

Sewer Rate and Capacity Management Evaluation

Town of Bourne

February 2020

REVISED
7/10/2020

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APPENDIX – Handout from July 12, 2020 Sewer Commission Meeting

Section 1 Introduction



This report was released in February 2020 and discussed at an in-person workshop held on March 16, 2020 which effectively began the COVID-19 quarantine period. The rate evaluation was further discussed at the July 2, 2020 and July 12, 2020 sewer commission meetings. One of the many impacts of COVID-19 were that meetings were no longer held in person and the July meetings were conducted via the Zoom video conferencing platform. To better support this platform, Tighe & Bond combined the elements of a written report and a presentation in the form of a detailed "handout" which consists primarily of the core figures and tables with key discussion points identified. While the handout contains the same elements as the report it is based upon more updated data and information. This document is a convergence of the detailed July 10 handout and the original text from the February 5, 2020 revised final draft. Updated information or tie-ins to the handouts (with page numbers) are clearly indicated. The handout is included in its entirety as an appendix.

The Town of Bourne owns and operates a municipal sewer system that collects wastewater from 604 residential and commercial parcels in the downtown, Taylor Point and Hideaway Village areas. The existing sewer system, constructed in early 1990's, consists of collection and pumping facilities only; all wastewater is sent to the Town of Wareham for disposal. Water is provided by the Buzzards Bay Water District.

The capacity of the Bourne sewer system is limited to 200,000 gallons per day (gpd) by the Intermunicipal Agreement (IMA) with Wareham, which was executed on February 23, 2010, and is valid through February 2030. In response to strong commercial growth in the downtown area, Bourne moved forward with the design and construction of its own municipal wastewater treatment plant (WWTP). The design capacity of the new treatment plant is 100,000 gallons per day, which increases the total sewer capacity to 300,000 gallons per day.

The Town engaged Tighe & Bond to review the existing capacity allocation policy, develop an impact fee policy and create an electronic rate model. The goal is to evaluate the viability of maintaining the existing rate structure compared to alternative rate structures.

During the data development phase, we discovered that the Town Meeting authorization or the WWTF clearly set the Town's expectations in terms of customer impacts. Given its significance, the entire motion is provided below:

Article 2, October 2017 Special Town Meeting

MOTION: That the sum of Six Million Five Hundred Fifty-Eight Thousand Dollars (\$6,558,000.00) is appropriated to make various wastewater system and wastewater treatment improvements for the protection of human and environmental health and to enhance the economic development in Bourne, such funds to be used for planning, constructing, originally equipping and furnishing a wastewater treatment facility and ancillary space on town-owned land, including the payment of all costs incidental and related thereto, and that to meet this appropriation, the Treasurer, with the approval of the Selectmen, is authorized to borrow said amount under and pursuant to Chapter 44, Section 8(14) of the General Laws, or pursuant to any other enabling authority, and to issue bonds or notes of the Town therefor:

provided, however, that no sums shall be borrowed or expended pursuant to this motion unless and until the Selectmen shall have determined that sewer rates and charges have been established to pay all costs of operating and maintaining the Town's sewer enterprise, including the cost of any existing debt service currently payable from the sewer enterprise, and that sewer rates have been so established as to provide for the full payment in each year of debt service on Two Million Four Hundred Thousand Dollars (\$2,400,000) of bonds or notes issued pursuant to this vote. The amount authorized to be borrowed by this vote shall be reduced to the extent of any grants received by the Town on account of this project. Any premium received upon the sale of any bonds or notes approved by this vote, less any such premium applied to the payment of the costs of issuance of such bonds or notes, may be applied to the payment of costs approved by this vote in accordance with Chapter 44, Section 20 of the General Laws, thereby reducing the amount authorized to be borrowed to pay such costs by a like amount.

VOTED: AYES 132; NAYS 24; declared a 2/3rds vote.

Our rate evaluations start with examining the revenue projected from existing rate structures against the estimated revenue needs (expenses) over a ten-year planning period. If the projected revenue falls short of the revenue needs, percentage increases are applied uniformly to all components of the rate structure (i.e. base fees and usage charges) to maintain the desired reserve balance. The cost impacts to residential customers are then calculated and reviewed in terms of equity. From there, incremental modifications to the existing rate structure are developed and reviewed. Typically, the residential costs for all alternatives are reviewed against each other with the lowest cost generally representing the most desirable option. The language outlined in the motion however sets a clear standard for evaluating not only the rate structure but fees as well, which was subsequently adopted as the primary project goal.

Section 2

Capacity Allocation Assessment

2.1 Defining and Measuring Sewer Capacity

The function of a public sewer system is to collect and transport wastewater from customers to a wastewater treatment plant where the wastewater is treated using both biological and chemical/physical processes.

Treated wastewater is discharged to either a surface water body or groundwater via subsurface disposal. A discharge permit is required for the above mentioned scenarios and are governed by different federal agencies. Surface water discharges are governed by the National Pollution Discharge Elimination System (NPDES) program while groundwater discharge administered by the Massachusetts Department of Environmental Protection (MADEP). The discharge permit defines effluent quality requirements and the maximum amount of treated wastewater that may be discharged. As a result, all **wastewater treatment plants have a finite capacity.**

Bourne is considered a secondary system (no treatment) and currently sends all sewerage from its collection system to the Town of Wareham for disposal as authorized under the Intermunicipal Agreement (IMA) between the two towns. The IMA provides Bourne 200,000 gallons per day of capacity.

2.2 Capacity allocation policy

In 2017, the Town developed the Commercial Wastewater Management Allocation Policy (the Policy), which is designed to support growth by developing an impartial method of allocating capacity to new commercial developments.

The Policy consists of the following steps:

Application. An application is submitted as the first step to provide general information about a project, proposed location, and descriptions. More importantly, the application requires information relative to the applicant's intent and progress towards obtaining ownership of the parcel and securing financing. The last and most important information provided is the estimated flow that will be generated from the completed project site.

Preliminary Allocation. The Town has 60 days to respond and issue a preliminary allocation to the applicant provided that the applicant has demonstrated that project financing is available, ownership of the identified parcel has been secured, and that the estimated flow is less than the Uncommitted Reserve Capacity. The pool from which capacity is allocated from is referred to as the **Uncommitted Reserve Capacity (UCRC)** which is defined as the total available (permitted) capacity minus preliminary allocations, operational allocations, existing residential flow and the residential reserve (2% of residential flow). The preliminary allocation reserves the requested capacity for the applicant and provides the applicant with two years to initiate construction.

Operational Allocation. The preliminary allocation is converted to an operational allocation by the approval of the Town once a building permit has been issued. It

is assumed that the allocation amount is the same as that requested in the preliminary allocation application.

2.2.1 Program Maintenance

The policy has several checks and balances designed to maintain the system:

Public Hearing: The Board is required to conduct a public hearing within six months of the preliminary allocation approval. At the public hearing, the applicant is required to submit a report on their plans for development within the next two years. If the applicant fails to demonstrate sufficient plans for development, the allocation is considered void and the capacity returns to the Uncommitted Reserve Capacity.

Operational Allocation Review: If a property with an approved operational allocation has not commenced to discharge within two years, the allocation is voided and returned to the Uncommitted Reserve Capacity. Three years after the initial connection, the actual flows are compared to the approved allocation, if the actual flow is greater than the allocation, the property owner must apply for an additional allocation, if less, the difference is returned to the uncommitted reserve capacity.

Annual Update of the Uncommitted Reserve Capacity: The policy requires the Board to determine the uncommitted reserve capacity annually in September. The status of all allocations is to be reviewed as part of the determination.

2.3 Determination of Uncommitted Reserve Capacity

The Uncommitted Reserve Capacity (UCR) is calculated for 2018 based upon the following components as described in Section 2.1, and further described below:

1. **Existing Residential Usage.** The capacity allocation provided by the Wareham IMA is based upon the total volume of sewage that enters the Wareham collection system as determined by summing the flows from Bourne's two pump stations; Main Street and Hideaway. No distinction is made between residential and non-residential sewage. The total pumped volume for 2017 and 2018 is shown below in Table 2-1

Table 2-1

Total Wastewater Pumped (gpd)

Year	Main Street	Hideaway	Total
CY 2017	85,156	11,063	96,220
CY 2018	89,050	10,363	99,413



See page 2-7 for updated pumpage data

2. **Existing Allocations.** Existing allocations as of December 2019, are shown in the following tables.

Table 2-2
Recent Approvals (Operational)

Owner	Location	Allocation (gpd)	Application Date	Approval Date
▶ Hampton Inn	12 Kendall Rae Place	15,243	-	9/30/2014
Vincent Michienzi	85-93 Main Street	13,000	10/24/2018	10/15/2018
TOTAL		28,243		

Table 2-3
Pending Approvals (Preliminary)

Owner	Location	Allocation (gpd)	Application Date	Approval Date
GENCON/ 12 Wagner	12 Wagner Way	17,750	1/5/2018	6/18/2019
Calamar / 25 Perry	13 Kendall Rae Place	16,800	12/21/17	9/19/2017
Vincent Michienzi/ 100 Block	Cohasset / Main	26,080	-	10/13/2015
TOTAL		60,630		

Table 2-4
Pending Applications

Owner	Location	Allocation (gpd)	Application date	Approval date
▶ Oak Bay Brewery	140 Main Street	2,256	8/23/2019	12/18/2019
James McLaughlin	227 Main Street	79	12/31/2019	TBD
MMA Cadet Housing	11 Buttermilk Way	7,070	12/27/2019	TBD
TOTAL		9,405		

The resulting Uncommitted Reserve Capacity based upon 2018 usage is shown below in Figure 2-1.



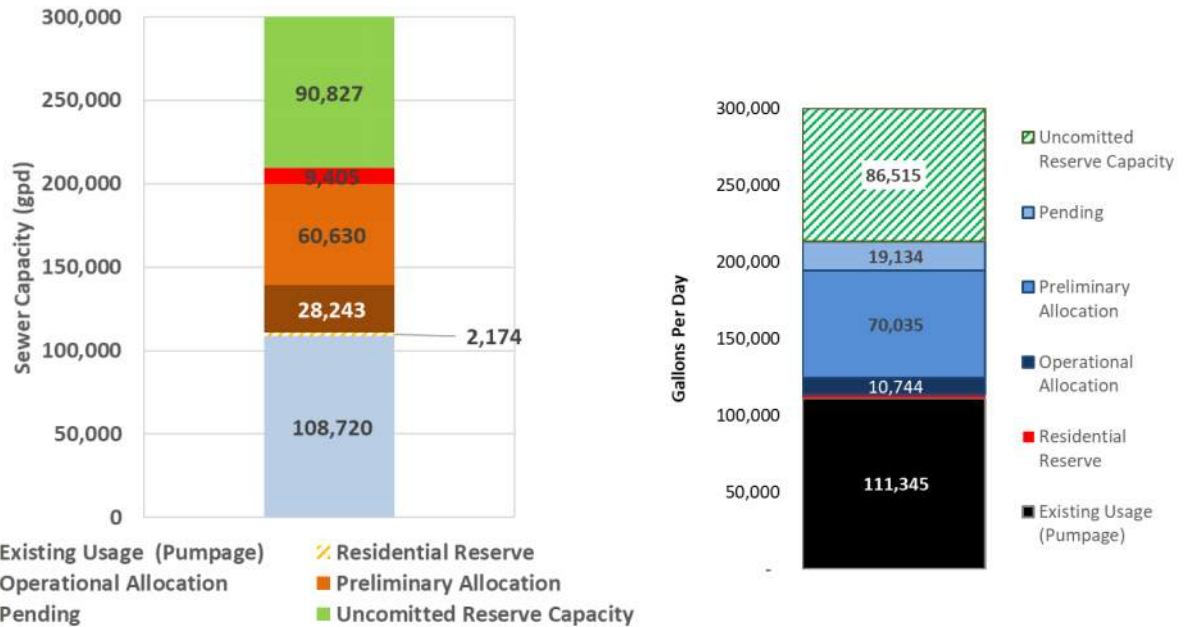
Projects marked with triangle above have come online since the project started, see handout page 8 for additional information

Figure 2-1
Uncommitted Reserve Capacity

Sewer Rate and Capacity Management Evaluation



Revised URC determined based upon 2019 pumpage with allocations for projects indicated on previous page removed.



The total of existing and allocated capacities is 199,679 gallons per day, which is almost at the existing allotted capacity defined by the Wareham IMA. However, it is important to understand that the inherent accuracy of this value is directly related to the method used to determine each component.

2.3.1 Accuracy of Uncommitted Reserve Capacity

The Uncommitted Reserve Capacity effectively defines the amount of commercial development that can be supported by the new WWTP. Sewer flows are determined by a variety of different methods for different purposes and each method has inherent accuracy limitations. Understanding these methods is important to maximize the value of the new WWTP investment.

The different uses of sewer flow and the methods used to determine them are as follows:

Customer Billing: Measuring actual sewer flow for small diameter pipes is impractical, so industry practice is to use metered water usage as a proxy. In Bourne, metered water usage data is provided by the Buzzard’s Bay Water District. The Water District reads water meters twice each year and provides Bourne with a summary of annual (calendar year) usage by customer consisting of the two metered usages.

Disposal Costs: The annual operating cost assessed to Bourne by Wareham was based upon the actual sewerage that entered the Wareham sewer system¹ as measured at Bourne’s two pump stations.

¹ On June 11, 2019 the two towns entered into a settlement agreement intended to resolve “multi fiscal year dispute” that effectively changed the basis of the operational charge to a fixed fee from a flow-based fee. For the purposes of this

Allocations: Allocations are based upon Title V, the common name for 310 CMR 15.000 The State Environmental Code Title V. Title V are the design guidelines for onsite wastewater disposal (septic) systems. Title V contains estimated flow values for residential and a variety of non-residential applications. These values are considered to represent a maximum day value versus the average day that Bourne manages to, it is also generally considered out of date and/or overly conservative.

The easiest Title V flow to evaluate against existing usage is for residential users. Title V estimates residential sewer usage to be 110 gallons per day per bedroom. Section 4.3 contains a distribution of usage for single family customers and shows that 50% had an annual usage of 20,000 gallons or less. A 3 bedroom assumption equals 18 gallons per day per bedroom. Using the residential water use value of 50 gallons per day per person reported by the Water District and assuming a 3-person household with 3 bedrooms, this equals 50 gallons per day per bedroom or 45% of Title V. **A 45% reduction factor was used in the financial analyses shown in Section 4.** The reduction factor for non-residential use is more difficult to determine as the Title V estimated flows are not available for existing non-residential customers.



Evaluations changed to reflect a 50% reduction factor.

Wareham IMA: The operational assessment of the IMA is based upon actual pumpage¹, while sewer customers are based upon metered water use. While it is common practice to bill sewer based upon water usage, the two can vary significantly for the following reasons:

- 1- Not all drinking water becomes sewage.** The Buzzards Bay Water District experiences a 75% increase in water demand in the summer, much of this is related to outdoor water use, which does not contribute to the sewer flow. Table 2-5 compares the actual sewage flow as measured at the pump stations to the amount of wastewater customers were billed based upon water usage.
- 2- Not all sewer flow is from drinking water.** Gravity sewers are susceptible to inflow and infiltration (I&I), which is ground water or stormwater that leaks into or enters the sewer system through illicit connections. I&I negatively impacts Bourne in two ways; it robs capacity that could otherwise support additional residential and commercial developments (and generate revenue) and increases the cost of disposal.

evaluation we have assumed that the operational charge will return to a flow basis in the future.

In recognition of the significance of Infiltration and Inflow statewide, the MADEP required all sewer systems to submit an Infiltration and Inflow Study by December 2018 or request an extension. Bourne requested an extension; thus, no data is available. To develop an order of magnitude understanding of I&I, water consumption and sewer pump station data were compared. Figure 2-2 shows this comparison, the water data reflects the usage for the entire water

Year	Total Pumped	Total Billed	Delta %
CY 2018	39,683	38,637	103%
CY 2019	40,640	38,345	106%
Delta %	2.4%	-0.8%	--

system so while the actual

volume is not meaningful, the peaks are valid.

Figure 2-2

Water Usage vs. Sewer Flow

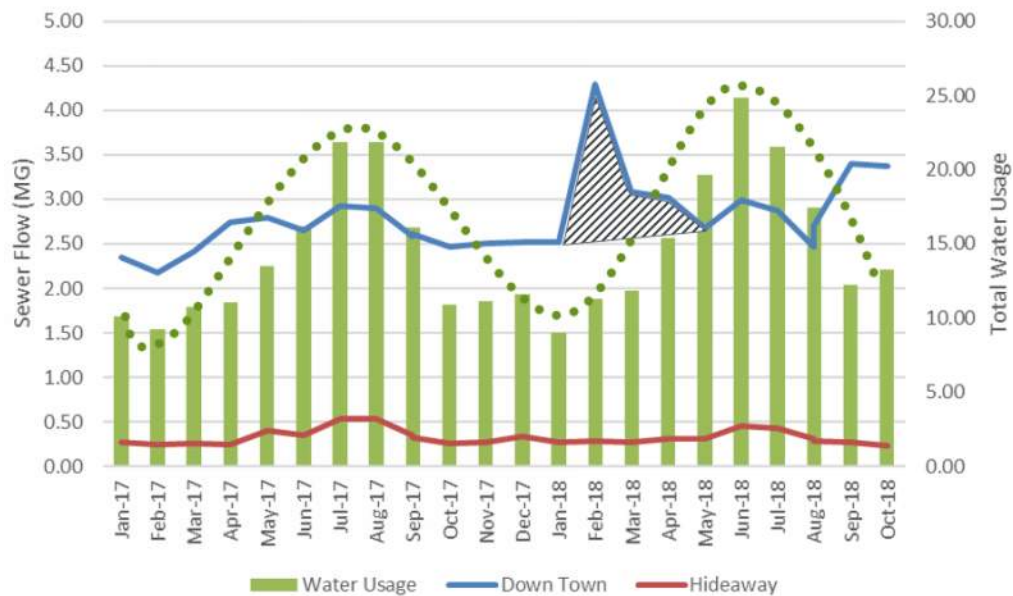


Table 2-5

Comparison of Billed vs Pumped Sewerage (kgal) by Calendar Year (CY)

Year	Total Pumped	Total Billed	Delta %
CY 2017	35,120	36,869	-5%
CY 2018	39,683	38,637	103%
Delta %	11%	5%	--



Updated table showing 2019 data. The pump station flow increased by 11% from 2017 to 2018 while usage went up 10%, this is reflected in the chart and is likely associated with Infiltration and Inflow. In 2019 pump station flow went up again by 2.4% however, usage went down by almost a percentage point. This indicates a potential increase in Infiltration and Inflow in 2019.

Water usage shows the expected seasonal increases peaking in July for both years. The Hideaway pump station flows are generally constant, with subtle increases coincident with the water use peaks. The difference in peak magnitude between water and the Hideaway Pump Station support the statement that not all drinking water contributes to sewer flow.

The Downtown pump station also experienced coincident increases for July but more importantly, there was a significant peak in February 2018, the second lowest month for water use. Pump station flows do not return to normal levels until May, this supports the statement that not all sewerage is related to drinking water.

One possible reason for the difference in response between the two sewer pump stations is that Hideaway is served by low pressure sewers (grinder pumps) while the Downtown area is served by gravity sewers. Low pressure sewers by their nature do not experience I&I because they operate under pressure. Gravity sewers, however, generally experience some level of I&I. For Bourne this is evidenced by the shaded area in Figure 2-2.

Section 3 Financial Evaluation – Revenue Needs

The first step of a water or sewer rate evaluation is to determine the future revenue needs (expenses) for the analysis period. These expenses consist of three primary categories: operating, capital and debt, each described in more detail below. The figures and schedules shown in this section were taken from the spreadsheet model developed for this project. The model is based in Microsoft Excel and consists of numerous modules or ‘tabs’ which are referred to in the text. The actual expenses, remaining debt service obligations and starting retained earnings balances were provided by the Town.

3.1 Operating Expenses

Operating expenses consist of the day to day cost of maintaining the sewer system, including labor, expenses and supplies. The entire chart of accounts (all line items) are entered into model, sorted by order of largest to smallest then reviewed for trends.

Schedule 3.2 shows the trending analysis, for brevity only the top 10 expenses are shown.

Schedule 3.2: Historic Trending Analysis

Category	Average Budget	Average Expended	Average Turnback	Trend %	Trends	Escalator
Wareham - Operating	\$350,500	\$272,229	20%	-5%		2.5%
Wareham - Capital	\$188,478	\$188,478	0%	0%		0.0%
Transfer Out (Indirects)		\$129,546		-1%		2.5%
Transfer Out (Reserve)		\$100,000				--
Purchase of Services	\$30,833	\$28,086	-12%	202%		2.5%
Personnel Services	\$62,987	\$66,423	-7%	14%		2.5%
Personnel Services	\$53,430	\$52,706	0%	2%		2.5%
Rate Funded Capital	\$70,000	\$32,126	51%	35%		2.5%
Existing Debt Service	\$25,163	\$26,453	0%	66%		2.5%
Purchase of Services	\$33,333	\$17,952	42%	472%		2.5%

The escalation factors shown above are based upon a review of the last five years (FY15-FY19) budget to actual reports. The average turnback represents the average percent change between the budget and actual expenses for each line item. The turnbacks are not factored into the projections but instead serve as an additional measure of conservatism. The budgeted values are used for FY20 and expenses for FY21 on are estimated by applying the escalators from above to the previous value for each year.

Schedule 3.2 shows that the most significant expense item are the charges levied by the Town of Wareham in accordance with the provisions of the existing IMA. The actual trend for the operating cost line item (SERVICES – WASTE REMOVAL AND DISP) indicates that this item has trended downward by an average of 5% over the analysis period. Due to June 11, 2019 settlement agreement however, the projected starting value of \$400,000 per year with an annual escalation rate of 2.5% was used.

Other noteworthy line items are the laborers salaries which have increased by 14% over the last five years (this may be the result of adding staff) and the transfer to General Fund which is not budgeted and thus was projected based upon the expended value from the FY20 budget to actual report. Also, starting in FY21, \$40,000 was added to the line items

for administrator salaries and indirect costs to reflect a portion of the Town Engineer salary to reflect work on sewer related items which is discussed in Section 5.

3.2 Capital Expenses

Capital expenses are associated with system improvements, expansions or other capital purchases. Figure 3-1 shows the projects from the CIP tab of the model, the projects and costs were taken directly from the Town’s FY20 Capital Improvement Plan.

Figure 3-1
Capital Improvements

Capital Improvement Planner			
Description	Funding source	Interest rate	Estimated Cost
Safety Equipment Upgrades [Exhaust systems/filter/vent]	Rate	--	\$65,000
Pumps and Alarm Panels	Rate	--	\$65,000
Repair or Replace Sewer Covers	Rate	--	\$15,000
Inspection Camera System	Rate	--	\$15,000
Replace Grates in Wet Well	Rate	--	\$100,000
Replace M-9	Rate	--	\$65,000
Replace M-7	Rate	--	\$25,000
Study of Sewer Line Repirs and Replacement	Rate	--	\$40,000
Treatment Plant Enterprise Share	Debt	2.0%	\$2,400,000
			\$2,790,000

The funding source is either rate funded (also called operating capital) or debt. Cost year represents the year that the budget was developed and is used to escalate costs. Impact year is the year that the cost hits the enterprise account, which for debt funded projects occurs at the end of the construction period. A 5% annual construction cost escalator is applied to all projects. The most significant capital project is the new wastewater treatment plant, the CIP reflects the enterprise funds share of the future debt service which is described more fully below.

3.2.1 Costs Associated with New Treatment Plant

Costs associated with the new treatment plant consist of operating costs and debt service. The debt service is funded by a variety of sources including the sewer enterprise fund. The breakdown is shown in Table 3-1, the impact year is assumed to be FY21. The annual operating costs are estimated to be \$250,000 annually. All WWTP costs were provided by the Wastewater Facility Design and Building Committee.

Table 3-1

Wastewater Treatment Plant Funding Summary

Project Element	Value
Estimated Project Cost	\$9,693,000
Mass Works Grant	-\$1,500,000
EDA Grant	-\$2,335,850
Total to be funded by debt	\$5,857,150

Debt Funding Sources	Value
State Revolving Fund Loan (General Fund)	\$2,260,410
State Revolving Fund Loan (Sewer Enterprise)	\$2,400,000
General Fund Borrowing	\$1,196,740
Total debt funding	\$5,857,150

Typically, the operating and capital costs associated with the new plant would be included in the various line items shown in the model dashboard, however, given that the cost impact of the new plant is a key concern, these costs are broken out and summed separately.

Reviewing the increases of total expenses shown at the bottom of Schedule 1.1, the increase from FY19 to FY20 is partly due to the fact that the FY19 values are based upon actuals, while FY20 are based upon budgeted values. The more important factor is the increase from FY20 to FY21, which is when the costs for the new wastewater plant begin to impact the enterprise fund.

Schedule 1.1: Expenses

	Historic Actuals	Actual Values	Actual Values	Budget Values	Projected Values	
	FY17	FY18	FY19	FY20	FY21	FY22
Operating Expenses						
Personnel Services	\$173,638	\$160,614	\$170,024	\$192,538	\$237,352	\$243,285
Purchase of Services	\$76,163	\$23,626	\$145,524	\$157,696	\$161,639	\$165,680
Supplies	\$12,602	\$13,018	\$12,661	\$20,321	\$20,829	\$21,349
Wareham - Operating	\$250,000	\$294,997	\$213,912	\$410,000	\$420,250	\$430,756
Wareham - Capital	\$188,478	\$188,478	\$188,478	\$188,478	\$188,478	\$188,478
Transfer Out (Indirects)	\$126,705	\$124,404	\$128,607	\$138,077	\$181,529	\$186,067
Transfer Out (Reserve)	\$0	\$59,445	\$0	\$0	\$0	\$0
Subtotal	\$827,585	\$864,583	\$859,206	\$1,107,110	\$1,210,075	\$1,235,615
Delta Previous		4.5%		28.9%	9.3%	2.1%
CIP/ Debt						
Rate Funded Capital	\$10,927	\$47,939	\$50,808	\$105,000	\$240,000	\$125,000
New Debt Service	\$0	\$0	\$0	\$0	\$0	\$0
Existing Debt Service	\$17,270	\$45,522	\$43,500	\$22,000	\$21,000	\$0
Subtotal	\$28,197	\$93,461	\$94,308	\$127,000	\$261,000	\$125,000
Delta previous		231%		35%	106%	-52%
New WWTP						
Operating Expenses	\$0	\$0	\$0	\$0		\$256,250
Debt Service	\$0	\$0	\$0	\$0	\$161,821	\$161,821
Subtotal	\$0	\$0	\$0	\$0	\$161,821	\$418,071
TOTAL EXPENSES	\$855,782	\$958,044	\$953,514	\$1,234,110	\$1,632,896	\$1,778,686



See handout page 4 for updated expense data.

Section 4 Rates and Revenue

The next step of the financial evaluation is to estimate revenues from the existing rate and fee structure. The results are used in the rate evaluation found in Section 4.3.

Sewer enterprise revenue consists of rate revenue, and non-rate revenue. Rate revenue is the direct result of customer payment of sewer bills and currently represents 90% of Bourne's total sewer revenue. Non-Rate Revenue consists of liens and penalties associated with non-payment of sewer bills (projected as a percent of revenue), transfers from the general fund (which were not projected forward) and fees associated with development.

The methodology and data used for projecting each element of future revenue are described below. The Town's operating assumption and basis for approval of the new treatment plant was that the revenue from connection fees and future usage associated with new commercial customers would recuperate the capital and operating costs, so determining revenue from development is an important concern.

4.1 Revenue Associated with Development

Development based revenue consists of the fees and charges paid by developers prior to construction as well as the future rate revenue associated with completed projects. Projecting these revenues requires numerous assumptions and estimations in terms of timing and ultimate water usage.

Future revenue from development fees depends on the fee structure, the projected amount of development and the timing or pace of development. For the purposes of this evaluation, development or growth associated with projects currently in the capacity allocation process are categorized as 'Known'² development and development estimated from vacant parcels is described as 'Projected'. Estimating future revenue from development requires also estimating the timeline for development

4.1.1 Development Fee Structure

At the January 17, 2006 Sewer Commission Meeting, the commission approved the following fees:

- Design Review and Construction Inspection Fee*: \$1,500 (commercial only)
- Commercial Sewer Permit Fee: \$150 + \$0.010 per square foot of building floor space
- Sewer Connection Fee*: Annual sewer fee per unit x the number of business units. (commercial only)
- Residential Sewer Permit Fee: \$100 + \$100 for each additional unit.
- Sewer System Development Charge*: \$5,769.678 per acre plus \$36.703 per foot of frontage.

* Indicates that the fee did not exist prior to this meeting.

² Some of these projects have since become active and technically are no longer in the 'pipeline', they are noted as such but remain included for continuity.

In 2017, the Capacity Allocation Policy discussed in Section 2 was adopted. The fees associated with the new allocation process are as follows:

Application Fee (one-time): \$1,500

Preliminary Allocation Fee (one-time): \$5,000 plus \$1 per projected flow

Operational Allocation Fees: Number of units x current annual base rate sewer fee.

4.1.1.1 Fee Revenue from Known Development

The projects currently in the allocation process are shown in Table 4-1, for each project, the existing step in the process is given as well as an estimated date for connection (commencement of discharge).

Table 4-1

Known Development Characteristics and Assumed Timeline

Project/Owner	No. Units¹	Allocated Flow² (gpd)	Est. Total Annual Flow³ (kgal)	Est. Overage⁴ (kgal)	Allocation Step	Flow Year⁵
Hampton Inn	100	15,243	7,622	-	Operational	2020
100 Main	121	27,080	13,540	-	Preliminary	2022
Calamar/ 25 Perry	120	16,800	8,400	-	Preliminary	2022
GENCON/Robert Gendron	109	17,715	8,858	-	Preliminary	2022
Veterinary Clinic	1	-	-	-	Operational	2020
Blended Berries	1	440	220	-	Operational	2020
Mahoney's on Main	1	3,465	1,733	-	Operational	2020
Oak Bay Brewery	1	1,661	6,500	-	Application	2023
85-93 Main	1	13,000	41,202	-	Application	2023
Bourne Scenic Park	22	17,700	7,965	1,917	None	2023
Total	477	36,266	57,620	1,917		

Notes:

1. Projects with 1 unit were assumed
2. Assumed to be based upon Title V
3. Assumed to be 50% of Title V
4. Based upon number of units and estimated annual flow
5. Projects shown starting in 2020 are reportedly connected to the system, these projects remain in the table to serve as placeholders for the wastewater volume until actual usage data is received.


 See handout page 8 for more updated information.

Table 4-2

Projected Revenue from Known Developments –2006 Fee Structure

Project/Owner	Design, Review and Construction	Commercial Sewer Permit Fee	Sewer Connection Fee	System Development Charge	TOTAL
Hampton Inn*					
100 Main	\$1,500	\$1,509	\$98,252	\$9,875	\$111,136
Calamar/ 25 Perry	\$1,500	\$48,763	\$97,440	\$70,922	\$218,625
GENCON/Robert Gendron	\$1,500	\$100	\$116,928	\$31,450	\$149,978
Veterinary Clinic*					
Blended Berries*					
Mahoney's on Main*					
Oak Bay Brewery	\$1,500	\$150	\$11,368	\$8,075	\$21,093
85-93 Main	\$1,500	\$9,210	\$86,072	\$20,810	\$117,592
Bourne Scenic Park	\$1,500	No Data	\$19,172	\$40,000	\$59,172
Total	\$4,500	\$9,360	\$116,612	\$68,885	\$197,857

Projects indicated with an asterisk however were reported to have begun active discharge, prior to the Town's decision and thus no additional fees will be assessed.

Table 4-3

Projected Revenue from Known Developments –2017 Allocation Fees

Project/Owner	Application Fee	Preliminary Allocation Fee	Operational Allocation Fee	TOTAL
Hampton Inn*				
100 Main	\$1,500	\$33,580	\$102,366	\$137,446
Calamar/ 25 Perry	\$1,500	\$23,300	\$101,520	\$126,320
GENCON/Robert Gendron	\$1,500	\$24,250	\$121,824	\$147,574
Veterinary Clinic*				
Blended Berries*				
Mahoney's on Main*				
Oak Bay Brewery	\$1,500	\$21,743	\$104,904	\$128,147
85-93 Main	\$1,500	\$33,580	\$102,366	\$137,446
Bourne Scenic Park	\$1,500	\$24,200	\$19,172	\$44,872
Total	\$4,500	\$79,523	\$226,442	\$310,465



 See note on next page.

Table 4-4

Total projected revenue –Total Fees, Known Developments

Project/Owner	2006 Fees	2017 Fees	GRAND TOTAL
---------------	-----------	-----------	-------------

Hampton Inn*			
100 Main	\$111,136	\$137,446	\$248,582
Calamar/ 25 Perry	\$218,625	\$126,320	\$344,945
GENCON/Robert Gendron	\$149,978	\$147,574	\$297,552
Veterinary Clinic*			
Blended Berries*			
Mahoney's on Main*			
Oak Bay Brewery	\$21,093	\$128,147	\$149,240
85-93 Main	\$117,592	\$137,446	\$255,038
Bourne Scenic Park	\$	\$44,872	\$44,872
Total	\$138,685	\$310,465	\$449,150

 See handout page 8 for updated/revised development fee information.

4.1.1.2 Projected Fee Revenue from Projected Development

To estimate future development, the parcel database was analyzed and 27 parcels not already in the allocation process were identified for potential development based upon land use codes. Vacant residential parcels were not included as they reportedly do not meet zoning requirements.

Table 4-5
Projected Development Parcels

Address	Land Use Code	Land Use Description	Est. Demand (GPD)	Est. Units
105 MAIN ST	3900	Developable Commercial Land	1,699	14
11 MAIN ST	3900	Developable Commercial Land	1,015	9
129-137 MAIN ST	3900	Developable Commercial Land	1,346	11
2 CANAL VIEW RD	3900	Developable Commercial Land	1,411	12
2 KENDALL RAE PL	3900	Developable Commercial Land	17,729	144
69-73 MAIN ST	3900	Developable Commercial Land	1,668	14
29 COHASSET AVE	3920	Undevelopable Commercial Land	736	6
32-A COHASSET AVE	3920	Undevelopable Commercial Land	501	5
6 WASHINGTON AVE	3920	Undevelopable Commercial Land	684	6
8 TAYLOR RD	9010	-	9,061	74
0 BEACH AREA	9300	Vacant, Selectmen or City Council (Municipal)	1,468	12
20 MAIN ST	9300	Vacant, Selectmen or City Council (Municipal)	954	8

Address	Land Use Code	Land Use Description	Est. Demand (GPD)	Est. Units
22 MAIN ST	9300	Vacant, Selectmen or City Council (Municipal)	645	6
229 MAIN ST	9300	Vacant, Selectmen or City Council (Municipal)	4,252	35
90 MAIN ST	9300	Vacant, Selectmen or City Council (Municipal)	23,392	190
Total			5,735	54

Notes

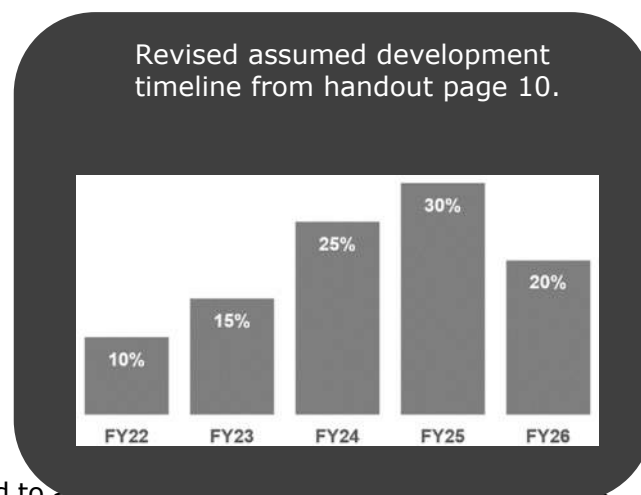
1. Parcels identified as 'undevelopable' were included as providing sewer service may make them developable. No further investigation into suitability was conducted.
2. Commercial sewer demand estimated at 50 gallons per day per 1,000 square feet of estimated floor area is based upon a 0.13 Floor Area Ratio (FAR).
3. Residential sewer demand estimated at 47 gallons per day per person³ and a household size of three people.
4. No definition of billable unit exists, units based on the existing per unit flow allowance of 45,000 gallons per year.

4.1.1.3 Assumed Development Timeframe

In order to include the revenue and additional units generated by development, the following development timeline was assumed. The steps refer to the allocation process steps. This timeline reflects a general slowing of the economy.

Table 4-6
Assumed Development Timeframe

Year	Step 1/2	Step 3
FY21	5%	-
FY22	30%	5%
FY23	30%	30%
FY24	20%	30%
FY25	15%	20%
FY26	-	15%
Total	100%	100%



The percentages shown in Table 4-6 were used to apply sewer demand, revenue, and flows.

³ From the 2018 Annual Statistical Report submitted by the Buzzards Bay Water District.

4.2 Projected Usage and Units

The revenue generated from sewer rates varies based upon the number of billable units and the volume of water used by those units as well as the rate structure itself. The rate model calculates rate revenue based upon projected water use and estimated number of additional customers.

4.2.1 Projected Billable Units

Schedule 2.1 shows the contribution of development in terms of additional units, which increase base fee revenues. The additional units are based upon the data from Table 4-1 and Table 4-5 distributed according to the assumed timing shown in Table 4-5.

Schedule 2.1 - Number of Units

Category	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Total Units- No Development	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Additional Units - Known Development		102	332	333	477	477	477	477	477	477	477
Additional Units - Projected Development			34	233	432	565	665	665	665	665	665
Total Units	1,092	1,194	1,458	1,658	2,001	2,134	2,234	2,234	2,234	2,234	2,234



Revised.

Schedule 2.1 - Number of Units

Category	Type	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Total Units- No Development	Annual	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Additional Units - Known Development	Annual		103	227	229	480	480	480	480	480	480	480	480
Additional Units - Projected Development	Annual			0	41	102	203	324	405	405	405	405	405
Total Units		1,092	1,195	1,319	1,362	1,674	1,775	1,896	1,977	1,977	1,977	1,977	1,977

Schedule 2.2 shows the projected overage, note that there is **no additional projected overage** (based upon estimated actual flows). The existing usage has been increasing by 3% per year, a more conservative 2% was used for projections.

Schedule 2.2 - Water Usage (Kgal)

Block	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Overage: Existing Users	10,875	10,875	10,875	10,875	10,875	10,875	10,875	10,875	10,875	10,875	10,875
Estimated Overage - Known Development		551	551	779	779	779	779	779	779	779	779
Estimated Overage - Projected Development											
	10,875	11,427	11,427	11,655	11,655	11,655	11,655	11,655	11,655	11,655	11,655



Revised to reflect additional (FY19) usage data.

Schedule 2.2 - Water Usage (Kgal)

Block	Type	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Overage: Existing Users		12,221	12,221	12,221	12,221	12,221	12,221	12,221	12,221	12,221	12,221	12,221
Estimated Overage - Known Development	Overage			3,573	5,715	16,482	16,482	16,482	16,482	16,482	16,482	16,482
Estimated Overage - Projected Development	Overage											
		12,221	12,221	15,794	17,936	28,703	28,703	28,703	28,703	28,703	28,703	28,703

4.3 Sewer Rate Evaluation

In order to evaluate the efficacy of a given rate structure, revenues are projected for the existing rate structure based upon the projected usage and connected units and compared against the revenue needs discussed in Section 3. If the retained earnings (reserves) are projected to fall below the 20% target minimum, a percentage increase is applied to the

rates. Once the rates are adjusted so that the target reserves are met, cost impacts are calculated and evaluated.

4.3.1 Evaluating Customer Rate Impacts

The Town’s stated goal for the new WWTP was to not impact existing customers. To quantify this, the rate increases from FY17 to FY19 were used as a benchmark. Schedule 4.3A shows the increase in base fee based upon the average increase between FY17 and FY19 of \$37 per year. The projected customer cost for a typical residential customer (3-person household using 50 gallons per day each) is also shown. These costs are used to evaluate the various scenarios.

Schedule 4.3 A- Existing Rate Structure - Status Quo Rate Increases

Description	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Base Fee	\$752	\$776	\$812	\$879	\$919	\$959	\$999	\$1,039	\$1,079	\$1,119	\$1,159	\$1,199	\$1,239
Increase in Base Fee (\$)		\$24	\$36	\$67	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40
Increase in Base Fee (%)				8%	5%	4%	4%	4%	4%	4%	4%	4%	3%
Annual Cost - Typical Res.	\$752	\$776	\$826	\$977	\$919	\$959	\$999	\$1,039	\$1,079	\$1,119	\$1,159	\$1,199	\$1,239
Annual Cost Increase		\$24	\$50	\$151	-\$58	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40

4.3.2 Projected Revenue - Existing Rates with Projected Development

Schedule 5.7 shows the revenue resulting from applying the projected number of accounts and usage to the existing rates (with no increases) as well as adding the projected fee revenue from both known and projected developments. For purposes of analysis each revenue element is broken out by existing users, known development and projected development.

Schedule 5.7 - Calculated Revenue: Existing Rates - Full Development

Category	Type	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Base Fee: Existing Users	Base Fee	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868	\$ 959,868
Base Fee: Known Development	Base Fee	\$ 89,658	\$ 291,828	\$ 292,707	\$ 419,283	\$ 419,283	\$ 419,283	\$ 419,283	\$ 419,283	\$ 419,283	\$ 419,283
Base Fee: Projected Development	Base Fee	\$ -	\$ 29,886	\$ 204,807	\$ 379,728	\$ 496,635	\$ 584,535	\$ 584,535	\$ 584,535	\$ 584,535	\$ 584,535
Overage: Existing Users	Overage	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754	\$ 108,754
Overage: Known Development	Overage	\$ 5,514	\$ 5,514	\$ 7,792	\$ 7,792	\$ 7,792	\$ 7,792	\$ 7,792	\$ 7,792	\$ 7,792	\$ 7,792
Overage: Projected Development	Overage	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Allocation Fees: Known Development	Alloc	\$ -	\$ 205,184	\$ 9,057	\$ 172,724	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Allocation Fees: Projected Development	Alloc	\$ -	\$ 8,156	\$ 76,981	\$ 217,205	\$ 200,893	\$ 136,648	\$ 84,135	\$ -	\$ -	\$ -
System Development Charge: Known	Development	\$ -	\$ 29,258	\$ 8,075	\$ 74,248	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
System Development Charge: Projected	Development	\$ -	\$ -	\$ 16,880	\$ 101,282	\$ 101,282	\$ 67,521	\$ 50,641	\$ -	\$ -	\$ -
Total		\$ 1,163,794	\$ 1,638,447	\$ 1,684,921	\$ 2,440,884	\$ 2,294,507	\$ 2,284,401	\$ 2,215,008	\$ 2,080,232	\$ 2,080,232	\$ 2,080,232



Revised to reflect revised usage projections, decreased development and the FY21 rates.

Schedule 5.7 - Calculated Revenue: Existing Rate Structure - 50% Projected Dev.

Category	Type	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Base Fee: Existing Users	Base Fee	\$ 959,868	\$ 1,003,548	\$ 1,047,228	\$ 1,090,908	\$ 1,134,588	\$ 1,178,268	\$ 1,221,948	\$ 1,265,628	\$ 1,309,308	\$ 1,352,988
Base Fee: Known Development	Base Fee	\$ 90,537	\$ 208,613	\$ 219,611	\$ 479,520	\$ 498,720	\$ 517,920	\$ 537,120	\$ 556,320	\$ 575,520	\$ 594,720
Base Fee: Projected Development	Base Fee	\$ -	\$ -	\$ 19,660	\$ 50,949	\$ 105,459	\$ 174,798	\$ 226,598	\$ 234,698	\$ 242,798	\$ 250,898
Overage: Existing Users	Overage	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210	\$ 122,210
Overage: Known Development	Overage	\$ -	\$ 35,728	\$ 57,150	\$ 164,820	\$ 164,820	\$ 164,820	\$ 164,820	\$ 164,820	\$ 164,820	\$ 164,820
Overage: Projected Development	Overage	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Development Charges- Known	Development	\$ -	\$ 211,370	\$ 133,767	\$ 235,827	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Development Charges- Projected	Development	\$ -	\$ -	\$ 22,947	\$ 34,421	\$ 57,368	\$ 68,842	\$ 45,895	\$ -	\$ -	\$ -
Total		\$ 1,172,615	\$ 1,581,469	\$ 1,622,573	\$ 2,178,655	\$ 2,083,165	\$ 2,226,858	\$ 2,318,590	\$ 2,343,675	\$ 2,414,655	\$ 2,485,635

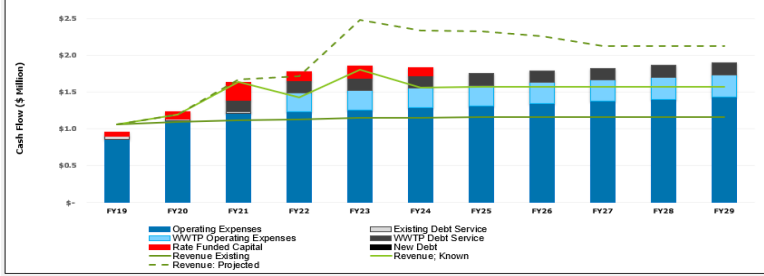
4.3.3 Proforma - Existing Rates with Projected Development

The proforma compares the projected revenue to the revenue needs developed in Section 3 and estimates the retained earnings for each year of the analysis period. The proforma is shown in Schedule 1.4.

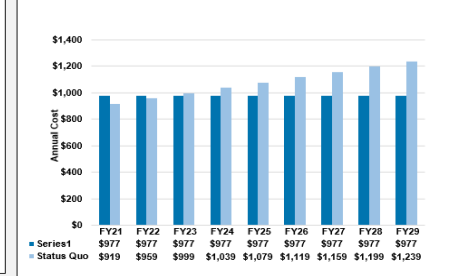
Schedule 1.4 Proforma - Existing Rates - Full Development

	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Revenue													
Base Fee	\$ 931,500	\$ 909,765	\$ 964,597	\$ 997,050	\$ 1,217,503	\$ 1,384,513	\$ 1,670,935	\$ 1,781,997	\$ 1,865,502	\$ 1,865,502	\$ 1,865,502	\$ 1,865,502	\$ 1,865,502
Overage				\$ 108,554	\$ 108,554	\$ 110,719	\$ 110,719	\$ 110,719	\$ 110,719	\$ 110,719	\$ 110,719	\$ 110,719	\$ 110,719
Allocation Fees				\$ -	\$ 213,340	\$ 86,038	\$ 389,929	\$ 200,893	\$ 136,848	\$ 84,135	\$ -	\$ -	\$ -
System Development				\$ -	\$ 29,258	\$ 24,955	\$ 175,530	\$ 191,292	\$ 67,521	\$ 59,841	\$ -	\$ -	\$ -
Non Rate			\$ 65,161	\$ 85,568	\$ 109,999	\$ 112,842	\$ 132,891	\$ 140,665	\$ 146,511	\$ 146,511	\$ 146,511	\$ 146,511	\$ 146,511
Total Revenue	\$ 931,500	\$ 909,765	\$ 1,029,758	\$ 1,191,172	\$ 1,669,654	\$ 1,719,066	\$ 2,480,004	\$ 2,335,556	\$ 2,326,900	\$ 2,257,507	\$ 2,122,731	\$ 2,122,731	\$ 2,122,731
Revenue Summary													
Existing	\$ 931,821	\$ 955,370	\$ 1,060,618	\$ 1,100,758	\$ 1,116,190	\$ 1,128,032	\$ 1,148,082	\$ 1,155,856	\$ 1,161,702	\$ 1,161,702	\$ 1,161,702	\$ 1,161,702	\$ 1,161,702
Known				\$ 90,413	\$ 516,916	\$ 302,606	\$ 652,693	\$ 405,721	\$ 405,721	\$ 405,721	\$ 405,721	\$ 405,721	\$ 405,721
Projected				\$ -	\$ 36,548	\$ 288,428	\$ 679,229	\$ 773,979	\$ 759,477	\$ 690,084	\$ 555,308	\$ 555,308	\$ 555,308
				\$ 1,191,172	\$ 1,669,654	\$ 1,719,066	\$ 2,480,004	\$ 2,335,556	\$ 2,326,900	\$ 2,257,507	\$ 2,122,731	\$ 2,122,731	\$ 2,122,731
				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Revenue (Revenue-Expense)	\$ 75,719	\$ (48,278)	\$ 76,244	\$ (42,838)	\$ 36,758	\$ (56,620)	\$ 623,733	\$ 500,886	\$ 572,996	\$ 468,512	\$ 297,769	\$ 269,893	\$ 223,114
Retained Earnings Balance	\$781,330	\$466,478	\$842,722	\$499,784	\$836,542	\$476,922	\$1,400,656	\$1,804,642	\$2,174,638	\$2,643,050	\$2,940,819	\$3,204,722	\$3,424,837
Retained Earnings as Percent of Operating Expense	88%	64%	63%	45%	44%	39%	87%	124%	165%	197%	214%	228%	239%

Schedule 1.4 Proforma - Existing Rates - Full Development



Typical Residential Cost



Typical Residential Cost	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	TOTAL
Annual Cost	\$826	\$977	\$977	\$977	\$977	\$977	\$977	\$977	\$977	\$977	\$977	\$9,619

i See handout page 13 for updated/revised proforma

The top of the proforma summarizes the revenue, below the revenue summary, the net revenue, projected retained earnings is calculated. In the chart on the left, the columns represent the various expense categories, the dark green lines represents the projected revenue from the existing users, while the light green and dashed green line represent total revenue (development fees plus additional user rate revenue) for known development and projected development respectively. To the right of the proforma chart the cost for a typical residential customer (three-person household using 50 gallons per person per day).

The proforma shows that starting in FY20, revenues are about equal with the expenses, in FY21 the WWTP expenses hit the enterprise but are offset by the fees from known developments (solid light green line). As of FY23 however the expenses are only met if **all development revenue** is included. The customer impacts are acceptable since the rates do not increase at all, however the reliance on projected development **leaves the Town vulnerable if there were a decrease in development**. To quantify this vulnerability, the impact on rates with no projected development revenue was determined. This alternative technically satisfies the project goal in terms of customer impact as the existing rates do not increase.

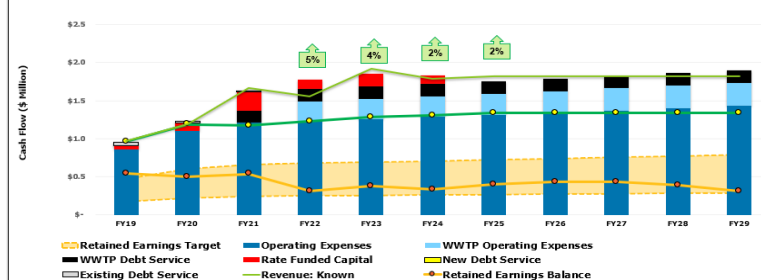
4.3.4 Projected Revenue – Existing Rate Structure with no projected development

Schedule 1.5 presents the same proforma as Schedule 1.4 with the revenue associated with **projected development removed**. As shown below, a number of **rate increases** were required to maintain the retained earnings target, the rates increases are shown just below the Year designation in the tabular portion and again in the proforma chart. The projected rates are shown in Schedule 4.4.

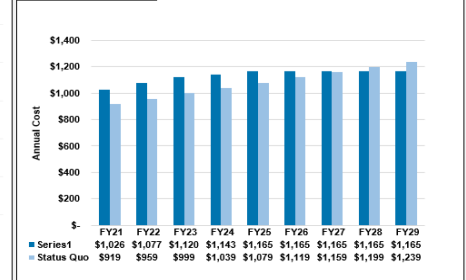
Schedule 1.5 Proforma - Exist Rate Structure - No Projected Development

	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Revenue													
Base Fee	\$ 780,125	\$ 804,285	\$ 964,597	\$ 997,050	\$ 1,248,567	\$ 1,311,916	\$ 1,502,268	\$ 1,532,313	\$ 1,562,959	\$ 1,562,959	\$ 1,562,959	\$ 1,562,959	\$ 1,562,959
Overage	\$ 350,256	\$ 367,052	\$ -	\$ 108,554	\$ 113,982	\$ 122,067	\$ 128,950	\$ 129,489	\$ 132,079	\$ 132,079	\$ 132,079	\$ 132,079	\$ 132,079
Allocation Fees	\$ -	\$ -	\$ -	\$ -	\$ 213,340	\$ 86,038	\$ 389,929	\$ 200,893	\$ 136,648	\$ 84,135	\$ -	\$ -	\$ -
Non-Rate Revenue	\$ 87,302	\$ 90,169	\$ -	\$ 85,569	\$ 103,554	\$ 100,554	\$ 122,221	\$ 124,502	\$ 126,328	\$ 126,328	\$ 126,328	\$ 126,328	\$ 126,328
Total Revenue	\$ 1,130,380	\$ 1,171,337	\$ 964,597	\$ 1,191,172	\$ 1,679,443	\$ 1,628,575	\$ 2,141,368	\$ 1,987,197	\$ 1,958,514	\$ 1,906,001	\$ 1,824,866	\$ 1,824,866	\$ 1,824,866
Revenue Summary													
Existing	\$ 1,130,380	\$ 1,171,337	\$ 964,597	\$ 1,191,172	\$ 1,169,504	\$ 1,227,802	\$ 1,286,238	\$ 1,311,800	\$ 1,337,872	\$ 1,337,872	\$ 1,337,872	\$ 1,337,872	\$ 1,337,872
Projected	\$ -	\$ -	\$ -	\$ -	\$ 501,783	\$ 323,792	\$ 837,924	\$ 474,504	\$ 483,994	\$ 483,994	\$ 483,994	\$ 483,994	\$ 483,994
					\$ 1,671,287	\$ 1,551,594	\$ 2,124,162	\$ 1,786,304	\$ 1,821,866	\$ 1,821,866	\$ 1,821,866	\$ 1,821,866	\$ 1,821,866
Net Revenue (Revenue-Expense)	\$ 274,599	\$ 213,293	\$ 11,084	\$ (42,938)	\$ (38,391)	\$ (227,082)	\$ 67,892	\$ (48,986)	\$ 67,982	\$ 32,872	\$ (3,096)	\$ (39,962)	\$ (77,750)
Retained Earnings Balance	\$ 731,330	\$ 466,478	\$ 542,722	\$ 499,764	\$ 536,175	\$ 581,083	\$ 578,975	\$ 538,609	\$ 598,570	\$ 434,442	\$ 428,347	\$ 388,385	\$ 340,634
Retained Earnings as Percent of Operating Expense	88%	54%	63%	45%	44%	25%	30%	26%	30%	32%	31%	28%	22%

Schedule 1.5 Proforma - Exist Rate Structure - No Projected Development



Typical Residential Cost



Typical Residential Cost	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	TOTAL
Annual Cost	\$ 826	\$ 977	\$ 1,026	\$ 1,077	\$ 1,120	\$ 1,143	\$ 1,165	\$ 1,165	\$ 1,165	\$ 1,165	\$ 1,165	\$ 10,005

As a result of increasing rates, the estimated residential costs exceed the status quo, thus this alternative fails to meet the project goal and alternative rate structures were developed and analyzed.

Schedule 4.4 - Exist Rate Structure - No Projected Development

Description	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Base Fee	\$923	\$969	\$1,008	\$1,028	\$1,049	\$1,049	\$1,049	\$1,049	\$1,049
Overage	\$0.0105	\$0.0110	\$0.0115	\$0.0117	\$0.0119	\$0.0119	\$0.0119	\$0.0119	\$0.0119



This scenario modified to include NO development (the above scenario includes known development), plus the previously mentioned revisions. See handout page 16 for updated/revised information

4.3.5 Projected Revenue – Modified Rate Structures

Alternative rate structures are generated in a step wise, incremental fashion starting with the existing rate structure. The first alternative was to maintain a fixed portion and a usage portion with no usage included in the base fee (no overage, all usage billed). Several combinations of base and usage fees were modelled but were not successful in raising needed revenue without unduly impacting residential users.

The next two most common rate structure modifications are to increase the base fee by service (water meter) size, and tiered rates. Customer meter data was not available, so only tiered rates were evaluated.

4.3.5.1 Tiered Rates

The current overage fee is a flat rate where any additional usage over 45,000 gallons will be charged at one cent per gallon with no limits. Under a tiered rate structure, the cost per unit volume (1,000 gallons) of water usage increases in incrementally. This is same as the drinking water rate structure where source conservation is often an overriding concern but in the case of Bourne, sewer conservation measures are necessary due to a finite capacity.

To determine the efficacy of a tiered rate structure, the following steps are completed:

1. Separate usage data into customer types to determine the residential fraction
2. Develop usage histograms for residential and non-residential users
3. Develop the volumetric tier component based upon the usage histograms
4. Break existing usage into the proposed tiers as model input
5. Develop starting point price for Tier 1 and cost ratios for Tiers 2 and 3
6. Review proforma while adjusting rates to meet revenue requirements
7. Review customer cost impacts and revise tier cost ratio as required
8. Iterate as required.

4.3.5.2 Usage Data Broken Out by User Type

A tiered rate structure is defined by its two variables; the volume of each usage tier and the price increment for each tier. There is this little ‘rule of thumb’ or guidance for tier setting beyond the suggestion that first tier capture roughly half of the users. Beyond that the best practice is to evaluate the distribution of existing water use.

To separate usage by user class, a parcel database with land use codes was obtained from Mass GIS and the sewer customer addresses were used to match metered usage to customer parcels. There are 42 different land use codes in the parcel database, 12 of which are residential. Table 4-7 shows the proportion of residential to non-residential users in terms of usage, accounts and units.

Table 4-7

2018 Residential as Percent of Total Use and Accounts

Land Use Code	Total Usage (KGal)	% of Total	Total Accounts	Total Units
Residential	20,791	54%	586	775
Non-Residential	17,846	46%	118	317
Total	38,637	100%	704	1,092

Usage between residential and non-residential is split nearly 50-50, which underlays the focus on commercial development in the sewer service area. However, the total number of accounts and units is heavily skewed towards residential. To understand the usage distribution across all user types (residential and non-residential), Table 4-8 summarizes usage and account data for the top ten land use codes in terms of usage, which comprise 80% of the total usage.

Table 4-8

Top Ten Water Use by Land Use Code

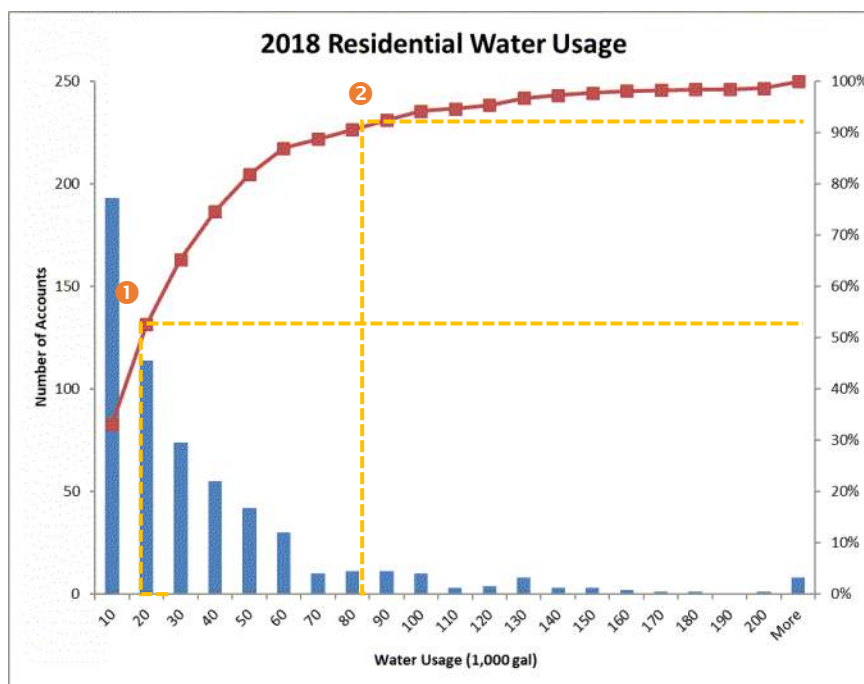
Land Use Code	Total Usage (gal)	% of Total	No. Accounts	No. Units
Single Family Residential	8,627	22%	249	257
Mixed Use (Primarily Commercial, some Residential)	5,821	15%	26	68
Developable Commercial Land	3,348	9%	1	106
Residential Condo	2,933	8%	151	153
Apartments with More than Eight Units	2,260	6%	4	106
Apartments with Four to Eight Units	2,221	6%	14	51
Residential Condominium	1,910	5%	132	134
Restaurants/Food Service	1,323	3%	6	6
Two-Family Residential	1,214	3%	17	35
Business Condo	1,062	3%	4	30

4.3.5.3 Analyzing Water Use Distribution Patterns

Histograms were developed for residential and non-residential usage for the most recent year (2018). Figure 4-1 shows the distribution of residential usage. The horizontal axis represents the total water used in 10,000-gallon increments while the vertical axis represents the number of accounts corresponding to each volume. Each of the blue columns represent the number of accounts. The red line represents the cumulative total percentage that each column represents.

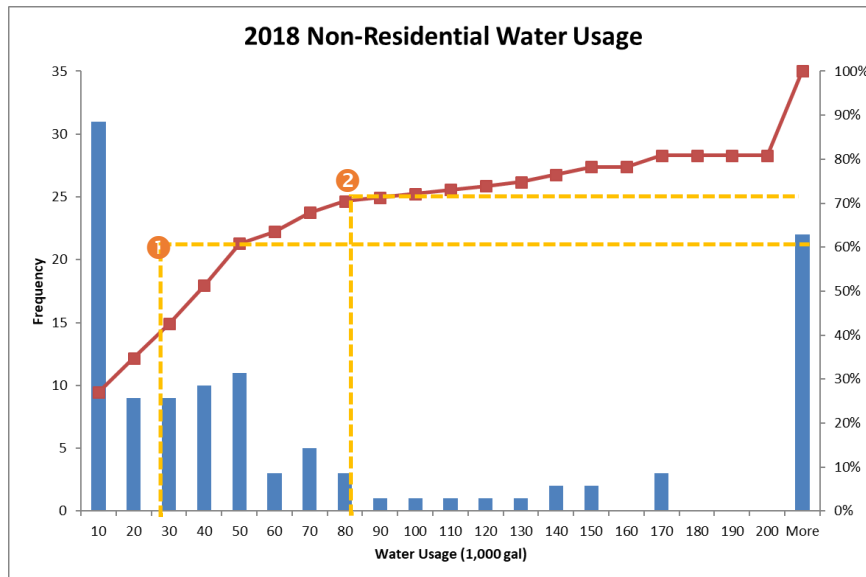
Figure 4-1

2018 Residential Water Use



The proposed rate structure consists of three tiers with the boundaries defined by the gold lines. Tier 1 includes usage up to 30,000 gallons represented by point 1 and captures just over 50% of all residential accounts. Tier 2 starts at 30,001 gallons and ends at 85,000 gallons (point 2) and captures over 90% of all residential users. Tier 3 captures all usage above 85,000 gallons. Figure 4-2 shows the same tier structure applied to non-residential usage.

Figure 4-2
2018 Non-Residential Water Use



See handout pages 11 and 12 for additional usage analysis information.

As Figure 4-2 shows, the distribution of non-residential usage is quite different than residential, this is to be expected as there is a wide range of water uses across the non-residential spectrum while the residential users tend to be more homogeneous and vary primarily in the magnitude of use.

4.3.5.4 Subtotaling Existing Usage by the Proposed Tiers

The 2018 water usage values were grouped into the proposed usage tiers and escalated the same as the usage in the previous two scenarios. The estimated usage for known developments were also broken into these tiers. The results are shown in Table 4-9 and Table 4-10.

Table 4-9

Existing Customer Usage Broken into the Proposed Tiers

Block	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Tier 1	13,081	13,343	13,609	13,912	14,280	14,685	14,979
Tier 2	8,108	8,270	8,436	8,659	8,997	9,342	9,529
Tier 3	17,122	17,770	18,126	18,127	18,507	18,997	19,056

i Revised and corrected.

Schedule 2.2 - Water Usage (Kgal)

Block	Type	FY19	FY20	FY21	FY22	FY23	FY24
Usage Tier 1 - Existing	Usage	13,081	13,343	13,327	13,594	13,865	14,143
Usage Tier 2 - Existing	Usage	8,108	8,270	8,590	8,762	8,937	9,116
Usage Tier 3 - Existing	Usage	17,422	17,770	16,938	17,277	17,622	17,975
		38,611	39,383	38,855	39,632	40,425	41,233

Table 4-10

Estimated Usage from Known Development Under Proposed Tiers

Block	FY21	FY22	FY23
Tier 1	30	90	120
Tier 2	55	165	165
Tier 3	2,697	10,986	17,789



Revised based upon revised usage and development assumptions.

Block	FY21	FY22	FY23
Tier 1	180	180	270
Tier 2	262	262	427
Tier 3	18,030	18,030	23,467

The usage shown in Table 4-10 is based upon the development scenario described in Section 4.1

4.3.5.5 Starting Rates

Water or sewer rates exist in a continuum where each year’s rate is based upon the previous years increased by either a percentage or a dollar amount. However, when rate structures are changed it is often necessary to reestablish a starting point. This starting point is the first year for proposed rate changes, in this case, FY21.

The starting rates are shown below in Schedule 4.2

Schedule 4.2 - Tiered Rates - No Projected Development

Description	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Base Fee	\$150	\$150	\$150	\$150	\$153	\$156	\$159	\$159	\$159
Tier 1	\$0.0150	\$0.0150	\$0.0150	\$0.0150	\$0.0153	\$0.0156	\$0.0159	\$0.0159	\$0.0159
Tier 2	\$0.0225	\$0.0225	\$0.0225	\$0.0225	\$0.0230	\$0.0234	\$0.0239	\$0.0239	\$0.0239
Tier 3	\$0.0330	\$0.0330	\$0.0330	\$0.0330	\$0.0337	\$0.0343	\$0.0350	\$0.0350	\$0.0350



The tiered rate structure was revised by shifting revenue generation towards the base fee and away from usage to increase revenue stability and equity of existing residential users.

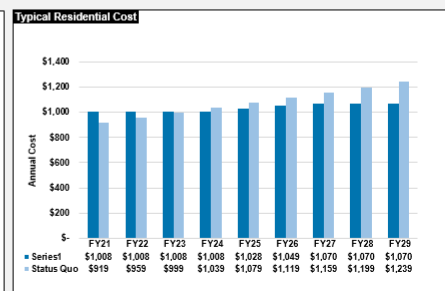
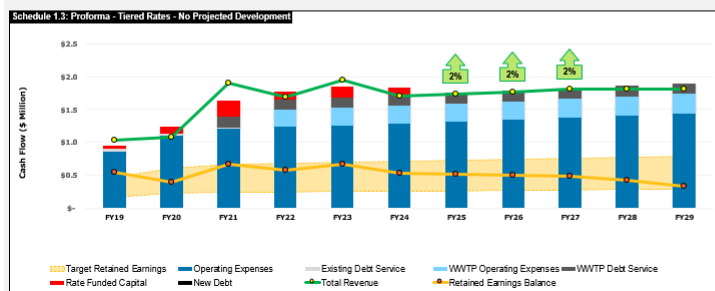
Schedule 4.1 - Tiered ERU Rates - 0% Projected Dev.									
Category	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Base Fee	\$575	\$575	\$575	\$575	\$575	\$575	\$575	\$575	\$575
Tier 1	\$0.0065	\$0.0065	\$0.0065	\$0.0065	\$0.0065	\$0.0065	\$0.0065	\$0.0065	\$0.0065
Tier 2	\$0.0098	\$0.0098	\$0.0098	\$0.0098	\$0.0098	\$0.0098	\$0.0098	\$0.0098	\$0.0098
Tier 3	\$0.0130	\$0.0130	\$0.0130	\$0.0130	\$0.0130	\$0.0130	\$0.0130	\$0.0130	\$0.0130

As mentioned previously, the second dimension of a tiered rate structure is the price increment. The rate model computes the cost of tiers 2, 3, etc. by multiplying the tier 1 starting rate by the price increments. The rates for years FY22 on are all based upon the prior year's value multiplied by the rate increases shown in the individual proformas. The starting price increments are 1.5 for tier 2 and 2.2 for tier 3. Again, there is little guidance in terms of establishing the price increment, the methodology used is to start with a conservative (in this case, a relatively small increment), test for efficacy and revise if required.

See handout pages 14 for revised proforma.

Schedule 1.3: Proforma - Tiered Rates - No Projected Development

	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Revenue													
Base Fee	\$ 331,500	\$ 309,765	\$ 284,597	\$ 262,050	\$ 240,220	\$ 219,150	\$ 200,820	\$ 184,110	\$ 168,810	\$ 154,350	\$ 140,610	\$ 127,470	\$ 114,810
Non-Rate Revenue	\$ 73,847	\$ 141,353	\$ 65,161	\$ 81,642	\$ 16,977	\$ 117,511	\$ 118,348	\$ 118,348	\$ 123,423	\$ 123,423	\$ 125,728	\$ 125,728	\$ 125,728
Tier 1					\$ 249,204	\$ 249,532	\$ 249,532	\$ 249,532	\$ 254,624	\$ 253,717	\$ 264,311	\$ 264,311	\$ 264,311
Tier 2					\$ 91,555	\$ 92,731	\$ 92,731	\$ 92,731	\$ 94,585	\$ 94,477	\$ 98,406	\$ 98,406	\$ 98,406
Tier 3					\$ 1,010,631	\$ 1,016,519	\$ 1,016,519	\$ 1,016,519	\$ 1,036,849	\$ 1,057,586	\$ 1,078,738	\$ 1,078,738	\$ 1,078,738
Allocation Fees					\$ 206,080	\$ 9,057	\$ 172,724	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
System Development					\$ -	\$ 23,250	\$ 0,075	\$ 74,240	\$ -	\$ -	\$ -	\$ -	\$ -
Total Revenue	\$1,005,348	\$ 1,051,118	\$ 1,029,758	\$ 1,078,692	\$ 1,806,624	\$ 1,696,586	\$ 1,948,393	\$ 1,701,411	\$ 1,735,276	\$ 1,769,818	\$ 1,805,050	\$ 1,805,050	\$ 1,805,050
Administrative (Rate Revenue)			\$ 54,332	\$ 154,611	\$ (794,130)	\$ 140	\$ 26,520	\$ -	\$ 4,472	\$ 4,561	\$ 4,562	\$ -	\$ -
Administrative (Total Revenue)			\$ (13,349)	\$ 49,924	\$ (27,932)	\$ (210,633)	\$ 25,176	\$ (241,972)	\$ 33,165	\$ 34,542	\$ 35,233	\$ -	\$ -
Net Revenue (Revenue-Expense)	\$ 149,566	\$ 93,075	\$ 79,244	\$ (55,418)	\$ 273,726	\$ (92,100)	\$ 92,112	\$ (133,250)	\$ (16,629)	\$ (19,177)	\$ (19,311)	\$ (16,720)	\$ (14,868)
Retained Earnings Balance	\$ 731,330	\$ 466,478	\$ 542,722	\$ 397,305	\$ 661,032	\$ 576,933	\$ 671,044	\$ 597,785	\$ 519,197	\$ 499,980	\$ 480,068	\$ 423,290	\$ 326,724
Retained Earnings as Percent of Operating Expense	88%	54%	63%	35%	55%	47%	53%	42%	39%	37%	35%	30%	23%



The proforma resulting from applying the rates shown above to the usage previously described is shown below. Small rate increases are required throughout the analysis period, the resultant customer cost impacts are less than the targets established in Section 4.3.1, therefore this scenario meets the project goals.

4.3.6 Projected Revenue - Revised Service Development Charge (SDC)

The System Development Charge described in Section 4.1.1 was based upon the betterment formula used to fund construction of the original sewer system. The minutes of the January 17, 2006 Sewer Commission Meeting indicate that current values of \$73.406 per foot of frontage and \$11,539.356 were arrived at by simply doubling the values used in the original betterments based upon the statement that construction costs had more than doubled since. Although this fact is not in dispute, it is recommended that System Development Charges be based upon a defensible methodology and cost basis.

As discussed previously there are two methods for determining System Development Charges, buy-in or growth approach. For purposes of evaluation, the planned facility / growth approach was deemed most appropriate.

The method used to develop an alternative fee was adopted from the Water Environment Federation's Manual of Practice No. 27, Financing and Charges for Wastewater Systems, 4th Ed. The methodology consists of determining an appropriate unit of measure or scaling factor by which the growth-related costs are divided by to obtain a per unit cost. The per unit cost can then be applied to a variety of development projects.

4.3.6.1 Growth Related Costs

The growth-related cost was taken to be the \$2.4M in construction debt allocated to the sewer enterprise. Note that the SDC is only intended to recover fixed capital costs and not operating costs.

4.3.6.2 Scaling Factor

Our understanding based upon discussions with the Town is that the new WWTP is designed to add hydraulic capacity versus biological treatment capacity, or stated differently, there is no existing concern over high strength wastes. To allocate the 100,000 gallons per day of capacity to be provided by the new plant the Equivalent Residential Unit (ERU) was selected. The ERU is used to represent non-residential uses as a multiple of a typical residential user.

Capacity is allocated to future projects based upon Title V flow estimates, and as discussed in Section 2, overestimates actual daily average flow, which the 100,000 gpd represents. The usage used for the typical residential user is 150 gpd which equals the 50 gallons per day per person for a three-person household also discussed in Section 2. This represents 45% of the 330 gallons per day assigned to a 3-bedroom house in Title V. Dividing 100,00 by 150 results in 667 ERU's. To obtain the value of 1 ERU the total cost of \$2.4M is divided by 667, which results in a value of \$3,600.

4.3.6.3 Estimating Revenue From revised SDC

Table 4-11 compares fee revenue between the current and revised fee structures for selected developments.

Table 4-11
Comparison of Estimated Fee Revenue

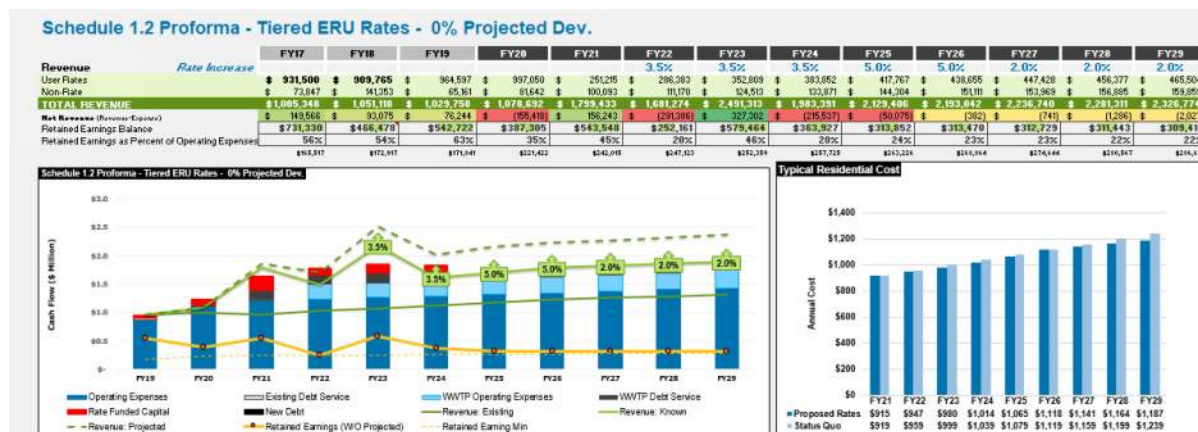
Development	Existing Fees		ERU Based Fee		Delta
	No. Units	Total	ERU's	Fee	
Hampton Inn ¹	100	\$293,238	46	\$164,624	-78%
100 Main	121	\$248,582	81	\$292,464	15%
Calamar/ 25 Perry	120	\$344,945	50	\$181,440	-90%
Bourne Scenic Park ²	22	\$84,360	53	\$191,160	56%

Notes:

1. Shown for comparison only, Hampton Inn's total fee of \$48,533 was based upon 2006 fee structure only and 1 Unit.
2. SDC for Bourne Scenic Park is estimated.

Note – the calculations shown on handout page 8 reflect further discussion relative to the application of the existing fee structure.

With the exception of Calamar, the new fee structure results in higher fee totals, with 100 Main and Bourne Scenic Park doubling. While it is important to have an established basis for SDC development, an equally important consideration is that excessive costs could drive off development. In recognition of the fact that the additional development would also contribute to user fees (rate revenue), the Tiered Rate alternative was reevaluated with the decreased ERU rate and development rate revenue calculated using the ERU's as billable units. The Proforma is shown below as Schedule 1.2.



This scenario requires moderate rate increases throughout the analysis period to maintain the desired reserve balance. The residential user costs from this scenario are below the status quo costs which meet one of the project goals.

Note: Due to the rapidly changing economic conditions, the two scenarios ultimately discussed were 100% known development/ 50% projected development and no development at all. See handout pp. 13 & 14.

previous scenarios were developed based upon either 0% or 100% development to frame

outcomes, however the most likely scenario is something in between. To evaluate the impact of partial development, the scenario shown above was modeled with 50% of projected development. The proforma is shown below.

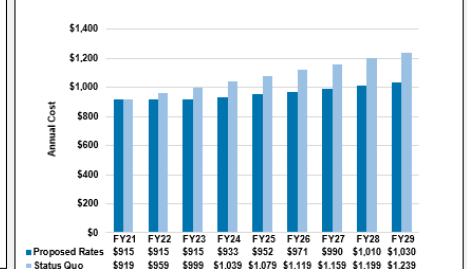
Schedule 1.2 Proforma - Tiered ERU Rates - 50% Projected Dev.

	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Revenue													
Use Rates	\$ 931,500	\$ 909,765	\$ 964,597	\$ 997,050	\$ 251,215	\$ 276,630	\$ 323,351	\$ 353,127	\$ 373,257	\$ 380,824	\$ 388,440	\$ 396,209	\$ 404,123
Non-Rate	\$ 73,847	\$ 141,353	\$ 65,161	\$ 81,642	\$ 100,093	\$ 107,687	\$ 116,778	\$ 123,813	\$ 128,833	\$ 132,266	\$ 134,748	\$ 137,280	\$ 139,862
TOTAL REVENUE	\$ 1,005,347	\$ 1,051,118	\$ 1,029,758	\$ 1,078,692	\$ 1,799,433	\$ 1,628,036	\$ 2,373,074	\$ 1,829,648	\$ 1,908,207	\$ 1,904,994	\$ 1,942,931	\$ 1,981,626	\$ 2,021,095
Rate Increase					2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Net Revenue (Revenue-Expense)	\$ 149,556	\$ 93,076	\$ 76,244	\$ (155,418)	\$ 188,413	\$ (237,752)	\$ 381,148	\$ (162,021)	\$ (23,654)	\$ (44,809)	\$ (46,158)	\$ (47,612)	\$ (49,279)
Retained Earnings Balance	\$ 731,330	\$ 466,478	\$ 542,722	\$ 307,305	\$ 575,710	\$ 337,966	\$ 719,114	\$ 557,093	\$ 533,439	\$ 488,630	\$ 442,372	\$ 394,760	\$ 349,481
Retained Earnings as Percent of Operating Expense	56%	54%	63%	35%	43%	27%	57%	43%	41%	36%	32%	28%	24%
	\$16,517	\$12,417	\$11,441	\$21,422	\$24,015	\$247,123	\$262,359	\$271,725	\$243,224	\$249,344	\$274,444	\$289,547	\$284,139

Schedule 1.2 Proforma - Tiered ERU Rates - 50% Projected Dev.



Typical Residential Cost



Typical Residential Cost	FY26	FY27	FY28	FY29	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
Annual Cost	\$762	\$776	\$826	\$977	\$915	\$915	\$915	\$933	\$952	\$971	\$990	\$1,010	\$1,030

Under the 50% development scenario, minimal rate increases are required, and the residential costs represents the lowest of all scenarios except for the existing rate scenario.

i See handout page 15 for extended customer impact analysis

Section 5 Conclusions and Recommendations

5.1 Capacity Management and Allocation Policy

5.1.1 Administrative

Approval: The version of the allocation policy found on the Town website is not signed by the Board of Sewer Commissioners and may call into question the validity of its application, if challenged. We recommend that a signed version to be uploaded immediately.

Residential Exclusion: The policy states that it does not apply to single family residences and residential buildings with up to four units. According the Town, vacant parcels were not initially assessed betterments as part of the collection system construction. Additionally, the policy appears to assume that all if not most existing usage used to calculate the uncommitted reserve capacity is residential use. Table 5-1 shows the summary of water use by customer type. The existing usage is almost exactly divided between residential and non-residential so there does not appear to be sufficient justification for a residential exclusion.

Table 5-1

Residential vs Non-Residential Usage

User Class	2018 Water Usage	
	Gallons (x 1,000)	% of Total
Residential	20,791	54%
Non-Residential	17,846	46%
TOTAL	38,637	100%

Project Identification: Projects are defined to by a combination of address and developers name, consolidating data from different sources was difficult due to inconsistent naming. We recommend using the parcel or assigning a unique identifier to each project to prevent further confusion.

Estimated Flows:

The application form requires the requested allocation volume and the *basis* for that volume. The estimated flows provided by Bourne were all based upon Title V estimates. Although Title V is generally not representative of actual sewer flow, it has become the default standard for demand projections in Massachusetts. We recommend that Bourne standardize on this practice for consistency.

5.1.2 Managing Uncommitted Reserve Capacity

Reconciling Actual vs Estimated Flows. Section V Paragraph A states “within six months of adoption of the policy the Board shall conduct a public hearing in order to review the Allocations to parcels on which betterments have been paid but no development has occurred.”

- a. Presuming that the policy has been approved, this language should be changed to represent the schedule moving forward.

- b. Relative to use of the word 'betterment', the original sewer system was funded by betterments, however our understanding is this is no longer being used as a funding mechanism. The word betterment should be replaced with the appropriate fee, if that was the intent.
- c. Section V Paragraph C requires reconciliation of actual versus estimated usage after three years. We recommend the reconciliation timeline to be shortened to once the project is at full capacity and no more than 12 months.

Increasing Usage. Existing usage has been increasing between 3% and 5% with no increase in users. This potentially reduces capacity independent of growth and should be monitored.

5.2 Development Fees

When new users enter or connect to an existing water or sewer system it is common for the municipality to assign a variety of connection fees and charges. These fees and charges fall into two categories, those directly related to the actual project (pipe connections, review fees, inspection fees, etc.) and System Development Charges (SDC's).

5.2.1 Existing Fees

The existing fee structure instituted in 2006 contains four individual fee components for commercial developers (see Section 4.1.1). The design review and construction inspection components are clearly administrative, and the System Development Charge is self-explanatory. It is not clear what costs the Sewer Permit Fee or Connection Fee are intended to recover or clear distinction between the two.

The 2017 Commercial Wastewater Management Allocation Policy includes three additional charges also described in 4.1.1, it is not clear if the intent of the 2017 policy was to supplement or expand the existing fees; the operational allocation fee appears to overlap with the sewer connection fee. In terms of rational nexus between fees and costs, the only justification is the doubling of the existing betterment charge, which is not designed to equitably distribute treatment plant costs.

We recommend that Bourne review the existing fee structures, identify which administrative costs are to be recovered and adopt the ERU fee structure. The entire process including fees should be summarized in one document and referenced appropriately.

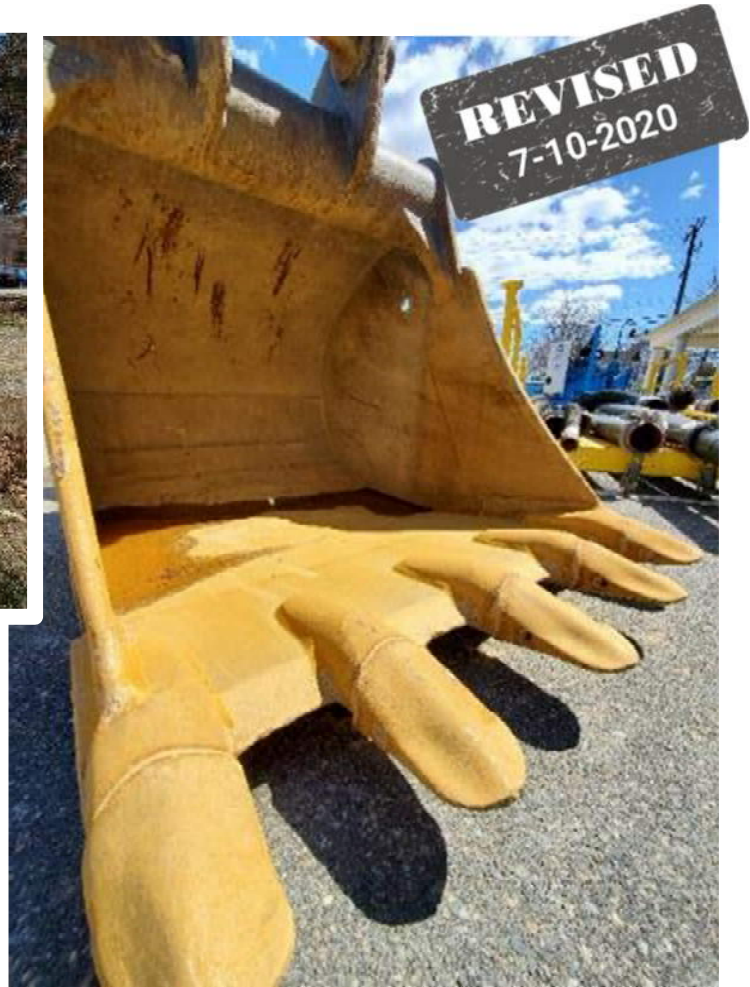
5.3 Sewer Rates

The existing rates consist of a base charge and an overage charge, the base charge is assessed to each billable unit, however, do definition of a billable unit could be found. In the supporting revenue projections for the WWTF for example the Hampton Inn was assumed to be billed for 100 units however while the system development fees were based upon one billable unit. The ERU based alternatives apply the base fee to the total number of ERU's which is suitable for use as it is defensible.



See handout page 19 for additional recommendations. At the July 28th, 2020 meeting of the Sewer Commission the FY21 sewer rates were set based upon maintaining the existing rate structure with a \$90 increase to the base fee. Given the amount of uncertainty at present, this is a prudent decision. The commission should continue to monitor water use, development activity and revisit this issue in late FY21.

J:\B\B0855 Bourne\03 - Sewer Rate and Capacity Management\Design\Deliverables\Bourne Revised Final Draft 2_5_20.docx



BOURNE SEWER RATE EVALUATION

Bourne Sewer Commission
July 14, 2020 Workshop

INTRODUCTION



This handout is designed specifically for use in a virtual meeting environment where some participants may be connected by telephone only. The goal is to provide a comprehensive overview of the evaluation in an intentionally condensed fashion to minimize the total number of pages.

Bourne Sewer System History and Overview

Existing sewer system

- Constructed in the 1990's
- Services the Downtown, Taylor Point and Hideaway Village Areas
- Paid by owners through betterments
- Sewage goes to Wareham for treatment through Intermunicipal Agreement (IMA)
- Sewer users are billed based upon a base fee which includes 45,000 gallons of use, anything over that billed at \$0.01 per gallon.

New Wastewater Treatment Plant

- Need first identified in early 2000's
- Designed to support projected development in existing sewer service area
- Intended to be fully funded by new growth with no impact on existing rate payers.

Development Fees

- 2006 Existing fee structure established
- 2017 Capacity management policy developed

Project Goals

Rate Evaluation: Determine if new plant costs will be supported entirely by growth.

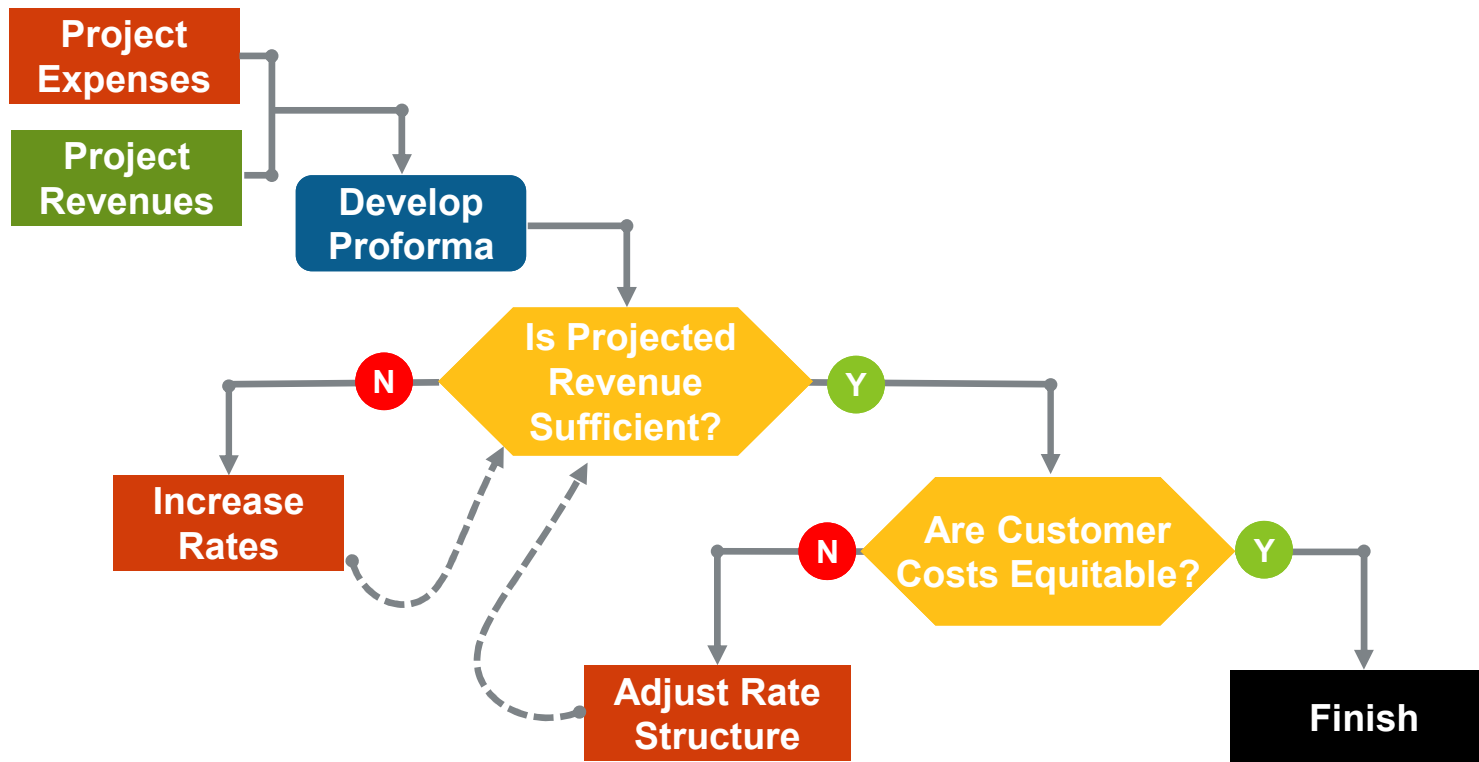
- Add costs of new plant to existing costs
- Estimate future revenue under existing connection fees and from future users
- Determine user cost impacts

Connection Fee and Allocation Evaluation

- Review existing development fees
- Review capacity allocation policy

RATE EVALUATION PROCESS

REVISED
7-10-2020



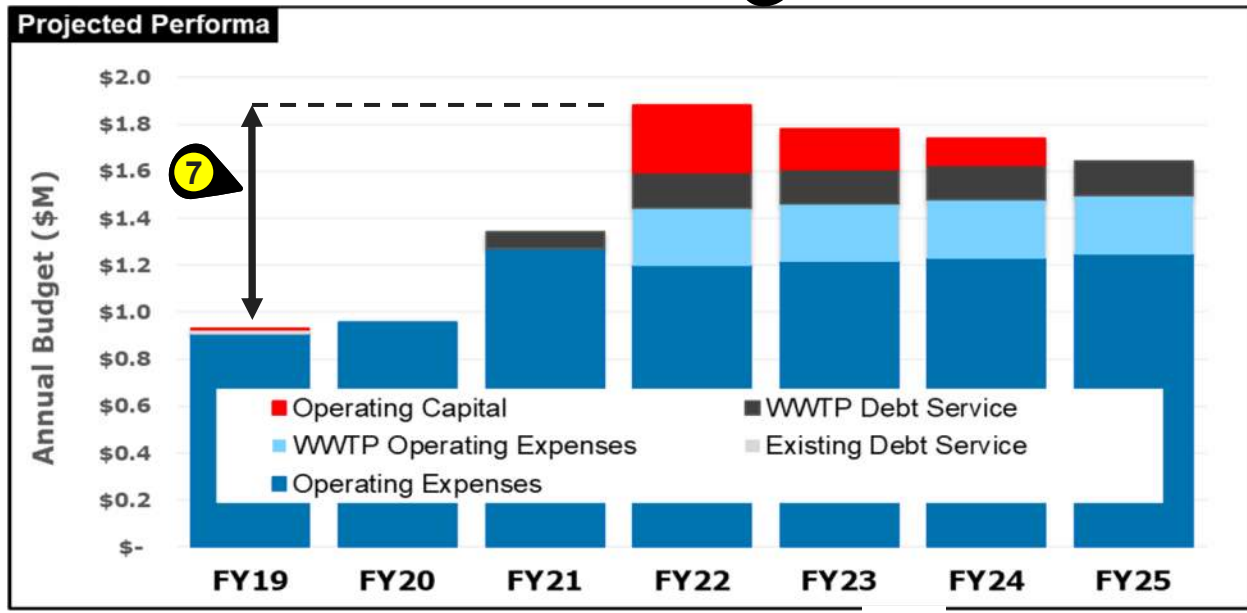
PROJECTING EXPENSES

REVISED
7-10-2020

	Actual Values		Budget Values	Projected Values			
	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Operating Expenses							
Wareham - Operating	\$213,912	\$400,000	\$410,000	\$420,250	\$430,756	\$441,525	\$452,563
Personnel Services	\$170,024	\$106,494	\$197,380	\$243,315	\$249,397	\$255,632	\$262,023
Wareham - Capital	\$188,478	\$188,478	\$188,478	\$188,478	\$188,478	\$188,478	\$188,478
Transfer Out (Indirects)	\$128,607	\$128,607	\$140,944	\$145,877	\$150,983	\$156,267	\$161,736
Purchase of Services	\$145,524	\$92,776	\$113,150	\$79,796	\$81,791	\$83,836	\$85,932
Other Charges and Expenditures	\$47,408	\$32,614	\$105,375	\$108,009	\$110,710	\$113,477	\$116,314
Transfer Out (Reserve)	\$0	\$0	\$100,000	\$0	\$0	\$0	\$0
Supplies	\$12,661	\$6,715	\$20,028	\$20,616	\$21,223	\$21,851	\$22,498
Subtotal	\$906,615	\$955,684	\$1,275,355	\$1,206,341	\$1,233,339	\$1,261,066	\$1,289,545
Delta Previous	3.4%	0.0%	9.6%	-5.4%	2.2%	2.2%	2.3%
Capital							
Operating Capital	\$3,679	\$0	\$0	\$290,000	\$170,000	\$115,000	\$0
New Debt Service	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Existing Debt Service	\$20,500	\$0	\$0	\$0	\$0	\$0	\$0
Subtotal	\$24,179	\$0	\$0	\$290,000	\$170,000	\$115,000	\$0
New WWTP							
Operating Expenses	\$0	\$0	\$0	\$250,000	\$250,000	\$250,000	\$250,000
Debt Service	\$0	\$0	\$72,000	\$146,776	\$146,776	\$146,776	\$146,776
Subtotal	\$0	\$0	\$72,000	\$396,776	\$396,776	\$396,776	\$396,776
TOTAL EXPENSES	\$930,794	\$955,684	\$1,347,355	\$1,893,117	\$1,800,115	\$1,772,843	\$1,686,321

Key points:

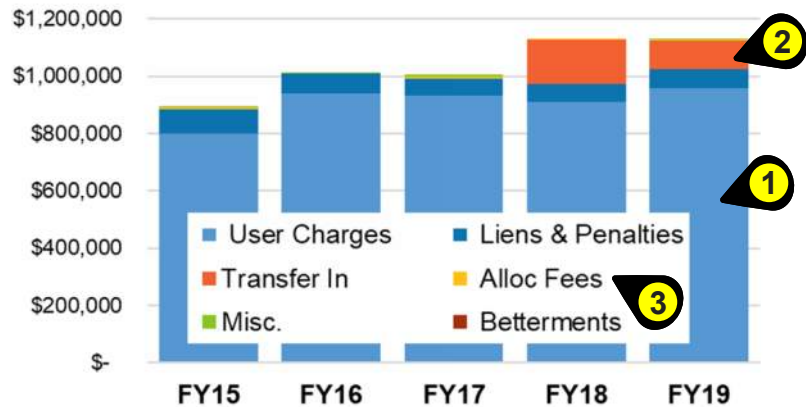
- Operating expenses projected to increase by about 3.5% annually
- Wareham costs based on June 2019 settlement agreement. Cost escalates 2.5% annually
- Plant O&M cost based upon estimate, actual cost will vary based upon future contracts costs and actual startup – based upon March 2021 completion
- Based upon FY21 budget, should replace with information from schedule C.
- Operating Capital reflects deferred projects including \$100k Infiltration & Inflow investigation (MADEP required).
- Based upon Budget, actual costs likely to be lower. For FY19 the actual expenditure was 77% of budget.
- Budget levels nearly double by FY22 which tends to bring out any inequities in a water or sewer rate structure



PROJECTING REVENUE

REVISED
7-10-2020

Historic Revenue by Source



Key points:

1. The majority of revenue has come from user charges
2. In the past, transfers were used to minimize rate increases
3. Once debt and CIP costs hit, development revenue becomes more important.

Projecting Revenue From New and Existing Customers

Existing Customers

User Charges: Based upon analysis of previous years usage data

New Customers (Development) Broken down into two categories:

Known: Projects that the Town is aware of and are in the development process

Projected: Estimated from undeveloped non-residential parcels

User Charges

Known: Based upon flow data provided in application materials or estimated combined with estimated connection year.

Projected: Based upon planning level flow estimates

Development Charges

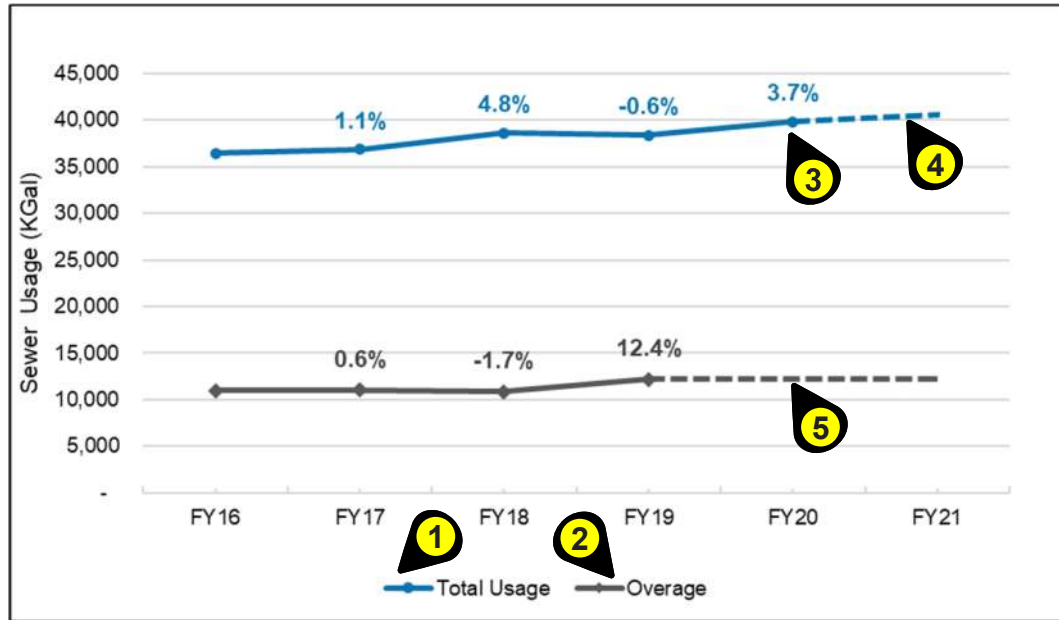
Known: Based upon data provided in application materials or estimated combined with estimated connection year.

Projected: Based upon planning level data

PROJECTING REVENUE FROM USER CHARGES

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Usage Analysis – Existing Customers



Key points:

1. Total amount of water use as measured by Buzzards Bay Water District
2. Amount of usage over the 45K gallons allotted per billable unit under the current rate structure
3. 2020 based upon first 6 months of meter data extrapolated to full year using data from previous years water use.
4. Estimated to increase at 2% annually
5. Overage trends differently than total usage because of masking effect of existing fee structure. Projected to remain at 2019 levels.
6. First year of flow, based upon best estimate. Green indicates project usage appears in 2019 flow data
7. Allocated flow is based upon Title 5 (Septic System planning level flow estimates based upon type of use). Generally considered to be a maximum day flow or about twice the average daily flow
8. 50% of Title 5 flow, considered to be an average daily flow

Usage Analysis – Known Development

Development	Flow Year	Units	Allocated (gpd)	Expected Flow (gpd)
Hampton Inn	2020	100	15,243	
Oak Bay Brewery	2020	1	1,661	
Veterinary Clinic	2020	1		
Blended Berries	2020	1	440	
Mahoney's on Main	2020	1	3,465	
Vincent Michienzi (85-93 Main)	2020	1	13,000	6,500
Calamar/ 25 Perry	2021	120	16,800	8,400
James McLaughlin	2021	1	79	40
MMA Cadet Housing	2021	1	7,070	3,535
Bay Motor Inn	2022	1	11,985	5,993
Choubah Engineering	2022	1	41	21
GENCON/Robert Gendron	2023	109	17,750	8,875
100 Main	2023	121	26,080	13,040
Bourne Scenic Park	2023	20	17,700	8,850
CMP Development LLC	2023	1	46,475	23,238
Total				78,490

PROJECTING REVENUE FROM DEVELOPMENT FEES

FEE STRUCTURES

REVISED
7-10-2020

Existing Fee Structure

Fee	Amount and Basis
Existing Fee Structure (as of 2006)	
Design Review and Construction Inspection Fee	\$1,500 (commercial only)
Commercial Sewer Permit Fee	\$150 + \$0.010 per square foot of building floor space
Sewer Connection Fee	Annual sewer fee times the number of business units.
Residential Sewer Permit Fee	\$100 + \$100 for each additional unit.
Sewer System Development Charge	\$5,769.678 per acre plus \$36.703 per foot of frontage.
2017 Commercial Allocation Policy Fees	
Application Fee	\$1,500
Preliminary Allocation Fee	\$5,000 plus \$1 per projected flow
Operational Allocation Fee	Number of units x current annual base rate sewer fee

Key points:

- 2006 Sewer Development Charge was based upon betterment structure used to pay for system in the 1990's. This method is designed to distribute the costs of sewer (horizontal) construction.
- The proposed system development charge distributes the \$2.4M of new WWTP debt assigned to the sewer enterprise fund using the widely accepted ERU methodology.

Proposed ERU Based Development Fee

Service Development Charge

1. Determine number of Equivalent Residential units

Divide total plant capacity by average residential usage

Total Capacity	100,000	gpd
Residential usage	150	gpd
Equals	667	ERU's

2. Determine ERU cost

Cost to be recovered	\$2,400,000
Total ERU's	667
Equals	\$3,600 Per ERU

PROJECTED DEVELOPMENT REVENUE

Existing Fee Structure

REVISED
7-10-2020

Known Development

Development	Flow Year	Units	Allocated (gpd)	Expected Flow (gpd)	2017 Commercial Allocation Policy		2006 Fee Structure	Grand Total	Total Billed	Total Remaining
					Application Fee	Preliminary Allocation Fee (calc)	System Development Charge			
Hampton Inn	2020	100	15,243		\$1,500	\$21,743	\$39,231	\$62,474	\$48,533	
Oak Bay Brewery	2020	1	1,661		\$1,500	\$8,756	\$8,757	\$19,013	\$8,756	
Veterinary Clinic	2020	1		-	\$1,500	\$6,681	\$10,514	\$18,694		
Blended Berries	2020	1	440		\$1,500	\$6,940	\$31,816	\$40,256		
Mahoney's on Main	2020	1	3,465		\$1,500	\$9,965	\$5,414	\$16,879		\$16,879
Vincent Michienzi (85-93 Main)	2020	1	13,000	6,500	\$1,500	\$19,500	\$20,810	\$41,810	\$21,000	\$20,810
Calamar/ 25 Perry	2021	120	16,800	8,400	\$1,500	\$23,300	\$70,922	\$95,722	\$21,800	\$73,922
James McLaughlin	2021	1	79	40	\$1,500	\$6,830	\$15,011	\$23,341	\$6,579	\$16,762
MMA Cadet Housing	2021	1	7,070	3,535	\$1,500	\$13,570	\$18,586	\$33,656	\$13,570	\$20,086
Bay Motor Inn	2022	1	11,985	5,993	\$1,500	\$6,684	\$49,184	\$57,368		\$57,368
Choubah Engineering	2022	1	41	21	\$1,500	\$6,541	\$68,358	\$76,399		\$76,399
GENCON/Robert Gendron	2023	109	17,750	8,875	\$1,500	\$24,250	\$31,450	\$57,200	\$24,250	\$32,950
100 Main	2023	121	26,080	13,040	\$1,500	\$32,580	\$9,875	\$43,955		\$43,955
Bourne Scenic Park	2023	20	17,700	8,850	\$1,500	\$24,200	\$58,961	\$84,661		\$84,661
CMP Development LLC	2023	1	46,475	23,238	\$1,500	\$52,975	\$39,491	\$93,966		\$93,966
Total				78,490	\$22,500	\$264,514	\$478,379	\$765,394	\$144,488	\$537,757

Key points:

1. Assumed
2. Consists of the three charges shown which represent Bourne's intended application of existing fees
3. Total received to date
4. Remaining charges anticipated to be billed
5. Parcels selected based upon land use descriptions. Developable residential parcels not included based upon previous discussion relative to zoning restrictions
6. Development fees distributed based upon the assumed timeline

Projected Development

Land Use Description	Title 5 Estimated Flow (gpd)	Expected Flow (gpd)	Est No Units	Application Fee	Preliminary Allocation Fee	System Development Charge	Grand Total
Vacant, Selectmen or City Council (Municipal)	1,468	734	12	\$ 1,500	\$ 7,968	\$ 18,570	\$ 28,038
Developable Commercial Land	1,411	706	12	\$ 1,500	\$ 7,911	\$ 18,273	\$ 27,684
Undevelopable Commercial Land	501	250	5	\$ 1,500	\$ 7,001	\$ 5,805	\$ 14,306
Undevelopable Commercial Land	736	368	6	\$ 1,500	\$ 7,236	\$ 7,089	\$ 15,825
Vacant, Selectmen or City Council (Municipal)	645	322	6	\$ 1,500	\$ 7,145	\$ 19,619	\$ 28,264
Vacant, Selectmen or City Council (Municipal)	954	477	8	\$ 1,500	\$ 7,454	\$ 15,593	\$ 24,547
Developable Commercial Land	1,015	507	9	\$ 1,500	\$ 7,515	\$ 9,809	\$ 18,824
Developable Commercial Land	1,346	673	11	\$ 1,500	\$ 7,846	\$ 15,678	\$ 25,024
Developable Commercial Land	1,699	849	14	\$ 1,500	\$ 8,199	\$ 9,639	\$ 19,337
Developable Commercial Land	1,668	834	14	\$ 1,500	\$ 8,168	\$ 10,732	\$ 20,401
Vacant, Selectmen or City Council (Municipal)	4,252	2,126	35	\$ 1,500	\$ 10,752	\$ 23,962	\$ 36,213
Vacant, Selectmen or City Council (Municipal)	23,392	11,696	190	\$ 1,500	\$ 29,892	\$ 90,595	\$ 121,986
-	9,061	4,530	74	\$ 1,500	\$ 15,561	\$ 38,683	\$ 55,744
Undevelopable Commercial Land	684	342	6	\$ 1,500	\$ 7,184	\$ 14,071	\$ 22,754
Total	48,831	24,415	402	\$21,000	\$139,831	\$298,116	\$458,947

PROJECTING REVENUE FROM DEVELOPMENT FEES

Proposed Fee Structure

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7-10-2020

Known Development

Development	Flow Year	Expected Flow (gpd)	No. ERU's	ERU System Development Charge
Hampton Inn	2020			\$ -
Oak Bay Brewery	2020			\$ -
Veterinary Clinic	2020	-		\$ -
Blended Berries	2020			\$ -
Mahoney's on Main	2020			\$ -
Vincent Michienzi (85-93 Main)	2020	6,500	44	\$ 158,400
Calamar/ 25 Perry	2021	8,400	56	\$ 201,600
James McLaughlin	2021	40	1	\$ 3,600
MMA Cadet Housing	2021	3,535	24	\$ 86,400
Bay Motor Inn	2022	5,993	40	\$ 144,000
Choubah Engineering	2022	21	1	\$ 3,600
GENCON/Robert Gendron	2023	8,875	60	\$ 216,000
100 Main	2023	13,040	87	\$ 313,200
Bourne Scenic Park	2023	8,850	59	\$ 212,400
CMP Development LLC	2023	23,238	155	\$ 558,000
Total		78,490	527	\$1,897,200

Known Development

Land Use Description	Title 5 Estimated Flow (gpd)	Expected Flow (gpd)	No. ERU's	ERU System Development Charge
Vacant, Selectmen or City Council (Municipal)	1,468	734	5	\$ 35,232.00
Developable Commercial Land	1,411	706	5	\$ 33,871.20
Undevelopable Commercial Land	501	250	2	\$ 12,021.60
Undevelopable Commercial Land	736	368	3	\$ 17,668.80
Vacant, Selectmen or City Council (Municipal)	645	322	3	\$ 15,472.80
Vacant, Selectmen or City Council (Municipal)	954	477	4	\$ 22,896.00
Developable Commercial Land	1,015	507	4	\$ 24,357.60
Developable Commercial Land	1,346	673	5	\$ 32,304.00
Developable Commercial Land	1,699	849	6	\$ 40,771.20
Developable Commercial Land	1,668	834	6	\$ 40,039.20
Vacant, Selectmen or City Council (Municipal)	4,252	2,126	15	\$ 102,036.00
Vacant, Selectmen or City Council (Municipal)	23,392	11,696	78	\$ 561,400.80
-	9,061	4,530	31	\$ 217,452.00
Undevelopable Commercial Land	684	342	3	\$ 16,413.60
	48,831	24,415	170	\$1,171,937

DEVELOPMENT FEE SUMMARY

REVISED
7-10-2020

Existing Fee Structure

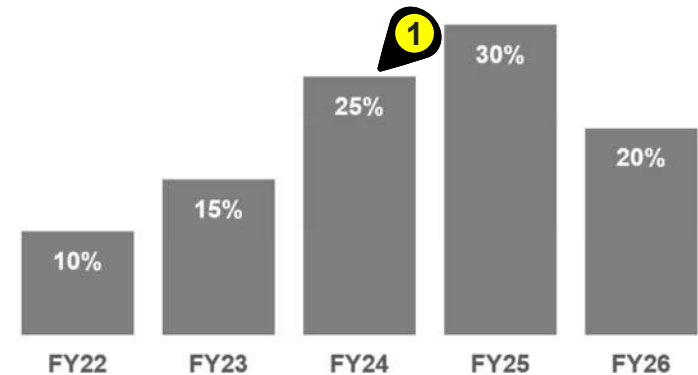
	Known	Projected	Total	Debt Service	Stabilization Balance
2020	\$ 144,488		\$ 144,488	\$ -	\$ 144,488
2021	\$ 211,408	\$ -	\$ 211,408	\$ 72,000	\$ 283,896
2022	\$ 133,767	\$ 45,895	\$ 179,662	\$ 148,981	\$ 314,577
2023	\$ 235,827	\$ 68,842	\$ 304,669	\$ 148,981	\$ 470,265
2024	\$ -	\$ 114,737	\$ 114,737	\$ 148,981	\$ 436,021
2025	\$ -	\$ 137,684	\$ 137,684	\$ 148,981	\$ 424,724
2026		\$ 91,789	\$ 91,789	\$ 148,981	\$ 367,533
2027		\$ -	\$ -	\$ 148,981	\$ 218,552
2028		\$ -	\$ -	\$ 148,981	\$ 69,571
2029		\$ -	\$ -	\$ 148,981	\$ (79,409)
Total	\$ 725,490	\$ 458,947	\$ 1,184,437		

Proposed Fee Structure

	Known	Projected	Total	Debt Service	Stabilization Balance
2020	\$ 144,488.00	\$ -	\$ 144,488	\$ -	\$ 144,488
2021	\$ 450,000	\$ -	\$ 450,000	\$ 72,000	\$ 522,488
2022	\$ 147,600	\$ 61,200	\$ 208,800	\$ 148,981	\$ 582,307
2023	\$ 1,299,600	\$ 91,800	\$ 1,391,400	\$ 148,981	\$ 1,824,727
2024	\$ -	\$ 153,000	\$ 153,000	\$ 148,981	\$ 1,828,746
2025	\$ -	\$ 183,600	\$ 183,600	\$ 148,981	\$ 1,863,365
2026	\$ -	\$ 122,400	\$ 122,400	\$ 148,981	\$ 1,836,784
2027	\$ -	\$ -	\$ -	\$ 148,981	\$ 1,687,804
2028	\$ -	\$ -	\$ -	\$ 148,981	\$ 1,538,823
2029	\$ -	\$ -	\$ -	\$ 148,981	\$ 1,389,842
Total	\$ 2,041,688	\$ 612,000	\$ 2,653,688		

Key points:

1. Projected development is assumed to follow the timeline shown below (i.e. 25% of all projected development fees are assumed to be collected in FY24).
2. While the goal of System Development charges is to recover the \$2.4M in new WWTP Debt assigned to the Sewer Enterprise, the debt service represents the actual cost that must be paid each year
3. Assumes that all development fee revenue is deposited into the Capital Stabilization Fund and used only to pay debt service
4. Existing fee structure does not recover full cost of capital as it was not designed for that purpose

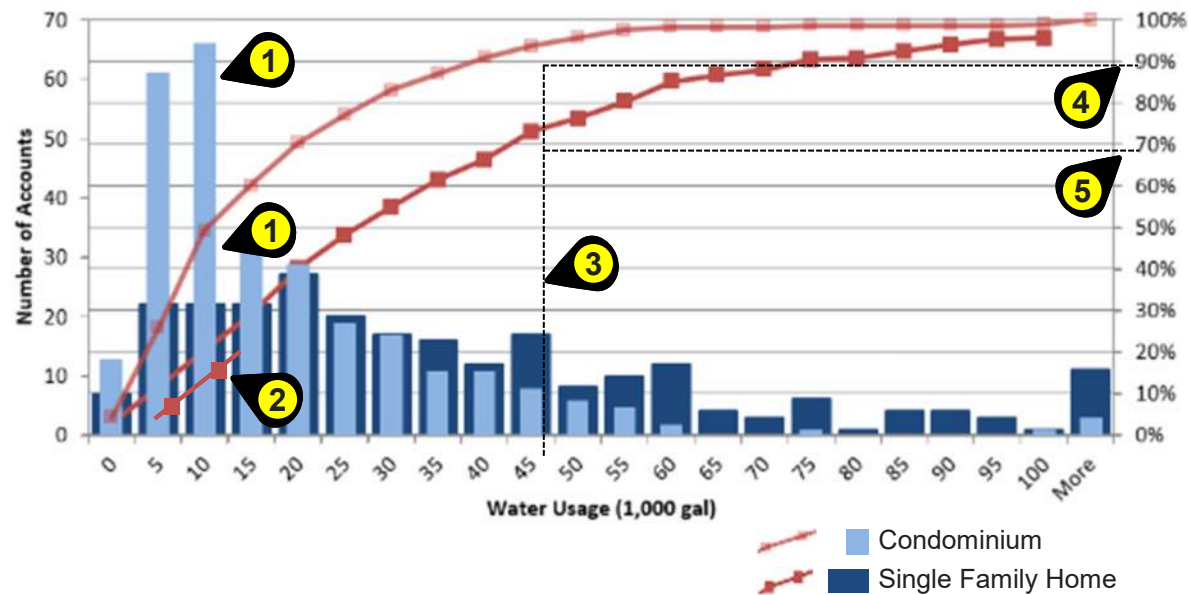


Assumed Projected Development Timeline

PROJECTING REVENUES – USER FEES

Evaluation of Existing Fee Structure

Residential Condo and Single-Family Usage Evaluation



REVISED
7-10-2020

Key points:

1. Example data point. This shows that out of all the condominium customer accounts, 65 of them (or 50% of them) used a total of 10,000 gallons of water in 2018.
2. Similarly, 21 of the single family customers (~20% of them) also used 10,000 gallons of water in 2018. This means condo's use less water than houses.
3. Bourne's current sewer user rate includes 45,000 gallons of usage before customers are charged for overage.
4. Usage data appears to be heavily skewed by seasonal aspect. This is exacerbated by the fact that usage is only billed once per year.

Pros and Cons of existing rate structure

The generous usage allowance means most residential customers never exceed the minimum charge.

↑ ↓

Users are effectively paying for more usage than they actually need.



Residential Usage

- MADEP target max usage = 65 gallons per person per day for residential. This equals 94,000 gallons per year.
- 50,000 gallons per year equals 2 people at 65 gallons per person per day or average family at 50 gpd
- 20,000 gpd example is seasonal cottage

PROJECTING REVENUES – USER FEES

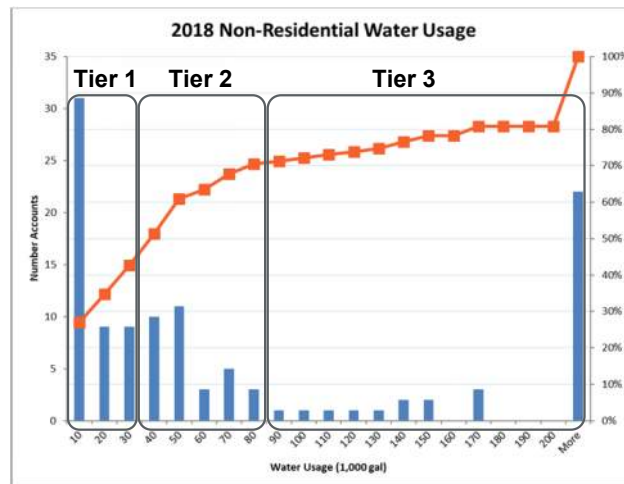
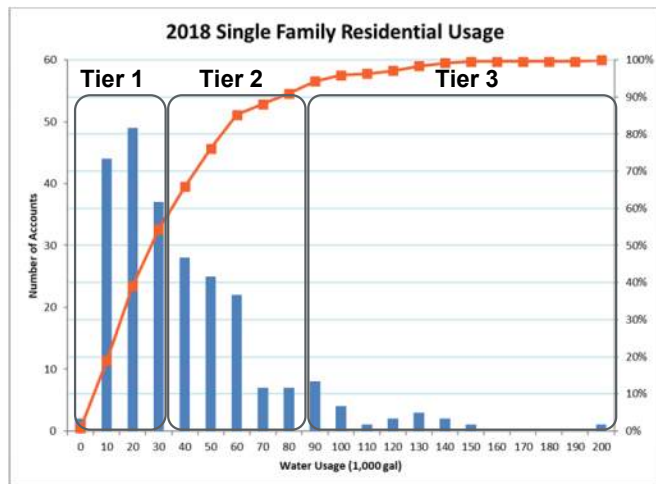
Alternative Rate Structure Development

REVISED
7-10-2020

The existing rates charge by the number of billing units, however this is not defined for non-residential customers which results in inconsistent user costs. As an alternative, a rate structure that maintains the base rate and a usage charge was developed. Many systems use base charges that increase according to the size of the water meter, this reflects the fact that larger users have a proportionally larger impact on system operations and costs. Since Bourne does not own the water system, this information was not available, thus the same Equivalent Residential Unit (ERU) method was used to establish the number of ERU's per customer. The customer's base charge would equal the number of ERU's times the Base Fee (\$600 per ERU in FY21).

With Tiered (or stepped) rates, the usage portion of the customers bill increases with the amount of usage. This is commonly used to encourage water conservation. The proposed tiers are based upon evaluation of the existing water use for both single family residential and non-residential users. The steps in a tier are defined by the volumetric increase and rate increase. Tiers volumes were developed based upon analysis of existing water use for both single family and non-residential customers.

Usage Analysis



RATE ALTERNATIVE A – STATUS QUO

Existing Rate and Fee Structure (usage and development fees)

REVISED
7-10-2020

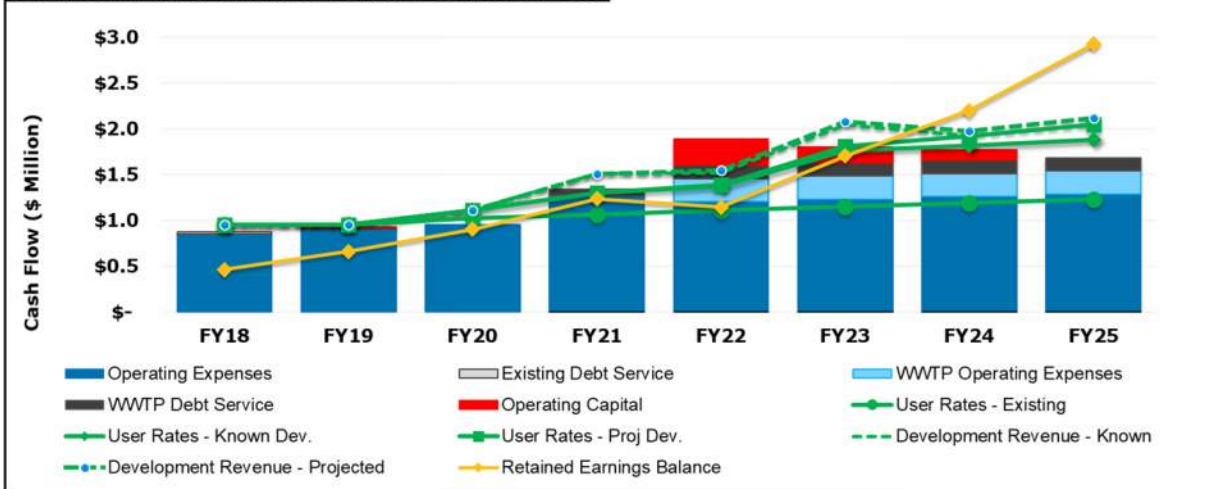
Revenue	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
User Rates - Existing	\$ 955,370	\$ 958,468	\$ 1,027,974	\$ 1,069,470	\$ 1,110,966	\$ 1,152,462	\$ 1,193,958	\$ 1,235,454
User Rates - Known Dev.	\$ -	\$ -	\$ 86,010	\$ 232,124	\$ 262,923	\$ 612,123	\$ 630,363	\$ 648,603
User Rates - Proj Dev.	\$ -	\$ -	\$ -	\$ -	\$ 18,677	\$ 48,402	\$ 100,186	\$ 166,058
Development Revenue - Known	\$ -	\$ -	\$ -	\$ 211,408	\$ 133,767	\$ 235,827	\$ -	\$ -
Development Revenue - Projected	\$ -	\$ -	\$ -	\$ -	\$ 22,947	\$ 34,421	\$ 57,368	\$ 68,842
Non Rate	\$ 170,811	\$ 83,202	\$ 96,335	\$ -	\$ 102,703	\$ 132,132	\$ 139,939	\$ 148,731
Total Revenue	\$ 1,129,280	\$ 1,197,187	\$ 1,609,337	\$ 1,651,983	\$ 2,215,367	\$ 2,215,367	\$ 2,121,814	\$ 2,267,688

Net Revenue (Revenue-Expense)	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Net Revenue (Revenue-Expense)	\$ 35,189	\$ 198,486	\$ 241,503	\$ 333,982	\$ (94,358)	\$ 562,028	\$ 495,747	\$ 728,143
Retained Earnings Balance	\$466,478	\$664,964	\$906,467	\$1,240,448	\$1,146,090	\$1,708,118	\$2,203,865	\$2,932,009
Retained Earnings as Percent of OpEx	55%	73%	95%	97%	95%	138%	175%	227%

Key points:

1. Most recent data
2. Base fee goes up by \$40 per year which is considered to be the status quo in terms of estimating burden on existing rate payers
3. User rate revenue for developments subject to change due to assumptions of billable units.
4. Assumes **ALL** known development and **50%** of projected development move forward as previously shown.
5. Average household (2.66 people) using 65 gpd each (State target) or 62.2K gal per year.

Schedule 1.4 Proforma - Existing Rate Structure - 50% Projected Dev.



User Rates

Description	Type	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Base Fee	Annual	\$776	\$812	\$879	\$919	\$959	\$999	\$1,039	\$1,079
Overage	Usage	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100
Increase		\$24	\$36	\$67	\$40	\$40	\$40	\$40	\$40

Residential Costs

Scenario	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Alternative A	\$ 776	\$ 826	\$ 1,060	\$ 1,100	\$ 1,140	\$ 1,180	\$ 1,220	\$ 1,260
Increase	\$ 50	\$ 234	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40	\$ 40



Alternative A supports enterprise without undue burden on existing rate payers*.

* Based upon FY18 financial data, projected usage and development assumptions shown herein.

RATE ALTERNATIVE B – NEW RATES & FEES

ERU and Tiered Usage Rates with ERU Based Development Fees

REVISED
7-10-2020

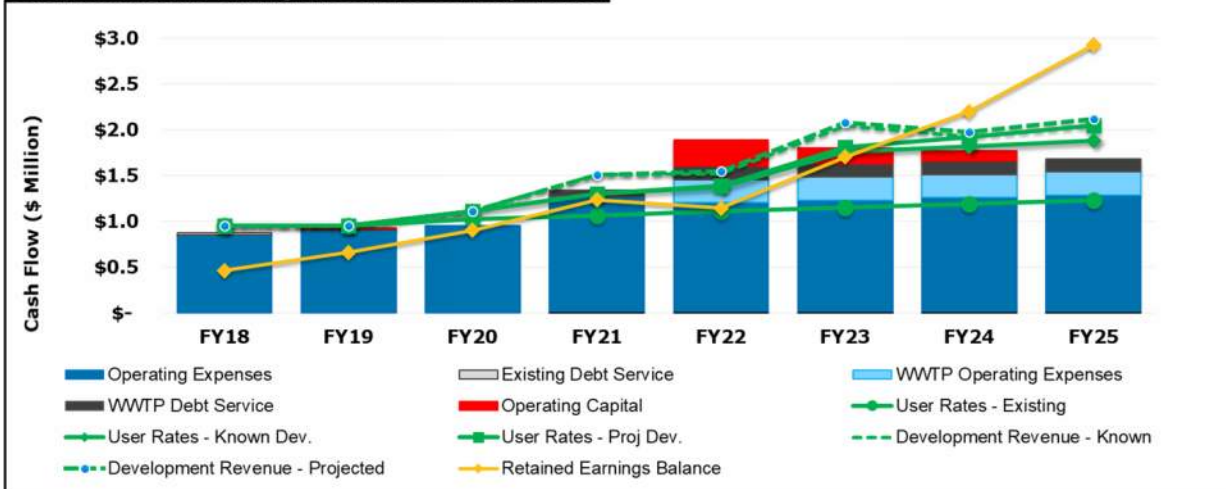
Schedule 1.2 Proforma - Tiered ERU Rates - 50% Projected Dev.

Revenue	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
User Rates - Existing	\$ 955,370	\$ 958,468	\$ 1,027,974	\$ 1,011,795	\$ 1,019,216	\$ 1,026,785	\$ 1,034,505	\$ 1,042,381
User Rates - Known Dev.			\$ 86,010	\$ 350,209	\$ 351,301	\$ 557,840	\$ 604,315	\$ 611,157
User Rates - Proj Dev.				\$ 3,198	\$ 27,916	\$ 54,955	\$ 79,887	\$ 94,950
Development Revenue - Known			\$ -	\$ 450,000	\$ 147,600	\$ 1,299,600	\$ -	\$ -
Development Revenue - Proj					\$ 30,600	\$ 45,900	\$ 76,500	\$ 91,800
Non-Rate		\$ 170,811	\$ 70,218	\$ 95,930	\$ 98,256	\$ 115,122	\$ 120,675	\$ 122,760
TOTAL REVENUE	Total	\$ 1,129,280	\$ 1,184,202	\$ 1,911,131	\$ 1,674,888	\$ 3,100,002	\$ 1,915,883	\$ 1,963,048
Net Revenue (Revenue-Expense)		\$ 257,284	\$ 198,486	\$ 228,518	\$ 635,776	\$ (71,453)	\$ 1,446,664	\$ 423,503
Retained Earnings Balance		\$ 466,478	\$ 664,964	\$ 893,482	\$ 1,529,258	\$ 1,457,805	\$ 2,904,468	\$ 3,617,787
Retained Earnings as Percent of Op Ex		55%	73%	93%	120%	121%	235%	253%

Key points:

1. Most recent data
2. Base fee is based upon the number of ERU's (same as current number of units for all residential users, average daily flow / 150 gallons per day for non-residential). **No usage is included in base fee.** Annual billing frequency assumed for usage.
3. User rate revenue for developments subject to change due to assumptions of billable units.
4. Assumes **ALL** known development and 50% of projected development move forward as previously shown.
5. Average household (2.66 people) using 65 gpd each (State target) or 62.2K gal per year.

Schedule 1.4 Proforma - Existing Rate Structure - 50% Projected Dev.



User Rates

Category	Type	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Base Fee	Annual	\$776	\$812	\$879	\$575	\$575	\$575	\$575	\$575
Tier 1	Usage				\$0.0065	\$0.0065	\$0.0065	\$0.0065	\$0.0065
Tier 2	Usage				\$0.0098	\$0.0098	\$0.0098	\$0.0098	\$0.0098
Tier 3	Usage				\$0.0130	\$0.0130	\$0.0130	\$0.0130	\$0.0130

Residential Costs

Scenario	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Alternative B	\$ 776	\$ 826	\$ 1,060	\$ 1,093	\$ 1,093	\$ 1,093	\$ 1,093	\$ 1,093
Increase	\$ 50	\$ 234	\$ 33	\$ -	\$ -	\$ -	\$ -	\$ -



Alternative B supports enterprise without undue burden on existing rate payers* - see page 15 for more.

* Based upon FY18 financial data, projected usage and development assumptions shown herein.

CUSTOMER COST IMPACTS

REVISED
7-10-2020

Land Use Code	LOCATION	2018 USAGE (Gal x 1,000)	2019 USAGE (Gal x 1,000)	Billable Units	No. of ERU's	Annual Bill Existing Rates	Annual Bill Tiered Rates	Delta
Business Condo	271 MAIN STREET (NAPA AUTO PARTS)	41	57	2	1	\$ 1,838	\$1,033	-\$805
Business Condo	258 MAIN STREET (BUZZARDS BAY PROF.)	490	540	17	9	\$ 15,623	\$11,821	-\$3,802
Gasoline Service Stations	246 MAIN STREET (SUPER PETR.)	29	17	1	1	\$ 919	\$686	-\$234
Gasoline Service Stations	160 MAIN STREET (CUMBERLAND FARMS)	485	500	1	9	\$ 5,469	\$11,301	\$5,832
Hotel	Perry Lane (Hampton Inn)		168	1	1	\$ 2,149	\$2,385	\$236
Mixed Use (Primarily Comm.)	7 & 9 ST MARGARETS STREET	148	120	6	3	\$ 5,514	\$2,911	-\$2,603
Mixed Use (Primarily Comm.)	145 MAIN STREET	350	321	3	7	\$ 3,377	\$7,824	\$4,447
Mixed Use (Primarily Comm.)	267 MAIN STREET (LAUNDRY MAT)	2,350	2450	1	43	\$ 24,969	\$56,201	\$31,232
Residential Condo	10-C HORSESHOE LANE	5	3	1	1	\$ 919	\$595	-\$325
Residential Condo	20-H BAKERS LANE	20	16	1	1	\$ 919	\$679	-\$240
Residential Condo	21-S BOG VIEW DRIVE	119	116	1	1	\$ 1,629	\$1,709	\$80
Restaurants/Food Service	57 MAIN STREET (MAHONEY'S ON MAIN ST)	10	321	1	1	\$ 3,679	\$4,374	\$695
Restaurants/Food Service	225 MAIN STREET (BETTY ANNE'S)	94	105	1	2	\$ 1,519	\$2,141	\$622
Restaurants/Food Service	278 MAIN STREET (DUNKIN DONUTS)	560	540	1	11	\$ 5,869	\$12,971	\$7,102
Single Family Residential	18 EVERETT ROAD	15	15	1	1	\$ 919	\$673	-\$247
Single Family Residential	225A MAIN STREET	60	50	1	1	\$ 969	\$965	-\$4
Single Family Residential	24 OLD BRIDGE ROAD	95	100	1	1	\$ 1,469	\$1,501	\$32
Two-Family Residential	17 BAY DRIVE	15	16	2	2	\$ 1,838	\$1,254	-\$584
Two-Family Residential	33 OLD BRIDGE ROAD	74	80	2	2	\$ 1,838	\$1,833	-\$6
Two-Family Residential	34 HARRISON AVENUE	144	133	2	2	\$ 2,053	\$2,505	\$452

Key points:

1. Representative sampling of most common user types showing range of usage.
2. Example of inconsistent application of billable units for existing rate structure
3. Single family typically used as test case for determining rate impacts.

Residential Usage

- Bourne has large seasonal component ~40% of single family homes likely to be seasonal
- MADEP target max usage = 65 gallons per person per day for residential. This equals 94K gallons per year for a 4 person household.
- 50,000 gallons per year equals 2 people at 65 gallons per person per day or average family (2.5 people) at 50 gpd
- 15,000 gpd example is likely seasonal

RATE ALTERNATIVE A1 – STATUS QUO

NO NEW DEVELOPMENT

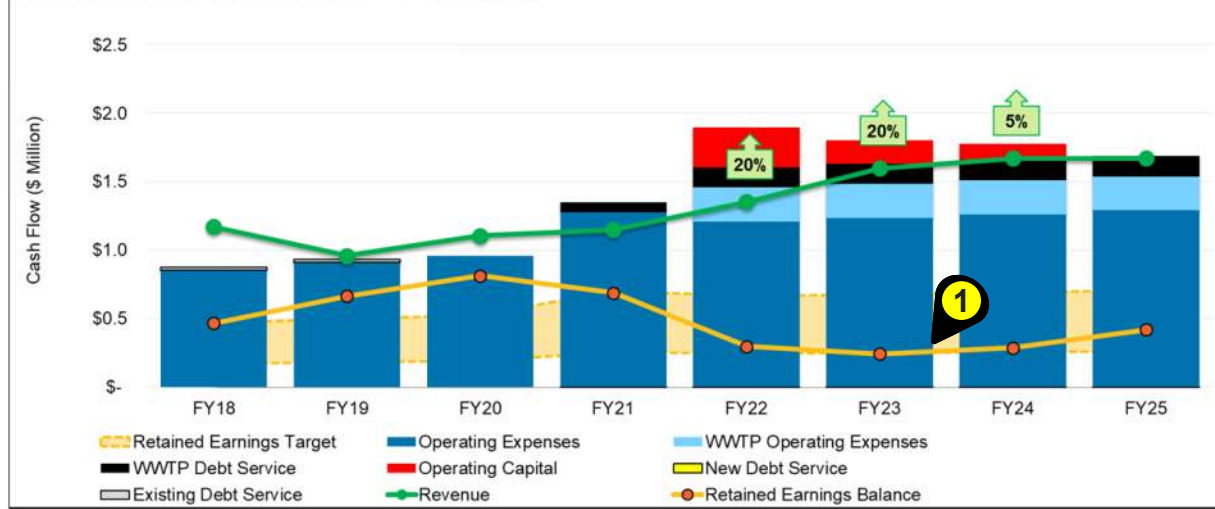
REVISED
7-10-2020

Key points:

1. Rates adjusted to maintain retained earnings balance above 20% of operating costs.
2. Base fee increases are much higher to make up for development revenue. **FY21 same as in alternative A.**

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Revenue								
Base Fee	\$ 804,285	\$ 958,947	\$ 911,875	\$ 958,947	\$ 1,144,045	\$ 1,372,854	\$ 1,441,496	\$ 1,441,496
Overage	\$ 367,052	\$ -	\$ 116,100	\$ 116,100	\$ 116,100	\$ 116,100	\$ 116,100	\$ 116,100
Non-Rate Revenue	\$ 87,217	\$ -	\$ 77,182	\$ 80,086	\$ 93,433	\$ 109,450	\$ 114,255	\$ 114,255
Total Revenue	\$ 1,171,337	\$ 958,947	\$ 1,105,156	\$ 1,149,556	\$ 1,353,578	\$ 1,598,403	\$ 1,671,851	\$ 1,671,851
Revenue Summary								
Existing	\$ 1,171,337	\$ 958,947	\$ 1,105,156	\$ 1,149,556	\$ 1,353,578	\$ 1,598,403	\$ 1,671,851	\$ 1,671,851
Projected								
Net Revenue (Revenue-Expense)								
Retained Earnings Balance	\$ 296,761	\$ 28,153	\$ 149,472	\$ (125,799)	\$ (392,764)	\$ (54,935)	\$ 45,785	\$ 132,306
Retained Earnings as Percent of Operating Expense	55%	73%	85%	54%	25%	20%	23%	32%

Schedule 1.5 Proforma - Exist Rate Structure - NO Development



Alternative A without development revenue does not support enterprise without undue burden on existing rate payers*.

User Rates

Description	Type	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Base Fee	Annual	\$776	\$812	\$879	\$919	\$1,103	\$1,323	\$1,390	\$1,390
Overage	Usage	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100
Increase		\$24	\$36	\$67	\$40	\$184	\$221	\$66	\$0

Residential Costs

Scenario	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Alternative A1	\$ 776	\$ 826	\$ 1,060	\$ 1,100	\$ 1,284	\$ 1,504	\$ 1,571	\$ 1,571
Increase	\$ -	\$ 50	\$ 234	\$ 40	\$ 184	\$ 221	\$ 66	\$ -

* Based upon FY18 financial data, projected usage and development assumptions shown herein.



RATE ALTERNATIVE B1 – NEW RATES

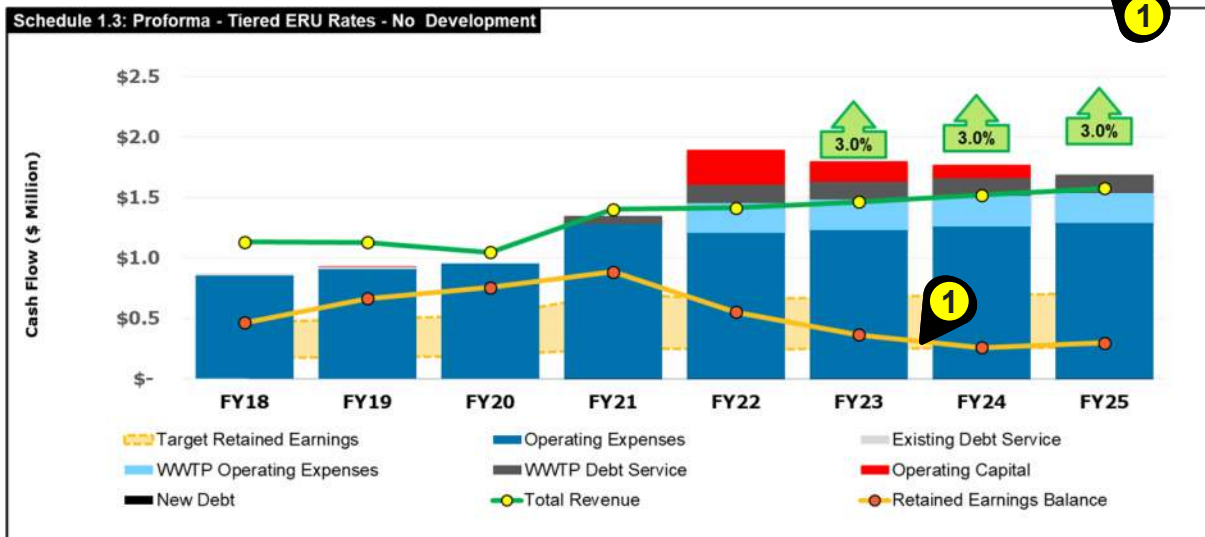
NO NEW DEVELOPMENT

REVISED
7-10-2020

Revenue	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Base Fee	\$ 909,765	\$ 958,947	\$ 959,868	\$ 850,425	\$ 850,425	\$ 875,938	\$ 902,216	\$ 929,282
Non-Rate Revenue	\$ 222,095	\$ 170,811	\$ 87,306	\$ 96,720	\$ 97,359	\$ 100,795	\$ 104,368	\$ 108,084
Tier 1				\$ 101,285	\$ 103,311	\$ 108,538	\$ 114,030	\$ 119,800
Tier 2				\$ 97,926	\$ 99,885	\$ 104,939	\$ 110,249	\$ 115,827
Tier 3				\$ 257,458	\$ 262,607	\$ 275,895	\$ 289,855	\$ 304,522
System Development			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Revenue	\$ 1,131,860	\$ 1,129,758	\$ 1,047,174	\$ 1,403,814	\$ 1,413,586	\$ 1,466,105	\$ 1,520,718	\$ 1,577,515
delta previous (Rate Revenue)	\$ 49,182	\$ 195,516	\$ (109,443)	\$ -	\$ 25,513	\$ 26,278	\$ 27,066	\$ 27,066
delta previous (Total Revenue)	\$ (2,102)	\$ (82,584)	\$ 356,639	\$ 9,773	\$ 52,518	\$ 54,613	\$ 56,797	\$ 56,797
Net Revenue (Revenue-Expense)	\$ 257,284	\$ 198,964	\$ 91,491	\$ 128,459	\$ (332,755)	\$ (187,234)	\$ (105,349)	\$ 37,970
Retained Earnings Balance	\$466,478	\$664,964	\$756,454	\$884,913	\$552,158	\$364,924	\$259,576	\$297,546
Retained Earnings as Percent of Operating Expense	55%	73%	79%	69%	46%	30%	21%	23%

Key points:

1. Rates adjusted to maintain retained earnings balance above 20% of operating costs
2. Base fee increases are much higher to make up for development revenue. **FY21** same as in alternative A.



Alternative B without development revenue does not support enterprise without undue burden on existing rate payers*.

User Rates

Description	Type	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Base Fee	Annual	\$776	\$812	\$879	\$1,011	\$1,162	\$1,279	\$1,279	\$1,279
Overage	Usage	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100	\$0.0100
Increase		\$24	\$36	\$67	\$132	\$152	\$116	\$0	\$0

Residential Costs

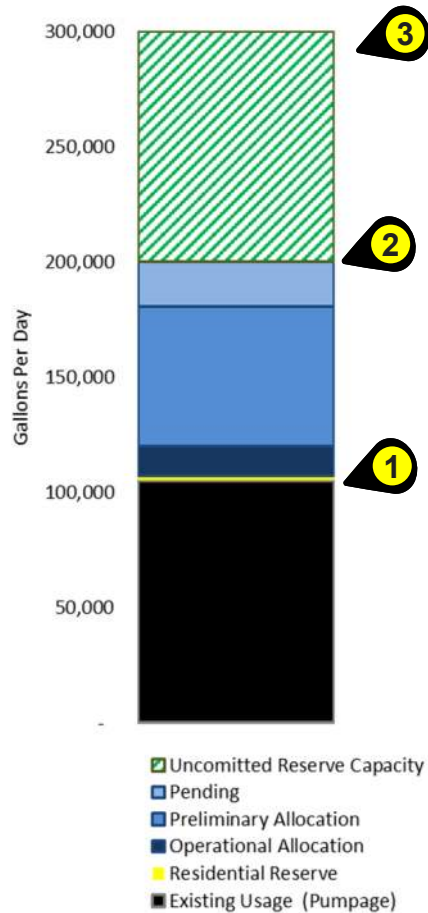
Scenario	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
Alternative B1	\$ 776	\$ 826	\$ 1,060	\$ 1,212	\$ 1,334	\$ 1,574	\$ 1,605	\$ 1,605
Increase	\$ 50	\$ 234	\$ 152	\$ 121	\$ 240	\$ 31	\$ -	\$ -

* Based upon FY18 financial data, projected usage and development assumptions shown herein.

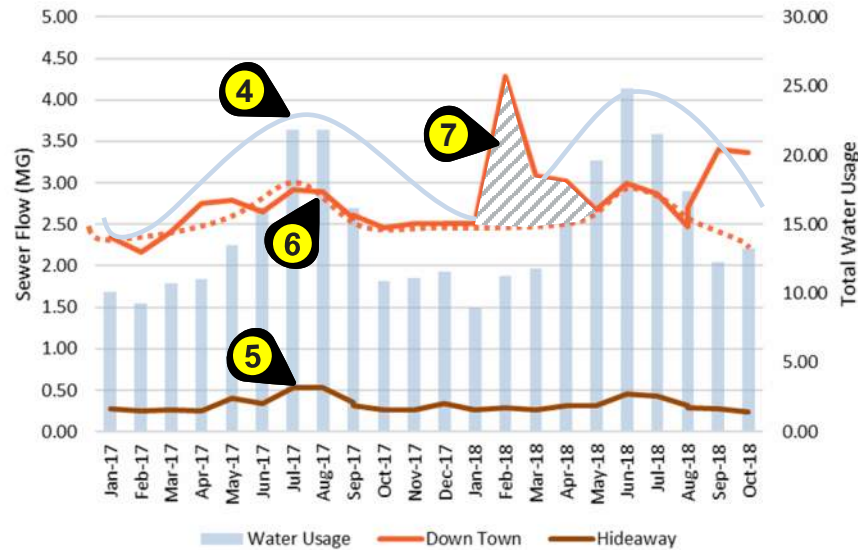
CAPACITY MANAGEMENT AND FLOWS

REVISED
7-10-2020

Capacity Status



Why Infiltration & Inflow is Important



Key Points

1. Based upon 2019 metered usage as pump station totals not available. Bourne should compare pumpage numbers to estimate volume of infiltration & inflow.
2. Allocations based upon Title 5 flow values which are roughly 2X expected daily flows thus understating the amount of available capacity
3. Assumes new WWTP on line
4. Blue bars represent total water usage (not just sewer area), blue curve shows seasonal increase in water usage
5. Amount of sewage pumped from Hideaway Station
6. Amount of sewage pumped from Down Town Pump station, curve represents expected increase corresponding to water use increase
7. Unexpected spike in Feb 2018 most likely due to infiltration & inflow. Feb 2018 precipitation was 7.15 in vs 2.76 for Feb 2017

FINDINGS, CONCLUSIONS & RECOMMENDATIONS

FINDINGS & CONCLUSIONS

REVISED
7-10-2020

1. Existing rate structure does not accurately reflect usage, some pay too much, some pay too little
2. The June 2019 settlement with Wareham resulted in a ~40% increase in treatment costs.
3. Lack of clarity related to definition of billable units impacts customer equity and cost comparisons, adjustments to new rates will not be even across user types
4. Revenue from existing users at status quo rates will not support the enterprise. Revenue from development is required.
5. Usage data is heavily skewed from seasonal aspect, water district reads semi-annually which would allow for a much better understanding of seasonal influence.
6. The operations and management of the Bourne Sewer System has become considerably more complicated with the addition of the new WWTP

Coastal Community Sewer Costs

Town	Cost
Scituate	\$563
Wareham	\$596
Statewide Average	\$862
Plymouth	\$990
Bourne	\$1,224
Provincetown	\$1,243
Gloucester	\$1,302
Cohasset	\$1,313

Based upon 2017 Tighe & Bond Sewer Rate Survey, annual costs based upon 120 HCF of usage (~90K gallons)

RECOMMENDATIONS

1. Meet with Buzzards Bay Water District to discuss options for balancing development needs with water conservation. Continue to negotiate IMA with Wareham, revisit cost sharing methodology
2. Retained earnings appears to be sufficient to allow selection of rate Alternative A or B for FY21, confirm projections against FY19 actual and FY20 estimated revenues.
3. Based upon resolution of development issue migrate to new fee structure, discuss timing and administration of fees with town counsel. Incorporate fee structure, timing and requirements into Sewer Regulations, separate out fees for easy adjustment. Reduce Title 5 allocations by 50% to better approximate expected flows, refine as uncommitted reserve capacity diminishes (obtain more accurate information, etc.)
4. Revisit staff roles relative to Wastewater management, adjust responsibilities to meet new requirements
5. Continue to monitor usage, expenses and revenue on annual basis