



The Township of Cramahe Water/Wastewater Rate Report

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Sharratt Water Management Ltd.
Sustainable Water Management Specialists



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1.0 EXECUTIVE SUMMARY

The Township of Cramahe is a municipality with a population of approximately 6,355, according to the 2016 Statistics Canada census, and is situated in Northumberland County. The Township's water and sewer system serves the community of Colborne that has a population of about 2,700 people. The Township metered all water users in Colborne in 2012. As of December 31, 2020, there were 1,023 metered water accounts and 961 wastewater connections. Sixty-two water accounts have septic systems for wastewater treatment. The Township has undertaken this rate study to prepare water rates that will ensure sufficient funds will be in place to cover the future operating, renewal and replacement costs in Colborne. This rate study provides a basis for the Financial Plan that must be developed and submitted to the Ontario Ministry of Municipal Affairs and Housing as a requirement to obtain a drinking water system licence renewal in 2021.

The aim of this rate project is as follows:

- Determine the capital renewal needs, in inflated dollars, of the water and wastewater systems based on their expected lifetimes over the next 90 years, the life of the Township's longest lived asset, a water main and a sewer line. This project will renew all assets reaching the end of their life over the period from 2031 to 2109.
- Tabulate and inflate the capital needs projected by the Lakefront Utilities Services Incorporated (LUSI) for the 2020-2030 period;
- Project and inflate non-user fee revenues and operating costs to 2030, and beyond;
- Estimate the most likely quantities of water sold, and number of connections, to 2030;
- Prepare a financing plan to cover the projected capital and operating costs, including utilizing debt, existing reserves and future user fees to 2030, and beyond to 2109.
- Develop metered water rates for 2021 to 2030 based on the above, utilizing best rate setting practices;
- Smooth the rates, where necessary, 2021-2030, to avoid sudden changes in water bills;
- Illustrate the bills for various hypothetical water users for the proposed rates, and,
- Compare the 2020 Cramahe water and wastewater rates with those in nearby communities

The intent of the project is to develop a sustainable financing plan that will fully meet the current financial needs, as well as making full provision for renewing all water system financial assets and accommodating growth. This means that each year, from 2021-30, and beyond, user fees have been set at a level, that when needed, funds will be available to meet future projected operating, capital renewal and replacement needs and growth needs.

The costs of the identified current and long-range capital renewal needs, as well as capital needed to accommodate growth, have been combined with the projection of the operating costs needed to produce an overall projection of system cost. Various methods have been utilized to supply the necessary financial resources to pay for this overall cost. These include loans, user fees and reserves. Grants have not been included in the water system, but should an opportunity arise, they could be used to reduce projected capital costs. Grants were considered for near-term wastewater projects due to their large costs.

User fees are the key component of the financing plan, as they pay down debt and build up reserves, as well as meeting day-to-day operating and smaller capital costs. In view of the difficulty of predicting the rate of new development and in consideration of the impact the anticipated growth could have on future water revenues, it is recommended that rates be monitored annually to determine if projected revenues and expenditures are in line with expectations. The projected increase in connections helps keep rates lower than otherwise. If the projected increases do not materialize, then it may be necessary to revise the rates.

1.1 Water Rate

Rates are calculated by considering the user fee requirements, and by taking into account future water use and the number of connections. User fees are projected to increase; however, the projected number of new users should offset at least some of the projected increase in user fees depending on the amount of new growth.

The rates for 2021 to 2030 were developed by assuming that ten new connections are added to the system each year. The proposed 2021 to 2025 rates are set out in table 1.1. The next rate study will take place in 2025. The proposed rates for 2021-30 are set out in table 5.5 later in this report.

Table 1.1 Proposed Two Part Cramahe Water Rate 2021- 25 Inflated \$

	2020	2021	2022	2023	2024	2025
Metered Fixed per Month						
Meter Size in mm (inches) 15 (0.62)	22.79	23.25	23.21	24.21	25.00	26.26
20 (0.75)	22.79	23.25	23.21	24.21	25.00	26.26
25 (1.00)	31.90	32.54	32.50	33.89	34.99	36.77
40 (1.50)	41.02	41.84	41.78	43.57	44.99	47.27
50 (2.00)	66.09	67.41	67.32	70.20	72.49	76.16
75 (3.00)	250.67	255.68	255.35	266.29	274.95	288.89
Metered Volumetric Charge - All Water						
Per cubic metre	\$ 2.06	\$ 2.16	\$ 2.29	\$ 2.42	\$ 2.55	\$ 2.64

The above increases the fixed portion of the rate by about 4% per annum through 2024, and 5% from 2025 onward and the variable rate increases at about about 5% per year to 2025, including almost 3% inflation. The monthly water bills associated with the above rates are set out in table 1.2.

Table 1.2 Projected Cramahe Monthly Water Bills with the proposed Rates 2021- 25 Inflated \$

User Category in M3 per Month	2020	2021	2022	2023	2024	2025
Couple 8 M3 15mm (.62") Meter	39	41	42	44	45	47
Family 25 M3 15mm (.62") Meter	74	77	80	85	89	92
Grocery 50 M3 25mm (1.0") Meter	135	141	147	155	163	169
Coffee Shop 150 M3 25mm (1.0") Meter	341	357	376	396	418	433
School 200 M3/Month 50mm (2.0") Meter	478	500	525	554	583	605
Restaurant 450 M3 50mm (2.0") Meter	993	1,041	1,097	1,158	1,221	1,266

Note: The 2020 water bills are for purposes of comparison only.

Note: Water use by singles, couples, families will vary widely and an individual's bill will depend on personal water use.

A user taking eight cubic metres per month is projected to pay \$39 in 2020, and \$47 in 2025. Someone using 25 cubic metres per month will pay \$74 per month in 2020, and \$92 in 2025. A user of 50 cubic metres per year, such as a grocery store, will pay a monthly water bill of \$135 per month in 2020, and \$169 in 2025. A larger user, such as a coffee shop using 150 cubic metres per month will pay \$341 monthly in 2020, and \$433 in 2025. A very large user, such as a school, taking 200 cubic metres per month will pay \$478 per month in 2020, and \$605 in 2025. A larger restaurant using 450 cubic metres per month will pay \$993 monthly in 2020, and \$1,266 in 2025. All figures are in inflated dollars.

1.2 Wastewater Rate

Wastewater rates are calculated by considering the user fee requirements, and by taking into account future water use and the number of connections. User fees are projected to increase, however, as with water rates, the anticipated growth in the projected number of new users will offset some of the projected increase in user fees. Wastewater rates are surcharge to water rates as a percentage of the water bill. Thus, a 115% surcharge is simply 1.15 times the cost of the water bill. The proposed surcharges for 2021 to 2030 to are shown in table 1.3.

Table 1.3 Proposed Cramahe Wastewater Surcharges for 2021-30 Inflated \$

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Water Bill Surcharge	115.0%	114.3%	115.3%	116.3%	117.3%	118.4%	113.9%	114.9%	113.2%	111.6%	109.9%

The proposed surcharges show an increase from 2021 to 2025, meaning that wastewater user fee needs are increasing faster than water user fees during this time, and then the pattern reverses from 2026 to 2030, as wastewater fees increase more slowly than water fees. The projected wastewater bills are shown in table 1.4.

Table 1.4 Projected Cramahe Wastewater Bills 2020-2025 Inflated \$

User Category in M3 per Month	2020	2021	2022	2023	2024	2025
Couple 8 M3 15mm (.62") Meter	\$45	\$46	\$48	\$51	\$53	\$56
Family 25 M3 15mm (.62") Meter	\$85	\$88	\$93	\$98	\$104	\$109
Grocery 50 M3 25mm (1.0") Meter	\$155	\$161	\$169	\$180	\$191	\$200
Coffee Shop 150 M3 25mm (1.0") Meter	\$392	\$408	\$433	\$461	\$490	\$513
School 200 M3/Month 50mm (2.0") Meter	\$550	\$572	\$606	\$644	\$684	\$716
Restaurant 450 M3 50mm (2.0") Meter	\$1,142	\$1,190	\$1,265	\$1,347	\$1,432	\$1,498

Note: The 2020 wastewater bills are for purposes of comparison only.

Note: Water use by singles, couples, families will vary widely and an individual's bill will depend on personal water use.

Basing wastewater rates on volume of the water used is a common rate practice, as those who use more water generate more wastewater, and should pay more, according to the basic user pay principle. Thus, someone with a 15 mm meter using eight m3 will pay \$45 per month in 2020, and \$56 per month in 2025, the time of the next rate study. A user, such as a family, using 25 m3 with a 15 mm meter will pay \$85 per month in 2020, and \$109 in 2025. An owner of a premise with a 25 mm meter using 150 m3 will pay \$392 per month in 2020, and \$513 in 2025. A large restaurant with a 50 mm meter using 450 m3 will pay \$1,142 in 2020, and \$1,498 per month in 2025.

1.3 The Value of Cramahe Water – What \$1 Will Buy in Cramahe in 2020 and 2025

This section discusses what water, at Cramahe’s proposed water rates, will buy in terms of practical use. The proposed cost per litre of drinking water in 2020, for someone using 300 cubic metres of water per year, about the average use, was just under one quarter of a cent. Table 1.5 provides an indication of the number of water uses that can be undertaken for \$1.00 with the 2020 and 2025 proposed rates.

Table 1.5 What \$1 Worth of Cramahe Tap Water Will buy in 2020 and 2025

	Amount Used (litres)	What \$1.00 will buy	
		2020 Rate	2025 Rate
Drink a 340 ml glass of Cramahe tap water	0.3	1,428	1,113
Drink a 500 ml bottle of Cramahe tap water	0.5	971	757
Buy a 500 ml bottle of water at Tim Hortons	0.5	two thirds bottle	?
Shower			
Shower 30 minutes	270.0	1.8	1.4
Shower 10 minutes	90.0	5	4
Shower 5 minutes	45.0	11	8
Dishwasher			
Run dishwasher start to finish - new	25.0	19	15
Run dishwasher start to finish - older	38.0	13	10
Toilet			
Flush an older 15 litre toilet	15.0	32	25
Flush a 6 litre toilet	6.0	81	63
Flush a high efficiency toilet	4.5	108	84
Washing Machine			
Wash clothes - older top load	175.0	2.8	2.2
Wash clothes - new front load	90.0	5	4
Assume the cost of water in option 2 if use 300 m3 per year			
	Yearly cost	\$891	\$938
	Cost/m3	\$2.06	\$2.64
	Cost/litre	\$0.00206	\$0.00264

Table 1.5 shows that \$1.00 worth of water in 2020 will buy one of the following uses: 1,428 normal glasses of tap water in 2020, and 1,113 in 2025. \$1.00 will buy 11 five-minute showers in 2020, and 8 in 2025. One dollar will buy 19 runs of a water-efficient dishwasher in 2020, and 15 in 2025. One dollar will buy 108 high efficiency toilet flushes in 2020, and 84 in 2025, or 5 washer loads using a high efficiency washing machine in 2020, or 4 loads in 2025. When wastewater fees are added, then each of the number of uses is divided by two. This table is not intended to downplay the bill increases in the future. They are real. Instead, it shows the tremendous value represented by tap water that will continue into the future.

THE TOWNSHIP OF CRAMAHE RATE DEVELOPMENT PROJECT

2.0 PROJECT PURPOSE

This report will begin by determining the capital renewal needs, in inflated dollars, of the water and wastewater systems based on their expected lifetimes over the next 90 years, the life of the Townships longest lived asset, a water main. This project will consider all assets over the period from 2031 to 2109. The project will also consider Lakeshore Utilities Services' (LUSI's) capital renewal projections to 2030, the projected water system day-to-day operating costs as well as any future borrowing costs, and develop a financing strategy for the water and wastewater system to provide long-term sustainable funding to enable the systems to provide service well into the future. This process serves as the basis for setting simple, smooth and fair water rates, based on current practice across Ontario, as well as MOE financial guidelines. This report projects the water bills of typical hypothetical customers associated with the proposed metered water rates, and will compare Cramahe's 2020 rates with those in nearby municipalities.

The water system serving the community of Colborne is based on groundwater, with two wells and a water tower. All connections were metered in 2012. As of December 31, 2020, it provided service to an estimated 1,023 water accounts. The wastewater system is comprised of a network of collection sewers leading to a water pollution control plant utilizing a conventional activated sludge treatment process. It serves 961 sewer connections.

3.0 WATER SERVICE FINANCING OPTIONS

Municipalities have a number of alternatives available to fund water services:

Development Charges - Such charges are applied to developers and others connecting new non-serviced areas to the existing water and wastewater systems. The growth related costs of building additions to the system could be passed on to these developers or new customers. Existing users are thus spared the capital cost of expanding infrastructure to accommodate new users to the system. The Township imposes an impost cost on new developments connecting to the systems but does not impose development charges.

Connection Charges - Fees are charged to landowners who wish to connect to the system. The fee covers the cost to the water utility associated with installing a service line or drain from the existing water main or large sewer to the edge of the property line. Current fees are \$500 per water and \$500 per wastewater connection

Government Grants - The Ontario and Federal governments provide funding on a shared basis with municipalities. The formula is one-third Federal government, one third Provincial government and one third municipal funding. A grant was provided to assist with the metering project in 2012, and grant funding was provided in the past for the upgrades to the wastewater plant. No grants were assumed for the water system in the next ten years, however, grants have been assumed during the next ten years for sewer line extensions and wastewater plant expansion.

Reserves - Reserves are set up to deal with unexpected equipment repairs and to renew ageing water and wastewater systems. Increasingly, municipalities are carrying out studies to look out up to 100 years to identify capital renewal or replacement projects that need to be funded by a reserve. The Township currently has substantial reserves that will be used to fund projects in the near term, and a reserve fund is proposed to be utilized in this study to help fund future water and wastewater capital renewal projects.

Debentures - Money has traditionally been borrowed in the form of debentures to provide upgrades to service existing users. Utilizing debentures and loans allows principal and interest to be recovered over a period of time spread over a large number of current and future water users, rather than having the full cost burden fall on one group of water users at one time. The water system has one loan outstanding that commenced in 2020 with a thirty-year term. This was part of a road project, with loan cost sharing by the road department, the water fees and wastewater fees. The wastewater system has part of the 2020 loan, and a loan was taken out by the Township in 2010 to help fund the Township's portion of the cost of the wastewater treatment plant upgrade. This was a 15-year loan terminating in 2024. A \$2 million loan is proposed for wastewater in 2022, and a \$5 million loan in 2028 to help finance sewer extension and the phase 3 plant expansion.

User Fees – Smaller, recurring capital maintenance and renewal projects are often financed out of the annual operating funds of the water and wastewater system. User fees cover all the costs not covered by other financing approaches.

Most water systems use some or all of the above means. In this project, revenue generation will rely upon user rates, connection fees, loans for both water and wastewater systems, grants for the wastewater system and reserves in both systems.

4.0 WATER/WASTEWATER RATE TYPES AND CRAMAHE 2020 RATES

4.1 Rate Types

There are a number of rate types that are in use in Ontario. These are as follows:

Flat Rate - All users are assessed an annual fee that does not depend on the amount of water used. This approach, by necessity, was utilized until 2012 in Colborne when all users were metered.

Decreasing Block - Users pay less per cubic metre as water use exceeds a certain pre-set amount. This rate provides an economic advantage to large industrial or institutional water users. The Township does not use a declining block rate for metered users, and it is proposed that all users pay the same volumetric rate.

Increasing Block - Users pay more per cubic metre as water use increases beyond a pre-set amount. This is sometimes called the conservation rate, as it was designed to encourage large users to be more careful with their water use. This is not currently used in the Township and is not proposed.

Two-part Constant Unit - The user pays a fixed fee that covers a small amount of the total water costs in each billing period, usually metering and billing costs as well as some capital, plus the same charge for each and every cubic metre of water used. This rate type is currently in use for water users in Colborne, and it is proposed that all Colborne users continue to pay according to this rate type.

Seasonal Rate – Higher rates in the summer when the system is closest to capacity. This is not utilized by the Township and is not proposed at this time.

Wastewater Surcharge – This is the surcharge placed on the water bill for metered users to recover wastewater costs. This is a common practice throughout Canada and the US. It is deemed fair, insofar that those who consume more water generate more wastewater, and therefore, should pay a corresponding larger share of wastewater treatment costs. The surcharge is expressed in percentage terms and usually ranges from 90% to 150%. It often changes from year to year due to the differing rates of increase in the revenue requirements for the water and wastewater systems.

Flat rates are commonly utilized in about a tenth, or less, of Ontario municipalities that are not metered, and in communities that are only partially metered. Decreasing block rates were formerly very popular as they provided some relief for large users. However, the popularity of this rate type is declining. The management of a system that is reaching capacity, and will face expensive expansion, often employs increasing block rates. An increasing number of municipalities in Ontario utilizes it. The two-part constant unit rate is now the most commonly used rate type. It is recommended that the two-part constant unit rate, now utilized for metered Colborne users be continued, and that a wastewater surcharge on all water bills continue to be used to recover wastewater costs.

4.2 Current Rates

Table 4.1 Township of Cramahe 2020 Water and Wastewater Rates

Water Rate		2020
Metered Monthly Fixed Charge - Minimum Charge		
Meter Size	Millimetres (inches)	Monthly \$
	15-22, (.62-.75)	22.79
	25 (1.0)	31.9
	40 (1.5)	41.02
	50 (2.0)	66.09
	75 (3.0)	250.67
Metered Volumetric Charge - All Water Registered on Meter		
Per Cubic Metre (220 gallons) in \$		2.06
Wastewater Surcharge		
Wastewater Surcharge on Water Bill		115%
<p>A water bill is calculated by taking the number of months by the monthly rate for that particular meter size, and adding the volume of water used multiplied by \$2.06 per cubic metre. Thus a family of four, with a 15 mm meter, that used 100 cubic metres over three months would receive a quarterly bill for \$22.79 times 3 or \$68.37 plus \$2.06 times 100 or \$20.60 for a total bill of \$88.97 for water only. Wastewater costs would be 1.15 times the total water bill or \$68.37 times 1.15 or \$102.31.</p>		

The 2020 rates are two part constant rate type meaning that there is a fixed component paid by all users whether or not any water is used. The fixed component varies by meter size, as larger meters are more expensive to replace. There is also a volume charge paid by all users for any water that passes through the meter. In 2020, the fixed rate for a standard residential user was \$22.79 per month, and the volumetric cost, for all users, was \$2.06 per cubic metre (220 gallons) for all the water that passed through the meter. The wastewater charge was a surcharge of 115% of the water bill or the water bill multiplied by 1.15.

5.0 PROPOSED WATER SYSTEM RATES FOR 2021-2030

5.1 Water Rate Making Assumptions

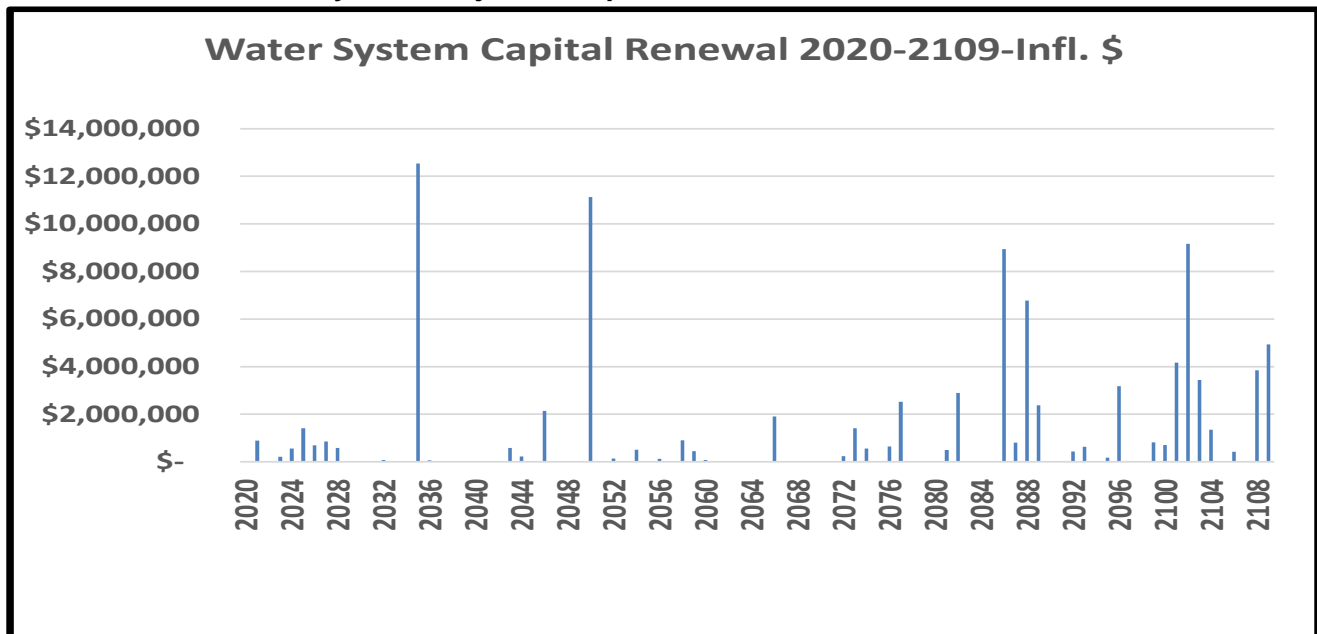
The water rate setting process in this report begins by establishing a financing plan for 2021-30, and beyond. This plan contains information about various system attributes, such as currently available information concerning various revenue sources, the day-to-day expenditures needed to operate the system, estimated new capital requirements, reserve levels and debt, if needed. Water sold and the number of connections is projected. Several assumptions have been made in preparing the financing plan:

- Inflation (operating) 2.0% per annum for most costs, 2.5% for equipment and 5% for hydro
- Inflation (capital) 3.0%
- New connections 10 new residential size connections per year

5.2 Capital Expenditures

Projecting future capital renewal and replacement expenditures is a very important step in developing sustainable rates. In this project, the system operator's (LUSI) projection of capital needs to 2030 was utilized. This is shown in appendix 1. Next, the Township's asset database was used to estimate renewal needs from 2031 to 2109. This asset database sets out the initial costs, when the asset was installed and set the cost of each asset to 2019 costs and in future costs. Also shown is the portion covered existing users, grants, loans and new user fees. Based on the life expectancies of each asset, a future renewal and replacement schedule was developed for 2031 to 2109. For example, an asset installed in 1994, with a 30-year life, is scheduled for replacement in 2024. The 2019 asset cost was inflated to 2024 replacement costs, the year when the asset is scheduled for replacement. Water mains, some with a 90-year life, installed in 1994 will be replaced in 2084, with 2019 replacement cost inflated to 2084 costs. This approach was used for all 108 listed water assets in place in 2019 and projected out to 2109. The projected capital asset replacement schedule and their future costs for 2020 to 2109 are summarized in figure 5.1.

Figure 5.1 Cramahe Water System Projected Capital Renewal Needs 2020-2109 Inflated \$



Capital project renewal is projected to cost \$27 million in inflated dollars between 2020 and 2050. This is to renew aging parts of the existing system. Major capital projects projected in the near term are shown in Appendix 1 and include some of the following:

- 2021 Upgrade of the King St. E main east of Colton Drive, New well 1A commissioning
- 2023 Installation of a pressure reducing valve at Percy Street
- 2024 Alfred water main extension
- 2025 Upsizing King Street Elgin to Durham
- 2026 Upgrade King Street East of Ontario Street
- 2027 Upgrade King Street E from Durham to Colton
- 2028 Water meter replacement for all users
- 2035 Water main replacement for ductile iron water mains with hydrants and valves installed in 1960
- 2046 Tank and tower rehabilitation
- 2050 Replacement of PVC lines installed in 1960.

Additional capital renewal is required in the late 2060s, late 2070s and major renewal in the 2080s and early in the next century

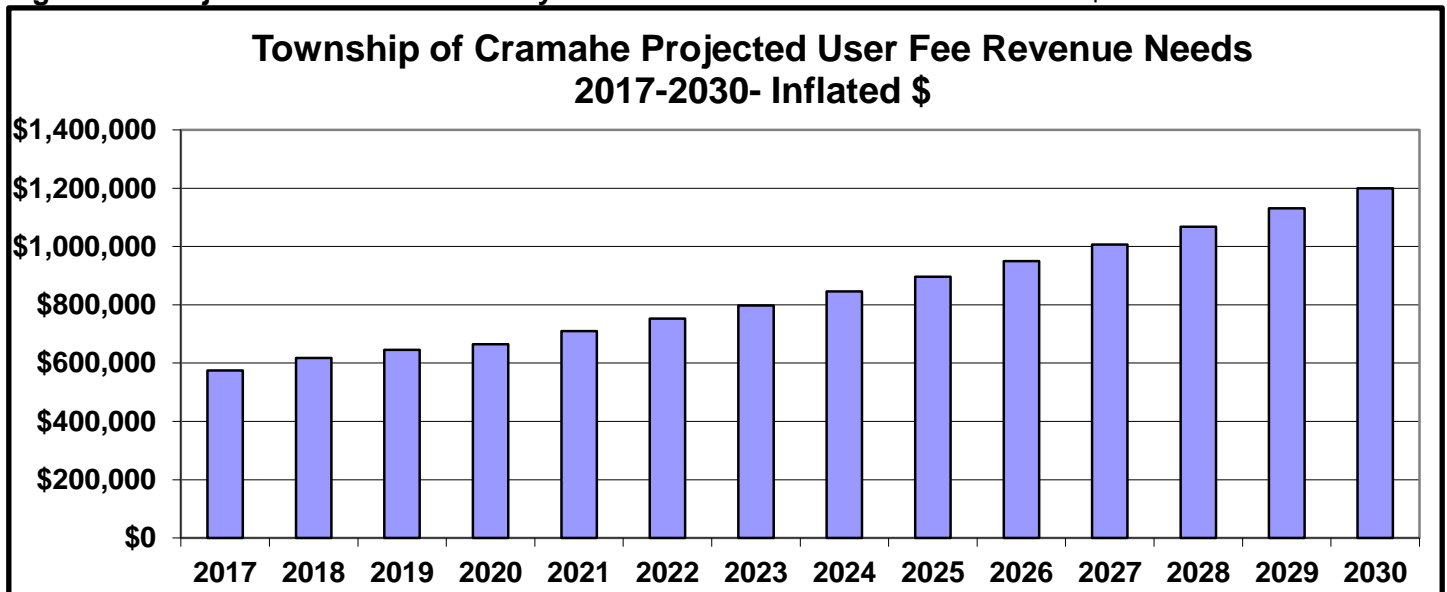
5.3 Operating Plan

The operating financial plan for the water system sets out the revenues and expenditures, and summarizes the financing strategy for the water system. The objective, adopted in this study, is to use user fees as much as possible to finance projected asset renewal expenditures, with loans used to finance major renewal projects are needed such as major water main replacement or water tower construction. The summarized operating financial transactions for 2017 to 2030 are shown in table 5.1.

5.1.1 User Fee Requirements

Revenues are comprised primarily of revenues from user fees, with some revenues from impost fees and various miscellaneous sources. Contributions are made from the capital reserve to augment revenue needs in years when large capital expenditures occur. The projected user fee revenue needs are set out in line 1 of table 5.1. The projected user fees are illustrated graphically in Figure 5.2 below:

Figure 5.2 Projected Cramahe Water System User Fee Needs 2017-30 Inflated \$

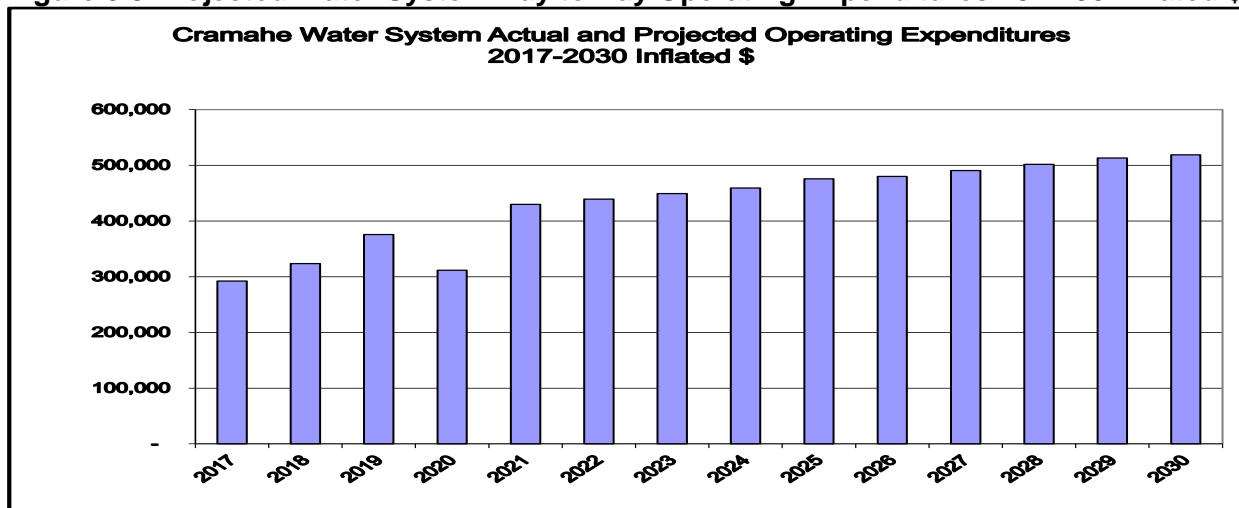


User fees are projected to increase at 6.0% per year from 2021 to 2030 and beyond to 2109. Included in the user fee increase is provision for the inflation of operating costs of 2% per year, and inflation of 3% per year for projected capital costs. The proposed schedule of user fee increases funds all routine projected operating costs, and provides sufficient revenue to cover the currently projected capital asset renewal and replacement needs to 2109.

5.1.2 Operating Expenses

Total operating expenditures represent the routine day-to-day costs of operating the system, and include labour, benefits, electrical, chemical and testing costs. They also include debt payments, capital expenditures and reserve transfers. The total expenses are summarized in line 60 of table 5.1. Day to day operating costs exclude loan repayments, capital costs and reserves. These are excluded as they vary greatly from year to year and make year-to-year comparisons difficult. The day-to-day operating expenditures are summarized in line 56 in table 5.1, and are illustrated in figure 5.3.

Figure 5.3 Projected Water System Day to Day Operating Expenditures 2017-30 Inflated \$



Fluctuations in expenditures are normal. The above costs show a decline to 2020, due to a large one-time charge in 2019. The expenses then rise more or less in line with inflation from 2021 to 2030.

5.3.3 Debt

The water system has 20% of one loan outstanding. The whole loan was taken out for \$1,720,000 on January 1, 2020 for a 30-year term. This loan is shared between the water system, wastewater and roads. The water system's 20% share of the principal is \$344,000. The principal and interest is shown on lines 57 and 58 of table 5.1. The schedule is shown in appendix 2. No further debt is projected at this time until 2035, when a \$6.7 million loan for 20 years at 3% is projected. No significant further debt is anticipated beyond that point. The amount of the 2035 loan will depend on the scheduling of the main replacements that will become clearer as engineering studies are carried out in the next ten years.

Table 5.1 Water System Operating Revenues, Expenditures and Transfers 2017-2030 Inflated\$

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenues														
1 Metered Sale of Water	(575,254)	(617,590)	(645,495)	(664,860)	(710,000)	(752,600)	(797,756)	(845,621)	(896,359)	(950,140)	(1,007,149)	(1,067,577)	(1,131,632)	(1,199,530)
2 Meter Sales	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 OSWAP Funding	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Impost Fees	(7,220)	(9,626)	(4,813)	(6,000)	(8,000)	(8,144)	(8,291)	(8,440)	(8,592)	(8,746)	(8,904)	(9,064)	(9,227)	(9,393)
5 Miscellaneous Revenue	(1,500)	-	(10,182)	(10,284)	(3,000)	(3,030)	(3,060)	(3,091)	(3,122)	(3,153)	(3,185)	(3,216)	(3,249)	(3,281)
6 Government Grants	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 Development Charge Revenue	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 MOE Source Mgt. Grant	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 Reserve Interest- Income (Expense)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 Loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11 Subtotal	(583,973)	(627,216)	(660,490)	(681,144)	(721,000)	(763,774)	(809,107)	(857,152)	(908,072)	(962,040)	(1,019,237)	(1,079,858)	(1,144,108)	(1,212,204)
12														
13 Expenditures for all Systems														
15 Administration Fee	4,800	4,000	4,800	4,896	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975
17 Payment in Lieu Expense	1,643	1,096	1,365	1,393	-	-	-	-	-	-	-	-	-	-
19 Telephone	467	464	1,085	1,107	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195
20 Hydro	33,802	24,385	23,197	24,357	25,000	26,250	27,563	28,941	30,388	31,907	33,502	35,178	36,936	38,783
22 Office Supplies	200	-	-	200	-	-	-	-	-	-	-	-	-	-
24 Meters/Spoolers	-	-	10,729	-	2,500	2,550	2,601	2,653	2,706	2,760	2,815	2,872	2,929	2,988
26	-	300	-	-	-	-	-	-	-	-	-	-	-	-
27 Line Maintenance	9,106	38,831	27,048	27,725	30,000	30,750	31,519	32,307	33,114	33,942	34,791	35,661	36,552	37,466
28 Equipment Maintenance	3,965	1,730	2,311	2,369	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244
29 Building Maintenance	-	293	790	806	30,000	30,600	31,212	31,836	32,473	33,122	33,785	34,461	35,150	35,853
31 Sampling	-	5,164	5,282	5,388	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975
32 Training	204	-	-	204	-	-	-	-	-	-	-	-	-	-
33 Contracted Out	4,915	-	-	-	-	-	-	-	-	-	-	-	-	-
34 Audit	8,395	6,441	5,308	5,414	6,700	6,834	6,971	7,110	7,252	7,397	7,545	7,696	7,850	8,007
35 Insurance	11,660	13,353	15,459	15,769	21,600	22,032	22,473	22,922	23,381	23,848	24,325	24,812	25,308	25,814
36 Env. Service	-	-	2,035	2,076	-	-	-	-	-	-	-	-	-	-
38 Fire Cost/Hydrants	-	5,627	5,879	5,997	5,249	-	-	-	-	-	-	-	-	-
45 Material on Hand/Shop Supplies	4,133	5,009	4,660	4,777	6,000	6,150	6,304	6,461	6,623	6,788	6,958	7,132	7,310	7,493
48 Contracted Out (LUS)	208,613	217,021	204,995	209,094	265,000	270,300	275,706	281,220	286,845	292,581	298,433	304,402	310,490	316,700
49 Lead Removal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50 Computer Software/Hardware	-	-	-	-	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975
51 Source Protection	-	-	-	-	7,000	7,140	7,283	7,428	7,577	7,729	7,883	8,041	8,202	8,366
52 Municipal Licenses	-	-	-	-	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975
54 Consulting, Eng. Fees	-	-	-	-	10,000	10,200	10,404	10,612	10,824	11,041	11,262	11,487	11,717	11,951
55 Env Service Waterworks	-	-	60,649	-	-	-	-	-	-	-	-	-	-	-
56 Total Day to Day Expenditures	292,203	323,414	375,594	311,571	435,049	439,351	449,136	459,161	475,782	479,851	490,637	501,693	513,026	518,786
57 Principal 2020 30 Year Loan	-	-	-	7,312	7,526	7,747	7,974	8,207	8,448	8,696	8,950	9,213	9,461	9,761
58 Interest	-	-	-	9,958	9,743	9,523	9,296	9,062	8,821	8,574	8,319	8,056	7,809	7,508
59 2035 Loan P and I	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60 Subtotal - Expenses	292,203	323,414	375,594	328,840	452,318	456,620	466,405	476,430	493,051	497,120	507,907	518,962	530,295	536,055
61 Trans to (from) Capital	-	-	296,209	19,600	890,950	-	218,545	562,754	1,409,040	693,110	860,912	581,276	-	-
62 Trans to (from) Water Mtr Res	(528,031)	(306,086)	(16,851)	-	-	-	-	-	-	-	-	-	-	-
63 Trans to (from) Wat Reserve	819,802	609,888	5,537	332,703	(622,268)	307,154	124,157	(182,032)	(994,018)	(228,191)	(349,581)	(20,381)	613,813	676,149
65 Subtotal Transfers	291,771	303,802	284,895	352,303	268,682	307,154	342,702	380,722	415,021	464,919	511,330	560,896	613,813	676,149
66														
67 Total Expenses and Transfers	583,974	627,217	660,490	681,144	721,000	763,774	809,107	857,152	908,072	962,040	1,019,237	1,079,858	1,144,108	1,212,204
68														
69 Net	0	0	(0)	-	-	-	-	-	-	-	-	-	-	-

5.3.4 Reserves

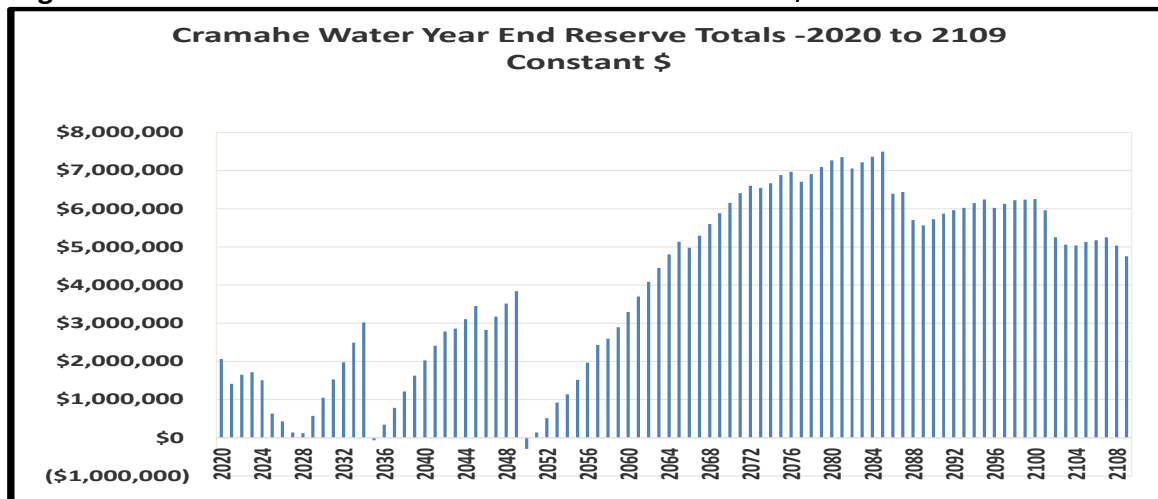
The infrastructure or capital reserve as of December 31, 2019 had a surplus of \$\$1,789,744. This reserve, supplemented by user fees in future years, as shown in table 5.2, will meet the projected capital renewal needs to 2030 and beyond to 2035.

Table 5.2 Water System Capital Reserve 2020-2030 Inflated \$

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Opening Value	\$1,789,744	\$2,122,447	\$1,500,179	\$1,807,333	\$1,931,490	\$1,749,458	\$755,439	\$527,248	\$177,667	\$157,287	\$771,100
Addition (Withdrawal) from (to) Ops	\$332,703	(\$622,268)	\$307,154	\$124,157	(\$182,032)	(\$994,018)	(\$228,191)	(\$349,581)	(\$20,381)	\$613,813	\$676,149
Interest on Deficit (loan)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,330	\$4,719	\$0
Close Inflated \$	\$2,122,447	\$1,500,179	\$1,807,333	\$1,931,490	\$1,749,458	\$755,439	\$527,248	\$177,667	\$157,287	\$771,100	\$1,447,249
Close in 2019\$	\$2,060,629	\$1,414,063	\$1,653,966	\$1,716,104	\$1,509,097	\$632,669	\$428,701	\$140,252	\$120,547	\$573,770	\$1,045,523

The reserve is projected to be in surplus to 2035. The reserve years in constant dollars are shown in Figure 5.4. It is apparent from Figure 5.1 that a major capital renewal project is forecast for 2035, and that some long-term borrowing will be required to carry out this large-scale capital renewal of aging water mains and above ground facilities. By the mid 2050s, the loan is paid off and the reserve remains in surplus to 2109. The complete listing of reserve transactions from 2020 to 2109 is shown in appendix 4.

Figure 5.4 Reserve Year End Totals 2020-2109 in Constant \$



5.4 Township Water Sales/Connections

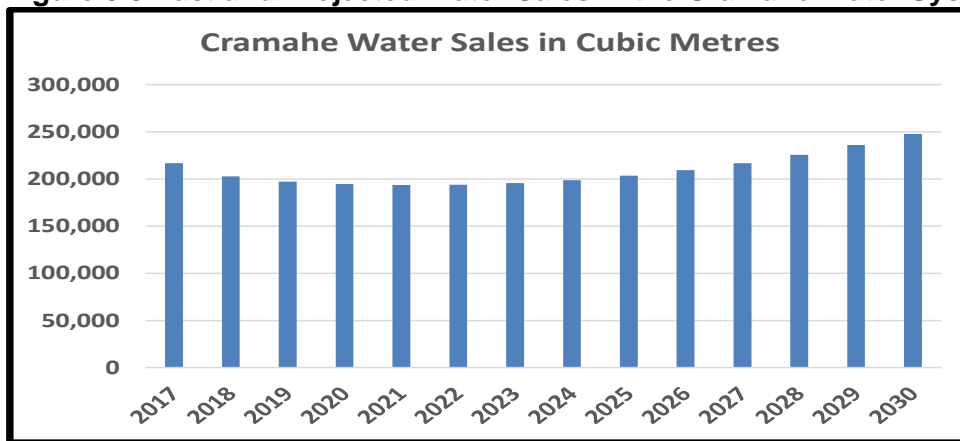
5.4.1 Water Sales 2017- 2030

Water sold is water that a user had paid for. Rates are based on water that is sold to a user. From 2021 to 2030, the rate-setting period, total water sold to existing 2019 residential and smaller industrial commercial and institutional (ICI) users is projected to decline modestly due to conservation. This is a result of provincial plumbing regulations, enacted in 1991, requiring installation of water efficient fixtures (toilets, showers and faucets) in all new connections and the restrictions on the sale of toilets that use more than 6 litres per flush. People carrying out renovations will replace currently inefficient fixtures with more water efficient ones. Highly efficient front-load washing machines are now very popular with homeowners. An annual improvement in water use efficiency of 1.5% per annum is assumed in all of the connections, existing as of December 2019, meaning a decline in water sold of about 1.5% each year for this water user group.

Offsetting this decline, and adding to water sales, is a modest increase in the number of new residential units. The increase, shown in table 5.4, is based on a projected ten new connections per year based on the experience of the past five years and projected new development. New residential users added to the system post 2019 will be using water efficient fixtures required by the changes to the plumbing code referenced above. As a result, they will use significantly less per person per day than those using older model fixtures and fittings. The water use per person of the new users is estimated at 150 litres per person per day (lppd). This assumption of 150 lppd is included in the estimates above. New users, as a group, even though they have more efficient fixtures than existing users, will increasingly add to overall water sales in future years.

This growth in projected water sales helps reduce the growth in water rates and eventually will lead to an overall increase in water sales. The actual water use for 2017-2019 and the projected water sales from 2020 to 2030 are set out in table 5.3 and illustrated in figure 5.5.

Figure 5.5 Past and Projected Water Sales in the Cramahe Water System 2017-30



5.4.2 Projected Number of Customers

The current number of customers, and the projected customers, are set out in table 5.4 and illustrated in figure 5.6. The increase is made up largely of residential connections.

Figure 5.6 Total Number of Cramahe Water System Customers 2020-2030

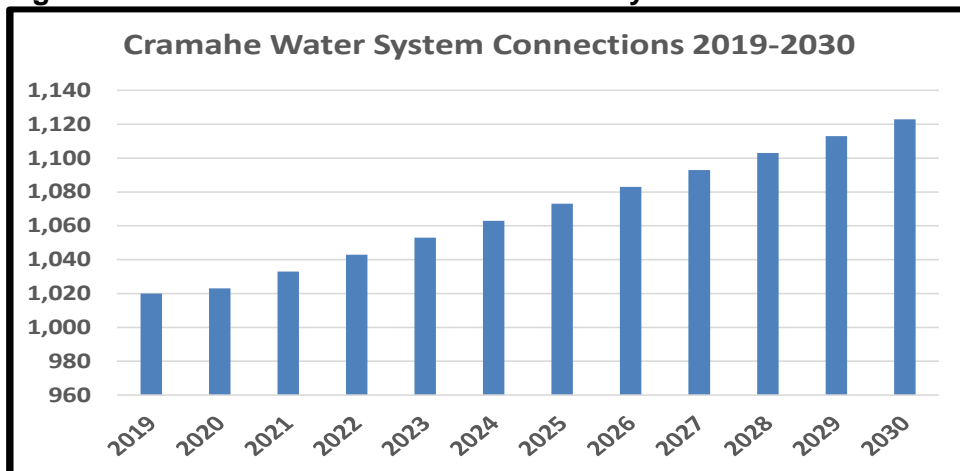


Table 5.3 Quantity of Water Sold in M3 Yearly 2017-2019 and Projected 2020-2030

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Pumpage (Measured)	347,603	333,691	328,206	325,674	324,565	324,879	326,617	329,779	334,364	340,373	347,805	356,660	366,940	378,642
Non-Revenue Water (Estimate 2010-2012)	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910	130,910
Fixture Conversion - Pre 2020 dev. - (decrease)				(2,959)	(2,959)	(2,959)	(2,959)	(2,959)	(2,959)	(2,959)	(2,959)	(2,959)	(2,959)	(2,959)
Use by New Users - Post 2019				427	1,851	3,274	4,698	6,121	7,545	8,968	10,392	11,815	13,239	14,662
Total Water Sold - Measured 2017 to 2019	216,693	202,781	197,296	194,764	193,655	193,969	195,707	198,869	203,454	209,463	216,895	225,750	236,030	247,732

Table 5.4 Number of Water Connections Yearly Actual 2019 and Projected 2020-2030

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Flat - Not Metered Units	0	0	0								
Meter Size in mm (inches) 15 (0.62)	985 [↓]	995 [↓]	1,005 [↓]	1,015 [↓]	1,025 [↓]	1,035 [↓]	1,045 [↓]	1,055 [↓]	1,065 [↓]	1,075 [↓]	1,085 [↓]
20 (0.75)	0	0	0 [↑]	0	0	0	0	0	0	0	0
25 (1.00)	6	6	6 [↑]	6	6	6	6	6	6	6	6
40 (1.50)	6	6	6 [↑]	6	6	6	6	6	6	6	6
50 (2.00)	25	25	25 [↑]	25	25	25	25	25	25	25	25
62 (2.50)	0	0	0 [↑]	0	0	0	0	0	0	0	0
75 (3.00)	1	1	1 [↑]	1	1	1	1	1	1	1	1
100 (4.00)	0	0	0 [↑]	0	0	0	0	0	0	0	0
150 (6.00)	0	0	0 [↑]	0	0	0	0	0	0	0	0
Total Connections	1,023	1,033	1,043	1,053	1,063	1,073	1,083	1,093	1,103	1,113	1,123

Table 5.5 Proposed Monthly Water Bills 2020-2030 Inflated \$

User Category in M3 per Month	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Couple 8 M3 15mm (.62") Meter	39	41	42	44	45	47	49	51	53	55	57
Family 25 M3 15mm (.62") Meter	74	77	80	85	89	92	96	99	101	104	106
Grocery 50 M3 25mm (1.0") Meter	135	141	147	155	163	169	175	180	185	189	192
Coffee Shop 150 M3 25mm (1.0") Meter	341	357	376	396	418	433	447	459	468	476	483
School 200 M3/Month 50mm (2.0") Meter	478	500	525	554	583	605	624	641	656	668	679
Restaurant 450 M3 50mm (2.0") Meter	993	1,041	1,097	1,158	1,221	1,266	1,305	1,338	1,365	1,387	1,405

Note: The 2020 water bills are for purposes of comparison only.

Note: Water use by singles, couples, families will vary widely and an individual's bill will depend on personal water use.

The number of connections by 2030 is 10% larger than the number in 2020. This is based on a projected increase of ten new residential customers per year. There will also be a small increase in the number of ICI customers as well as the loss of some of the pre-2019 customers. The increase in the number of residential customers will help keep water bills lower than if there were no new users.

5.5 Water Rate Calculations

Rates are calculated by considering the user fee revenue requirements, and by taking into account future projected water use and the number of connections. As illustrated in figure 5.3, user fees are projected to increase. This would normally cause rates to rise. However, the number of new users will help offset some of the projected increase in user fees. For purposes of computing rates for the next ten years, this report will assume that there will be ten new residential units added to the system each year, and the resulting water usage and numbers of users are set out in table 5.3 and 5.4

The rates recommended in this study will utilize the two-part rate structure currently in use. One part of this rate is a fixed cost applied to all users regardless of water use. This part of the rate in Cramahe accounts for 36% of the revenue raised annually from a user taking 240 cubic metres of water per year. This number is usually higher in communities that are facing substantial capital investment, as it is important that every user help pay for this basic infrastructure. The share of the total water represented by the fixed charge in a number of central and eastern Ontario communities is shown in appendix 3. Most of those on the list recover a larger proportion of their revenues, than Cramahe does, from the fixed part of the rate.

The second part of the rate is the cost per cubic metre that depends on the amount of water used. All costs that are not included in the fixed portion of the rate are included in this rate component. The more water that is used, the higher the water bill. The proposed rates for 2021-2030 are set out in table 5.6:

Table 5.6 Cramahe Proposed Monthly Two-Part Water Rates 2021-2030 Inflated \$

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Metered Fixed per Month											
Meter Size in mm (inches)											
15 (0.62)	22.79	23.25	23.21	24.21	25.00	26.26	27.60	29.00	30.48	32.03	33.67
20 (0.75)	22.79	23.25	23.21	24.21	25.00	26.26	27.60	29.00	30.48	32.03	33.67
25 (1.00)	31.90	32.54	32.50	33.89	34.99	36.77	38.63	40.60	42.67	44.84	47.13
40 (1.50)	41.02	41.84	41.78	43.57	44.99	47.27	49.67	52.20	54.86	57.65	60.60
50 (2.00)	66.09	67.41	67.32	70.20	72.49	76.16	80.03	84.10	88.38	92.89	97.63
75 (3.00)	250.67	255.68	255.35	266.29	274.95	288.89	303.55	318.98	335.23	352.32	370.32
Metered Volumetric Charge - All Water											
Per cubic metre	\$ 2.06	\$ 2.16	\$ 2.29	\$ 2.42	\$ 2.55	\$ 2.64	\$ 2.72	\$ 2.79	\$ 2.84	\$ 2.88	\$ 2.91

The proposed rates in table 5.6 show an increasing cost of about 4% per annum for the fixed cost for 2021 to 2024 and 5% for 2025. Rate increases for the variable rate are about 5% per annum. Rate increases are due to the increase in projected capital renewal. There are also inflationary increases in both operating costs and future capital renewal. Assuming an inflation rate of 2.5% per year for capital renewal needs, the variable rate increases about three and one-half per cent per m3 over the next ten years. Rate checking calculations for the above rates are set out in appendix 5.

Clearly, rates and the annual increase in rates are helped somewhat thanks to the number of new users in the future. If this modest growth does not materialize, then the rates may have to increase further to maintain the needed revenue flow to renew infrastructure. This will not require a rate study, but will require annual monitoring of new development and water sales.

5.6 Sample Monthly Water Bills for Various User Groups

A number of hypothetical user groups were selected to determine the impacts of the rates. The water bills to 2030 are set out in table 5.5. Bills to 2025, the time of the next rate study, are in table 5.7.

Table 5.7 Hypothetical Monthly Water Bills for the Proposed Water Rates 2021-2025 Inflated \$

User Category in M3 per Month	2020	2021	2022	2023	2024	2025
Couple 8 M3 15mm (.62") Meter	39	41	42	44	45	47
Family 25 M3 15mm (.62") Meter	74	77	80	85	89	92
Grocery 50 M3 25mm (1.0") Meter	135	141	147	155	163	169
Coffee Shop 150 M3 25mm (1.0") Meter	341	357	376	396	418	433
School 200 M3/Month 50mm (2.0") Meter	478	500	525	554	583	605
Restaurant 450 M3 50mm (2.0") Meter	993	1,041	1,097	1,158	1,221	1,266

Note: The 2020 water bills are for purposes of comparison only.

Note: Water use by singles, couples, families will vary widely and an individual's bill will depend on personal water use.

A user taking eight cubic metres per month is projected to pay \$39 in 2020, and \$47 in 2025. Someone using 25 cubic metres per month will pay \$74 per month in 2020, and \$92 in 2025. A user of 50 cubic metres per year, such as a grocery store, will pay a monthly water bill of \$135 per month in 2020, and \$169 in 2025. A larger user, such as a coffee shop using 150 cubic metres per month will pay \$341 monthly in 2020, and \$433 in 2025. A very large user, such as a school, taking 200 cubic metres per month will pay \$478 per month in 2020, and \$605 in 2025. A larger restaurant using 450 cubic metres per month will pay \$993 monthly in 2020, and \$1,266 in 2025. All figures are in inflated dollars.

5.7 Comparison with Nearby and Some Smaller Central and Eastern Ontario Communities

Table 5.8 Comparison of Water Bills for Users taking 240 cubic Metres per Year in 2020 \$

Utility	Water Bill
Coburg	\$494
Brighton	\$538
Norwood	\$542
Bay of Quinte	\$566
Toronto	\$598
Peterborough	\$602
Campbellford, Hastings, Warkworth	\$622
Lakefield	\$708
Cramahe	\$768
Dundalk	\$849
Clearview	\$884
Grafton	\$938
Kawartha Lakes	\$1,024
Barry's Bay	\$1,123
Mount Forest	\$1,208

Cramahe's water bills for a user of 240 cubic metres, approximating usage from an average user, is on the more expensive side of the listing, as shown in table 5.8. Smaller municipalities across Ontario are facing higher water bills. However, all municipalities are coming to grips with setting aside funding to renew capital assets. Even larger municipalities than Cramahe on the listing, like Toronto and Peterborough, are, like Cramahe, making plans to renew aging water infrastructure. Some municipalities have special circumstances that lead to higher costs, such as Kawartha Lakes, that has many small systems each requiring treatment processes.

Over the next ten years, there is a substantial amount of capital work planned, including sewer upgrades and the phase 3-plant expansion. In the longer term, the sewer mains were installed in 1960 and they have estimated lives, for accounting purposes, of 80 or 90 years depending on material. Thus, the system is in a quiet period, from that point of view, but major renewal costs are on the horizon. The principal costs that appear ahead include the following:

- 2023-7 Sewer system upgrades 4.5 million in 2020\$
- 2028 Ph. 3 wastewater plant expansion \$15 million in 2020\$
- 2033 Sewer plant structural work .49 million in inflated \$
- 2044 Sewer main replacement 7.7 million in inflated \$
- 2058 Sewer main replacement 3.3 million in inflated \$
- 2065 Plant renewal 35. Million in inflated \$

The projects beyond ten years will likely appear as renewal/replacement work taking place over a decade rather than in a single year. These projects will be funded with user fees, grants, a loan and from a reserve.

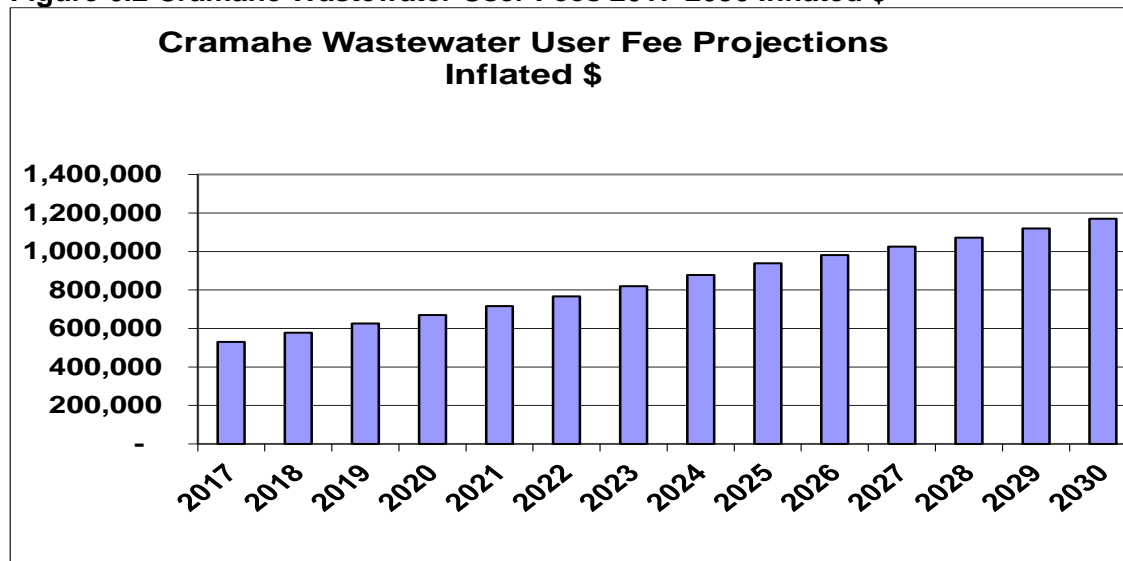
6.3 Financial Statement

The operating financial plan for the wastewater system sets out the revenues and expenditures, and summarizes the financing strategy for the wastewater system. The objective, adopted in this study, is to use user fees as much as possible to finance projected asset renewal expenditures, with loans used to finance major projects in the near term, and loans are undertaken when major renewal projects are needed, such as major sewer main replacement or wastewater treatment plant renewal. The summarized operating financial transactions for 2017 to 2030 are shown in table 6.1.

6.3.1 Wastewater User Fees

The projected revenues that must be raised through user fees are set out in line 1 of table 6.1 and illustrated in figure 6.2:

Figure 6.2 Cramahe Wastewater User Fees 2017-2030 Inflated \$



Wastewater fees increased from 2017 through 2019 and are projected to increase at 7% per year, or about 3.5% above inflation, from 2021 to 2030. At that point, they are projected to increase at 3.5% to 2109. Higher fees are needed, in the near term, to cover the increased costs associated with the sewer upgrades and phase 3-plant expansion, plus inflation of all costs averaging nearly 3% per year.

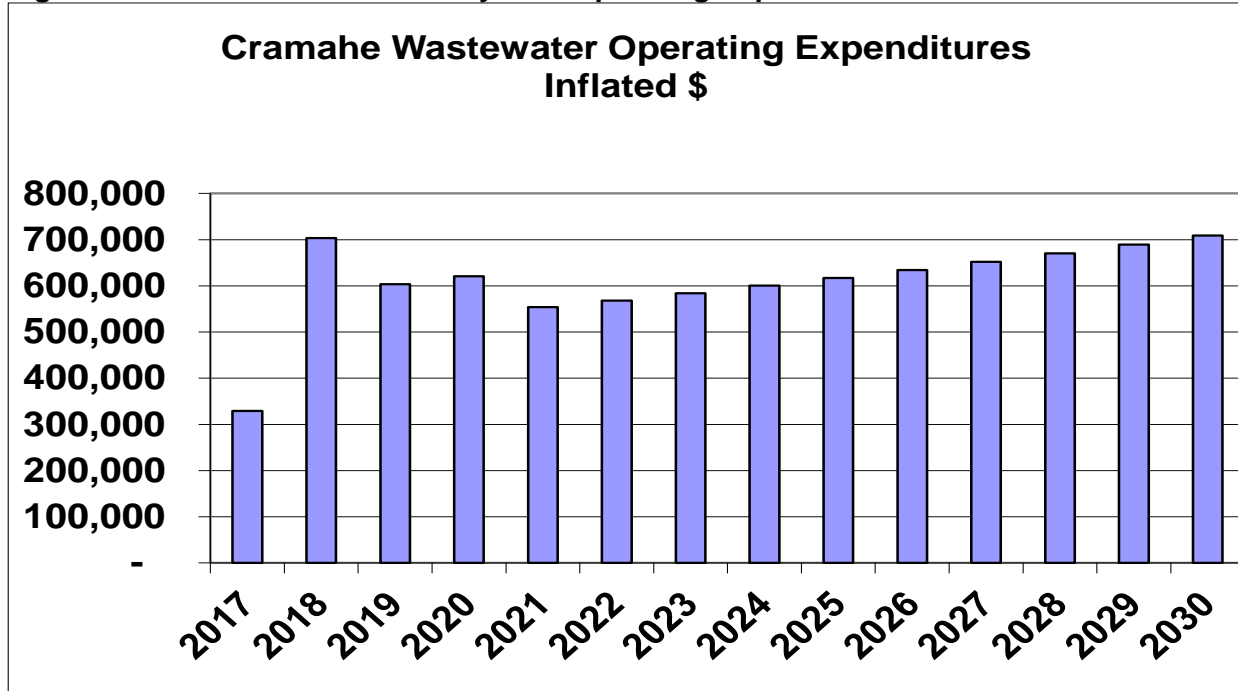
Table 6.1 Cramahe Wastewater System Operating Revenues and Expenditures – Inflated \$

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenues														
1 User Fees	(529,665)	(578,014)	(625,585)	(669,375)	(716,232)	(766,368)	(820,014)	(877,415)	(938,834)	(981,081)	(1,025,230)	(1,071,365)	(1,119,577)	(1,169,958)
3 Impost Fees	(20,899)	(20,899)	(6,966)	(7,175)	(10,000)	(10,300)	(10,609)	(10,927)	(11,255)	(11,593)	(11,941)	(12,299)	(12,668)	(13,048)
4 Miscellaneous	-	(4,128)	(10,182)	(10,386)	(2,500)	(2,550)	(2,601)	(2,653)	(2,706)	(2,760)	(2,815)	(2,872)	(2,929)	(2,988)
6 Interest	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 OCIF Funding	(50,000)	(57,262)	-	-	-	-	-	-	-	-	-	-	-	-
8 Loan	-	-	-	-	-	(2,000,000)	-	-	-	-	-	(5,000,000)	-	-
9 Federal Gas Tax	-	-	-	-	(266,000)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)
10 Government Grants	-	-	-	-	-	-	(655,964)	(675,643)	(695,912)	(716,790)	(738,293)	(11,598,537)	-	-
11 Total Revenues	(600,564)	(660,303)	(642,733)	(686,936)	(994,732)	(2,829,218)	(1,539,188)	(1,616,638)	(1,698,707)	(1,762,224)	(1,828,279)	(17,735,073)	(1,185,173)	(1,235,993)
12														
Operating Expenditures														
20 Salaries	167	-	-	-	-	-	-	-	-	-	-	-	-	-
21 SALARIES: Full Time	-	820	262	267	-	-	-	-	-	-	-	-	-	-
22 SALARIES: Overtime	-	19,242	21,366	21,793	19,500	19,890	20,288	20,694	21,107	21,530	21,960	22,399	22,847	23,304
23 Salaries Standby	-	520	5,454	5,563	6,600	6,732	6,867	7,004	7,144	7,287	7,433	7,581	7,733	7,888
24 Salaries Overtime	17,315	-	-	-	-	-	-	-	-	-	-	-	-	-
25 Administration Fee	4800	10,106	-	-	-	-	-	-	-	-	-	-	-	-
26 Admin Expenses	-	-	4,800	4,896	4,800	4,896	4,994	5,094	5,196	5,300	5,406	5,514	5,624	5,736
27 Distributed Salary	41,717	76,441	74,657	76,150	113,000	115,260	117,565	119,917	122,315	124,761	127,256	129,801	132,398	135,045
28 CPP	-	2,804	3,019	3,079	4,775	4,871	4,968	5,067	5,169	5,272	5,377	5,485	5,595	5,707
29 EI	-	1,127	1,167	1,190	1,556	1,587	1,619	1,651	1,684	1,718	1,752	1,787	1,823	1,860
30 WSIB	1,056	2,743	2,924	2,982	5,600	5,712	5,826	5,943	6,062	6,183	6,307	6,433	6,561	6,693
31 EHT	-	2,719	2,015	2,055	2,700	2,754	2,809	2,865	2,923	2,981	3,041	3,101	3,163	3,227
32 OMERS	-	7,152	8,198	8,362	13,200	13,464	13,733	14,008	14,288	14,574	14,865	15,163	15,466	15,775
33 SE Life	269	307	2,301	2,347	3,200	3,264	3,329	3,396	3,464	3,533	3,604	3,676	3,749	3,824
34 Ext Health Care	1,236	1,462	9,087	9,269	12,700	12,954	13,213	13,477	13,747	14,022	14,302	14,588	14,880	15,178
35 Payment in Lieu Expense	-	3,385	-	-	-	-	-	-	-	-	-	-	-	-
36 Memberships	274	-	145	148	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195
37 Professional Dev	209	1,588	260	265	3,000	3,060	3,121	3,184	3,247	3,312	3,378	3,446	3,515	3,585
38 Postage /Courier	-	-	-	250	-	-	-	-	-	-	-	-	-	-
39 Mileage	237	57	18	18	300	306	312	318	325	331	338	345	351	359
40 Telephone	1,856	1,901	1,986	2,046	2,000	2,060	2,122	2,185	2,251	2,319	2,388	2,460	2,534	2,610
41 Internet	687	989	989	1,019	1,000	1,030	1,061	1,093	1,126	1,159	1,194	1,230	1,267	1,305
42 Hydro	53,468	52,714	56,892	59,737	55,000	57,750	60,638	63,669	66,853	70,195	73,705	77,391	81,260	85,323
43 Water Charges	4,604	1,739	7,745	8,017	7,500	7,763	8,034	8,315	8,606	8,908	9,219	9,542	9,876	10,222
44 Office Supplies	277	-	180	184	250	255	260	265	271	276	282	287	293	299
45 Lab Supplies	-	-	-	-	1,000	-	-	-	-	-	-	-	-	-
46 Shop Supplies	55,225	52,780	39,399	40,581	10,000	10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,668	13,048
48 Sewer Charge	5,246	2,002	8,958	9,227	8,500	8,755	9,018	9,288	9,567	9,854	10,149	10,454	10,768	11,091
51 Line Maintenance	31,532	38,217	36,235	37,322	40,000	41,200	42,436	43,709	45,020	46,371	47,762	49,195	50,671	52,191
52 Equipment Maintenance	27,708	48,477	56,289	57,977	30,000	30,900	31,827	32,782	33,765	34,778	35,822	36,896	38,003	39,143
53 Building Maintenance	1,324	808	6,931	7,139	10,000	10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,668	13,048
55 Inspection	-	-	-	-	6,000	6,120	6,242	6,367	6,495	6,624	6,757	6,892	7,030	7,171
56 Sampling	8,223	8,330	9,826	10,022	10,000	10,200	10,404	10,612	10,824	11,041	11,262	11,487	11,717	11,951
58 Audit	7,622	5,800	5,001	5,101	6,000	6,120	6,242	6,367	6,495	6,624	6,757	6,892	7,030	7,171
59 Insurance	10,084	11,094	12,344	12,591	20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902
60 Legal	968	-	-	-	-	-	-	-	-	-	-	-	-	-
61 Other Expenses	213	143	29,542	30,428	10,000	10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,668	13,048
63 Materials	2,042	26,448	16,857	17,362	-	-	-	-	-	-	-	-	-	-
65 Aluminum Sulfate	-	-	-	-	15,000	15,450	15,914	16,391	16,883	17,389	17,911	18,448	19,002	19,572
66 Hypo Chlorite	-	-	-	-	20,000	20,600	21,218	21,855	22,510	23,185	23,881	24,597	25,335	26,095
67 Bisulphate	-	-	-	-	10,000	10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,668	13,048
68 Contracted Out	25,727	32,972	92,619	95,398	47,869	49,305	50,784	52,308	53,877	55,493	57,158	58,873	60,639	62,458
69 Contracted Out Line Maint	-	-	-	-	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975
70 Line Maint	-	-	-	-	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975
71 Machine rental	1,580	9,688	24,168	24,651	-	-	-	-	-	-	-	-	-	-
72 PIL	3,171	-	4,229	4,314	-	-	-	-	-	-	-	-	-	-
73 Consultants Small Bore	1,083	15,170	24,623	25,362	-	-	-	-	-	-	-	-	-	-
74 Consultant	427	-	1,190	1,225	40,000	41,200	42,436	43,709	45,020	46,371	47,762	49,195	50,671	52,191
75 Consultants Lines	18,575	263,660	31,764	32,717	2,000	2,060	2,122	2,185	2,251	2,319	2,388	2,460	2,534	2,610
77 Subtotal Expenditures	329,171	703,406	603,440	620,805	554,300	568,337	584,090	600,326	617,059	634,308	652,090	670,423	689,326	708,819
78														
Financial Transfers														
80 2010 Loan Interest	33,215	29,609	25,859	21,959	17,904	13,687	9,302	4,742	-	-	-	-	-	-
81 2010 Loan Principal	90,376	93,982	97,732	101,631	105,686	109,903	114,288	118,646	-	-	-	-	-	-
82 2022 Loan P and I	-	-	-	-	-	105,208	105,208	105,208	105,208	105,208	105,208	105,208	105,208	105,208
83 2028 Loan P and I	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84 2020 Loan Interest B,P and C	-	-	-	16,430	16,076	15,712	15,338	14,952	14,555	14,147	13,726	13,293	12,884	12,389
85 2020 Loan Principal B,P and C	-	-	-	12,064	12,418	12,782	13,156	13,542	13,939	14,348	14,768	15,201	15,610	16,105
86 Capital	-	-	(24,623)	-	273,980	-	983,454	1,012,958	1,043,347	1,074,647	1,106,886	1,141,458	1,179,805	-
87 County PILS	-	-	4,229	4,229	-	4,229	4,229	4,229	4,229	4,229	4,229	4,229	4,229	4,229
88 Transfer to Reserves	75,062	77,022	-	-	-	-	-	-	-	-	-	-	-	-
89 Subtotal	198,652	200,612	103,196	156,313	426,065	261,522	1,244,976	1,274,278	1,181,278	1,212,578	1,244,818	17,815,490	425,757	400,952
90 Total Expenses and Transfers	527,824	904,018	706,636	777,119	980,365	829,859	1,829,066	1,874,603	1,798,337	1,846,886	1,896,907	18,485,913	1,115,083	1,109,771
91 Revenue Less Expenses	(72,741)	243,715	63,903	90,183	(14,367)	(1,999,359)	289,879	257,965	99,630	84,663	68,628	750,840	(70,091)	(126,222)
92														
93 Transfer to (from) Reserves	(499,198)	-	90,000	(90,183)	14,367	1,999,359	(289,879)	(257,965)	(99,630)	(84,663)	(68,628)	(750,840)	70,091	126,222
94														
95 Net	(571,939)	243,715	(26,097)	-	-	-	-	-	-	-	-	-	-	-

6.3.2 Operating Expenditures

Line 77 of table 6.1 shows the day-to-day operating expenses and line 90 shows all expenses, including debt charges and transfers to or from the reserve. The day-to-day operating expenses are illustrated in figure 6.3:

Figure 6.3 Cramahe Wastewater System Operating Expenditures 2017-2030 Inflated \$



Operating expenses increased substantially from 2017 to 2019. The principal cost increase areas were salaries, equipment maintenance, consultants and contracted out. From 2020-2030, expenditures increase in line with inflation but from the higher base set in 2018-2019.

6.3.3 Debt and Government Grants

The Township has a 2010 CMHC loan of \$1.375 million at 3.99% which is applied to the wastewater treatment plant upgrade, with a term of 15 years. It will be paid off in 2024. The principal and interest payments are shown in lines 80 and 81 of table 6.1. An additional loan was undertaken in 2020 that was part of a Burnham, Park and Cedar road renewal project. The total value of this loan was \$1.72 million over 30 years at 2.91%. The wastewater system share of this debt was 33% or \$567,600. The principal and interest payments are shown on lines 84 and 85 of table 6.1.

The next ten years will be challenging as major capital work is proposed. To accommodate this, a \$2 million loan for 20 years is proposed to be taken out in 2022 at 3% with the loan shown on line 8 of table 6.1 with loan costs shown on line 82 of table 6.1. A second loan for \$5 million is proposed for 2028 to finance the wastewater plant expansion. This is a 20-year loan at 3% with costs shown on line 83 of table 6.1. The sewer system upgrades and the phase 3 plant expansion that require these loans are contingent on the receipt of government grants. The government grants are shown in line 10 of table 6.1. The wastewater debt schedule is shown in appendix 2, No additional wastewater debt is projected, unless further road improvements are undertaken near term.

6.3.4 Wastewater Reserves

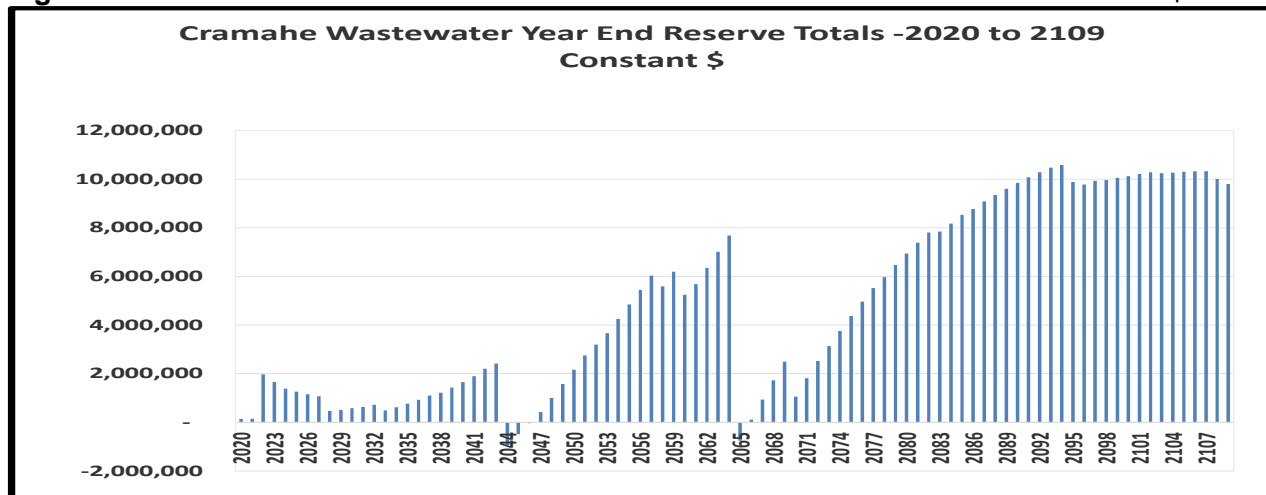
Wastewater reserves are set out in table 6.2:

Table 6.2 Cramahe Wastewater System Projected Capital Reserves 2020-2030 Inflated \$

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Opening Value	232,929	142,746	157,114	2,156,218	1,866,079	1,607,848	1,507,947	1,423,009	1,354,099	602,972	672,770
Addition (Withdrawal) from (to) Ops	(90,183)	14,367	1,999,104	(290,139)	(258,231)	(99,901)	(84,939)	(68,910)	(751,127)	69,798	125,923
Interest on Deficit (loan)	-	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	142,746	157,114	2,156,218	1,866,079	1,607,848	1,507,947	1,423,009	1,354,099	602,972	672,770	798,693
Close in 2019\$	138,589	148,095	1,973,245	1,657,987	1,386,944	1,262,882	1,157,036	1,068,938	462,128	500,604	576,993

The wastewater reserve total as of December 31 2019, for both the lagoon and sewage system, was \$232,929. The proposed reserve fund will be challenged in the next ten years. The two proposed loans will ensure the reserve stays in positive territory with funds available for emergencies. Over the longer term, the reserve is sustainable. The reserve to 2109 is set out in appendix 9 and the year end totals are illustrated in figure 6.4.

Figure 6.4 Cramahe Wastewater Reserve Year End Totals 2020-2109 Constant 2020 \$



The above reserve year-end totals are based on a user fee increase of 7% through 2025, and 4.5% from 2026 to 2109.

6.4 Proposed Wastewater Rate Surcharge

The proposed wastewater surcharge for 2013-2020 is presented in table 6.3:

Table 6.3 Cramahe Proposed Wastewater Surcharges 2020-2030 - Percent of Water Bill

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Water Bill Surcharge	115.0%	114.3%	115.3%	116.3%	117.3%	118.4%	113.9%	114.9%	113.2%	111.6%	109.9%

The surcharge on the water bills, of all metered users, for 2021 is proposed at 114.3% of the fixed and variable component of the water bill for metered users. This rises to 118.4% in 2025, the time of the next rate study. The percentage decline from 2025 to 2030 means that that wastewater user fee requirements are rising more slowly than those for the water system are during this time. The wastewater surcharge calculation is set out in appendix 7. The revenue raised from these rates is shown in appendix 8.

6.5 Wastewater Bills for Various User Groups

The impact of the water bills based on the rates proposed in table 6.3 for various hypothetical users is set out in table 6.4 below:

Table 6.4 Sample Monthly Wastewater Bills for Various User Groups 2020-2030 Inflated\$

User Category in M3 per Month	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Couple 8 M3 15mm (.62") Meter	\$45	\$46	\$48	\$51	\$53	\$56	\$56	\$59	\$60	\$61	\$63
Family 25 M3 15mm (.62") Meter	\$85	\$88	\$93	\$98	\$104	\$109	\$109	\$113	\$115	\$116	\$117
Grocery 50 M3 25mm (1.0") Meter	\$155	\$161	\$169	\$180	\$191	\$200	\$199	\$207	\$209	\$211	\$212
Coffee Shop 150 M3 25mm (1.0") Meter	\$392	\$408	\$433	\$461	\$490	\$513	\$509	\$527	\$530	\$532	\$531
School 200 M3/Month 50mm (2.0") Meter	\$550	\$572	\$606	\$644	\$684	\$716	\$711	\$737	\$743	\$746	\$746
Restaurant 450 M3 50mm (2.0") Meter	\$1,142	\$1,190	\$1,265	\$1,347	\$1,432	\$1,498	\$1,486	\$1,538	\$1,546	\$1,548	\$1,545

Note: The 2020 wastewater bills are for purposes of comparison only.
 Note: Water use by singles, couples, families will vary widely and an individual's bill will depend on personal water use.

Basing wastewater rates on volume of the water used is a common rate practice, as those who use more water generate more wastewater, and should pay more, according to the basic user pay principle. Thus, someone with a 15 mm meter using eight m3 will pay \$45 per month in 2020, and \$56 per month in 2025, the time of the next rate study. A user, such as a family, using 25 m3 with a 15 mm meter will pay \$85 per month in 2020, and \$109 in 2025. An owner of a premise with a 25 mm meter using 150 m3 will pay \$392 per month in 2020, and \$513 in 2025. A large restaurant with a 50 mm meter using 450 m3 will pay \$1,142 in 2020, and \$1,498 per month in 2025.

6.6 Comparison of Annual Wastewater Bills for Some Central and Eastern Ontario Communities 2020 \$

Table 6.5 Comparison of Wastewater Bills 2020 \$

Utility	Wastewater Bill
Brighton	\$494
Coburg	\$550
Toronto	\$598
Norwood	\$657
Lakefield	\$693
Kawartha Lakes	\$709
Bay of Quinte	\$804
Cramahe	\$883
Flesherton	\$936
Campbellford, Hastings, Warkworth	\$1,064
Springwater Residential	\$1,082
Dundalk	\$1,115
Barry's Bay	\$1,202
Adjala-Tosorontio	\$1,313
Mount Forest	\$1,485

Based on water taking of 240 cubic metres per year.

As with water, Cramahe is near the middle of this listing, as shown in table 6.5. Users in some smaller communities are paying very large bills. All are paying more now than they did a few years ago.

Appendix 1 Water Capital Renewal Projects 2020-2030 Inflated\$

	2020\$			Inflated \$								
	2020 Est Cost	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Project												
1 465 - Electrical System - Well No. 1	15,000						17,911					
2 Residential, Industrial and Commercial Water Meters	445,500									581,276		
3 Main Pump House	78,125							96,084				
4 Watermain PVC	19,600	19,600										
5 Colton Street Well	30,000		30,900									
6 New Well 1A Commissioning	275,000		283,250									
8 Capital Upgrades to the System	60,000		61,800									
9 Main Upgrade King St E east of Colton Drive 700 metres	500,000		515,000									
10 Main Upgrade Toronto Street East of Ontario St. 700 metres	500,000							597,026				
11 Pressure Reducing Valve Percy Street	200,000				218,545							
12 Upsize Mains King Street E Elgin to Durham 825 Metres	1,200,000						1,391,129					
13 Main Upgrade King St E (Durham to Spencer) 450	350,000								430,456			
14 Main Upgrade King St E (Spencer to Colton) 400	350,000								430,456			
15 Alfred Street Watermain Extension	500,000					562,754						
Total for Existing Users		19,600	890,950	-	218,545	562,754	1,409,040	693,110	860,912	581,276	-	-
Total for DC Charges		0	0	0	0	0	0	0	0	0	0	0

Note: Yellow shading denotes capital expenditures added to the listing of Township water tangible capital assets

Appendix 3 Revenue from the Fixed Portion of a 2020 Water Bill – Comparison

Revenue from Fixed Charge as % of Bill for a User of 240m3/Year	
Port Hope	25
Coburg	33
Cramahe	36
Kawartha Lakes	37
Kingston	43
Peterborough	43
Grafton	46
Bay of Quinte	47
Brighton	49
Campbellford, Hastings, Warkworth	54
Norwood	65
Barry's Bay	75
Lakefield	100

Note: Kingston's water data covers 2021. All others are 2020

Appendix 4 Cramahe Water System Reserve Transactions 2020-2109 Inflated \$

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Opening Value	1,789,744	2,122,447	1,500,179	1,807,333	1,931,490	1,749,458	755,439	527,248	177,667	157,287
Addition (Withdrawal) from (to) Ops	332,703	(622,268)	307,154	124,157	(182,032)	(994,018)	(228,191)	(349,581)	(20,381)	613,813
Close Inflated \$	2,122,447	1,500,179	1,807,333	1,931,490	1,749,458	755,439	527,248	177,667	157,287	771,100
Close in 2019\$	2,060,629	1,414,063	1,653,966	1,716,104	1,509,097	632,669	428,701	140,252	120,547	573,770
	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Opening Value	771,100	1,447,249	2,177,919	2,904,941	3,768,564	4,711,370	(109,035)	569,129	1,334,952	2,127,828
Addition (Withdrawal) from (to) Ops	676,149	730,670	727,022	863,623	942,806	(4,820,404)	681,435	765,822	792,877	807,699
Interest on Loan	-	-	-	-	-	-	(3,271)	-	-	-
Close Inflated \$	1,447,249	2,177,919	2,904,941	3,768,564	4,711,370	(109,035)	569,129	1,334,952	2,127,828	2,935,527
Close in 2019\$	1,045,523	1,527,548	1,978,123	2,491,465	3,024,049	(67,947)	344,333	784,144	1,213,471	1,625,330
	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Opening Value	2,935,527	3,771,060	4,621,948	5,501,460	5,812,521	6,507,083	7,448,346	6,273,456	7,261,928	8,281,444
Addition (Withdrawal) from (to) Ops	835,533	850,888	879,512	311,061	694,562	941,264	(1,174,890)	988,472	1,019,516	1,037,035
Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	3,771,060	4,621,948	5,501,460	5,812,521	6,507,083	7,448,346	6,273,456	7,261,928	8,281,444	9,318,480
Close in 2019\$	2,027,131	2,412,160	2,787,545	2,859,375	3,107,819	3,453,759	2,824,241	3,174,020	3,514,201	3,839,090
	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Opening Value	9,318,480	(727,295)	355,109	1,358,529	2,514,020	3,194,410	4,402,507	5,870,762	7,485,233	8,224,417
Addition (Withdrawal) from (to) Ops	(10,045,774)	1,104,223	1,003,420	1,155,491	680,390	1,208,097	1,468,255	1,614,471	739,184	1,220,937
Interest on Loan	-	(21,819)	-	-	-	-	-	-	-	-
Close Inflated \$	(727,295)	355,109	1,358,529	2,514,020	3,194,410	4,402,507	5,870,762	7,485,233	8,224,417	9,445,354
Close in 2019\$	(290,909)	137,902	512,201	920,244	1,135,240	1,519,008	1,966,605	2,434,393	2,596,889	2,895,538
	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Opening Value	9,445,354	11,074,231	12,800,395	14,563,217	16,347,066	18,168,317	20,011,004	19,985,330	21,887,936	23,829,330
Addition (Withdrawal) from (to) Ops	1,628,877	1,726,164	1,762,822	1,783,850	1,821,251	1,842,687	(25,674)	1,902,606	1,941,395	1,963,519
Close Inflated \$	11,074,231	12,800,395	14,563,217	16,347,066	18,168,317	20,011,004	19,985,330	21,887,936	23,829,330	25,792,849
Close in 2019\$	3,296,001	3,698,792	4,085,608	4,452,480	4,804,405	5,137,556	4,981,519	5,296,854	5,598,708	5,883,532
	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079
Opening Value	25,792,849	27,795,787	29,821,112	31,645,347	32,314,891	33,884,376	36,035,484	37,577,663	37,266,479	39,522,536
Addition (Withdrawal) from (to) Ops	2,002,937	2,025,325	1,824,235	669,544	1,569,485	2,151,108	1,542,179	(311,185)	2,256,057	2,278,719
Close Inflated \$	27,795,787	29,821,112	31,645,347	32,314,891	33,884,376	36,035,484	37,577,663	37,266,479	39,522,536	41,801,255
Close in 2019\$	6,155,743	6,411,921	6,605,975	6,549,265	6,667,333	6,884,078	6,969,602	6,710,569	6,909,531	7,095,056
	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089
Opening Value	41,801,255	44,121,496	45,963,512	45,448,968	47,855,473	50,303,610	52,773,416	46,342,984	48,062,888	43,859,688
Addition (Withdrawal) from (to) Ops	2,320,241	1,842,016	(514,543)	2,406,505	2,448,137	2,469,806	(6,430,432)	1,719,904	(4,203,201)	216,601
Close Inflated \$	44,121,496	45,963,512	45,448,968	47,855,473	50,303,610	52,773,416	46,342,984	48,062,888	43,859,688	44,076,289
Close in 2019\$	7,270,755	7,353,689	7,059,580	7,216,876	7,365,115	7,501,677	6,395,727	6,439,892	5,705,544	5,566,719
	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
Opening Value	44,076,289	46,710,438	49,363,684	51,621,308	53,694,437	56,444,023	59,029,872	58,654,354	61,471,800	64,325,035
Addition (Withdrawal) from (to) Ops	2,634,149	2,653,247	2,257,624	2,073,129	2,749,586	2,585,849	(375,518)	2,817,446	2,853,235	2,049,754
Close Inflated \$	46,710,438	49,363,684	51,621,308	53,694,437	56,444,023	59,029,872	58,654,354	61,471,800	64,325,035	66,374,790
Close in 2019\$	5,727,578	5,876,617	5,966,390	6,025,244	6,149,306	6,243,711	6,023,293	6,128,757	6,226,432	6,237,710
	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109
Opening Value	66,374,790	68,561,261	67,301,305	61,079,507	60,582,537	62,200,084	65,176,808	67,750,814	70,750,898	69,926,843
Addition (Withdrawal) from (to) Ops	2,186,471	(1,259,956)	(6,221,797)	(496,971)	1,617,547	2,976,724	2,574,006	3,000,084	(824,055)	(1,923,373)
Close Inflated \$	68,561,261	67,301,305	61,079,507	60,582,537	62,200,084	65,176,808	67,750,814	70,750,898	69,926,843	68,003,469
Close in 2019\$	6,255,523	5,961,713	5,252,982	5,058,486	5,042,279	5,129,698	5,176,974	5,248,754	5,036,524	4,755,332

Appendix 5 Water Revenue Derived from Rates

Fixed Charge	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Meter Size											
Size in mm (inches) 15 (0.62") Num.	985	995	1,005	1,015	1,025	1,035	1,045	1,055	1,065	1,075	1,085
Monthly Fee	22.79	23.25	23.21	24.21	25.00	26.26	27.60	29.00	30.48	32.03	33.67
Revenue	269,378	277,555	279,957	294,853	307,444	326,178	346,047	367,122	389,473	413,180	438,323
Size in mm (inches) 20 (0.75") Num.	-	-	-	-	-	-	-	-	-	-	-
Monthly Fee	22.79	23.25	23.21	24.21	25.00	26.26	27.60	29.00	30.48	32.03	33.67
Revenue	-	-	-	-	-	-	-	-	-	-	-
Size in mm (inches) 25 (1.00") Num.	6	6	6	6	6	6	6	6	6	6	6
Monthly Fee	31.90	32.54	32.50	33.89	34.99	36.77	38.63	40.60	42.67	44.84	47.13
Revenue	2,297	2,343	2,340	2,440	2,520	2,647	2,782	2,923	3,072	3,229	3,393
Size in mm (inches) 40 6 (1.50") Num.	6	6	6	6	6	6	6	6	6	6	6
Monthly Fee	41.02	41.84	41.78	43.57	44.99	47.27	49.67	52.20	54.86	57.65	60.60
Revenue	2,953	3,013	3,008	3,137	3,239	3,404	3,576	3,758	3,950	4,151	4,363
Size in mm (inches) 50 (2.00") Numb.	25	25	25	25	25	25	25	25	25	25	25
Monthly Fee	66.09	67.41	67.32	70.20	72.49	76.16	80.03	84.10	88.38	92.89	97.63
Revenue	19,827	20,224	20,196	21,061	21,746	22,848	24,008	25,229	26,513	27,866	29,289
Size in mm (inches) 75 (3.00") Numb.	1	1	1	1	1	1	1	1	1	1	1
Monthly Fee	250.67	255.68	255.35	266.29	274.95	288.89	303.55	318.98	335.23	352.32	370.32
Revenue	3,008	3,068	3,064	3,195	3,299	3,467	3,643	3,828	4,023	4,228	4,444
Total Number	1,023	1,033	1,043	1,053	1,063	1,073	1,083	1,093	1,103	1,113	1,123
Total Revenues Generated	\$ 297,463	\$ 306,202	\$ 308,566	\$ 324,687	\$ 338,249	\$ 358,543	\$ 380,056	\$ 402,859	\$ 427,031	\$ 452,653	\$ 479,812
Needed Revenues	\$ 291,100	\$ 308,566	\$ 324,687	\$ 338,249	\$ 358,543	\$ 380,056	\$ 402,859	\$ 427,031	\$ 452,653	\$ 479,812	\$ 479,812
Variable Revenue											
Volume of Water Sold in M3	194,764	193,655	193,969	195,707	198,869	203,454	209,463	216,895	225,750	236,030	247,732
Rate per M3	2.06	2.16	2.29	2.42	2.55	2.64	2.72	2.79	2.84	2.88	2.91
Total Volumetric Revenue Generated	401,213	418,900	444,034	473,069	507,373	537,815	570,084	604,289	640,546	678,979	719,718
Revenue Needed	(398,916)	418,900	444,034	473,069	507,373	537,815	570,084	604,289	640,546	678,979	719,718
Total Revenue Generated	\$ 698,676	\$ 725,102	\$ 752,600	\$ 797,756	\$ 845,621	\$ 896,359	\$ 950,140	\$ 1,007,149	\$ 1,067,577	\$ 1,131,632	\$ 1,199,530
Total Revenue Needed	\$ 664,860	\$ 710,000	\$ 752,600	\$ 797,756	\$ 845,621	\$ 896,359	\$ 950,140	\$ 1,007,149	\$ 1,067,577	\$ 1,131,632	\$ 1,199,530
Variance	\$33,816	\$15,102	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Appendix 6 Wastewater System Near-Term Capital Renewal 2020-2030 Inflated \$

	2020 Cost Estimate	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
CAPITAL EQUIPMENT - BY-PASS VALVE	25,000	25,750	-	-	-	-	-	-	-	-	-
CAPITAL EQUIPMENT	-	-	-	-	-	-	-	-	-	-	-
CAPITAL EQUIPMENT - PIPE FLOW TESTER	-	-	-	-	-	-	-	-	-	-	-
CAPITAL EFFLUENT PUMPS	35,000	36,050	-	-	-	-	-	-	-	-	-
CAPITAL RAS/WAS PUMP	16,000	16,480	-	-	-	-	-	-	-	-	-
CAPITAL METERS	-	-	-	-	-	-	-	-	-	-	-
CAPITAL SLUDGE REMOVAL	40,000	41,200	-	-	-	-	-	-	-	-	-
CAPITAL ALUM TANK REPLACEMENT	50,000	51,500	-	-	-	-	-	-	-	-	-
CAPITAL SEWER PIPE CAMERA SYSTEM	25,000	25,750	-	-	-	-	-	-	-	-	-
CAPITAL VFD BLOWERS	35,000	36,050	-	-	-	-	-	-	-	-	-
CAPITAL EQUIPMENT - CONTAINMENT BUILDING	40,000	41,200	-	-	-	-	-	-	-	-	-
Industrial Park Sanitary System Upgrades	4,500,000	-	-	983,454	1,012,958	1,043,347	1,074,647	1,106,886	-	-	-
Phase 3 of wastewater treatment plant expansion	15,000,000	-	-	-	-	-	-	-	17,389,111	-	-
Total Cost	\$ 19,766,000	273,980	-	\$ 983,454	\$ 1,012,958	\$ 1,043,347	\$ 1,074,647	\$ 1,106,886	\$ 17,389,111	-	-
Government Grants	-	-	-	655,964	675,643	695,912	716,790	738,293	11,598,537	-	-
Net Cost to Existing Users	-	\$ 547,960	-	\$ 327,490	\$ 337,315	\$ 347,434	\$ 357,857	\$ 368,593	\$ 5,790,574	-	-

Appendix 7 Wastewater Surcharge Calculation

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
User Fee Surcharge										
Water User Fees	\$710,000	\$752,600	\$797,756	\$845,621	\$896,359	\$950,140	\$1,007,149	\$1,067,577	\$1,131,632	\$1,199,530
Wastewater User Fees	\$716,232	\$766,368	\$820,014	\$877,415	\$938,834	\$981,081	\$1,025,230	\$1,071,365	\$1,119,577	\$1,169,958
Wastewater Fee Surcharge	100.9%	101.8%	102.8%	103.8%	104.7%	103.3%	101.8%	100.4%	98.9%	97.5%
Number of Users										
Number of Water Connections	1,033	1,043	1,053	1,063	1,073	1,083	1,093	1,103	1,113	1,123
Number of Wastewater Connections	971	981	991	1,001	1,011	1,021	1,031	1,041	1,051	1,061
Surcharge Based on No. of Users	6.39%	6.32%	6.26%	6.19%	6.13%	6.07%	6.01%	5.96%	5.90%	5.84%
Wastewater Customer Water Volume Adjustment	6.50%	6.50%	6.50%	6.50%	6.50%	4.00%	6.50%	6.50%	6.50%	6.50%
The volume adjustment allows for the uncertainty about the amount of water not used by the 62 water users not connected to the wastewater system										
Water Bill Surcharge	114.3%	115.3%	116.3%	117.3%	118.4%	113.9%	114.9%	113.2%	111.6%	109.9%

Appendix 8 Wastewater Projected Revenues from the Proposed Surcharges Inflated \$

Fixed Charge	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Meter Size										
Size in mm (inches) 15 (0.62") Num.	918	924	930	937	943	949	956	962	968	974
Monthly WW Fee \$	26.59	27.26	28.78	30.08	31.99	32.45	34.51	35.85	37.24	38.69
Revenue \$	292,896	302,318	321,316	338,105	361,995	369,630	395,786	413,842	432,718	452,452
Size in mm (inches) 20 (0.75") Num.	-	-	-	-	-	-	-	-	-	-
Monthly WW Fee \$	23.25	23.62	24.71	25.59	26.97	28.43	29.97	31.59	33.30	35.10
Revenue \$	-	-	-	-	-	-	-	-	-	-
Size in mm (inches) 25 (1.00") Num.	6	6	6	6	6	6	6	6	6	6
Monthly WW Fee \$	37.22	38.17	40.29	42.11	44.79	45.43	48.32	50.19	52.14	54.17
Revenue \$	2,680	2,748	2,901	3,032	3,225	3,271	3,479	3,614	3,754	3,900
Size in mm (inches) 40 6 (1.50") Num.	6	6	6	6	6	6	6	6	6	6
Monthly WW Fee \$	47.87	49.07	51.80	54.14	57.58	58.41	62.13	64.54	67.04	69.64
Revenue \$	3,446	3,533	3,730	3,898	4,146	4,205	4,473	4,647	4,827	5,014
Size in mm (inches) 50 (2.00") Numb.	25	25	25	25	25	25	25	25	25	25
Monthly WW Fee \$	77.12	79.06	83.46	87.23	92.77	94.10	100.09	103.97	108.01	112.20
Revenue \$	23,136	23,718	25,038	26,169	27,831	28,229	30,028	31,192	32,402	33,661
Size in mm (inches) 75 (3.00") Numb.	1	1	1	1	1	1	1	1	1	1
Monthly WW Fee \$	292.51	299.89	316.57	330.87	351.89	356.92	379.66	394.38	409.69	425.60
Revenue \$	3,510	3,599	3,799	3,970	4,223	4,283	4,556	4,733	4,916	5,107
Total Number of Wastewater Users	956	962	968	975	981	987	994	1,000	1,006	1,013
Total Fixed WW Revenues Generated	\$ 325,670	\$ 335,916	\$ 356,784	\$ 375,175	\$ 401,420	\$ 409,618	\$ 438,322	\$ 458,027	\$ 478,618	\$ 500,135
Variable WW Revenues Earned										
Volume in M3 used by all Water Customers in M3	194,068	193,799	194,426	195,951	198,372	201,690	205,905	211,017	217,026	223,931
Water Not Paid for by Users not Connected to WW (Est.) in M3	12,648	12,648	12,648	12,648	12,648	12,648	12,648	12,648	12,648	12,648
Water Paid for by Wastewater users in M3	181,420	181,151	181,778	183,303	185,724	189,042	193,257	198,369	204,378	211,283
Water Cost per M3	\$2.16	\$2.29	\$2.43	\$2.59	\$2.71	\$2.83	\$2.93	\$3.04	\$3.13	\$3.21
Water Revenue Generated from Sale of Water to WW Users	\$391,599	\$415,055	\$442,295	\$474,624	\$503,525	\$534,334	\$567,170	\$602,153	\$639,409	\$679,067
Wastewater Surcharge on Water Revenue from WW Customers	114.4%	115.4%	116.5%	117.5%	118.6%	114.1%	115.2%	113.5%	111.9%	110.2%
Total Projected Variable Wastewater Revenues Raised	\$ 448,004	\$ 479,127	\$ 515,185	\$ 557,840	\$ 597,162	\$ 609,837	\$ 653,248	\$ 683,474	\$ 715,229	\$ 748,571
Total Wastewater Revenue (Fixed and Variable Revenues)	\$ 773,673	\$ 815,043	\$ 871,969	\$ 933,016	\$ 998,582	\$ 1,019,456	\$ 1,091,570	\$ 1,141,501	\$ 1,193,847	\$ 1,248,706
Revenue Requirement as per the Financial Plan	\$ 716,232	\$ 766,368	\$ 820,014	\$ 877,415	\$ 938,834	\$ 981,081	\$ 1,025,230	\$ 1,071,365	\$ 1,119,577	\$ 1,169,958
Variance Surplus/(Deficit)	\$ 57,442	\$ 48,675	\$ 51,955	\$ 55,601	\$ 59,748	\$ 38,375	\$ 66,340	\$ 70,135	\$ 74,271	\$ 78,748
Note: Water use by water customers not connected to the wastewater is not known. For study purposes it is assumed to be 204 cubic metres per household per year										

Appendix 9 Wastewater Capital Reserve 2020-2109 Inflated \$

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Opening Value	232,929	142,746	157,114	2,156,473	1,866,594	1,608,629	1,508,998	1,424,336	1,355,708	604,868
Addition (Withdrawal) from (to) Ops	(90,183)	14,367	1,999,359	(289,879)	(257,965)	(99,630)	(84,663)	(68,628)	(750,840)	70,091
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	142,746	157,114	2,156,473	1,866,594	1,608,629	1,508,998	1,424,336	1,355,708	604,868	674,958
Close in 2019\$	138,589	148,095	1,973,478	1,658,445	1,387,617	1,263,762	1,158,115	1,070,208	463,581	502,232
	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Opening Value	674,958	801,180	910,397	1,054,360	743,579	962,628	1,222,197	1,524,402	1,871,459	2,136,928
Addition (Withdrawal) from (to) Ops	126,222	109,217	143,963	(310,781)	219,048	259,570	302,205	347,057	265,469	443,839
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	801,180	910,397	1,054,360	743,579	962,628	1,222,197	1,524,402	1,871,459	2,136,928	2,580,767
Close in 2019\$	578,790	638,534	717,968	491,594	617,874	761,633	922,288	1,099,285	1,218,660	1,428,908
	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Opening Value	2,580,767	3,076,764	3,627,593	4,341,261	4,909,480	(1,963,060)	(1,058,329)	(83,366)	965,360	2,354,570
Addition (Withdrawal) from (to) Ops	495,998	550,829	713,668	568,219	(6,872,540)	904,731	974,962	1,048,726	1,389,211	1,470,549
Principal/Interest on Loan	-	-	-	-	-	(58,892)	(31,750)	(2,501)	-	-
Close Inflated \$	3,076,764	3,627,593	4,341,261	4,909,480	(1,963,060)	(1,058,329)	(83,366)	965,360	2,354,570	3,825,120
Close in 2019\$	1,653,912	1,893,214	2,199,681	2,415,139	(937,568)	(490,741)	(37,531)	421,936	999,153	1,575,899
	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Opening Value	3,825,120	5,409,561	7,083,648	8,473,921	10,001,212	11,971,786	14,051,102	16,244,506	18,557,597	17,695,337
Addition (Withdrawal) from (to) Ops	1,584,441	1,674,087	1,390,273	1,527,292	1,970,574	2,079,315	2,193,404	2,313,091	(862,260)	2,510,109
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	5,409,561	7,083,648	8,473,921	10,001,212	11,971,786	14,051,102	16,244,506	18,557,597	17,695,337	20,205,446
Close in 2019\$	2,163,755	2,750,843	3,194,890	3,660,893	4,254,574	4,848,086	5,441,632	6,035,416	5,587,365	6,194,118
	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Opening Value	20,205,446	17,635,784	19,654,633	22,659,725	25,728,620	29,059,844	(2,947,315)	435,016	3,855,291	7,363,379
Addition (Withdrawal) from (to) Ops	(2,569,662)	2,018,849	3,005,092	3,068,895	3,331,225	(32,007,159)	3,382,330	3,420,275	3,508,088	3,551,940
Principal/Interest on Loan	-	-	-	-	-	-	(117,893)	-	-	-
Close Inflated \$	17,635,784	19,654,633	22,659,725	25,728,620	29,059,844	(2,947,315)	435,016	3,855,291	7,363,379	10,915,319
Close in 2019\$	5,248,903	5,679,387	6,357,026	7,007,750	7,684,545	(756,683)	108,431	932,976	1,730,028	2,489,862
	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079
Opening Value	10,915,319	4,782,171	8,421,027	12,102,832	15,455,341	19,098,046	22,905,915	26,754,643	30,643,523	34,151,736
Addition (Withdrawal) from (to) Ops	(6,133,148)	3,638,856	3,681,806	3,352,509	3,642,705	3,807,869	3,848,728	3,888,880	3,508,213	3,966,722
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	4,782,171	8,421,027	12,102,832	15,455,341	19,098,046	22,905,915	26,754,643	30,643,523	34,151,736	38,118,458
Close in 2019\$	1,059,075	1,810,629	2,526,470	3,132,337	3,757,868	4,375,856	4,962,235	5,517,974	5,970,580	6,469,964
	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089
Opening Value	38,118,458	42,122,690	46,163,361	50,239,298	52,022,972	55,824,573	59,998,126	63,533,502	67,764,068	71,870,503
Addition (Withdrawal) from (to) Ops	4,004,232	4,040,672	4,075,937	1,783,674	3,801,601	4,173,553	3,535,376	4,230,566	4,106,435	4,133,687
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	42,122,690	46,163,361	50,239,298	52,022,972	55,824,573	59,998,126	63,533,502	67,764,068	71,870,503	76,004,190
Close in 2019\$	6,941,373	7,385,663	7,803,661	7,845,358	8,173,457	8,528,661	8,768,166	9,079,631	9,349,366	9,599,128
	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
Opening Value	76,004,190	80,305,356	84,625,438	88,961,838	93,311,766	97,148,428	93,478,604	95,246,562	99,618,553	102,952,394
Addition (Withdrawal) from (to) Ops	4,301,166	4,320,083	4,336,400	4,349,928	3,836,662	(3,669,824)	1,767,959	4,371,991	3,333,841	4,060,097
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	80,305,356	84,625,438	88,961,838	93,311,766	97,148,428	93,478,604	95,246,562	99,618,553	102,952,394	107,012,491
Close in 2019\$	9,846,946	10,074,436	10,282,207	10,470,846	10,583,856	9,887,424	9,780,994	9,932,000	9,965,422	10,056,723
	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109
Opening Value	107,012,491	110,970,633	115,302,002	119,611,392	122,679,700	126,701,076	130,911,096	135,075,670	139,187,997	138,987,511
Addition (Withdrawal) from (to) Ops	3,958,142	4,331,369	4,309,390	3,068,308	4,021,376	4,210,020	4,164,573	4,112,327	(200,487)	1,134,480
Principal/Interest on Loan	-	-	-	-	-	-	-	-	-	-
Close Inflated \$	110,970,633	115,302,002	119,611,392	122,679,700	126,701,076	130,911,096	135,075,670	139,187,997	138,987,511	140,121,991
Close in 2019\$	10,124,949	10,213,731	10,286,862	10,243,440	10,271,082	10,303,271	10,321,399	10,325,855	10,010,662	9,798,421