



# BELIZE WATER SERVICES LIMITED

Tariff Review and Business Plan 2020-2025

October 1, 2019



# Table of Contents

<b>Executive Summary</b> .....	<b>1</b>
Overview .....	1
Proposed Tariff Structure .....	1
Full Five-Year Business Plan Forecast.....	2
Findings, Observations, and Recommendations .....	3
<b>Section 1. Introduction</b> .....	<b>4</b>
Background .....	4
Summary of Report .....	5
Programme for Full Tariff Review Proceedings.....	6
<b>Section 2. Customer Statistics</b> .....	<b>7</b>
General .....	7
Water and Sewer Customer Statistics .....	7
Customer and Sales Forecast .....	11
Revenue from Existing Tariffs.....	12
<b>Section 3. Capital Improvements</b> .....	<b>13</b>
General .....	13
Capital Expenditures Plan .....	14
Capital Funding Sources .....	14
Proposed Debt Service .....	15
<b>Section 4. Business Plan/Cash Revenue Requirements</b> .....	<b>16</b>
Background .....	16
Cash Revenue Requirement Overview .....	16
Principal Assumptions and Considerations .....	18
Cash Revenue Requirements Summary.....	22
Sufficiency of Existing Water and Sewer Tariff Revenues .....	23
Tariff Adjustments.....	23
<b>Section 5. Regulatory Projections</b> .....	<b>25</b>
Introduction .....	25
PUC Regulatory .....	25
Actual to Projected Results.....	26
CWBL Analysis .....	27
Regulated Asset Value Forecast .....	27
Tariff Basket Revenue Forecast.....	28

<b>Section 6. Cost of Service .....</b>	<b>30</b>
<b>Introduction .....</b>	<b>30</b>
<b>Cost of Service Analysis.....</b>	<b>30</b>
<b>Section 7. Tariff Design .....</b>	<b>31</b>
<b>Introduction .....</b>	<b>31</b>
<b>Existing Tariff Structure.....</b>	<b>31</b>
<b>Proposed Tariff Design .....</b>	<b>32</b>
<b>Bill Comparisons .....</b>	<b>35</b>
<b>Section 8. Miscellaneous Charges and Fees .....</b>	<b>38</b>
<b>Introduction .....</b>	<b>38</b>

## List of Tables and Figures

Table 1: Proposed FY 2020/21 Water and Sewer Tariffs .....	2
Table 2: Existing Water and Sewer Tariffs .....	2
Table 3: Projected Annual Tariff Adjustments .....	3
Figure 1: Programme for Full Tariff Review Proceedings .....	6
Table 4: Historical 3-Year Water Customer Statistics .....	7
Table 5: Historical FY 2018/19 Customer Account Summary by Branch.....	8
Table 6: Historical FY 2018/19 Water Customer Consumption Summary by Branch.....	8
Table 7: Historical FY 2018/19 Water Customer Class Summary .....	9
Table 8: Existing Consumption Block Allowances .....	9
Figure 2: FY 2018/19 Consumption % by Tariff Block – Water Customers .....	10
Figure 3: FY 2018/19 Consumption % by Tariff Block – Sewer Customers .....	10
Figure 4: Residential Water Bill Frequency.....	11
Table 9: Water Customer Forecast .....	12
Table 10: Water and Sewer Tariff Revenue Forecast .....	12
Table 11: Capital Expenditures Plan Summary .....	14
Table 12: Projected Funding Sources .....	14
Table 13: FY 2020/21 New Loan Assumptions.....	15
Table 14: FY 2022/23 New Loan Assumptions .....	15
Figure 5: Cash-Needs Approach Revenue Requirements .....	17
Figure 6: Utility-Basis Approach Revenue Requirements .....	17
Table 15: Additional Personnel Assumptions .....	19
Table 16: Existing Long-Term Debt .....	20
Figure 7: Projected Fund Balances.....	21
Table 17: Other Operating Revenue Projections .....	22
Table 18: Projected Net Cash Revenue Requirements .....	22
Table 19: Revenue Sufficiency Forecast at Existing Tariffs.....	23
Table 20: Projected Annual Tariff Adjustments.....	23
Table 21: Revenue Sufficiency Forecast under Projected Rate Adjustments.....	23
Table 22: Projected Debt Service Coverage.....	24
Table 23: Approved TBR and Components for FTP of April 1, 2015, to March 31, 2020 .....	26
Table 24: Example TBR Calculation for CWBL Operations Based on FY 2019/20 Budget .....	27
Table 25: Depreciation Forecast .....	28
Table 26: Regulated Asset Value Forecast .....	28
Table 27: Tariff Basket Revenue Forecast .....	29
Table 28: FY 2018/19 Cost of Service Analysis.....	30
Table 29: Existing Water and Sewer Tariffs .....	31
Table 30: Existing Tariff Block Ratios .....	32
Table 31: FY 2020/21 Water Tariff Design.....	33
Table 32: FY 2020/21 Sewer Tariff Design .....	33
Table 33: Proposed Tariff Block Ratios.....	34
Table 34: AWWA Meter Size Ratios .....	35
Table 35: Proposed FY 2020/21 Water and Sewer Tariffs .....	35
Table 36: Mainland (Water Only) Bill Impacts .....	36
Table 37: Mainland (Water and Sewer) Bill Impacts .....	36
Table 38: Caye Caulker (Water Only) Bill Impacts.....	36
Table 39: San Pedro (Water and Sewer) Bill Impacts.....	37
Table 40: Existing, Proposed and Calculated Miscellaneous Fees .....	39

# Executive Summary

## Overview

Belize Water Service Limited (BWS) tariff and miscellaneous fees are reviewed and approved by the Public Utilities Commission (PUC) through a tariff review process. The PUC regulatory process includes a five-year review period referred to as a Full Tariff Period (FTP). The first FTP under the current PUC license was for the period ending March 31, 2010. This initial period is referred to as the “First FTP” period. The Second FTP includes the period between April 1, 2010 and March 31, 2015. The existing or Third FTP includes the period between April 1, 2015 and March 31, 2020. The business plan herein addresses the Fourth FTP which is projected to span from April 1, 2020 through March 31, 2025 (FFBP).

BWS operates on a fiscal year (FY) basis starting each year April 1 and ending March 31. As of the date of this report BWS is operating within FY 2019/20. The business plan includes a financial model and projections based on planned future financial results. The financial analysis relies on recent Financial Statements and Independent Auditor’s reports, the FY 2019/20 budget, and other recent information to form the starting point, and then forecasts key financial and operational elements to develop the full five-year forecast from FY 2020/21 through FY 2024/25.

## Proposed Tariff Structure

No tariff increase is proposed during the first two years of the FFBP, but an adjustment in the tariff is proposed. Important objectives identified in the tariff design include i) simplifying the consumption block for residential and non-residential customers; ii) maintaining the 1,000-gallon minimum for all customers; iii) evaluating a fixed minimum charge by meter size for non-residential customers; and iv) affordability. Based on a review of several alternative tariff structures, a tariff structure is proposed herein that involves the following:

- Reducing the residential consumption blocks from 8 blocks to 4 blocks (not including 0 – 1,000 gallons);
- Reducing the non-residential consumption blocks from 8 blocks to 2 blocks (not including 0 – 1,000 gallons);
- No changes to the monthly 1,000 gallon minimum for all customers;
- The fixed monthly minimum charge for non-residential customers is based on the size of the water meter; and
- Block 1 for residential customers is discounted below average cost to provide for an “affordable” tariff level for low-consumption customers.

The FY 2020/21 tariffs are designed on a revenue-neutral basis. This means that the new tariff is designed to produce BZD \$48.9 million in revenue which is the revenue under the existing tariff structure.

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The following table summarizes the proposed tariffs for FY 2020/21:

**Table 1: Proposed FY 2020/21 Water and Sewer Tariffs**

Description	Mainland (Water Only)	Belize and Belmopan (Water and Sewer)	San Pedro	Caye Caulker
<b>Monthly Minimum Charges</b>				
Residential (0 - 1,000 Gallons)	\$8.72	\$10.47	\$25.57	\$23.46
Non-Residential (0 - 1,000 Gallons):				
5/8-Inch	\$8.72	\$10.47	\$25.57	\$23.46
3/4-Inch	\$8.72	\$10.47	\$25.57	\$23.46
1-Inch	\$14.56	\$17.48	\$42.70	\$39.18
1.5-Inch	\$29.04	\$34.87	\$85.15	\$78.12
2-Inch	\$46.48	\$55.81	\$136.29	\$125.04
<b>Consumption Charges</b>				
Residential:				
Block 1: 1,001 - 3,000	\$14.29	\$18.27	\$31.13	\$26.60
Block 2: 3,001 - 5,000	\$15.88	\$20.56	\$41.93	\$35.46
Block 3: 5,001 - 8,000	\$18.26	\$24.11	\$50.64	\$42.55
Block 4: Above 8,000	\$19.76	\$24.99	\$63.93	\$51.75
Non-Residential:				
Block 1: 1,001 - 8,000	\$15.88	\$20.56	\$41.93	\$35.46
Block 2: Above 8,000	\$19.76	\$24.99	\$63.93	\$51.75

The overall tariff change is designed to be revenue-neutral, although customer bills will change slightly depending on level of usage as shown in this report. For comparison, the table below provides the existing tariffs:

**Table 2: Existing Water and Sewer Tariffs**

Description	Mainland (Water Only)	Belize and Belmopan (Water and Sewer)	San Pedro	Caye Caulker
Minimum Bill (0 - 1,000 Gallons)	\$8.72	\$10.47	\$25.57	\$23.46
Consumption Blocks:				
Block 1: 1,001 - 2,000	\$13.95	\$18.02	\$30.22	\$26.98
Block 2: 2,001 - 3,000	\$15.12	\$19.76	\$32.54	\$29.61
Block 3: 3,001 - 4,000	\$15.69	\$20.92	\$34.87	\$32.50
Block 4: 4,001 - 5,000	\$16.27	\$22.09	\$37.19	\$35.67
Block 5: 5,001 - 6,000	\$17.44	\$23.25	\$44.17	\$39.14
Block 6: 6,001 - 7,000	\$18.60	\$23.82	\$52.31	\$42.96
Block 7: 7,001 - 8,000	\$19.17	\$24.41	\$58.11	\$47.15
Block 8: Above 8,000	\$19.76	\$24.99	\$63.93	\$51.75

## Full Five-Year Business Plan Forecast

The FFBP includes a five-year forecast under a cash basis and also a regulatory accrual basis. The cash basis consists of customers/revenue, the following expenditures: operating expenses (excluding depreciation), debt service (principal and interest), dividends, capital expenditure funding, and taxes/licensing fees. The regulatory accrual forecast consists of the following expenditures: operating expenses (with depreciation), return on regulated asset

value, taxes/licensing fees, and any applicable regulatory corrections or adjustments. These projections are detailed in the body of the report.

The five-year forecast includes significant capital investment. The Capital Investment plan has a particular emphasis on climate change resiliency, water supply security, and environmental stewardship. The planned capital expenditures during the FFBP period includes BZD \$237 million of improvements. Funding sources include BZD \$111 million of outside contributions, \$79 million from issuance of additional debt and \$47 million funded from Operation Revenue. Fully funding the Business Plan will require the following forecast tariff adjustment:

**Table 3: Projected Annual Tariff Adjustments**

<u>Fiscal Year</u>	<u>% Adjustment</u>
2020/21	0.0%
2021/22	0.0%
2022/23	10.0%
2023/24	0.0%
2024/25	0.0%

## Recommendations

As set forth herein, the following recommendations are identified:

1. During the FFBP, BWS is planning to expend approximately BZD \$237 million of capital improvements including sewer collection and treatment systems, water expansion projects, water supply projects, meter replacement, capital renewal and replacement, and similar projects. These projects are funded from a blend of tariff revenue, available reserves, additional debt, and Government of Belize (GOB) assistance.
2. The existing tariff levels will need to be adjusted within the FTP to fully fund the planned capital projects along with addressing inflationary cost increases and operating costs. This Business Plan forecasts a tariff increase of 10.0% in April 2022 in order to obtain adequate revenue to cover expenditures.
3. A new tariff structure is recommended to simplify monthly bill calculations, encourage conservation, maintain water affordability, and better represent the various customer classes served by BWS. This modified tariff structure is proposed to be implemented April 1, 2020 and is not designed to increase overall tariff revenue.
4. In order to minimize tariff increases, a revised schedule of miscellaneous charges is recommended for approval. This aims to recover a more significant portion of the actual cost from non-residential customers benefitting from the services. Charges to residential customers are recommended to remain the same.

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# Section 1. Introduction

## Background

Belize Water Services Limited (BWS) was incorporated by the Government of Belize (GOB) in January 2001 and was the successor company to the Water and Sewerage Authority. The GOB is the majority shareholder of the company with approximately 83% of the ordinary shares. The Social Security Board owns 10% of the shares and the remaining 7% are owned by individual shareholders. BWS has paid dividends to its shareholders over the past 10 years, although the GOB has relinquished its claim to its share of dividends through 2025 in order to strengthen the BWS financial position. BWS is licensed by the Public Utilities Commission (PUC) to serve as the water and sewerage utility for all of Belize’s major urban centers and some adjacent rural communities. BWS currently provides water service to all municipalities and over 30 villages located throughout the country. Sewer service is provided within Belize City, Belmopan, and Ambergris Caye/San Pedro. As set forth later in this report, BWS is planning to provide central sewer service to Caye Caulker within the next five years.

BWS provides utility service to approximately 61,000 potable water customers and 12,000 sewer customers throughout BWS’ service area. The BWS mission is “to improve the lives of consumers by delivering cost-effective and sustainable supply of high quality water and wastewater services in an environmentally and socially responsible manner, promoting employee excellence and providing a fair return to our shareholders.” As such, the cost of BWS operations is primarily funded from user fees (tariffs) billed on a monthly basis to water customers. BWS also earns other revenue from miscellaneous services such as connection fees, account transfers, and similar activities. The Government of Belize (GOB) also provides support to BWS by either directly funding capital projects, assisting with debt service on capital projects, and relinquishing dividends on its shares.

BWS tariff and miscellaneous fees are reviewed and approved by the PUC through a tariff review process. The PUC regulatory process includes a five-year review period referred to as a Full Tariff Period (FTP). The first FTP under the current PUC license was for the period ending March 31, 2010. This initial period is referred to as the “First FTP” period. The Second FTP includes the period between April 1, 2010 and March 31, 2015. The existing or Third FTP includes the period between April 1, 2015 and March 31, 2020. The business plan herein addresses the Fourth FTP which is projected to span from April 1, 2020 through March 31, 2025 (FFBP).

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In January 2019, BWS acquired 100 percent of the issued and outstanding shares of Consolidated Water Belize Limited (CWBL) for approximately BZD \$14 million. This purchase was funded through the Caribbean Development Bank #22 loan. Prior to the purchase, CWBL provided bulk potable water service to BWS for distribution in San Pedro under long-term contract agreements. CWBL’s facilities on Ambergris Caye included a seawater reverse osmosis desalination plant with a daily production capacity of 550,000 gallons. With this purchase, BWS will be able to more efficiently manage the increasing demand for potable water service from the residents and businesses on Ambergris Caye.

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## Summary of Report

In addition to Section 1, this report is subdivided into seven (7) other sections. The following is a brief discussion of the remaining sections included in this report.

Section 2. Customer Statistics – This section summarizes the historical and projected customers and sales during the FFBP. Projections are primarily based off recent historical trends and expected future sales with a conservative outlook. Also included are the projected revenues from existing tariffs.

Section 3. Capital Improvements – This section summarizes BWS’ capital expenditure plan during the FFBP and provides the proposed funding sources for the plan which includes two new debt issues.

Section 4. Business Plan/Cash Revenue Requirements – This section illustrates BWS’ financial forecast which serves as the basis for the revenue sufficiency analysis. Included in this section is a discussion of the assumptions utilized in the forecast of utility expenditures, tariff and miscellaneous revenues, and CWBL.

Section 5. Regulatory Projections – This section modifies the cash forecast from Section 4 into the utility approach to address the regulatory framework from the PUC.

Section 6. Cost of Service – This section provides the analysis and assumptions utilized in identifying the cost of service among the different branches of BWS. An important objective of the analysis included identifying water system versus sewer system costs.

Section 7. Tariff Design – This section provides BWS’ existing tariff structure and summarizes the process taken on the proposed FY 2020/21 tariffs. Also included are the bill impacts on residential customers at various consumption levels.

Section 8. Miscellaneous Charges and Fees – This section discusses the approach used to calculate the miscellaneous charges and provides recommendations for adjustments based on the level of effort put forth to provide each service.

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## Programme for Full Tariff Review Proceedings

The figure below illustrates the schedule of events for this fourth FTP:

**Figure 1: Programme for Full Tariff Review Proceedings**

Event No.	No. of Days for Event	Prior Event	Latest End Date	Event Description
A	-	-	01-Oct-19	Public Notice & BWS Submission of Business Plan Document (Clause 15 and 16 of Byelaws) (6 mths before April 1)
B	10	A	11-Oct-19	Meeting with BWS and Public (Clause 17)
C	30	A	31-Oct-19	Interested Parties Comments submission deadline (Clause 18)
D	15	C	15-Nov-19	<b><i>PUC to publish Initial decision (Clause 19)</i></b>
E	15	D	30-Nov-19	The Licensee or interested party may object to the Initial Decision(Clause 20)
F	not specified	D	18-Mar-20	<b><i>Where there is no objection, the PUC shall deliver a final decision adopting its initial decision (Clause 21)</i></b>
<b>OR</b>				
G	15	E	15-Dec-19	In the event of an objection being lodged (see item D above), then the PUC shall select an Independent Expert (see Clause 22(1))
H	14	G	29-Dec-19	In the event that an Independent Expert cannot be agreed upon, the International Chamber of Commerce shall appoint one (Clause 22 (3))
I	30	G or H	28-Jan-20	The Independent Expert shall submit a written report (Clause 23(1))
J	20	I	17-Feb-20	Licensee & Interested Parties may submit comments on IE's Report (Clause 24)
K	15	J	03-Mar-20	PUC to hear Comments which challenge the IE's report (Clause 24)
L	50	I	18-Mar-20	<b><i>The PUC shall deliver a Final Decision ... (which) may incorporate the Independent Expert's determination of any element of the Business Plan. (Clause 25)</i></b>
Maximum Duration	169			

# Section 2. Customer Statistics

## General

A major component to determine sustained revenue sufficiency for water and sewer service is the development of a forecast of customers and sales. The customer and sales forecast is an essential component of this study that helps bring the timing of capital improvement projects, anticipated increases to on-going operating expenses, and the anticipated tariff revenues into alignment. This section provides a discussion of the recent historical trends and the forecast of customers through Fiscal Year 2024/25.

## Water and Sewer Customer Statistics

An analysis was conducted on the customer billing statistics for FYs 2016/17, 2017/18, and 2018/19. The data included: (i) monthly water consumption; (ii) monthly billed revenue amounts; (iii) customer type; (iv) meter size; (v) rate code; and (vi) branch. A summary of the prior 3 years of water customer statistics is shown in the table below:

**Table 4: Historical 3-Year Water Customer Statistics**

Description	FY 2016/17	FY 2017/18	FY 2018/19
Customer Accounts	57,234	58,822	60,391
Customer Growth %	3.2%	2.8%	2.6%
Consumption (1,000 gals)	2,498,436	2,543,346	2,613,714
Avg. Mthly Use/Account (gals.)	3,704	3,649	3,710

As shown in Table 4, total water customers have grown by approximately 2.6% per year since FY 2016/17. The average monthly consumption per customer has remained relatively consistent over the 3 fiscal years between 3,600 and 3,700 gallons.

A billing frequency analysis was performed on the FY 2018/19 customer data, where each bill rendered during the fiscal year is accumulated pursuant to the service type, branch, and customer classification. Once these statistics are accumulated for each group, the monthly flows are analyzed and grouped by tariff block. The customer billing data is highly reliable since calculated revenues were within 0.45% when compared to actual water and sewer revenues. The remaining portion of this section provide summarized and detailed information aimed toward providing an in-depth understanding of the customer base.

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The summarized historical FY 2018/19 customer statistics by branch are provided in Table 5 and Table 6 below.

**Table 5: Historical FY 2018/19 Customer Account Summary by Branch**

Branch	Water	% of Total	Sewer	% of Total
Mainland:				
Belize City	22,545	37.6%	8,525	72.6%
Belmopan	7,216	12.0%	2,083	17.7%
Benque Viejo	2,363	3.9%	0	0.0%
Corozal	5,167	8.6%	0	0.0%
Dangriga	3,019	5.0%	0	0.0%
Orange Walk	5,247	8.7%	0	0.0%
Placencia	1,250	2.1%	0	0.0%
Punta Gorda	2,301	3.8%	0	0.0%
San Ignacio	6,045	10.1%	0	0.0%
Subtotal – Mainland	55,153	91.9%	10,608	90.3%
Caye Caulker	802	1.3%	0	0.0%
San Pedro	4,062	6.8%	1,134	9.7%
Total	60,017	100.0%	11,742	100.0%

**Table 6: Historical FY 2018/19 Water Customer Consumption Summary by Branch**

Branch	Water (1,000s)	% of Total
Mainland:		
Belize City	1,048,266	40.1%
Belmopan	321,731	12.3%
Benque Viejo	83,435	3.2%
Corozal	171,838	6.6%
Dangriga	112,358	4.3%
Orange Walk	195,275	7.5%
Placencia	110,599	4.2%
Punta Gorda	86,624	3.3%
San Ignacio	255,374	9.8%
Subtotal – Mainland	2,385,500	91.3%
Caye Caulker	39,816	1.5%
San Pedro	188,398	7.2%
Total	2,613,714	100.0%

As shown on the tables above, there are approximately 60,000 water customers and 11,700 sewer customers connected to the system. The majority of BWS' water customers are located in Belize City in the Mainland, with approximately 8% of the water customer base located outside the Mainland, in Caye Caulker and San Pedro. Currently, sewer service is provided in 3 of the 11 branches (Belize City, Belmopan, and San Pedro).

Table 6 shows that the total metered water consumption during FY 2018/19 was 2,613,714 thousand gallons (7.16 million gallons per day). The difference between this amount and the total volume of water produced/purchased during the same time period results in the amount of non-revenue water (NRW). NRW is the difference between water that has been produced or purchased and the amount billed to customers. NRW includes water used for flushing, internal leaks in the mains or service connections, unauthorized connections, or metering inaccuracies. The total water production/purchases during FY 2018/19 was 3,534,507 thousand gallons or 9.68 million gallons per day (MGD). The NRW for the entire system during the FY 2018/19 period is approximately 26%. However, after

accounting for adjustments for water loss and usage related to capital expenditure projects, the actual NRW is closer to 23.7%. BWS continues to actively reduce NRW through capital improvement projects such as mains replacements, meter replacements and monitoring and leak detection equipment. As shown in Section 3, the Capital Investment includes several million dollars per year in renewal mains, pipeline and valves, and direct NRW projects over the FFBP.

As mentioned above, the historical customer billing statistics also includes the customer classification. The data included several different customer classifications which have been categorized into the following 3 major classes: Residential, Commercial, and Government. The following provides how the customer classifications were categorized for this study:

- **Residential:** Residential
- **Commercial:** Apartments, City/Town Council, Commercial, Construction, Embassy, Essential Services, Food Services, Hotel/Resorts, Industrial, Professional Services, Recreational with Pool, Retail Services, Bulk, and School/Church
- **Government:** Government

Table 7 below provides the number of customer accounts, metered consumption, and average monthly consumption by customer classification for FY 2018/19.

**Table 7: Historical FY 2018/19 Water Customer Class Summary**

Customer Class	Average Monthly Accounts	Annual Consumption (000s)	Avg. Monthly Use Per Account
Residential	54,429	1,952,011	2,989
Commercial	4,941	519,043	8,754
Government	647	142,660	18,375
<b>Total</b>	<b>60,017</b>	<b>2,613,714</b>	<b>3,629</b>

As of FY 2018/19, BWS provided water service to over 54,000 residential customers, or 90% of the total customer accounts. The average monthly consumption for the residential customer class is around 3,000 gallons, which is less than the total water system average of approximately 3,600 gallons per month.

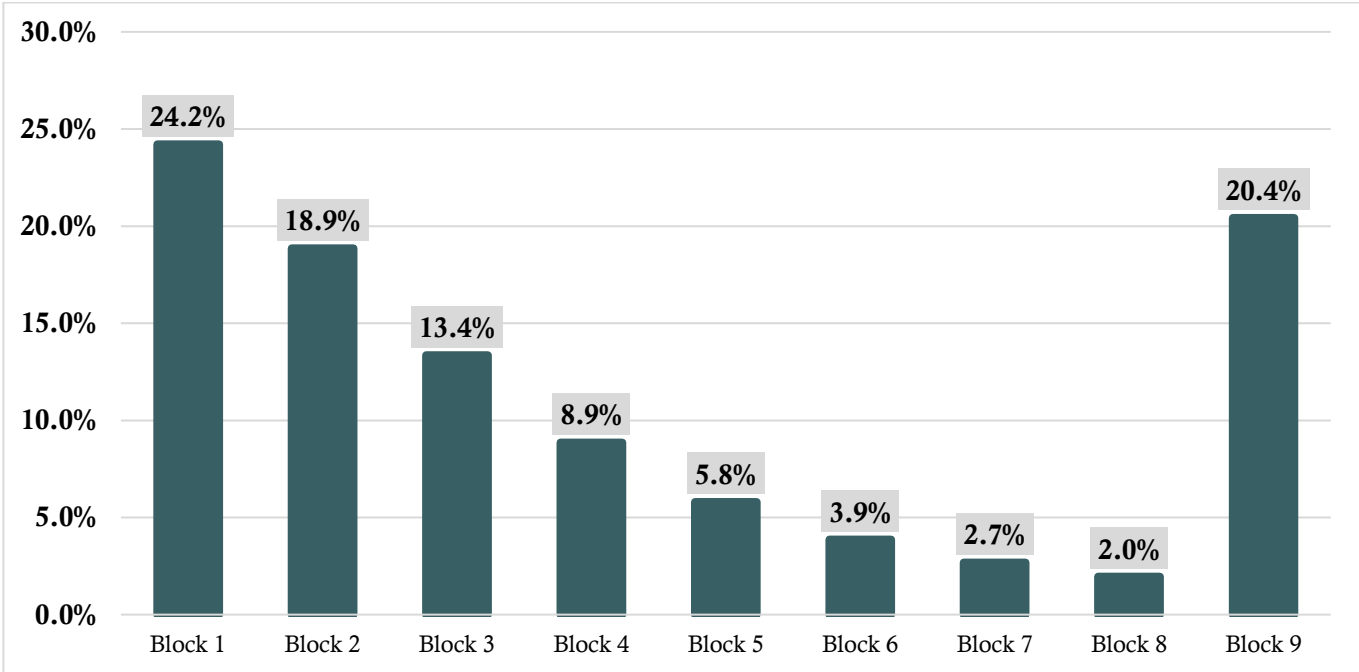
BWS' current tariff structure includes nine consumption blocks, including the first consumption block of 0 – 1,000 gallons which is a part of the fixed monthly minimum bill. The consumption blocks are utilized in the billing process and have been designed to promote conservation, as the tariff applied to each block is inclining as a customer increases water consumption. The tariffs applied to each consumption block will be introduced later in this report, but the table below illustrates the gallons that will be billed for in each block.

**Table 8: Existing Consumption Block Allowances**

Description	Amount
Block 1	0 - 1,000
Block 2	1,001 - 2,000
Block 3	2,001 - 3,000
Block 4	3,001 - 4,000
Block 5	4,001 - 5,000
Block 6	5,001 - 6,000
Block 7	6,001 - 7,000
Block 8	7,001 - 8,000
Block 9	Above 8,000

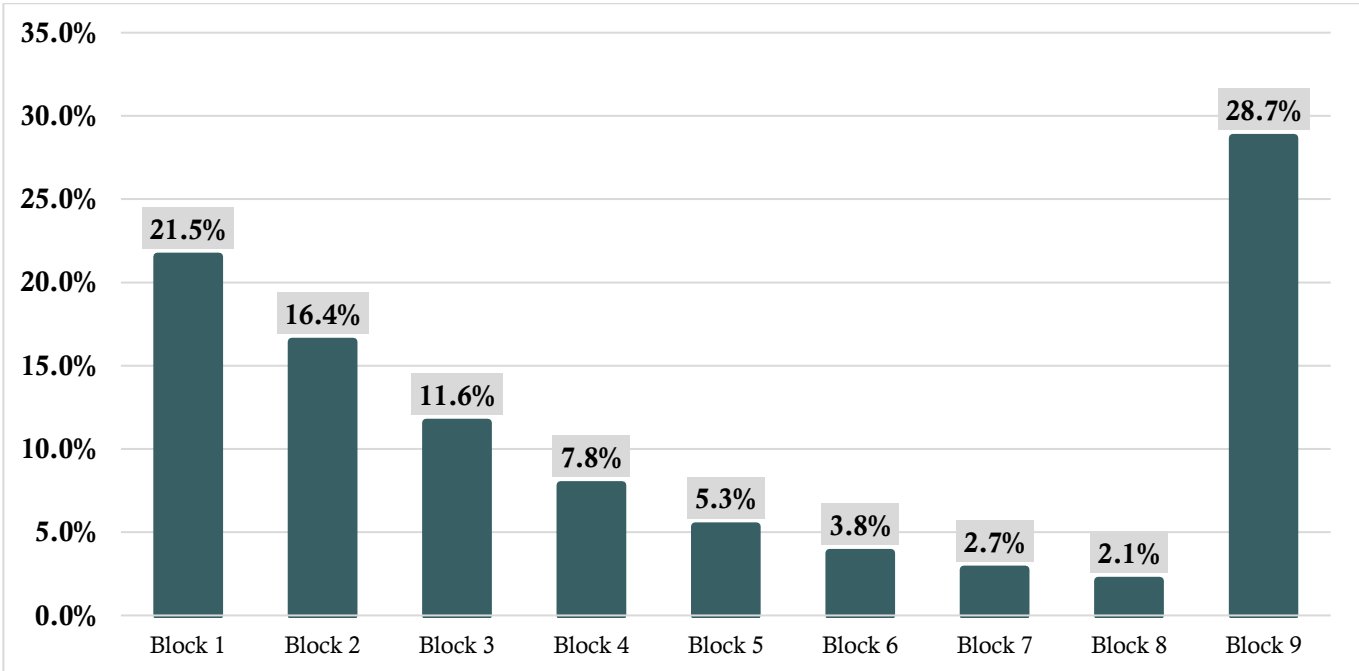
The following figures illustrates the percentage of annual consumption, for FY 2018/19, that was billed in each consumption block for all customers. Block 1 represents those gallons in the existing monthly minimum charge (0 – 1,000 gallons).

**Figure 2: FY 2018/19 Consumption % by Tariff Block – Water Customers**



As shown in the figure above, approximately 24% of the annual water consumption is included with the fixed monthly minimum charge. 20.4% of the annual water consumption is billed at the highest block tariffs.

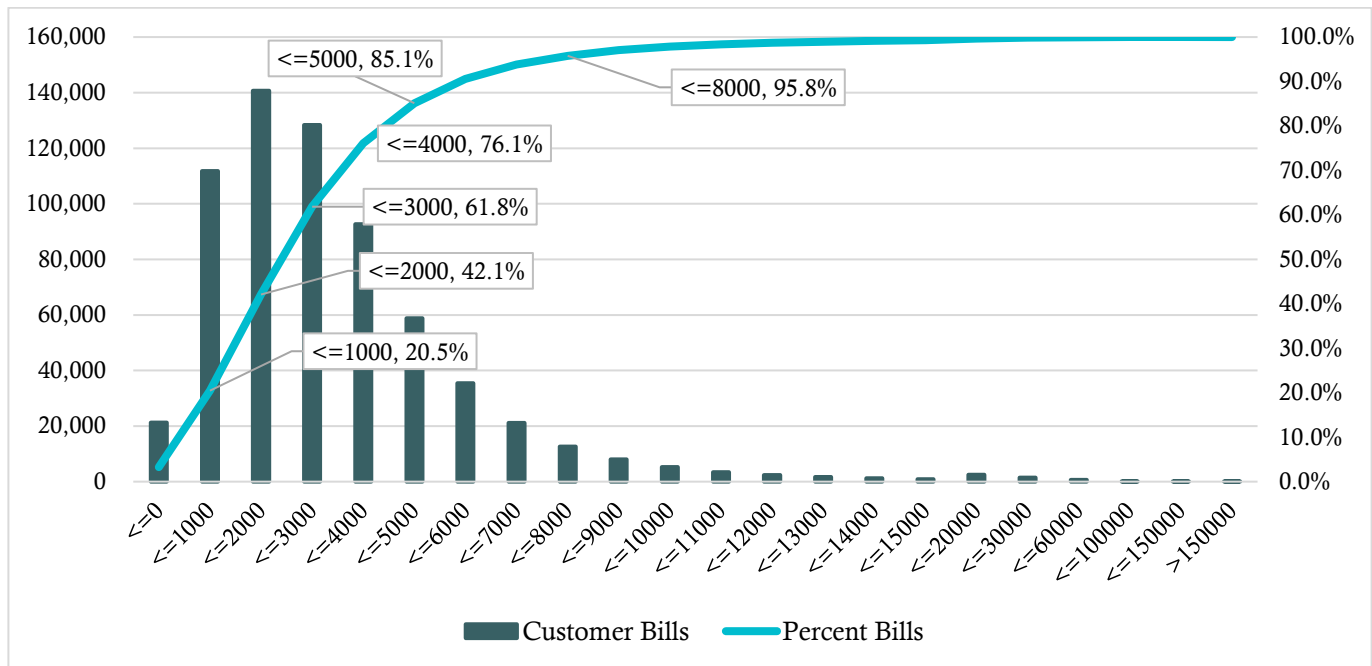
**Figure 3: FY 2018/19 Consumption % by Tariff Block – Sewer Customers**



For sewer customers, slightly less consumption (21.5%) is included with the fixed monthly minimum charge, and close to 30% of the annual consumption is billed at the highest block tariffs.

The figure below illustrates the water bill frequency for the residential customer class, which is BWS’ largest customer class. The dark blue bars represent the number of monthly bills that are within each of the 1,000- gallon increments shown on the figure during the FY 2018/19 period. The light blue line represents the same information but on a percentage basis.

**Figure 4: Residential Water Bill Frequency**



As shown in Figure 4, 20.5% of the residential customer bills were for usage of 1,000 gallons or lower. According to the existing tariff structure, these customers would receive the minimum charge only and would not be charged according to the eight consumption tariffs. At 3,000 gallons or lower, over 60% of the bills were sent to residential customers during the FY 2018/19 period. Only 4.2% of the residential bills were for consumption greater than 8,000 gallons and these customers would be charged the eighth block tariff per 1,000 gallons over 8,000 gallons of consumption.

## Customer and Sales Forecast

A forecast of sales and customers is necessary to evaluate the adequacy of existing water and sewer system tariff levels and identify potential tariff level adjustments. In addition, the forecast is essential for the design of the water and sewer tariffs. The historical data analysis provides actual data associated with the number of customer accounts together with the total metered and billable consumption by branch and customer class. The billable consumption reflects those gallons above the minimum gallons included with the existing monthly charges. Both the metered and billable flows are considered reliable indicators for projection purposes, as average usage trends are not anticipated to vary materially from year to year except for periods experiencing unusual weather conditions.

BWS has grown by 1,687 total water connections from FY 2016/17 to FY 2017/18 and 1,514 total water connections from FY 2017/18 to FY 2018/19. This represents a 3.0% growth in FY 2017/18 and a 2.6% growth in FY 2018/19. However, given that the areas available for expansion are limited, a conservative approach to forecasting customer growth was utilized resulting in an average annual growth rate of 1.9% during the five-year period ending FY 2024/25 for customers. This growth rate equates to an average of 1,184 water customer accounts per year and an

average of 288 sewer customer accounts per year, although there was an exceptional jump in sewer connections due to sewer expansion works in Belmopan and San Pedro.

The table below provide a summary of the forecast of the total number of customers served and associated consumption during the five-year period for the water system. The detailed forecast of customers, including growth by area, is provided on Exhibit 1.

**Table 9: Water Customer Forecast**

<u>Fiscal Year [1]</u>	<u>Accounts</u>	<u>Consumption (1,000s)</u>
2020/21	62,277	2,701,210
2021/22	63,427	2,745,670
2022/23	64,617	2,791,580
2023/24	65,817	2,837,850
2024/25	67,057	2,885,480

[1] Detailed forecast provided on Exhibit 1.

## Revenue from Existing Tariffs

The projection of customer accounts and metered consumption provided above serves as the basis for the water and sewer revenue forecast. By applying the adopted monthly user tariffs and charges to the appropriate customer statistics, the expected tariff revenue for each fiscal year can be calculated. The table below distinguishes between the minimum charge revenue and consumption charge revenue for the FFBP. Exhibit 2 at the end of this report provides the detailed water and sewer tariff revenues by branch and customer class over the five-year period.

**Table 10: Water and Sewer Tariff Revenue Forecast**

<u>Description [1]</u>	<u>FY 2020/21</u>	<u>FY 2021/22</u>	<u>FY 2022/23</u>	<u>FY 2023/24</u>	<u>FY 2024/25</u>
Minimum Charge Revenue	\$7,745,600	\$7,887,800	\$8,034,700	\$8,182,800	\$8,336,900
Consumption Charge Revenue	41,195,500	41,831,700	42,482,400	43,139,200	43,814,500
Total Tariff Revenue	\$48,941,100	\$49,719,500	\$50,517,100	\$51,322,000	\$52,151,400

[1] Detailed existing tariff revenue forecast by branch and customer class provided in Exhibit 2.

As shown on Table 10 above, the fixed revenue recovery (revenues from the Minimum Charge) consist of approximately 16% of the total tariff revenues, with the remaining 84% derived from the Consumption Charges.

It should be noted that the above is based solely on existing tariffs, the forecast based on the projected tariff adjustment is included in Section 4 (Tariff Adjustments).

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# Section 3. Capital Improvements

## General

BWS has developed a capital expenditure plan (CapEx) for the five-year period from FY 2020/21 through FY 2024/25. The CapEx classified projects by branch and by group. It also identified projects that were anticipated to be funded through contributions by third parties, and the portion to be funded by BWS and/or by other sources.

The CapEx plan has a particular emphasis on climate change resiliency, water supply security, and environmental stewardship. As a low-lying coastal country, Belize is extremely vulnerable to the effects of natural disasters, climate change and economic devastation that follows, which have been more frequent and severe in the last few years.<sup>[1]</sup> In September 2019 GOB has declared extreme droughts in several areas of the country. It is therefore imperative that BWS proactively implement water supply solutions, infrastructure upgrades, and other capital improvements to address climate change and the persistent threat of drought. Other capital measures include central sewer infrastructure in Ambergris Caye, Caye Caulker and Placencia to eliminate septic tanks and other onsite sewer systems that are inadequate for these fast-developing areas.

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[1] “Climate Change Prevention and Emergency Response” UNICEF; [https://www.unicef.org/belize/20636\\_22129.htm](https://www.unicef.org/belize/20636_22129.htm)

## Capital Expenditures Plan

The total five-year CapEx as shown in Exhibit 3 amounts to approximately BZD \$237 million through FY 2024/25. The table below provides the capital improvements planned for the FFBP.

**Table 11: Capital Expenditures Plan Summary**

Description [1]	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25	Total
Development Capex	\$2,250,000	\$25,250,000	\$31,550,000	\$25,550,000	\$43,500,000	\$128,100,000
Buildings and Compounds	2,360,000	1,840,000	665,000	505,000	300,000	5,670,000
Fencing and Security	775,000	0	0	290,000	0	1,065,000
Renewal Mains and Services	9,093,000	5,693,000	3,350,000	1,700,000	1,000,000	20,836,000
Non-Revenue Water	1,165,000	1,165,000	1,165,000	1,540,000	795,000	5,830,000
New Service Connections – Water	714,000	738,000	764,000	789,000	738,000	3,743,000
Furniture	30,000	0	0	0	0	30,000
Direct Purchases	3,724,000	1,976,000	1,932,000	4,979,000	1,780,000	14,391,000
Plant and Equipment	200,000	200,000	50,000	150,000	325,000	925,000
Pipelines and Valves New and Replacement	2,115,000	2,015,000	2,015,000	2,015,000	2,040,000	10,200,000
Reservoirs and Boosters	2,650,000	1,000,000	0	825,000	1,125,000	5,600,000
Raw Water Resources	1,495,000	100,000	980,000	700,000	190,000	3,465,000
SCADA Countrywide	85,000	85,000	200,000	110,000	120,000	600,000
Distribution Expansion – Water	4,661,000	2,557,000	2,278,000	2,524,000	1,521,000	13,541,000
Water Quality	640,000	50,000	150,000	50,000	580,000	1,470,000
Water Treatment Production Works	3,200,000	3,010,000	4,210,000	1,500,000	50,000	11,970,000
Wastewater Service Connections	65,000	65,000	65,000	65,000	65,000	325,000
Sewer Expansion	125,000	125,000	125,000	125,000	125,000	625,000
Collection and Treatment Works – Sewerage	1,120,000	4,060,000	220,000	3,150,000	150,000	8,700,000
<b>Total</b>	<b>\$36,467,000</b>	<b>\$49,929,000</b>	<b>\$49,719,000</b>	<b>\$46,567,000</b>	<b>\$54,404,000</b>	<b>\$237,086,000</b>

[1] Detailed five-year CapEx provided in Exhibit 3.

## Capital Funding Sources

The table below provides the projected funding sources of the CapEx for the FFBP. As shown on the table, contributions from third parties represent a major portion of the projected funding sources, consisting of approximately 47% of the funding over the five-year period. Water and sewer tariff revenues and reserves provide funding for an average of BZD \$9.4 million per year in capital projects. The CapEx also includes several capital improvements that assume the issuance of additional debt. The assumptions regarding this additional debt are discussed in further detail below.

**Table 12: Projected Funding Sources**

Description [1]	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25	Total
Tariff Revenue/Reserves	\$9,572,000	\$9,511,000	\$9,914,000	\$9,562,000	\$8,374,000	\$46,933,000
New Loans	22,768,000	19,758,000	14,730,000	15,430,000	6,455,000	79,141,000
Contributions	4,127,000	20,660,000	25,075,000	21,575,000	39,575,000	111,012,000
<b>Total</b>	<b>\$36,467,000</b>	<b>\$49,929,000</b>	<b>\$49,719,000</b>	<b>\$46,567,000</b>	<b>\$54,404,000</b>	<b>\$237,086,000</b>

[1] Projected funding sources for the CapEx over the five-year period provided on Exhibit 3.

## Proposed Debt Service

A portion of the CapEx is assumed to be funded from proceeds obtained from the issuance of additional debt. It is anticipated that there will be a total of two separate loans issued to fund the various projects. Projects include but are not limited to the expansion of water and sewer service into Northern Ambergris Caye, a sewer system in Caye Caulker, climate resilience improvements, new buildings and compounds, wells, renewal of mains and services, new reservoirs and boosters, improvements to water plants, and other water distribution expansion projects. The loans are anticipated to begin during FY 2020/21 and FY 2022/23.

Debt funding can provide significant advantages by spreading out the cost of major capital projects over ten or more years, which reduces the burden on existing customers and shares the debt repayment on future customers that benefit from such improvements or expansions. The annual debt service associated with the additional debt and assumptions are shown in the tables below.

**Table 13: FY 2020/21 New Loan Assumptions**

Description	Amount/Timing
Project Funds Available from Loan Proceeds	\$42,526,000
Issuance Cost [1]	866,300
Capitalized Interest [2]	788,400
Total Loan Principal	\$44,180,700
Term of Issuance	20 years
Interest Rate	4.00%
Assumed Issue Date	April 1, 2020
Assumed First Payment Date	April 1, 2021
Annual Debt Service Payments	\$3,250,900

[1] Assumed at 2.0% of project costs.

[2] Assumes one year of project construction.

**Table 14: FY 2022/23 New Loan Assumptions**

Description	Amount/Timing
Project Funds Available from Loan Proceeds	\$36,615,000
Issuance Cost [1]	745,900
Capitalized Interest [2]	678,800
Total Loan Principal	\$38,039,700
Term of Issuance	20 years
Interest Rate	4.00%
Assumed Issue Date	April 1, 2022
Assumed First Payment Date	April 1, 2023
Annual Debt Service Payments	\$2,799,000

[1] Assumed at 2.0% of project costs.

[2] Assumes one year of project construction.

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# Section 4. Business Plan/Cash Revenue Requirements

## Background

This section describes the assumptions and analysis supporting the FFBP projection financial outlook relying on the customer forecast in Section 2, the CapEx funding in Section 3, and several assumptions as outlined further in this report. These projections rely on the utility cash revenue requirement approach, which is converted to an accrual/return/dividend projection in Section 5.

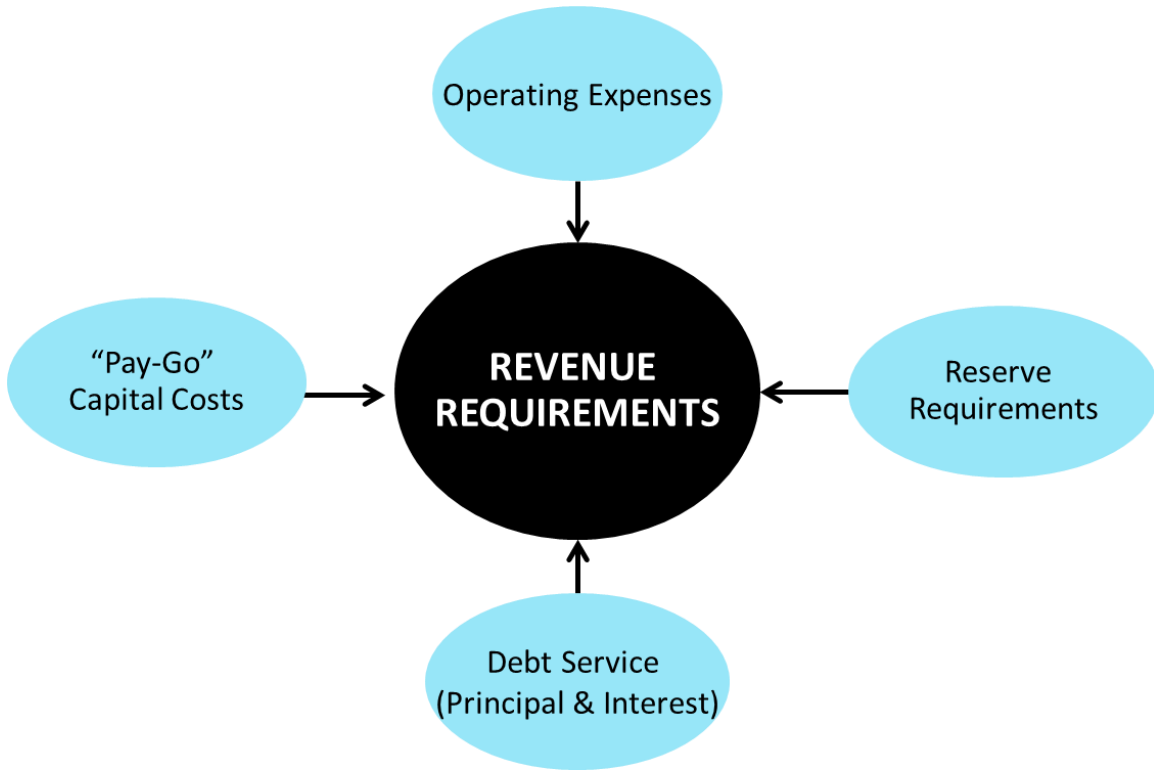
## Cash Revenue Requirement Overview

Utility cash revenue requirements is the term that generally defines the various components of cost associated with operating and maintaining a utility system, as well as the cost of financing the renewal and replacement of facilities and capital improvements for upgrades and expansion. The sum of these cost components, less any miscellaneous utility revenues, represents the net cash revenue requirements that must be funded from the water and sewer tariffs. The cash revenue requirements for this study are predicated on an analysis of projected water and sewer costs for the five-year period ending FY 2024/25. The projected cash revenue requirements include the various generalized cost components described below:

- Operating Expenses: These expenses include the cost of employment, electricity, purchased water, insurance, chemicals, materials, supplies, I.T., taxes, administration and other items necessary for the operation and maintenance of the system.
- Depreciation Expense (not included in cash approach): This expense is a non-cash expense and represents the loss in value of assets not restored by current maintenance that occurs to the facility because of wear and tear, decay, inadequacy, and obsolescence. Depreciation expense allows the system to recover its capital investment over the anticipated useful life of the assets. This expense is not included in the cash basis approach, since it is an accounting entry only, and does not necessarily reflect capital expenditures.
- Debt Service: Debt service includes the principal and interest on any current outstanding loans and other debt obligations payable from the net operating revenues of the system. As discussed in Section 3 of this report, the projected revenue requirements also include the assumption that BWS will issue additional debt during the five-year period to fund certain capital improvements.
- Return on Rate Base: The return is used to pay the annual interest costs associated with debt capital and to provide a fair rate of return to the shareholders.
- Other Revenue Requirements: This component of cost includes, in general, any ongoing capital improvements (capital expenditures) to be funded from tariff revenue, transfers to reserves for future capital investment, and other revenue requirements.

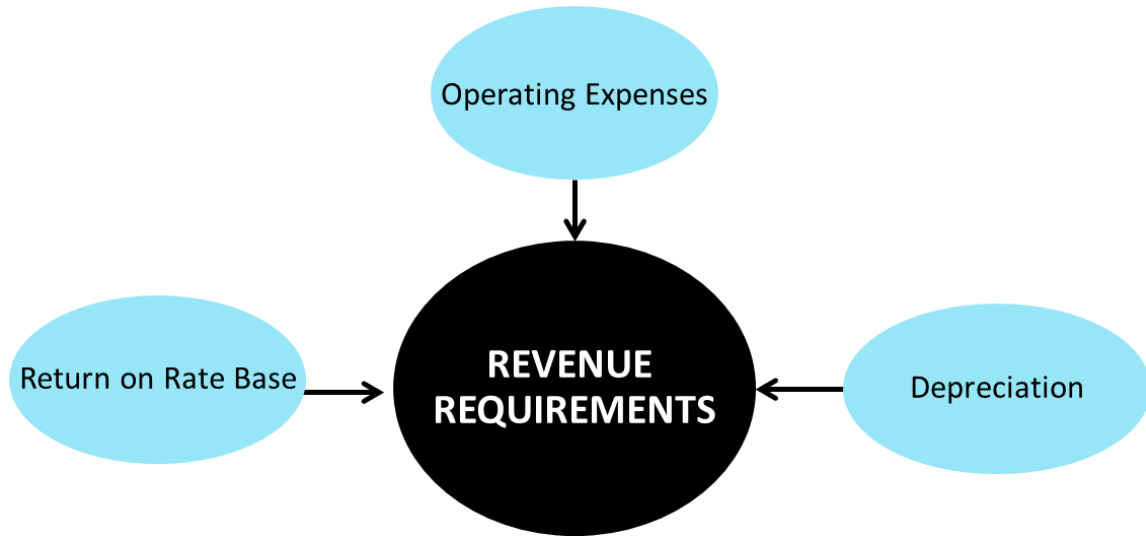
Figure 5 below illustrates the cash-needs approach as derived from Chapter II.1 of the M1 (Principles of Water Rates, Fees, and Charges) Manual, Seventh Edition, as published by the American Water Works Association (AWWA).

**Figure 5: Cash-Needs Approach Revenue Requirements**



The following figure summarizes the utility approach:

**Figure 6: Utility-Basis Approach Revenue Requirements**



This section of the report is focused on the cash-needs approach while Section 5 converts the forecast into the utility approach for regulatory purposes.

## Principal Assumptions and Considerations

The projected revenue requirements during the FFBP are summarized in this section and are provided in more detail in Exhibits 5 and 6 at the end of this report. The major assumptions, considerations and analyses that are included in the development of the projected revenue requirements for the five-year period are as follows:

1. The BWS adopted budget for Fiscal Year 2019/20 (Budget) served as the basis for operating expenditure projections. Unless otherwise noted, the underlying assumptions and expenditure amounts included in the Budget are assumed to be reasonable and reflect anticipated operations. Such budgetary amounts are incorporated into the revenue requirement component of the study, except for adjustments and assumptions as noted below.
2. Relying on the customer statistics discussed in Section 2, revenues were projected over the five-year period using the existing water and sewer tariffs. The revenue forecast is provided on Table 10 in Section 2 and used to determine revenue sufficiency from existing tariff levels. This forecast is developed as a baseline to determine the future revenues that will be generated by the existing customer base plus the anticipated growth. With this forecast, tariff adjustments can be easily identified to attain revenue sufficiency, debt service coverage, and maintain the necessary fund balances.
3. The operations and maintenance expenses (“O&M”) budgeted for FY 2019/20 are projected for the FFBP. The primary assumptions associated with the projected operating expenses as developed for the five-year period are as follows:
  - a. Employment costs were increased above FY 2019/20 budgeted amounts by 4.0% annually to reflect increases from cost of living adjustments and allowances for salary adjustments such as promotions and merit increases. Certain benefits (i.e., pension and group medical coverage and insurance), are projected to increase at the same growth rate as wages and salaries.
  - b. Thirty-six additional personnel are planned during the FFBP to meet the demands of customer and service area growth. The estimated FY 2019/20 base salary for each of the new personnel are based on an average of the minimum and maximum salary scales for a specific position. A taxes and benefits factor of 19% is added to the base salary to account for social security expenses, pension costs, medical insurance, etc. For each year in the future the amount is then escalated pursuant to the labor escalator of 4.0%. The table below illustrates the new personnel in the FFBP, and identifies in which fiscal year they are assumed to start and the position of the new personnel:

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**Table 15: Additional Personnel Assumptions**

Position	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25	Total
M&E Engineer	0	1	0	0	0	1
Construction Technician	1	1	1	1	1	5
Engineering Technician	1	0	0	0	0	1
Heavy Duty Equipment Operator	2	1	1	2	0	6
HR/PR Administrative Assistant	0	0	1	1	0	2
Foreman Jr.	1	0	0	0	1	2
Water Works Technician	4	2	1	0	4	11
Wastewater Technician	0	0	1	0	0	1
Lab Analyst	0	0	1	0	1	2
Meter Reader	2	0	0	0	0	2
Customer Services Representative	0	1	0	0	0	1
GIS Technician	1	0	0	0	0	1
Assistant Accountant	1	0	0	0	0	1
<b>Total Additional Personnel</b>	<b>13</b>	<b>6</b>	<b>6</b>	<b>4</b>	<b>7</b>	<b>36</b>

- c. As discussed in Section 1, BWS entered into an agreement with CWBL to provide bulk potable water service within the designated service area on Ambergris Caye (San Pedro). BWS has since purchased 100 percent of the issued and outstanding shares of CWBL in February 2019. For this study, it is assumed that CWBL operations are combined with BWS operations. Therefore, the water purchases of approximately BZD \$4.7 million in the FY 2019/20 budget is substituted with the operating expenses associated with CWBL. The direct operating expenses for CWBL are obtained from CWBL's financial statements ended December 31, 2018. The employee-related costs are projected to increase by 4.0% annually, similarly to BWS' employment cost projections. All other CWBL operating costs (fuel oil, maintenance, electricity, insurance, and other costs) are projected to increase by 2.0% per year to account for general inflation.
- d. Other expenditures such as electricity, chemicals, meter reading costs, vehicles, repairs and maintenance, and other miscellaneous expenditures are projected to increase above the FY 2019/20 level by 2.0% per year to reflect anticipated general inflation. Inflation assumptions are based on the inflation forecast for average consumer prices for the Country of Belize published by the International Monetary Fund.<sup>2</sup>
- e. The business tax line item in the budget is calculated based on 1.75% of the projected annual water and sewer tariff revenues.

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[2] Source: <https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/index.aspx>



4. As of March 31, 2019, there are six outstanding debt obligations for BWS. The table below summarizes the maturity date and amount outstanding for each of the loans:

**Table 16: Existing Long-Term Debt**

Description	Maturity Date	Amount Outstanding as of March 31, 2019
Social Security Board	March 2035	\$25,613,159
Caribbean Development Bank #10	April 2031	\$5,544,324
Caribbean Development Bank #5	November 2032	\$3,110,491
Belize Wastewater Revolving Fund	February 2027	\$5,019,836
Caribbean Development Bank #53	July 2019	\$27,859
Caribbean Development Bank #22	July 2030	\$13,573,707

The most recent debt issue for BWS is the Caribbean Development Bank #22 loan. The proceeds from this loan were used to fund the purchase of 100% of shares of CWBL from Consolidate Water Co. Ltd, expand the related water treatment plant, and invest in other related capital improvement projects. This loan along with the Caribbean Development Bank #10 and #5 loans are guaranteed by the Government of Belize.

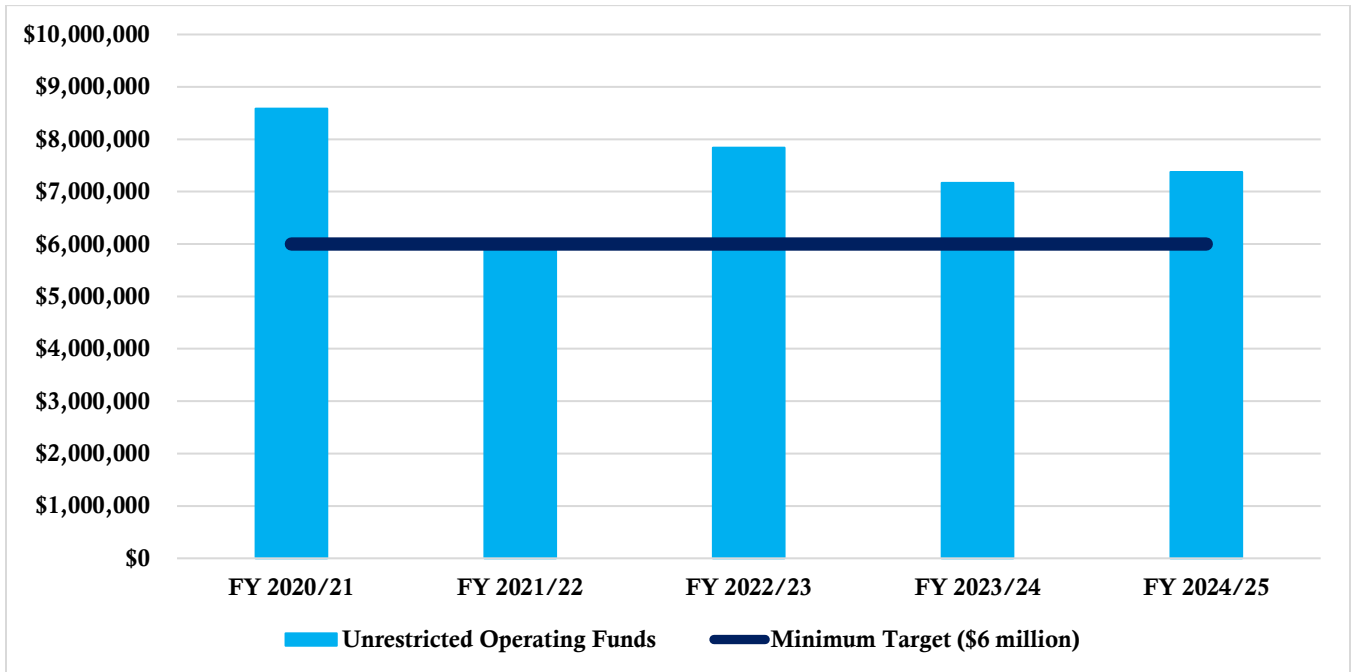
5. BWS and the GOB have entered into an agreement whereby the GOB has agreed to make the annual debt service payments to the Caribbean Development Bank on the Caribbean Development Bank #10 and Caribbean Development Bank #5 loans. This agreement is designed to assist BWS in improving its cash flow position to support the capital expenditure program. BWS and the GOB have entered into 6 similar agreements dating back to December 2007. The current agreement, dated August 20, 2019, extends the payment by the GOB on the annual debt service of the loans mentioned above through March 31, 2025 (i.e., the end of the FFBP). The amount of debt service assistance on the two loans during this current agreement period is estimated at BZD \$4.4 million.
6. As mentioned in Section 1, BWS has paid dividends to its shareholders over the past 10 years. During the prior 3-year period, BWS has paid dividends of BZD \$758,060 in FY 2018/19, \$708,628 in FY 2017/18, and \$739,811 in FY 2016/17. For the financial forecast, dividends are projected to increase above the FY 2018/19 level by 2.0% per year to reflect anticipated general inflation.
7. BWS maintains adequate cash reserves to meet day-to-day funding needs and provide funds to meet unexpected emergencies requiring immediate financial resources. One source that provides data points for water and sewer utilities in the United States of America for Days Cash on Hand is the 2019 Water and Sewer Medians published by Fitch Ratings. Days Cash on Hand is defined as current unrestricted cash and investments plus any restricted cash and investments (if available for general system purposes), divided by operating expenditures minus depreciation, divided by 365 days. When looking at Midsize systems, (utilities serving between 100,000 and 499,999 persons), the median Days Cash on Hand was 624 days. This level of Days Cash on Hand is not achievable for BWS during the five-year period due to the historically lower levels set for the unrestricted operating reserve. According to the BWS Business Plan Review Report 2015-2020, to provide continuity of service, properly respond to meet the needs of customers, recover from emergency or disaster situations, and to provide technical assistance to rural systems in restoration of these systems, a target of at least \$3 million was identified to adequately deal with these situations. The system currently achieves this target previously identified but should strive to improve the reserve position in the future.

BWS aims to double the existing minimum reserve from \$3 million to \$6 million. This higher reserve level represents approximately 60 days of operating expenses and brings the reserve target closer to highly rated utilities. As shown in the figure below, the unrestricted operating reserves exceed the minimum target line during all years of the FFBP (with the exception of FY 2021/22 where the reserves are just slightly under the minimum target line). These reserves assume implementation of the tariff adjustments indicated in this



section below. The water and sewer infrastructure funds are not tracked separately, and therefore are included with the unrestricted operating reserves. BWS' projected available fund balance during the FFBP is illustrated in the following figure:

**Figure 7: Projected Fund Balances**



Footnotes:

1. Detailed fund balances for each year of the five-year period shown in Exhibit 6 at the end of this report. Amounts represent the balance at the end of each fiscal year.
2. Assumes implementation of tariff adjustment identified on Table 20.

8. Interest income from third parties has been recognized as an available revenue source to fund water and sewer expenditures. For the financial forecast, interest income is based on the FY 2019/20 budgeted levels. Projected interest income will remain at the FY 2019/20 budgeted level of \$108,000 per year during the five-year period.
9. BWS receives other operating revenues from miscellaneous charges for specific customer services. These miscellaneous revenues are available to reduce the amount of revenue requirements needed to be collected from monthly water and sewer tariffs. Examples of miscellaneous revenues include water and sewer connection fees, reconnection fees, infrastructure fees, services income, and other miscellaneous fees. Miscellaneous revenues are provided in the FY 2019/20 budget and are projected based on the nature of the fee for the remainder of the five-year period. For example, water connection charges and late payment charges are anticipated to increase each year due to growth in the customer base. Table 17 below provides the other operating revenues for the FFBP:

**(Remainder of page intentionally left blank)**

**Table 17: Other Operating Revenue Projections**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Reconnection Fees	\$235,200	\$239,600	\$244,100	\$248,700	\$253,400
Water Connection Charges	505,900	515,300	525,000	534,800	544,900
Sewerage Connection Charges	26,300	26,800	27,400	28,000	28,600
Other Water Sales	201,200	201,200	201,200	201,200	201,200
Discount – Measured Water Sales [1]	(243,200)	(247,700)	(252,400)	(257,100)	(262,000)
Services Income	282,400	282,400	282,400	282,400	282,400
Other Third-Party Turnover	47,600	47,600	47,600	47,600	47,600
Bad Debt Collections	33,100	33,100	33,100	33,100	33,100
<b>Total</b>	<b>\$1,088,500</b>	<b>\$1,098,300</b>	<b>\$1,108,400</b>	<b>\$1,118,700</b>	<b>\$1,129,200</b>

[1] The discount on measured water sales represents leak adjustments made for residential customers on request.

10. Infrastructure fees are a one-time charge to new development for growth related capital investment. The existing water infrastructure fee is BZD \$150.00 for both residential and non-residential customers. The sewer infrastructure fee is BZD \$1,695.00 for residential customers and can vary for all other customers. Based on the customer forecast outlined in Section 2 of this report, the collection of water and sewer infrastructure fees during the five-year period is anticipated to average approximately BZD \$635,000 per year.

## Cash Revenue Requirements Summary

Based on the principal assumptions and considerations discussed above, the projected net cash revenue requirements for the combined water and sewer system during the FFBP are summarized below. The net revenue requirements are net of other incomes and are representative of the amounts needed to be recovered from annual water and sewer tariff revenues.

**Table 18: Projected Net Cash Revenue Requirements**

Description [1]	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Operating Expenses	\$34,198,236	\$35,357,000	\$36,552,400	\$37,736,000	\$39,052,600
Debt Service	5,537,386	9,383,516	9,146,506	11,708,497	11,607,043
Capital from Tariff Revenue	9,332,000	8,786,000	9,089,000	9,187,000	8,039,000
Dividends	788,700	804,500	820,600	837,000	853,700
Gross Cash Revenue Requirements	\$49,856,322	\$54,331,016	\$55,608,506	\$59,468,497	\$59,552,343
Less: Income from Other Sources [2]	2,124,309	2,108,531	2,093,053	2,077,776	2,062,698
<b>Net Cash Revenue Requirements</b>	<b>\$47,732,013</b>	<b>\$52,222,485</b>	<b>\$53,515,453</b>	<b>\$57,390,721</b>	<b>\$57,489,644</b>

[1] Further detail on the projected cash revenue requirements over the five-year period can be found on Exhibit 4.

[2] Income from Other Sources include the GOB payment on Caribbean Development Bank #10 and Caribbean Development Bank #5 loans.

As shown on the table above, the net cash revenue requirements are projected to increase from BZD \$47.7 million in FY 2020/21 to \$57.5 million by the end of the FFBP. The largest component of the net cash revenue requirements is the operating expenses, which are increasing each year based on inflationary and other cost pressures. This trend is common in the utility industry, especially amongst systems that are experiencing good customer growth and need to keep pace by extending utility services and expanding the workforce. These operating expenses also include the incorporation of CWBL's operating expenses related to running the facilities on Ambergris Caye. During the period shown, debt service ranges from approximately BZD \$5.5 million to \$11.7 million. This is largely due to the timing of the two new debt issuances described in Section 3 above. In addition, capital from tariffs varies by year depending on the funding needs identified on the CapEx.

## Sufficiency of Existing Water and Sewer Tariff Revenues

As shown in the table below, revenues generated by existing tariffs are expected to be below the projected net cash revenue requirements during the last four years of the FFBP. With no tariff adjustments, the deficiency is anticipated to grow from approximately BZD \$2.5 million in FY 2021/22 to over BZD \$5 million during the last two years of the FFBP. The deficiencies can be primarily attributed to the capital expenditures required each year. As shown on Table 12 above, there is a significant need for cash funding and debt funding of the CapEx. Therefore, in order to meet the near-term revenue requirements and achieve the fund balance targets illustrated in Figure 7, tariff adjustments will be required.

**Table 19: Revenue Sufficiency Forecast at Existing Tariffs**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Tariff Revenue from Existing Tariffs [1]	\$48,941,100	\$49,719,500	\$50,517,100	\$51,322,000	\$52,151,400
Net Cash Revenue Requirements [2]	47,732,013	52,222,485	53,515,453	57,390,721	57,489,644
Surplus/(Deficiency)	\$1,209,087	(\$2,502,985)	(\$2,998,353)	(\$6,068,721)	(\$5,338,244)

[1] Obtained from Table 10.

[2] Obtained from Table 18.

## Tariff Adjustments

As discussed above, the existing tariffs will not be sufficient to support the revenue requirements forecast for the FFBP. Therefore, tariff adjustments will be necessary to some degree and may vary depending on future customer growth and usage patterns. The table below illustrates the system wide tariff adjustments necessary (using the growth assumptions outlined in Section 2) to meet operating requirements, debt service coverage requirements, capital requirements and the minimum target for Unrestricted Operating Reserves during the FFBP:

**Table 20: Projected Annual Tariff Adjustments**

Fiscal Year	% Adjustment [1]
FY 2020/21	0.0%
FY 2021/22	0.0%
FY 2022/23	10.0%
FY 2023/24	0.0%
FY 2024/25	0.0%

[1] Overall water and sewer tariff revenues to increase by percentages shown above. The percent changes to customer bills may vary depending on customer usage level as detailed in Section 7 of this report. All tariff adjustments are assumed to occur April 1 in each year where a tariff increase is indicated.

Assuming the rate adjustment shown above is implemented beginning April 1, 2022, the following table provides an illustration of the projected revenue sufficiency for the water and sewer system.

**Table 21: Revenue Sufficiency Forecast under Projected Rate Adjustments**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Tariff Revenue from Projected Tariffs	\$48,941,100	\$49,719,500	\$55,568,800	\$56,454,200	\$57,366,500
Net Cash Revenue Requirements [1]	47,732,013	52,222,485	53,515,453	57,390,721	57,489,644
Surplus/(Deficiency)	\$1,209,087	(\$2,502,985)	\$2,053,347	(\$936,521)	(\$123,144)

[1] Obtained from Table 18.

Under the projected tariff adjustment shown in Table 20, the system is anticipated to generate a surplus in FY 2020/21 and FY 2022/23. In the years where a deficiency is shown, reserves are anticipated to be used to fund the amounts.

Several of BWS' loan agreements authorizing the outstanding indebtedness on the system require that net revenues each year exceed a minimum debt service coverage threshold. The language from the Caribbean Development Bank #22 loan agreement states that the debt service coverage ratio must be at least 1.50x. This ratio is calculated as the operating surplus before deduction of depreciation, but after taxes, divided by the total debt service in the same year. As shown on the table below, and detailed on Exhibit 5, with the proposed tariff increase in FY 2022/23, the projected debt service coverage exceeds the minimum requirement each fiscal year:

**Table 22: Projected Debt Service Coverage**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Revenue from Projected Tariffs [1]	\$48,941,100	\$49,719,500	\$55,568,800	\$56,454,200	\$57,366,500
Miscellaneous Revenues [2]	1,196,500	1,206,300	1,216,400	1,226,700	1,237,200
GOB Payment of CDB #10 and CDB #5 Loans	927,809	902,231	876,653	851,076	825,498
<b>Total</b>	<b>\$51,065,409</b>	<b>\$51,828,031</b>	<b>\$57,661,853</b>	<b>\$58,531,976</b>	<b>\$59,429,198</b>
Operating Expenses [3]	34,198,236	35,357,000	36,552,400	37,736,000	39,052,600
Net Operating Revenue	\$16,867,173	\$16,471,031	\$21,109,453	\$20,795,976	\$20,376,598
Debt Service [4]	\$5,537,386	\$9,383,516	\$9,146,506	\$11,708,497	\$11,607,043
Debt Service Coverage Tests:					
Net Operating Revenue (Including GOB Debt Payment)	\$16,867,173	\$16,471,031	\$21,109,453	\$20,795,976	\$20,376,598
Coverage Ratio Calculated [5]	3.05	1.76	2.31	1.78	1.76
Net Operating Revenue (Excluding GOB Debt Payment)	\$15,939,364	\$15,568,800	\$20,232,800	\$19,944,900	\$19,551,100
Coverage Ratio Calculated [5]	2.88	1.66	2.21	1.70	1.68

[1] Water and sewer revenues from projected tariffs obtained from Table 21.

[2] Miscellaneous revenues include other operating revenues obtained from Table 17 and interest income from third parties.

[3] Operating expenses obtained from Table 18. Expenses include taxes and exclude depreciation.

[4] Debt service includes both existing and proposed debt service. Amounts obtained from Table 18.

[5] Minimum coverage required is 1.50x.

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# Section 5. Regulatory Projections

## Introduction

Section 4 of the report details the financial forecast on a cash basis, and details the assumptions used to develop the forecast. This section involves the modification of the cash forecast into the utility approach to address the regulatory framework of the Public Utilities Commission.

## PUC Regulatory

As set forth in the 2014 – 2015 FTRP Final Decision, the Public Utilities Commission Act (No. 39 of 1999) establishes the Public Utilities Commission as the economic regulator for the water, electricity and telecommunications sectors in Belize. As such the PUC has the authority to fix the rates for a public utility provider such as BWS.

The PUC has historically used a Rate Setting Methodology that includes the identification of Tariff Basket Revenue (TBR). The TBR is intended to provide for the full recovery of the reasonable costs incurred in the provision of water and sewer services. The TBR formula is as follows:

$$\begin{array}{r} \textbf{TBR Formula} \\ \hline + \text{ OPEX} \\ + \text{ Return} \\ + \text{ Depreciation} \\ + \text{ Taxes/License Fees} \\ + \text{ or – Annual Correction} \\ + \text{ or – RSA Recovery} \\ - \text{ Other Income} \\ \hline = \text{ Tariff Basket Revenue (TBR)} \end{array}$$

Whereas the TBR components are defined as follows (Note: certain definitions are abbreviated for purposes of this report):

- **OPEX:** includes, but is not limited to, the following cost items:
  - Customer Care/Billing/Collections (meter reading, bill preparation and delivery, collections, disconnections, reconnections, complaints, inspections, applications, etc.)
  - Transmission and Distribution (operations, maintenance, project planning and design, dispatch/control, emergency servicing, etc.)
  - Sewerage Collection and Disposal (operations, maintenance, project planning and design, emergency servicing, etc.)
  - Purchase of Water from Independent Producers
  - Finance/Administration (executive, general expenses, public relations, management fees, finance and accounting, purchasing and stores, etc.)
- **Return:** The return is equal to the Regulated Asset Value (RAV) times the target Rate of Return.

- **Depreciation:** This is calculated as the sum of the annual depreciation of assets represented in the Regulated Asset Value.
- **Annual Correction:** This is calculated as the sum of the surpluses or deficits in approved revenues for revenue-capped items for the immediately previous Annual Tariff Period.
- **Taxes/License Fees:** These fees are equal to the sum of the Tariff Basket Revenue and Other Income times the sum of the legal tax rate of 1.75% and the legal annual license fee rate of 0.50%.
- **RSA Recovery:** This is determined and approved by the PUC for any relevant Annual Tariff Period during which there exists any outstanding balance in any approved Rate Stabilization Account operated or maintained by a licensee.
- **Other Income:** This represents other sources of revenues for a licensee, provided by charging various approved fees and charges for water and sewer services.

## Actual to Projected Results

BWS has exceeded the FFBP projections based on the prior year's financial audits compared to the FFBP approved plan. As shown below, the average tariff based on the actual FY 2018/19 audit was \$17.77, which is slightly higher than the FFBP projection of \$17.69 for FY 2018/19. Actual consumption was 2,614 million gallons which is 6% higher than the projected 2,458 million gallons for FY 2018/19. Actual water consumption exceeded the prior FFBP projections. For these other years BWS exceeded the FFBP average tariff projections in FY 2017/18, FY 2016/17, and FY 2015/16 by \$0.07, \$0.24, and \$0.44, respectively.

**Table 23: Approved TBR and Components for FTP of April 1, 2015, to March 31, 2020**

Description	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20
<b><u>FFBP Projection: [1]</u></b>					
Return	\$10,026,202	\$10,809,186	\$11,372,902	\$11,845,869	\$12,266,773
Depreciation	4,179,958	4,592,968	4,865,070	5,086,220	5,278,916
OPEX	24,689,415	25,306,650	25,939,316	26,587,799	27,252,494
Gross TBR	\$38,895,575	\$40,708,805	\$42,177,288	\$43,519,888	\$44,798,183
Taxes/License Fees	895,295	937,031	970,833	1,001,737	1,031,160
Less: Other Income	950,000	973,750	998,094	1,023,046	1,048,622
Net TBR	\$38,840,869	\$40,672,086	\$42,150,027	\$43,498,579	\$44,780,721
Total Consumption – 1,000 gals.	2,283,188	2,340,268	2,398,775	2,458,744	2,520,213
Average Tariff - \$ 1,000 gals.	\$17.01	\$17.38	\$17.57	\$17.69	\$17.77
<b><u>Actual Results</u></b>					
Net TBR [2]	\$41,950,666	\$44,017,563	\$44,866,083	\$46,442,214	N/A
Water Consumption – 1,000 gals. [3]	2,404,600	2,498,436	2,543,346	2,613,714	N/A
Average Tariff per Mo. / 1,000 gals.	\$17.45	\$17.62	\$17.64	\$17.77	N/A

[1] Projections obtained from Schedule 3 of the PUC's Final Decision (2014-15 Full Tariff Review Proceeding) document.

[2] Net Tariff Basket Revenue (TBR) is based on actual audit results for each year shown. Reported Water Charges in the audit exclude other miscellaneous charges and income and includes all other components of the Net TBR shown in the FFBP.

[3] Water consumption shown for FY 2015/16 obtained from Page 8 of the 2017 Report to Shareholder's. All other fiscal years obtained from Table 4 in Section 2 above.

The assumptions and projections herein for the Fourth FTP reflect continued water and sewer service expansion and increased level of service to existing customers.

## CWBL Analysis

Purchase water from CWBL has been a significant BWS operating cost on Ambergris Caye. During the past 3 years wholesale water purchases from CWBL have ranged between BZD \$5.5 million and \$6.2 million per year. The FY 2019/20 budget indicates an expectation of a lower expense of \$4.7 million. This cost is an operating cost pursuant to the PUC Tariff Basket Revenue (TBR). An analysis was conducted question on whether CWBL should continue to be represented as a separate entity from BWS or should the CWBL assets be absorbed into the overall BWS regulatory structure.

To answer this question, the following represents the composition of the TBR for the CWBL assets and operations under two scenarios. Scenario 1 represents “status quo” representing CWBL as a separate entity, with the only TBR impact being the direct operating expenses from wholesale purchases. Scenario 2 represents the CWBL assets absorbed into BWS operations.

**Table 24: Example TBR Calculation for CWBL Operations Based on FY 2019/20 Budget**

Description	Scenario 1: CWBL as Separate Entity	Scenario 2: CWBL Absorbed into BWS	Notes
Return	None	\$80,353	Amount reflects return on \$1.0 million CWBL fixed assets and assuming an 8% rate of return
Depreciation	None	\$223,726	Depreciation on CWBL fixed assets assuming 26-year depreciable life
OPEX	\$4,703,481	\$2,887,200 + \$1,213,031	Direct CWBL operations <b>plus</b> amortization of intangible assets
Gross TBR	\$4,703,481	\$4,404,310	
Taxes/License Fees	0	0	
Less: Other Income	0	0	
Net TBR from CWBL	\$4,703,481	\$4,404,310	

As shown on Table 24 above, the net TBR under either scenario is comparable although Scenario 2 (CWBL absorbed into BWS) is less than keeping CWBL separate. The key element in the table above is amortization of intangible assets is included as an operating expense. While the PUC definition of operating expenses does not explicitly include intangible assets, including this item as an operating expense is justified since it essentially represents a buy-out of the multi-year wholesale obligation. Without the buyout, BWS would continue to endure higher operating expenses in the form of wholesale water purchases. Through the acquisition, BWS is lowering the overall TBR representing both short-term and long-term savings to customers. Finally, the consolidation of CWBL into BWS assets for regulatory purposes will be consistent with the BWS audit for the year ended March 31, 2019. This business plan recognizes CWBL assets as consolidated into BWS assets for regulatory purposes since there is justification for inclusion of intangible assets in the tariff structure.

## Regulated Asset Value Forecast

The RAV is an essential component of the TBR calculation. The following assumptions were used to develop the RAV forecast:

- The starting balance for the FY 2019/20 RAV was calculated utilizing the following information:
  - Based on BWS’ existing fixed asset listing through March 31, 2019;
  - The net book value of assets associated with the CWBL purchase are included in the beginning balance; and
  - Previously acquired capital funded through contributions from third parties and/or grants were deducted from the beginning balance.



Depreciation forecast includes:

- Existing assets depreciated based on approved depreciation schedules (except land);
- New capital assets assume a 40-year useful life; and
- CWBL assets assume a 26-year useful life.

**Table 25: Depreciation Forecast**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Depreciation of Existing Assets	\$6,297,243	\$6,024,132	\$5,653,144	\$5,160,486	\$4,511,048
New Depreciation	1,811,750	2,543,475	3,159,575	3,784,375	4,155,100
CWBL Depreciation	223,726	223,726	223,726	223,726	109,503
<b>Total</b>	<b>\$8,332,720</b>	<b>\$8,791,333</b>	<b>\$9,036,445</b>	<b>\$9,168,588</b>	<b>\$8,775,651</b>

- The new assets (Additions) forecast includes only 50% of the book value of assets that are projected to be commissioned and put in service during a fiscal year.

The following summarizes the RAV forecast during the FFBP:

**Table 26: Regulated Asset Value Forecast**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Starting RAV	\$210,921,571	\$238,823,851	\$260,837,018	\$278,757,072	\$294,406,485
Less: Depreciation	8,332,720	8,791,333	9,036,445	9,168,588	8,775,651
Additions	36,235,000	30,804,500	26,956,500	24,818,000	19,910,500
<b>Ending RAV</b>	<b>\$238,823,851</b>	<b>\$260,837,018</b>	<b>\$278,757,072</b>	<b>\$294,406,485</b>	<b>\$305,541,334</b>

## Tariff Basket Revenue Forecast

Section 4 outlines the assumptions for the financial forecast on a cash-needs basis. The cash-needs basis forecast is the foundation for the TBR regulatory projection. The following summarizes our additional assumptions in deriving the projected TBR calculation:

- The BWS adopted budget for FY 2019/20 serves as the basis for the OPEX projections. Employment cost increases, additional personnel, CWBL incremental operating expenses, and other expenditure assumptions are provided in Section 4 above;
- The OPEX also includes the amortization of contractual rights regarding the CWBL purchase. The contractual rights of BZD \$8,491,220 are amortized over seven years, which represents the remaining life of the wholesale agreement between BWS and CWBL;
- The Return for each fiscal year is calculated based on the ending RAV balance in a fiscal year times a rate of return. In the 2014 – 2015 FTRP Final Decision by the PUC, the PUC approved a target rate of return of 10.0% and a lower limit for rate of return of 8.0%. This study assumes a target rate of return of 8.0%;
- The Taxes/License Fees for each fiscal year is calculated based on total revenues (existing tariff and other miscellaneous revenue) in a fiscal year times 2.25%, which is the sum of the legal tax rate and the legal annual license fee rate; and
- Other Income projections obtained from Table 17 in Section 4 above, plus the interest income from third parties.



The following summarizes the TBR forecast during the FFBP:

**Table 27: Tariff Basket Revenue Forecast**

Description	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Return	\$19,105,908	\$20,866,961	\$22,300,566	\$23,552,519	\$24,443,307
Depreciation	8,332,720	8,791,333	9,036,445	9,168,588	8,775,651
OPEX	34,307,667	35,447,831	36,624,131	37,788,431	39,085,231
Gross TBR	\$61,746,295	\$65,106,126	\$67,961,143	\$70,509,538	\$72,304,189
Taxes/License Fees	1,128,096	1,145,831	1,164,004	1,182,346	1,201,244
Less: Other Income	1,196,500	1,206,300	1,216,400	1,226,700	1,237,200
Net TBR	\$61,677,891	\$65,045,656	\$67,908,746	\$70,465,184	\$72,268,232
Total Consumption - 1,000 gals. [1]	2,701,210	2,745,670	2,791,580	2,837,850	2,885,480
Average Tariff - \$ 1,000 gals.	\$22.83	\$23.69	\$24.33	\$24.83	\$25.05

[1] Water consumption obtained from Table 9 in Section 2 above.

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# Section 6. Cost of Service

## Introduction

One of the objectives of this study included identifying the cost of service among the existing tariff areas and appropriately identifying water system versus sewer system costs for those branches that provide both services. The Mainland branches consist of Belize City, Belmopan, Benque Viejo, Corozal, Dangriga, Orange Walk, Placencia, Punta Gorda, and San Ignacio. The remaining two branches not located on the Mainland are Caye Caulker and San Pedro.

## Cost of Service Analysis

The cost of service analysis among the branches was conducted using the historical FY 2018/19 period. The following data and assumptions were used in the cost of service analysis:

- Reported revenues are based on the calculated revenues by branch from the billing frequency analysis and internal revenue reports;
- Operating expenses include direct expenses by branch and an allocation of shared expenses;
- Shared operating expenses are allocated among branches based on an allocation of fixed assets, customer accounts, personnel, and tariff revenues;
- Fixed assets are adjusted for replacement cost new less depreciation (RCNLD), which represents the historical (original) cost of asset acquisition, adjusted for inflation and depreciation. The assets are then allocated by branch and function (i.e., water and sewer); and
- Only direct costs are allocated to those branches with sewer service (currently Belize City, Belmopan, and San Pedro).

Finally, the cost of service assumes that total BWS tariff revenue is equal to the cost. Therefore, the revenue less operating expenses equals the amount available for assets, reserves, and dividends. The cost of service identifies the revenue surplus or deficiency by branch. The table below illustrates the results of the analysis on a summary level and includes whether the revenues collected in each major area are over or under compared to the cost of providing service to the area.

**Table 28: FY 2018/19 Cost of Service Analysis**

Areas [1]	Revenue Above (Below) COS			
	Amount		Percent	
	Water	Sewer	Water	Sewer
Mainland	\$401,555	\$269,797	1.1%	11.3%
Islands	(401,555)	(269,797)	-4.7%	-22.8%
Total	\$0	\$0		

[1] Further detail on the cost of service analysis can be found in Exhibit 7.

As shown above the Mainland areas revenue are shown to generate revenue above the cost of service, although revenue in certain branches within the Mainland are below the cost of service. Revenues for Caye Caulker and San Pedro (Islands) are shown to be below cost of service.

# Section 7. Tariff Design

## Introduction

This section introduces BWS' existing water and sewer tariffs as well as summarizes the process of the proposed tariff design. The test year selected for the tariff design is FY 2020/21. One of the goals of the tariff design is to identify alternative water and sewer tariff structures that would help to promote better equity among BWS' various customer classes. The proposed tariffs calculated in this section are shown on a revenue-neutral basis. Should the tariff percentage adjustments illustrated in Section 4 become approved by the PUC, the tariffs shown herein would be increased across-the-board. Also included in this section are various customer bill impacts for the Mainland, Caye Caulker, and San Pedro service areas at several usage levels.

## Existing Tariff Structure

The existing tariffs, effective April 1, 2015, were last increased by 2.0% and are effective through the end of the Third FTP (or March 31, 2020).

The existing water and sewer tariffs include: i) a minimum monthly charge for all customer classes; ii) a minimum number of gallons at no additional charge included with the monthly fixed charge; and iii) eight usage charges based on metered water use above the minimum allowance. For example, a residential customer would have a minimum allowance of 1,000 gallons of usage per month. Additional usage above the 1,000 gallons per month are charged according to an inclining block structure. BWS' existing tariffs are summarized in the table below:

**Table 29: Existing Water and Sewer Tariffs**

Description	Mainland (Water Only)	Belize and Belmopan (Water and Sewer)	San Pedro	Caye Caulker
Minimum Bill (0 - 1,000 Gallons)	\$8.72	\$10.47	\$25.57	\$23.46
Consumption Blocks:				
Block 1: 1,001 - 2,000	\$13.95	\$18.02	\$30.22	\$26.98
Block 2: 2,001 - 3,000	\$15.12	\$19.76	\$32.54	\$29.61
Block 3: 3,001 - 4,000	\$15.69	\$20.92	\$34.87	\$32.50
Block 4: 4,001 - 5,000	\$16.27	\$22.09	\$37.19	\$35.67
Block 5: 5,001 - 6,000	\$17.44	\$23.25	\$44.17	\$39.14
Block 6: 6,001 - 7,000	\$18.60	\$23.82	\$52.31	\$42.96
Block 7: 7,001 - 8,000	\$19.17	\$24.41	\$58.11	\$47.15
Block 8: Above 8,000	\$19.76	\$24.99	\$63.93	\$51.75

Table 30 below illustrates the consumption block ratios in the existing tariff structure. The first 1,000 gallons of usage is 0.00 as that consumption is provided at no additional charge and is included with the monthly fixed minimum bill. The next 1,000 gallons, or first consumption charge, is used to calculate the ratios for the remaining blocks. The existing consumption blocks have been designed to promote conservation, as shown by the increasing ratio in the higher blocks.

**Table 30: Existing Tariff Block Ratios**

Consumption Block	Consumption Charge Ratio			
	Mainland (Water Only)	Belize and Belmopan (Water and Sewer)	San Pedro	Caye Caulker
0 - 1,000	0.00	0.00	0.00	0.00
1,001 - 2,000 [1]	1.00	1.00	1.00	1.00
2,001 - 3,000	1.08	1.10	1.08	1.10
3,001 - 4,000	1.12	1.16	1.15	1.20
4,001 - 5,000	1.17	1.23	1.23	1.32
5,001 - 6,000	1.25	1.29	1.46	1.45
6,001 - 7,000	1.33	1.32	1.73	1.59
7,001 - 8,000	1.37	1.35	1.92	1.75
Above 8,000	1.42	1.39	2.12	1.92

[1] 1.00 represents the lowest consumption charge for each area and are not equivalent across each branch or service (i.e., Mainland – Water only; Belize and Belmopan, etc.) Block ratios starting at 2,000 gallons and above are calculated based on each specific branch or service tariff at its 1,001 – 2,000 gallons.

## Proposed Tariff Design

Tariff design involves the calculation of monthly tariffs and charges for each customer classification (i.e., residential, commercial, etc.). The goal of this task is to establish a pricing structure or formula to recover the total revenue requirements of the system in an equitable manner, consistent with the cost of providing service, regulatory guidelines, overall revenue stability, and the fiscal and pricing objectives of BWS. The proposed water and sewer tariffs, to the extent practical, should meet the following criteria for service:

- The tariffs should be based on a policy that calls for the lowest reasonable prices consistent with the requirements of providing quality service on an ongoing basis;
- The tariffs should be simple and easy to understand;
- The tariffs should be equitable among customers, taking into consideration the cost of providing service to the various users of the system;
- The tariffs and cost recovery strategies should recognize the current financial needs to the system, when tariffs were last adjusted, and where possible help develop approaches to avoid “rate shock” in the future; and
- The tariffs should comply with applicable orders and requirements of regulatory authorities that may have jurisdiction.

Other considerations that affect the design of water and sewer tariffs include revenue stability and historical tariff structure.

Some of the important objectives identified included i) simplifying the consumption blocks for residential and non-residential customers; ii) maintaining the 1,000-gallon minimum for all customers; iii) evaluating a fixed minimum charge by meter size for non-residential customers; and iv) affordability. A tariff structure is proposed herein that involves the following:

- Reducing the residential consumption blocks from 8 blocks to 4 blocks (not including 0 – 1,000 gallons);
- Reducing the non-residential consumption blocks from 8 blocks to 2 blocks (not including 0 – 1,000 gallons);

- No changes to the monthly 1,000 gallon minimum for all customers;
- The fixed monthly minimum charge for non-residential customers is based on the size of the water meter; and
- Block 1 for residential customers is discounted below average cost to provide for an “affordable” tariff level for low-consumption customers.

As mentioned above, the tariffs in this section are designed on a revenue-neutral basis. So, the projected revenues from existing tariffs for FY 2020/21, identified on Table 10 above, serve as the total revenue target for the water and sewer tariffs. Based on this revenue target and the appropriate determinants used to calculate the tariffs, the following minimum and consumption charges are calculated:

**Table 31: FY 2020/21 Water Tariff Design**

Description	Monthly Minimum Charge			Consumption Charge		
	Mainland	San Pedro	Caye Caulker	Mainland	San Pedro	Caye Caulker
Water Revenue Target [1]	\$6,006,132	\$1,204,301	\$236,018	\$30,638,968	\$6,054,899	\$1,272,082
Number of Billing Units:						
1,000 Gallons	N/A	N/A	N/A	2,465,200	195,490	40,520
Bills/Accounts	57,233	4,222	822	N/A	N/A	N/A
Annualized Equivalent Number of Billing Units [2]	689,180	51,363	10,064	1,929,422	170,740	35,872
Unit Charge per Equivalent Unit (rounded)	\$8.72	\$23.45	\$23.46	\$15.88	\$35.46	\$35.46

[1] Water revenue target for each area based on projected water customers in FY 2020/21 times the existing water tariffs. Assumed San Pedro water tariffs is equal to the Caye Caulker (water only) tariffs.

[2] The equivalent billing units for each tariff component takes into consideration different factors related to how they are applied. Each is summarized below:

[a] Monthly minimum charge: reflects adjustments for meter size ratios in addition to being converted to an annual amount; and

[b] Consumption charge: reflects an adjustment based on the 1,000-gallon minimum and the block pricing structure for residential and non-residential customers.

As shown above, the water tariff design indicates no change to the monthly minimum charge.

**Table 32: FY 2020/21 Sewer Tariff Design**

Description	Monthly Minimum Charge		Consumption Charge	
	Mainland	San Pedro	Mainland	San Pedro
Sewer Revenue Target [1]	\$232,000	\$108,500	\$2,113,800	\$1,074,500
Number of Billing Units:				
1,000 Gallons	N/A	N/A	543,650	195,490
Bills/Accounts	11,008	4,222	N/A	N/A
Annualized Equivalent Number of Billing Units [2]	132,584	51,363	452,102	166,097
Unit Charge per Equivalent Unit (rounded)	\$1.75	\$2.12	\$4.68	\$6.47

[1] Sewer revenue target for each area based on projected customers paying the sewer tariffs in FY 2020/21 times the existing sewer tariffs. Assumed Belize and Belmopan sewer tariffs are equal to the difference between the Belize and Belmopan (water and sewer) tariffs and the Mainland (water only) tariffs. For San Pedro, assumed the sewer tariffs are equal to the difference between the San Pedro (water and sewer) tariffs and the Caye Caulker (water only) tariffs.

[2] The equivalent billing units for each tariff component takes into consideration different factors related to how they are applied. Each is summarized below:

[a] Monthly minimum charge: reflects adjustments for meter size ratios in addition to being converted to an annual amount; and

[b] Consumption charge: reflects an adjustment based on the 1,000-gallon minimum and the block pricing structure for residential and non-residential customers.

For customers located on the Mainland with water and sewer service, the tariff designs indicate a monthly minimum charge of \$10.47 (no change from existing water and sewer Mainland tariff). These tariffs would apply to those customers in Belize City and Belmopan who have both water and sewer service from BWS. In San Pedro, the proposed minimum charge is \$25.57, which is equivalent to the existing San Pedro monthly minimum charge.

Table 33 below illustrates the consumption block ratios in the proposed tariff structure. In the proposed tariff structure, there are separate structures for residential and non-residential customers. Also shown are the reduced number of consumption blocks for both the residential and non-residential customer class.

**Table 33: Proposed Tariff Block Ratios**

Consumption Block	Consumption Charge Ratio				
	Existing [1]	Proposed [2]			
		Mainland (Water Only)	Belize and Belmopan (Water and Sewer)	San Pedro	Caye Caulker
<b>Residential:</b>					
0 - 1,000	0.00	0.00	0.00	0.00	0.00
1,001 - 3,000	1.00 - 1.10	0.90	0.89	0.74	0.75
3,001 - 5,000	1.12 - 1.32	1.00	1.00	1.00	1.00
5,001 - 8,000	1.25 - 1.92	1.15	1.17	1.21	1.20
Above 8,000	1.39 - 2.12	1.24	1.22	1.52	1.46
<b>Non-Residential:</b>					
0 - 1,000	0.00	0.00	0.00	0.00	0.00
1,001 - 8,000	1.00 - 1.92	1.00	1.00	1.00	1.00
Above 8,000	1.39 - 2.12	1.24	1.22	1.52	1.46

[1] Summary of existing tariff ranges obtained from Table 30.

[2] Proposed tariff ratios, however tariffs will continue to be separate for San Pedro, Caye Caulker, and Mainland.

Similar to the existing tariff structure, the first 1,000 gallons of usage for all customers is 0.00 as that consumption is provided at no additional charge and is included with the proposed monthly fixed minimum charge. The residential structure consists of 4 blocks (not including 0 – 1,000 gallons), with the first 2,000 gallons after the minimum charged at a ratio between 0.74 and 0.90. This is discounted below the average cost and represents indoor/essential usage for residential customers. As the residential customers use more on a monthly basis, the ratio increases which is designed (like the existing tariff structure) to promote conservation. The highest tariff block ratio applies to usage above 8,000 gallons a month. The proposed block structure for non-residential customers will be reduced even further down to 2 blocks (not including 0 – 1,000 gallons). The first 7,000 gallons after the minimum is charged at the 1.00 ratio, while usage above 8,000 gallons per month ranges from 1.22 to 1.52.

Another objective of the proposed tariff structure was having a fixed monthly charge for non-residential customers that is based on the size of the customer’s water meter. One of the advantages of this method is that it is relatively easy to administer and explain to the customer. A common approach used in the United States for utilities basing the fixed charge on meter size is to use the AWWA’s meter size ratios. The ratio represents the capacity of larger meters in relation to the capacity of the utility’s base or smallest meter size (i.e., a 5/8-inch meter). The AWWA ratios are highlighted in the table below:

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**Table 34: AWWA Meter Size Ratios**

Meter Size	Factor
5/8-Inch	1.00
3/4-Inch	1.00
1-Inch	1.67
1.5-Inch	3.33
2-Inch	5.33

The following table summarizes the proposed tariffs for FY 2020/21:

**Table 35: Proposed FY 2020/21 Water and Sewer Tariffs**

Description	Mainland (Water Only)	Belize and Belmopan (Water and Sewer)	San Pedro	Caye Caulker
<b>Monthly Minimum Charges</b>				
Residential (0 - 1,000 Gallons)	\$8.72	\$10.47	\$25.57	\$23.46
Non-Residential (0 - 1,000 Gallons):				
5/8-Inch	\$8.72	\$10.47	\$25.57	\$23.46
3/4-Inch	\$8.72	\$10.47	\$25.57	\$23.46
1-Inch	\$14.56	\$17.48	\$42.70	\$39.18
1.5-Inch	\$29.04	\$34.87	\$85.15	\$78.12
2-Inch	\$46.48	\$55.81	\$136.29	\$125.04
<b>Consumption Charges</b>				
Residential:				
Block 1: 1,001 - 3,000	\$14.29	\$18.27	\$31.13	\$26.60
Block 2: 3,001 - 5,000	\$15.88	\$20.56	\$41.93	\$35.46
Block 3: 5,001 - 8,000	\$18.26	\$24.11	\$50.64	\$42.55
Block 4: Above 8,000	\$19.76	\$24.99	\$63.93	\$51.75
Non-Residential:				
Block 1: 1,001 - 8,000	\$15.88	\$20.56	\$41.93	\$35.46
Block 2: Above 8,000	\$19.76	\$24.99	\$63.93	\$51.75

## Bill Comparisons

The remainder of this section includes the bill impact for residential and non-residential customers in the Mainland, San Pedro, and Caye Caulker at various usage levels under the existing tariffs and the proposed FY 2020/21 tariffs. The four tables below provide this information for a residential customer using less than 6,000 gallons per month and a non-residential customer at various usage levels. Exhibit 8 at the end of this report provides additional bill impacts for residential and non-residential customers.

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**Table 36: Mainland (Water Only) Bill Impacts**

Usage	Existing Bill	FY 2020/21 Bill	\$ Difference	% Difference
<b>Residential:</b>				
1,000	\$8.72	\$8.72	\$0.00	0.0%
2,000	\$22.67	\$23.01	\$0.34	1.5%
3,000	\$37.79	\$37.30	(\$0.49)	-1.3%
4,000	\$53.48	\$53.18	(\$0.30)	-0.6%
5,000	\$69.75	\$69.06	(\$0.69)	-1.0%
6,000	\$87.19	\$87.32	\$0.13	0.1%
<b>Non-Residential:</b>				
7,000 (3/4")	\$105.79	\$104.00	(\$1.79)	-1.7%
100,000 (1.5")	\$1,942.88	\$1,958.12	\$15.24	0.8%

**Table 37: Mainland (Water and Sewer) Bill Impacts**

Usage	Existing Bill	FY 2020/21 Bill	\$ Difference	% Difference
<b>Residential:</b>				
1,000	\$10.47	\$10.47	\$0.00	0.0%
2,000	\$28.49	\$28.74	\$0.25	0.9%
3,000	\$48.25	\$47.01	(\$1.24)	-2.6%
4,000	\$69.17	\$67.57	(\$1.60)	-2.3%
5,000	\$91.26	\$88.13	(\$3.13)	-3.4%
6,000	\$114.51	\$112.24	(\$2.27)	-2.0%
<b>Non-Residential:</b>				
8,000 (3/4")	\$162.74	\$154.39	(\$8.35)	-5.1%
250,000 (1.5")	\$6,210.32	\$6,226.37	\$16.05	0.3%

**Table 38: Caye Caulker Bill Impacts**

Usage	Existing Bill	FY 2020/21 Bill	\$ Difference	% Difference
<b>Residential:</b>				
1,000	\$23.46	\$23.46	\$0.00	0.0%
2,000	\$50.44	\$50.06	(\$0.38)	-0.8%
3,000	\$80.05	\$76.66	(\$3.39)	-4.2%
4,000	\$112.55	\$112.12	(\$0.43)	-0.4%
5,000	\$148.22	\$147.58	(\$0.64)	-0.4%
6,000	\$187.36	\$190.13	\$2.77	1.5%
<b>Non-Residential:</b>				
9,000 (3/4")	\$329.22	\$323.43	(\$5.79)	-1.8%
40,000 (1.5")	\$1,933.47	\$1,982.34	\$48.87	2.5%

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**Table 39: San Pedro Bill Impacts**

<u>Usage</u>	<u>Existing Bill</u>	<u>FY 2020/21 Bill</u>	<u>\$ Difference</u>	<u>% Difference</u>
<b>Residential:</b>				
1,000	\$25.57	\$25.57	\$0.00	0.0%
2,000	\$55.79	\$56.70	\$0.91	1.6%
3,000	\$88.33	\$87.83	(\$0.50)	-0.6%
4,000	\$123.20	\$129.76	\$6.56	5.3%
5,000	\$160.39	\$171.69	\$11.30	7.0%
6,000	\$204.56	\$222.33	\$17.77	8.7%
<b>Non-Residential:</b>				
12,000 (3/4")	\$570.70	\$574.80	\$4.10	0.7%
40,000 (1.5")	\$2,360.74	\$2,424.42	\$63.68	2.7%

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# Section 8. Miscellaneous Charges and Fees

## Introduction

BWS currently assesses and collects a number of miscellaneous fees and charges which are used to offset revenue requirements and reduce revenues to be recovered through the monthly user tariffs and charges. The types of miscellaneous fees include connection fees, security deposits, transfer of account fees, reconnection fees, and other fees as described herein.

The cost of providing each of these services was determined using a “bottom-up” approach (or activity-based costing), meaning costs for each service were developed based on labor and material costs to provide each service. For labor costs, the average time required to conduct each service and the type of personnel involved in completing each service were evaluated. Wage rates for each type of personnel are based on existing salary scales. These wage rates were then adjusted upward to account for social security expense, pension costs, and group medical coverage and insurance with a tax/benefit rate of 19%. Equipment rates were obtained from FEMA’s Schedule of Equipment Rates for 2019 to calculate the cost of use of a BWS service truck and any necessary equipment to provide each service. Material costs, such as pipes, fittings, and other materials necessary to provide each service are based on actual costs. In addition, an allowance for overhead costs associated with administrative and management personnel equal to approximately 44% of the cost for each task (where appropriate). The labor, material and equipment costs for each service were then totaled to determine the cost to provide each type of service.

Based on the factors discussed above, the following changes to the miscellaneous charges are proposed:

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**Table 40: Existing, Proposed and Calculated Miscellaneous Fees**

Description	Existing	Proposed	Full Cost Allocation
<b>Reconnection Fee</b>	\$25.00	\$25.00	\$38 - \$58
<b>Transfer of Account (Name Change)</b>	\$20.00	\$10.00	
<b>Transfer of Service (Location)</b>	\$20.00	\$20.00	
<b>Transfer New Connection</b>	\$20.00	\$20.00	
<b>Water Connection Fee</b>			
<u>Mainland:</u>			
Residential	\$85.00	\$85.00	\$2,221
All Other	\$85.00	\$330.00	\$2,221
<u>San Pedro:</u>			
Residential	\$127.50	\$127.50	\$4,173
All Other	\$637.50	\$650.00	\$4,173
<u>Caye Caulker:</u>			
Residential	\$100.00	\$100.00	\$2,679
All Other	\$300.00	\$400.00	\$2,679
<b>Sewer Connection Fee</b>			
<u>Belize City &amp; Belmopan:</u>			
Residential	\$100.00	\$100.00	\$2,447
All Other	Varies	Varies	\$2,447
<u>San Pedro:</u>			
Residential	\$150.00	\$150.00	\$5,208
All Other	Varies	Varies	\$5,208
<b>Water Infrastructure Fee</b>			
Residential	\$150.00	\$150.00	
All Others	\$150.00	Varies	
<b>Sewer Infrastructure Fee</b>			
Residential	\$1,695.00	\$1,695.00	
All Others	Varies	Varies	
<b>Security Deposit</b>			
<u>Mainland:</u>			
Residential	\$50.00	\$50.00	
All Other:			
3/4" Meter	\$200.00	\$100.00	
1" Meter	\$200.00	\$200.00	
1.5" Meter	\$200.00	\$500.00	
2" Meter	\$200.00	\$1,000.00	
<u>San Pedro:</u>			
Residential	\$50.00	\$50.00	
All Other:			
3/4" Meter	\$300.00	\$150.00	
1" Meter	\$300.00	\$300.00	
1.5" Meter	\$300.00	\$750.00	
2" Meter	\$300.00	\$1,500.00	
<u>Caye Caulker:</u>			
Residential	\$50.00	\$50.00	
All Other:			
3/4" Meter	\$250.00	\$125.00	
1" Meter	\$250.00	\$250.00	
1.5" Meter	\$250.00	\$625.00	
2" Meter	\$250.00	\$1,250.00	
<b>Late Payment Charge</b>			
Residential	N/A	N/A	
All Others [1]	N/A	2% per Month	

[1] Minimum charge of \$10.00.

## **LIST OF EXHIBITS**

- Exhibit 1: Water Customer Projections by Branch**
- Exhibit 2: Projected Revenue from Existing Tariffs**
- Exhibit 4: Capital Expenditures Plan**
- Exhibit 4: Projected Water and Sewer Revenue Requirements**
- Exhibit 5: Combined System Projected Debt Service Coverage**
- Exhibit 6: Fund Balance Projections**
- Exhibit 7: Fiscal Year 2018/19 Cost of Service Analysis**
- Exhibit 8: Customer Bill Impacts**