

Burlington Water District

Water Rate Study

Final Report
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Prepared by:

Oregon Association of Water Utilities



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Water Rate Study

Introduction:

In March 2020, the Burlington Water District (BWD) Board of Directors authorized Oregon Association of Water Utilities, to review current water rates. The purpose of this study was to develop examples of financial strategies and rates that:

- Provide adequate revenue to meet the operation and maintenance costs, capital improvement costs as well as emergency funding.
- Equitably determine and distribute costs among the various consumer types.
- Are relatively simple to understand and implement, being consistent with industry practices.

Per the request from the BWD Board, Oregon Association of Water Utilities is pleased to present this rate study to the District for review. When conducting a rate study, the best results are based on the most accurate data obtained, equity among the consumers and revenues that provide a budget that allows the water system to operate according to state regulations.

After careful review of the written materials that have been provided and discussions with Board members, key points are necessary to mention to keep the same level of understanding. They are:

- Changes in necessary monies for capital improvement
- Creation of a contingency fund for emergency purposes
- Existing expenditures based on billing units of 100 cubic foot units (748 gallons)
- Monthly costs based on dwelling units and not the size of the meter connections.

After several discussions regarding this rate study, it appears that an increase to the existing water rates is necessary to meet the financial obligations of the district. The financial obligations include normal operations and maintenance as per adopted budget for 2020-2021. It is also important to create reserves for future loan payments, capital replacement, capital projects, and for major maintenance and repairs. System Development Charges (SDCs) have also proven to be an important facet for any district to continue to look at future growth. SDCs resolution # 15/16-01 and resolution 19/20-01 have established the current charges and was not included in this study.

Contingency funds have been considered in the annual water budget to cover unexpected repair and replacement costs. A recommended contingency for emergencies may be 10% to 20% of the operational portion of your budget. These contingencies do not need to be expanded if not needed. Carry unused contingencies and other revenues not expended over to next year's working capital or other expense line items and again set aside a new contingency for the next budget year.

If you decide to implement or increase contingencies, ensure that your auditor reviews your intentions prior to implementation. Whenever in doubt, consult "Local Budget Law Guidelines". In this rate study, is

provided several water rate examples for the District to consider when it is time to create and implement any changes to the water rate structure.

We will be utilizing the information provided that is pertinent when performing a rate study. The information includes the adopted budget that consist of revenues necessary for O&M, personnel, contingency, capital outlay, loan debt service, and loan debt reserve fund, if required. The water system figures are based upon as close an estimate as could be determined from your existing records and future needs as discussed during conversations since July 2020. This has been provided in a one single budget revenue figure at \$343,925.00.

The other pertinent information is as follows: 196 connections – which 91.8 percent are considered single family residential (SFR) dwellings and the remaining 16 service connections are 1.0-inch through 3.0-inch sized meters. The current rate structure consists of two separate base rates (inside and outside district) with a multi-tiered format of an increased block rate.

Currently, the increased block rate is established having six tiers, beginning with zero usage through the last tier starting at 4,001 cubic feet. The cost per unit at various levels begins at \$7.52 per unit (inside district) and \$8.09 per unit (outside district).

Table 1: Current Rate Information						
Service Connection Size (in.)	# of connections	Allowance (Gallons)	Base Rate	Unit Rate Cost ¹	Average Consumption ²	Typical Monthly Cost
5/8 - 3/4 Residential	180 ³	0 ⁴	\$54.18	\$7.52 ⁵	4.18	\$85.61
1.0 Residential	7	0	\$54.18	\$7.52	16.64	\$117.94
2.0	7	0	\$72.71	\$8.09	62.26	\$431.16
3.0	2	0	\$72.71	\$8.09		
Total Annual Base	196	NA	\$147,221.40	NA		
Total Annual Consumption ⁶			\$126,215.68			
Combined Base and Consumption			\$273,437.08	79.50%		
Proposed Budget			\$343,925.00			
1 – 1 unit = 748 gals.						
2 – Average consumption figured from random users / months.						
3 – 80 service connections are outside the district at a base rate - \$72.71.						
4 – Consideration in providing some allowance of water,						
5 – Price per unit is first tier, with 5 additional tiers established with current rates, outside district has similar tier structure						
6 – Consumption revenue figured using percentage of inside/outside users with appropriate tier 1, unit charge for all available units (16,784)						

BWD is a wholesale customer using water supplied by Portland Water Bureau (PWB), which BWD is responsible for the distribution aspects of water delivery. BWD has a fiscal year 2020-21 guarantee minimum purchase (GMP) of 26,838 units (20 million gallons) from PWB which is approximately 38

percent higher than average annual usage. Discussions with the Board determined the contract covers the period through June 2026.

Applied throughout this study will be to the approximate cost of \$40,000.00 annually for the purchase of water from PWB. Contractual agreement with PWB estimates per unit cost to BWD to increase from \$1.347 (2021) to \$4.939 (2024). This assumption, if correct, will increase BWD water cost from \$40,000.00 annually to approximately \$132,000.00 dollars annually. This valuation reserve shows the Board a method to simplify the upcoming budgets until discussions with PWB to develop a new contract in 2026. Also included in the calculation of rates is the amount of water purchased at 20.1 million gallons (MG) or 26,912 units for fiscal year 2019-20. The amount of water purchased, and the amount of water sold, indicates a 37 percent non-revenue (lost) water. When viewing actual water meter readings and accounting for 16,784 units, 12.5 MG, the average monthly usage per service connection is approximately 3,100 gallons, (4.18 units) which is in the range of statewide average estimates.

Table 2: Current Expenditures Information		
Personnel Services:	\$40,000.00	
Materials and Services:	\$ 95,000.00	
Funding Debt Service	\$68,925.00	
Sub-total:		\$203,925.00
Contingency Reserve:	\$110,000.00 ¹	
Capital Outlay:	\$30,000.00 ²	
Total Expenditures:		\$343,925.00
1 - Recommended 10-20% of operations and maintenance, 2 – Adjusted each year to match cost associated with future improvements.		

Table 3: Annual Water Purchased	
Reporting Year	Total Units
2019-2020 ¹	16,678
1 – PWB has an annual guarantee minimum purchase of 26,838 units for 2020-21	20,074,824 gals

System Data:

On the following pages, copies of worksheets reflect the original findings and assumptions based on the initial information. As we continue in the water rate study, a comparison from current structures and the recommendation for future years will be outlined.

Burlington Water District														
FY 2019-20, 2020-21 Guarantee Minimum Purchase (GMP) and monthly billing														
Account #2992304500														
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	Total	
GMP (in ccf) 19-20	2,154	2,308	1,688	2,139	1,937	2,682	3,151	1,886	1,985	1,906	2,636	2,440	26,912	
GMP (in ccf) 20-21	1,999	1,927	1,609	2,423	1,958	2,736	3,112	1,848	2,082	1,890	2,816	2,439	26,839	
Actual usage 2020	1,509	1,518	1,346	1,619	1,078	1,392	1,260	1,178	1,455	1,603	1,480	1,346	16,784	
Difference ¹	645	790	342	520	859	1,290	1,891	708	530	303	1,156	1,094	10,128	
Unused	30%	34%	20%	24%	44%	48%	60%	38%	27%	16%	44%	45%	36%	
Rate	\$ 1.344	All figures are one-hundred cubic feet (ccf), except percentages of unused water												
Billing for GMP	\$3,752.00	\$4,020.00	\$2,941.00	\$2,866.26	\$3,374.00	\$4,673.00	\$5,489.00	\$3,286.00	\$3,457.00	\$3,320.00	\$4,593.00	\$4,251.00	\$46,881.00	
Base Charge ²	\$98.48	\$98.48	\$95.30	\$98.48	\$85.78	\$108.00	\$98.48	\$88.94	\$101.66	\$95.30	\$98.48	\$95.30	\$1,162.68	
Total bill sent	\$3,850.48	\$4,118.48	\$3,036.30	\$2,964.74	\$3,459.78	\$4,781.00	\$5,587.48	\$3,374.94	\$3,558.66	\$3,415.30	\$4,691.48	\$4,346.30	\$48,043.68	
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	Total	
GMP (in ccf) 19-20	2,154	2,308	1,688	2,139	1,937	2,682	3,151	1,886	1,985	1,906	2,636	2,440	26,912	
Actual usage (in ccf)	1,509	1,518	1,346	1,619	1,078	1,392	1,260	1,178	1,455	1,603	1,480	1,346	16,784	
Actual paid \$/ccf ³	\$2.55	\$2.71	\$2.26	\$1.83	\$3.21	\$3.43	\$4.43	\$2.86	\$2.45	\$2.13	\$3.17	\$3.23	\$2.86	
GMP Ave:	2,243	2,237	1 - Figures are subtracted from GMP 19-20, which determines the percentage of unused water											
Mo Ave:	1,399	TBD	2 - Base charge, (monthly connection fee with PWB) fluctuates, no answer as to why at the writing of the study											
Ave \$	\$ 2.86		3 - Is the actual cost per ccf when total monthly bill is figures into the number of units actually flowed past the meter											
Ave Diff	844													
Unused %	36%													

Between the total purchased water from PWB and water sold, a loss of 37 percent non-revenue water demonstrates a needed continued effort in leak detection and meter calibration. At 37 percent or 10,054 units, and an actual cost per unit at \$2.86, equates to approximately \$28,000.00 in non-revenues. BWD's current contract confirms actual cost per unit at \$1.34, yet with the guarantee minimum purchase (GMP) and a variable monthly base rate corroborates an actual cost of \$2.86 per unit.

The above table outlines the GMP for the two-year cycle, concluding in June 2021, and more importantly the actual cost per unit found in the yellow highlighted row. These figures are obtained by dividing the monthly payment (total bill sent) to PWB by the actual usage for the month. Pending on when the contract is negotiated. Discussions led to assume June 2026 is the current ending date, BWD can focus on two aspects a) look at water loss reduction to lower the average monthly consumption, which will provide evidence to reset new terms of the contract, b) review meter readings, testing to determine the accuracy of both the master meter from PWB, and individual meters. As meters age, particularly the mechanical positive displacement meters, they tend to slow down and have short readings each month.

The following two pages show the structure of the base rates and consumption rates from the "System Data and Existing Rates" spreadsheets and how revenues are compared to current budget expenditures.



Water Rate Study for

Burlington Water District

System Data

For Year: 2020-2021
Date completed: January-21

Amount of Water Purchased
Amount of Water Sold
Non-Revenue Water

Cubic Feet (annual)	100 CF (annual)	Total Annual Gallons	
2,683,800	26,838	GMP 2019-20	20,074,824.00
1,678,400	16,784		12,554,432.00
1,005,400	10,054	7,520,392	37.46%

Purchased Water / Materials
Capital Outlay
Funding Authority Debt
Contingency
Proposed Annual Budget

Dollars	Cost per Gallon	Cost Per 1000 Gallons	Cost Per 100 Cu.Ft.
\$135,000.00			
\$30,000.00	\$0.01713	\$17.13	\$12.81
\$68,925.00			
\$110,000.00			
\$343,925.00			

Connection Information
Base Rate Only

Size	Residential	# of connections Commercial	Outside	Actual Connections
5/8"	100		80	125
3/4"				
1"	5	2		
1 1/2"				
2"	1	6		
3"	2			
4"				
6"				
				Total Connections Billed
				196

Current Rate information (base)

Size	Residential	Commercial	Outside	Base Rate Revenues
5/8"	\$54.18		\$72.71	
3/4"				
1"	\$54.18	\$54.18		
1 1/2"				
2"	\$54.18	\$54.18		
3"	\$54.18			
4"				
6"				
				\$145,220.16

Current Consumption Rate
Current Consumption Cost
\$2.86

Per 100 Cubic Feet	\$7.52	\$8.09
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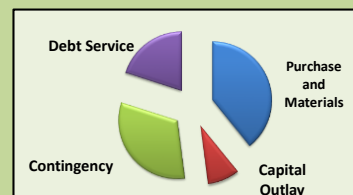
Percentage of budget without any consumption revenue

Operating Budget Outline

Personnel / Materials	\$135,000.00	39.25%
Contingency	\$30,000.00	8.72%
Capital Outlay	\$110,000.00	31.98%
Purchased Water	\$68,925.00	20.04%
TOTAL OPERATING EXPENDITURES	\$343,925.00	Base Rate % Total Cost
		42.22%

Notes:

Comparison / understanding of 100 cubic feet (ccf) (748 gallons)
Burlington Water District -BWD- purchases water at \$ 1.344 per ccf or \$0.0018 per gallon
BWD sells water (minimum rate) at \$7.52 per ccf or \$8.09 per ccf (outside district) effective July 1, 2020 - Tier 1 5-ccf (3,740 gallons)
Zero "allowance" of water is supplied in the base rate
Current average cost price per 100 cubic feet at \$12.81 or \$0.017 based on proposed budget of \$343,925.00
Tier One 500 cu. ft. = \$7.52 per unit or \$0.010 per gallon or \$0.007 shortfall per gallon
Tier Two 501 - 1000 cu. ft. = \$9.45 per unit or \$0.013 per gallons
Not until Tier 4 (\$13.73 - \$13.90 per ccf) does BWD gain revenue per unit of water sold





Water Rate Study for Burlington Water District

Existing Rates

For Year: 2020-2021
Date completed: January-21

Amount of Water Purchased
Amount of Water Sold
Unaccounted for Water

Cubic Feet (annual)	100 CF (annual)	Total Annual Gallons
2,683,800	26,838	20,074,824
1,678,400	16,784	12,554,432
1,005,400	10,054	7,520,392

37.46%

Annual Operating Budget
Purchased Water
Proposed Annual Budget
Connection information

Dollars			
\$275,000.00			
\$68,925.00			
\$343,925.00			
			</

Consumption w/ base

Zero Water
Current Rate information

5/8"	100	0	80	Non-Billable Accounts 0
3/4"	0	0	0	
1"	5	2	0	
1 1/2"	0	0	0	
2"	1	6	0	
3"	2	0	0	
4"	0	0	0	
6"	0	0	0	
	0	0	0	
				Total Connections 196

Tier One Charge

Current Base Revenue

	Residential	Commercial	Outside
5/8"	\$54.18	\$0.00	\$72.71
3/4"	\$0.00	\$0.00	\$0.00
1"	\$54.18	\$54.18	\$0.00
1 1/2"	\$0.00	\$0.00	\$0.00
2"	\$54.18	\$54.18	\$72.71
3"	\$54.18	\$0.00	\$72.71
4"	\$0.00	\$0.00	\$0.00
6"	\$0.00	\$0.00	\$0.00
per 100 cubic feet	\$7.52		\$8.09

Base Rate Totals

	Residential	Commercial	Other	Totals
5/8"	\$5,418.00	\$0.00	\$5,816.80	\$11,234.80
3/4"	\$0.00	\$0.00	\$0.00	\$0.00
1"	\$270.90	\$108.36	\$0.00	\$379.26
1 1/2"	\$0.00	\$0.00	\$0.00	\$0.00
2"	\$54.18	\$325.08	\$0.00	\$379.26
3"	\$108.36	\$0.00	\$0.00	\$108.36
4"	\$0.00	\$0.00	\$0.00	\$0.00
6"	\$0.00	\$0.00	\$0.00	\$0.00
Total/month	\$5,851.44	\$433.44	\$5,816.80	\$12,101.68
12 mo. Total	\$70,217.28	\$5,201.28	\$69,801.60	\$ 145,220.16

% of operating budget

	20.42%	1.51%	20.30%	42.22%
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Water with base charge

Total/month	0	0	0	0
12 mo. Total	0	0	0	0

Total Water Included in Base Rate

Available Units to be sold

Consumption Rate Revenues ¹

12 mo. Total	0			16,784
				\$ 126,215.68
Potential Non Revenue Cost				36.70%

Non-Revenue Units

10,054	\$ 28,754.44			
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Total Revenue Generated

Annual Gain/(Shortfall)

\$ 271,435.84

\$ (72,489.16)

-21.08%

Notes:

1- \$7.52 consumption charge used to figure revenues for all units sold

\$28,754.00 is lost when 10,054 units @ \$2.86 is not sold to the consumer

Goal to achieve in first fiscal year, reduce water loss from 37% to 20%

Priority 1 - investigate non-revenue water

Typical Residential Water Bill

Units of Water	Residential Water Bill
2.00	\$69.22
4.18	\$85.61
10.00	\$129.38

In Table 4, “Cost of Production” shows that cost per unit (748 gallons) at approximately \$12.81 per unit, a figure that offers evidence in the first step in setting rates. This analysis is using the current year, and associates with PWB “guarantee minimum purchase” (GMP), not the three-year average consumption designated by the master meter readings. BWD has consumed approximately sixty-five percent of the GMP.

Table 4: Cost of Delivery	
Total Expenditures:	\$343,925.00
Average Annual Total Water Purchased: (2017-2019)	16,784 units ¹
Price per gallon:	\$0.01713
Per 748 gallons: (1-Unit)	\$12.81
1 – Each unit is 748 gallons, total average gallons consumed – 12.5 MG, PWB – guarantee minimum purchase – 26,838 unit (20.0 MG)	

Rate structures vary from utility to utility, but generally include three elements. First, include consideration of the classification of customers served, i.e., residential, commercial, and industrial. Secondly, all customers have an established frequency in billing and third, the charges, or schedule of charges will be identified and assessed.

Total revenue requirements are generated by both base and consumption rates. Each play a role as it relates to the total budget. Due to the discrepancy of GMP and actual water consumption, it is in the best interest of BWD to focus efforts on water consumption, and non-revenue water to better negotiate the next contractual agreement with PWB.

For water utilities using a cost-of-service approach, the level of the utility’s rates is a function of the utility’s costs and customer’s demands. Setting the base rate per size of connection, multiply by number of connections, and then multiply by 12 (12 mo. /yr.) forecasts an amount that can be considered as a substantial revenue income to help ensure that most “fixed” annual expenditures are covered.

It is typically suggested that having the base rate cover a percentage of the annual water budget allows for the balance of revenues generated by what is termed a *volume rate*. Discussions usually lead water personnel, city council, and board of directors to a targeted base rate to cover 60-75% of the annual fixed costs. The metered amount of water can be charged by a unit measurement in gallons or cubic feet. Meters for BWD measure in cubic feet for every one-hundred cubic feet or 748-gallons. A dollar amount can be charged per unit.

In understanding the level of fairness, the BWD desires to maintain fairness with its customer base. Realizing the rise in costs for the water system operations in purchased water, maintenance and capital improvements, this rate study will outline the examples discussed during our conversations.

Cost Evaluations:

If the total operating expenditures were equally segregated according to the number of services, the cost per service for the BWD would be \$146.23 per month.

$$\$343,925.00 \text{ divided by } 12 \text{ months divided by } 196 \text{ services} = \$146.23 \text{ per month}$$

When determining cost for water, equity centered on water consumption has to be applied across the board, (size, and classification of the connection) and this is accomplished by means of determining the price per unit and the amount of consumption per month. One should pay only for water consumed.

Rate Study Approach:

A number of diverse and competing objectives can be applied to any rate study, but when they are not well understood and evaluated, can cause confusion among customers that are affected by a change in the water utility rates. Even though the objectives can be many, a selected rate structure should support and optimize a level of understanding. It is the goal of this rate study to abridge key elements and provide a tool of information for all.

Examples shown in this rate study are based on a single line item of cost to operate and maintain the BWD's Water System. In reviewing the existing rates, how those rates have been managed, led to a quick realization that current rates are in line with expenditures, yet the monies for capital improvement could be less than anticipated.

Preliminary Observations:

On the next worksheet several items begin to demonstrate the merging of base rates, consumption rates, average water usage per month and where adjustments can be made to fine tune the water rates.

With a view of both the base rate and the consumption rate; revenues generated from each; it was determined that the water utility was collecting revenues that equaled 78.92 percent of total expenditures established on the adopted budget. The 78.92 percentage was based on all units of water sold at \$7.52 or at the tier-one rate. It is understood that some units of water are sold at charges higher than the tier-one rate.

Most users consume 4.18 units which keeps the unit cost in the tier one range (0 – 5 units). Deciphering how much water sold at what tier is beyond the available information provided for this study. Replacing the \$7.52 (tier-one) charge per unit with a new rate at \$11.90 will provide a balance budget for BWD. If this sole step were implemented the additional cost for a single-family residential dwelling would be \$18.30 per month, based on 4.18 units. This may be the single simplest step the Board may consider when looking at consumption rates.



Preliminary Observations

Rate Study for

Burlington Water District

For Year: 2020-2021
Date completed: January-21

	Cubic Feet	CCF Units				
Amount of Water Purchased	2,683,800	26,838				
Amount of Water Sold	1,678,400	16,784				
Unaccounted for Water ¹	1,005,400	10,054	\$	13,512.58		
Annual Operating Budget Funding Authority Debt Proposed Annual Budget	Dollars					
	\$275,000.00					
	\$68,925.00	Monthly Cost per Connection				
	\$343,925.00	\$146.23				
Connection information	Size	# of connections				
		Residential	Commercial	Outside		
	5/8"	100	0	80	Cost per 1,000 gallons	
	3/4"	0	0	0	\$ 17.13	
	1"	5	2	0	Cost per 100 Cubic Feet	
	1 1/2"	0	0	0	\$ 12.81	
	2"	1	6	0		
	3"	2	0	0		
	4"	0	0	0		
	6"	0	0	0		
	Consumption w/ base (gal.)	0	0	0	Connections	
	Current Rate (base)				196	
Consumption Charge		Residential	Commercial	Outside		
	5/8"	\$54.18	\$0.00	\$72.71		
	3/4"	\$0.00	\$0.00	\$0.00		
	1"	\$54.18	\$54.18	\$0.00		
	1 1/2"	\$0.00	\$0.00	\$0.00		
	2"	\$54.18	\$54.18	\$0.00		
	3"	\$54.18	\$0.00	\$0.00		
	4"	\$0.00	\$0.00	\$0.00		
	6"	\$0.00	\$0.00	\$0.00		
	per 100 cf	\$11.90	\$7.52	\$8.09		
	Current Base revenue		Residential	Commercial	Outside	Totals
		5/8"	\$5,418.00	\$0.00	\$5,816.80	\$ 11,234.80
3/4"		\$0.00	\$0.00	\$0.00	\$ -	
1"		\$270.90	\$108.36	\$0.00	\$ 379.26	
1 1/2"		\$0.00	\$0.00	\$0.00	\$ -	
2"		\$54.18	\$325.08	\$0.00	\$ 379.26	
3"		\$108.36	\$0.00	\$0.00	\$ 108.36	
4"		\$0.00	\$0.00	\$0.00	\$ -	
6"		\$0.00	\$0.00	\$0.00	\$ -	
Total/month		\$5,851.44	\$433.44	\$5,816.80	\$ 12,101.68	
12 mo. Total		\$70,217.28	\$5,201.28	\$69,801.60	\$ 145,220.16	
% of operating budget			20.42%	1.51%	20.30%	42.22%
	Water with base charge	Total/month	0	0	0	0
		12 mo. Total	0	0	0	0
		Ave Mo Residential Usage	4.18			
Total Water Included in Base Rate		Residential				
	12 mo. Total	0	Commercial			
	12 mo. Total	0		Other	Total Base Revenue	
	12 mo. Total			0	\$ 145,220.16	
Available water to be sold				16,784	\$ 199,729.60	
		Potential Annual Revenues	100.30%		\$ 344,949.76	
Consumption Revenues					\$ 1,024.76	
					0.30%	
Notes:	1 - Accounted water based on GMP		Annual Gain/(Shortfall)			
Ave Residential Usage = 4.18 units (3,100 gals) figured using Billing register "Ron"		Typical Residential Water Bill				
Consumption rate average price per unit = \$11.90 to meet budget of \$333,925.00		Units of Water	Res. Water Bill			
Increase of \$18.30 per month based on 4.18 units consumed		2.00	\$77.98			
Base rate (inside) equals the cost of 4.22 units of water at \$12.81 based on \$333,925.00		4.18	\$103.92			
		10.00	\$173.18			

Meter Multiplier Approach:

BWD has approximately 16 service connections which are larger than the 5/8" by 3/4" meter used at most single-family residential dwellings. While studying base rates, the American Water Works Association looks at **costs based on meter size**. Customer related costs for meters and services may be properly distributed among customer classes by recognizing factors that are generally responsible for those costs being incurred. As an example, one method for distributing meter-and-service costs to customer classes is in proportionate to the investment in meters and services installed for each customer class. This is in relation to the entire water system and all the components utilized and make the system function.

This is acknowledged in this study as it was mentioned during one of the monthly meetings, and after some review, realized revenues would fall by approximately \$42,000 annually. This may be a consideration for the district Board to consider as the current rates evolve, and new contract negotiations begin in 2026.

Increased Consumption Rate:

The approach taken in this example is a schedule of rates applicable to blocks of increasing usage in which the usage in each succeeding block is charged a higher unit rate. Currently BWD has this rate structure in place. An increased block rate structure requires applying a judgment and utility policy regarding the number of blocks, the point at which one block ends and the next block begins, and the relative price levels of the blocks.

BWD's monthly base rates generate revenues equal to 42.22 percent or \$145,220.16. The remaining balance of \$198,704.84 must be generated through consumption charges. Currently BWD does not provide an allowance of water with the base rate. When no allowance is provided, the Board must be prepared to defend "what" the customer receives for the base fee.

Costs per unit are usually set according to actual usage of like groups. The group that usually sets the foundation will likely be the majority users, single family residences. In the analysis performed using the current rate structure, indicates if all available units can be sold at \$11.90 per unit, revenues will match the adopted budget. The average monthly usage among single family dwellings is 4.18 units.

If all inside district customers were to use 4.18 units, the charge of \$85.61 per month would equate to annual revenues of \$110,950.56 or 32.2 percent of adopted budget. Looking at outside district customers, using 4.18 units would have a monthly charge of \$106.53 which equals annual revenues of \$102,268.80 or 29.7 percent of adopted budget.

With the six-tier structure, a review of each level of consumption, total cost to the customer and the revenue per unit had to be calculated to assure each level of water sold was generating revenues that met the delivery cost of \$12.81 per unit. For the outside district tiers, each level of usage maintained or exceeded the delivery cost per unit.

The inside district tiers present a different picture as in the middle of tier-three, (18 units - 13,500 gallons), the per unit revenues drop below the \$12.81 and does not produce necessary revenues until consumption level at 25 units (18,700 gallons). This range of 7 units or approximately 5,000 gallons the district is breaking even with each unit of water sold. Level of water consumption in tiers four and five generate little revenues, less than a dollar per unit.

To compound the effect of revenues for each unit of water sold, a second discovery was the discrepancy between the cost to purchase a unit of water \$1.344 and the actual cost using the GMP at \$2.86, which is 213 percent higher. The Board may consider reviewing the supply meter for accuracy and engage in leak detection as a top priority. Discussions with the Board have indicated this is a concern. Highlighting meter accuracy and water loss will substantiate the parameters when the PWB contract is negotiated.

One analysis that was performed was adjusting the tier rates by removing the tier-one (\$7.52 per unit), creating a five-tier approach, keeping the remaining tiers. Units consumed in tier-one would cost \$9.45 per unit, then implement the remaining per unit costs as established. See table below:

Table: 5 Tier Cost Adjustments				
Tier Levels	Current Inside	Inside New ¹	Outside	Outside New ¹
First 500 cubic feet	\$ 7.52	\$9.45	\$8.09	\$9.88
501 to 1000 cubic feet	\$ 9.45	\$11.31	\$9.88	\$11.69
1001 to 2000 cubic feet	\$11.31	\$13.73	\$11.69	\$13.90
2001 to 3000 cubic feet	\$13.73	\$15.64	\$13.90	\$15.78
3001 to 4000 cubic feet ²	\$15.64	\$17.00	\$15.78	\$17.52
Any additional cubic feet ³	\$17.00	NA	\$17.52	NA
1 – All units sold at all consumption levels are above the cost to deliver a unit of water				
2 – Final tier volume will be 3,001 + cubic feet				
3 – Any additional cubic feet begin at 3001+ cubic feet				

Using the 4.18 average monthly units for consumption, the average monthly water bill will increase from \$85.61 to \$93.68. When combining the base rates (remain as established) and the new consumption rates provides average charge per unit above the cost to deliver one unit to the tap.

A chart outlining the comparison of current water rates related to proposed rates is shown on the following page. A few notes to explain the chart. The tier levels are distinguished by color, and the chart depicts cost related to levels of consumption from zero to three-thousand cubic feet or 30 units, the first four tiers.

The four columns highlighted in “red” show actual cost associated with various consumption levels from two approaches. They are:

1. Column 1 – Inside district users – current tier rates – using tiers 1 through 4.
2. Column 2 – Outside district users – current tier rates – using tiers 1 through 4.
3. Column 3 – Inside district users – proposed rates – using tiers 2 through 5.
4. Column 4 – Outside district users – proposed rates – using tiers 2 through 5.

The proposed tier structure eliminates tier one and moves the remaining five tiers up with the first-tier unit cost set at \$9.45, and the maximum cost at \$17.00 per unit, as they relate to inside users. Outside users are formatted with the same method using the current \$9.88 unit cost for tier-one and the maximum cost at \$17.52 per unit. Each level of water sold substantiates the price per unit above the cost of \$12.81 to deliver the same unit of water.

Water Consumption - Monthly Rate Comparison								
Connection Size		Inside	Outside	Inside		Outside		
Base Rate Water Allowance	0	0		0	0	0	0	
Base Rate	\$54.18	\$72.71			\$54.18	\$72.71	\$0.00	
Consumer Class	1	2			3	4		
Residential	100	80			100	80	0	
Commercial	12	4	0	0	12	4	0	
Other		0	0	0	0	0	0	
	Current Water Rates					Proposed Water Rates		
INSIDE	Tier One	\$7.52		Tier Two	\$9.45		Tier Three	
	Tier Four	\$13.73		Tier Five	\$15.64		Tier Six	\$17.00
OUTSIDE	Tier One	\$8.09		Tier Two	\$9.88		Tier Three	\$11.69
Consumption Levels	Tier Four	\$13.90		Tier Five	\$15.78		Tier Six	\$17.52
100	Tier 1	\$ 61.70	\$ 80.80		Tier 2	\$ 63.63	\$ 82.59	
200		\$ 69.22	\$ 88.89			\$ 73.08	\$ 92.47	
300		\$ 76.74	\$ 96.98			\$ 82.53	\$ 102.35	
418		\$ 85.61	\$ 106.53			\$ 93.68	\$ 114.01	
500		\$ 91.78	\$ 113.16			\$ 101.43	\$ 122.11	
501	Tier 2	\$ 91.87	\$ 113.26		Tier 3	\$ 101.54	\$ 122.23	
600		\$ 101.23	\$ 123.04			\$ 112.74	\$ 133.80	
700		\$ 110.68	\$ 132.92			\$ 124.05	\$ 145.49	
800		\$ 120.13	\$ 142.80			\$ 135.36	\$ 157.18	
900		\$ 129.58	\$ 152.68			\$ 146.67	\$ 168.87	
1000	Tier 3	\$ 139.03	\$ 162.56		Tier 4	\$ 157.98	\$ 180.56	
1001		\$ 139.14	\$ 162.68			\$ 158.12	\$ 180.70	
1100		\$ 150.34	\$ 174.25			\$ 171.71	\$ 194.46	
1200		\$ 161.65	\$ 185.94			\$ 185.44	\$ 208.36	
1300		\$ 172.96	\$ 197.63			\$ 199.17	\$ 222.26	
1400	Tier 4	\$ 184.27	\$ 209.32		Tier 5	\$ 212.90	\$ 236.16	
1500		\$ 195.58	\$ 221.01			\$ 226.63	\$ 250.06	
1600		\$ 206.89	\$ 232.70			\$ 240.36	\$ 263.96	
1700		\$ 218.20	\$ 244.39			\$ 254.09	\$ 277.86	
1800		\$ 229.51	\$ 256.08			\$ 267.82	\$ 291.76	
1900		\$ 240.82	\$ 267.77			\$ 281.55	\$ 305.66	
2000		\$ 252.13	\$ 279.46			\$ 295.28	\$ 319.56	
2100		\$ 265.86	\$ 293.36			\$ 310.92	\$ 335.34	
2200		\$ 279.59	\$ 307.26			\$ 326.56	\$ 351.12	
2300		\$ 293.32	\$ 321.16			\$ 342.20	\$ 366.90	
2400	Tier 4	\$ 307.05	\$ 335.06		Tier 5	\$ 357.84	\$ 382.68	
2500		\$ 320.78	\$ 348.96			\$ 373.48	\$ 398.46	
2600		\$ 334.51	\$ 362.86			\$ 389.12	\$ 414.24	
2700		\$ 348.24	\$ 376.76			\$ 404.76	\$ 430.02	
2800		\$ 361.97	\$ 390.66			\$ 420.40	\$ 445.80	
2900		\$ 375.70	\$ 404.56			\$ 436.04	\$ 461.58	
3000		\$ 389.43	\$ 418.46			\$ 451.68	\$ 477.36	

Projects Operating Costs:

One of the initial concerns of the Board is the projected cost of water from PWB in the foreseeable future, particularly in 2022 when the cost of a unit of water increases significantly. PWB in February 2020 provided a preliminary five-year rate forecast per one-hundred cubic feet (ccf). The table below is provided to clarify the approach into this study.

Table 6: Purchased Water Impact				
	FY 2020-21	FY-2021-22	FY 2022-23	FY 2023-24
Cost per ccf	\$1.347	\$1.584	\$2.948	\$4.939
GMP ¹	26,838	26,838	26,838	26,838
Annual Costs ²	\$36,150.78	\$42,511.39	\$79,118.42	\$132,552.88
Annual Increase	-	+ \$6,360.61	+ \$42,967.64	+ \$96,402.10
Unit Op Cost ³	\$12.81	\$13.05	\$14.42	\$16.41
Budget ⁴	\$343,925.00	\$350,285.61	\$386,892.64	\$440,327.10
1- GMP- Guarantee Minimum Purchase – assumed to be the same over the period, actual usage is approximately – 16,800 ccf. 2- Predicted cost to purchase water from PWB. 3- Cost per unit of water to deliver to the tap, centered on only the unit rate increase, all other cost items remaining the same. 4- Budget items – water purchase, contracts, materials, capital outlay, contingency, and IFA loan				

Looking at the 2023-24 final adjustment to the current budget, an estimated \$100,000.00 will be necessary to meet only the increase in purchased water from PWB, which incrementally will be an annual adjustment of \$33,000.00 over the same period. Even though the increase does not peak until 2022, this approach levels the required adjustments in upcoming base rates. The allocated funds equate to approximately \$14.00 per month for all users. This monthly increase will be essential each year through 2024.

Another approach to the increase in PWB's water costs is looking at the tier structure and applying an increase in the unit cost. If the Board decides to adjust the tier structure as proposed in Table 5, the increase in unit cost is consequently completed. This step allocates costs based on water consumption creating a more fair and equitable method.

One modification to the annual budget is in the areas of capital outlay and contingencies: currently at \$140,000.00, (line replacement) may be decreased pending the reduction in mandatory system repairs. A look at non-revenue water (water loss), and meter accuracy on both user's meters and PWB's supply meter will assist in tracking. Data will identify important parameters and better designate new contractual agreements with PWB.

FIGURES FOR DETERMINING 2021-24 WATER RATES									
	2020-21	2021-22 ¹	2022-23 ²	2023-24 ³	2024-25				
	Total Budget								
	\$343,925.00	\$349,925.00	\$385,925.00	\$439,925.00	\$439,925.00				
PWB Cost Increase		\$ 6,000.00	\$ 36,000.00	\$ 54,000.00	?				
Per Connection ⁴		\$ 2.55	\$ 13.30	\$ 22.95					
Inside Base Rate	\$ 54.18	\$ 60.18	\$ 66.18	\$ 72.18	\$ 78.18				
Outside Base Rate	\$ 72.71	\$ 78.71	\$ 84.71	\$ 90.71	\$ 96.71				
Base Rate Increase ⁵		\$6.00	\$6.00	\$6.00	\$6.00				
	Tiers								
Inside	Increase ⁶	\$ 0.25	\$ 1.35	\$ 3.60	Units	2020-21	2021-22 ¹	2022-23 ²	2023-24 ³
1	\$ 9.45	\$ 9.70	\$ 11.05	\$ 14.65	4.18	\$ 93.68	\$ 100.73	\$ 112.37	\$ 133.42
2	\$ 11.31	\$ 11.56	\$ 12.91	\$ 16.51	7.50	\$ 131.23	\$ 139.11	\$ 155.23	\$ 188.23
3	\$ 13.73	\$ 13.98	\$ 15.33	\$ 18.93	15.00	\$ 234.21	\$ 243.96	\$ 270.21	\$ 330.21
4	\$ 15.64	\$ 15.89	\$ 17.24	\$ 20.84	25.00	\$ 390.61	\$ 402.86	\$ 442.61	\$ 538.61
5	\$ 17.00	\$ 17.25	\$ 18.60	\$ 22.20	35.00	\$ 560.61	\$ 575.36	\$ 628.61	\$ 760.61
Outside									
1	\$ 9.88	\$ 10.13	\$ 11.48	\$ 15.08	4.18	\$ 114.01	\$ 121.05	\$ 132.70	\$ 153.74
2	\$ 11.69	\$ 11.94	\$ 13.29	\$ 16.89	7.50	\$ 152.82	\$ 160.69	\$ 176.82	\$ 209.82
3	\$ 13.90	\$ 14.15	\$ 15.50	\$ 19.10	15.00	\$ 257.07	\$ 266.82	\$ 293.07	\$ 353.07
4	\$ 15.78	\$ 16.03	\$ 17.38	\$ 20.98	25.00	\$ 414.87	\$ 427.12	\$ 466.87	\$ 562.87
5	\$ 17.52	\$ 17.77	\$ 19.12	\$ 22.72	35.00	\$ 590.07	\$ 604.82	\$ 658.07	\$ 790.07
1 - PWB increase in water cost = \$6,000 for fiscal year or \$2.55 per connection									
2 - PWB increase in water cost = \$36,000 for fiscal year, two year total = \$42,000 or \$13.30 per connection									
3 - PWB increase in water cost = \$54,000 for fiscal year, three year total = \$96,000 or \$22.95 per connection									
4 - Increase cost per month if applied to base rates only for respective year									
5 - Increase at \$6.00 per month, annually builds base rates to match 60% of proposed budget for 2020-21, currently at 42%, carried over 4 years, reevaluate changes and adjust annually									
6 - Increase is per unit of water based on GMP of 26,838 units annually									
* - figures (hypothetical) based on 4.18 units of water, new tier structure cost beginning July 1, 2021, and assuming all of operating expenses remain the same									

Burlington Water District Board Considerations:

All figures are based on assumptions: They are:

- Budget of \$343,925.00 remains steady based on 2020-21 figures.
 - Contract agreement, CIP, contingency, etc.
- Increase in budget stems from PWB increases on purchased water.
 - Total Budget
 - 2021-2022 = \$6,000.00 or \$349,925.00
 - 2022-2023 = \$36,000.00 or \$385,925.00
 - 2023-2024 = \$54,000.00 or \$439,925.00
- 1. Base rate to equal 60 percent of operating budget, 2020-2021 = 42 percent
 - a. Purpose is to align base rates to meet fixed operating expenses.
- 2. Base rate upwards \$5.60 to:
 - a. Inside – 2021 - \$59.78, 2022 - \$65.38, 2023 - \$70.98, 2024 - \$76.58,
 - b. Outside – 2021 - \$78.31, 2022 - \$83.91, 2023 - \$89.51, 2024 - \$95.11
 - c. Each succeeding year through 2024, same increase on the base rate will get BWD base rate up to 57.54 percent.
- 3. Consumption rate:
 - a. Drop first tier, \$7.52 and adjust tiers downward to:
 - i. Inside – 2021-2022
 - ii. Tier 1 - \$9.70, Tier 2, - \$11.56, Tier 3, - \$13.98, Tier 4, - \$15.89, Tier 5, - \$17.25
 - iii. Outside – 2021-2022
 - iv. Tier 1 - \$10.13, Tier 2, - \$11.94, Tier 3, - \$14.15, Tier 4, - \$16.03, Tier 5, - \$17.77
 - b. 2021–2022-unit rates will increase \$0.25 both inside and outside (Bullets ii and iv)
 - c. 2022–2023-unit rates will increase \$1.35 both inside and outside.
 - d. 2023–2024-unit rates will increase \$3.60 both inside and outside.
 - e. Increases are in conjunction with PWB increases in purchased water.
- 4. PWB increase and impact annual budget.
 - a. If applied to base rates = approximately \$14.00 monthly increase annually
 - b. Consumption figured at 4.18 units of water user has control of consumption.
 - i. Current rates @ \$54.18 + 4.18 units at \$7.52 = \$85.61
 - c. 2021-2022
 - i. Base rate @ \$60.18 + 4.18 units @ \$9.70 = \$100.73
 - ii. Increase in monthly rate at \$15.11, user has control over monthly cost.
- 5. Flexibility
 - a. 2021-2022 look at CIP, contingency.
 - b. Projects necessary to achieve goals.
 - c. Figures for all four years maintains \$140K in CIP and contingency.

Summary:

Essential points taken from this water rate study are:

- Base rates equate to 42.22 percent of adopted budget or \$145,220.16.
 - For the size of BWD, the percentage should be at least 60 percent or \$206,355.00.
 - 60 percent of budget would create base rates at \$87.74 per month per user.
 - BWD should consider annual adjustments between 2021 and 2025.
 - Annual increase of \$5.60 - \$6.00 to meet the 60 percent of total budget.
- Consumption rates are determined by capital outlay and contingency figures.
 - If the two lines (\$140,000.00) remain the same, add consumer price index each year.
 - Average CPI is 3.0 percent added to base rates or \$2.29 for year 2025-2026
 - This action will be at the conclusion of the \$5.60 annual increase.
- PWB cost to purchase water increases from \$40,000.00 to \$132,000.00 annually.
 - Year 2021-22 an increase of \$6,000.00
 - Year 2022-23 an increase of \$36,000.00
 - Year 2023-24 an increase of \$54,000.00
- Consumer impact
 - Base Rates
 - Year 2021-22 - \$2.55 per month
 - Year 2022-23 - \$15.30 per month
 - Year 2023-24 - \$22.95 per month
 - Three-year approximate average - \$14.00 per month
- Consumer Impact
 - Consumption
 - Year 2021-22 - \$0.25 per unit
 - Year 2022-23 - \$1.35 per unit
 - Year 2023-24 - \$3.60 per unit
 - Three-year approximate average - \$1.75 per unit

There are various arrangements that can be used to reach an acceptable water rate that meets budgetary requirements, regardless of how costs are incurred. The uniqueness of communities creates challenges that may or may not work from community to community. The variables associated with other water systems may not apply to the BWD. A new water system completed without any debt owed is rare. The age of a water system plays a bigger role in determining future cost since maintenance and rebuilding is often more expensive than new construction.

The importance of looking at the future regarding system growth and repair or replacement of aging components and determining an evaluation of costs can be challenging. All the figures delivered with this study are based on those four components (Purchased water, materials, contracts, CIP) that create the budget. Though each component is likely to remain static, any discrepancies could either maintain or increase the budget. An example of budget increase would be CIP, if increased \$10,000 for the next fiscal year, would raise the monthly user rate by \$4.25.

Proposed costs are often lower than actual costs due to various circumstances. It is important for public relations and communications to play a role in preserving consumer confidence in water quality system operations and management.

It is our experience that applied fair and equitable rates will provide a tool for BWD to continue service. The knowledge learned from past studies as priority one is the continued responsibility to review and evaluate recent established rates and ensure BWD is on track making necessary adjustments that balance expenditures against revenues.

With numerous considerations and decisions being calculated with this rate study, it is an objective of the Oregon Association of Water Utilities to assist the BWD towards a sufficient water rate to meet the needs of the water system, provide fair and equitable rates for all consumers, and to ensure the water system is poised for the future.