,094	$150	$3,244
One Inch	Displacement	1.000	0.785	2.5		$1,834	$2,361	$4,195	$150	$4,345
One & a Half Inch	Displacement	1.500	1.767	5.0		$3,668	$2,361	$6,029	$150	$6,179
Two Inch	Displacement	2.000	3.142	8.0		$5,868	$2,361	$8,229	$150	$8,379
Two & a Half Inch	Displacement	2.500	4.909	12.5	2	$9,169	$2,361	$11,530	$150	$11,680
Three Inch	Singlet	3.000	7.069	16.0		$11,736	$2,361	$14,097	$150	$14,247
Three Inch	Compound, Class I	3.000	7.069	16.0		$11,736	$2,361	$14,097	$150	$14,247
Three Inch	Turbine, Class I	3.000	7.069	17.5		$12,837	$2,361	$15,198	$150	$15,348
Four Inch	Singlet	4.000	12.566	25.0		$18,338	$2,361	$20,699	$150	$20,849
Four Inch	Compound, Class I	4.000	12.566	25.0		$18,338	$2,361	$20,699	$150	$20,849
Four Inch	Turbine, Class I	4.000	12.566	31.0		$22,739	$2,361	$25,100	$150	$25,250
Six Inch	Singlet	6.000	28.274	50.0		$36,676	$2,361	$39,037	$150	$39,187
Six Inch	Compound, Class I	6.000	28.274	50.0		$36,676	$2,361	$39,037	$150	$39,187
Six Inch	Turbine, Class I	6.000	28.274	65.0		$47,679	$2,361	$50,040	$150	$50,190
Eight Inch	Compound, Class I	8.000	50.266	80.0		$58,682	$2,361	$61,043	$150	$61,193
Eight Inch	Turbine, Class I	8.000	50.266	140.0		$102,693	$2,361	$105,054	$150	$105,204
Ten Inch	Turbine, Class II	10.000	78.540	210.0		$154,040	$2,361	$156,401	$150	$156,551

Foot Notes, which apply to Tables 14, 15 and 16, as well:

[1] The Three-Quarter-Inch meter capacity share factor is 1.5. However, it was set equal to the Five-eighths-Inch meter because most such meters are used for residential connections. This enables a uniform system development fee for almost all residential customers.

[2] These meter sizes were not included in AWWA study results, so these values are estimates.

Table 14 - Revenues From System Development Fees
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table calculates total fee revenues that would be generated during one full year at the fees in Table 13.

Meter Size	Meter Type	Mix of New Taps in a Typical Year	Capacity Shares After Economy of Scale Adjustments	Projected Annual Growth in Capacity Shares, Adjusted for Economy of Scale	Adjusted Peak Capacity Cost Fees for One Full Year	Base Capacity Cost Fees for One Full Year	Combined Capacity-only Fee Revenues to Collect in One Year	Adjusted Admin and Field Cost Fees to Collect in One Year	**System Development Fee Revenues for One Full Year**
In-City Meters									
Five Eighths	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
Three Quarters	Displacement	31.4	1.0	31.4	$15,375	$74,230	$89,606	$4,716	**$94,322**
One Inch	Displacement	0.0	2.5	0.0	$0	$0	$0	$0	**$0**
One & a Half Inch	Displacement	0.1	5.0	0.7	$323	$312	$636	$20	**$656**
Two Inch	Displacement	0.4	8.0	3.1	$1,495	$902	$2,397	$57	**$2,455**
Two & a Half Inch	Displacement	0.0	12.5	0.0	$0	$0	$0	$0	**$0**
Three Inch	Singlet	0.0	16.0	0.5	$230	$69	$299	$4	**$304**
Three Inch	Compound, Class I	0.0	16.0	0.0	$0	$0	$0	$0	**$0**
Three Inch	Turbine, Class I	0.0	17.5	0.0	$0	$0	$0	$0	**$0**
Four Inch	Singlet	0.0	25.0	0.4	$180	$35	$214	$2	**$217**
Four Inch	Compound, Class I	0.0	25.0	0.0	$0	$0	$0	$0	**$0**
Four Inch	Turbine, Class I	0.0	31.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Singlet	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Compound, Class I	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Turbine, Class I	0.0	65.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Compound, Class I	0.0	80.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Turbine, Class I	0.0	140.0	0.0	$0	$0	$0	$0	**$0**
Ten Inch	Turbine, Class II	0.0	210.0	0.0	$0	$0	$0	$0	**$0**
	Subtotal:	32.0		36.0	$17,604	$75,549	$93,153	$4,800	**$97,953**
Out of City Meters									
Five Eighths	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
Three Quarters	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
One Inch	Displacement	0.0	2.5	0.0	$0	$0	$0	$0	**$0**
One & a Half Inch	Displacement	0.0	5.0	0.0	$0	$0	$0	$0	**$0**
Two Inch	Displacement	0.0	8.0	0.0	$0	$0	$0	$0	**$0**
Two & a Half Inch	Displacement	0.0	12.5	0.0	$0	$0	$0	$0	**$0**
Three Inch	Singlet	0.0	16.0	0.0	$0	$0	$0	$0	**$0**
Three Inch	Compound, Class I	0.0	16.0	0.0	$0	$0	$0	$0	**$0**
Three Inch	Turbine, Class I	0.0	17.5	0.0	$0	$0	$0	$0	**$0**
Four Inch	Singlet	0.0	25.0	0.0	$0	$0	$0	$0	**$0**
Four Inch	Compound, Class I	0.0	25.0	0.0	$0	$0	$0	$0	**$0**
Four Inch	Turbine, Class I	0.0	31.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Singlet	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Compound, Class I	0.0	50.0	0.0	$0	$0	$0	$0	**$0**
Six Inch	Turbine, Class I	0.0	65.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Compound, Class I	0.0	80.0	0.0	$0	$0	$0	$0	**$0**
Eight Inch	Turbine, Class I	0.0	140.0	0.0	$0	$0	$0	$0	**$0**
Ten Inch	Turbine, Class II	0.0	210.0	0.0	$0	$0	$0	$0	**$0**
	Subtotal:	0.0		0.0	$0	$0	$0	$0	**$0**
	Total:	32.0		36.0	$17,604	$75,549	$93,153	$4,800	**$97,953**

This is the amount used to calculate the "Meter Size-based System Development Fees" income in Table 3.

Table 15 - Minimum Charge Fees, Including Capacity Surcharges
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table does, essentially, the same thing as Table 13, except costs are recovered over time as minimum charge surcharges.

Uniform Adjustment to Peak Capacity Cost	$0.00

Meter Size	Meter Type	Current Number Meters This Size	Total Adjusted Capacity Shares in Each Meter Size Group	Monthly Peak Capacity-only Costs (Surcharge per Capacity Share, Including Out of City Multiplier)	Cost to Serve Minimum Calculated in Table 10	Monthly Minimum Charge	Monthly Snowbird Fee
In-City Meters							
Five Eighths	Displacement	0	0	$10.87	$5.07	$15.94	$11.27
Three Quarters	Displacement	1,965	1,965	$10.87	$5.07	$15.94	$11.27
One Inch	Displacement	0	0	$27.17	$5.07	$32.24	$22.80
One & a Half Inch	Displacement	8	41	$54.34	$5.07	$59.40	$42.01
Two Inch	Displacement	24	191	$86.94	$5.07	$92.01	$65.07
Two & a Half Inch	Displacement	0	0	$135.84	$5.07	$140.91	$99.65
Three Inch	Singlet	2	29	$173.87	$5.07	$178.94	$126.55
Three Inch	Compound, Class I	0	0	$173.87	$5.07	$178.94	$126.55
Three Inch	Turbine, Class I	0	0	$190.17	$5.07	$195.24	$138.08
Four Inch	Singlet	1	23	$271.68	$5.07	$276.74	$195.72
Four Inch	Compound, Class I	0	0	$271.68	$5.07	$276.74	$195.72
Four Inch	Turbine, Class I	0	0	$336.88	$5.07	$341.95	$241.83
Six Inch	Singlet	0	0	$543.35	$5.07	$548.42	$387.85
Six Inch	Compound, Class I	0	0	$543.35	$5.07	$548.42	$387.85
Six Inch	Turbine, Class I	0	0	$706.36	$5.07	$711.43	$503.14
Eight Inch	Compound, Class I	0	0	$869.36	$5.07	$874.43	$618.42
Eight Inch	Turbine, Class I	0	0	$1,521.38	$5.07	$1,526.45	$1,079.54
Ten Inch	Turbine, Class II	0	0	$2,282.07	$5.07	$2,287.14	$1,617.52
Out of City Meters							
Five Eighths	Displacement	0	0	$16.30	$5.07	$21.37	$15.11
Three Quarters	Displacement	0	0	$16.30	$5.07	$21.37	$15.11
One Inch	Displacement	0	0	$40.75	$5.07	$45.82	$32.41
One & a Half Inch	Displacement	0	0	$81.50	$5.07	$86.57	$61.23
Two Inch	Displacement	0	0	$130.40	$5.07	$135.47	$95.81
Two & a Half Inch	Displacement	0	0	$203.76	$5.07	$208.83	$147.69
Three Inch	Singlet	0	0	$260.81	$5.07	$265.88	$188.03
Three Inch	Compound, Class I	0	0	$260.81	$5.07	$265.88	$188.03
Three Inch	Turbine, Class I	0	0	$285.26	$5.07	$290.33	$205.33
Four Inch	Singlet	0	0	$407.51	$5.07	$412.58	$291.79
Four Inch	Compound, Class I	0	0	$407.51	$5.07	$412.58	$291.79
Four Inch	Turbine, Class I	0	0	$505.32	$5.07	$510.39	$360.96
Six Inch	Singlet	0	0	$815.03	$5.07	$820.10	$579.99
Six Inch	Compound, Class I	0	0	$815.03	$5.07	$820.10	$579.99
Six Inch	Turbine, Class I	0	0	$1,059.53	$5.07	$1,064.60	$752.91
Eight Inch	Compound, Class I	0	0	$1,304.04	$5.07	$1,309.11	$925.83
Eight Inch	Turbine, Class I	0	0	$2,282.07	$5.07	$2,287.14	$1,617.52
Ten Inch	Turbine, Class II	0	0	$3,423.11	$5.07	$3,428.18	$2,424.48

Table 16 - Revenues From Minimum Charges
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table calculates total minimum charge surcharge revenues that would be generated during one full year at the fees in Table 15.

Meter Size	Meter Type	Capacity Shares After Economy of Scale Adjustments	Current Number Meters This Size	Total Adjusted Capacity Shares	Adjusted Annual Peak Capacity-only Surcharge Revenues	Annual Base Capacity-only Surcharge Revenues	Capacity Surcharges for One Full Year
In-City Meters							
Five Eighths	Displacement	1.0	0	0	$0	$0	$0
Three Quarters	Displacement	1.0	1,965	1,965	$256,256	$0	$256,256
One Inch	Displacement	2.5	0	0	$0	$0	$0
One & a Half Inch	Displacement	5.0	8	41	$5,391	$0	$5,391
Two Inch	Displacement	8.0	24	191	$24,919	$0	$24,919
Two & a Half Inch	Displacement	12.5	0	0	$0	$0	$0
Three Inch	Singlet	16.0	2	29	$3,834	$0	$3,834
Three Inch	Compound, Class I	16.0	0	0	$0	$0	$0
Three Inch	Turbine, Class I	17.5	0	0	$0	$0	$0
Four Inch	Singlet	25.0	1	23	$2,995	$0	$2,995
Four Inch	Compound, Class I	25.0	0	0	$0	$0	$0
Four Inch	Turbine, Class I	31.0	0	0	$0	$0	$0
Six Inch	Singlet	50.0	0	0	$0	$0	$0
Six Inch	Compound, Class I	50.0	0	0	$0	$0	$0
Six Inch	Turbine, Class I	65.0	0	0	$0	$0	$0
Eight Inch	Compound, Class I	80.0	0	0	$0	$0	$0
Eight Inch	Turbine, Class I	140.0	0	0	$0	$0	$0
Ten Inch	Turbine, Class II	210.0	0	0	$0	$0	$0
		Subtotal:	2,000	2,250	$293,394	$0	$293,394
Out of City Meters							
Five Eighths	Displacement	1.0	0	0	$0	$0	$0
Three Quarters	Displacement	1.0	0	0	$0	$0	$0
One Inch	Displacement	2.5	0	0	$0	$0	$0
One & a Half Inch	Displacement	5.0	0	0	$0	$0	$0
Two Inch	Displacement	8.0	0	0	$0	$0	$0
Two & a Half Inch	Displacement	12.5	0	0	$0	$0	$0
Three Inch	Singlet	16.0	0	0	$0	$0	$0
Three Inch	Compound, Class I	16.0	0	0	$0	$0	$0
Three Inch	Turbine, Class I	17.5	0	0	$0	$0	$0
Four Inch	Singlet	25.0	0	0	$0	$0	$0
Four Inch	Compound, Class I	25.0	0	0	$0	$0	$0
Four Inch	Turbine, Class I	31.0	0	0	$0	$0	$0
Six Inch	Singlet	50.0	0	0	$0	$0	$0
Six Inch	Compound, Class I	50.0	0	0	$0	$0	$0
Six Inch	Turbine, Class I	65.0	0	0	$0	$0	$0
Eight Inch	Compound, Class I	80.0	0	0	$0	$0	$0
Eight Inch	Turbine, Class I	140.0	0	0	$0	$0	$0
Ten Inch	Turbine, Class II	210.0	0	0	$0	$0	$0
		Subtotal:	0	0	$0	$0	$0
		Total:	2,000	2,250	$293,394	$0	$293,394

Table 17 - Financial Capacity Indicators and Reserves

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table depicts the affordability of future rates, the financial health of the system and the ending balances in various (assumed) accounts for the test year and the next 10 years.

Capacity Indicators	Test Year Starting 1/1/17	Analysis (This) Year Starting 1/1/18	1st Year Starting 1/1/19	2nd Year Starting 1/1/20	3rd Year Starting 1/1/21	4th Year Starting 1/1/22	5th Year Starting 1/1/23	6th Year Starting 1/1/24	7th Year Starting 1/1/25	8th Year Starting 1/1/26	9th Year Starting 1/1/27	10th Year Starting 1/1/28
The Normal Affordability Index: Equivalent Final Monthly Bill for a 5,000 gal per Month Residential Customer	$38.24	$38.39	$38.39	$39.15	$39.94	$40.74	$41.55	$42.38	$43.23	$44.09	$44.98	$45.88
Annual Median Household Income (AMHI) Within Service Area (Projected from last available Census survey or estimated income data)	$41,746	$43,984	$46,343	$48,828	$51,446	$54,205	$57,112	$60,174	$63,401	$66,801	$70,383	$74,157
Affordability Index: Current Rates First Column, Then Proposed Rates	1.10%	1.05%	0.99%	0.96%	0.93%	0.90%	0.87%	0.85%	0.82%	0.79%	0.77%	0.74%

Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the percent of AMHI needed by a 5,000 gallon per month residential user to pay their bill. Rates near 1.0% are common in the U.S. and are generally considered affordable. Federal grant agencies generally will not consider awarding grants if this indicator is less than 2.0%. The above index is only for a 1 share customers but it should be fairly representative of all residential customers.

Low-income, Low-volume Affordability Index												
Equivalent Final Monthly Bill for a 2,000 gal per Month, Low-income Residential Customer	$24.46	$24.92	$24.92	$25.42	$25.92	$26.44	$26.97	$27.51	$28.06	$28.62	$29.19	$29.78
Income at One-half the AMHI Above	$20,873	$21,433	$22,007	$22,597	$23,203	$23,825	$24,464	$25,120	$25,793	$26,485	$27,195	$27,924
Affordability for Low-income, Low-volume: Current Rates First Column, Then Proposed Rates	1.41%	1.40%	1.36%	1.35%	1.34%	1.33%	1.32%	1.31%	1.31%	1.30%	1.29%	1.28%

This additional indicator of affordability assumes a residential customer with income at one-half of the median household income above, that income is growing at one-half the rate of the median household income and the customer uses 2,000 gallons per month. Such a customer is likely either a minimum wage, or near-minimum wage worker, or is retired and living on Social Security-only.

Estimated Operating Ratio: Current Rates First Column, Then Proposed Rates	1.81	1.74	1.59	1.48	1.48	1.51	1.52	1.52	1.55	1.56	1.55	1.58

Operating ratio (OR) goes to the ability of the utility to pay its operating expenses. A 1.0 OR is break even. Below 1.0 indicates operating in the "red." Generally, the OR should be at least 1.15 for large systems, 1.30 or more for medium systems and perhaps as high as 2.0 for small systems. Note: If the utility has or will have reserves (below,) it has more ability to pay its operating costs than the OR implies.

Estimated Coverage Ratio: Current Rates First Column, Then Proposed Rates	1.56	1.27	1.06	0.96	0.85	0.72	0.75	0.76	0.82	1.91	1.94	2.13

Coverage Ratio (CR) goes to the ability of the utility to pay its debt payments. OR applies only to years with debt service. 1.0 is break even. Generally, the CR should be at least 1.25. Note: If the utility has or will have reserves (below,) it has more ability to make debt payments than the CR implies.

Reserves	Balance Ending on 12/31/16	Balance Ending on 12/31/17	Balance Ending on 12/31/18	Balance Ending on 12/31/19	Balance Ending on 12/31/20	Balance Ending on 12/31/21	Balance Ending on 12/31/22	Balance Ending on 12/31/23	Balance Ending on 12/31/24	Balance Ending on 12/31/25	Balance Ending on 12/31/26	Balance Ending on 12/31/27	Balance Ending on 12/31/28
Cash and Cash Equivalents	$305,692	$242,514	$252,350	$289,740	$330,424	$341,259	$345,601	$353,563	$365,498	$370,274	$379,039	$392,185	$397,437
Other Liquid Assets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Undedicated Cash Assets	$305,692	$242,514	$252,350	$289,740	$330,424	$341,259	$345,601	$353,563	$365,498	$370,274	$379,039	$392,185	$397,437
Total Cash Assets Discounted for Inflation (Future Unrestricted Purchasing Power)	$305,692	$242,514	$252,350	$281,048	$310,896	$311,458	$305,959	$303,617	$304,449	$299,175	$297,070	$298,151	$302,144
Repair & Replacement	$0	-$60,000	-$45,877	-$82,765	-$21,674	$44,136	$103,439	$107,936	$47,088	$105,797	$156,876	$213,152	$192,002
Debt and CIP Reserves	$300,263	$463,542	$550,623	$578,277	$578,373	$58,149	-$76,898	-$197,059	-$318,153	-$410,566	-$220,364	-$20,422	$221,609
Sum of All Reserves	$605,955	$646,056	$757,096	$785,252	$887,123	$443,544	$372,142	$264,440	$94,433	$65,504	$315,552	$584,914	$811,048

Table 18 - Comparison of Bills Before and After Rate Adjustments

Tonganoxie, KS; Sewer Rates, Scenario 2019-2

The weighted-average revenue (bill) increase, as compared to the test year rates, for all customers combined will be 5.7%

Note: the bill increase rate above includes the effect of meter size-based minimum charge surcharges calculated in Table 15. But, the modeled bills in the table below do not, because such a table would be many times longer than this table.

In addition, the City increased rates after the test year completed, therefore, bill increases in this table are compared to the now current rates.

Comparison of a Current Rate Class With a Meter Size-based Rate Class They May Be In After Adjustments	Gallons of Use	Customers at or Above This Volume and Below Next	Cumulative Customers	The Now Current Bill for This Volume	Modeled Bill for This Volume	Bill Increase or Decrease (-)	Percent Increase or Decrease (-)
1 Minimum Now, Assume 3/4 Inch Meter Minimum After Adjustment	0	0	0	$19.87	$15.94	-$3.93	-20%
	1,000	213	213	$19.87	$20.43	$0.56	3%
	2,000	351	564	$24.46	$24.92	$0.45	2%
	3,000	391	955	$29.06	$29.41	$0.35	1%
	4,000	328	1,283	$33.65	$33.90	$0.25	1%
	5,000	236	1,519	$38.24	$38.39	$0.14	0%
	6,000	141	1,660	$42.84	$42.88	$0.04	0%
	7,000	83	1,743	$47.43	$47.37	-$0.06	0%
	8,000	49	1,793	$52.03	$51.86	-$0.17	0%
	9,000	28	1,821	$56.62	$56.35	-$0.27	0%
	10,000	45	1,866	$61.21	$60.84	-$0.38	-1%
	15,000	7	1,873	$84.18	$83.29	-$0.90	-1%
	20,000	2	1,875	$107.15	$105.74	-$1.41	-1%
	25,000	1	1,876	$130.12	$128.19	-$1.93	-1%
	30,000	1	1,877	$153.09	$150.64	-$2.45	-2%
	40,000	0	1,877	$199.03	$195.54	-$3.49	-2%
	140,000	1	1,878	$658.41	$644.54	-$13.87	-2%
6 Minimums Now, Assume 2 Inch Meter Minimum After Adjustment	0	0	0	$119.21	$92.01	-$27.21	-23%
	1,000	0	0	$119.21	$96.50	-$22.72	-19%
	2,000	0	0	$119.21	$100.99	-$18.23	-15%
	3,000	0	0	$119.21	$105.48	-$13.74	-12%
	4,000	0	0	$119.21	$109.97	-$9.25	-8%
	5,000	0	0	$119.21	$114.46	-$4.76	-4%
	6,000	0	0	$119.21	$118.95	-$0.27	0%
	10,000	0	0	$137.59	$136.91	-$0.68	0%
	20,000	0	0	$183.53	$181.81	-$1.72	-1%
	55,000	0	0	$344.31	$338.96	-$5.35	-2%
	65,000	0	0	$390.25	$383.86	-$6.39	-2%
	145,000	0	0	$757.75	$743.06	-$14.69	-2%
8 Minimums Now, Assume 4 Inch Meter Minimum After Adjustment	0	0	0	$158.95	$276.74	$117.80	74%
	1,000	0	0	$158.95	$281.23	$122.29	77%
	2,000	0	0	$158.95	$285.72	$126.78	80%
	7,000	0	0	$158.95	$308.17	$149.23	94%
	8,000	0	0	$158.95	$312.66	$153.72	97%
	9,000	0	0	$163.54	$317.15	$153.61	94%
	20,000	1	1	$214.08	$366.54	$152.47	71%
	25,000	0	1	$237.04	$388.99	$151.95	64%
	85,000	0	1	$512.67	$658.39	$145.72	28%
	145,000	0	1	$788.30	$927.79	$139.49	18%

Table 19 - User Statistics
Tonganoxie, KS; Sewer Rates, Scenario 2019-2

This table shows measures of equitability, or "fairness," of the rates as modeled in Table 10. If debt, capacity or other surcharges were also calculated but not included in Table 10, this table does not take those fees into account.

If your rates were based only on volume of service, your % of Usage and % of Revenues figures would be the same within all the classes. While rates are not set up that way, it is still useful to make comparisons on that basis. This table does that, among other things.

Normally, the % of usage figure will be lower than the % of revenue for the lower volumes of use. That will switch for the higher volumes of use. Even for declining rate structures, this switch should occur near the volume of the average residential user, typically near 5,000 gallons/month (668 cu ft).

In urban and suburban areas the average monthly use for residential or general customers can be twice that used by their rural and "old town" counterparts. Use is largely dependent upon who lives in a community. Older people living in longer established neighborhoods tend to use less volume than younger people living in more recently developed areas. As you make comparisons between different customers and customer classes, keep that, and the following statistics about your rates in mind:

4,019 **Gallons: This is the average residential customer's usage per Monthly billing cycle.**

Usage allowance is the volume "given away" with the minimum charge. The higher the allowance, the less volume the utility can sell to generate income.

103,156,000 **Gallons: This is the volume metered through customer meters that was available to be sold by the utility during the test year.**

23,727,000 **Gallons: This is the volume metered through customer meters that was given away as a usage allowance during the test year.**

$105,822 **Revenue Loss: At the unit charge rate in effect during the test year, the usage allowance 'cost' the utility this much.**

$0 **Revenue Loss: At the modeled (recommended) unit charge rates and usage allowance (if any), over a full year, that allowance would 'cost' the utility this much.**

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
Residential 1 Minimum	-111,000	-1	-55.500	-222,000	0.0	-0.2%	100.0%	0.0%	-0.2%	-0.1%	-0.2%
	0	999	0.945	0	0.0	-0.2%	100.2%	0.0%	0.0%	0.0%	17.3%
	1,000	1,999	0.887	2,556,000	213.0	2.6%	100.2%	10.6%	2.5%	16.6%	17.5%
	2,000	2,999	0.789	8,432,000	351.3	11.9%	97.4%	17.4%	8.2%	18.2%	15.7%
	3,000	3,999	0.703	14,064,000	390.7	27.4%	88.1%	19.4%	13.6%	16.8%	12.5%
	4,000	4,999	0.644	15,760,000	328.3	44.8%	72.6%	16.3%	15.3%	13.0%	8.9%
	5,000	5,999	0.603	14,160,000	236.0	60.5%	55.2%	11.7%	13.7%	8.9%	5.7%
	6,000	6,999	0.607	10,152,000	141.0	71.7%	39.5%	7.0%	9.8%	5.3%	3.5%
	7,000	7,999	0.618	6,972,000	83.0	79.4%	28.3%	4.1%	6.8%	3.2%	2.1%
	8,000	8,999	0.633	4,736,000	49.3	84.6%	20.6%	2.4%	4.6%	1.9%	1.3%
	9,000	9,999	0.667	3,060,000	28.3	88.0%	15.4%	1.4%	3.0%	1.2%	0.8%
	10,000	14,999	2.047	6,092,000	45.0	94.7%	12.0%	2.2%	5.9%	2.0%	1.5%
	15,000	19,999	3.057	1,408,000	7.0	96.3%	5.3%	0.3%	1.4%	0.4%	0.4%
	20,000	24,999	3.643	424,000	1.7	96.7%	3.7%	0.1%	0.4%	0.2%	0.2%
	25,000	29,999	3.556	428,000	1.3	97.2%	3.3%	0.1%	0.4%	0.1%	0.1%
	30,000	39,999	6.400	248,000	0.7	97.5%	2.8%	0.0%	0.2%	0.1%	0.1%
	40,000	49,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	50,000	59,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	60,000	69,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	70,000	79,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	80,000	89,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	90,000	99,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	100,000	109,999	10.000	0	0.0	97.5%	2.5%	0.0%	0.0%	0.1%	0.1%
	110,000	119,999	9.000	468,000	0.3	98.0%	2.5%	0.0%	0.5%	0.1%	0.1%
	140,000	276,000	86.500	1,812,000	0.7	100.0%	2.0%	0.0%	1.8%	0.4%	0.5%
	Totals for Class			90,550,000	1,877.7			93.2%	87.8%	88.7%	88.9%

Table 19 - User Statistics

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
Residential 2 Minimums	0	999	0.811	0	3.3	0.0%	100.0%	0.2%	0.0%	0.2%	0.2%
	1,000	1,999	0.791	36,000	3.0	2.6%	100.0%	0.1%	0.0%	0.2%	0.1%
	2,000	2,999	0.882	32,000	1.3	4.8%	97.4%	0.1%	0.0%	0.1%	0.1%
	3,000	3,999	0.767	84,000	2.3	10.8%	95.2%	0.1%	0.1%	0.2%	0.1%
	4,000	4,999	0.870	48,000	1.0	14.2%	89.2%	0.0%	0.0%	0.1%	0.1%
	5,000	5,999	0.900	40,000	0.7	17.0%	85.8%	0.0%	0.0%	0.1%	0.1%
	6,000	6,999	0.944	24,000	0.3	18.8%	83.0%	0.0%	0.0%	0.1%	0.1%
	7,000	7,999	0.882	56,000	0.7	22.7%	81.3%	0.0%	0.1%	0.1%	0.1%
	8,000	8,999	0.933	32,000	0.3	25.0%	77.3%	0.0%	0.0%	0.0%	0.0%
	10,000	14,999	3.214	320,000	2.3	47.7%	75.0%	0.1%	0.3%	0.2%	0.2%
	15,000	19,999	4.429	64,000	0.3	52.3%	52.3%	0.0%	0.1%	0.1%	0.1%
	20,000	24,999	3.333	260,000	1.0	70.7%	47.7%	0.0%	0.3%	0.1%	0.1%
	25,000	29,999	3.667	104,000	0.3	78.1%	29.3%	0.0%	0.1%	0.0%	0.0%
	30,000	34,999	4.500	136,000	0.3	87.8%	21.9%	0.0%	0.1%	0.0%	0.0%
	35,000	44,999	8.000	172,000	0.3	100.0%	12.2%	0.0%	0.2%	0.0%	0.0%
	Totals for Class			1,408,000	17.7			0.9%	1.4%	1.6%	1.3%
Residential 4 Minimums	0	999	1.000	0	0.0	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
	5,000	5,999	0.917	5,000	0.1	6.1%	100.0%	0.0%	0.0%	0.0%	0.0%
	6,000	6,999	0.636	24,000	0.3	35.4%	93.9%	0.0%	0.0%	0.0%	0.0%
	7,000	7,999	0.286	35,000	0.4	78.0%	64.6%	0.0%	0.0%	0.0%	0.0%
	8,000	8,999	0.500	8,000	0.1	87.8%	22.0%	0.0%	0.0%	0.0%	0.0%
	9,000	9,999	1.000	0	0.0	87.8%	12.2%	0.0%	0.0%	0.0%	0.0%
	10,000	14,999	0.000	10,000	0.1	100.0%	12.2%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			82,000	1.0			0.0%	0.1%	0.1%	0.1%
Residential 6 Minimums	0	999	1.000	0	0.0	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
	1,000	1,999	0.000	4,000	0.3	100.0%	100.0%	0.0%	0.0%	0.1%	0.0%
	Totals for Class			4,000	0.3			0.0%	0.0%	0.1%	0.0%
Residential 8 Minimums	0	999	1.000	0	0.0	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
	20,000	24,999	4.000	188,000	0.7	61.0%	100.0%	0.0%	0.2%	0.2%	0.0%
	25,000	29,999	5.000	0	0.0	61.0%	39.0%	0.0%	0.0%	0.0%	0.0%
	30,000	34,999	0.000	120,000	0.3	100.0%	39.0%	0.0%	0.1%	0.1%	0.0%
	Totals for Class			308,000	1.0			0.0%	0.3%	0.4%	0.2%
Residential 12 Minimums	0	999	1.000	0	0.0	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
	15,000	19,999	3.000	136,000	0.7	61.8%	100.0%	0.0%	0.1%	0.2%	0.0%
	20,000	24,999	1.000	84,000	0.3	100.0%	38.2%	0.0%	0.1%	0.1%	0.0%
	Totals for Class			220,000	1.0			0.0%	0.2%	0.4%	0.2%

Table 19 - User Statistics

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
Commercial 1 Minimum	0	999	0.714	0	31.8	0.0%	100.0%	1.6%	0.0%	0.9%	1.1%
	1,000	1,999	0.645	338,000	28.2	3.2%	100.0%	1.4%	0.3%	1.1%	0.8%
	2,000	2,999	0.699	370,000	15.4	6.8%	96.8%	0.8%	0.4%	0.7%	0.5%
	3,000	3,999	0.776	288,000	8.0	9.6%	93.2%	0.4%	0.3%	0.4%	0.3%
	4,000	4,999	0.793	276,000	5.8	12.2%	90.4%	0.3%	0.3%	0.3%	0.3%
	5,000	5,999	0.879	160,000	2.7	13.7%	87.8%	0.1%	0.2%	0.2%	0.2%
	6,000	6,999	0.914	120,000	1.7	14.9%	86.3%	0.1%	0.1%	0.2%	0.2%
	7,000	7,999	0.915	126,000	1.5	16.1%	85.1%	0.1%	0.1%	0.1%	0.2%
	8,000	8,999	0.943	88,000	0.9	16.9%	83.9%	0.0%	0.1%	0.1%	0.1%
	9,000	9,999	0.951	81,000	0.8	17.7%	83.1%	0.0%	0.1%	0.1%	0.1%
	10,000	14,999	4.069	558,000	4.0	23.1%	82.3%	0.2%	0.5%	0.5%	0.6%
	15,000	19,999	4.270	508,000	2.5	27.9%	76.9%	0.1%	0.5%	0.4%	0.4%
	20,000	24,999	4.698	221,000	0.8	30.1%	72.1%	0.0%	0.2%	0.3%	0.4%
	25,000	29,999	4.395	518,000	1.6	35.0%	69.9%	0.1%	0.5%	0.2%	0.3%
	30,000	34,999	4.642	256,000	0.7	37.5%	65.0%	0.0%	0.2%	0.2%	0.2%
	35,000	44,999	9.390	189,000	0.4	39.3%	62.5%	0.0%	0.2%	0.3%	0.4%
	45,000	54,999	9.093	446,000	0.8	43.6%	60.7%	0.0%	0.4%	0.3%	0.4%
	55,000	64,999	9.600	112,000	0.2	44.6%	56.4%	0.0%	0.1%	0.2%	0.3%
	65,000	74,999	9.209	416,000	0.5	48.6%	55.4%	0.0%	0.4%	0.2%	0.3%
	75,000	84,999	9.243	397,000	0.4	52.4%	51.4%	0.0%	0.4%	0.2%	0.3%
	85,000	94,999	9.875	91,000	0.1	53.3%	47.6%	0.0%	0.1%	0.2%	0.2%
	95,000	104,999	10.000	0	0.0	53.3%	46.7%	0.0%	0.0%	0.2%	0.2%
	105,000	114,999	9.516	330,000	0.3	56.5%	46.7%	0.0%	0.3%	0.2%	0.2%
	115,000	124,999	8.893	594,000	0.4	62.2%	43.5%	0.0%	0.6%	0.1%	0.2%
	125,000	134,999	8.565	777,000	0.5	69.6%	37.8%	0.0%	0.8%	0.1%	0.2%
	135,000	144,999	8.294	551,000	0.3	74.9%	30.4%	0.0%	0.5%	0.1%	0.1%
	145,000	256,000	56.154	2,615,000	1.1	100.0%	25.1%	0.1%	2.5%	0.4%	0.6%
	Totals for Class			10,426,000	111.1			5.5%	10.1%	8.2%	9.1%
Commercial 2 Minimums	0	999	0.500	0	1.0	0.0%	100.0%	0.0%	0.0%	0.1%	0.0%
	3,000	3,999	0.917	3,000	0.1	5.8%	100.0%	0.0%	0.0%	0.0%	0.0%
	4,000	4,999	0.273	32,000	0.7	67.3%	94.2%	0.0%	0.0%	0.0%	0.0%
	5,000	5,999	0.333	10,000	0.2	86.5%	32.7%	0.0%	0.0%	0.0%	0.0%
	6,000	6,999	1.000	0	0.0	86.5%	13.5%	0.0%	0.0%	0.0%	0.0%
	7,000	7,999	0.000	7,000	0.1	100.0%	13.5%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			52,000	2.0			0.1%	0.1%	0.1%	0.1%
Commercial 4 Minimums	0	999	1.000	0	0.0	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
	5,000	5,999	0.917	5,000	0.1	6.1%	100.0%	0.0%	0.0%	0.0%	0.0%
	6,000	6,999	0.636	24,000	0.3	35.4%	93.9%	0.0%	0.0%	0.0%	0.0%
	7,000	7,999	0.286	35,000	0.4	78.0%	64.6%	0.0%	0.0%	0.0%	0.0%
	8,000	8,999	0.500	8,000	0.1	87.8%	22.0%	0.0%	0.0%	0.0%	0.0%
	9,000	9,999	1.000	0	0.0	87.8%	12.2%	0.0%	0.0%	0.0%	0.0%
	10,000	14,999	0.000	10,000	0.1	100.0%	12.2%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			82,000	1.0			0.0%	0.1%	0.1%	0.1%

Table 19 - User Statistics

Customer or Rate Class, or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Avg. Use in Each Volume Range in 1,000 Gallons	Total Annual Use in Each Volume Range in Gallons	Customers Within This Volume Range	Cumulative Use % in This Class From Low to High	Cumulative Use % in This Class From High to Low	% Users	% Usage	% Revenue at Current Rates	% Revenue at Modeled Rates
Commercial 6 Minimums	0	999	0.583	0	0.4	0.0%	100.0%	0.0%	0.0%	0.1%	0.0%
	1,000	1,999	0.571	3,000	0.3	12.5%	100.0%	0.0%	0.0%	0.0%	0.0%
	2,000	2,999	0.500	4,000	0.2	29.2%	87.5%	0.0%	0.0%	0.0%	0.0%
	3,000	3,999	1.000	0	0.0	29.2%	70.8%	0.0%	0.0%	0.0%	0.0%
	4,000	4,999	1.000	0	0.0	29.2%	70.8%	0.0%	0.0%	0.0%	0.0%
	5,000	5,999	0.500	5,000	0.1	50.0%	70.8%	0.0%	0.0%	0.0%	0.0%
	10,000	14,999	2.000	12,000	0.1	100.0%	50.0%	0.0%	0.0%	0.0%	0.0%
	Totals for Class			24,000	1.0			0.0%	0.0%	0.2%	0.0%
	Grand Totals			103,156,000				100.00%	100.00%	100.00%	100.00%

Chart 1 - Operating Ratio

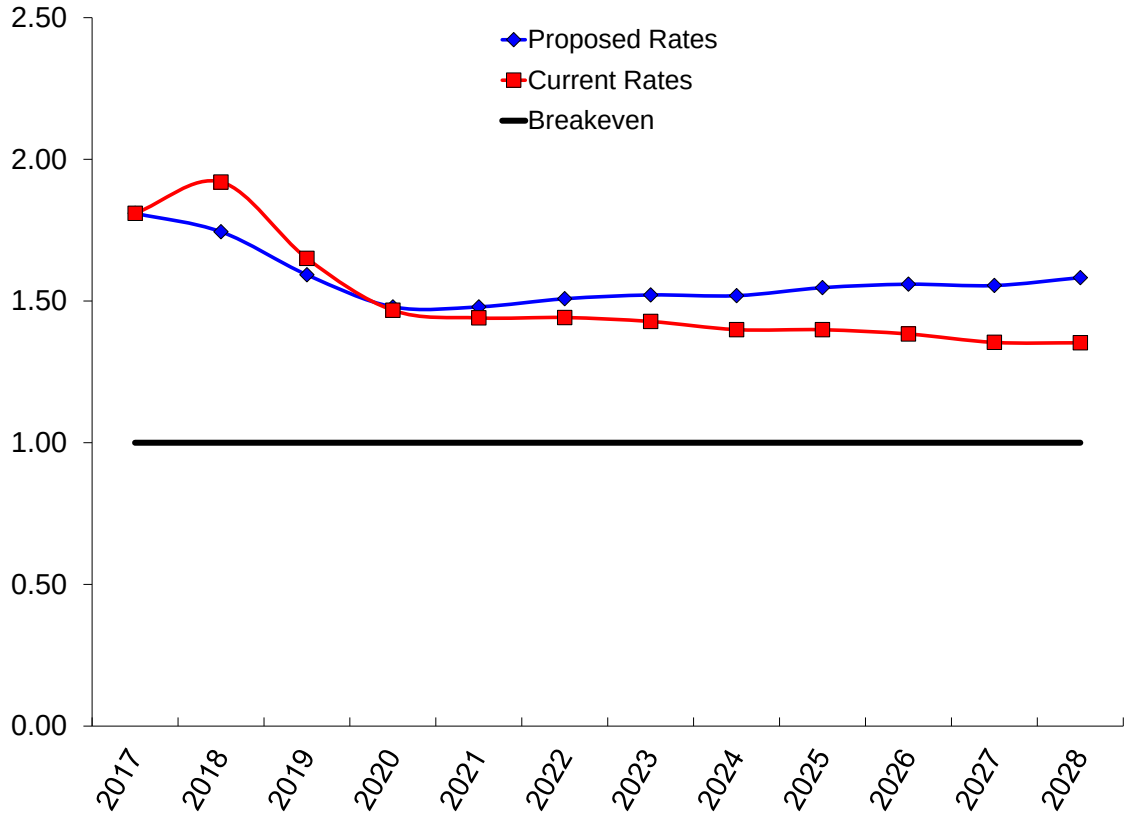


Chart 2 - Coverage Ratio

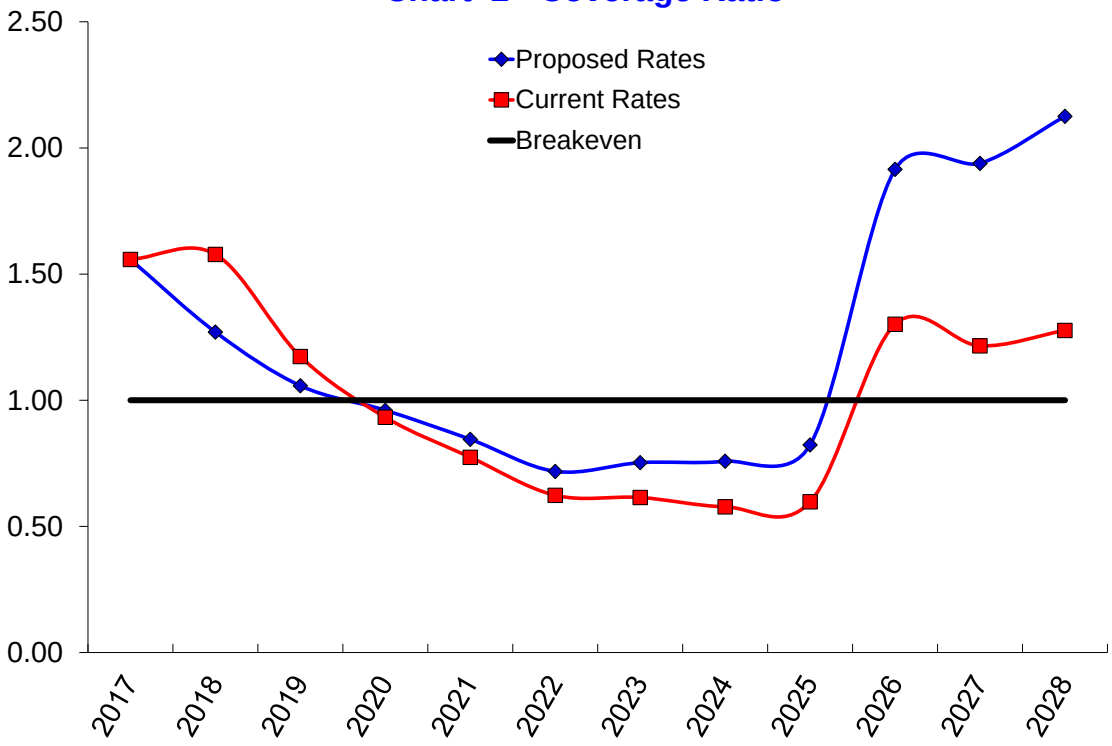


Chart 3 - Residential Users' Bills

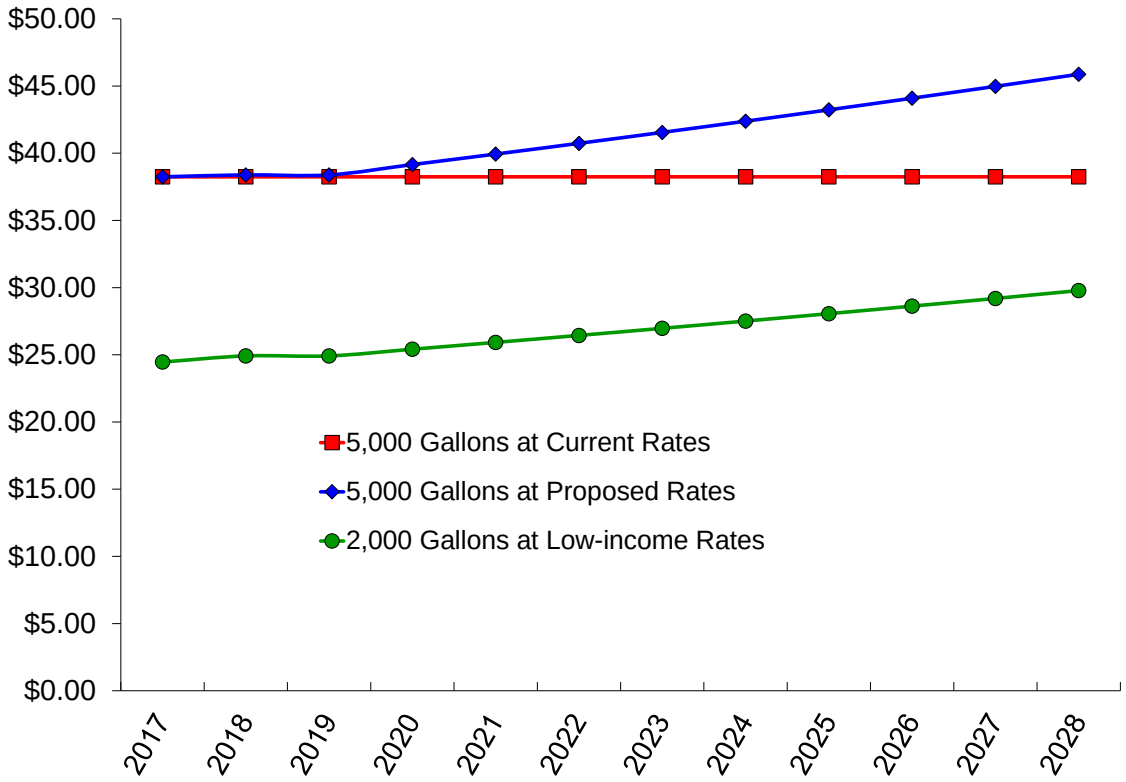


Chart 4 - Affordability

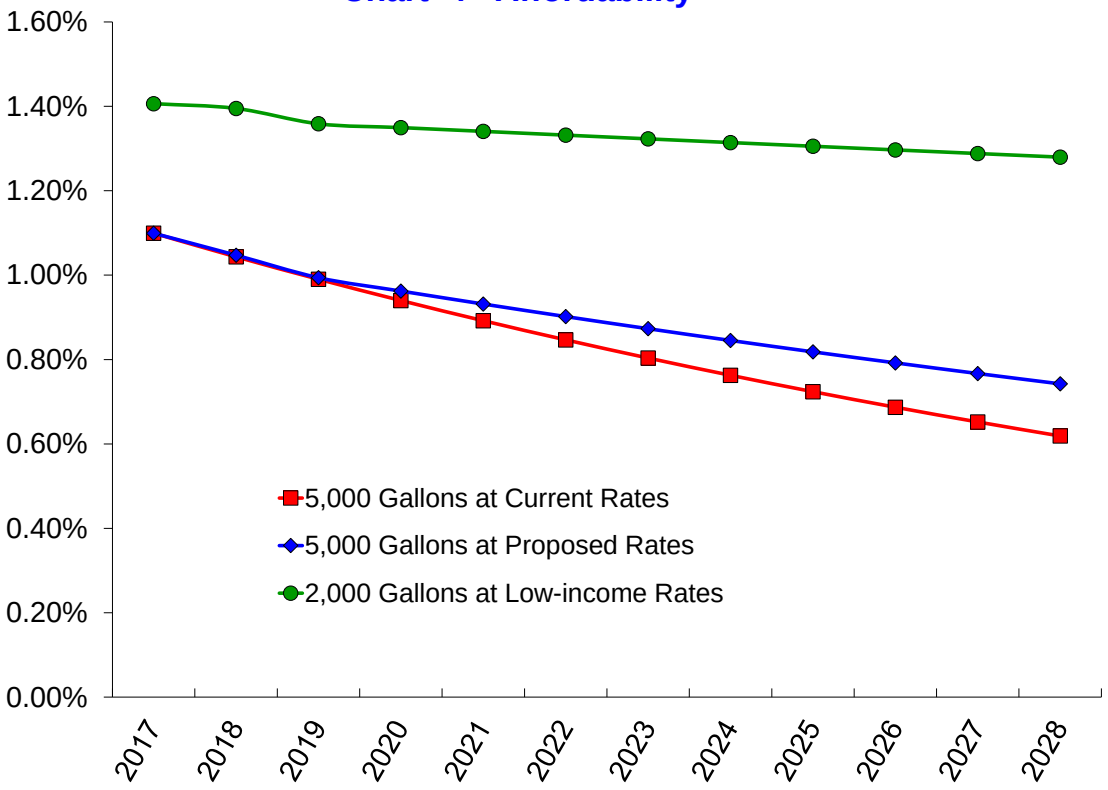


Chart 5 - Working Capital vs Goal

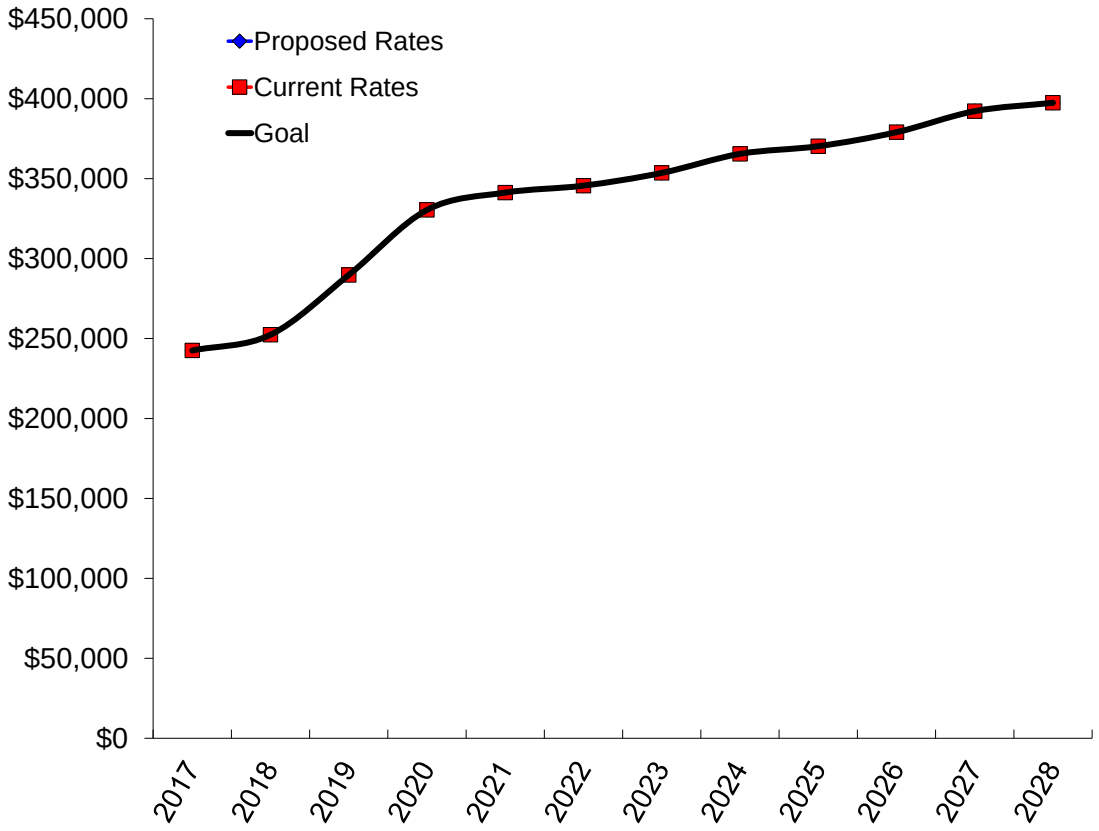


Chart 6 - Value of Cash Assets Before Inflation

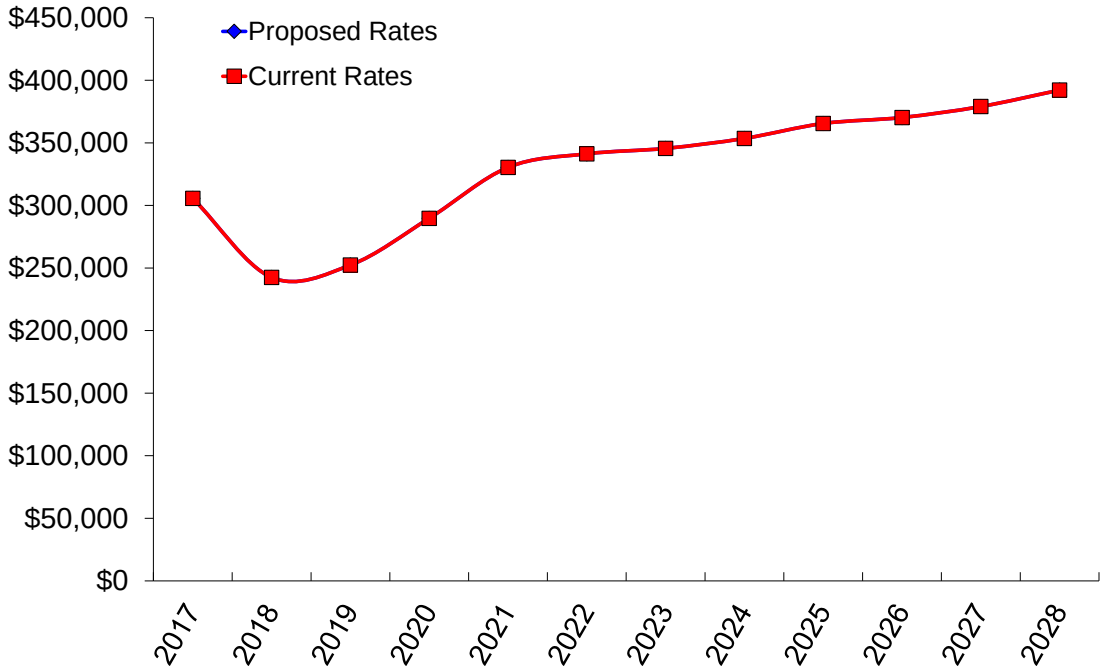


Chart 7 - Value of Cash Assets After Inflation

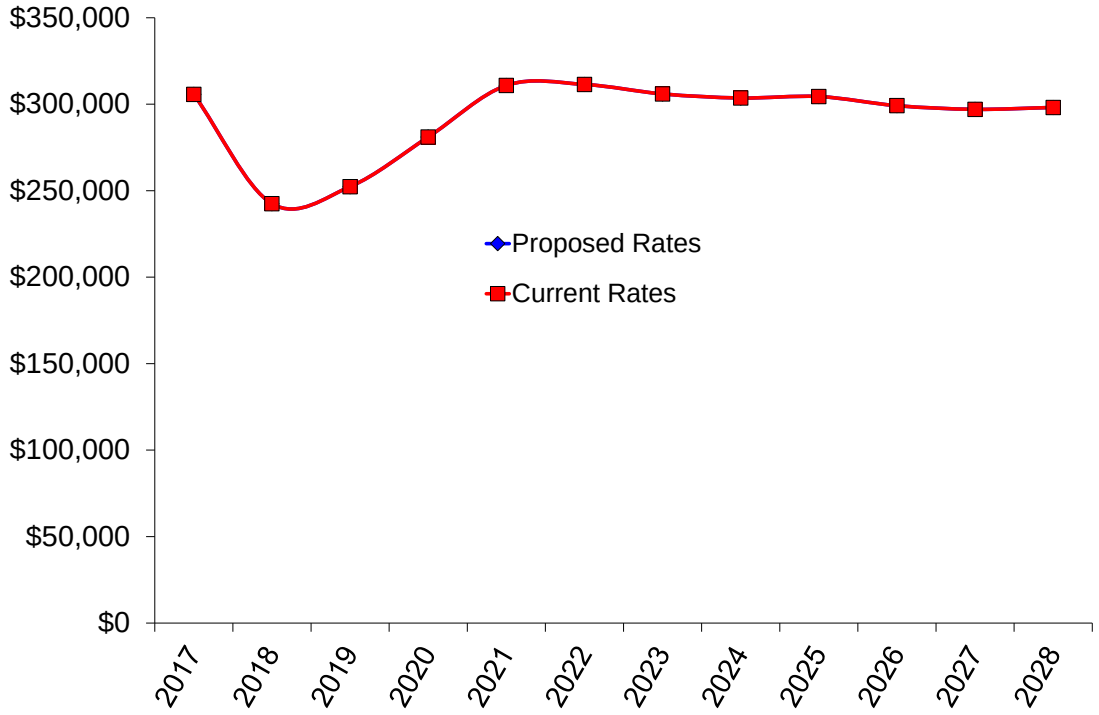


Chart 8 - Sum of All Reserves