



Rate Analysis Report
For
The Town of
Boonsboro, MD.



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SERCAP Maryland-Delaware

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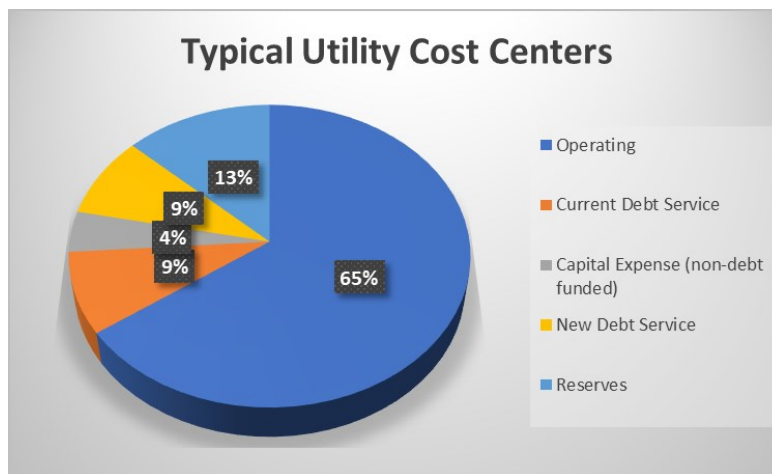


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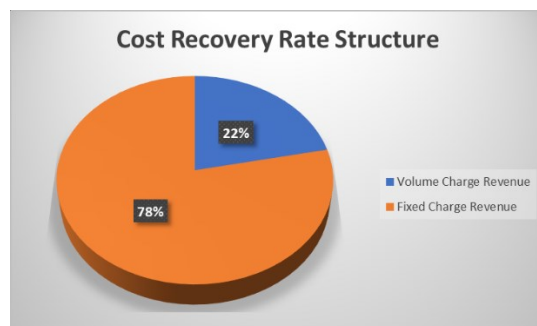
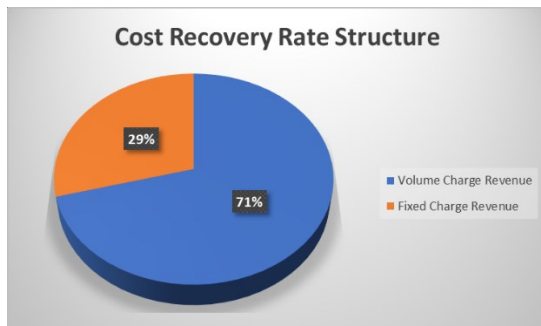
I. General

Rate Setting and Cost Recovery Principles:

The goal of any sustainable utility is to fully recover its costs of operation, including capital expenditures, both self- and debt-funded, reasonable reserves and general overhead. The way in which these various costs may be recovered is embedded in the rate structure. The level of charges for fixed and variable costs is generally known as “the rates”. If the full costs of owning and operating the utility are viewed as a pie, the rate structure and subsequent charges reflect how that pie is sliced. What doesn’t change in any of these scenarios is the size of the pie itself. What is not in one piece will be in the other, but the pie remains the same. This is illustrated in the figure below.



These costs of operations, “the pie,” can be recovered through fixed charges or volume charges that reflect what each customer uses. Usually it is with a combination of both, with fixed charges covering the utility’s fixed costs, and volumetric charges covering the variable costs that change according to the amount of water (or sewer) used, but again, what isn’t in one piece must be in the other as the two figures below illustrate.



Either structure will recover the utility’s costs, but the structure used will determine *where* the money comes from, how and when it is received.

Three Things to Do BEFORE a Rate Change:

1. If there is a gallon allowance included in a minimum bill, consider reducing or eliminating those gallons, making them subject to the volume charge. If that is politically or practically not feasible, then make sure the charge that includes those gallons is not less than the base cost to produce those gallons. No gallon allowance is preferred, however, if there must be a quantity of water included in a minimum charge it should be as low as possible and not more than 3,000 gallons per month or 9,000 gallons per quarter. If your gallon allowance is too high you may be giving away water in that minimum bill as well as encouraging people to waste water rather than conserve it.
2. Get a handle on non-revenue water. That is water your system produces and which costs to produce, but for which there is no revenue coming back to cover costs. There will always be a certain amount of water that doesn't get billed or paid for, after all, unlike sewer pipes, water pipes hold water all the time. There may also be connections you don't charge for water service, such as your own town buildings or the fire department. Those buildings should still be metered even if you choose not to charge them as a matter of policy. If they are not, consider installing meters and reading them without billing. Otherwise, there is no way to tell how much water is lost or un-billable. A simple calculation or two can give you an idea of how much is non-revenue water. Subtracting billed gallons from gallons produced during the same period, whether month or quarter, will give you a non-revenue figure. That can then be reduced further by deducting known losses, leaks, fire flows, filter backwash, hydrant flushing, etc. When everything has been accounted for, the difference between production and known water consumption should be less than 15%. If it is higher than 15% an evaluation of meters and leak detection may be in order, or at least a more in-depth water audit to drill down on the amount of water not being billed.
3. Get a grip on collections. You should be collecting at least 95% of what you're billing before the next bill is sent out. You can measure that as 95% of the \$\$ billed or 95% of the total number of bills sent, but if you have more than 5% in arrears when the next bill is due, your on-time customers are paying more than their share of the operating costs for the system

These three things are stated in relation to a water utility but, with the possible exception of #2 above, the principles are the same for water or sewer. The difference with a sewer system would be if you see your system is treating more than its average daily flow or substantially more than the water that is produced whenever it rains, there may be an inflow and infiltration problem. That can mean you're treating water that isn't really sewage but runoff.

A Word About General Overhead/General Government:

If you are a municipal system and have other services that are offered from your main office or town hall, it's important to measure the proportion of those general service that are directly related to the water and/or sewer utilities. The cost of a clerk who provides customer service daily, the cost of a town clerk/treasurer, the cost of a town manager/administrator, care and maintenance of the building, insurance, telephone, electricity, etc. are all services that may be

applied to all the town's services, and the costs of these should be allocated in some way to the utility if it is to recover its full cost of operation. Even if the governing body chooses deliberately to forego these costs and let them be paid by the General Fund, there should be some calculation to indicate how much those costs actually are.

A Word about Reserves:

Many systems, small systems in particular, tend to think of reserves as something that is either a "paper number" and a nice thing to have or that should be accumulated outside of the rate structure for a rainy day. Reserves are, in fact, an actual cost of operation and, as such, should be included in whole or in part in the calculation of a *full* cost recovery rate structure. Including reserves as a cost of operation reflects two basic philosophies: 1) current users should pay for the cost to serve them including system installation costs; and 2) current users should bear some of the costs of the system's eventual replacement as they are the ones causing it to wear out currently by receiving service. That is not to say that every user currently connected should pay an equal portion of the cost to install the system when it was brand new, but that current users should pay a fair share of the debt service on that installation cost and any upgrades since as long as they remain customers.

In addition to bearing some share of the costs of system installation and repairs in a reserve, users should also pay for accumulating some level of reserve for emergencies. What that level is can be a matter of policy or a matter of simple arithmetic, but some reserve for contingencies is strongly recommended. Also, most lenders require some level of reserve to cover debt service in the event that there's an un-expected drop in revenue or loss of large portions of the customer base. The amount of that reserve depends on the lender and whatever is specified in the loan instruments and conditions but a minimum of 10% per year or one year's debt service payment is required.

In Summary:

These principles have been used in the course of analyzing your system's rate structure and offering options and recommendations for your consideration. The usual rules of thumb used by our analysis may have been altered or adjusted based on direction from your management team before this final report was presented. Changes from standard procedure, if any, will be duly noted in the applicable section's narrative.

II. Water Analysis and Recommendations

System Costs and 5-year Projections:

SERCAP's analysis used FY 21's budget as a base year for estimating costs and projecting revenues, after examining actual expenditures for FY 18, FY 19 and FY 20. For rate setting purposes, actual figures are preferred, but the variance between the previous fiscal years examined was inconsistent, dropping drastically between the first two years and increasing slightly each year thereafter. In view of this wide variance, as well as some changes in accounting practices that affected the variance, FY 21 budget was used as a good middle ground. Costs were then projected for four additional years, giving a 5-year outlook.

System Revenue and Revenue Requirement Projection:

System revenues are projected using FY 21 as the base year and forward for 4 years using a standard 2.5% rate of inflation, with the exception of Health Insurance, Fuel and Electricity where % increases were likely to be higher. The analysis used a rate revenue requirement based on deducting estimated NON-rate revenues from estimated total revenues, and rates were derived accordingly. HOWEVER, it is critical that decision makers understand if any portion of that non-rate revenue is restricted, cannot or should not be used to fund overall operations, the rate options shown here will all need to be increased to compensate for that reduction in revenue. As it is, the FY 21 Budget appears to be sufficient to cover the projected costs for that year, however years 2-4 show a potential deficit based on conservatively estimated revenue, with or without the non-rate revenue factored in.

Non-revenue Water:

As explained above, a customary part of SERCAP's rate analysis is to compare water produced to water billed. During this comparison it was noted that Boonsboro's non-revenue water percentage is approximately 30%. AWWA recommends a 10% limit on non-revenue water and SERCAP generally recommends 15% or less. 30% of total production equates to 38,781,628 gallons. At the present \$6.20 rate that represents a loss of \$240,446 without even factoring the increased block of \$9.10 per 1,000 gallons. This gap between production and billing should be examined carefully to determine whether the reasons are administrative or actual gallons wasted with the goal of reducing that number to 10-15% total.

System User Profile:

SERCAP's analysis included an examination of the number of users in each block of usage to determine where the majority of users fall. The table below represents that usage curve, showing that 77.6% of the users connected use 15,000 gallons or less per quarter. This level was used as the dividing line in a tiered usage rate structure in each of the alternatives presented.

Current Charges:

The current rate structure is tiered with a minimum charge of \$15.00, \$6.20 per 1,000 for the first 18,000 gallons of water used and \$9.10 per 1,000 for any gallons over 18,000. The usage curve shown on the previous page indicates that the majority of customers use 15,000 gallons or less. SERCAP used 15,000 gallons as the first tier in all the tiered rate scenarios shown in this report.

SERCAP also found that the present \$15.00 minimum charge brings in only enough revenue to cover about half of the town’s fixed costs. It is recommended that the town increase this charge to at least \$30.00 per EDU regardless of the rate option it decides upon, and it has been used as a start in the rate options recommended. In addition, it is recommended that all volumetric rates start at the first gallon without an allowance being included in the minimum bill or customer charge.

SERCAP also calculated the average cost per 1,000 of water produced for the Test Year FY 21. That average cost was \$6.38 per 1,000 gallons produced. Clearly, the present \$6.20 in the first tier of usage is not enough to recover that cost, while the higher tier of \$9.10 is. However, more than ¾ of the customer base uses less than that current 18,000-gallon tier.

Rate Options and Alternatives:

SERCAP’s usual practice is to give a system three rate scenarios to choose from. Six options were calculated including one based on a uniform rate for all gallons used and then options showing an increased rate for gallons over a certain level, the present level being 18,000 gallons. Based on the town’s customer base and usage blocks the increased block rate was changed to 15,000 gallons with the first usage block of 15,000 gallons and a higher rate for all gallons after that. Each option uses a minimum or “Customer Charge” per EDU to cover fixed costs of operations – debt service and reserves. Tiered rate options in the final report version were presented as follows:

Revenue Requirement = \$747,538

Option #1

Customer Charge	\$30.00
1 st 15,000	\$ 5.25
Over 15,000	\$ 8.10
Revenue projected	\$752,499

Option #2

Customer Charge	\$40.00
1 st 15,000	\$ 4.15
Over 15,000	\$ 7.25
Revenue projected	\$753,576

Option #3	
Customer Charge	\$50.00
1 st 15,000	\$ 3.30
Over 15,000	\$ 6.00
Revenue projected	\$752,568

Either of these options should generate enough revenue to cover operational and fixed costs, but each one differs in its impact(s) on customers at various user levels. There was not enough usage detail for commercial customers to make any determinations on a separate commercial rate structure. A cost of service study is suggested for any consideration of a separate commercial rate or rates.

CONCLUSIONS:

1. The current minimum or Customer Charge is too low to cover the system’s fixed costs and should be at least doubled to generate sufficient revenue for those costs, however, the higher the customer charge per EDU, the lower the usage rate can be.
2. The majority of system customers use 15,000 gallons or less per quarter, so establishing a tiered rate at 15,000 gallons rather than the present 18,000 gallons is recommended. This alone will have little impact on 77%+ of system users. Decreasing the usage charge per 1,000 gallons helps to offset the increase in Customer Charge to ease the impact of the overall rate changes, although every level of user will see some changes in their quarterly and annual billing. In addition, the average cost of \$6.38 should be taken into consideration as well. Some users will actually pay less quarterly and annually even though the town will be generating more revenue overall.
3. Scenario #1 in has the least impact on lower end users under 15,000 gallons. Even though the usage rate is less than the average cost per 1,000 gallons, the increased customer charge to cover fixed costs makes up the balance of revenue needed to cover all costs. If the town’s goal is to set more equitable rates with the least impact possible on the majority of its customers, Scenario #1 is the best option. Five-year rate projections are based on the #1 option.

System Costs and 5-year Cost Projection:

The usual SERCAP analysis looks at a single, base year and calculates projections, based on a combination of known or planned figures and an average rate of inflation. Due to the variance between the last 4 fiscal years’ figures, the analysis looked at costs for four (4) fiscal years before deciding on a Base Year. With the exception of things like health insurance, electricity and fuel, 2.5% inflation was used for most line item figures. The actual figures from FY 2018, 2019, 2020 and the budgeted figures for FY2021 are shown below.

Total <u>Actual</u> System Costs	FY 2018	FY 2019	FY 2020	FY 2021
Administration Expenses	\$245,296	\$204,791	\$167,825	\$123,050
Operations and Maintenance Expenses	\$314,028	\$381,115	\$395,750	\$498,400
Debt Service and Reserves	\$289,418	\$215,312	\$258,400	\$204,443
Total Annual System Costs	\$848,742	\$801,218	\$821,975	\$825,893

Five Year Cost Projection based on FY 21

	FY 2021	Year 2	Year 3	Year 4	Year 5
Admin	\$123,050	\$126,126	\$129,279	\$132,511	\$135,824
O & M	\$498,400	\$510,838	\$524,793	\$539,143	\$553,900
Debt/Res	\$204,443	\$263,760	\$287,402	\$268,500	\$292,260
TOTAL	\$825,893	\$921,954	\$941,403	\$961,384	\$981,913

System Revenue and Revenue Requirement Projection:

RATE REVENUE REQUIREMENT CALCULATION:	FY 2021		Year 2	Year 3	Year 4	Year 5
TOTAL SYSTEM COSTS:	\$825,893		\$921,954	\$941,403	\$961,384	\$981,913
LESS NON-RATE REVENUE:	\$ 78,355		\$ 79,522	\$ 80,713	\$81,927	\$83,165
= RATE REVENUE REQUIRED FOR COST RECOVERY	\$747,538		\$842,432	\$860,690	\$879,457	\$898,747

The amount that must be recovered by Rates alone is shown in the bottom line of each year. This **Rate Revenue Requirement** figure is then used to project what rates need to be to fully recover costs of operation.

Surplus/Deficit 5-year Projections:

For the test year, using the FY 2021 budget figures, the Town projected \$767,182 in revenue. To cover the Rate Revenue Requirement shown above, that should have yielded a surplus of about \$19,644, IF all the “non-rate revenue” shown above is available to fund operations and is not restricted for other purposes. Subsequent years 2-5 show a projected deficit in year 2 of approximately \$31,841, and increasing deficits in subsequent years at the present rates.

	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Revenue	\$890,113	\$907,915	\$926,074	\$944,595
Expense	\$921,954	\$941,403	\$961,384	\$981,913
Surplus/(Def)	\$(31,841)	\$(33,488)	\$(35,310)	\$(37,318)

Observations and Comments on Costs/Revenues Analysis:

- It appears that the town has kept the rates lower by funding through other means as the current rate doesn’t appear to be sufficient to recover costs
- As previously stated, the base charge is too low to cover the fixed costs and should be raised, regardless of any other rate decisions

Water Production and Non-Revenue Water:

The Town’s water system produced 129,272,093 gallons of water during calendar year 2020. It billed and sold about 90,490,465 gallons of water, meaning the level of non-revenue water was about 38,781,628 gallons or 30% of water produced. This figure is higher than the SERCAP recommendation of 15% and significantly higher than the AWWA standard of 10% non-revenue water. This represents potentially lost revenue of more than \$240,000 annually. When Sewer billing is based on water used, this loss of revenue is multiplied as Sewer costs are about 2.5 times more than Water costs.

Whichever target % is used, this difference reflects water that costs the town to produce, but for which it is receiving no revenue. Some of that total may be actual lost gallons, and some of it may be water used in filter back wash or for other town facilities for which no money is collected and still more can be attributed to meter inaccuracies. Regardless, it bears examination to bring it closer to the 10-15% recommended level. A water audit is recommended to determine the actual amount.

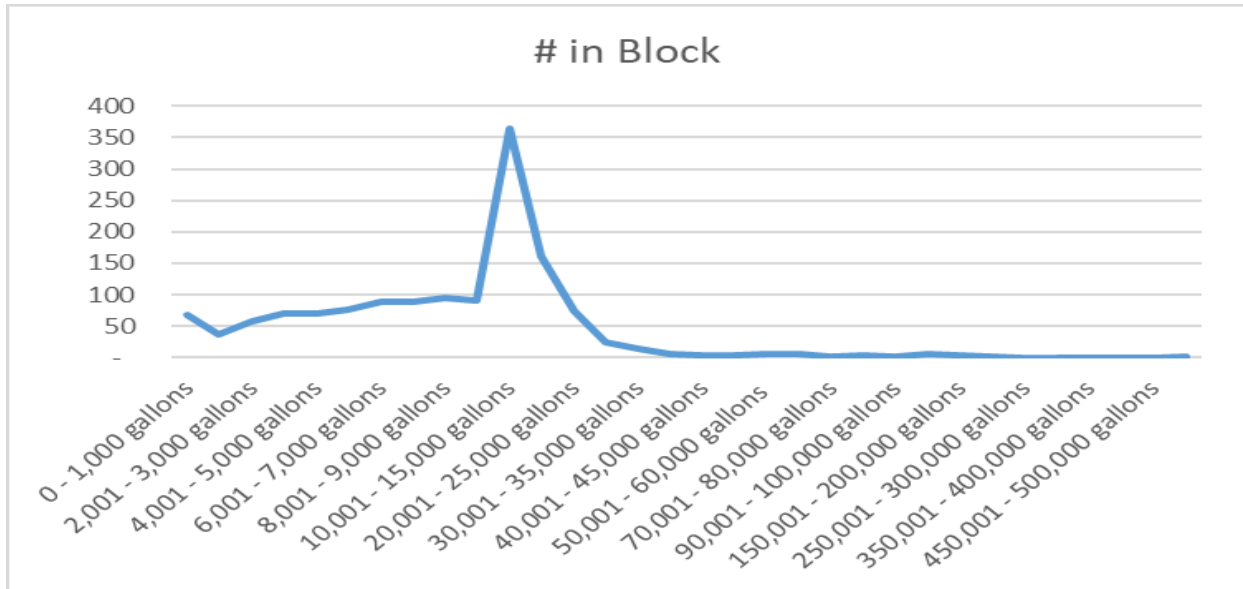
User Blocks and Average Users per Billing Period:

Usage records for calendar 2020 were examined to determine the average water usage per billing quarter and the average number of users in each usage block. 1,000-gallon increments were used up to 10,000 gallons per quarter, then 5,000 gallon increments up to 50,000 gallons, 10,000 gallon increments up to 100,000 gallons and 50,000-gallon increments thereafter. The usage blocks for the test year are shown below.

AVERAGE	# in Block	Usage
0 - 1,000 gallons	67	61,985
1,001 - 2,000 gallons	37	57,443
2,001 - 3,000 gallons	57	145,426
3,001 - 4,000 gallons	70	245,436
4,001 - 5,000 gallons	71	320,519
5,001 - 6,000 gallons	77	423,647
6,001 - 7,000 gallons	89	578,842
7,001 - 8,000 gallons	88	672,991
8,001 - 9,000 gallons	95	810,575
9,001 - 10,000 gallons	90	855,139
10,001 - 15,000 gallons	364	4,467,630
15,001 - 20,000 gallons	161	2,766,151
20,001 - 25,000 gallons	74	1,628,528
25,001 - 30,000 gallons	25	693,933
30,001 - 35,000 gallons	14	459,219
35,001 - 40,000 gallons	7	250,031
40,001 - 45,000 gallons	4	178,608
45,001 - 50,000 gallons	3	129,032
50,001 - 60,000 gallons	7	353,569
60,001 - 70,000 gallons	5	324,253
70,001 - 80,000 gallons	1	92,034
80,001 - 90,000 gallons	3	230,116
90,001 - 100,000 gallons	2	189,998
100,001 - 150,000 gallons	5	594,810
150,001 - 200,000 gallons	3	522,316
200,001 - 250,000 gallons	3	556,839
250,001 - 300,000 gallons	0	74,176
300,001 - 350,000 gallons	1	161,750
350,001 - 400,000 gallons	0	92,250
400,001 - 450,000 gallons	-	-
450,001 - 500,000 gallons	-	-
500,001 gallons and over	1	1,900,266
TOTAL	1,423	19,837,505
PLUS EDU's by Meter Sz	575	
TOTAL EDU's	1,998	

Usage Curve:

Determining where the majority of users fall in these usage blocks can be helpful in making decisions about which rate structure or amount to implement. It can help to identify the impacts on various user levels. The usage curve below is a graphic way to display that.



1,266 customers or 89% use 20,000 gallons per quarter or less, and 1,066 or 77.6% use 15,000 gallons or less. This is a significant number for purposes of determining both a minimum charge and the effect on each level of customer for the various rate scenarios. That comparison will be shown in tables later in this report.

Meter Sizes:

SERCAP generally uses meter sizes to determine the number of Equivalent Dwelling Units or EDU’s. While that is not a good method to determine capacity or capacity planning, it is used in this analysis because it is a more consistent benchmark for a minimum charge than usage levels which can vary from day to day, let alone from billing to billing.

Using this method means that a single residential 5/8” meter is 1 EDU, while meters larger than 5/8” are factors or multipliers of that size. Boonsboro’s meter equivalency chart is shown below. Boonsboro’s own EDU calculations indicate an EDU count of 1,728. SERCAP adjusted that upward to 575 “excess” EDU’s as shown on the usage block table after gathering further information and data from the town. This amount was also justified by the number of users in each user block. The town should continue to use a gallon or volume definition of EDU for the purpose of capacity planning, but for the purpose of adjusting rates, meter equivalency is recommended.

SERCAP was asked to calculate a tiered rate structure, with different charges for different levels of usage. The current rate structure is tiered with a minimum charge of \$15.00 plus \$6.20 per 1,000 for the first 18,000 gallons of water used and \$9.10 per 1,000 for any gallons over 18,000. The usage curve shown on the previous page indicates that the majority of customers use 15,000 gallons or less. SERCAP used 15,000 gallons as the first tier in all the tiered rate scenarios shown in this report, and it is recommended that the current tier be reduced to that level.

In addition, SERCAP was directed to calculate a separate rate for Commercial and larger users, reflecting higher rates for commercial customers. There is insufficient usage data available regarding commercial vs. residential usage to make any reasonable conclusions. It can be logically assumed that the higher usage rate will account for the different classes, however, some commercial users, such as retail stores and offices, often use less than a residential connection. Without specific usage data for both classes of customer, conclusions are not possible at this time. If the town wants to establish a separate commercial rate, a full cost of service study is recommended, something SERCAP is not presently equipped to provide.

Minimum Charge or “Customer Charge:

It is SERCAP’s practice to set a customer charge per EDU to cover “fixed costs” that the system must pay regardless of the volume of water sold (or sewer collected.) This reflects the cost of installing and providing the service to each property. This customer charge is something that each connection pays for space or allocation it takes up in the system. So even if a customer turns off the water and goes elsewhere for a whole billing quarter or quarters they pay this charge as the price of maintaining their connection and the availability of water, whether used or not.

SERCAP typically uses Debt Service, Reserves and non-debt funded Capital Costs to calculate this charge and recommends that it be calculated and itemized separately from usage, without any gallon allowance included. The present charge of \$15.00 per EDU is insufficient in and of itself, to cover the annual fixed costs. SERCAP’s calculations indicate the customer charge should be at least \$25.58 per EDU for water. In each rate option calculated the usage charge compensates for the difference in revenues from base charges, as illustrated in the first section of this report. Raising the customer charge can allow the town to reduce the prices per 1,000 gallons of usage and still adequately recover the costs of operation, in effect, re-slicing the pie.

Rate Scenarios and Comparison Charts:

SERCAP calculated different rate structures, with a minimum or customer charge and starting usage charges at the first gallon used. This is an equitable way to charge so that no single customer is paying for any more than they, themselves use. The customer can also exert some control over the final cost to them by conserving (or wasting) water. The difference between the scenarios is only in the source of the revenue – fixed or variable charges – since the cost of running the system is the same regardless.

The rate scenarios and the comparison tables all represent projected figures, based on data supplied by the town. In some instances, the conclusions may be limited by the availability of data detail from the town’s billing software or system. Regardless, all calculations start with projections from the 2021 budget and extrapolations based on past performance and usage data. Usage projections are average figures compiled from a full year’s worth of billing, while production numbers are actual figures from that same time period. This CAN result in numbers that are under- or over-estimated once actual figures are examined after the fact. A small “cushion” is projected for each scenario to account for the possibilities of variations in usage, growth or loss of customer base and other issued that cannot be foreseen.

Tiered Rates with 15,000 gallon “break point”:

Rate Scenario #1:

	Residential
Customer Charge	\$30.00
Usage Rate to 15k	\$ 5.25
Usage Rate > 15k	\$ 8.10
Revenue Projected:	\$752,499
Surplus/(Deficit):	\$ 4,961

Usage Level	Quarterly Bill	Difference	Annual Bill	Difference
3,000/quarter	\$45.75	\$12.15	\$183.00	\$48.60
6,000/quarter	\$61.50	\$ 9.30	\$246.00	\$37.20
9,000/quarter	\$77.25	\$ 6.45	\$309.00	\$25.80
12,000/quarter	\$93.00	\$ 3.60	\$372.00	\$14.40
15,000/quarter	\$108.75	\$ 0.75	\$435.00	\$ 3.00
24,000/quarter	\$181.65	\$ 0.45	\$726.60	\$ 1.80
30,000/quarter	\$230.25	(\$ 5.55)	\$936.00	(\$22.20)
36,000/quarter	\$278.85	(\$11.55)	\$1,130.40	(\$46.20)

Rate Scenario #2:

	Residential
Customer Charge	\$40.00
Usage Rate to 15k	\$ 4.50
Usage Rate > 15k	\$ 7.25
Revenue Projected:	\$753,544
Surplus/(Deficit):	\$ 6,006

<u>Usage Level</u>	<u>Quarterly Bill</u>	<u>Difference</u>	<u>Annual Bill</u>	<u>Difference</u>
3,000/quarter	\$52.45	\$18.85	\$209.80	\$75.40
6,000/quarter	\$64.90	\$12.70	\$259.60	\$50.80
9,000/quarter	\$77.35	\$ 6.70	\$309.40	\$26.80
12,000/quarter	\$89.80	\$ 0.40	\$359.20	\$ 1.60
15,000/quarter	\$102.25	(\$5.75)	\$409.00	(\$23.00)
24,000/quarter	\$167.50	(\$14.90)	\$607.00	(\$59.60)
30,000/quarter	\$211.00	(\$27.20)	\$844.00	(\$108.80)
36,000/quarter	\$254.50	(\$39.50)	\$1,018.00	(\$158.00)

Rate Scenario #3:

	Residential
Customer Charge	\$50.00
Usage Rate to 15k	\$ 3.75
Usage Rate > 15k	\$6.00
Revenue Projected:	\$753,098
Surplus/(Deficit):	\$ 5,560

<u>Usage Level</u>	<u>Quarterly Bill</u>	<u>Difference</u>	<u>Annual Bill</u>	<u>Difference</u>
3,000/quarter	\$59.90	\$26.30	\$238.00	\$105.20
6,000/quarter	\$69.80	\$17.60	\$279.20	\$ 70.40
9,000/quarter	\$79.70	\$ 8.90	\$318.00	\$ 35.60
12,000/quarter	\$ 89.60	\$ 0.20	\$358.40	\$ 0.80
15,000/quarter	\$ 99.50	(\$8.50)	\$398.00	(\$34.00)
24,000/quarter	\$171.50	(\$10.90)	\$686.00	(\$43.60)
30,000/quarter	\$207.50	(\$30.70)	\$830.00	(\$122.80)
36,000/quarter	\$243.50	(\$50.50)	\$974.00	(\$202.00)

Out of Town Customers:

A multiplier of 1.2 times the in-town charges is suggested for any out-of-town customers. Their number and usage were included in rate and revenue calculations so there is no need to calculate a separate block, other than to charge slightly more for those who do not contribute to general expenses as taxpayers.

Observations and Recommendations:

The first, and most obvious impact is that raising the customer charge to a more appropriate level to cover fixed costs results in a lower cost per 1,000 gallons in both tiers than the current \$6.20 and \$9.10. It's also noticeable that the difference between the two tiers is narrower than the current rates. The difference between the two tiers is increased in subsequent years' rate projections discussed later in this report.

Higher volume users actually save some money due to the lower cost per 1,000 gallons, but they are paying more of their fair share of fixed costs with the true up of customer charge to where it should be. Lower end users will see less of an increase with Scenario #1.

Conclusion:

1. The Town should increase its quarterly customer charge to at least cover the fixed costs per EDU or \$25.58 at minimum. A higher customer charge is recommended to ensure sustainable revenue for the first 4-5 years. Three scenarios showing \$30, \$40 and \$50 customer charges are offered here, but it is recommended that it should not be lower than \$30, whichever option is chosen.
2. With an increase in the customer charge to where it should be to cover fixed costs, the rate per 1,000 gallons can be reduced, resulting in a few customers actually saving money on their regular water bills. Careful consideration should be given to the usage curve when choosing a rate scenario so that the impact of the chosen rate structure on the majority of customers is diligently evaluated. Likewise, the eventual rate structure should strive to true up inequities presented by the current rates.

Recommendations and Five-Year Projections:

Given the rate scenarios presented in this section, SERCAP was asked to choose an option with the least impact on the largest segment of the user base and then to project rates and revenues needed for five years. After consideration of each of the rate options on the foregoing pages and the usage curve showing where the majority of customers fall, SERCAP chose Option #1 to use in projections as the least cost increase for more than $\frac{3}{4}$ of the users and the most modest savings for the higher end users. Taking that scenario - \$30.00 customer charge, \$5.25 per 1,000 for the first 15,000 gallons and \$8.10 for each 1,000 gallons above 15,000 – SERCAP projected rates for 4 years beyond the test year. The results of that projection are reflected in the chart below.

	BASE YEAR	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Customer Charge	\$ 30.00	\$ 35.00	\$ 35.00	\$ 35.00	\$ 35.00
Rate up to 15k gal	\$5.25	\$5.75	\$5.75	\$5.75	\$6.00
Rate over 15k gal	\$ 8.10	\$ 8.75	\$ 8.90	\$ 9.00	\$ 9.00
Revenue Projected	\$ 752,499	\$ 848,347	\$ 870,578	\$ 882,827	\$ 903,761
Rate Rev. Required	\$ 747,538	\$ 842,432	\$ 860,690	\$ 879,457	\$ 898,747
"Cushion" (Surplus)	\$ 4,961	\$ 5,916	\$ 9,888	\$ 3,370	\$ 5,013

By increasing the base or customer charge slightly after the first year, volume usage rates can still be lower than they are in current rates of \$6.20 and \$9.10 for at least 5 years. In these projections a rate of 2% growth in customers and usage was employed for the third year and a 1% growth rate was used after that. The reason for this difference is the number of additional units at 2% is 40 and it seemed unreasonable that growth will continue at the rate of 40 or more units per year. Any difference in growth or general usage characteristics could change these projections and actual figures for usage and costs should be examined each year BEFORE implementing any of these rates. SERCAP can help with that analysis at no charge if requested.

RECOMMENDATIONS:

1. Institute a \$30.00 customer charge per EDU with the new Fiscal Year 2022-23 in July.
2. Implement Scenario #1 user rates of \$5.25 1,000 gallons for the first 15,000 gallons per quarter and \$8.10 for each 1,000 gallons after 15,000. Out of town customers should be charged at 1.2 times the in-town customer rates.
3. Analyze actual and projected figures annually before implementing any of the projected rates shown above to make sure they are adequate and represent actual costs and usage for that year. Adjust from the projections if necessary.
4. Proceed with meter replacement as planned and conduct a water audit after new meters have been operational for at least 6 months to 1 year to ensure non-revenue water is not excessive.
5. Adopt an official policy regarding multi-family units and assessment of the customer charge per EDU that can be consistently applied throughout the customer base. Adjust the meter equivalency number used to calculate EDU's accordingly if necessary.

III. Sewer Analysis And Recommendations

System Costs and 5-year Projections:

As with the Water System, SERCAP's analysis used FY 21's budget as a base year for estimating costs and projecting revenues, after examining actual expenditures for FY 18, FY 19 and FY 20. For rate setting purposes, actual figures are preferred, but the variance between the previous fiscal years examined was inconsistent, dropping drastically between the first two years and increasing slightly each year thereafter. In view of this wide variance, as well as some changes in accounting practices that affected the variance, FY 21 budget was used as a good middle ground. Costs were then projected for four additional years, giving a 5-year outlook.

System Revenue and Revenue Requirement Projection:

System revenues are projected using FY 21 as the base year and forward for 4 years using a standard 2.5% rate of inflation. The analysis used a rate revenue requirement based on deducting estimated NON-rate revenues from estimated total revenues, and rates were derived accordingly. In the Base Year of FY 21, there was a one-time only expenditure of \$300,000+ budgeted for matching funds to a one-time grant. That amount was deducted before projecting subsequent years to give a more realistic picture of revenue needs.

Again, as with the water fund, it is critical that decision makers understand if any portion of that non-rate revenue is restricted, cannot or should not be used to fund overall operations, the rate options shown here will all need to be increased to compensate for that reduction in revenue. Each year shows a projected deficit based on conservatively estimated revenue, with or without the non-rate revenue factored in.

Non-revenue Water and the effect on Sewer Revenue:

The effects of 30% non-revenue water volume discussed in the water system section of this report is even more pronounced for the sewer system because sewer charges are based on the volume of water used for most customers. The sewer system's costs are an average of 2.5 times more than the costs of the water system. That means a non-revenue water volume of 38,781,628 gallons translates to about \$350,000 in lost revenue per year for the sewer system at the present rate. That doesn't even include the increase for the next tier of usage. The town should strive to identify the source(s) of this non-revenue water with the goal of reducing that volume to an acceptable percentage of the total water produced.

Current Charges:

The current charges for sewer users are \$55.00 per EDU plus \$9.00 per 1,000 gallons of water used. SERCAP's analysis shows that this \$55.00 minimum charge doesn't even cover half of the town's fixed costs. Totaling all of the town's fixed costs – debt service and reserve – a minimum fixed charge would be about \$100.00 with a slight increase in the volume charge to meet revenue requirements. The average cost per 1,000 gallons of water used is \$12.58 so, like the water system, the usage charges are not recovering the average costs in and of themselves.

The increased Customer Charge proposed enables cost recovery without increasing volume charges to the level of \$12.58. SERCAP has based its first-year projection on a \$110.00 Customer Charge per EDU for the first year but reducing it to reflect the difference in expenses for years 2 through 5.

System Costs and 5-year Cost Projection:

The usual SERCAP analysis looks at a single, base year and calculates projections, based on a combination of known or planned figures and an average rate of inflation. Due to the variance between the last 4 fiscal years’ figures, the analysis looked at costs for four (4) fiscal years before deciding on a Base Year. 2.5% inflation was used for the projection of costs and revenue, while a 1.5% growth rate was used to project customer base and usage. The five-year projection of costs with a base year of FY2021 is shown below, and the projected revenues AT THE PRESENT RATE LEVELS are shown below that.

Total Annual Sewer Costs:

2021 Base Year	Year 2	Year 3	Year 4	Year 5
\$1,939,403	\$1,523,131	\$1,549,493	\$1,576,503	\$1,604,179

Total Annual Sewer Revenues at Current Rates:

2021 Base Year	Year 2	Year 3	Year 4	Year 5
\$1,255,260	\$1,323,029	\$1,356,105	\$1,390,007	\$1,424,758

Projected **Deficits at Current Rates:**

2021 Base Year	Year 2	Year 3	Year 4	Year 5
\$684,143	\$200,102	\$193,338	\$186,496	\$179,421

Even given the one-time expense of \$302,000 in FY 21, the system is clearly not sustainable at the present rates and costs. The large variance between the FY 21 Base Year and Year 2 is attributable to a large, self-funded capital expense in FY 2021 as well as required matching fund expense in that same year. Projections were based on a percentage of Year 2 expenses and revenue requirements to avoid skewing the results.

The main conclusion here is that the current charge of \$55.00 per EDU is much too low to cover the aforesaid fixed costs, and that raising that charge, along with capturing all EDU’s in multi-family housing can result in a lower charge per 1,000 gallons of water used. Moreover, the volume charge per 1,000 gallons of water used is not sufficient to recover variable costs either.

Rate Options and Alternatives:

As was done for the water system SERCAP’s usual practice is to give a system three rate scenarios to choose from. The same usage blocks and usage numbers were used as were the basis for the water rate calculations. The rate options calculated for Boonsboro are as follows:

Option #1:

Customer Charge: \$100.00 per EDU
Charge per 1,000 gal: \$ 9.10
Revenue Projected: \$1,544,206

Option #2:

Customer Charge: \$110.00 per EDU
Charge per 1,000 gal: \$ 9.60
Revenue Projected: \$1,640,990

Option #3:

Customer Charge: \$100.00 per EDU
Charge per 1,000 gal: \$ 9.20
Revenue Projected: \$1,623,165

A jump from the current \$55.00 per EDU to \$100 or more will be a leap for most customers, and perhaps even for the elected officials to swallow. It is important to keep in mind during deliberations about this report and its recommendations that the current \$55 base charge is much too low to recover the system’s fixed costs and it has been artificially low for too long.

Impact on Users:

Impact on all levels of users is of particular concern during any consideration of a rate change. SERCAP has estimated the impact of the recommended rate option on several levels of usage for the sake of comparison, beginning with an average user of 15,000 gallons per quarter.

Examples of the estimate for an average user follows and other levels are shown below:

15,000 gal. user	Current Bill	New Bill	+/- Difference
Customer Charge	\$55.00	\$100.00	+\$45.00
Usage Charge/1,000	\$9.00	\$9.10	+\$0.10
Quarterly Bill	\$190.00	\$236.50	\$46.50
Annual Charges	\$760.00	\$946.00	+\$186
Revenue Projected	\$1,255,260	\$1,544,206	+\$288,946

Again, more than 77% of the town’s customers use 15,000 gallons or less per quarter but all users will see a slight increase regardless of volume. Estimates for lower end users are as follows:

	Current Bill	New Bill	+/- Difference
3,000 gal/quarter	\$82.00	\$127.30	+\$45.30
6,000 gal/quarter	\$109.00	\$154.60	+\$45.60
9,000 gal/quarter	\$136.00	\$181.90	+\$45.90
12,000 gal/quarter	\$163.00	\$209.20	+\$46.20

In recognition of the impact this increase will have on everyone, SERCAP chose Option #1 to use for projecting a five-year revenue requirement and rate estimate, since it has the lowest increase in base charge of all the scenarios, and should have the lowest dollar impact on the 77.6% who use 15,000 gallons or less. The resulting projections, using a 1.5% rate of growth, are shown below. For the Base Year FY 21, a more significant increase would have been necessary, but since FY 21 will end in less than 6 months, it may not be necessary to increase rates to that level and then reduce them to meet subsequent years’ expenses.

	BASE YEAR	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Customer Charge	\$ 110.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
Rate per 1,000	\$ 9.60	\$ 9.10	\$ 9.10	\$ 9.10	\$ 9.20
Revenue Projected	\$ 1,640,990	\$ 1,544,206	\$ 1,567,369	\$ 1,590,880	\$ 1,623,165
Rate Rev. Required	\$ (1,627,403)	\$ (1,523,131)	\$ (1,549,493)	\$ (1,576,503)	\$ (1,604,179)
"Cushion" (Surplus)	\$ 13,587	\$ 21,075	\$ 17,876	\$ 14,376	\$ 18,986

The "cushion" is necessary for both water and sewer funds because all rates and costs are based on estimates and projections that could be changed by any number of unforeseeable circumstances in the actual year as it occurs. Therefore, costs and revenues should be carefully examined each year to make sure these projected rates are sufficient to recover costs. Moreover, when a rate change occurs, consumers are typically much more careful about their water use and waste for the first few months, so a small surplus in projections is necessary to cover that decrease in revenues.

RECOMMENDATIONS:

1. Institute a \$100.00 customer charge per EDU with the new Fiscal Year 2022-23 in July.
2. Implement Scenario #1 user rates of \$9.10 for each 1,000 gallons of water usage. If there are customers who do not have metered water usage then calculate a sewer bill based on average residential usage of 5,000 gallons per month/15,000 gallons per quarter for those

customers' flat rate charge. Out of town customers should be charged 1.2 times the in-town customer rates to reflect their lack of contribution to other town services through taxes.

3. Analyze actual and projected figures annually before implementing any of the projected rates shown previously to make sure they are adequate and represent actual costs and usage for that year. Adjust from the projections if necessary.
4. Proceed with meter replacement as planned and conduct a water audit after new meters have been operational for at least 6 months to 1 year to ensure non-revenue water is not excessive.
5. Adopt an official policy regarding multi-family units and assessment of the customer charge per EDU that can be consistently applied throughout the customer base. Adjust the meter equivalency number used to calculate EDU's accordingly if necessary.

Summary of recommendations for Water and Sewer:

1. The customer charge for each service that represents a minimum payment per EDU should be increased - \$30 for Water and \$100.00 for Sewer. This represents a true up of the cost distribution between existing customers for the availability of the service. Neither charge under the present rates is sufficient to cover those fixed costs of providing service.
2. The volume or usage charges for water can be decreased from the present rates for at least 5 years IF the break between usage tiers is lowered to 15,000 gallons. The majority of customers use 15,000 gallons or less, and this change will help to make the rates more equitable for all customers.
3. The volume charge for sewer should be increased to at least \$9.10 to make up for a projected deficit for the next five years. Once increased it can stabilize at or around that level provided costs and revenues stay relatively stable.
4. A water audit should be conducted once the planned new meters are operational for at least 6 months, in order to determine if meter replacement has reduced the non-revenue water to an acceptable level (either 10% or 15%.)
5. **The projections shown herein are estimates based on present circumstances and any difference from one year to another will affect the cost recovery for any projected rate scenario. Actual costs and revenues for each year should be examined before setting rates for the next fiscal period to ensure full cost recovery.**