Proposal for Water and Sewer Rate Analyses
Wardwell Water and Sewer District
Mills, Wyoming

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 Wardwell Water and Sewer District, Mills, Wyoming (later referred to as the "District" or "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.

My services will support you as you seek to satisfy the utilities' and ratepayers' 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 board 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 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 2014. 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 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, 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 24 years of experience in accounting, financial assurance and complex spreadsheet and database design. Eight of those years have been devoted to utility rate analysis.

GettingGreatRates.com serves as the rate analyst for the Wyoming RATES Program https://gettinggreatrates.com/consulting/WyRATES.pdf. A benefit of the program is that Wyoming Rural Water Association (WARWS) member systems get a 25 percent discount on all fees. WARWS verified that the District is a member system of WARWS. Therefore, you qualify for this discount.

Disclosure: Mark Pepper, the Executive Director of WARWS has known and worked with me for several years to present this program. Mr. Pepper is also on the District's board. However, Mr. Pepper has requested no special treatment for the District, and I would not give the District special treatment even if he had. It is my policy to treat all clients and potential clients the same. I do not take advantage of any nor do I give special favors.

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.

Insurance

The firm carries the following insurance:

- Professional liability, $2,000,000 limit, United States Liability Insurance Company (USLI)
- General liability, $1,000,000 limit, United States Liability Insurance Company (USLI)
- Auto liability, $1,000,000 limit, American Family Insurance Company

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.
- 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 board meeting. That is especially useful when I analyze more than one utility.

You may add or drop service packages at any time.

Approach and Timeline

I have scoped your situation. I have a clear idea of how the analyses need to be done to arrive at fair and adequate rates. However, as the project proceeds, I or you may discover that conditions are different than they first appeared. Or, you may decide you desire a different rate structure than I will initially propose. Such things happen. Regardless of how the project unfolds, I will carry you all the way through to a rate structure and level that works for you.

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, make some interim decisions as the project proceeds and proof analysis models and draft reports. That takes time. Completion time is only slightly affected by my workload. Generally, we can move analyses along almost as fast as data and guidance are sent to us. If we start soon and you gather data quickly, we can have your analyses and report done by November 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. When your staff has difficulty understanding what data I need or how to get it, I will talk them through it. 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. Your situation and needs are simpler than most, so I will almost certainly build in some rate simplifications and convenience features. 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 you want to see.
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 board in person. While there I would also like to meet with staff to discuss how to make needed changes to billing, equipment replacement scheduling, capital improvements planning 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 board 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 my WARWS contacts informed of my activities through the RATES Program. Therefore, I copy them on proposals, invoices, rate analysis reports and other communications of similar importance. 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 after the project is complete, they have little call for discussing your situation anyway. Sharing with them is focused on enabling them to oversight my work in real time.
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 this to board 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. To put it bluntly, I guard against a board member "going rogue."

Early on you will probably designate your district manager 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 person 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, usually receiving and sharing data and information by e-mail attachment. I prefer to receive numerical data (financial statements, customer usage data and the like) in a spreadsheet format and textual material (proposed ordinances) 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 report and the analyses, and any follow-up reports electronically as PDF documents.

Investment

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 $7,259, less the Wyoming RATES Program discount of $1,815 yields a **net fee of $5,444**
- **Service package 2**, sewer rate analysis – full fee of $7,259, less our multi-study discount of $1,089, and less the Wyoming RATES Program discount of $1,543 yields a **net fee of $4,628**
- **Service package 3**, on-site visits – $2,556, less the Wyoming RATES Program discount of $639 yields a **net fee of $1,917 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 $11,989, including total multi-study and Wyoming RATES Program discounts of $5,085.

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, 2020, if you choose at least one service package by July 1, 2019. Once you tell me what service packages you desire, and you provide data to work with, I will immediately start to produce the analyses.

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 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, finances and services set on an excellent course.

Best regards,
GettingGreatRates.com

Carl E. Brown
President

September 16, 2019

Larry Keffer, President
Wardwell Water and Sewer District
P O Box 728
Mills, WY 82644

Subject: Water and Sewer User Charge Rate Analysis Report

Dear Mr. Keffer:

Attached is the rate analysis report for the District's water and sewer utilities. Before I address the report, I have some observations for you.

Rate analysis requires a lot of data gathering. I did little of that myself. Gloria Brainard, the district manager, did most of that work. Ms. Brainard was great to work with; always helpful, fast, friendly and very effective. You and the other members of the District are lucky to have her serving them.

I also want to thank Kathy Weinsaft and Mark Pepper of the Wyoming Association of Rural Water Systems (WARWS). WARWS could take the path of many associations and focus on the building, permitting, compliance and running of water and sewer utilities. That is, after all, the vitally important core mandate of such associations. But, WARWS goes 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. I hope you all will thank the WARWS team, too. Since the WARWS Executive Director is also on your Board, you won't have to go far to start those thank-yous.

Now, on to the report.

Your rates are quite simple, and your utilities are in what I call a "steady-state" condition – not a lot of things are going on that would upset your financial situation. That made rate modeling easier than it could would have been. Ms. Brainard and I had to deal with some data difficulties brought on by your billing program, but I think we got through that just fine, so overall, the analyses went quite well.

As you will see, rate structures need to change markedly, somewhat in opposite directions. Thus, the bill outcome is mixed, depending upon how much water and how much sewer service each customer uses. Overall, the utilities need small (water) to moderate (sewer) revenue increases, but your rates are still going to be affordable.

Once the initial rate adjustments are in place, you should monitor cash flow and reserve accumulation carefully. If revenues, costs and reserves respond as projected, great. If reserves fall short of their targets and it appears that will not be a temporary situation, have Ms. Brainard give me a call to discuss the situation. We may need to make further adjustments to get reserves back on track.

I proposed an on-site visit to present my report and results to the Board and answer questions. The Board took me up on that service and we are now working on scheduling that.

As it turns out, I need to be in your area on the morning of October 7 and all day on the 8th. Ms. Brainard is trying to coordinate a Board meeting to coincide with my travel there. If that works out, such a coordinated trip will save me some travel costs and time. As I told Ms. Brainard, if we can do the visit on that timing, I will be glad to do that service for one-half of the on-site visit fee I included in the original proposal. I figure, if you all can be flexible with visit timing, I will be glad to give up some fee. Hopefully, it will work out.

Finally, I am sure you and the Board members know of other districts and towns that also need rate setting help. As you run into these folks at rural water association 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 Wardwell.

Best regards,
GettingGreatRates.com

Carl E. Brown
President

Enclosure

Water and Sewer Rate Analysis Report

Wardwell Water and Sewer District

Mills, Wyoming

Prepared September 16, 2019

Carl Brown, President
GettingGreatRates.com, LLC

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Index of Model Tables and Charts

Executive Summary

These analyses calculate cost-to-serve water and sewer rates for the District. However, because some detailed data needed for complete cost-to-serve rate calculations is not available, estimates of that data were made. The initial water rate adjustments will result in an overall revenue increase of 8.2 percent. The water bill for a 5,000 gallon per month residential customer will rise from $32.50 per month to $34.05. The initial sewer rate adjustments will result in an overall revenue increase of 20.1 percent. The sewer bill for a 4,000 gallon per month residential customer in Midwest Heights will rise from $24.78 per month to $29.01. All other sewer customers using 4,000 gallons per month would see their bills rise from $20.51 to $24.74.

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The Meaning of This Report, in a Nutshell

The Wardwell Water & Sewer District, later called "the District" or "you," hired GettingGreatRates.com, later called "me," "we" or "I," to perform rate analysis of its water and sewer utilities, produce a report of my findings and recommendations and provide guidance on rate setting.

This report is detailed. The math behind the report is complex. And many assumptions had to be made about data. These things make interpreting the models difficult. Following is the "Cliff's Notes" version of what the calculated rates will do and what they mean to customers.

The idea the rate calculations in this report are based on is called, "cost-of-service" or "cost-to-serve" 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.

Water and sewer bills will go in opposite directions, to a degree, when you compare rates before and after adjustment:

- Because the water minimum charge needs to be higher, water bills will go up the most for the lowest volume customers. At a somewhat high level of use, bills will begin to go down. However, the opposite is the case for sewer, so their sewer bills will go down the most. Such customers will see a slight combined bill decrease.
- Sewer bills rise starting at 3,000 gallons per month, whereas, water bills do not start to fall until about 15,000 gallons per month. Few customers use that much water volume, so higher volume water and sewer customers will see overall bill increases.

Customers will naturally compare the recommended rates with the current rates to see "What will happen to me?" When their bills go up, many will think the recommended 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 deciding what is fair and what is not. The benchmark should not be the current rates. It should be the costs incurred to serve customers.

Introduction

Overall, water and sewer rate revenues are a bit too low. The sewer system seems to need little if any improvements right now, but its current rates are further behind than the water rates. The water system needs to have a water line replaced, but that will be funded with special property assessments, so it will have no effect on water rates.

"Test year" is the one-year period from which data was used as the starting place for the analysis.

Having adequate rates is rate setting job one. But, having fairly structured rates is very important, too. Cost-to-serve rates are the clearest way to achieve both goals. I recommend such rates. Therefore, I recommend eliminating the 6,000 gallon per month usage allowance in the sewer rates, which serve to make those rates, for all practical purposes, flat rates. Cost classification also revealed that the balance between minimum charges and units should be adjusted for both utilities' rates.

Unfortunately, the District's billing program does not allow easy retrieval of data needed for facts-only-based cost-of-service rate calculations. To overcome this problem; and often with the help from the District's Manger, Gloria Brainard; I estimated things like master metered flows and how to split costs that are shared by both utilities. Because these assumptions are consequential, especially on the wastewater side, you may need to track the revenue results of those rates closely for perhaps a year after making the first adjustment. As you do that, just give me a call with your results, so I can make sure the new rates are on track.

This report is the culmination of a process where I submitted information and data requests to Ms. Brainard. She replied, quite promptly and capably, I must say. We went through this step several times. I know that Ms. Brainard has also consulted with operations staff when she needed certain technical information. As I received information and data, I modeled the District's finances and rates and submitted drafts for review and feedback. Ms. Brainard reviewed those drafts to assure accuracy, and in some instances, she corrected data.

With that feedback, I prepared and submitted a draft final report. Again, Ms. Brainard reviewed and gave me feedback, from which I revised the full report to arrive at this, hopefully, the final report.

The report is in two parts. The first is this narrative report that tells readers what should be done to the utility's rates and why and interprets much of the mathematically modeling. The second is a printout of the modeling spreadsheets, called:

- "Wardwell Water & Sewer District; Water Rates, Scenario 2019-1," later called, "the Water Model;" and
- "Wardwell Water & Sewer District, Sewer Rates, Scenario 2019-2," later called, "the Sewer Model."

The models are sets of integrated calculations that mathematically depict the utilities' situations to arrive at an appropriate set of rates for each utility. In the Water Model, one table that summarizes data was left out of my template because your situation is simple enough that keeping it in would only be confusing. In the Sewer Model, I left out that same table, plus Table 9 having to do with marginal cost calculations because I did not have reliable data with which to use that table. Fortunately, that table would only have been used to calculate the cost of inflow and infiltration, a relatively minor issue in your sewer system because it is thought to be very "tight."

As you read this report, please keep this in mind. The report does not *direct* the District 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.

Important Assumptions, Details and Caveats

The District's data sources – primarily the billing program and financial statements – lacked data I need, or we found it impossible to export that data into a usable format. Thus, I had to make some assumptions and deal with other rate analysis data shortcomings. I mention several here, which you should keep in mind as you read the rest of this report:

- The District's financial statements combine many water and sewer incomes and costs. The ideal is one set of financial statements for the water system and a different set of statements for the sewer system. Lacking that, a dollar or percentage breakdown of incomes, costs and balances is useful. I separated combined or undifferentiated incomes, costs and balances in this way:
    - When it was clear an income or cost was related to water, I included it in the water income or cost total. I did the same for sewer. Then I calculated the percentage that each is of the grand total and applied that percentage to the unknown and combined incomes and costs.
- Construction water sales were a minor percentage of the utility's revenues, and the test year was a relatively strong year for such sales. Therefore, I did not attempt to do a marginal cost calculation for such sales. Rather, I calculated new rates for all other customers, based on cost-to-serve principles. I then added the price differential in the current rates for construction water to the new rates to arrive at the fees to assess to construction water sales. Moving on to sewer rates issues,

- Master metered volume of sewer delivered to the treatment plants is not available.
- Monthly water sales (monthly sums of customer metered flows), systemwide were used to estimate winter averaged sewer flows for residential sewer flows and the rates based on those flows. That worked out to 4,468 gallons per month per water customer during December through March. Ms. Brainard told me that most of the sewer customers live in more modest homes and tend to be older (and perhaps are better water conservationists) than the water customers in general, so to be more conservative, I assumed an average sewer flow of 4,000 gallons per sewer customer per month for calculating sewer rates and revenues. In my experience, that should be a reasonable usage rate, but bear in mind, it still is an estimate.
- Interestingly, it is likely that few if any sewer customers use the full, current 6,000 gallons per month sewer usage allowance. Thus, for all practical purposes, your current sewer rates are flat rates. Flat rates are not fair to low-volume customers.
- I assumed all sewer customers are served by five-eighths or three-quarter inch water meters. This should be the most conservative assumption because there could be a few larger meter sewer customers that would end up paying higher rates than I calculated, boosting your sewer revenues over the projected revenues just a bit.

Rate Setting Resources Beyond This Report

Over the years, I have found that several topics are common to many utilities. Others can be important to a utility at certain times in their development. In the past, I wrote about such issues in each rate analysis report. Now, I cover such issues in separate guides, all available for FREE download at https://gettinggreatrates.com/freebies/freebies.shtml. Following is a listing of a few those guides and resources:

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

How to Get Great Rates focuses closely on rate setting for smaller systems. The Rate Setting Issues Guide expands upon the book to cover affordability, sustainability, bill assistance programs, meter size-based system development fees and minimum charges, and more.

The last two items in the list above are spreadsheet applications that enable users to build their own equipment repair and replacement and capital improvement schedules, calculate their costs and calculate revenues needed 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. I encourage the District to use these two sheets so you can make repair and replacement and capital improvement plans more formal, more forward-looking and less reactive.

There are other guides and resources on this site. All are FREE, so check them out.

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. Your situation is simple enough that I did not need to use all the methods I normally employ for calculating fair and adequate rates.

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. The approach is exhaustively described in the American Water Works Association's "M1 Manual, Principles of Water Rates, Fees and Charges," Seventh Edition. 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.

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 step is to classify costs, which is done in Table 8. The "Average Fixed Cost/User/Month" from Table 8 is used for calculating the base minimum charge. Also, from Table 8, the "Average Variable Cost to Produce/1,000 gallons (or other units)" is the basis for calculating unit charges.

The second step is to arrive at capacity costs. In your case, capacity costs are almost not an issue to be concerned with – growth is static so you have the capacity now that will be needed in the foreseeable future.

The third step 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, 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 step is to set reserve goals through the tenth year. Those goals will only be met if (primarily) rates are set high enough and/or (secondarily) grants and subsidized loans are large enough to enable the utility to generate net revenues.

The fifth step is to arrive at the full suite of rates needed to fully fund the 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 in a cost-to-serve structure.

- 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 means they retain their cost-to-serve proportions.
- Once the overall revenue increase need is established, the base minimum charge is "back calculated" from the adjusted minimum charge revenue amount. The unit charge is "back calculated" from the adjusted unit charge revenue amount. The resulting rates are the starting rates, what you will (hopefully) adopt initially. In later years, you will increase these starter rates and fees across-the-board by an inflationary factor, to keep them tracking with rising costs.
- Of course, system development fees, minimum charge surcharges, investment earnings, penalties collected, 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.

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 utilities need analysis only to this level of complexity – doing more than that results in rates that are impractical for small systems.

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 the 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. And because such are agreements are made for nearly forever, a mistake made in the beginning can hamstring a utility for years or decades to come. Regardless of system size, thorough analysis should always be done before entering into such agreements.

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.

Your utilities should have 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" that come from the classification exercise. 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: ***Fixed costs are related to the fact that you have customers.*** For every customer, you incur one increment of this type of cost. **In your case, all fixed costs were considered to be equally shared by all customers.**

- 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, or full minimum charge for each meter size.

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 utilities 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 a 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.

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 use.

There are three, unit charge structures that I commonly recommend, depending on the situation:

- 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 a utility that is bumping up against its 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, customers are assessed unit charges on an average unit cost basis. 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, and almost all sewer service is assessed using level unit charges.
- 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 industry or in an area where folks want to attract such users.

The District currently assesses a level unit charge and I recommend you stay with that structure.

To complicate the aforesaid just a bit, rate setting is first 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 the need 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 shortfall. When future expenses need to be higher, or lower, or of a different nature, the models adjust rates and fees accordingly. Such modeling enables me to do dynamic "what-if" scenario calculations. That enables me to arrive quickly at the "best fit" rates for each utility.

Coincidentally, such a dynamic model makes it easy to calculate rate and other changes over the next two or three years, too. If a change does not affect the cost structure drastically, I can do the same for almost any cost or rate change. If, one, two or three years from now, you discover your costs or incomes will be different from what I had assumed, you can call me up, tell me what is different, I will enter the changes into the model(s) and re-run the rates. If the change is small and quick to model, I do that for no charge. If it is more complex and will take some time and usually a written report, I do those projects on an hourly basis. Fees for those usually come in at $500 – $1,000. Some of my clients find that to be a very accurate and cost-effective way to maintain good rates.

Two final thoughts on the rate modeling and adjustment topic:

- Almost always, rate adjustments include bill 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 about customers' 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 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 number 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.

General Issues

Concerning construction of the models, they were built to match the systems' 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 standard financial statements, and other data, are seldom grouped in such a way as to enable the required rate calculation methodology, 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, to learn the meaning of terms used in the charts of both analysis models.

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 of each model, and they are included in the Chart 8 amounts of each model, too.

As you set and later reset rates, I suggest you follow the guidance I give in my book, "How to Get Great Rates." This book is one of the rate setting resources 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:

1. It appears the District's billing program cannot export data into a spreadsheet format or another format that can be converted to a spreadsheet. Spreadsheets are widely used by many to do modeling of costs, rates, usage and many other things. They are critical planning tools. Billing programs are, or should be, an important source of data for such planning. If your billing program really is not capable of exporting data to a spreadsheet format, I recommend you buy one that is. You will be surprised at how much easier it is to make mathematically sound decisions given access to such data.

2. 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, 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.
3. Retain required funds in interest bearing debt service and debt reserve accounts when required by your lender(s).
4. Have me conduct a full rate analysis again when the actual financial performance and my projection of future performance diverge significantly. Conditions should dictate rate analysis frequency.
5. 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 a utility, especially those looking to build new facilities or replace existing facilities soon. At a basic level, you can use my free spreadsheet tools to do capital improvement and equipment repair and replacement scheduling, costing and annuity calculations – the core of asset management.
6. Track volume usage, incomes and expenses on a regular basis so the data and information you generate will support future rate analyses.
7. As a reminder, check with your attorney for language and legality of all charges and issues discussed.

The remainder of this report directly addresses the analysis findings and my recommendations, first for water and later for sewer. Several issues affect both water and sewer rates. Thus, to keep the report shorter and simpler, I will cover such issues in the water subsection. In the sewer subsection, I will just refer readers back to the water subsection for those issues.

Water Rates Discussion

Recommended Rate Structures

Your current water rate structure is simple, but a bit too simple to treat all customers fairly. I am recommending a structure that is a bit more complex, but which improves fairness. Such rates need to include:

- System development fees that graduate with meter size, based on the cost of capacity to serve different meter sizes.
- A minimum charge that is also based on meter size for the same reason.
- In a large system with widely different customers, non-level unit charges can make sense. But the District is small and does not enjoy much "economy of scale," thus, a level unit charge with no usage allowance is nearly as fair and it certainly is more practical for the District.
- If you now have or may someday have out-of-District customers, I calculated out-of-District fees in the same rate structure, but those fees are 25 percent higher than the same in-District fees. Serving customers farther away from the backbone of the system (out-of-District) requires more infrastructure, raising costs. Plus, the District is not obligated to serve them. Analysis may determine a different percentage to use for such customers, but the District is small, and the State-sanctioned and customary 25 percent differential should be an acceptable value for you to use, so that is what I assumed.

Most of these things are fairly easy to understand but I will expound upon meter size-based rates a bit more in the next subsection.

Meter Size-based Rates

I almost always recommend meter size-based system development fees (connection fees) and minimum charges for both water and sewer utilities. Both of your utilities are large enough, and customers should be diverse enough to warrant them, so I recommend both for you, too.

As to system development fees, you have two kinds:

- One includes fees assessed by the District which are intended to recover costs of the District's infrastructure. In Table 3, page 38, these fees are included on the line called, "Current Water Connection Fee and Water System Development Charge – District." A similarly named fee appears in the same table in the Sewer Model.
- The other type includes fees assessed by the District but remitted to the city of Casper (for sewer) and the Central Wyoming Regional Water System to which the District is a consecutive system. In Table 3 of the Water Model, these fees are called, "System Investment Charge – Regional."

In your case, you had a big year last year for new connections in a new and now built out subdivision. But future growth is projected to cease or nearly cease. Therefore, you will cease or nearly cease collecting revenue from these fees, and you will also remit no fees or nearly no fees to other entities, as well.

When there is no growth or nearly no growth, system development fees could be set high or low and there will be little to no additional revenue to be collected. Therefore, I am not concerned about recovering a large percentage of system development costs from new connections – there will be few, so you simply cannot recover those costs in that way. For that reason, I modeled system development fees for five-eighths and three-quarter inch meter new connections to be the same as the current new connection fees. Then, to at least make the structure fair, larger meter new connections would graduate up from that fee based on the costs of capacity to demand service through larger meters. You will not recover all capacity costs from system development fees, which is normal practice in the U.S. But at least those fees you charge will be fairly structured.

Because your growth is slow to non-existent, meter size-based minimum charges become an even more important part of fairly structured and adequate rates, so I calculated such rates for you.

The cost-to-serve notion and the mathematics of calculating system development fees that recover the cost of capacity apply just as well to minimum charges. The basic difference is, system development fees recover that cost all at once and minimum charges recover that cost over time. Thus, the minimum charges I recommend also graduate by the same relative amounts as do the system development fees.

There is much more to the math and science of such calculations than you may care to understand. But if you want to research this further, please read Chapter 12 of the "Rate Setting Issues Guide" cited in the subsection called, "Rate Setting Resources Beyond This Report" on page 7.

Volume Usage

Table 2, page 37, shows the total volumes used by each rate class of customers. I normally display the number of customers and the volumes they used within narrow ranges. However, because your billing program did not provide usage data in that way, Ms. Brainard gave me the total volumes and bill counts for the two customer classes. For that reason, volumes and bill counts only show up on the row within each volume range where the average use for that class fell. No doubt, some of that use occurred within other ranges, but because you have a level unit charge and no water usage allowance, using total volume and bill counts has no effect on the revenues to be generated by the current rates and the rates I modeled. Aside from rate structure fairness, having no usage allowance makes revenue projections from rates easy to calculate.

Expected Incomes

Table 3, page 38, shows past income and future incomes to expect, as well as several other things related to revenues.

In Table 3, near the top, on the line called, "Rate Increases Projected for Future Years," note that I show a three-percent annual across-the-board rate increase in future years. That means, in years after the initial rate adjustments, you will need to raise all important rates and fees by three percent each year to enable incomes to keep up with inflation, pay for improvements and build the reserves to the target level.

Expected Operating Costs

Table 4, page 39, shows expected operating costs. A few costs deserve discussion.

The first two rows of this table are the salaries of directors and system staff. Several later rows cover related costs for all staff. When combined, these costs are your highest or second highest cost category.

Lower in Table 4 you will see water purchase costs and system investment charges paid to the regional system. These are also quite substantial, but since your growth will stop or nearly stop, the system investment charges payout will also fall off in future years.

As to repair and replacement (R&R) costs, you handle them in your regular budget each year as equipment needs replacement. To make that number more predictable, I got service truck replacement information from Ms. Brainard, plus a couple other R&R costs. I entered those costs into Table 6, page 41. That is a rather light level of R&R, so I added a "place keeper" item I called, "Occasional Fire Hydrants, Valves, etc." to bring the annual annuity (savings amount) up to approximately ten percent of your annual operating costs, less general administration types of costs. Fifteen percent is a normal amount for R&R for systems older than yours, so I backed your rate of R&R down to ten percent to account for that difference.

As mentioned before, I discuss R&R extensively in the "Rate Setting Issues Guide" and the spreadsheet called, "ReplacementScheduler©" can be used to schedule R&R and calculate the annuity (annual savings amount) needed to pay for it. I encourage you to read that chapter, get the spreadsheet and begin to schedule R&R in a more formal way.

Unbilled-for and Lost Water

According to the difference between your master metered water purchase volume and the volumes billed to customers, as well as your records of water used for line flushing and other system maintenance (unbilled-for water use), you appear to have an enviable eight percent rate of water loss. Well done! Lost water costs money, so keeping the loss rate low saves your customers money in the form of lower rates.

The estimated cost of lost water is shown in the bottom right corner of Table 8, page 43. At a cost of approximately $48,000 per year, this cost is quite economical compared to most water systems.

Capital Improvements

Capital improvements and debt are covered in Table 5, page 40. A water main needs to be replaced and you are starting to plan that project now. The cost of that main is not yet known, but your engineering firm gave you a rough estimate of $620,000. I assumed an even $1,000,000 for this project.

This project will serve the Blair Lane area. Funding of the project will be by special property assessments to those properties served by the new main. The District currently has sufficient reserves with which to temporarily fund the project until the special assessments are collected. Or, you may desire to short-term loan fund the project and pay off that loan with assessment proceeds. Either way, the cost of the project will not affect user charge rates, so inclusion of the project in Table 5 is informational in nature.

If, in the near future, the District takes on another capital improvement that will not be funded with special assessments, have Ms. Brainard give me a call to discuss the situation. It is likely I will be able to enter the new information into the Model and quickly determine what rate effect it will have.

Target Reserve Levels

Your current total reserves exceed what I normally recommend. In such cases, I almost always recommend rates that will retain that level of reserves ten years out, indexed up for inflation. That is what I modeled and recommend for you, too, except that I recommend the R&R reserves be accumulated in addition to all other reserves.

You may want to know what I otherwise would have recommended for you. The following spells that out:

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. *Your utility is on the smaller side, so I would recommend 50 percent;*
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. *You do not have such a schedule, so I estimated such R&R costs at 10 percent of operating costs, not including CIP, debt and administration costs and I targeted R&R reserves 20 years out at double the average annual R&R cost,* and
3. Capital improvement and debt 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. *In your case, I would recommend the same.*

The lines on the bottom of Table 17, page 54, and several of the charts at the end of the Model show the reserve balances to expect for the next ten years. The last line of Table 17, the "Sum of All Reserves," is the critical one.

As shown in Chart 8, page 60, total reserves will grow over the next ten years.

Projecting budgets and ending balances for next year is a difficult task. 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 will bring you back on course.

Rate Affordability

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

In Table 17, near the top, I show the estimated Affordability Index. The Affordability Index is also shown graphically in Chart 4, page 58.

In the table, the Affordability Index calculation for the test year was at 0.67 percent. That means, such a customer paid 0.67 percent of their monthly household income to pay their monthly water bill. The national average is around 1.0 percent and that is consider affordable, so your current rates more affordable than the average.

> 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. The Affordability index is a primary factor in determining grant and loan eligibility and grant amount.

Under the recommended rates, this customer's bill would go up about one dollar per month, resulting in an Affordability Index of 0.69 percent. That is important because most grant programs that have an Affordability Index eligibility criterion try to keep rates, after a capital improvement is completed and debt is in place, below 1.5 to 2.0 percent. Your rates are far from satisfying such a criterion and in the future, your rates will become even more affordable. But do not dismiss grants entirely for future projects. Grant agencies have other eligibility criteria, so you might get a grant based on those.

The affordability index is useful, but it does not depict how new rates will affect customer types or those using different volumes. Table 18, page 55, shows how customers' bills at different volumes of use will be affected by the recommended rates. Table 18 gives ratepayers useful information. It is one of the few tables from the Model that I recommend you copy and bring to the board meeting where we will discuss rates. Because most customers are concerned about what will happen to their bills, you should give this table to everyone who wants a copy.

What everyone should get from Table 18 is, bills need to go up the most for very low volume customers. But the greatest bill increase will still be less than three three dollars per month and the resulting bill will still be quite affordable.

Recommendations for Adjusting Water Rates

The 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. Tables A and B that follow this list state the recommended rates and fees.
    a) As to system development fees assessed by the District but remitted to water suppliers from which the District purchases water, assess the fees required by those entities.
2. The calculations assumed you would have made these adjustments early enough to enable you to collect at these rates for the January 1, 2020, billing.
3. 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. Approximately one full year after the initial rate adjustments, examine the costs and incomes the utility experienced during that year, plus the balances that have accrued. Compare those items to the same items in Tables 3, 4, 5 and 17, of the Model.
    a) If all accrued close to the values in the Model, raise all rates by 3.0 percent, as shown near the top of Table 3, page 38.
    b) If balances did not accrue as shown at the bottom of Table 17, 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.
    c) If balances were too low by an amount that is troubling to you, call me to discuss the situation. It is likely I will be able to "talk you through" how to make appropriate rate adjustments to correct the situation.
5. Repeat recommendation Number 4 each following year until you have raised rates and fees by a cumulative 20 percent, which should occur in about seven years from now. At that time, have me or another rate analyst of your choice perform a new rate analysis, so rate structure and adequacy can be adjusted again. If you need to capital improvements or repair and replacements that are quite different from those assumed, you will need a new rate analysis sooner than that.

Table A: Recommended Water Rates Within the District

Table A: Wardwell Water & Sewer District Water Modeled System Development Fees; Minimum Charges; Usage Allowance and Unit Charge

		In-District			
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	$2,050	$17.75	0	$3.26
0.750	Displacement	$2,050	$17.75	0	$3.26
1.000	Displacement	$4,900	$29.68	0	$3.26
1.500	Displacement	$9,650	$49.57	0	$3.26
2.000	Displacement	$15,350	$73.44	0	$3.26
2.500	Displacement	$23,900	$109.24	0	$3.26
3.000	Singlet	$30,550	$137.08	0	$3.26
3.000	Compound, Class I	$30,550	$137.08	0	$3.26
3.000	Turbine, Class I	$33,399	$149.02	0	$3.26
4.000	Singlet	$47,649	$208.68	0	$3.26
4.000	Compound, Class I	$47,649	$208.68	0	$3.26
4.000	Turbine, Class I	$59,049	$256.41	0	$3.26
6.000	Singlet	$95,149	$407.57	0	$3.26
6.000	Compound, Class I	$95,149	$407.57	0	$3.26
6.000	Turbine, Class I	$123,648	$526.90	0	$3.26
8.000	Compound, Class I	$152,148	$646.23	0	$3.26
8.000	Turbine, Class I	$266,146	$1,123.56	0	$3.26
Construction Water Customers		N.A.	$52.75	0	$3.76

Table B: Recommended Water Rates Outside of the District

Table B: Wardwell Water & Sewer District Water Modeled System Development Fees; Minimum Charges; Usage Allowance and Unit Charge

		Out-of-District			
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	$2,525	$19.74	0	$4.08
0.750	Displacement	$2,525	$19.74	0	$4.08
1.000	Displacement	$6,087	$34.66	0	$4.08
1.500	Displacement	$12,025	$59.52	0	$4.08
2.000	Displacement	$19,150	$89.35	0	$4.08
2.500	Displacement	$29,837	$134.10	0	$4.08
3.000	Singlet	$38,149	$168.90	0	$4.08
3.000	Compound, Class I	$38,149	$168.90	0	$4.08
3.000	Turbine, Class I	$41,712	$183.82	0	$4.08
4.000	Singlet	$59,524	$258.40	0	$4.08
4.000	Compound, Class I	$59,524	$258.40	0	$4.08
4.000	Turbine, Class I	$73,774	$318.07	0	$4.08
6.000	Singlet	$118,898	$507.01	0	$4.08
6.000	Compound, Class I	$118,898	$507.01	0	$4.08
6.000	Turbine, Class I	$154,523	$656.18	0	$4.08
8.000	Compound, Class I	$190,147	$805.34	0	$4.08
8.000	Turbine, Class I	$332,645	$1,402.00	0	$4.08
Construction Water Customers		N.A.	$65.94	0	$4.70

Closing

I recommend you adopt the rates calculated in the Model and discussed in several subsections above. The recommended rates are shown in Tables A and B immediately above. These rates are in a cost-to-serve structure that will fully fund the utility over the long term. It is important that you examine accrual of balances each year to assure the rates are bringing in adequate revenue. And if they are not, increase rates across the board by a percentage that will bring the balances up to where I calculated they need to be each year.

This combination of adjustments will result in a modest overall increase in water rate revenues and essentially no change to the average residential customer's water bill. Future inflationary increases will raise all bills by 3.0 percent per year.

***

Sewer Rates Discussion

Recommended Rate Structures

The sewer rates will be in the same basic structure as the water rates, with this exception. For residential customers, but not commercial or other types of customers, sewer bills will be based upon winter-averaged use. You already bill residential customers this way, so you will not need to change how you calculate residential sewer bills. You will only need to use the recommended rates that soon follow when you make those bill calculations.

Meter Size-based Rates

So long as sewer customers are served by water meters that were appropriately sized for each property, meter size-based system development fees and minimum charges make just as much sense for sewer as for water. That is the case for the District, so I recommend such rates for the sewer system, too. Those rates were calculated using the same methodology as for water.

Volume Usage

The subsection entitled, "Important Assumptions, Details and Caveats," which starts on page 6 largely deals with sewer volume usage and related issues. Table 2, page 64, shows the total volumes used by each rate class of customers. Sewer usage data is the same as the data for water except for residential sewer use. That use was estimated on a winter-averaged use basis of water use. That volume, which was a bit over 4,000 gallons per customer per month was rounded down to 4,000 gallons to be more conservative.

Expected Incomes

Table 3, page 65, shows past incomes and future incomes to expect, as well as several other things related to revenues. These are similar to those for water.

Expected Operating Costs

Table 4, page 66, shows expected operating costs. Cost issues for sewer are much like those for water.

Inflow and Infiltration (I&I)

I&I is the wastewater equivalent of water loss in a water system. I&I costs money to collect and treat. The amount and percentage of I&I is calculated in the same way as is water loss. Unfortunately, wastewater volumes delivered to the treatment plants is not known, so this calculation could not be done. Fortunately, the system is fairly new and thought to be water tight, so I&I should not be an important issue at this time.

Capital Improvements

The sewer system has no plans for making system improvements over the next ten year. It also has no debt, so capital improvements are not an issue for the sewer system.

Target Reserve Levels

As was the case with water, your current total sewer reserves exceed what I normally recommend, so I modeled retaining that level of reserves ten years out, indexed up for inflation. Lines on the bottom of Table 17, page 78, and several of the charts at the end of the Model show the reserve balances to expect for the next ten years. The last line of Table 17, the "Sum of All Reserves," is the critical one.

As shown in Chart 8, page 83, total reserves will grow over the next ten years.

Rate Affordability

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

In Table 17, near the top, I show the estimated Affordability Index. The Affordability Index is also shown graphically in Chart 4, page 81.

In the table, the Affordability Index calculation for the test year was at 0.51 percent. That means, such a customer paid 0.51 percent of their monthly household income to pay their monthly sewer bill. Under the recommended rates, the Affordability Index for this volume would go up 0.64 percent. The current and the recommended rates are both considered to be affordable based on this criterion.

How new rates will affect customers is shown in Table 18, page 79. What everyone should get from Table 18 is, bills for very low volume customers should go down. As sewer volume contributed goes up, the bill increases would also go up. For a very low-volume water and sewer customer, the overall water and sewer bill will go down but for most customers, overall bills will go up.

Recommendations for Adjusting Sewer Rates

The format of these recommendations is the same as for water rates. The only difference is the actual rates you should adopt, and the fact that monthly residential sewer bills should be based on the average use by each customer during the previous months of December through March. Thus, you should do the following:

1. Tables C and D that follow this list state the recommended rates and fees.
    a) As to system development fees assessed by the District but remitted to wastewater treatment entities, assess the fees required by those entities.
    b) Quite importantly, note that the recommended rates include NO usage allowance; sewer customers will pay unit charges on all sewer volume they generate.
2. The calculations assumed you would have made these adjustments early enough to enable you to collect at these rates for the January 1, 2020, billing.
3. 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. Approximately one full year after the initial rate adjustments, examine the costs and incomes the utility experienced during that year, plus the balances that have accrued. Compare those items to the same items in Tables 3, 4, 5 and 17, of the Model.
    a) If all accrued close to the values in the Model, raise all rates by 3.0 percent, as shown near the top of Table 3, page 65.
    b) If balances did not accrue as shown at the bottom of Table 17, 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.
    c) If balances were too low by an amount that is troubling to you, call me to discuss the situation. It is likely I will be able to "talk you through" how to make appropriate rate adjustments to correct the situation.
5. Repeat recommendation Number 4 each following year until you have raised rates and fees by a cumulative 20 percent, which should occur in about seven years from now. At that time, have me or another rate analyst of your choice perform a new rate analysis, so rate structure and adequacy can be adjusted again. If you need to capital improvements or repair and replacements that are quite different from those assumed, you will need a new rate analysis sooner than that.

Table C: Recommended Sewer Rates Within the District

Table C: Wardwell Water & Sewer District Sewer Modeled System Development Fees; Minimum Charges; Usage Allowance and Unit Charge

		In-District			
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	$161	$17.77	0	$2.81
0.750	Displacement	$161	$17.77	0	$2.81
1.000	Displacement	$177	$30.42	0	$2.81
1.500	Displacement	$203	$51.51	0	$2.81
2.000	Displacement	$235	$76.81	0	$2.81
2.500	Displacement	$283	$114.76	0	$2.81
3.000	Singlet	$320	$144.28	0	$2.81
3.000	Compound, Class I	$320	$144.28	0	$2.81
3.000	Turbine, Class I	$336	$156.93	0	$2.81
4.000	Singlet	$416	$220.18	0	$2.81
4.000	Compound, Class I	$416	$220.18	0	$2.81
4.000	Turbine, Class I	$480	$270.79	0	$2.81
6.000	Singlet	$682	$431.03	0	$2.81
6.000	Compound, Class I	$682	$431.03	0	$2.81
6.000	Turbine, Class I	$842	$557.54	0	$2.81
8.000	Compound, Class I	$1,002	$684.05	0	$2.81
8.000	Turbine, Class I	$1,640	$1,190.08	0	$2.81

Table D: Recommended Sewer Rates Outside of the District

Table D: Wardwell Water & Sewer District Sewer Modeled System Development Fees; Minimum Charges; Usage Allowance and Unit Charge

		Out-of-District			
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	$163	$19.88	0	$3.51
0.750	Displacement	$163	$19.88	0	$3.51
1.000	Displacement	$183	$35.69	0	$3.51
1.500	Displacement	$217	$62.05	0	$3.51
2.000	Displacement	$256	$93.68	0	$3.51
2.500	Displacement	$316	$141.12	0	$3.51
3.000	Singlet	$363	$178.02	0	$3.51
3.000	Compound, Class I	$363	$178.02	0	$3.51
3.000	Turbine, Class I	$383	$193.83	0	$3.51
4.000	Singlet	$483	$272.90	0	$3.51
4.000	Compound, Class I	$483	$272.90	0	$3.51
4.000	Turbine, Class I	$562	$336.15	0	$3.51
6.000	Singlet	$815	$536.46	0	$3.51
6.000	Compound, Class I	$815	$536.46	0	$3.51
6.000	Turbine, Class I	$1,015	$694.59	0	$3.51
8.000	Compound, Class I	$1,214	$852.73	0	$3.51
8.000	Turbine, Class I	$2,013	$1,485.27	0	$3.51

Closing

I recommend you adopt the rates calculated in the Model and discussed in several subsections above. The recommended rates are shown in Tables C and D immediately above. These rates are in a cost-to-serve structure that will fully fund the utility over the long term. Because I had to make several critical assumptions about volume use by customers, it is important that you examine accrual of balances after about six months and then each year after the initial adjustments to assure the rates are bringing in adequate revenue. If they are not, increase rates across the board by a percentage that will bring the balances up to where I calculated they need to be each year.

This combination of adjustments will result in a moderate overall increase in sewer rate revenues. However, because you currently have a 6,000 gallon per month usage allowance and almost no customers use more than that, and because I recommend eliminating the allowance, bill amounts for many customers will change markedly. Low-volume customers' bills will go down. Modest to higher volume customers' bills will go up. The highest volume customers' bills would go up the most. Some of those customers will consider the adjustments to be unfair. But as I described in the very beginning of the report, the recommended rates were calculated on a cost-to-serve basis. Thus, those customers who would get higher bills are being subsidized by other customers now.

And do not forget that future inflationary increases, projected at 3.0 percent per year, will be needed to offset the effects of inflation.

***

Conclusion

"Conclusion" is a misnomer here. This report provides information upon which the District 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, so always feel free to call me to discuss any concerns you have as the years pass. Having the Model available to track your progress and determine the effect of condition changes later, I should be able to test changes easily and advise you quickly.

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

As you take on the initial adjustments, keep the following in mind.

- Everyone impacted by the District's water and sewer rates should at least be made aware of the results of this report.
- My default recommendation is to 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 these analyses. To satisfy those information needs, the District 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 District's Web site, Facebook page or other media, so everyone can see for themselves what the report says. That way, no one would have to print out a long document, unless they wanted to. Publicize the 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 pay one visit to the board to discuss my findings and recommendations. I look forward to meeting with the board, answering everyone's questions and helping you get on your way to the next generation of great rates.

Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

This model calculates cost-to-serve rates and assumes paying for a water main replacement project.

September 16, 2019

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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.

Table and Chart Descriptions

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.

Name	What Each is or Does
Definitions (List)	The meaning of terms used in this report and in rate setting generally
Return on Investment (Calculation)	A summary of financial outcomes enabled by the proposed rates
Table 1 - Rates	User rates in effect at the end of the test year. Unless rates were recently changed, these are the current rates.
Table 2 - Test Year Usage	Compilation of actual volume of service used by customers during the test year
Table 3 - Basic User Data and Operating Incomes	Basic user statistics and operating revenues, projected for 10 years, based on the assumption the modeled rates and future inflationary increases will ber adopted
Table 4 - Operating Costs and Net Income	Operating costs projected for 10 years
Table 5 - Capital Improvements Program (CIP)	Capital improvements and how they will be paid over next 10 years, including debt service
Table 6 - Equipment Replacement Schedule - Detailed	Detailed schedule of equipment replacements for next 20 years, if applicable
Table 7 - Equipment Replacement Annuity Calculation	Calculation of the annual annuity (yearly savings amount) needed to pay for all equipment replacements as they come due and ending with the desired balance
Table 8 - Average Cost Classification	Sumation of a target year's costs and calculation of the "cost of service" rate structure basis for recovery of fixed costs and variable costs
Table 9 - Marginal Cost Classification	Calculation of costs incurred to serve a specified type of customer, if applicable
Table 10 - Initial Rate Adjustments and Resulting Revenues	These are the modeled user rates and the resulting "blended" revenues they, and the current rates, will generate during the rate adjustment year
Table 11 - Capacity Costs	Calculation of the various costs to build base and peak flow capacity to serve customers, when such fees will be based on water meter size
Table 12 - AWWA Safe Operating Capacities by Meter Size	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.
Table 13 - System Development Fees	Calculation of meter size-based system development fees needed to recover costs calculated in Table 11, when such fees will be based on water meter size
Table 14 - Revenues From System Development Fees	Calculation of total fee revenues that would be generated during one full year at the fees in Table 13.
Table 15 - Minimum Charge Fees, Including Capacity Surcharges	Calculation of meter size-based capacity surcharges and minimum charges to recover costs calculated in Table 11, when such fees will be based on water meter size
Table 16 - Revenues From Minimum Surcharges	Calculation of total fee revenues that would be generated during one full year at the fees in Table 15.
Table 17 - Financial Capacity Indicators and Reserves	Shows the financial effects of the modeled rates, costs, etc. on the utility and on the benchmark 5,000 gallon per month residential water or sewer customer, as appropriate
Table 18 - Bills Before and After Rate Adjustments	Bills at the modeled rates are compared to those under the current rates. Note: the modeled bills do not include capacity surcharges to the minimum charges unless they are included in the minimum charges column of Table 10.
Table 19 - User Statistics	For volume ranges within each rate class, this table shows volumes and percentages of use, revenue generated and other statistics
Chart 1 - Operating Ratio	*Graph of operating ratio for 10 years as a result of the modeled rates and the current rates*
Chart 2 - Coverage Ratio	*Graph of coverage ratios for 10 years of the modeled rates and the current rates*
Chart 3 - 5,000 Gallon Residential User's Bill	*Graph of the bill for the benchmark 5,000 gallon per month residential user, with smallest available meter size (used in grant and loan eligibility determinations) as a result of the modeled rates, and the current rates*
Chart 4 - Affordability Index	*Graph of the affordability index for 10 years of the benchmark residential user's bill (used in grant and loan eligibility determinations)*
Chart 5 - Working Capital vs Goal	*Graph for 10 years of total (unobligated) cash assets at modeled rates compared to the goal for total cash assets*
Chart 6 - Value of Cash Assets Before Inflation	*Graph for 10 years of unobligated cash assets NOT adjusted for inflation at modeled rates and current rates*
Chart 7 - Value of Cash Assets After Inflation	*Graph for 10 years of unobligated cash assets adjusted for inflation at modeled rates and current rates. This is the real buying power of cash reserves.*
Chart 8 - Sum of All Reserves	*Graph of all reserves of all kinds at the modeled rates and at the current rates*

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

Wardwell Water & Sewer District; 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

$6,403	Fees to GettingGreatRates.com
$500	Estimated value of system staff time and incidentals to assemble needed information
$6,903	Total Investment for This Analysis
$1,116,842	Five-year Increase in Revenue Due at Least Partly to This Analysis
16,180%	Five-year Return on Investment (increase in revenues / investment)
$2,863,241	Ten-year Improvement in Cash Position Due at Least Partly to This Analysis
41,480%	Ten-year Return on Investment (increase in revenues / investment)

Table 1 - Rates

Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

Unless rates were recently changed, these are the current rates. At the least, these rates were in effect at the end of 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
All Customers Except Construction	0	$15.00	0.000	$3.50
	1,000	$15.00	0.000	$3.50
	2,000	$15.00	0.000	$3.50
	3,000	$15.00	0.000	$3.50
	4,000	$15.00	0.000	$3.50
	5,000	$15.00	0.000	$3.50
	150,000	$15.00	0.000	$3.50
Construction Water Customers	0	$50.00	0.000	$4.00
	1,000	$50.00	0.000	$4.00
	2,000	$50.00	0.000	$4.00
	3,000	$50.00	0.000	$4.00
	4,000	$50.00	0.000	$4.00
	5,000	$50.00	0.000	$4.00
	150,000	$50.00	0.000	$4.00
System Flushing and Jetting	0	$0.00	0.000	$0.00
	1,000	$0.00	0.000	$0.00
	2,000	$0.00	0.000	$0.00
	3,000	$0.00	0.000	$0.00
	4,000	$0.00	0.000	$0.00
	5,000	$0.00	0.000	$0.00
	150,000	$0.00	0.000	$0.00

Table 2 - Test Year Usage
Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

This table shows usage by all customers during the test year.

Test year = the one-year period being analyzed starts: 7/1/2018

Date this scenario created: 7/25/2019

Residential meter readings per year: 12

Other customer readings per year: 12

Bills per year: 12

Customer, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Count of Bills With ANY Use in Each Range	Use in Each Range in Gallons	Count of Bills That "Maxed Out" in Each Range	Volume of Bills That "Maxed Out" in Each Range	# of Customers That "Maxed Out" in Each Range	% of Customers That "Maxed Out" in Each Range	% of Total Use in Each Range
All Customers Except Construction	0	999	0	0	0	0	0	0.0%	0.0%
	1,000	1,999	0	0	0	0	0	0.0%	0.0%
	8,000	8,999	19,036	162,386,400	19,036	162,386,400	1,586	99.8%	93.0%
			19,036	162,386,400	19,036	162,386,400	1,586	99.8%	93.0%
Construction Water Customers	0	999	0	0	0	0	0	0.0%	0.0%
	1,000	1,999	0	0	0	0	0	0.0%	0.0%
	150,000	999,999	24	7,261,400	24	7,261,400	2	0.1%	4.2%
			24	7,261,400	24	7,261,400	2	0.1%	4.2%
System Flushing and Jetting	0	999	0	0	0	0	0	0.0%	0.0%
	1,000	1,999	0	0	0	0	0	0.0%	0.0%
	150,000	999,999	15	4,981,100	15	4,981,100	1	0.1%	2.9%
			15	4,981,100	15	4,981,100	1	0.1%	2.9%
		Grand Totals:	19,075	174,628,900	19,075	174,628,900	1,590	100%	100%

Table 3 - Operating Incomes and Basic User Data

Wardwell Water & Sewer District; 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)

$55,013	Census Bureau estimate of AMHI for the year	2017
$53,559	Census Bureau estimate of AMHI for the year	2016
$1,454	AMHI growth during this time period	
2.71%	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

19	Number of new connections made during the test year
$2,050	Average tap or installation fee assessed during the test year

This model is programmed for rates to be reset in the "Analysis Year," also called the "0 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. 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. If rates will not be adjusted during the "0 Year," an adjustment (normally a revenue reduction) was calculated below to account for the late start in making the first adjustments.

Basic User (Customer) Data

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

	Inflation/ Deflation (–) Factor	Test Year	Analysis Year 0 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 7/1/18	Starting 7/1/19	Starting 7/1/20	Starting 7/1/21	Starting 7/1/22	Starting 7/1/23	Starting 7/1/24	Starting 7/1/25	Starting 7/1/26	Starting 7/1/27	Starting 7/1/28	Starting 7/1/29
Rate Increases Projected for Future Years	N.A.	N.A.	N.A.	2.0%	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.	1,590	1,593	1,596	1,597	1,598	1,599	1,600	1,601	1,602	1,603	1,604	1,605
Customers Added or Lost (-) During the Year	N.A.	19.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Customer Growth or Loss (-) Rate	N.A.	1.20%	0.19%	0.19%	0.19%	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%
Actual (Test Year) and Projected Volumes, in Gallons	N.A.	174,628,900	174,958,475	175,288,050	175,397,908	175,507,766	175,617,625	175,727,483	175,837,341	175,947,199	176,057,058	176,166,916	176,276,774
How User Charge Fees Were Calculated, Accounting for New Customers and Future Rate Increases													
Actual or Calculated Sales Revenues		$813,333	$920,153	$975,695	$997,080	$1,018,934	$1,039,963	$1,061,426	$1,083,332	$1,105,689	$1,128,506	$1,151,795	$1,175,563
Additional Sales Revenues From New Customers			$862	$1,834	$1,875	$638	$651	$664	$677	$690	$704	$718	$733
Total Calculated Revenues (User Charge Fees)		$813,333	$921,015	$977,530	$998,955	$1,019,572	$1,040,614	$1,062,090	$1,084,008	$1,106,379	$1,129,211	$1,152,513	$1,176,296
Operating Incomes													
User Charge Fees (Including Construction Water Sales)	N.A.	$828,427	$938,108	$995,672	$1,017,494	$1,038,494	$1,059,927	$1,081,801	$1,104,126	$1,126,912	$1,150,168	$1,173,902	$1,198,127
Late Payment Charge	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Water Connection Fee and Water System Development Charge - District	% Above	$38,957	$3,092	$0	$0	$0	$0	$0	$0	$0	$0	$1	$2
Meter Size-based System Development Fees (Table 14)	% Above	$0	$3,849	$7,895	$2,684	$2,738	$2,793	$2,849	$2,906	$2,964	$3,023	$3,083	$3,145
Interest Income	N.A.	$6,212	$5,878	$5,811	$6,149	$6,316	$6,477	$6,624	$6,811	$6,867	$6,833	$6,620	$6,136
Miscellaneous Income (Excluding Construction Water Sales)	N.A.	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916	$23,916
Property Taxes	N.A.	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555	$275,555
System Investment Charge - Regional	N.A.	$18,414	$2,907	$2,907	$969	$969	$969	$969	$969	$969	$969	$969	$969
Total Operating Incomes		**$1,191,482**	**$1,253,306**	**$1,311,756**	**$1,326,768**	**$1,347,989**	**$1,369,637**	**$1,391,714**	**$1,414,284**	**$1,437,184**	**$1,460,464**	**$1,484,048**	**$1,507,850**

Table 4 - Operating Costs and Net Income

Wardwell Water & Sewer District; 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.)			Analysis Year	Years Following the Analysis Year (for Which Results Have Been Projected)									
	Inflation/ Deflation (–) Factor	Test Year Starting 7/1/18	0 Year Starting 7/1/19	1st Year Starting 7/1/20	2nd Year Starting 7/1/21	3rd Year Starting 7/1/22	4th Year Starting 7/1/23	5th Year Starting 7/1/24	6th Year Starting 7/1/25	7th Year Starting 7/1/26	8th Year Starting 7/1/27	9th Year Starting 7/1/28	10th Year Starting 7/1/29
Salaries - Directors	3.0%	$1,664	$1,714	$1,766	$1,819	$1,873	$1,930	$1,987	$2,047	$2,108	$2,172	$2,237	$2,304
Salaries - Employees	3.0%	$229,548	$236,434	$243,527	$250,833	$258,358	$266,109	$274,092	$282,315	$290,784	$299,508	$308,493	$317,748
WY Retirement - District 10.69%	3.0%	$24,911	$25,658	$26,428	$27,221	$28,037	$28,878	$29,745	$30,637	$31,556	$32,503	$33,478	$34,482
Attorney Fees	3.0%	$32,958	$33,947	$34,965	$36,014	$37,094	$38,207	$39,354	$40,534	$41,750	$43,003	$44,293	$45,622
Supervision & Engineering	3.0%	$67,783	$69,817	$71,911	$74,069	$76,291	$78,580	$80,937	$83,365	$85,866	$88,442	$91,095	$93,828
Office Equipment	3.0%	$6,032	$6,213	$6,399	$6,591	$6,789	$6,993	$7,202	$7,419	$7,641	$7,870	$8,106	$8,350
Office Supplies	3.0%	$13,669	$14,079	$14,501	$14,937	$15,385	$15,846	$16,322	$16,811	$17,316	$17,835	$18,370	$18,921
Books, Periodical, & Ads	3.0%	$431	$444	$457	$471	$485	$500	$515	$530	$546	$562	$579	$597
Meetings, Schools & Travel	3.0%	$1,086	$1,119	$1,152	$1,187	$1,223	$1,259	$1,297	$1,336	$1,376	$1,417	$1,460	$1,504
Maintenance of Vehicle	3.0%	$2,284	$2,352	$2,423	$2,496	$2,571	$2,648	$2,727	$2,809	$2,893	$2,980	$3,069	$3,162
Gas & Oil	3.0%	$4,311	$4,440	$4,574	$4,711	$4,852	$4,998	$5,148	$5,302	$5,461	$5,625	$5,794	$5,968
Water Purchases - Joint Powers Brd	3.0%	$258,594	$266,854	$275,376	$284,171	$292,879	$301,854	$311,104	$320,637	$330,463	$340,589	$351,026	$361,782
Maintenance of Lines	3.0%	$17,985	$18,525	$19,081	$19,653	$20,243	$20,850	$21,475	$22,120	$22,783	$23,467	$24,171	$24,896
Meter Expense	3.0%	$165,623	$170,592	$175,710	$180,981	$186,410	$192,003	$197,763	$203,696	$209,806	$216,101	$222,584	$229,261
General Maintenance	3.0%	$558	$575	$592	$610	$628	$647	$667	$687	$707	$728	$750	$773
Chemicals & Materials	3.0%	$1,555	$1,605	$1,656	$1,709	$1,761	$1,815	$1,871	$1,928	$1,987	$2,048	$2,111	$2,175
Water Installations	3.0%	$1,878	$1,935	$1,993	$2,052	$2,114	$2,177	$2,243	$2,310	$2,379	$2,451	$2,524	$2,600
Power/tank & Booster	3.0%	$161,293	$166,445	$171,760	$177,246	$182,677	$188,275	$194,045	$199,991	$206,119	$212,435	$218,945	$225,654
Insurance - Building	3.0%	$8,778	$9,041	$9,312	$9,592	$9,879	$10,176	$10,481	$10,796	$11,119	$11,453	$11,797	$12,151
Insurance - Vehicles	3.0%	$2,321	$2,391	$2,463	$2,537	$2,613	$2,691	$2,772	$2,855	$2,941	$3,029	$3,120	$3,213
Insurance - Public Liability	3.0%	$5,639	$5,808	$5,982	$6,162	$6,347	$6,537	$6,733	$6,935	$7,143	$7,358	$7,578	$7,806
Insurance - Employee Group	3.0%	$87	$89	$92	$95	$98	$101	$104	$107	$110	$113	$117	$120
Insurance - Surety Bond	3.0%	$980	$1,010	$1,040	$1,071	$1,103	$1,136	$1,170	$1,206	$1,242	$1,279	$1,317	$1,357
Soc Sec District Share	3.0%	$17,688	$18,218	$18,765	$19,328	$19,908	$20,505	$21,120	$21,754	$22,406	$23,078	$23,771	$24,484
Workmen's Compensation	3.0%	$2,334	$2,404	$2,476	$2,551	$2,627	$2,706	$2,787	$2,871	$2,957	$3,046	$3,137	$3,231
Unemployment Compensation	3.0%	$3,991	$4,111	$4,234	$4,361	$4,492	$4,627	$4,765	$4,908	$5,056	$5,207	$5,364	$5,524
Business Phone	3.0%	$5,331	$5,491	$5,656	$5,826	$6,001	$6,181	$6,366	$6,557	$6,754	$6,956	$7,165	$7,380
Accounting & Collection	3.0%	$9,023	$9,294	$9,573	$9,860	$10,156	$10,460	$10,774	$11,097	$11,430	$11,773	$12,126	$12,490
Light & Power Purchased	3.0%	$2,687	$2,768	$2,851	$2,936	$3,024	$3,115	$3,208	$3,305	$3,404	$3,506	$3,611	$3,719
Natural Gas	3.0%	$1,627	$1,675	$1,726	$1,777	$1,831	$1,886	$1,942	$2,001	$2,061	$2,122	$2,186	$2,252
Maintenance of Building	3.0%	$8,329	$8,579	$8,836	$9,101	$9,374	$9,655	$9,945	$10,243	$10,551	$10,867	$11,193	$11,529
Safety Equipment	3.0%	$336	$346	$356	$367	$378	$389	$401	$413	$425	$438	$451	$464
Shop Equipment	3.0%	$4,663	$4,803	$4,947	$5,096	$5,249	$5,406	$5,568	$5,735	$5,907	$6,085	$6,267	$6,455
System Invest Charge (Regional)	3.0%	$96,938	$15,277	$15,249	$15,249	$5,076	$5,073	$5,070	$5,067	$5,064	$5,061	$5,057	$5,054
Refund of Surety Bond	3.0%	$12,640	$1,996	$1,996	$665	$665	$665	$665	$665	$665	$665	$665	$665
One-time Reduction of R&R Annuity	0.0%	-$79,900	-$40,168	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Payment to R&R Reserve (Table 7)	0.0%	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900	$79,900
User Charge Analysis Services	5.0%	$0	$6,403	$0	$0	$7,059	$0	$0	$7,783	$0	$0	$8,580	$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		**$1,175,557**	**$1,162,183**	**$1,229,725**	**$1,263,241**	**$1,295,450**	**$1,324,777**	**$1,362,265**	**$1,408,670**	**$1,440,678**	**$1,481,672**	**$1,532,487**	**$1,567,420**
Net Income (or Loss)		$15,925	$91,123	$82,031	$63,527	$52,539	$44,860	$29,449	$5,614	-$3,494	-$21,209	-$48,439	-$59,569
Working Capital Goal: 50%	In Dollars, That is:	$587,779	$581,091	$614,863	$631,621	$647,725	$662,389	$681,133	$704,335	$720,339	$740,836	$766,244	$783,710

Notes: Cost items are projected to grow due to inflation. Yellow highlighted items are projected to grow by inflation, plus by the rate of growth in new connections.

Table 5 - Capital Improvement Program (CIP)

Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

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

	Analysis Year	Years Following the Analysis Year (for Which Improvement Projects, Costs, Funding, etc. Have Been Projected)										
	Test Year Starting	0 Year Starting	1st Year Starting	2nd Year Starting	3rd Year Starting	4th Year Starting	5th Year Starting	6th Year Starting	7th Year Starting	8th Year Starting	9th Year Starting	10th Year Starting
	7/1/18	7/1/19	7/1/20	7/1/21	7/1/22	7/1/23	7/1/24	7/1/25	7/1/26	7/1/27	7/1/28	7/1/29
Planned Spending, Debt-paid Portion of Projects (CIP costs to be funded with loans are shown in this section.)												
Blair Lane Water Main Replacement Project	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt-paid Portion of Projects	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Planned Spending, Grant-paid Portion of Projects (CIP costs to be grant-funded are shown here.)												
Blair Lane Water Main Replacement Project	$0	$0	$1,030,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Grant-paid Portion of Projects	$0	$0	$1,030,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Planned Spending, Cash-paid Portion of Projects (CIP costs to be funded from reserves are shown here.)												
Blair Lane Water Main Replacement Project	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Cash-paid Portion of Projects	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total CIP Costs	**$0**	**$0**	**$1,030,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt Repayment												
Existing Debt Payments (Following is debt that was initiated during the test year or earlier.)												
None	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
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 2.0% interest rate.)												
Loan Originated in 1st Year				$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt Payments	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total CIP-related Payouts	**$0**	**$0**	**$1,030,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
(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												
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	$0	$1,681,763	$1,813,208	$1,897,732	$1,982,456	$2,058,540	$2,129,907	$2,183,210	$2,226,874	$2,271,411	$2,316,840	$2,363,176
Working Capital Transferred in	$1,681,763	$97,810	$48,260	$46,769	$36,435	$30,196	$10,705	$0	$0	$0	$0	$0
Debt and CIP Reserves Interest Earned (or Paid)	$0	$33,635	$36,264	$37,955	$39,649	$41,171	$42,598	$43,664	$44,537	$45,428	$46,337	$47,264
Total Available Internal Funds	$1,681,763	$1,813,208	$1,897,732	$1,982,456	$2,058,540	$2,129,907	$2,183,210	$2,226,874	$2,271,411	$2,316,840	$2,363,176	$2,410,440
Grant and Loan Proceeds (External Funds)												
Blair Lane Improvement District Property Assessments	$0	$0	$1,030,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Loan Originated in 1st Year			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Available External Funds	$0	$0	$1,030,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Available Funds	**$1,681,763**	**$1,813,208**	**$2,927,732**	**$1,982,456**	**$2,058,540**	**$2,129,907**	**$2,183,210**	**$2,226,874**	**$2,271,411**	**$2,316,840**	**$2,363,176**	**$2,410,440**
Outcomes (This CIP spending and funding plan will result in the following cash needs and ending balances each year.)												
Total Available Funds	**$1,681,763**	**$1,813,208**	**$2,927,732**	**$1,982,456**	**$2,058,540**	**$2,129,907**	**$2,183,210**	**$2,226,874**	**$2,271,411**	**$2,316,840**	**$2,363,176**	**$2,410,440**
Total CIP-related Payouts	**$0**	**$0**	**$1,030,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt and CIP Reserves Ending Balances	**$1,681,763**	**$1,813,208**	**$1,897,732**	**$1,982,456**	**$2,058,540**	**$2,129,907**	**$2,183,210**	**$2,226,874**	**$2,271,411**	**$2,316,840**	**$2,363,176**	**$2,410,440**

Notes: Facilities are fairly new and in good repair. Little CIP will be needed for some years. There is only one water main replacement anticipated at this time. This is for the Blair Lane area and will be paid for with property assessments on properties in that area.

Table 6 - Equipment Replacement Schedule - Detailed

Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

Year Beginning	Occasional Fire Hydrants, Valves, etc.	Oldest (2008) Pickup Truck (Water)	Next Oldest Pickup Truck (Water)	Next Oldest Pickup Truck (Sewer)	Next Oldest Pickup Truck (Water)	Newest (2015) Pickup Truck (Water)	Infrequent (Sewer) Lift Station Pump R&R			Total Annual Replacement Costs
7/1/19	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/20	$40,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$70,000
7/1/21	$40,000	$0	$30,000	$0	$0	$0	$0	$0	$0	$70,000
7/1/22	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/23	$40,000	$0	$0	$0	$30,000	$0	$0	$0	$0	$70,000
7/1/24	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/25	$40,000	$0	$0	$0	$0	$30,000	$0	$0	$0	$70,000
7/1/26	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/27	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/28	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/29	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/30	$40,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$70,000
7/1/31	$40,000	$0	$30,000	$0	$0	$0	$0	$0	$0	$70,000
7/1/32	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/33	$40,000	$0	$0	$0	$30,000	$0	$0	$0	$0	$70,000
7/1/34	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/35	$40,000	$0	$0	$0	$0	$30,000	$0	$0	$0	$70,000
7/1/36	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/37	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/38	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/39	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/40	$40,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$70,000
7/1/41	$40,000	$0	$30,000	$0	$0	$0	$0	$0	$0	$70,000
7/1/42	$40,000	$0	$0	$0	$0	$0	$0	$0	$0	$40,000
7/1/43	$40,000	$0	$0	$0	$30,000	$0	$0	$0	$0	$70,000

Table 7 - Equipment Replacement Annuity Calculation

Wardwell Water & Sewer District; 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
7/1/19	Analysis Year	$40,000	$40,000	$0	-$40,000	$200,000
7/1/20	1st Year	$70,000	$72,100	-$800	-$33,000	$206,000
7/1/21	2nd Year	$70,000	$74,263	-$660	-$28,024	$212,180
7/1/22	3rd Year	$40,000	$43,709	-$560	$7,606	$218,545
7/1/23	4th Year	$70,000	$78,786	$152	$8,872	$225,102
7/1/24	5th Year	$40,000	$46,371	$177	$42,578	$231,855
7/1/25	6th Year	$70,000	$83,584	$852	$39,745	$238,810
7/1/26	7th Year	$40,000	$49,195	$795	$71,245	$245,975
7/1/27	8th Year	$40,000	$50,671	$1,425	$101,899	$253,354
7/1/28	9th Year	$40,000	$52,191	$2,038	$131,645	$260,955
7/1/29	10th Year	$40,000	$53,757	$2,633	$160,421	$268,783
7/1/30	11th Year	$70,000	$96,896	$3,208	$146,632	$276,847
7/1/31	12th Year	$70,000	$99,803	$2,933	$129,661	$285,152
7/1/32	13th Year	$40,000	$58,741	$2,593	$153,413	$293,707
7/1/33	14th Year	$70,000	$105,881	$3,068	$130,499	$302,518
7/1/34	15th Year	$40,000	$62,319	$2,610	$150,690	$311,593
7/1/35	16th Year	$70,000	$112,329	$3,014	$121,274	$320,941
7/1/36	17th Year	$40,000	$66,114	$2,425	$137,485	$330,570
7/1/37	18th Year	$40,000	$68,097	$2,750	$152,037	$340,487
7/1/38	19th Year	$40,000	$70,140	$3,041	$164,837	$350,701

Notes: There is currently no R&R schedule. This schedule mainly replaces service trucks on a 10-year cycle. Because R&R costs will likely be higher in the future, a Discretionary Annuity amount was added so that at the end of the 20-year modeling period, the balance will be double the average of the annual replacement cost amounts, less interest paid for borrowing during the negative balance years.

Starting Account Balance	$0	$200,000
Minimum Annual Annuity	$72,683	Minimum Desired Balance in Today's Dollars
Discretionary Annuity	$7,217	

Required Annual Deposit (Annuity) to Replacement Account **$79,900**

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

Table 8 - Average Cost Classification

Wardwell Water & Sewer District; 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: 7/1/2023 through 6/30/2024

Cost Items	Cost During Rate Structure Basis Year	Fixed Cost %	Variable Cost %	Fixed Cost	Variable Cost
Salaries - Directors	$1,930	100.0%	0.0%	$1,930	$0
Salaries - Employees	$266,109	33.3%	66.7%	$88,694	$177,415
WY Retirement - District 10.69%	$28,878	33.8%	66.2%	$9,764	$19,115
Attorney Fees	$38,207	24.5%	75.5%	$9,361	$28,847
Supervision & Engineering	$78,580	24.5%	75.5%	$19,252	$59,328
Office Equipment	$6,993	100.0%	0.0%	$6,993	$0
Office Supplies	$15,846	100.0%	0.0%	$15,846	$0
Books, Periodical, & Ads	$500	100.0%	0.0%	$500	$0
Meetings, Schools & Travel	$1,259	33.8%	66.2%	$426	$834
Maintenance of Vehicle	$2,648	33.3%	66.7%	$882	$1,765
Gas & Oil	$4,998	33.3%	66.7%	$1,666	$3,332
Water Purchases - Joint Powers Brd	$301,854	0.0%	100.0%	$0	$301,854
Maintenance of Lines	$20,850	33.3%	66.7%	$6,949	$13,901
Meter Expense	$192,003	33.3%	66.7%	$63,994	$128,008
General Maintenance	$647	100.0%	0.0%	$647	$0
Chemicals & Materials	$1,815	100.0%	0.0%	$1,815	$0
Water Installations	$2,177	24.5%	75.5%	$533	$1,644
Power/tank & Booster	$188,275	0.0%	100.0%	$0	$188,275
Insurance - Building	$10,176	100.0%	0.0%	$10,176	$0
Insurance - Vehicles	$2,691	100.0%	0.0%	$2,691	$0
Insurance - Public Liability	$6,537	100.0%	0.0%	$6,537	$0
Insurance - Employee Group	$101	33.8%	66.2%	$34	$67
Insurance - Surety Bond	$1,136	100.0%	0.0%	$1,136	$0
Soc Sec District Share	$20,505	33.8%	66.2%	$6,933	$13,572
Workmen's Compensation	$2,706	33.8%	66.2%	$915	$1,791
Unemployment Compensation	$4,627	33.8%	66.2%	$1,564	$3,062
Business Phone	$6,181	100.0%	0.0%	$6,181	$0
Accounting & Collection	$10,460	100.0%	0.0%	$10,460	$0
Light & Power Purchased	$3,115	100.0%	0.0%	$3,115	$0
Natural Gas	$1,886	100.0%	0.0%	$1,886	$0
Maintenance of Building	$9,655	100.0%	0.0%	$9,655	$0
Safety Equipment	$389	100.0%	0.0%	$389	$0
Shop Equipment	$5,406	100.0%	0.0%	$5,406	$0
Sewer Connection Charge to Casper	$0	100.0%	0.0%	$0	$0
System Invest Charge (Regional)	$5,073	100.0%	0.0%	$5,073	$0
Refund of Surety Bond	$665	100.0%	0.0%	$665	$0

Table 8 - Average Cost Classification

Cost Items	Cost During Rate Structure Basis Year	Fixed Cost %	Variable Cost %	Fixed Cost	Variable Cost
Annual Payment to R&R Reserve (Table 7)	$79,900	33.3%	66.7%	$26,631	$53,269
User Charge Analysis Services	$0	33.3%	66.7%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	-$7,290	24.5%	0.0%	-$1,786	$0
Grand Total Costs, Weighted Avg Percentages	$1,317,487	24.8%	75.6%	$326,914	$996,078

Bases for Cost to Serve Rate Structure			
Number Customers During Year Defined Above	1,599	100%	$1,322,991
Billed Volume, in Gallons, During Year Defined Above	175,617,625	Unbilled-for Water is Estimated at	8%
Average Fixed Cost per User per Month During Year Defined Above	$17.04	Unbilled-for Water is Estimated at This Percentage of Average Cost	56%
Average Variable Cost to Produce per 1,000 Gallons During Year Defined Above	$5.67	Resulting Cost of Unbilled-for Water	$47,774
Gallons per Billing Cycle Used by Average Residential Customer	8,530	Test Year Customer Metered Volume, in Gallons	174,628,900
		+ Test Year Unbilled-for Water, in Gallons	14,840,943
		Total Test Year Volume, in Gallons, From Master Meter Readings	189,469,843

Table 9 - Marginal Cost Classification

Wardwell Water & Sewer District; 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.

Below, it is assumed that marginal costs are being calculated for: Cost of Water Loss

The marginal rate structure basis year runs from: 7/1/2023 through 6/30/2024

Cost Items	Fixed Cost	Variable Cost	Marginal Fixed Cost %	Marginal Variable Cost %	Marginal Fixed Cost	Marginal Variable Cost
Salaries - Directors	$1,930	$0	100.0%	0.0%	$1,930	$0
Salaries - Employees	$88,694	$177,415	50.0%	25.0%	$44,347	$44,354
WY Retirement - District 10.69%	$9,764	$19,115	50.0%	25.0%	$4,882	$4,779
Attorney Fees	$9,361	$28,847	50.0%	0.0%	$4,680	$0
Supervision & Engineering	$19,252	$59,328	50.0%	0.0%	$9,626	$0
Office Equipment	$6,993	$0	50.0%	0.0%	$3,496	$0
Office Supplies	$15,846	$0	50.0%	0.0%	$7,923	$0
Books, Periodical, & Ads	$500	$0	50.0%	0.0%	$250	$0
Meetings, Schools & Travel	$426	$834	50.0%	25.0%	$213	$208
Maintenance of Vehicle	$882	$1,765	50.0%	25.0%	$441	$441
Gas & Oil	$1,666	$3,332	50.0%	25.0%	$833	$833
Water Purchases - Joint Powers Brd	$0	$301,854	50.0%	100.0%	$0	$301,854
Maintenance of Lines	$6,949	$13,901	50.0%	25.0%	$3,475	$3,475
Meter Expense	$63,994	$128,008	50.0%	0.0%	$31,997	$0
General Maintenance	$647	$0	50.0%	25.0%	$324	$0
Chemicals & Materials	$1,815	$0	50.0%	25.0%	$908	$0
Water Installations	$533	$1,644	50.0%	0.0%	$267	$0
Power/tank & Booster	$0	$188,275	50.0%	100.0%	$0	$188,275
Sewer Treatment Charge-Casper	$0	$0	50.0%	0.0%	$0	$0
Maintenance of Sewer Lines	$0	$0	50.0%	0.0%	$0	$0
Sewer Line Installation	$0	$0	50.0%	0.0%	$0	$0
Sewer Treatment Charge-Mills	$0	$0	50.0%	0.0%	$0	$0
Maintenance of Sewer Lift Station	$0	$0	50.0%	0.0%	$0	$0
Insurance - Building	$10,176	$0	50.0%	0.0%	$5,088	$0
Insurance - Vehicles	$2,691	$0	50.0%	0.0%	$1,346	$0
Insurance - Public Liability	$6,537	$0	50.0%	0.0%	$3,269	$0
Insurance - Employee Group	$34	$67	50.0%	0.0%	$17	$0
Insurance - Surety Bond	$1,136	$0	50.0%	0.0%	$568	$0
Soc Sec District Share	$6,933	$13,572	50.0%	25.0%	$3,466	$3,393
Workmen's Compensation	$915	$1,791	50.0%	25.0%	$457	$448
Unemployment Compensation	$1,564	$3,062	50.0%	25.0%	$782	$766
Business Phone	$6,181	$0	50.0%	0.0%	$3,090	$0
Accounting & Collection	$10,460	$0	50.0%	0.0%	$5,230	$0
Light & Power Purchased	$3,115	$0	50.0%	0.0%	$1,557	$0

Table 9 - Marginal Cost Classification

Cost Items	Fixed Cost	Variable Cost	Marginal Fixed Cost %	Marginal Variable Cost %	Marginal Fixed Cost	Marginal Variable Cost
Natural Gas	$1,886	$0	50.0%	0.0%	$943	$0
Maintenance of Building	$9,655	$0	50.0%	0.0%	$4,828	$0
Safety Equipment	$389	$0	50.0%	25.0%	$194	$0
Shop Equipment	$5,406	$0	50.0%	25.0%	$2,703	$0
Sewer Connection Charge to Casper	$0	$0	50.0%	0.0%	$0	$0
System Invest Charge (Regional)	$5,073	$0	50.0%	0.0%	$2,537	$0
Refund of Surety Bond	$665	$0	50.0%	0.0%	$333	$0
Payroll Expenses	$0	$0	50.0%	25.0%	$0	$0
Annual Payment to R&R Reserve (Table 7)	$26,631	$53,269	50.0%	25.0%	$13,315	$13,317
User Charge Analysis Services	$0	$0	50.0%	0.0%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	-$1,786	$0	50.0%	25.0%	-$893	$0
Grand Total All Costs	$326,914	$996,078			$164,422	$562,143
	$1,322,991				$726,565	

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

	Monthly Marginal Fixed Cost per Customer	Marginal Variable Cost per 1,000 Gallons
	$8.57	
Marginal Fixed Cost as a Percent of Total Fixed Cost:	50%	$3.20
Marginal Variable Cost as a Percent of Total Variable Cost:		56%

Table 10 - Initial Rate Adjustments and Resulting Revenues
Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

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

Out of District Multiplier	125%	Conservation Rate Block Multiplier	100%	Other Multiplier	100%

1/1/20 — Date when fees will first be collected at adjusted rates. Actual adjustment should occur one billing cycle earlier.

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

Blended Sales Revenues: 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 after the modeled rates are adopted. The "blended" sales 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	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	Total "Blended" Sales This Year
All Customers Except Construction	0	999	$0	$17.75	0.000	$3.26	$0	$0
	1,000	1,999	$0	$17.75	0.000	$3.26	$0	$0
	2,000	2,999	$0	$17.75	0.000	$3.26	$0	$0
	3,000	3,999	$0	$17.75	0.000	$3.26	$0	$0
	4,000	4,999	$0	$17.75	0.000	$3.26	$0	$0
	5,000	5,999	$0	$17.75	0.000	$3.26	$0	$0
	6,000	6,999	$0	$17.75	0.000	$3.26	$0	$0
	7,000	7,999	$0	$17.75	0.000	$3.26	$0	$0
	8,000	8,999	$429,279	$17.75	0.000	$3.26	$431,270	$860,549
	150,000	999,999	$0	$17.75	0.000	$3.26	$0	$0
Construction Water Customers	0	999	$0	$52.75	0.000	$3.76	$0	$0
	1,000	1,999	$0	$52.75	0.000	$3.76	$0	$0
	150,000	999,999	$15,205	$52.75	0.000	$3.76	$14,206	$29,412
System Flushing and Jetting	0	999	$0	$0.00	0.000	$0.00	$0	$0
	1,000	1,999	$0	$0.00	0.000	$0.00	$0	$0
	150,000	999,999	$0	$0.00	0.000	$0.00	$0	$0
Total Rate Revenue at Current Rates			$444,485	Total Rate Revenue at Modeled Rates			$445,476	
Prorated capacity surcharges from Table 16 (minimum charges above do not include them)								$30,192
Total Blended Rate Revenues for the Year								$920,153

Note: New Minimum Charge Base Rates: If meter 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 size surcharges as calculated in Table 16. Either way, the narrative report includes the rates and surcharges to assess.

6.0	months at the old user charge rates	and	6.0	months at the new user charge rates.

Table 11 - Capacity Costs

Wardwell Water & Sewer District; 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)
	$7,189,166	50.0%	$3,594,583	$209,486	50.0%	$3,594,583	$209,486
Totals	$7,189,166		$3,594,583	$209,486		$3,594,583	$209,486

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

3.480%	Target Percentage of Costs to Recover
$7,290	Target Portion of Costs to Recover
$1,900	Cost per Peak Flow Capacity Share

Base Flow Capacity Costs to be Recovered by System Development Fees

0.0%	Target Percentage of Costs to Recover
$0	Target Portion of Costs to Recover
$0	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
$150	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

96.5%	Target Percentage of Costs to Recover
$202,196	Target Portion of Costs to Recover in One Full Year
$16,850	Target Portion of Costs to Recover in Monthly Surcharges
$7.96	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

Wardwell Water & Sewer District; 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
Wardwell Water & Sewer District; 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.

In-District

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 Adj	Foot Notes	Peak Plus Base Capacity Cost	Field and Admin Cost per New Connection	System Development Fee
Five Eighths	Displacement	0.625	0.307	1.0	100%	1.0		$1,900	$150	$2,050
Three Quarters	Displacement	0.750	0.442	1.0	100%	1.0	1	$1,900	$150	$2,050
One Inch	Displacement	1.000	0.785	2.5	100%	2.5		$4,750	$150	$4,900
One & a Half Inch	Displacement	1.500	1.767	5.0	100%	5.0		$9,500	$150	$9,650
Two Inch	Displacement	2.000	3.142	8.0	100%	8.0		$15,200	$150	$15,350
Two & a Half Inch	Displacement	2.500	4.909	12.5	100%	12.5	2	$23,750	$150	$23,900
Three Inch	Singlet	3.000	7.069	16.0	100%	16.0		$30,400	$150	$30,550
Three Inch	Compound, Class I	3.000	7.069	16.0	100%	16.0		$30,400	$150	$30,550
Three Inch	Turbine, Class I	3.000	7.069	17.5	100%	17.5		$33,249	$150	$33,399
Four Inch	Singlet	4.000	12.566	25.0	100%	25.0		$47,499	$150	$47,649
Four Inch	Compound, Class I	4.000	12.566	25.0	100%	25.0		$47,499	$150	$47,649
Four Inch	Turbine, Class I	4.000	12.566	31.0	100%	31.0		$58,899	$150	$59,049
Six Inch	Singlet	6.000	28.274	50.0	100%	50.0		$94,999	$150	$95,149
Six Inch	Compound, Class I	6.000	28.274	50.0	100%	50.0		$94,999	$150	$95,149
Six Inch	Turbine, Class I	6.000	28.274	65.0	100%	65.0		$123,498	$150	$123,648
Eight Inch	Compound, Class I	8.000	50.266	80.0	100%	80.0		$151,998	$150	$152,148
Eight Inch	Turbine, Class I	8.000	50.266	140.0	100%	140.0		$265,996	$150	$266,146

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.

Economy of Scale Adjustments: As meter size rises, capacity to pass peak flow rises. However, costs to build that capacity do not rise as rapidly. Therefore, peak flow capacity shares were adjusted downward by an estimated cost savings factor to account for that savings. Economy of scale savings do not apply to base costs because all connections are afforded the same level of base flow capacity.

Table 14 - Revenues From System Development Fees

Wardwell Water & Sewer District; 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.

In-District

Meter Size	Meter Type	Mix of New Taps in a Typical Year	Capacity Shares After Economy of Scale Adj	Adjusted Annual Growth in Capacity Shares	Adjusted Peak Capacity Fees, One Full Year	Base Capacity Fees, One Full Year	Combined Capacity Fees, One Full Year	Adjusted Admin and Field Fees, One Full Year	**System Development Fee Revenues, One Full Year**
Five Eighths	Displacement	2.7	1.0	2.7	$5,101	$0	$5,101	$403	**$5,504**
Three Quarters	Displacement	0.0	1.0	0.0	$0	$0	$0	$0	**$0**
One Inch	Displacement	0.2	2.5	0.6	$1,153	$0	$1,153	$36	**$1,189**
One & a Half Inch	Displacement	0.0	5.0	0.1	$155	$0	$155	$2	**$157**
Two Inch	Displacement	0.1	8.0	0.4	$826	$0	$826	$8	**$834**
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	$55	$0	$55	$0	**$55**
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**
	Total:	3.0		3.8	$7,290	$0	$7,290	$450	**$7,740**

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

Wardwell Water & Sewer District; 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.

In-District

Meter Size	Meter Type	Peak Plus Base Capacity Cost	Adjusted Peak Capacity-only Surcharge Revenues	Adjusted Monthly Base Capacity Cost	Base Capacity-only Surcharge Revenues	Cost to Serve Minimum From Table 10	Monthly Minimum Charge
Five Eighths	Displacement	$7.96	$141,480	$0.00	$0	$9.80	$17.75
Three Quarters	Displacement	$7.96	$0	$0.00	$0	$9.80	$17.75
One Inch	Displacement	$19.89	$31,981	$0.00	$0	$9.80	$29.68
One & a Half Inch	Displacement	$39.78	$4,296	$0.00	$0	$9.80	$49.57
Two Inch	Displacement	$63.64	$22,912	$0.00	$0	$9.80	$73.44
Two & a Half Inch	Displacement	$99.44	$0	$0.00	$0	$9.80	$109.24
Three Inch	Singlet	$127.29	$1,527	$0.00	$0	$9.80	$137.08
Three Inch	Compound, Class I	$127.29	$0	$0.00	$0	$9.80	$137.08
Three Inch	Turbine, Class I	$139.22	$0	$0.00	$0	$9.80	$149.02
Four Inch	Singlet	$198.89	$0	$0.00	$0	$9.80	$208.68
Four Inch	Compound, Class I	$198.89	$0	$0.00	$0	$9.80	$208.68
Four Inch	Turbine, Class I	$246.62	$0	$0.00	$0	$9.80	$256.41
Six Inch	Singlet	$397.77	$0	$0.00	$0	$9.80	$407.57
Six Inch	Compound, Class I	$397.77	$0	$0.00	$0	$9.80	$407.57
Six Inch	Turbine, Class I	$517.10	$0	$0.00	$0	$9.80	$526.90
Eight Inch	Compound, Class I	$636.44	$0	$0.00	$0	$9.80	$646.23
Eight Inch	Turbine, Class I	$1,113.76	$0	$0.00	$0	$9.80	$1,123.56

Table 16 - Revenues From Minimum Charges

Wardwell Water & Sewer District; 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 Adj	Current Number Meters This Size	Total Adjusted Capacity Shares	Adjusted Peak Capacity-only Surcharge Revenues	Base Capacity-only Surcharge Revenues	Capacity Surcharges for One Full Year
In-District							
Five Eighths	Displacement	1.0	1,482	1,482	$141,480	$0	$141,480
Three Quarters	Displacement	1.0	0	0	$0	$0	$0
One Inch	Displacement	2.5	134	335	$31,981	$0	$31,981
One & a Half Inch	Displacement	5.0	9	45	$4,296	$0	$4,296
Two Inch	Displacement	8.0	30	240	$22,912	$0	$22,912
Two & a Half Inch	Displacement	12.5	0	0	$0	$0	$0
Three Inch	Singlet	16.0	1	16	$1,527	$0	$1,527
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
		Total:	1,656	2,118	$202,196	$0	$202,196

Table 17 - Financial Capacity Indicators and Reserves

Wardwell Water & Sewer District; 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 7/1/18	0 Year Starting 7/1/19	1st Year Starting 7/1/20	2nd Year Starting 7/1/21	3rd Year Starting 7/1/22	4th Year Starting 7/1/23	5th Year Starting 7/1/24	6th Year Starting 7/1/25	7th Year Starting 7/1/26	8th Year Starting 7/1/27	9th Year Starting 7/1/28	10th Year Starting 7/1/29
Customary Affordability Index: Monthly Bill for a 5,000 gal per Month, Small Meter Residential Customer	$32.50	$34.05	$34.73	$35.43	$36.13	$36.86	$37.59	$38.35	$39.11	$39.90	$40.69	$41.51
AMHI Within Service Area	$58,040	$59,616	$61,235	$62,897	$64,604	$66,358	$68,160	$70,010	$71,911	$73,863	$75,868	$77,928
Affordability Index: Current Rates First Column, Modeled Rates After That	0.67%	0.69%	0.68%	0.68%	0.67%	0.67%	0.66%	0.66%	0.65%	0.65%	0.64%	0.64%
Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the cost of 60,000 gallons of residential service per year (5,000 gallons per month) divided by the Annual Median Household Income (AMHI) in the service area (gleaned from Census data or a survey). Rates near 1.0% are common in the U.S. and are generally considered affordable. Most grant agencies will not consider awarding grants if this indicator is less than 1.5 to 2.0%.												
Low-income, Low-volume Affordability Index: Monthly Bill for a 2,000 gal per Month, Low-income Residential Customer	$22.00	$24.27	$24.76	$25.25	$25.76	$26.27	$26.80	$27.33	$27.88	$28.44	$29.01	$29.59
Income at One-half the AMHI and Rising at One-half the Rate Above	$29,020	$29,414	$29,813	$30,218	$30,628	$31,044	$31,465	$31,893	$32,325	$32,764	$33,209	$33,660
Affordability for Low-income, Low-volume: Current Rates First Column, Modeled Rates After That	0.91%	0.99%	1.00%	1.00%	1.01%	1.02%	1.02%	1.03%	1.03%	1.04%	1.05%	1.05%
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 only on Social Security benefits. Such customers are more commonly the "slow pays" and "no pays" compared to others.												
Estimated Operating Ratio: Current Rates First Column, Modeled Rates After That	1.01	1.08	1.07	1.05	1.04	1.03	1.02	1.00	1.00	0.99	0.97	0.96
Operating ratio (OR) is a measure of the utility's ability to pay its operating expenses using only current incomes. 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-sized 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, Modeled Rates After That	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Coverage Ratio (CR) goes to the ability of the utility to pay its debt payments out of current incomes. 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 (shown below,) it has more ability to make debt payments than the CR implies.												

Reserves	Balance Ending on 6/30/19	Balance Ending on 6/30/20	Balance Ending on 6/30/21	Balance Ending on 6/30/22	Balance Ending on 6/30/23	Balance Ending on 6/30/24	Balance Ending on 6/30/25	Balance Ending on 6/30/26	Balance Ending on 6/30/27	Balance Ending on 6/30/28	Balance Ending on 6/30/29	Balance Ending on 6/30/30
Cash and Cash Equivalents	$587,779	$581,091	$614,863	$631,621	$647,725	$662,389	$681,133	$686,747	$683,253	$662,044	$613,605	$554,036
Other Liquid Assets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Undedicated Cash Assets	$587,779	$581,091	$614,863	$631,621	$647,725	$662,389	$681,133	$686,747	$683,253	$662,044	$613,605	$554,036
Total Cash Assets Discounted for Inflation (Future Unrestricted Purchasing Power)	$587,779	$581,091	$596,417	$594,292	$591,161	$586,408	$584,912	$572,041	$552,056	$518,873	$466,481	$421,195
Repair & Replacement	-$40,000	-$33,000	-$28,024	$7,606	$8,872	$42,578	$39,745	$71,245	$101,899	$131,645	$160,421	$146,632
Debt and CIP Reserves	$1,681,763	$1,813,208	$1,897,732	$1,982,456	$2,058,540	$2,129,907	$2,183,210	$2,226,874	$2,271,411	$2,316,840	$2,363,176	$2,410,440
Sum of All Reserves	$2,229,541	$2,361,299	$2,484,571	$2,621,682	$2,715,137	$2,834,873	$2,904,088	$2,984,865	$3,056,563	$3,110,529	$3,137,202	$3,111,108

Table 18 - Bills Before and After Rate Adjustments

Wardwell Water & Sewer District; Water Rates, Scenario 2019-1

Revenue increase to be generated by the modeled rates 8.2%

If applicable, the revenue increase above includes meter size-based minimum charges calculated in Table 15. If rate classes shown below do not include meter size, the modeled bills below do not include those surcharges.

To reduce confusion, this table shows only example customer bills.

Customer, Rate Class or Meter Size	Gallons of Use	Customers at or Above This Volume and Below the Next	Customers up to and Including This Volume	Current Bill	Modeled Bill	Modeled Bill Increase or Decrease (-)
All Customers Except Construction	0	0	0	$15.00	$17.75	$2.75
	1,000	0	0	$18.50	$21.01	$2.51
	2,000	0	0	$22.00	$24.27	$2.27
	3,000	0	0	$25.50	$27.53	$2.03
	4,000	0	0	$29.00	$30.79	$1.79
	5,000	0	0	$32.50	$34.05	$1.55
	6,000	0	0	$36.00	$37.31	$1.31
	7,000	0	0	$39.50	$40.57	$1.07
	8,000	1,586	1,586	$43.00	$43.83	$0.83
	9,000	0	1,586	$46.50	$47.09	$0.59
	10,000	0	1,586	$50.00	$50.35	$0.35
	15,000	0	1,586	$67.50	$66.65	-$0.85
	20,000	0	1,586	$85.00	$82.95	-$2.05
	25,000	0	1,586	$102.50	$99.25	-$3.25
	30,000	0	1,586	$120.00	$115.55	-$4.45
	40,000	0	1,586	$155.00	$148.15	-$6.85
	50,000	0	1,586	$190.00	$180.75	-$9.25
	60,000	0	1,586	$225.00	$213.35	-$11.65
	70,000	0	1,586	$260.00	$245.95	-$14.05
	80,000	0	1,586	$295.00	$278.55	-$16.45
	90,000	0	1,586	$330.00	$311.15	-$18.85
	100,000	0	1,586	$365.00	$343.75	-$21.25
	110,000	0	1,586	$400.00	$376.35	-$23.65
	120,000	0	1,586	$435.00	$408.95	-$26.05
	130,000	0	1,586	$470.00	$441.55	-$28.45
	140,000	0	1,586	$505.00	$474.15	-$30.85
	150,000	0	1,586	$540.00	$506.75	-$33.25

Table 18 - Bills Before and After Rate Adjustments

Customer, Rate Class or Meter Size	Gallons of Use	Customers at or Above This Volume and Below the Next	Customers up to and Including This Volume	Current Bill	Modeled Bill	Modeled Bill Increase or Decrease (-)
Construction Water Customers	0	0	0	$50.00	$52.75	$2.75
	1,000	0	0	$54.00	$56.51	$2.51
	2,000	0	0	$58.00	$60.27	$2.27
	3,000	0	0	$62.00	$64.03	$2.03
	4,000	0	0	$66.00	$67.79	$1.79
	5,000	0	0	$70.00	$71.55	$1.55
	6,000	0	0	$74.00	$75.31	$1.31
	7,000	0	0	$78.00	$79.07	$1.07
	8,000	0	0	$82.00	$82.83	$0.83
	9,000	0	0	$86.00	$86.59	$0.59
	10,000	0	0	$90.00	$90.35	$0.35
	15,000	0	0	$110.00	$109.15	-$0.85
	20,000	0	0	$130.00	$127.95	-$2.05
	25,000	0	0	$150.00	$146.75	-$3.25
	30,000	0	0	$170.00	$165.55	-$4.45
	40,000	0	0	$210.00	$203.15	-$6.85
	50,000	0	0	$250.00	$240.75	-$9.25
	60,000	0	0	$290.00	$278.35	-$11.65
	70,000	0	0	$330.00	$315.95	-$14.05
	80,000	0	0	$370.00	$353.55	-$16.45
	90,000	0	0	$410.00	$391.15	-$18.85
	100,000	0	0	$450.00	$428.75	-$21.25
	110,000	0	0	$490.00	$466.35	-$23.65
	120,000	0	0	$530.00	$503.95	-$26.05
	130,000	0	0	$570.00	$541.55	-$28.45
	140,000	0	0	$610.00	$579.15	-$30.85
	150,000	2	2	$650.00	$616.75	-$33.25

Chart 1 - Operating Ratio

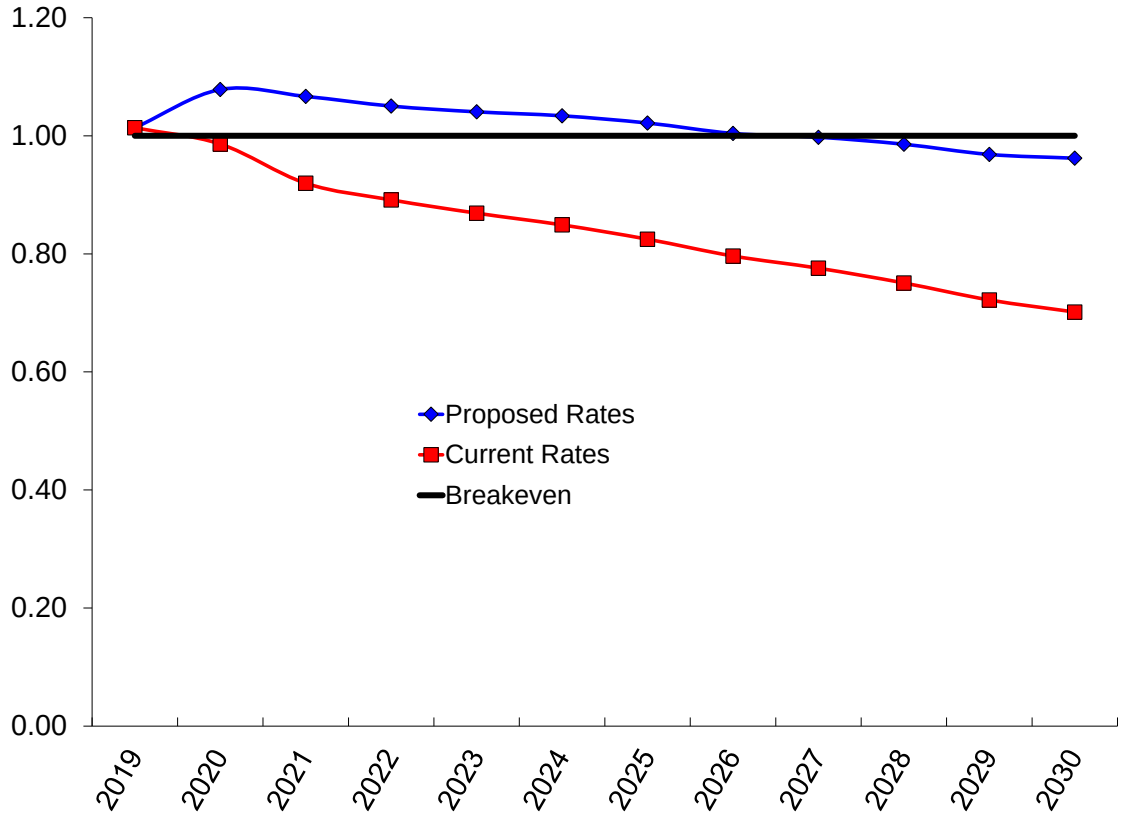


Chart 2 - Coverage Ratio

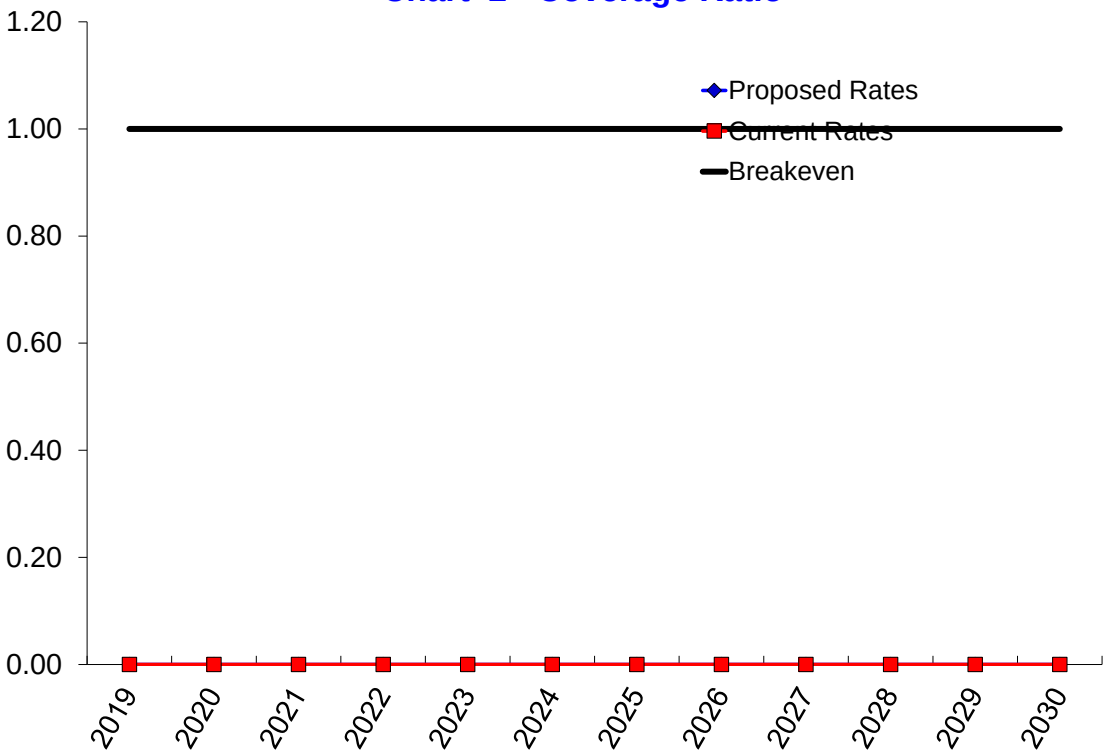


Chart 3 - Residential Users' Bills

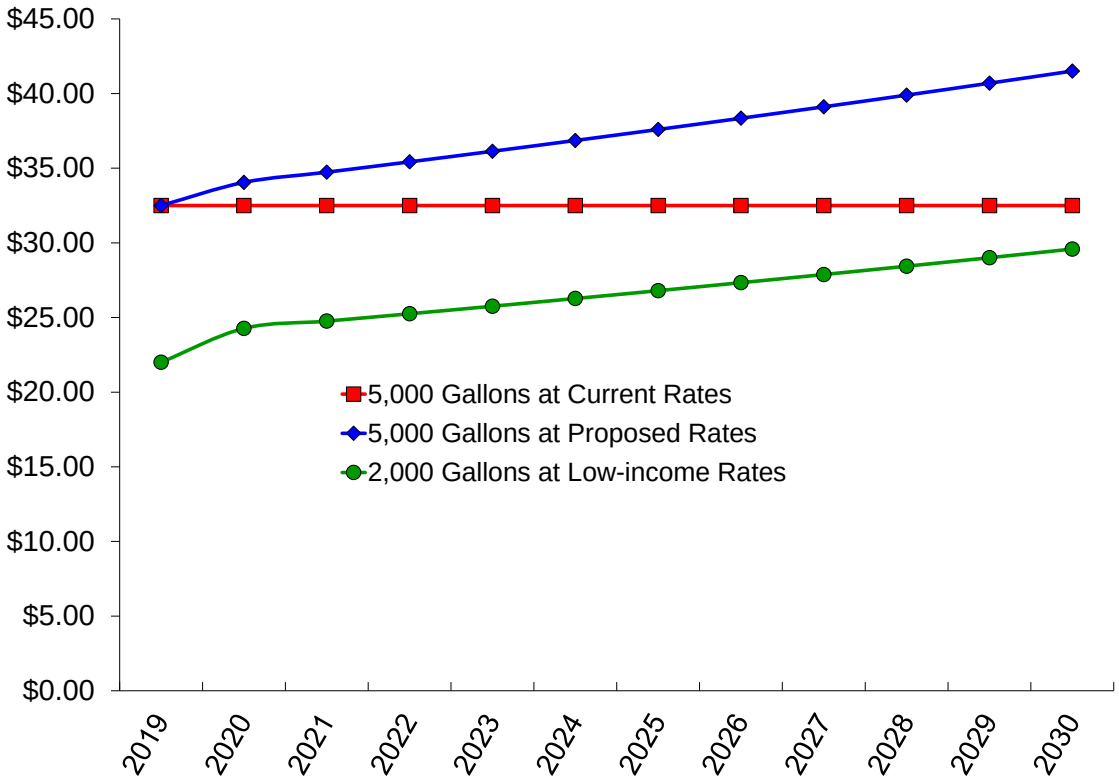


Chart 4 - Affordability

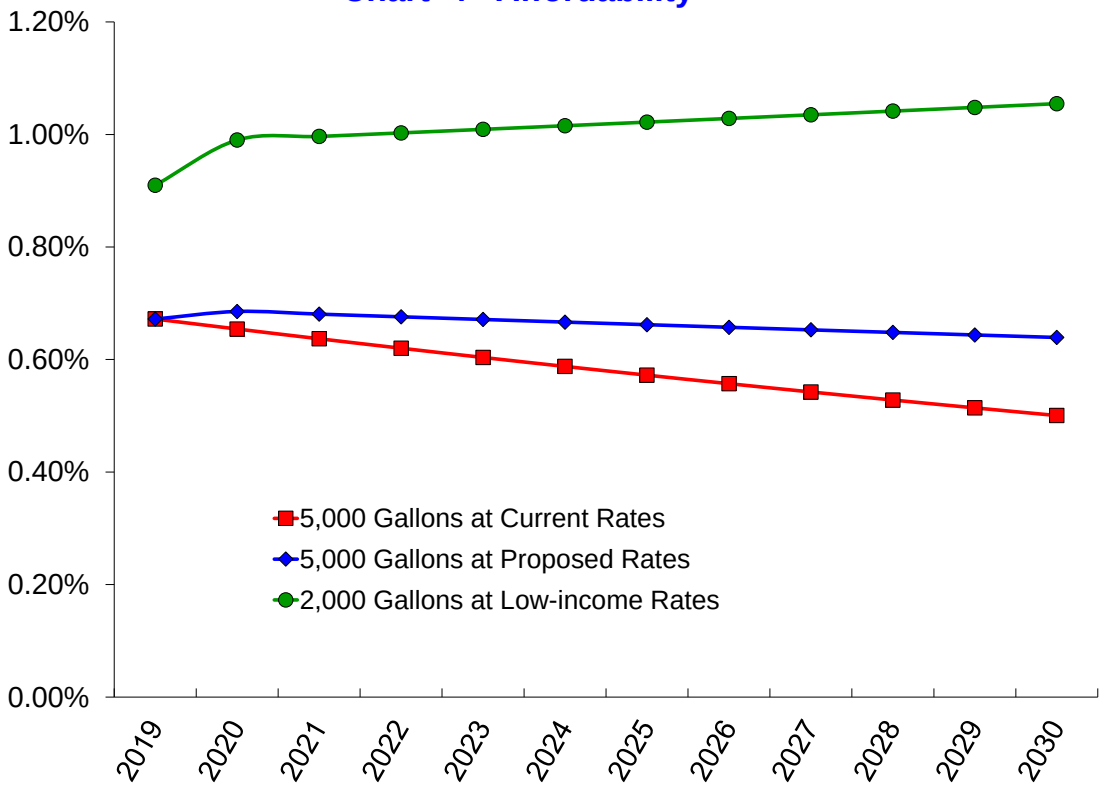


Chart 5 - Working Capital vs Goal

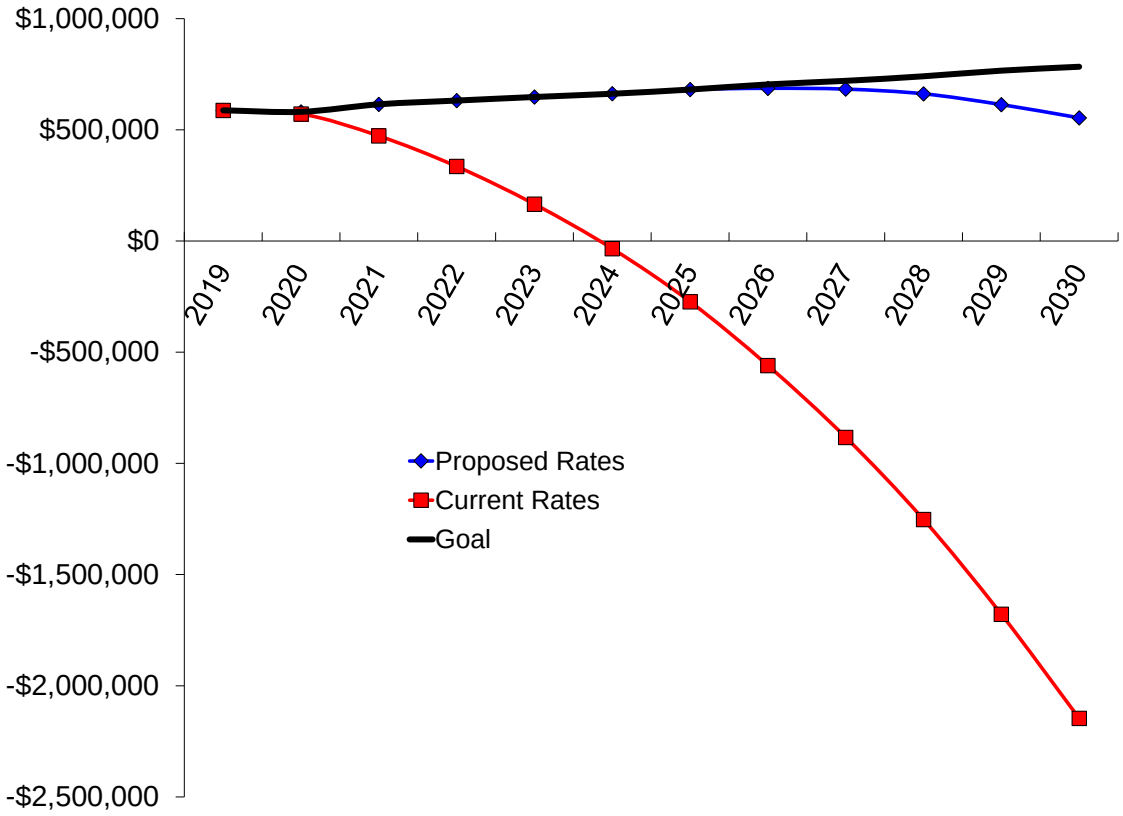


Chart 6 - Value of Cash Assets Before Inflation

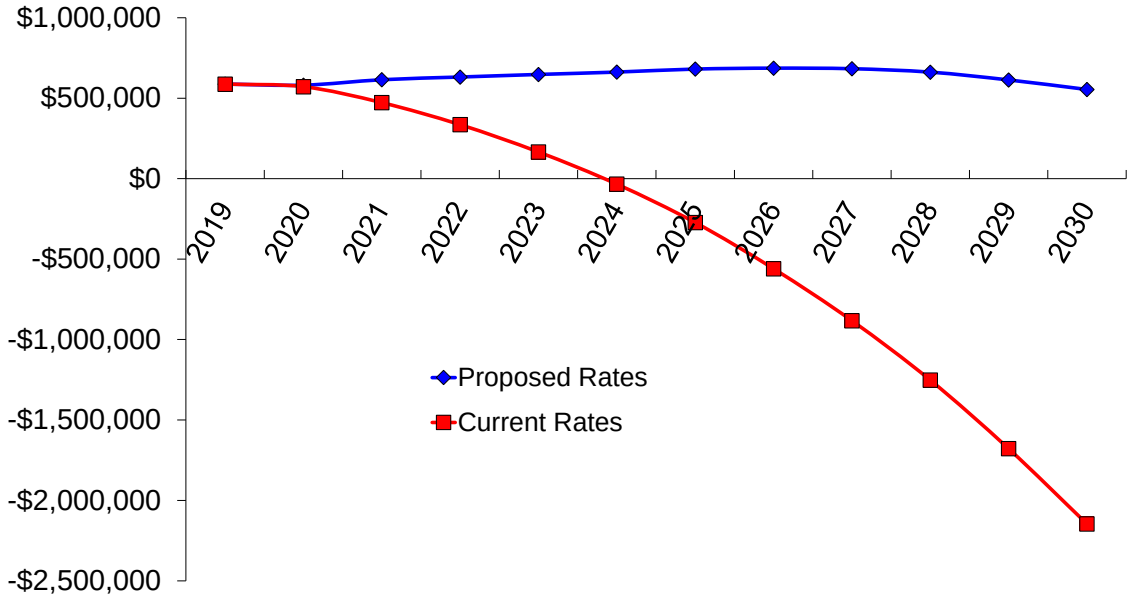


Chart 7 - Value of Cash Assets After Inflation

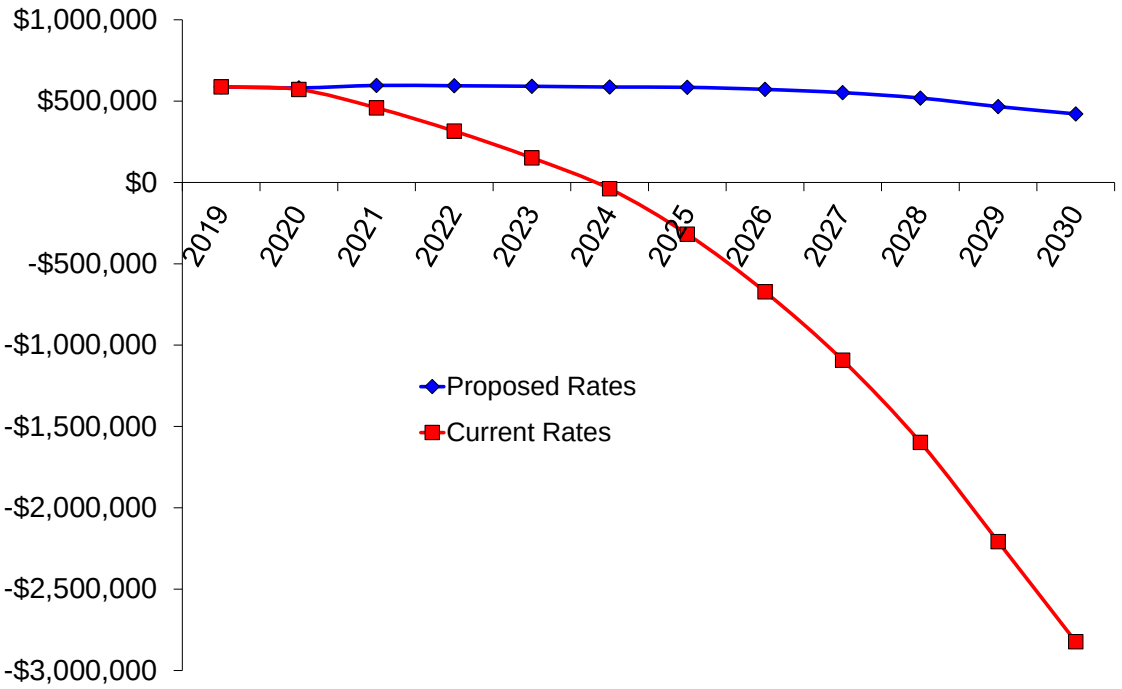
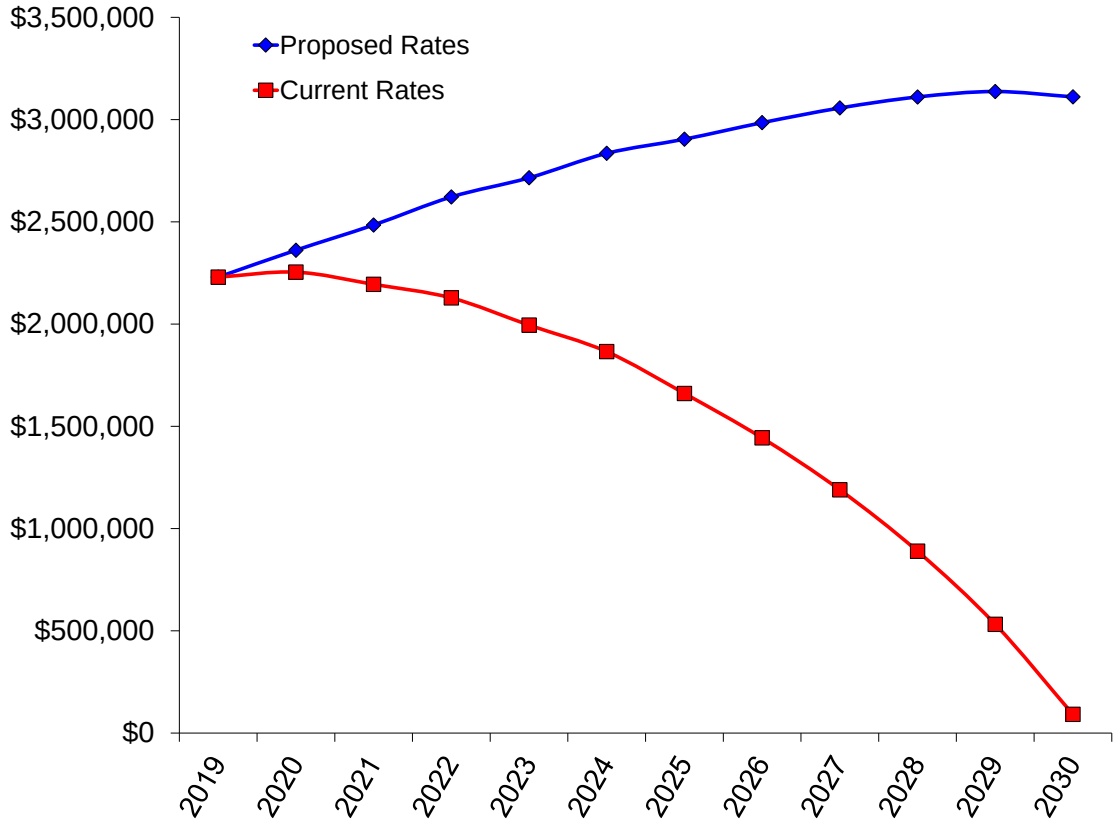


Chart 8 - Sum of All Reserves



Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

This model calculates cost-to-serve rates.

September 16, 2019

This rate analysis scenario was produced by
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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

Wardwell Water & Sewer District; 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

$6,403	Fees to GettingGreatRates.com
$500	Estimated value of system staff time and incidentals to assemble needed information
$6,903	Total Investment for This Analysis
$228,428	Five-year Increase in Revenue Due at Least Partly to This Analysis
3,309%	Five-year Return on Investment (increase in revenues / investment)
$586,007	Ten-year Improvement in Cash Position Due at Least Partly to This Analysis
8,489%	Ten-year Return on Investment (increase in revenues / investment)

Table 1 - Rates

Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

Unless rates were recently changed, these are the current rates. At the least, these rates were in effect at the end of 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
Midwest Heights Customers	0	$24.78	6.000	$0.85
	1,000	$24.78	6.000	$0.85
	2,000	$24.78	6.000	$0.85
	3,000	$24.78	6.000	$0.85
	4,000	$24.78	6.000	$0.85
	5,000	$24.78	6.000	$0.85
	6,000	$24.78	6.000	$0.85
	7,000	$24.78	6.000	$0.85
	8,000	$24.78	6.000	$0.85
	9,000	$24.78	6.000	$0.85
	10,000	$24.78	6.000	$0.85
	90,000	$24.78	6.000	$0.85
All Other Customers	0	$20.51	6.000	$0.85
	1,000	$20.51	6.000	$0.85
	2,000	$20.51	6.000	$0.85
	3,000	$20.51	6.000	$0.85
	4,000	$20.51	6.000	$0.85
	5,000	$20.51	6.000	$0.85
	6,000	$20.51	6.000	$0.85
	7,000	$20.51	6.000	$0.85
	8,000	$20.51	6.000	$0.85
	9,000	$20.51	6.000	$0.85
	10,000	$20.51	6.000	$0.85
	90,000	$20.51	6.000	$0.85

Table 2 - Test Year Usage

Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

This table shows usage by all customers during the test year.

Residential meter readings per year: 12

Test year = the one-year period being analyzed starts: 7/1/2018

Other customer readings per year: 12

Date this scenario created: 7/25/2019

Bills per year: 12

Customer, Rate Class or Meter Size	Volume Range Bottom (in Gallons)	Volume Range Top (in Gallons)	Count of Bills With ANY Use in Each Range	Use in Each Range in Gallons	Count of Bills That "Maxed Out" in Each Range	Volume of Bills That "Maxed Out" in Each Range	# of Customers That "Maxed Out" in Each Range	% of Customers That "Maxed Out" in Each Range	% of Total Use in Each Range
Midwest Heights Customers	0	999	6,621	912,000	0	0	0	0.0%	0.0%
	1,000	1,999	912	912,000	0	0	0	0.0%	0.0%
	2,000	2,999	912	912,000	0	0	0	0.0%	0.0%
	3,000	3,999	912	912,000	0	0	0	0.0%	0.0%
	4,000	4,999	912	0	912	3,648,000	76	12.1%	12.1%
	5,000	5,999	0	0	0	0	0	0.0%	0.0%
	6,000	6,999	0	0	0	0	0	0.0%	0.0%
	7,000	7,999	0	0	0	0	0	0.0%	0.0%
	8,000	8,999	0	0	0	0	0	0.0%	0.0%
	9,000	9,999	0	0	0	0	0	0.0%	0.0%
	10,000	14,999	0	0	0	0	0	0.0%	0.0%
			10,269	3,648,000	912	3,648,000	76	12.1%	12.1%
All Other Customers	0	999	6,621	6,621,000	0	0	0	0.0%	0.0%
	1,000	1,999	6,621	6,621,000	0	0	0	0.0%	0.0%
	2,000	2,999	6,621	6,621,000	0	0	0	0.0%	0.0%
	3,000	3,999	6,621	6,621,000	0	0	0	0.0%	0.0%
	4,000	4,999	6,621	0	6,621	26,484,000	552	87.9%	87.9%
	5,000	5,999	0	0	0	0	0	0.0%	0.0%
	6,000	6,999	0	0	0	0	0	0.0%	0.0%
	7,000	7,999	0	0	0	0	0	0.0%	0.0%
	8,000	8,999	0	0	0	0	0	0.0%	0.0%
	9,000	9,999	0	0	0	0	0	0.0%	0.0%
	10,000	14,999	0	0	0	0	0	0.0%	0.0%
			33,105	26,484,000	6,621	26,484,000	552	87.9%	87.9%
		Grand Totals:	43,374	30,132,000	7,533	30,132,000	628	100%	100%

Table 3 - Operating Incomes and Basic User Data

Wardwell Water & Sewer District; 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)

$55,013	Census Bureau estimate of AMHI for the year	2017
$53,559	Census Bureau estimate of AMHI for the year	2016
$1,454	AMHI growth during this time period	
2.71%	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

19	Number of new connections made during the test year
$161	Average tap or installation fee assessed during the test year

This model is programmed for rates to be reset in the "Analysis Year," also called the "0 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. 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. If rates will not be adjusted during the "0 Year," an adjustment (normally a revenue reduction) was calculated below to account for the late start in making the first adjustments.

Basic User (Customer) Data

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

	Inflation/ Deflation (–) Factor	Test Year	Analysis Year 0 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 7/1/18	Starting 7/1/19	Starting 7/1/20	Starting 7/1/21	Starting 7/1/22	Starting 7/1/23	Starting 7/1/24	Starting 7/1/25	Starting 7/1/26	Starting 7/1/27	Starting 7/1/28	Starting 7/1/29
Rate Increases Projected for Future Years	N.A.	N.A.	N.A.	2.0%	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.	628	631	634	635	636	637	638	639	640	641	642	643
Customers Added or Lost (-) During the Year	N.A.	19.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Customer Growth or Loss (-) Rate	N.A.	3.03%	0.48%	0.47%	0.47%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%	0.16%
Actual (Test Year) and Projected Volumes, in Gallons	N.A.	30,132,000	30,276,000	30,420,000	30,468,000	30,516,000	30,564,000	30,612,000	30,660,000	30,708,000	30,756,000	30,804,000	30,852,000
How User Charge Fees Were Calculated, Accounting for New Customers and Future Rate Increases													
Actual or Calculated Sales Revenues		$158,396	$174,247	$194,078	$198,896	$203,835	$208,238	$212,737	$217,332	$222,025	$226,820	$231,717	$236,720
Additional Sales Revenues From New Customers			$412	$919	$942	$321	$327	$334	$340	$347	$354	$361	$368
Total Calculated Revenues (User Charge Fees)		$158,396	$174,659	$194,996	$199,838	$204,155	$208,565	$213,070	$217,672	$222,372	$227,174	$232,078	$237,088
Operating Incomes													
User Charge Fees (Includes Sewer Assessment, Treatment, Operation and Maintenance)	N.A.	$159,784	$176,189	$196,705	$201,588	$205,944	$210,392	$214,937	$219,579	$224,320	$229,164	$234,111	$239,165
Late Payment Charge	N.A.	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Current Sewer Connection Fees (District)	% Above	$3,057	$243	$0	$0	$0	$0	$0	$0	$0	$0	$1	$2
Meter Size-based System Development Fees (Table 14)	% Above	$0	$240	$492	$167	$170	$174	$177	$181	$185	$188	$192	$196
Interest on Invested Funds	N.A.	$1,894	$832	$829	$927	$949	$1,000	$1,003	$1,031	$1,043	$1,090	$1,121	$1,086
(City of Casper) Sewer Connection Fees (201)	N.A.	$4,000	$632	$632	$211	$211	$211	$211	$211	$211	$211	$211	$211
Total Operating Incomes		**$168,734**	**$178,135**	**$198,657**	**$202,893**	**$207,273**	**$211,777**	**$216,327**	**$221,001**	**$225,758**	**$230,653**	**$235,636**	**$240,659**

Table 4 - Operating Costs and Net Income

Wardwell Water & Sewer District; 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/ Deflation (–) Factor	Test Year Starting 7/1/18	Analysis Year 0 Year Starting 7/1/19	Years Following the Analysis Year (for Which Results Have Been Projected) 1st Year Starting 7/1/20	2nd Year Starting 7/1/21	3rd Year Starting 7/1/22	4th Year Starting 7/1/23	5th Year Starting 7/1/24	6th Year Starting 7/1/25	7th Year Starting 7/1/26	8th Year Starting 7/1/27	9th Year Starting 7/1/28	10th Year Starting 7/1/29
Salaries - Directors	3.0%	$236	$243	$250	$257	$265	$273	$281	$290	$298	$307	$317	$326
Salaries - Employees	3.0%	$32,485	$33,460	$34,463	$35,497	$36,562	$37,659	$38,789	$39,953	$41,151	$42,386	$43,657	$44,967
WY Retirement - District 10.69%	3.0%	$3,525	$3,631	$3,740	$3,852	$3,968	$4,087	$4,209	$4,336	$4,466	$4,600	$4,738	$4,880
Attorney Fees	3.0%	$4,664	$4,804	$4,948	$5,097	$5,250	$5,407	$5,569	$5,736	$5,908	$6,086	$6,268	$6,456
Supervision & Engineering	3.0%	$9,593	$9,880	$10,177	$10,482	$10,797	$11,120	$11,454	$11,798	$12,152	$12,516	$12,892	$13,278
Office Equipment	3.0%	$854	$879	$906	$933	$961	$990	$1,019	$1,050	$1,081	$1,114	$1,147	$1,182
Office Supplies	3.0%	$1,934	$1,992	$2,052	$2,114	$2,177	$2,243	$2,310	$2,379	$2,450	$2,524	$2,600	$2,678
Books, Periodical, & Ads	3.0%	$61	$63	$65	$67	$69	$71	$73	$75	$77	$80	$82	$84
Meetings, Schools & Travel	3.0%	$154	$158	$163	$168	$173	$178	$184	$189	$195	$201	$207	$213
Maintenance of Vehicle	3.0%	$323	$333	$343	$353	$364	$375	$386	$398	$409	$422	$434	$447
Gas & Oil	3.0%	$610	$628	$647	$667	$687	$707	$728	$750	$773	$796	$820	$845
Sewer Treatment Charge-Casper	3.0%	$38,580	$39,927	$41,319	$42,760	$44,112	$45,507	$46,945	$48,430	$49,960	$51,540	$53,168	$54,849
Maintenance of Sewer Lines	3.0%	$27,177	$27,992	$28,832	$29,697	$30,588	$31,505	$32,450	$33,424	$34,427	$35,459	$36,523	$37,619
Sewer Line Installation	3.0%	$295	$304	$313	$322	$332	$342	$352	$363	$374	$385	$396	$408
Sewer Treatment Charge-Mills	3.0%	$22,588	$23,376	$24,191	$25,035	$25,827	$26,643	$27,485	$28,354	$29,251	$30,175	$31,129	$32,113
Maintenance of Sewer Lift Station	3.0%	$4,011	$4,151	$4,296	$4,445	$4,586	$4,731	$4,881	$5,035	$5,194	$5,358	$5,527	$5,702
Insurance - Building	3.0%	$1,242	$1,279	$1,318	$1,357	$1,398	$1,440	$1,483	$1,528	$1,574	$1,621	$1,669	$1,720
Insurance - Vehicles	3.0%	$329	$338	$349	$359	$370	$381	$392	$404	$416	$429	$442	$455
Insurance - Public Liability	3.0%	$798	$822	$847	$872	$898	$925	$953	$981	$1,011	$1,041	$1,072	$1,105
Insurance - Employee Group	3.0%	$12	$13	$13	$13	$14	$14	$15	$15	$16	$16	$16	$17
Insurance - Surety Bond	3.0%	$139	$143	$147	$152	$156	$161	$166	$171	$176	$181	$186	$192
Soc Sec District Share	3.0%	$2,503	$2,578	$2,656	$2,735	$2,817	$2,902	$2,989	$3,079	$3,171	$3,266	$3,364	$3,465
Workmen's Compensation	3.0%	$330	$340	$350	$361	$372	$383	$394	$406	$418	$431	$444	$457
Unemployment Compensation	3.0%	$565	$582	$599	$617	$636	$655	$674	$695	$715	$737	$759	$782
Business Phone	3.0%	$754	$777	$800	$824	$849	$875	$901	$928	$956	$984	$1,014	$1,044
Accounting & Collection	3.0%	$1,277	$1,315	$1,355	$1,395	$1,437	$1,480	$1,525	$1,570	$1,618	$1,666	$1,716	$1,768
Light & Power Purchased	3.0%	$380	$392	$403	$416	$428	$441	$454	$468	$482	$496	$511	$526
Natural Gas	3.0%	$230	$237	$244	$252	$259	$267	$275	$283	$292	$300	$309	$319
Maintenance of Building	3.0%	$1,179	$1,214	$1,250	$1,288	$1,327	$1,366	$1,407	$1,450	$1,493	$1,538	$1,584	$1,632
Safety Equipment	3.0%	$47	$49	$50	$52	$53	$55	$57	$58	$60	$62	$64	$66
Shop Equipment	3.0%	$660	$680	$700	$721	$743	$765	$788	$812	$836	$861	$887	$914
Sewer Connection Charge to Casper	0.0%	$8,827	$1,394	$1,394	$465	$465	$465	$465	$465	$465	$465	$465	$465
One-time Reduction of R&R Annuity	0.0%	-$16,151	-$8,119	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Annual Payment to R&R Reserve (Table 7)	0.0%	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151	$16,151
User Charge Analysis Services	5.0%	$0	$6,403	$0	$0	$7,059	$0	$0	$7,783	$0	$0	$8,580	$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		**$166,362**	**$178,408**	**$185,331**	**$189,776**	**$202,147**	**$200,562**	**$206,205**	**$219,803**	**$218,015**	**$224,192**	**$239,140**	**$237,121**
Net Income (or Loss)		$2,371	-$273	$13,326	$13,117	$5,127	$11,214	$10,122	$1,198	$7,744	$6,460	-$3,504	$3,538
Working Capital Goal: 50%	In Dollars, That is:	$83,181	$89,204	$92,666	$94,888	$101,073	$100,281	$103,103	$109,902	$109,007	$112,096	$119,570	$118,561

Notes: Cost items are projected to grow due to inflation. Yellow highlighted items are projected to grow by inflation, plus by the rate of growth in new connections.

Table 5 - Capital Improvement Program (CIP)

Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

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

	Test Year Starting	Analysis Year: 0 Year Starting	1st Year Starting	2nd Year Starting	3rd Year Starting	4th Year Starting	5th Year Starting	6th Year Starting	7th Year Starting	8th Year Starting	9th Year Starting	10th Year Starting
	7/1/18	7/1/19	7/1/20	7/1/21	7/1/22	7/1/23	7/1/24	7/1/25	7/1/26	7/1/27	7/1/28	7/1/29
Planned Spending, Debt-paid Portion of Projects (CIP costs to be funded with loans are shown in this section.)												
None	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Loan Closing Costs, Estimated at: 2.5%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Debt-paid Portion of Projects	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Planned Spending, Grant-paid Portion of Projects (CIP costs to be grant-funded are shown here.)												
None	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Grant-paid Portion of Projects	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Planned Spending, Cash-paid Portion of Projects (CIP costs to be funded from reserves are shown here.)												
None	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grant Acquisition Costs, Estimated at: 2.5%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Cash-paid Portion of Projects	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total CIP Costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt Repayment												
Existing Debt Payments (Following is debt that was initiated during the test year or earlier.)												
None	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
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 2.0% interest rate.)												
Total Debt Payments	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total CIP-related Payouts	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
(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												
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	$0	$608,757	$620,932	$636,918	$660,551	$673,762	$698,185	$719,450	$733,839	$751,553	$769,955	$785,354
Working Capital Transferred in	$608,757	$0	$3,568	$10,894	$0	$10,948	$7,301	$0	$3,037	$3,372	$0	$0
Debt and CIP Reserves Interest Earned (or Paid)	$0	$12,175	$12,419	$12,738	$13,211	$13,475	$13,964	$14,389	$14,677	$15,031	$15,399	$15,707
Total Available Internal Funds	$608,757	$620,932	$636,918	$660,551	$673,762	$698,185	$719,450	$733,839	$751,553	$769,955	$785,354	$801,062
Grant and Loan Proceeds (External Funds)												
Total Available External Funds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Available Funds	**$608,757**	**$620,932**	**$636,918**	**$660,551**	**$673,762**	**$698,185**	**$719,450**	**$733,839**	**$751,553**	**$769,955**	**$785,354**	**$801,062**
Outcomes (This CIP spending and funding plan will result in the following cash needs and ending balances each year.)												
Total Available Funds	**$608,757**	**$620,932**	**$636,918**	**$660,551**	**$673,762**	**$698,185**	**$719,450**	**$733,839**	**$751,553**	**$769,955**	**$785,354**	**$801,062**
Total CIP-related Payouts	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt and CIP Reserves Ending Balances	**$608,757**	**$620,932**	**$636,918**	**$660,551**	**$673,762**	**$698,185**	**$719,450**	**$733,839**	**$751,553**	**$769,955**	**$785,354**	**$801,062**

Notes: Facilities are fairly new and in good repair, with no improvements anticipated for the next 10 years.

Table 6 - Equipment Replacement Schedule - Detailed

Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

Year Beginning	Unspecified R&R (5% of Operating Costs)	Oldest (2008) Pickup Truck (Water)	Next Oldest Pickup Truck (Water)	Next Oldest Pickup Truck (Sewer)	Next Oldest Pickup Truck (Water)	Newest (2015) Pickup Truck (Water)	Infrequent (Sewer) Lift Station Pump R&R			**Total Annual Replacement Costs**
7/1/19	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/20	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/21	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/22	$5,000	$0	$0	$30,000	$0	$0	$0	$0	$0	$35,000
7/1/23	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/24	$5,000	$0	$0	$0	$0	$0	$25,000	$0	$0	$30,000
7/1/25	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/26	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/27	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/28	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/29	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/30	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/31	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/32	$5,000	$0	$0	$30,000	$0	$0	$0	$0	$0	$35,000
7/1/33	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/34	$5,000	$0	$0	$0	$0	$0	$25,000	$0	$0	$30,000
7/1/35	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/36	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/37	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/38	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/39	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/40	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/41	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000
7/1/42	$5,000	$0	$0	$30,000	$0	$0	$0	$0	$0	$35,000
7/1/43	$5,000	$0	$0	$0	$0	$0	$0	$0	$0	$5,000

Table 7 - Equipment Replacement Annuity Calculation

Wardwell Water & Sewer District; 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
7/1/19	Analysis Year	$5,000	$5,000	$0	-$5,000	$41,000
7/1/20	1st Year	$5,000	$5,150	-$100	$5,901	$42,230
7/1/21	2nd Year	$5,000	$5,305	$118	$16,865	$43,497
7/1/22	3rd Year	$35,000	$38,245	$337	-$4,893	$44,802
7/1/23	4th Year	$5,000	$5,628	-$98	$5,533	$46,146
7/1/24	5th Year	$30,000	$34,778	$111	-$12,984	$47,530
7/1/25	6th Year	$5,000	$5,970	-$260	-$3,063	$48,956
7/1/26	7th Year	$5,000	$6,149	-$61	$6,877	$50,425
7/1/27	8th Year	$5,000	$6,334	$138	$16,831	$51,938
7/1/28	9th Year	$5,000	$6,524	$337	$26,795	$53,496
7/1/29	10th Year	$5,000	$6,720	$536	$36,762	$55,101
7/1/30	11th Year	$5,000	$6,921	$735	$46,726	$56,754
7/1/31	12th Year	$5,000	$7,129	$935	$56,683	$58,456
7/1/32	13th Year	$35,000	$51,399	$1,134	$22,568	$60,210
7/1/33	14th Year	$5,000	$7,563	$451	$31,607	$62,016
7/1/34	15th Year	$30,000	$46,739	$632	$1,651	$63,877
7/1/35	16th Year	$5,000	$8,024	$33	$9,812	$65,793
7/1/36	17th Year	$5,000	$8,264	$196	$17,894	$67,767
7/1/37	18th Year	$5,000	$8,512	$358	$25,891	$69,800
7/1/38	19th Year	$5,000	$8,768	$518	$33,792	$71,894

Notes: There is currently no R&R schedule. This schedule mainly replaces service trucks on a 10-year cycle. Because R&R costs will likely be higher in the future, a Discretionary Annuity amount was added so that at the end of the 20-year modeling period, the balance will be double the average of the annual replacement cost amounts, less interest paid for borrowing during the negative balance years.

Starting Account Balance	$0	$41,000
Minimum Annual Annuity	$14,671	Minimum Desired Balance in Today's Dollars
Discretionary Annuity	$1,479	

Required Annual Deposit (Annuity) to Replacement Account **$16,151**

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

Table 8 - Average Cost Classification

Wardwell Water & Sewer District; 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: 7/1/2023 through 6/30/2024

Cost Items	Cost During Rate Structure Basis Year	Fixed Cost %	Variable Cost %	Fixed Cost	Variable Cost
Salaries - Directors	$273	100.0%	0.0%	$273	$0
Salaries - Employees	$37,659	75.0%	25.0%	$28,244	$9,415
WY Retirement - District 10.69%	$4,087	75.2%	24.8%	$3,072	$1,014
Attorney Fees	$5,407	45.4%	54.6%	$2,455	$2,952
Supervision & Engineering	$11,120	45.4%	54.6%	$5,049	$6,072
Office Equipment	$990	100.0%	0.0%	$990	$0
Office Supplies	$2,243	100.0%	0.0%	$2,243	$0
Books, Periodical, & Ads	$71	100.0%	0.0%	$71	$0
Meetings, Schools & Travel	$178	75.2%	24.8%	$134	$44
Maintenance of Vehicle	$375	75.0%	25.0%	$281	$94
Gas & Oil	$707	75.0%	25.0%	$530	$177
Sewer Treatment Charge-Casper	$45,507	0.0%	100.0%	$0	$45,507
Maintenance of Sewer Lines	$31,505	75.0%	25.0%	$23,629	$7,876
Sewer Line Installation	$342	100.0%	0.0%	$342	$0
Sewer Treatment Charge-Mills	$26,643	0.0%	100.0%	$0	$26,643
Maintenance of Sewer Lift Station	$4,731	0.0%	100.0%	$0	$4,731
Insurance - Building	$1,440	100.0%	0.0%	$1,440	$0
Insurance - Vehicles	$381	100.0%	0.0%	$381	$0
Insurance - Public Liability	$925	100.0%	0.0%	$925	$0
Insurance - Employee Group	$14	75.2%	24.8%	$11	$4
Insurance - Surety Bond	$161	100.0%	0.0%	$161	$0
Soc Sec District Share	$2,902	75.2%	24.8%	$2,182	$720
Workmen's Compensation	$383	75.2%	24.8%	$288	$95
Unemployment Compensation	$655	75.2%	24.8%	$492	$163
Business Phone	$875	100.0%	0.0%	$875	$0
Accounting & Collection	$1,480	100.0%	0.0%	$1,480	$0
Light & Power Purchased	$441	100.0%	0.0%	$441	$0
Natural Gas	$267	100.0%	0.0%	$267	$0
Maintenance of Building	$1,366	100.0%	0.0%	$1,366	$0
Safety Equipment	$55	100.0%	0.0%	$55	$0
Shop Equipment	$765	100.0%	0.0%	$765	$0
Sewer Connection Charge to Casper	$465	100.0%	0.0%	$465	$0

Table 8 - Average Cost Classification

Cost Items	Cost During Rate Structure Basis Year	Fixed Cost %	Variable Cost %	Fixed Cost	Variable Cost
Annual Payment to R&R Reserve (Table 7)	$16,151	75.0%	25.0%	$12,113	$4,038
User Charge Analysis Services	$0	75.0%	25.0%	$0	$0
Total CIP-related Payouts, Less Capacity Charges From Tables 14 & 16 (This value can be negative)	-$32	45.4%	0.0%	-$14	$0
Grand Total Costs, Weighted Avg Percentages	$200,531	45.4%	54.6%	$91,004	$109,544

Bases for Cost to Serve Rate Structure		100%	$200,548	
Number Customers During Year Defined Above	637	Master metered flows not available, so I&I was not estimated for this system.		0%
Billed Volume, in Gallons, During Year Defined Above	30,564,000	Inflow and Infiltration is Estimated at This Percentage of Average Cost		0%
Average Fixed Cost per User per Month During Year Defined Above	$11.91	Resulting Cost of Inflow and Infiltration		$0
Average Variable Cost to Produce per 1,000 Gallons During Year Defined Above	$3.58	Test Year Customer Metered Volume, in Gallons		30,132,000
Gallons per Billing Cycle Used by Average Residential Customer	4,000	+ Test Year Inflow and Infiltration, in Gallons		0
		Total Test Year Volume, in Gallons, From Master Meter Readings		30,132,000

Table 10 - Initial Rate Adjustments and Resulting Revenues

Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

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

Out of District Multiplier	125%	Conservation Rate Block Multiplier	100%	Other Multiplier	100%

1/1/20 — Date when fees will first be collected at adjusted rates. Actual adjustment should occur one billing cycle earlier.

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

Blended Sales Revenues: 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 after the modeled rates are adopted. The "blended" sales 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	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	Total "Blended" Sales This Year
Midwest Heights Customers	0	999	$0	$17.77	0.000	$2.81	$1,274	$1,274
	1,000	1,999	$0	$17.77	0.000	$2.81	$1,274	$1,274
	2,000	2,999	$0	$17.77	0.000	$2.81	$1,274	$1,274
	3,000	3,999	$0	$17.77	0.000	$2.81	$1,274	$1,274
	4,000	4,999	$11,361	$17.77	0.000	$2.81	$8,060	$19,421
	90,000	100,000	$0	$17.77	0.000	$2.81	$0	$0
All Other Customers	0	999	$0	$13.50	0.000	$2.81	$9,252	$9,252
	1,000	1,999	$0	$13.50	0.000	$2.81	$9,252	$9,252
	2,000	2,999	$0	$13.50	0.000	$2.81	$9,252	$9,252
	3,000	3,999	$0	$13.50	0.000	$2.81	$9,252	$9,252
	4,000	4,999	$68,269	$13.50	0.000	$2.81	$44,453	$112,722
	90,000	100,000	$0	$13.50	0.000	$2.81	$0	$0
Total Rate Revenue at Current Rates			$79,631	Total Rate Revenue at Modeled Rates			$94,616	
							Total Blended Rate Revenues for the Year	$174,247

Note: New Minimum Charge Base Rates: If meter 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 size surcharges as calculated in Table 16. Either way, the narrative report includes the rates and surcharges to assess.

6.0	months at the old user charge rates	and	6.0	months at the new user charge rates.

Table 11 - Capacity Costs

Wardwell Water & Sewer District; 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)
	$2,191,834	50.0%	$1,095,917	$63,868	50.0%	$1,095,917	$63,868
Totals	$2,191,834		$1,095,917	$63,868		$1,095,917	$63,868

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

0.050%	Target Percentage of Costs to Recover
$32	Target Portion of Costs to Recover
$11	Cost per Peak Flow Capacity Share

Base Flow Capacity Costs to be Recovered by System Development Fees

0.0%	Target Percentage of Costs to Recover
$0	Target Portion of Costs to Recover
$0	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
$150	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

100.0%	Target Percentage of Costs to Recover
$63,836	Target Portion of Costs to Recover in One Full Year
$5,320	Target Portion of Costs to Recover in Monthly Surcharges
$8.43	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

Wardwell Water & Sewer District; 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.

In-District

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 Adj	Foot Notes	Peak Plus Base Capacity Cost	Field and Admin Cost per New Connection	System Development Fee
Five Eighths	Displacement	0.625	0.307	1.0	100%	1.0		$11	$150	$161
Three Quarters	Displacement	0.750	0.442	1.0	100%	1.0	1	$11	$150	$161
One Inch	Displacement	1.000	0.785	2.5	100%	2.5		$27	$150	$177
One & a Half Inch	Displacement	1.500	1.767	5.0	100%	5.0		$53	$150	$203
Two Inch	Displacement	2.000	3.142	8.0	100%	8.0		$85	$150	$235
Two & a Half Inch	Displacement	2.500	4.909	12.5	100%	12.5	2	$133	$150	$283
Three Inch	Singlet	3.000	7.069	16.0	100%	16.0		$170	$150	$320
Three Inch	Compound, Class I	3.000	7.069	16.0	100%	16.0		$170	$150	$320
Three Inch	Turbine, Class I	3.000	7.069	17.5	100%	17.5		$186	$150	$336
Four Inch	Singlet	4.000	12.566	25.0	100%	25.0		$266	$150	$416
Four Inch	Compound, Class I	4.000	12.566	25.0	100%	25.0		$266	$150	$416
Four Inch	Turbine, Class I	4.000	12.566	31.0	100%	31.0		$330	$150	$480
Six Inch	Singlet	6.000	28.274	50.0	100%	50.0		$532	$150	$682
Six Inch	Compound, Class I	6.000	28.274	50.0	100%	50.0		$532	$150	$682
Six Inch	Turbine, Class I	6.000	28.274	65.0	100%	65.0		$692	$150	$842
Eight Inch	Compound, Class I	8.000	50.266	80.0	100%	80.0		$852	$150	$1,002
Eight Inch	Turbine, Class I	8.000	50.266	140.0	100%	140.0		$1,490	$150	$1,640

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.
Economy of Scale Adjustments: As meter size rises, capacity to pass peak flow rises. However, costs to build that capacity do not rise as rapidly. Therefore, peak flow capacity shares were adjusted downward by an estimated cost savings factor to account for that savings. Economy of scale savings do not apply to base costs because all connections are afforded the same level of base flow capacity.

Table 14 - Revenues From System Development Fees
Wardwell Water & Sewer District; 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.

In-District

Meter Size	Meter Type	Mix of New Taps in a Typical Year	Capacity Shares After Economy of Scale Adj	Adjusted Annual Growth in Capacity Shares	Adjusted Peak Capacity Fees, One Full Year	Base Capacity Fees, One Full Year	Combined Capacity Fees, One Full Year	Adjusted Admin and Field Fees, One Full Year	**System Development Fee Revenues, One Full Year**
Five Eighths	Displacement	3.0	1.0	3.0	$32	$0	$32	$450	**$482**
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**
	Total:	3.0		3.0	$32	$0	$32	$450	**$482**

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
Wardwell Water & Sewer District; 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.

In-District

Meter Size	Meter Type	Peak Plus Base Capacity Cost	Adjusted Peak Capacity-only Surcharge Revenues	Adjusted Monthly Base Capacity Cost	Base Capacity-only Surcharge Revenues	Cost to Serve Minimum From Table 10	Monthly Minimum Charge
Five Eighths	Displacement	$8.43	$63,836	$0.00	$0	$9.34	$17.77
Three Quarters	Displacement	$8.43	$0	$0.00	$0	$9.34	$17.77
One Inch	Displacement	$21.08	$0	$0.00	$0	$9.34	$30.42
One & a Half Inch	Displacement	$42.17	$0	$0.00	$0	$9.34	$51.51
Two Inch	Displacement	$67.47	$0	$0.00	$0	$9.34	$76.81
Two & a Half Inch	Displacement	$105.42	$0	$0.00	$0	$9.34	$114.76
Three Inch	Singlet	$134.94	$0	$0.00	$0	$9.34	$144.28
Three Inch	Compound, Class I	$134.94	$0	$0.00	$0	$9.34	$144.28
Three Inch	Turbine, Class I	$147.59	$0	$0.00	$0	$9.34	$156.93
Four Inch	Singlet	$210.85	$0	$0.00	$0	$9.34	$220.18
Four Inch	Compound, Class I	$210.85	$0	$0.00	$0	$9.34	$220.18
Four Inch	Turbine, Class I	$261.45	$0	$0.00	$0	$9.34	$270.79
Six Inch	Singlet	$421.69	$0	$0.00	$0	$9.34	$431.03
Six Inch	Compound, Class I	$421.69	$0	$0.00	$0	$9.34	$431.03
Six Inch	Turbine, Class I	$548.20	$0	$0.00	$0	$9.34	$557.54
Eight Inch	Compound, Class I	$674.71	$0	$0.00	$0	$9.34	$684.05
Eight Inch	Turbine, Class I	$1,180.74	$0	$0.00	$0	$9.34	$1,190.08

Table 16 - Revenues From Minimum Charges

Wardwell Water & Sewer District; 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 Adj	Current Number Meters This Size	Total Adjusted Capacity Shares	Adjusted Peak Capacity-only Surcharge Revenues	Base Capacity-only Surcharge Revenues	Capacity Surcharges for One Full Year
In-District							
Five Eighths	Displacement	1.0	631	631	$63,836	$0	$63,836
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
		Total:	631	631	$63,836	$0	$63,836

Table 17 - Financial Capacity Indicators and Reserves

Wardwell Water & Sewer District; 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 7/1/18	0 Year Starting 7/1/19	1st Year Starting 7/1/20	2nd Year Starting 7/1/21	3rd Year Starting 7/1/22	4th Year Starting 7/1/23	5th Year Starting 7/1/24	6th Year Starting 7/1/25	7th Year Starting 7/1/26	8th Year Starting 7/1/27	9th Year Starting 7/1/28	10th Year Starting 7/1/29
Customary Affordability Index: Monthly Bill for a 5,000 gal per Month, Small Meter Residential Customer	$24.78	$31.82	$32.46	$33.11	$33.77	$34.44	$35.13	$35.84	$36.55	$37.28	$38.03	$38.79
AMHI Within Service Area	$58,040	$59,616	$61,235	$62,897	$64,604	$66,358	$68,160	$70,010	$71,911	$73,863	$75,868	$77,928
Affordability Index: Current Rates First Column, Modeled Rates After That	0.51%	0.64%	0.64%	0.63%	0.63%	0.62%	0.62%	0.61%	0.61%	0.61%	0.60%	0.60%

Affordability Index (AI) goes to the willingness and ability of customers to pay. AI is the cost of 60,000 gallons of residential service per year (5,000 gallons per month) divided by the Annual Median Household Income (AMHI) in the service area (gleaned from Census data or a survey). Rates near 1.0% are common in the U.S. and are generally considered affordable. Most grant agencies will not consider awarding grants if this indicator is less than 1.5 to 2.0%.

Low-income, Low-volume Affordability Index												
Monthly Bill for a 2,000 gal per Month, Low-income Residential Customer	$24.78	$23.39	$23.86	$24.34	$24.82	$25.32	$25.83	$26.34	$26.87	$27.41	$27.96	$28.51
Income at One-half the AMHI and Rising at One-half the Rate Above	$29,020	$29,414	$29,813	$30,218	$30,628	$31,044	$31,465	$31,893	$32,325	$32,764	$33,209	$33,660
Affordability for Low-income, Low-volume: Current Rates First Column, Modeled Rates After That	1.02%	0.95%	0.96%	0.97%	0.97%	0.98%	0.98%	0.99%	1.00%	1.00%	1.01%	1.02%

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 only on Social Security benefits. Such customers are more commonly the "slow pays" and "no pays" compared to others.

Estimated Operating Ratio: Current Rates First Column, Modeled Rates After That	1.01	1.00	1.07	1.07	1.03	1.06	1.05	1.01	1.04	1.03	0.99	1.01

Operating ratio (OR) is a measure of the utility's ability to pay its operating expenses using only current incomes. 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-sized 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, Modeled Rates After That	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Coverage Ratio (CR) goes to the ability of the utility to pay its debt payments out of current incomes. 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 (shown below,) it has more ability to make debt payments than the CR implies.

Reserves	Balance Ending on 6/30/19	Balance Ending on 6/30/20	Balance Ending on 6/30/21	Balance Ending on 6/30/22	Balance Ending on 6/30/23	Balance Ending on 6/30/24	Balance Ending on 6/30/25	Balance Ending on 6/30/26	Balance Ending on 6/30/27	Balance Ending on 6/30/28	Balance Ending on 6/30/29	Balance Ending on 6/30/30
Cash and Cash Equivalents	$83,181	$82,908	$92,666	$94,888	$100,015	$100,281	$103,103	$104,300	$109,007	$112,096	$108,592	$112,130
Other Liquid Assets	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Undedicated Cash Assets	$83,181	$82,908	$92,666	$94,888	$100,015	$100,281	$103,103	$104,300	$109,007	$112,096	$108,592	$112,130
Total Cash Assets Discounted for Inflation (Future Unrestricted Purchasing Power)	$83,181	$82,908	$89,886	$89,280	$91,281	$88,778	$88,538	$86,879	$88,076	$87,855	$82,555	$85,245
Repair & Replacement	-$5,000	$5,901	$16,865	-$4,893	$5,533	-$12,984	-$3,063	$6,877	$16,831	$26,795	$36,762	$46,726
Debt and CIP Reserves	$608,757	$620,932	$636,918	$660,551	$673,762	$698,185	$719,450	$733,839	$751,553	$769,955	$785,354	$801,062
Sum of All Reserves	$686,938	$709,740	$746,449	$750,547	$779,309	$785,482	$819,489	$845,016	$877,391	$908,846	$930,708	$959,918

Table 18 - Bills Before and After Rate Adjustments

Wardwell Water & Sewer District; Sewer Rates, Scenario 2019-2

Revenue increase to be generated by the modeled rates 20.1%

If applicable, the revenue increase above includes meter size-based minimum charges calculated in Table 15. If rate classes shown below do not include meter size, the modeled bills below do not include those surcharges.

To reduce confusion, this table shows only example customer bills.

Customer, Rate Class or Meter Size	Gallons of Use	Customers at or Above This Volume and Below the Next	Customers up to and Including This Volume	Current Bill	Modeled Bill	Modeled Bill Increase or Decrease (-)
Midwest Heights Customers	0	0	0	$24.78	$17.77	-$7.01
	1,000	0	0	$24.78	$20.58	-$4.20
	2,000	0	0	$24.78	$23.39	-$1.39
	3,000	0	0	$24.78	$26.20	$1.42
	4,000	76	76	$24.78	$29.01	$4.23
	5,000	0	76	$24.78	$31.82	$7.04
	6,000	0	76	$24.78	$34.63	$9.85
	7,000	0	76	$25.63	$37.44	$11.81
	8,000	0	76	$26.48	$40.25	$13.77
	9,000	0	76	$27.33	$43.06	$15.73
	10,000	0	76	$28.18	$45.87	$17.69
	15,000	0	76	$32.43	$59.92	$27.49
	20,000	0	76	$36.68	$73.97	$37.29
All Other Customers	0	0	0	$20.51	$13.50	-$7.01
	1,000	0	0	$20.51	$16.31	-$4.20
	2,000	0	0	$20.51	$19.12	-$1.39
	3,000	0	0	$20.51	$21.93	$1.42
	4,000	552	552	$20.51	$24.74	$4.23
	5,000	0	552	$20.51	$27.55	$7.04
	6,000	0	552	$20.51	$30.36	$9.85
	7,000	0	552	$21.36	$33.17	$11.81
	8,000	0	552	$22.21	$35.98	$13.77
	9,000	0	552	$23.06	$38.79	$15.73
	10,000	0	552	$23.91	$41.60	$17.69
	15,000	0	552	$28.16	$55.65	$27.49
	20,000	0	552	$32.41	$69.70	$37.29

Chart 1 - Operating Ratio

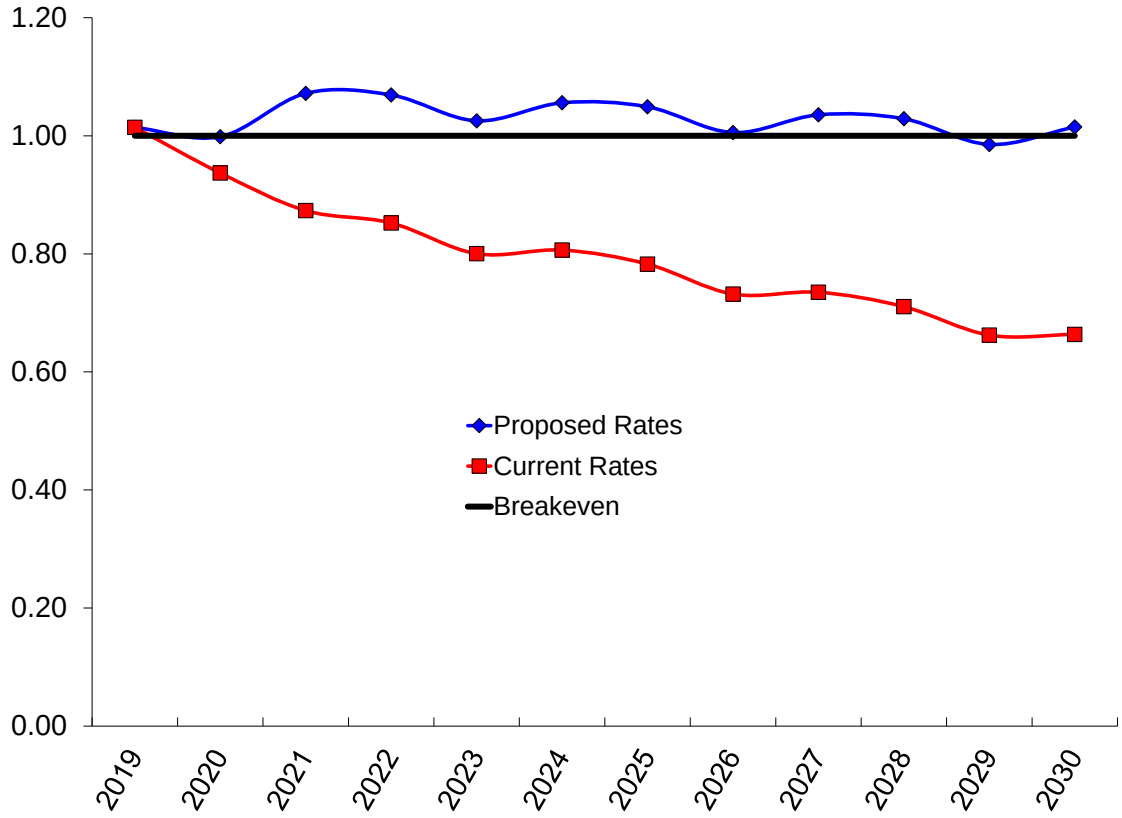

Chart 2 - Coverage Ratio

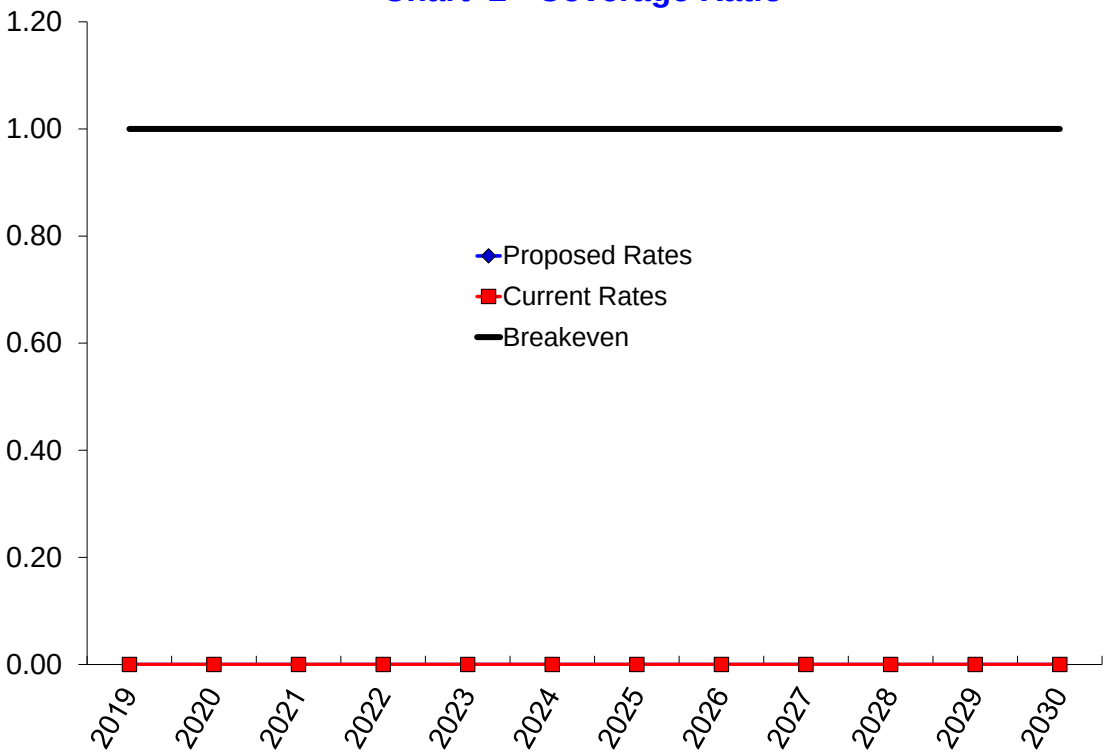

Chart 3 - Residential Users' Bills

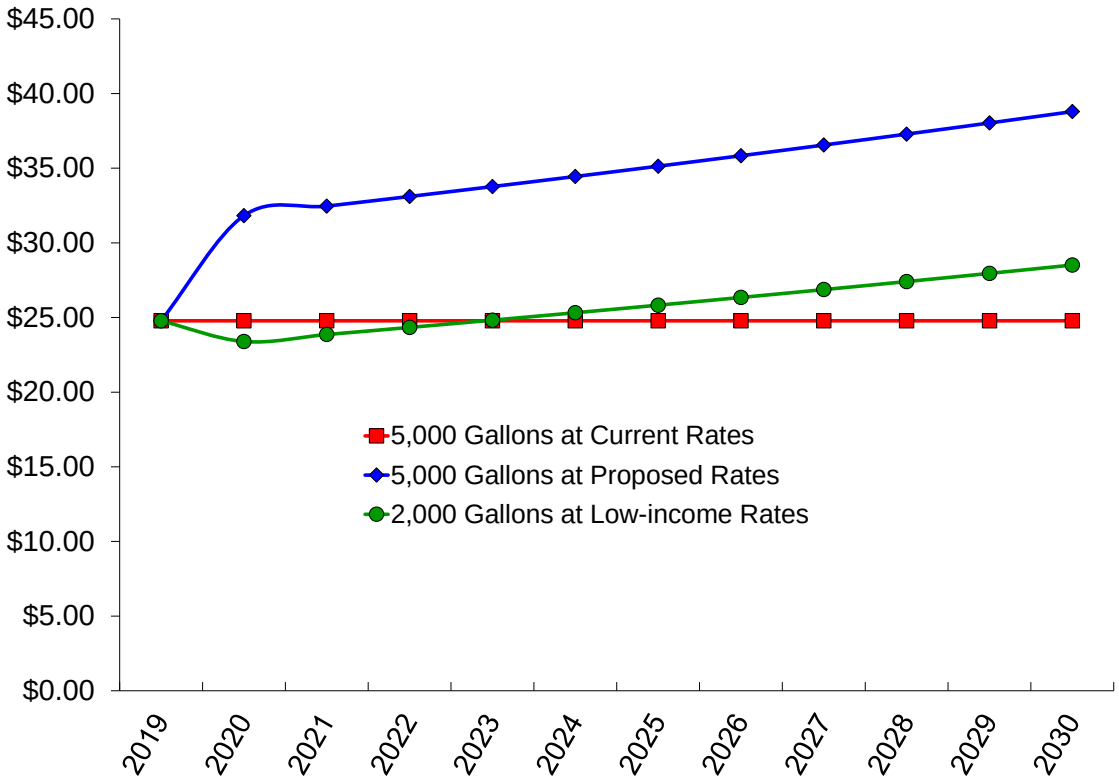

Chart 4 - Affordability

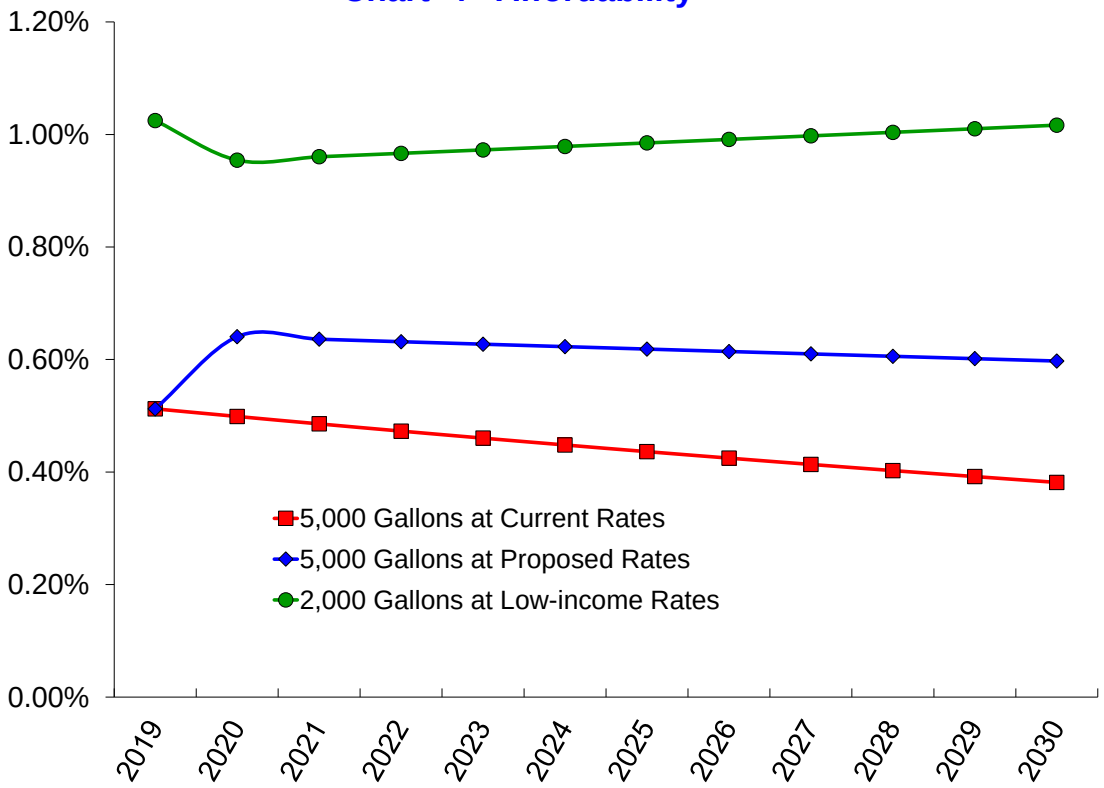

Chart 5 - Working Capital vs Goal

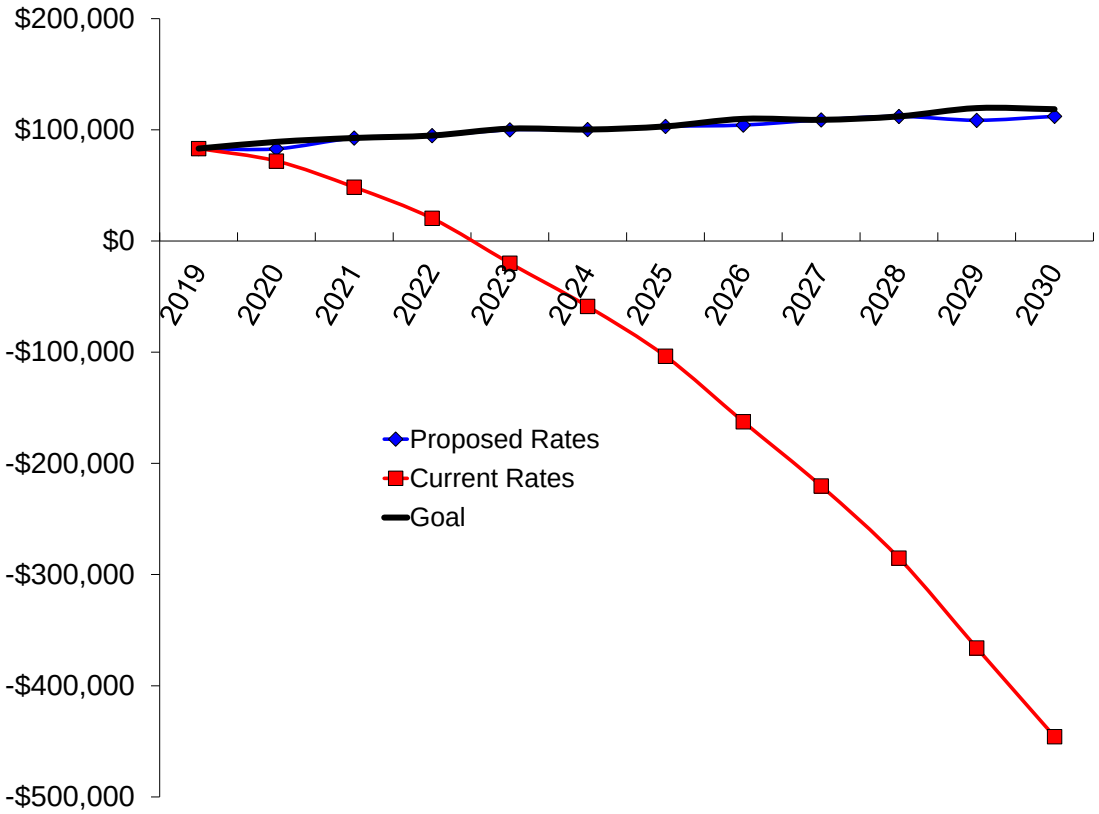

Chart 6 - Value of Cash Assets Before Inflation

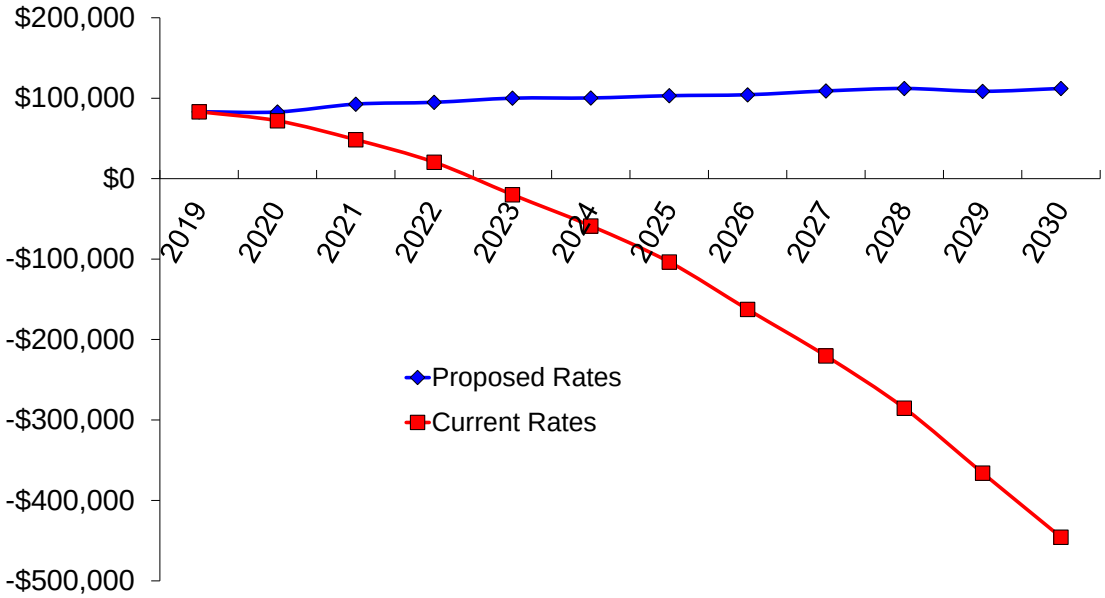

Chart 7 - Value of Cash Assets After Inflation

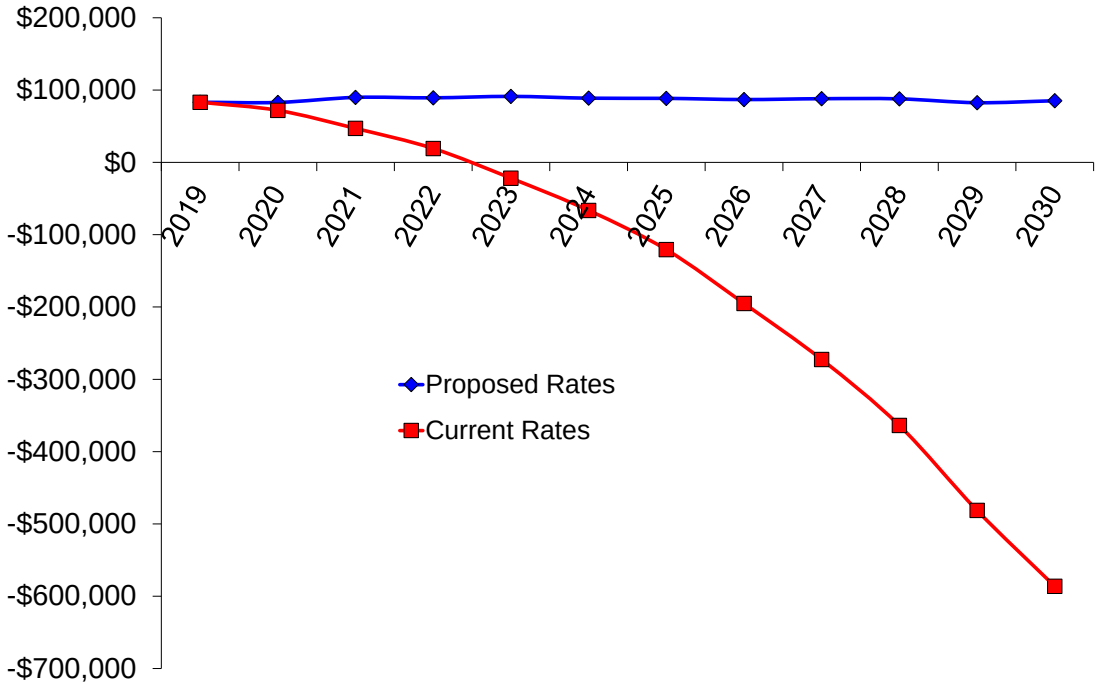

Chart 8 - Sum of All Reserves