



WATER & WASTEWATER STUDY UPDATE

The 2017 Water and Wastewater Study was distributed electronically to Council in early September for the Committee of All Council Meeting held on September 13, 2017. After discussion, the motion adopted by Council on September 27, 2017 was as follows:

That Staff Report No. GGF-2017-52 regarding the update to the Water and Wastewater Rate Study be received;

And that Council direct Staff to follow Option 1 in the Study, with an amended water rate of \$833 for the 10 year period, for the preparation of the 2018 Preliminary Operating and Capital Budget;

And that Council also directs Staff to increase the current vacant lot levy from \$64 to \$122 in the 2018 for a five year period and then full rate in 2023 until 2027;

And that a By-law be brought forward to set the 2018 Water and Wastewater rates;

And further, that public awareness efforts by the Township be increased to address the need for water conservation and inform users of the additional costs to the system by putting "non-flushable" products down the drain.

The 2018 water and wastewater rates are as follows:

Residential

Water	\$208.25 (quarterly)	\$833.00 (annually)
Wastewater	\$210.25 (quarterly)	\$841.00 (annually)

Metered Customers

Metered customers are billed on a monthly basis. The flat rate minimum fees are listed below:

Water Meter Rate - \$3.09 per cubic meter

Minimum Charge

Residential - \$69.42 per service lateral (based on 22.5 cubic meters)

Commercial- \$55.53 per service lateral (based on 18.0 cubic meters)

Wastewater Meter Rate - \$3.12 per cubic meter

Minimum Charge

Residential - \$70.09 per service lateral (based on 22.5 cubic meters)

Commercial- \$56.16 per service lateral (based on 18.0 cubic meters)

2018-2027 Water and Wastewater Rates

The schedule below includes the recommendations as set out in Option 1 of the study with an amended water rate of \$833 for the 10 year period.

Wastewater Rates											
Option 1	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Residential Flat Rate	\$0	\$809	\$841	\$875	\$910	\$946	\$984	\$1,024	\$1,065	\$1,107	\$1,151
Option 1: Increase Annual Rate @ 3% per year		3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Add: Inflation factor @1.0%		1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 809	\$ 841	\$ 875	\$ 910	\$ 946	\$ 984	\$ 1,023	\$ 1,065	\$ 1,108	\$ 1,151	\$ 1,197
Water Rates											
Option 1, as amended	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Residential Flat Rate	\$0	\$833	\$833	\$833	\$833	\$833	\$833	\$821	\$808	\$796	\$784
Option 1: Decrease Annual Rate @ 1% per year		-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%
Add: Inflation factor @1.0%		1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833	\$ 833
Total Annual Residential Flat Rate	\$1,642	\$1,674	\$1,708	\$1,743	\$1,779	\$1,817	\$1,856	\$1,898	\$1,941	\$1,984	\$2,030

Every Drop Counts

Water and Wastewater Rate Study



Township of Tay

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September 13, 2017

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EXECUTIVE SUMMARY

In 2007, Watson & Associates undertook a water and wastewater rate study on behalf of the Township of Tay. This study identified and recommended increases to the Township's rates which included a schedule of rate increases covering the period 2008 to 2017. Council has followed option 3 of the 2007 study since its adoption. Water and wastewater rates have been frozen in the Township since 2010 (\$1642/year for residential users).

Council determined that it was prudent to hold off on updates to the current Water and Wastewater Rate Study until the costing and timing of the upgrades made to the Tay Area Water Treatment Plant and Victoria Harbour Wastewater Treatment Plant were accurately known. With these projects now complete, an updated study has been completed to ensure that sufficient revenues are raised on a go forward basis to fund the water and wastewater system requirements.

The updated study continues to give consideration to the legislative requirements currently in place and those expected to come in the near future. For details on the associated legislation see Section 2.

The objective of this study was to review and recommend, as necessary, water and wastewater rates for the 2018-2027 period that address the following:

- Full recovery of system operating costs;
- Full recovery of capital infrastructure financing needs (net of Development Charges), with an annual contribution to reserves to fund the future rehabilitation and replacement of infrastructure;
- Review of the vacant lot levy currently charged and propose a charge that recovers the cost of maintaining and replacing the linear infrastructure put in place for these fronting properties;

In undertaking this study, Township Staff:

- Used the current long term plan covering a 10-year period from 2017 to 2026 to evaluate the adequacy of its annual infrastructure contributions;
- Updated the detailed asset inventory database for the existing water and wastewater systems. The components for each asset were separated, a replacement value and a useful life was assigned for each asset component;
- Analyzed the Township's operating expenses, other (non-rate) revenues and reserves;
- Calculated the annual funding needed to meet the long term capital requirements for rehabilitation and replacement of the system;

Study Highlights:

There is a proposed increase to the annual charge for vacant lots from 2018 to 2027. The annual charge calculated for vacant lots reflects their proportionate share of the annual infrastructure reserve contribution required for the long term repair, maintenance and replacement of the water and wastewater linear infrastructure. The proposed increase has been phased in over the 10-year forecast period, with the 2018 rate being increased by \$8 (to \$72/year). For details on the calculation of the proposed vacant lot levy see Section 4.2.

The study provides for a gradual phase-in to full funding for the wastewater system, which starts out approximately 60% funded at the beginning of the forecasted period. The phase in for wastewater is gradual due to the expected increase in operating expenses (i.e. debt payments), with the system reaching 75% funding by the end of the forecast period. Full funding for wastewater is not recommended at this time due to the significant increase in rates that would be required. This contribution may be increased over time, as we do have time before the vast amount of our infrastructure reaches its useful life. The water system will reach 100% funding well before the end of the forecast period.

It is recommends that the Township continue to employ a flat rate structure for residential users and a metered structure for commercial users (includes industrial and residential where metered).

The analysis performed for this study presented three options for rate adjustments over the forecast period for both water and wastewater. The recommendation is for the Township to follow option 1 for both residential water and wastewater with a combined 2018 increase of \$28 or 2% (total bill \$1670/year). Commercial users would see a similar increase of \$36 per year based on average consumption patterns. For details on the calculated rates see Section 7.

Based upon the findings of the analysis, the following recommendations are put forth for consideration:

- Staff continue to explore strategies to minimize operating and asset renewal costs including undertaking a Master Servicing Study that will address the future needs of both the water and wastewater systems;
- Council and staffs preceding commitment to move towards full cost recovery continue, and be reflected in the water and wastewater rates moving forward.
- The Township undertakes a publicity campaign addressing the benefits of water conservation and the added costs to the system of putting “non-flushables” down the drain.
- The Township update water and wastewater rate study in 5 years time, or earlier, pending significant changes in; annual operating or capital expenditures, consumption patterns, or growth projections etc.

1 BACKGROUND AND STUDY OBJECTIVE

1.1 BACKGROUND

The Township of Tay has a present population of approximately 10,033 which is partially served by municipal water and wastewater. Water is currently provided through the Tay Area Water Treatment Plant (TAWTP) and the Rope Water Treatment Plant (Rope). Wastewater is currently provided by the Victoria Harbour Wastewater Treatment Plant (VHWWT) and the Port McNicoll Wastewater Treatment Plant (PMWWTP). At the end of 2016 there were 3,215 users (or an estimated 7400 persons) receiving water services and 2,293 users (or an estimated 5,733 persons) receiving wastewater services. Water and wastewater are billed based on a flat fixed rate for residential users and metered rates for commercial users.

In 2007, the Township of Tay undertook a water and wastewater rate study in response to the anticipated requirements of the Sustainable Water and Sewage Systems Act. This study identified and recommended increases to the Township's rates covering the period 2008 to 2017.

The 2007 Water & Wastewater Study conducted by Watson & Associates Economists Ltd. recommended that the Township set their rates for the ten year period based on the Rate Sensitivity Option (Option 3). While this option imposed larger rate increases on ratepayers earlier in the forecast period, it was expected that this option would provide the Township with greater financial flexibility to address the needs of the corporation. It was also recommended that the financial plan be reviewed periodically to address changes in operational and financial circumstances.

The Rate Sensitivity Option (Option 3) which is still in effect today did not consider the full lifecycle contributions required to continually operate, maintain and renew the Township's water and wastewater infrastructure. Instead, this option provided for a greater initial increase in the rate to utilize rate based capital funding sources and to lessen the impact on the Township's indebtedness and therefore overall cost.

The 2007 study suggested that in order to reach a full cost recovery model (Option 2), a total rate of \$2,174 was required in 2008, which increased

steadily to \$2,389 by 2017. Given that the Public Sector Accounting Board (PSAB) Standards requiring municipalities to record, amortize and report on their capital assets did not come into effect until 2009, the costing model developed for option 2 would have required significant data assumptions and cost estimates. Today, because of standards such as PSAB, and legislative requirements such as Asset Management Plans, the Township is in a much better position to qualify and quantify the renewal requirements of the Township's assets.

Although the rate structure adopted in 2008 (and still in effect today) was not based on a full cost recovery model, the rates implemented did position the Township well for the recent upgrades made to both the TAWTP (\$6 million) and the VHWWT (\$8 million). Only the growth related, development charge portion of these projects required debt financing of \$1.3 million and \$3.0 million respectively.

With the completion of the upgrades to the TAWTP and the phase 1 upgrades to the VHWWT, staff determined that it was necessary to review and update the current water and wastewater rate study to ensure sufficient revenues were raised to fund the systems requirements well into the future.

1.2 STUDY OBJECTIVE

The purpose of this study is to develop water and wastewater cost recovery plan for the Township of Tay. Although the notion of "full cost recovery" is not currently mandated by Provincial legislation, it is fiscally responsible that municipalities work toward recovering the full cost of providing water and wastewater services. It is expected that the requirement to file the plans to support the future mandate of full cost recovery is coming sometime in the future.

The first step in a study of this nature is to establish a population and household forecast as this is the basis for determining anticipated water consumption and wastewater generation levels. The study period for this analysis examines the period from 2018 through 2027.

Next, the Township updated and reviewed the inventory of the water and wastewater assets, including life expectancies and valuations to the assets. With this information a life-cycle cost for each asset can be developed. A

review of the systems' ability to adequately provide servicing to the community is then conducted. Any additional infrastructure required to support the anticipated growth is also taken into consideration. Growth related water and wastewater infrastructure needs are usually funded through development charges for local and internal servicing needs. The non-growth related costs will therefore require funding from the Township, usually through the user rates and/or reserves.

The Township's current water and wastewater rates, reserves and annual operating and capital budgets are analyzed. Based on this analysis, the financial position of the Township's water and wastewater system is determined.

The next step in the study process is to compare the Township's current financial position with the fiscal legislative requirements. A strategy for the Township to achieve full cost recovery for its water and wastewater services can then be developed.

The final step in the process is to evaluate the impacts of implementing the full cost recovery rates to the residents and businesses of the Township. Using an excel model, the Township is able to perform sensitivity analyses of water and wastewater rates, and phase-in options.

2 ASSOCIATED LEGISLATION

2.1 SUSTAINABLE WATER AND SEWAGE SYSTEMS ACT

This report was prepared in keeping with the Sustainable Water and Sewage Systems Act (the Act) which will require the Township of Tay to complete a Water and Wastewater Systems Full Cost of Services Report and Cost Recovery Plan. The regulations governing the Act have not been established, however it is anticipated that this Report and Plan will facilitate future compliance with the legislation, once the regulations are in place.

The two reports required under the *Sustainable Water and Sewage Systems Act* is the Full Cost of Services Report and the Cost Recovery Plan.

The Full Cost of Services Report provides an inventory and asset management plan, ensuring the integrity of the water and wastewater infrastructure. The full cost of services includes:

"the source protection costs, operating costs, financing costs, renewal and replacement costs and improvement costs"- Sustainable Water and Sewer Systems Act, 2002, S.O. 2002, c.29, s.3 (7)

The Report addresses the full cost of providing water and wastewater services, including provisions for the periodic rehabilitation and eventual replacement of the water and wastewater infrastructure.

The Act also requires municipalities to develop a Cost Recovery Plan. The Cost Recovery Plan consists of a revenue plan, identifying the revenue requirements to finance the system. The plan includes the development of water and wastewater rates which will fund the expansion, upgrading, rehabilitation, replacement, operation and maintenance of the water and wastewater systems. Financing, administrative and all other relevant costs related to providing the services are also included. This Plan will be the basis of a strategy to ensure water and wastewater services are fully funded.

Although the notion of "full cost recovery" is not currently mandated by Provincial legislation, it is fiscally responsible that municipalities work toward recovering the full cost of providing water and wastewater services. It is

expected that the requirement to file the plans to support the future mandate of full cost recovery is coming sometime in the future.

2.2 MUNICIPAL ACT

The Township is given authority to impose user fees for water and wastewater services under Section 391 of the Municipal Act. The accompanying regulation, Ontario Regulation 584/06 sets out the conditions by which a municipality must administer the fees. When developing water and wastewater rates, the requirements outlined in Ontario Regulation 584/06 must be adhered to.

2.3 THE WATER OPPORTUNITIES ACT

The *Water Opportunities Act* is the most recent legislative framework designed to help strengthen Ontario's leadership in water protection. *The Water Opportunities Act* received Royal Assent on November 29, 2010. The Act was created to deliver three outcomes:

- Make Ontario the North American leader in the development and sale of water conservation and treatment technologies;
- Encourage sustainable infrastructure and conservation planning using made-in-Ontario technologies to solve water, wastewater, and stormwater infrastructure challenges; and
- Encourage all Ontarians to use water more wisely.

At this time, a water financial plan has been prepared by the Township consistent with the requirements of the *Safe Drinking Water Act* and its associated regulation (*O. Reg 453/07*). Additional sustainability plans for wastewater and stormwater services as well as a more detailed review of the water financial plan should be prepared once regulations are in place.

2.4 THE INFRASTRUCTURE FOR JOBS AND PROSPERITY ACT

The Infrastructure for Jobs and Prosperity Act, 2015, was proclaimed on May 1, 2016 and includes an authority for the province to regulate municipal asset management planning. The purpose of the proposed asset management planning regulation is to introduce new requirements in order

to provide greater standardization and consistency between plans throughout the municipal sector.

The proposed legislation requires the adoption of a strategic asset management policy by January 1, 2019 with a review at least every five years. The policy must include specific goals and criteria. The regulation proposes additional requirements (service levels, operational criteria such as energy costs, climate mitigation information and growth estimates) to be included in the asset management plan as well all municipal assets must be included by January 1, 2021. The proposed legislation was posted for public review and comment starting May 25, 2017, with comments to be received by July 24, 2017. AMO is concerned with the impact the proposed legislation will have on Municipalities.

2.5 SMART GROWTH FOR OUR COMMUNITIES ACT

Bill 73 (Smart Growth for Our Communities Act, 2015) amending the Development Charges Act together with regulations came into effect January 1, 2016. The majority of the amendments will become effective for the Township with the review of our Development Charges By-law in 2018. The new regulations will still require some review, however it is known that there are changes to notice periods, reporting and more importantly the new regulation requires that an Asset Management Plan be prepared for all assets which are funded from Development Charges to show that the assets included in the study are financially sustainable.

3 GROWTH AND DEMAND FORECASTS

Future costs of the Township’s water and wastewater system will largely be driven by demands placed on the system by consumers. A forecast of future consumption demands must therefore be developed.

3.1 GROWTH FORECAST

The following number of actual customers connected to the water and wastewater system at the end of 2016 is provided in Table 1.3-1 below.

Description	Water TAWTP	Water Rope	Wastewater VHWWT	Wastewater PMWWT
Residential	3,043	31	1,529	663
Non-Residential	141	0	53	48
Total	3,184	31	1,582	711

Table 1.3-2 below summarizes the water and wastewater customer forecast as at 2027. This forecast is based on the current system users, historical growth and the projected level of development within the municipal water and wastewater serviced areas. It is anticipated that on average 25 additional residential users will be added to the water system annually and non-residential growth is estimated at approximately 1.5% annually. In 2021, an additional 109 new users have been added to the water system to account for the 2017/2018 construction of the new year-round watermains in the Paradise Point and Grandview Beach area. These users are currently not connected to the seasonal system and have been given a deadline of Jan 1, 2021 to connect and pay users rates.

Description	Water TAWTP	Water Rope	Wastewater VHWWT	Wastewater PMWWT
Residential	3,427	31	1,755	718
Non-Residential	161	0	62	67
Total	3,588	31	1,817	785

It is recommended that all new developments, where possible, be connected and receive municipal water and wastewater servicing to comply with land use planning and best practices, This will improve economies of scale these operations.

See Appendix A for a detailed forecast on user growth.

3.2 WATER AND WASTEWATER DEMAND FORECASTS

The total number of users connected to the water system is 3,215 (or 7,400 persons). These users consumed an estimated total of 827,090 cubic meters of treated water in 2016. The estimated consumption of treated water has been adjusted for the amount of water that is potentially lost to the system (approximately 5%) due to fire protection and mains flushing etc. It should be noted that due to the plant upgrades to Tay Area Water Treatment Plant and no watering ban in effect for 2016, water consumption levels were noticed to be much higher in 2016 than the five year historical trend, and therefore the forecast for 2017 was adjusted to account for the 2016 increased usage. The 2017 forecast for Rope was based on a three year average to account for significant demand fluctuations.

The total number of users receiving municipal water is expected to increase to 3,619 by 2027 and will consume approximately 745,482 cubic meters of water per annum. This level of consumption assumes that the average annual consumption per household decreases by 1.5% each year once residential metering is installed in 2020. All of the expected water system growth has been attributed to the TAWTP.

A capacity report for the TAWTP has been recently completed. Based on the calculated per capita water consumption of 0.77 m³ per day (peak flow), approximately 20% of the plant's firm capacity will be left uncommitted at the end of the forecasted period. As such it is recommended that further analysis be done prior to scheduling the proposed 2022 expansion of the TAWTP.

Tables 3-1 and 3-2 show the average consumption per user for both TAWTP and Rope WTP.

Table 3-1			
Summary of Growth & Demand Township of Tay			
Tay Area Water Treatment Plant			
Year	Number of Units Connected	Consumption m3	Consumption per Unit m3
2016	3,184	817,477	256.75
2017	3,209	731,674	228.01
2027	3,588	735,959	205.12

Table 3-2			
Summary of Growth & Demand Township of Tay			
Rope Water Treatment Plant			
Year	Number of Units Connected	Consumption m3	Consumption per Unit m3
2016	31	9,613	310.09
2017	31	10,585	341.46
2027	31	9,523	307.18

The wastewater system had 2,293 users (or approximately 5,733 persons) connected at the end of 2016. The number of users connected to the municipal wastewater system is expected to increase at the same rate as water users to 2,602 connections by 2027. This expected increase has been mostly assigned (80%) to the Victoria Harbour Wastewater Treatment Plant, as the growth in this community is expected to be strong over the forecasted period.

Wastewater generation is expected to be higher than water consumption throughout the 10- year planning period, particularly in the community of Port McNicoll where inflow and infiltration continues to be an area of concern for the Township. Several factors may contribute to Port McNicoll having a higher rate of infiltration, such as age of the system and the fact that the majority of the system's pipes are asbestos concrete. Additional factors could be unidentified connections such as catch basins accidentally

connected to the sanitary system and sump pumps from private dwellings connected to our system. Further investigation is required to identify the leading cause of the higher volume per capita of sewage in Port McNicoll and to identify problem areas within the system.

Tables 3-3 and 3-4 below summarize the current number of connections and consumptions patterns, and also the anticipated demand in year 2027.

Table 3-3			
Summary of Growth & Demand Township of Tay			
Victoria Harbour Wastewater Treatment Plant			
Year	Number of Units Connected	Generation m3	Generation per Unit m3
2016	1,582	549,908	347.60
2017	1,601	597,752	373.36
2027	1,817	610,158	335.88

Table 3-4			
Summary of Growth & Demand Township of Tay			
Port McNicoll Wastewater Treatment Plant			
Year	Number of Units Connected	Generation m3	Generation per Unit m3
2016	711	391,536	550.68
2017	725	398,549	549.72
2027	785	388,211	494.54

4 OPERATIONS, MAINTENANCE COSTS AND OTHER (NON-RATE) REVENUES

4.1 OPERATING EXPENDITURES

Using the Township's historical operating costs, a forecast for each expense category was created, and a cost of living inflationary factor of 1.5% was applied. The Township does anticipate some new costs related to the systems operations and maintenance, therefore, some adjustments were made to the operating expenditures throughout the planning period. A new Lead Hand position for the water and wastewater department is planned for 2018. A split of 60/40 has been applied respectively to water and wastewater systems to account for each system's proportionate cost of the increased cost of an added employee.

The total operating expenditures for the water system in 2017 is projected to be \$1,691,895. The projected operating costs are expected to be \$1,340,750 by 2027. The water system currently has debentures expiring in 2027, resulting in annual payment savings (principal and interest) of \$494,250. No new debt is expected to be issued for the water system during the forecasted period.

The water system's operating budget for the forecasted periods contains the following assumptions (other than the inflation adjustment identified above).

- Overhead & Utilities – Based on 2 year average as it is the most reasonable selection to use. Additional Staff (Lead Hand) added in 2018.
- Professional Services /Plant Repairs & Maintenance/Taxes/Vehicles – 5 year average used, as no strong changes were noticed or anticipated to occur within the next few years.

- Distribution Repairs & Maintenance/ Chemicals, Testing/Conservation – 3 year average used, as most recent trend is more reasonable and assumed to be more accurate than the 5 year trend.
- Interest on Debt – As per current amortization schedule. Debt expires in 2022.

The total operating expenditures for the wastewater system in 2017 is projected to be \$1,329,588. The projected operating costs are expected to increase to \$1,823,813 by 2027. The wastewater system has current debt payments of \$123,687 annually, \$100,186 of which is funded by development charges. Annual debt payments are forecasted to increase to \$999,919 by 2027, of which \$268,317 relates to development charges. Should plant upgrades be delayed, significant savings in both principal and interest payments will be realized during the forecasted period.

The wastewater system's operating budget for the forecasted periods contains the following assumptions (other than the inflation adjusted identified above).

- Collection Repairs & Maintenance– 5 year historical average used to smooth out large variances in expenses year over year.
- Interest on Debt – As per current amortization schedule. Current Debt expires in 2027. New Debt forecasted is related to the Phase1 and Phase 2 upgrades to VHWWTTP and equipment replacements at the PMWWTP.
- All other categories – Based on 3 year historical average, as is more reasonable and assumed to be more accurate than the 5 year trend. Additional Staff (Lead Hand) added in 2018.
- The hydro usage at the new VHWWTTP Headwork's' building has not been fully accounted for in the projection, as the total annual costs are not yet known. It is anticipated that this increased energy consumption will at least be partially offset by efficiencies realized at the PMWWTP in 2017 YTD actuals.

Table 4-1			
Operating & Maintenance Costs			
	Actual	Projected Costs	
	2016	2017	2027
Water	\$1,767,131	\$1,691,895	\$1,340,750
Wastewater	\$1,502,716	\$1,329,588	\$1,823,813

Note: 2016 was a particularly high year for repairs and maintenance costs related to the distribution and collection system & utilities at the treatment plants.

Detailed operating expenditures for the water and wastewater systems are set out in Appendix B.

4.2 OTHER (NON-RATE) REVENUES

Other (non-rate) revenues are budgeted revenue which decrease the net operating budget but which are not recovered through water or wastewater user rates. Examples of non-rate revenues are connection fees, vacant lot levies, late fees, penalties, interest income, and other miscellaneous revenues. For the purposes of this study, interest income has been calculated at a rate of 1 percent based on the expected reserve balances for the prior year. Penalties are estimated to be 1 percent of the projected billings for the year.

As part of this study, the current vacant lot levy (\$64 in 2017) was reviewed. From the rate analysis performed it was concluded that this annual charge should reflect these properties proportionate share of the annual infrastructure reserve contribution required for the long term repair, maintenance and replacement of the water and wastewater linear infrastructure. Existing water and wastewater linear infrastructure has been sized to service all fronting lands, and therefore it is reasonable that properties not yet connected to the system would contribute to the annual funds put aside for the future replacement of these assets. Properties benefit

by having a main available when they wish to connect as well as being provided with fire protection.

To arrive at this annual charge, the total annual contribution required to replace existing water and wastewater linear infrastructure (see section 5-Infrastructure Capital) is divided by the total number of properties, both connected and not connected to the water and wastewater system.

Table 4-2 below shows the calculated annual levy charge required at the end of the forecast period.

Table 4-2			
Proposed Vacant Lot Levy Charge			
	Annual Contribution	Total Properties	Calculated Annual Levy Charge
	2016	2027	2027
Water – Linear Infrastructure	\$710,010	3,999	\$177.55
Wastewater – Linear Infrastructure	\$549,104	2,909	\$188.76

It is recommended that this increase be phased in over the ten year period as per the schedule below.

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Water	\$64	\$72	\$80	\$90	\$101	\$113	\$126	\$141	\$158	\$177	\$178
Wastewater	\$64	\$72	\$80	\$90	\$101	\$113	\$126	\$141	\$158	\$177	\$189

The total vacant lot revenue assumed over the forecast period is based on the annual rate in the schedule above multiplied by the number of vacant lots. Vacant lots have been forecasted to decrease by 1% per year, with the exception of the add on for the 79 vacant lots in Paradise Point and Grandview Beach that will be subject to the water vacant lot levy once the year around watermain is operational.

Overall, the water and wastewater system are forecasted to recover approximately \$216,131 by 2027 through other (non-rate) revenues such as vacant lot/improved lot levies, connection fees, late fees, penalties, and interest income.

Table 4-3		
Non-rate Revenues		
	Projected Costs	
	2017	2027
Water	\$69,792	\$136,434
Wastewater	\$15,251	\$79,697

5 INFRASTRUCTURE AND CAPITAL

5.1 WATER AND WASTEWATER INFRASTRUCTURE

The information contained in the analysis was gathered from the Township’s existing asset database. The information is used not only to describe, but also define the quantity, age and replacement value of the existing infrastructure. The inventory was grouped into nine main asset categories.

Table 5-1	
Water & Wastewater Asset Categories	
Water	Wastewater
Watermains	Sewer gravity mains
Water Distribution – Booster Stations	Forcemains
Water Distribution – Standpipes	Wastewater Treatment Plants
Water Treatment Plants	Pumping (lift) Stations
Vehicles & Related Equipment	

The replacement value of the Township’s water and wastewater infrastructure inventory is approximately \$144 million. Both the water and wastewater systems are relatively young. The TAWTP was substantially upgraded in 2015 and the phase 1 upgrade to the VHWTP was completed in the spring of 2017. Significant upgrades were also done to the PMWWTP in 2011.

It should be noted that the Township’s assets have been valued (at replacement cost) and assigned a useful life using the Township’s current Tangible Capital Asset Policy and standard asset life expectancy assumptions. The table below identifies some of the useful life assumptions made by asset category.

Table 5-2	
Tay Water System Assets Useful Life by Asset Category	
Asset Category	Useful Life
Membrane Equipment	10 Years
Instrumentation & Control	20 Years
Equipment (Mechanical)	20 Years
System Equipment	20 Years
Equipment (Electrical)	50 Years
General Buildings	50 Years
Building Structure	50 Years
Forcemains	50 Years
Wet Wells	75 Years
Gravity Sewer mains	85 Years
Water mains	50, 65, 75, and 100 Years

The largest share of water infrastructure by replacement value is attributed to linear infrastructure (e.g. water mains), which is valued at approximately \$62 million, and accounts for about 72% of the infrastructure related to the Township’s water systems combined. With water mains having a useful life of up to 100 years, the replacement cost can be spread over a long period of time and thus the annual requirement needed to fund the future replacement of this asset category becomes negligible on a per user, per year basis. Whereas, other asset replacements such as the membrane treatment equipment at the plants have a relatively short useful life (approximately 10 years), and therefore the annual required contribution to fund the future replacement needs to be collected faster, and is far more sensitive to changes in replacement costs and life expectancies.

The annual requirement figure for each asset category presented in tables 5-3 and 5-4 below represents the asset’s replacement value divided by the assigned useful life.

Table 5-3		
Tay Water System Assets		
Value by Asset Category		
Asset Category	Replacement Value	Annual Requirement
Watermains (89.0km)	\$62,199,868	\$710,010
Water Distribution – Booster Stations (3)	\$ 3,021,209	\$ 83,381
Water Distribution – Standpipes (3)	\$ 9,800,000	\$130,667
Water Treatment Plants (2)	\$11,175,626	\$465,543
Vehicles & Related Equipment (3)	\$ 95,000	\$ 9,500
TOTAL	\$86,291,703	\$1,399,101

The largest share of wastewater infrastructure by replacement value is attributed to the linear infrastructure (e.g. gravity & forcemains), which is valued at \$31 million. The next largest portion of the wastewater system replacement value is attributed to the Wastewater Treatment Plants, valued at \$21 million.

Table 5-4		
Tay Wastewater System Assets		
Value by Asset Category		
Asset Category	Value	Annual Requirement
Sewer gravity mains (13.6km)	\$ 9,551,192	\$112,367
Pumping (lift) Stations (8)	\$ 5,272,073	\$126,966
Wastewater Treatment Plants (2)	\$20,985,722	\$744,828
Forcemains (31.2km)	\$21,836,850	\$436,737
Vehicles & Related Equipment (2)	\$ 55,000	\$ 5,500
TOTAL	\$57,700,837	\$1,426,398

From the useful life table, you will note that on average the useful life assigned to all mains is between 50 to 100 years. Consistent with the Township's Asset Management Plan, the useful life has been lowered in situations where the main diameter may not meet the Township's future needs (i.e. less than 100mm). With the majority of our mains installed in the 1970's and 1980's, only time will tell if the assigned useful life is appropriate. It should also be noted, that the replacement value assumes that all existing mains will in fact need to be replaced at some point in the future. Should a significant portion of these mains be good candidates for a relining program, the replacement cost could drop significantly, and thus reduce the annual requirement (assuming the assigned useful life remained unchanged). Taking these variables into consideration, a conservative approach has been used for this study, where the replacement costs are based on recent contracted work completed within the Township for full watermain replacement and the useful life assigned is based on standard useful life assumptions. It is recommended that the feasibility of a relining program for all mains be explored prior to the next rate study update.

It is important to look at these annual requirement calculations as averages, as some assets will last longer than the estimated useful life, while other assets will deteriorate well before the average expected useful life. Permanent changes to the asset inventory, such as the elimination of a treatment plant would significantly impact the annual requirement calculated in the tables above.

5.2 CAPITAL FORECAST

Over the next 10 year period, additional infrastructure will be required to support growth within the Township. Infrastructure related to growth will receive partial funding through development charge revenues. Historically, the development charge fund for the water and wastewater has not raised enough in annual developer contributions to support the annual capital requirements and the current debt payments. As such, any expected revenue shortfall will need to be recovered through the user rates. The 2017 debt to be issued for the development charge portion of the phase 1 upgrades to the VHWTP is expected to be funded 50% by the development charge fund and 50% by user rates. This payment structure will be reviewed

in late 2018 when the Township updates its current Development Charge Background Study and corresponding By-law. This update will consider whether the new proposed charge can support the annual payments, while keeping the rate attractive enough to support growth and development within the settlement areas of the Township.

Capital improvements and financing costs related to non-growth related infrastructure are the responsibility of the Township and are summarized in the table below. These costs will need to be funded through user rates unless other sources of funding (i.e. government grants) become available.

It should be noted that the watermain improvements (full year round servicing) in Paradise Point and Grandview Beach valued at \$4.4 million is included in the water capital forecast for 2017. Construction for this project is scheduled to begin in late 2017 and is to be completed by the end of 2018. This project timeline is consistent with grant funding currently available for this project from both the provincial and federal governments totalling \$3.9 million.

Table 5-5 Non-Growth Share of Capital Expenditures 2017-2026	
	Non-Growth Related
Water	\$14,847,389
Wastewater	\$12,101,700

Detailed capital expenditures planned over the study period are outlined in Appendix C.

5.3 ASSET REHABILITATION AND REPLACEMENT

When the assets require rehabilitation or are due for replacement, the source of funds are essentially limited to reserves, contributions from operating, and debt. In maintaining a user-pay approach, it is important for the Township to build sufficient reserves for the scheduled replacement of infrastructure through contributions from operating.

Contributions for infrastructure replacement are calculated for each asset based on their useful life requirements and the anticipated cost of replacement. The aggregate of all individual requirements form the required annual contribution. A full cost recovery approach is employed to calculate the annual requirement. This approach is recognized as a fair approach to charging customers for the use of these assets. As current assets are used by customers, contributions are made for the eventual replacement of these assets. Essentially, customers are paying for the assets they are using.

The combined total of all the individual annual requirements for water assets is the contribution requirement the Township must make to the water infrastructure reserve each year. The same concept applies to wastewater assets and the wastewater infrastructure replacement reserve. This ensures adequate funds are available for asset replacements as scheduled.

The study assumes that the Township will be making 100% of the required annual contribution to the reserve for the future infrastructure repair and replacement of the water system by the end of the forecast period.

To mitigate an impractical increase of the user rates, reserve contributions are phased in gradually over the analysis for the wastewater system. This system generates approximately \$1M less annually in revenue than the water system, simply because of the number of users connected to wastewater services. As such, by the end of the planning period, 2027, the Township will be making 75% of the required annual contribution to the reserve for the future repair and replacement of the wastewater system infrastructure.

The required annual contribution for asset rehabilitation and replacement is briefly summarized in Appendix D.

Table 5-6**Annual Requirement for Asset Replacement**

	Fully Calculated Annual Requirement	2017 Contribution	2027 Contribution
Water	1,399,101	1,133,272	1,399,101
Wastewater	1,436,398	861,839	1,077,299

Table 5-7 illustrates the calculated total reserve balances at the end of the 10-year period if the water and wastewater user rates remain unchanged. Under the current rates, the water reserve is well prepared for recommendations that may arise from the upcoming Master Servicing Study. However, with the current rates the wastewater reserve is forecasted to be in a deficit position, highlighting that any additional capital requirements not included in the forecasted period would need to be debt financed.

Table 5-7

**Calculated Total Reserve Balances
(today's \$)
At End of Period**

Water	\$5,285,238
Wastewater	\$(69,603)

Table 5-8 illustrates the calculated total reserve balances by the end of the 10-year period if the water and wastewater rates are adjusted as recommended (option 1). Under this option, both the water and wastewater reserves are in a position to address future replacement needs.

Table 5-8	
Calculated Total Reserve Balances (today's \$) At End of Period	
Water	\$4,510,097
Wastewater	\$4,911,077

Table 5-9 illustrates the total amount of capital costs anticipated over the 2027 – 2036 period for both water and wastewater. This forecast is system generated and is based on the average useful life identified for each asset category included in this study. Actual replacements of assets would only be completed as needed. Replacements of such assets would be reviewed by Staff and Council prior to the replacement being included in the Township's 10-year forecast, known as the Township's Long Term Plan.

Table 5-9	
Capital Forecast (today's \$) For the Period 2027-2036	
Water	\$ 4,900,000
Wastewater	\$ 6,800,000
Total Capital	\$ 11,700,000

6 RATE STRUCTURES

Various water and wastewater rate structures are in place across Ontario municipalities. The varying rate structures include flat rates, constant rates, humpback block rates, declining block rates and inclining block rates. Rate structures may also include fixed or minimum charges. The implementation of a particular rate structure depends on a number of factors including administrative and financial factors.

6.1 BACKGROUND

The Township currently has flat-rate structure for residential users and a constant variable rate for commercial users with a combined minimum monthly fixed charge of \$109.46. Residential users are billed quarterly. Commercial water consumption is billed at the same variable rate regardless of the amount of water consumed on a monthly basis (once the minimum monthly bill is exceeded).

Table 6-1 below calculates the average rate per cubic meter that both commercial and residential users are or would be paying based on their average annual consumption.

Table 6-1				
Calculated Current Rates per m3 Residential and Commercial for 2016				
Water	Users	Average Annual Consumption per User	Current Rate per year	Calculated Rate per m3 Based on Average Consumption
Residential	3,074	254.73	\$833	\$3.27
Commercial *	141	319.32	\$985	\$3.09
Wastewater				
Residential **	2,192	254.73	\$809	\$3.18
Commercial *	101	344.91	\$1,035	\$3.00

*Commercial users are charged a monthly minimum bill based on 18 cubic meters of water. The metered rate applies to all consumption above 18 cubic meters.

**For residential wastewater the average consumption per user assumes that water in equates to water out. The metered influent read from the wastewater plants is considerably higher (410.57m³ per user). For the purpose of this analysis, the difference between the calculated average annual consumption per user for water and wastewater has been attributed to inflow & infiltration within the wastewater system. This inflow and infiltration represents approximately 38% of the total wastewater influent.

6.2 ANALYSIS

Staff did explore metering's effect on rates, as it is currently slotted in year 2019 of our Long Term Plan. With the Public Works Department's current workload, which includes the ongoing work in Paradise Point and Grandview Beach, Staff assumed that a metering program would likely not be implemented before 2020. The analysis performed indicates that metering all residential connections would have little to no impact on the annual rates paid by the average water and wastewater user as the same amount of revenue (if not more to support the costs of metering) would still need to be raised to support the operation, maintenance, rehabilitation and eventual replacement of the system. The advantage of this user pay approach is that those users who use significantly more water/wastewater than the average user would pay considerably more.

Appendix E includes a table of this analysis and has been included in this study for information purposes only. It is recommended that should residential metering be implemented in 2020, this study be reviewed and updated to recommend the appropriate block rate structure to be used. The analysis completed by staff was done on an inclining block structure, where the rate increases as usage increases. The revenue forecast completed took a conservative approach, where a high fixed cost was assumed during the implementation phase (which decreased over time) and most of the consumption charged was assumed to fall within the 1st and 2nd block rates.

6.3 RATE SETTING: ISSUES TO CONSIDER

1. Cost Recovery

In determining water and wastewater rates, the full costs of providing services are recovered. The costs are to include, operation and maintenance, periodic rehabilitation and non-growth related capital costs, including the cost of long-term sustainability of infrastructure through reserve contributions.

2. Equity

A 'user-pay' approach was used in selecting a rate structure and calculating water and wastewater rates. An entirely equitable approach is considerably more difficult to apply when not all connections are metered and also when water and wastewater systems vary greatly in age, value and size.

3. Conservation

Considering the direction of environmental awareness, it is important in determining a rate structure, if and when practical to do so, that promotes conservation. It is also important to recognize that not all users have the ability to change their levels of consumption and as such, should not be penalized.

4. Administration

An important part of a rate structure is transparency to both the users and service provider. Also, easing administrative requirements may reduce the overall administrative cost, which would ultimately provide for a reduction of rates.

5. Economic Development

While recognizing the importance of the above objectives, it is also important to maintain the Township's attractiveness to industry's which may rely on water and or wastewater service to conduct business. A rate structure must allow the Township to continue to be competitive from an economic development perspective.

6.4 MOVING FORWARD

This study recommends that a flat-rate structure for residential users and a constant variable rate structure for commercial users remains. Metered connections for all users has not been recommended due to the limited water and wastewater connections within the Township, the high initial cost of implementing a metering system (estimated at \$1.5M), and the ongoing operational costs of reading, recording and billing users through a metering system (not yet quantified).

7 CALCULATED RATES

7.1 OVERVIEW

In calculating the water and wastewater rates, a number of assumptions were applied. The annual required rate calculated in tables 7-2 and 7-3 shows the additional revenue that would need to be generated by the rates (in today’s \$) in order to fully recover the operating costs and provide for the required annual asset contribution to reserves.

An immediate implementation of a rate that fully funded the calculated asset replacement contributions would result in significant rate increase to all users in the Township.

Table 7-1 below shows the total amount of funding needed in 2027 (in today’s \$) to fully fund both the water and wastewater systems so that they are 100% sustainable. Based on the data, the wastewater rate would have to increase a total of 65% over the 10 years. With an inflationary factor of 1% applied annually the percentage increase would be over 80%.

Fully Funded Rate Calculation			Table 7-1
	2017 Projected Rate Revenue	2027 Projected Rate Revenue Required (today's \$)	Percentage Increase (Decrease)
Water	2,751,286	2,603,417	-5%
Wastewater	1,927,634	3,180,514	65%

One factor to consider when implementing rates based on full funding is that the current capital forecast assumes that all non-growth related capital will be the financial responsibility of the Township. With limited funding sources available, debt is the most probable option for large scale capital upgrades to our treatment plants. Should grant financing become available for the next wastewater plant upgrade or should the 2022 wastewater plant upgrade be delayed until a future period, significant annual savings would be realized in both principal and interest payments. Considering this sensitivity analysis, the calculated rates are based on providing for a gradual movement towards full cost rates with infrastructure replacement contributions at 100% for the water system by year 2023 and 75% for the wastewater system by the end of the forecast period (2027). Based on the information we have today, these annual contributions will demonstrate a significant movement towards long-term full cost recovery rates.

The analysis presented shows three options for gradual rate adjustments to both the wastewater and water users. As the analysis was prepared in today's dollars, an inflation factor of 1% has been applied to the calculated rates to account for increases in capital replacements costs over the forecasted period. Should actual annual inflation rates be significantly higher or lower than this, Council may want to consider adjusting the annual inflationary factor before setting the rates for each calendar year.

Three options for adjustments to the current water and wastewater rates are presented below:

Water

Option 1) Provides for a phased-in rate decrease of 1.5% less inflation over the forecast period. A phased-in decrease gives a modest decrease to rate payers, and gives the Township time to evaluate the accuracy of the forecast and adjust accordingly before the operating expenses decline in 2023 with the expiry of the 2007 debt.

Option 2) Implements a rate that supports full lifecycle reserve fund contributions and the expected reduction in operating costs immediately. A rate decrease of \$65 or -8% would be required for 2018. Only inflationary increases (1%) would be applied annually.

Option 3) Rates remain stable at \$833/year (including inflation) until 2022 then decline by 2.5% less inflation thereafter. This option is the most consistent with the actual funding need calculated per year.

Wastewater

Option 1) Phased-in rate increase of 3% plus inflation over the forecast period to provide sufficient funding for full cost needs (reach 75% reserve funding by the end of the forecast period).

Option 2) Option 1 with lifecycle reserve fund contributions implemented immediately. To implement this option, a rate increase of \$372 or 46% would be required for 2018. Only inflationary increases (1%) would be applied annually.

Option 3) Rate sensitive option with a phased-in increased of 1.5% plus inflation in years 2018-2022, and a 3% increase plus inflation thereafter. This increase would coincide with the reduction in the forecasted water rates. This option provides for a more gradual increase with the actual calculated funding need (@75%) being reached in 2030.

The tables below highlight the annual increase / (decrease) in billings revenue required to reach our funding need and provides the annual rates applicable under each of the options presented.

Tables 7-2
Water

Table 7-2a
Net Rate Funding Needed (Today's \$)

Township of Tay											
2017 Water & Wastewater Rate Study											
Water Rate Calculations											
	Forecast										
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Expenditures											
Operating											
Annual Operating Expenses	1,321,256	1,377,191	1,274,773	1,271,593	1,267,600	1,262,743	1,263,234	1,282,182	1,301,415	1,320,936	1,340,750
Debt - Principal Repayment (existing)	370,639	389,668	409,675	430,709	452,823	476,072	-	-	-	-	-
Debt - Principal Repayment (new)											
<i>Subtotal Annual Gross Operating Expenditures</i>	1,691,895	1,766,859	1,684,449	1,702,302	1,720,422	1,738,815	1,263,234	1,282,182	1,301,415	1,320,936	1,340,750
Capital											
Annual Capital Renewal Expenditures											
Identified Non-Growth Related Capital Works Share	5,383,149	50,000	2,303,490	413,800	852,450	531,700	735,400	3,165,800	1,051,600	360,000	-
Other Non-growth works											
Transfer from Operating (for capital)	(900,000)	-	(1,100,000)	(318,300)	(756,950)	(436,200)	(639,900)	(1,125,000)	(956,100)	(264,500)	-
Transfer from Reserve (for capital)	(141,213)	-	(642,421)	-	-	-	-	(1,945,300)	-	-	-
Grants & Other	(4,341,936)	(50,000)	(561,069)	(95,500)	(95,500)	(95,500)	(95,500)	(95,500)	(95,500)	(95,500)	-
<i>Sub-total Capital</i>	-	-	-	-	-	-	-	-	-	-	-
Asset Replacement Reserve Contribution											
Calculated Annual Contribution	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101
Contribution Smoothing %	81%	85%	85%	90%	95%	95%	100%	100%	100%	100%	100%
Contribution Smoothing \$	(265,829)	(209,865)	(209,865)	(139,910)	(69,955)	(69,955)	-	-	-	-	-
Contribution To Reserves	1,133,272	1,189,236	1,189,236	1,259,191	1,329,146	1,329,146	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101
Total Capital Expenditures	1,133,272	1,189,236	1,189,236	1,259,191	1,329,146	1,329,146	1,399,101	1,399,101	1,399,101	1,399,101	1,399,101
Total Annual Expenditures	2,825,167	2,956,095	2,873,684	2,961,492	3,049,568	3,067,961	2,662,335	2,681,283	2,700,516	2,720,037	2,739,851
Non Rates Revenues											
Penalties & Interest	(27,516)	(27,750)	(27,981)	(28,213)	(29,353)	(29,586)	(29,818)	(30,050)	(30,283)	(30,515)	(30,748)
Lot Levies	(21,760)	(24,127)	(33,095)	(36,696)	(40,688)	(45,115)	(50,023)	(55,466)	(61,501)	(68,192)	(71,802)
Investment & Interest Income	(20,516)	(10,309)	(21,047)	(3,833)	(11,911)	(17,184)	(29,959)	(41,340)	(11,300)	-	(33,885)
Other											
<i>Total Non-Rates Revenues</i>	(69,792)	(62,186)	(82,122)	(68,741)	(81,953)	(91,885)	(109,800)	(126,856)	(103,083)	(98,707)	(136,434)
Net Rate Funding Needed (today's \$)	2,755,374	2,893,909	2,791,562	2,892,751	2,967,615	2,976,076	2,552,534	2,554,427	2,597,432	2,621,330	2,603,417
Projected Billings (@ current rates)	(2,751,586)	(2,774,962)	(2,798,062)	(2,821,300)	(2,935,335)	(2,958,573)	(2,981,811)	(3,005,049)	(3,028,287)	(3,051,525)	(3,074,763)
Increase/(decrease) in Billings Required	3,789	118,946	(6,499)	71,451	32,281	17,503	(429,276)	(450,622)	(430,854)	(430,195)	(471,346)

Table 7-2b
Residential Water Rate Options

Residential - Option 1	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Flat Rate	\$0	\$833	\$829	\$825	\$821	\$816	\$812	\$808	\$804	\$800	\$796
Option 1: decrease Annual Rate @ 1.5% per year		-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%
Add: Inflation factor @1.0%	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$833	\$829	\$825	\$821	\$816	\$812	\$808	\$804	\$800	\$796	\$792
Residential - Option 2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Flat Rate	\$0	\$833	\$776	\$784	\$792	\$800	\$808	\$816	\$824	\$832	\$841
Option 2: Decrease to Annual Rate Required Immediately		-7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Add: Inflation factor @1.0%	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$833	\$776	\$784	\$792	\$800	\$808	\$816	\$824	\$832	\$841	\$849
Residential - Option 3	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Flat Rate	\$0	\$833	\$833	\$833	\$833	\$833	\$833	\$821	\$808	\$796	\$784
Option 3: Continue to freeze rate until 2022, then 3% decrease by thereafter		-1.0%	-1.0%	-1.0%	-1.0%	-1.0%	-2.5%	-2.5%	-2.5%	-2.5%	-2.5%
Add: Inflation factor @1.0%	\$ -	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$833	\$833	\$833	\$833	\$833	\$833	\$821	\$808	\$796	\$784	\$772

Table 7-2c
Commercial Water Rate Options

Commercial - Option 1	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Metered Rate	3.09	3.09	3.07	3.06	3.04	3.03	3.01	3.00	2.98	2.97	2.95
Option 1 decrease Annual Rate 1.5% per year starting in 2023	-	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%	-1.5%
Add: Inflation factor @1.0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 3.09	\$ 3.07	\$ 3.06	\$ 3.04	\$ 3.03	\$ 3.01	\$ 3.00	\$ 2.98	\$ 2.97	\$ 2.95	\$ 2.94
Average Annual charge per user	985	980	975	970	965	961	956	951	946	942	937
Commercial - Option 2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Metered Rate	3.09	3.09	2.88	2.91	2.94	2.97	3.00	3.03	3.06	3.09	3.12
Option 2: Decrease to Annual Rate Required Immediately		-7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Add: Inflation factor @1.0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 3.09	\$ 2.88	\$ 2.91	\$ 2.94	\$ 2.97	\$ 3.00	\$ 3.03	\$ 3.06	\$ 3.09	\$ 3.12	\$ 3.15
Average Annual charge per user	985	918	927	936	946	955	965	974	984	994	1,004
Commercial - Option 3	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Metered Rate	3.09	3.09	3.09	3.09	3.09	3.09	3.09	3.04	3.00	2.95	2.91
Option 3: Continue to freeze rate until 2022, then 3% decrease by thereafter											
Add: Inflation factor @1.0%	0%	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%	-2.5%	-2.5%	-2.5%	-2.5%	-2.5%
Cumulative Rate	\$ 3.09	\$ 3.09	\$ 3.09	\$ 3.09	\$ 3.09	\$ 3.09	\$ 3.04	\$ 3.00	\$ 2.95	\$ 2.91	\$ 2.87
Average Annual charge per user	985	985	985	985	985	985	970	956	941	927	913

Tables 7-3
Wastewater

Table 7-3a
Net Rate Funding Needed (Today's \$)

Township of Tay											
2017 Water & Wastewater Rate Study											
Wastewater Rate Calculations											
	Forecast										
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Expenditures											
Operating											
Annual Operating Expenses	1,313,334	1,415,535	1,399,691	1,418,065	1,436,646	1,525,081	1,786,762	1,794,098	1,801,186	1,808,031	1,814,750
Debt - Principal Repayment (existing- net of DC's)	16,254	16,869	17,507	18,153	18,857	19,570	20,310	21,072	21,877	22,704	9,063
Debt - Principal Repayment (new - net of DC's)	-	35,357	36,542	37,766	39,031	40,338	190,804	198,165	205,812	213,755	222,006
<i>Subtotal Annual Gross Operating Expenditures</i>	<i>1,329,588</i>	<i>1,432,404</i>	<i>1,417,197</i>	<i>1,436,218</i>	<i>1,455,502</i>	<i>1,544,652</i>	<i>1,807,072</i>	<i>1,815,170</i>	<i>1,823,063</i>	<i>1,830,735</i>	<i>1,823,813</i>
Capital											
Annual Capital Renewal Expenditures											
Identified Non-Growth Related Capital Works Share	2,556,000	20,000	20,000	590,000	4,550,700	4,140,000	70,000	30,000	35,000	90,000	-
Other Non-growth works											
Transfer from Operating (for capital)	(338,787)	(20,000)	(20,000)	(550,000)	(250,000)	(500,000)	(70,000)	(30,000)	(10,000)	(60,000)	-
Transfer from Reserve (for capital)	(2,003,426)	-	-	(40,000)	-	-	-	-	-	-	-
Grants & Other	(213,787)										
Debt Proceeds					(4,300,700)	(3,640,000)					
<i>Sub-total Capital</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>25,000</i>	<i>30,000</i>	<i>-</i>
Asset Replacement Reserve Contribution											
Calculated Annual Contribution	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398	1,436,398
Contribution Smoothing %	60%	45%	50%	55%	55%	55%	60%	65%	65%	70%	75%
Contribution Smoothing \$	(574,559)	(790,019)	(718,199)	(646,379)	(646,379)	(646,379)	(574,559)	(502,739)	(502,739)	(430,919)	(359,100)
Contribution To Reserves	861,839	646,379	718,199	790,019	790,019	790,019	861,839	933,659	933,659	1,005,479	1,077,299
Total Capital Expenditures	861,839	646,379	718,199	790,019	790,019	790,019	861,839	933,659	958,659	1,035,479	1,077,299
Total Annual Expenditures	2,191,427	2,078,783	2,135,396	2,226,237	2,245,521	2,334,670	2,668,911	2,748,828	2,781,721	2,866,214	2,901,111
Non Rates Revenues											
Grants		-	-	-	-	-	-	-	-	-	-
Penalties & Interest	(19,276)	(19,503)	(19,730)	(19,957)	(20,184)	(20,411)	(20,683)	(20,910)	(21,136)	(21,363)	(21,590)
Lot Levies	(21,760)	(24,127)	(26,753)	(29,663)	(32,891)	(36,469)	(40,437)	(44,836)	(49,715)	(55,124)	(58,042)
Investment & Interest Income	25,785	3,871	8,497	13,489	7,724	5,301	3,413	1,910	818	(64)	(65)
Other											
<i>Total Non-Rates Revenues</i>	<i>(15,251)</i>	<i>(39,760)</i>	<i>(37,986)</i>	<i>(36,131)</i>	<i>(45,350)</i>	<i>(51,578)</i>	<i>(57,707)</i>	<i>(63,836)</i>	<i>(70,033)</i>	<i>(76,551)</i>	<i>(79,697)</i>
Net Rate Funding Needed (today's \$)	2,176,176	2,039,024	2,097,410	2,190,106	2,200,171	2,283,092	2,611,204	2,684,992	2,711,689	2,789,663	2,821,415
Projected Billings (@ current rates)	(1,927,634)	(1,950,319)	(1,973,004)	(1,995,689)	(2,018,375)	(2,041,060)	(2,068,275)	(2,090,961)	(2,113,646)	(2,136,331)	(2,159,016)
Increase/(decrease) in Billings Required	248,542	88,705	124,406	194,417	181,796	242,032	542,928	594,031	598,043	653,332	662,398

Table 7-3b
Residential Wastewater Rate Options

Township of Tay											
ANNUAL WASTEWATER RATE OPTIONS											
NET RATE FUNDING NEEDED											
Residential - Wastewater System	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Increase to Annual Rate		\$40	\$16	\$31	-\$5	\$26	\$127	\$21	\$2	\$23	\$4
Annual Rate Required	\$809	\$849	\$873	\$912	\$916	\$951	\$1,087	\$1,119	\$1,132	\$1,166	\$1,181
Add: Inflation factor @1.0%	0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$809	\$857	\$882	\$921	\$925	\$960	\$1,098	\$1,130	\$1,143	\$1,178	\$1,193
OPTIONS FOR CONSIDERATION											
Residential - Option 1	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Flat Rate	\$0	\$809	\$841	\$875	\$910	\$946	\$984	\$1,024	\$1,065	\$1,107	\$1,151
Option 1: Increase Annual Rate @ 3% per year		3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Add: Inflation factor @1.0%	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$809	\$841	\$875	\$910	\$946	\$984	\$1,024	\$1,065	\$1,107	\$1,151	\$1,198
Residential - Option 2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Flat Rate	\$0	\$809	\$1,189	\$1,201	\$1,213	\$1,225	\$1,238	\$1,250	\$1,262	\$1,275	\$1,288
Option 2: Increase to Annual Rate Required Immediately		46.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Add: Inflation factor @1.0%	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$809	\$1,189	\$1,201	\$1,213	\$1,225	\$1,238	\$1,250	\$1,262	\$1,275	\$1,288	\$1,301
Residential - Option 3	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Flat Rate	\$0	\$809	\$829	\$850	\$871	\$893	\$915	\$952	\$990	\$1,030	\$1,071
Option 3: Increase Annual Rate 1.5% per year until 2022, then 3% thereafter		1.5%	1.5%	1.5%	1.5%	1.5%	3%	3%	3%	3%	3%
Add: Inflation factor @1.0%	\$ -	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Cumulative Rate	\$809	\$829	\$850	\$871	\$893	\$915	\$952	\$990	\$1,030	\$1,071	\$1,114

Table 7-3c
Commercial Wastewater Rate Options

Commercial - Option 1	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Metered Rate	3.00	3.00	3.12	3.24	3.37	3.51	3.65	3.80	3.95	4.11	4.27
Option 1: Increase Annual Rate @ 3% per year	-	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Add: Inflation factor @1.0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 3.00	\$ 3.12	\$ 3.24	\$ 3.37	\$ 3.51	\$ 3.65	\$ 3.80	\$ 3.95	\$ 4.11	\$ 4.27	\$ 4.44
Average Annual charge per user	1,035	1,076	1,119	1,164	1,211	1,259	1,310	1,362	1,416	1,473	1,532
Commercial -Option 2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Metered Rate	3.00	3.00	4.41	4.45	4.50	4.54	4.59	4.63	4.68	4.73	4.78
Option 2: Increase to Annual Rate Required Immediately	-	46.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Add: Inflation factor @1.0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 3.00	\$ 4.41	\$ 4.45	\$ 4.50	\$ 4.54	\$ 4.59	\$ 4.63	\$ 4.68	\$ 4.73	\$ 4.78	\$ 4.82
Average Annual charge per user	1,035	1,521	1,537	1,552	1,568	1,583	1,599	1,615	1,631	1,648	1,664
Commercial -Option 3	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Metered Rate	3.00	3.00	3.08	3.15	3.23	3.31	3.39	3.53	3.67	3.82	3.97
Option 3: Increase Annual Rate 1.5% per year and 3% starting in 2023	-	1.5%	1.5%	1.5%	1.5%	1.5%	3%	3%	3%	3%	3%
Add: Inflation factor @1.0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cumulative Rate	\$ 3.00	\$ 3.08	\$ 3.15	\$ 3.23	\$ 3.31	\$ 3.39	\$ 3.53	\$ 3.67	\$ 3.82	\$ 3.97	\$ 4.13
Average Annual charge per user	1,035	1,061	1,087	1,115	1,142	1,171	1,218	1,267	1,317	1,370	1,425

7.2 WATER RATES

The required user rate revenue for Township water systems in 2018 is forecast to be \$2.9 million. The amount of revenue required throughout the forecast period decreases to \$2.6 million (in today's \$) by the end of 2027. At an inflationary rate of 1% per year, this requirement could reach upwards to \$2.9 million. This is the amount of revenue which must be collected through the sale of water to substantially recover the operating, capital, rehabilitation and replacement costs of the water system.

7.3 WASTEWATER RATES

The required user rate revenue for the Township's wastewater systems in 2018 is forecast to be \$2.0 million. The amount of revenue required throughout the forecast period increases to \$2.8 million (in today's \$) by the end of 2027. At an inflationary rate of 1% per year, this requirement could reach upwards to \$3.0 million. This is the amount of revenue which must be collected through wastewater charges to substantially recover the operating, capital, rehabilitation and replacement costs of the wastewater system.

7.4 IMPACT ON A TYPICAL USER

The tables below summarize the combined increase to the user rates under each of the options presented. The annual commercial rate presented is based on an estimated consumption of 300m³/year.

Option 1: Phased-in Cost Recovery			
	2017 Annual Rate	2018 Annual Rate	2027 Annual Rate
Water & Wastewater			
Residential	\$ 1,642	\$ 1,670	\$ 1,990
Commercial	\$ 2,020	\$ 2,056	\$ 2,469

Option 1 – Under this scenario the rates would increase gradually over the forecast period to address issues of user affordability and promotes more of a pay as you go approach.

Option 2: Immediate Cost Recovery			
	2017 Annual Rate	2018 Annual Rate	2027 Annual Rate
Water & Wastewater			
Residential	\$ 1,642	\$ 1,965	\$ 2,219
Commercial	\$ 2,020	\$ 2,370	\$ 2,668

Option 2 – This option provides for an immediate increase to cost recovery (100% for water, 75% for wastewater). This option would allow the wastewater system to reach full cost recovery by the mid- 2030’s if rate increases were continued past the forecast period. This option does not balance the concerns of full cost recovery with affordability and the pay as you go approach, as today’s use would be burdened by the full cost of past underfunding.

Option 3: Rate Sensitive			
	2017 Annual Rate	2018 Annual Rate	2027 Annual Rate
Water & Wastewater			
Residential	\$ 1,642	\$ 1,662	\$ 1,886
Commercial	\$ 2,020	\$ 2,046	\$ 2,338

Option 3 –This option provides for a nominal increase to the wastewater rates in the first half of the forecast period, with a more substantial increase noted in the balance of the forecast. Water rates are kept stable in the first half, and then decreased thereafter. This rate sensitive option gives the Township time to review the study forecast accuracy and re-assess the capital upgrades noted in the Long Term Plan. However, with a much more gradual phase-in, the wastewater system would not reach 75% funding until 2030. While this approach addresses the affordability concerns, it leaves future ratepayers with the burden of paying for today’s infrastructure use.

7.5 IMPACT ON A VACANT LOT LEVIES

Table 7-5 below presents a comparison of the newly calculated 2018 water and wastewater vacant lot levies with the current levy.

Vacant Lot Levy Impact			
	2017 Levy	Proposed 2018 Levy	Impact
Water	\$64	\$72	\$8
Wastewater	\$64	\$72	\$8

8 RECOMMENDATIONS AND FINDINGS

The table below presents the total adjustment to the water and wastewater rates as presented in option 1 for the entire forecast period.

	2017 User Rate (Per Year)	2027 Calculated User Rate (Per Year)	Total Percentage Change	2027 Rate per m3
Water				
Residential	\$ 833	\$ 792	-5%	3.11
Commercial	\$ 985	\$ 937	-5%	2.93
Wastewater				
Residential	\$ 809	\$ 1,198	48%	\$ 4.70
Commercial	\$ 1,035	\$ 1,532	48%	\$ 4.45

By adopting Option 1 of this study, water users would see a nominal decline in the annual rate charged of 0.5% per year and wastewater users would see a steady increase in the annual rate charged of 4% per year.

Over the ten-year period, users of both water and wastewater services would see a total increase to their annual bill of 21% for residential users and 22% for the average commercial user.

	2017 Annual Rate	2027 Annual Rate (Option 1)	Total Percentage Change
Water & Wastewater			
Residential	\$ 1,642	\$ 1,990	21%
Commercial	\$ 2,020	\$ 2,469	22%

The analysis included in this report ensures that the water and wastewater rates fund all of the Township’s anticipated annual costs including all operating costs and capital financing needs. It is fiscally prudent that the Township’s water and wastewater rates also continue to provide for an annual contribution towards the eventual repair and ultimate replacement of water and wastewater infrastructure. An immediate implementation of a rate that fully funds the calculated asset rehabilitation and replacement contributions would result in significant rate increase to all users in the Township. Instead, the analysis provided demonstrates an increasing annual contribution to reserves for asset rehabilitation and replacement. Over time, these contributions, will demonstrate a significant movement towards long-term full cost recovery rates. Life-cycle planning with mid-course corrections is always the preferable approach, compared to planning over the short-term, or not planning at all.

The calculated wastewater rates included in this updated study are higher than the rates adopted in the previous study, however, it should be noted that the 2007 adopted rate did not include the full lifecycle costs. Council and staffs preceding commitments to move towards full cost recovery has resulted in controllable increases to the water and wastewater rates moving forward.

When comparing the Township’s water and wastewater rates to surrounding municipalities, it is important to recognize that a limited number of users support a vast amount of infrastructure operating our water and wastewater systems. Staff continues to look for operational efficiencies and grant funding from higher levels of government to ensure that Tay remains an attractive place to live, work and play. Education and outreach must remain a focus, as water conservation efforts have the potential to make significant operational and capital savings, which in turn affect the overall rates paid (even under a flat-rate structure). As such, it is recommended that the study

be updated in 5 years' time, or earlier, pending significant changes in; inflation, annual operating or capital expenditures or financing (i.e. grants), consumption patterns, or growth projections etc.

APPENDIX

APPENDIX A

GROWTH AND DEMAND FORECASTS

Appendix A

Table 1 – Page 1

Water Users 2009 - 2018

Description	Water System Customers									
	2009		2010		2011		2012		2013	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
<u>Residential</u>										
Tay Area Water Plant	2,981	2,928	3,021	2,945	3,061	2,957	3,102	2,972	3,142	3,010
Rope	27	-	27	-	27	-	27	-	27	-
Subtotal	3,008	2,928	3,048	2,945	3,088	2,957	3,129	2,972	3,169	3,010
<u>Non-Residential</u>										
Tay Area Water Plant	121	129	123	127	126	129	128	134	131	134
Subtotal	121	129	123	127	126	129	128	134	131	134
Total Water Users	3,129	3,057	3,171	3,072	3,214	3,086	3,257	3,106	3,300	3,144
Description	2014		2015		2016		2017		2018	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
<u>Residential</u>										
Tay Area Water Plant	3,182	3,029	3,222	3,045	3,262	3,043	3,068	-	3,093	
Rope	27	-	27	-	27	31	31	-	31	
Subtotal	3,209	3,029	3,249	3,045	3,289	3,074	3,099	-	3,124	-
<u>Non-Residential</u>										
Tay Area Water Plant	133	135	136	137	138	141	141		143	
Subtotal	133	135	136	137	138	141	141		143	
Total Water Users	3,342	3,164	3,385	3,182	3,427	3,215	3,240	-	3,267	-

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Table 1 – Page 2

Water Users 2019 – 2027

Description	Water System Customers									
	2019		2020		2021		2022		2023	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
Residential										
Tay Area Water Plant	3,118		3,143		3,277		3,302		3,327	
Rope	31		31		31		31		31	
Subtotal	3,149	-	3,174	-	3,308	-	3,333	-	3,358	-
Non-Residential										
Tay Area Water Plant	145		147		149		151		153	
Subtotal	145		147		149		151		153	
Total Water Users	3,294	-	3,321	-	3,457	-	3,484	-	3,511	-
Description	2024		2025		2026		2027			
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual		
Residential										
Tay Area Water Plant	3,352		3,377		3,402		3,427			
Rope	31		31		31		31			
Subtotal	3,383	-	3,408	-	3,433	-	3,458	-		
Non-Residential										
Tay Area Water Plant	155		157		159		161			
Subtotal	155		157		159		161			
Total Water Users	3,538	-	3,565	-	3,592	-	3,619	-		

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Table 2 – Page 1

Wastewater Users 2009 - 2018

Description	Wastewater System Customers									
	2009		2010		2011		2012		2013	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
Residential										
Port McNicoll	669	647	676	655	684	660	692	661	700	663
Victoria Harbour	1,400	1,412	1,426	1,418	1,453	1,421	1,479	1,435	1,505	1,466
Subtotal	2,069	2,059	2,102	2,073	2,137	2,081	2,171	2,096	2,205	2,129
Non-Residential										
Port McNicoll	50	41	51	40	52	39	53	39	53	40
Victoria Harbour	45	40	46	40	47	40	47	41	48	41
Subtotal	95	81	97	80	99	79	100	80	101	81
Total Wastewater Users	2,164	2,140	2,199	2,153	2,236	2,160	2,271	2,176	2,306	2,210
Description	2014		2015		2016		2017		2018	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
Residential										
Port McNicoll	708	663	715	662	723	663	668	-	673	
Victoria Harbour	1,532	1,486	1,558	1,505	1,584	1,529	1,549	-	1,569	
Subtotal	2,240	2,149	2,273	2,167	2,307	2,192	2,217	-	2,242	
Non-Residential										
Port McNicoll	54	47	55	47	56	48	57	-	58	
Victoria Harbour	49	50	50	52	51	53	52	-	53	
Subtotal	103	97	105	99	107	101	109	-	111	-
Total Wastewater Users	2,343	2,246	2,378	2,266	2,414	2,293	2,326	-	2,353	

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Table 2 – Page 2

Wastewater Users 2019 - 2027

Description	Wastewater System Customers									
	2019		2020		2021		2022		2023	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
Residential										
Port McNicoll	678		683		688		693		698	
Victoria Harbour	1,589		1,609		1,629		1,649		1,675	
Subtotal	2,267		2,292		2,317		2,342		2,373	
Non-Residential										
Port McNicoll	59		60		61		62		63	
Victoria Harbour	54		55		56		57		58	
Subtotal	113	-	115	-	117	-	119	-	121	-
Total Wastewater Users	2,380		2,407		2,434		2,461		2,494	
	2024		2025		2026		2027			
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual		
Residential										
Port McNicoll	703		708		713		718			
Victoria Harbour	1,695		1,715		1,735		1,755			
Subtotal	2,398		2,423		2,448		2,473			
Non-Residential										
Port McNicoll	64		65		66		67			
Victoria Harbour	59		60		61		62			
Subtotal	123	-	125	-	127	-	129	-		
Total Wastewater Users	2,521		2,548		2,575		2,602			

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Table 3 – Page 1

Water User Consumption Forecast

Rope Water Treatment Plant			
Year	Water Consumption (m3)	Rope Users	Yearly Consumption Per User (m3)
2012	12,719	31	410.28
2013	13,374	31	431.40
2014	11,989	31	386.73
2015	10,154	31	327.56
2016	9,613	31	310.09
Forecast			
2017	10,585	31	341.46
2018	10,585	31	341.46
2019	10,585	31	341.46
2020	10,585	31	341.46
Conservation Assumption Starts (Meters in place)			
2021	10,426	31	336.34
2022	10,270	31	331.29
2023	10,116	31	326.32
2024	9,964	31	321.43
2025	9,815	31	316.61
2026	9,668	31	311.86
2027	9,523	31	307.18
Lost Water Assumption		0.95	
Water Conservation Rate		0.985	

Tay Area Water Treatment Plant			
All Users			
Year	Water Consumption (m3)	Users	Yearly Consumption Per User (m3)
2012	675,977	3079	219.54
2013	676,099	3117	216.91
2014	675,297	3137	215.27
2015	730,599	3155	231.57
2016	817,477	3184	256.75
Forecast			
2017	731,674	3209	228.01
2018	737,856	3236	228.01
2019	743,986	3263	228.01
2020	750,142	3290	228.01
Conservation Assumption Starts (Meters in place)			
2021	769,434	3426	224.59
2022	763,865	3453	221.22
2023	758,291	3480	217.90
2024	752,711	3507	214.63
2025	747,129	3534	211.41
2026	741,544	3561	208.24
2027	735,959	3588	205.12

Appendix A

Table 4 – Page 1

Wastewater User Consumption Forecast

Port McNicoll			
All Users			
Year	Influent (m3)	Users	Yearly Consumption Per User (m3)
2012	333,932	700	477.05
2013	430,194	703	611.94
2014	428,481	710	603.49
2015	358,367	709	505.45
2016	391,536	711	550.68
Forecast			
2017	398,549	725	549.72
2018	401,848	731	549.72
2019	405,146	737	549.72
2020	408,444	743	549.72
Conservation Assumption Starts (Meters in place)			
2021	405,567	749	541.48
2022	402,683	755	533.36
2023	399,795	761	525.36
2024	396,903	767	517.47
2025	394,008	773	509.71
2026	391,110	779	502.07
2027	388,211	785	494.54

Victoria Harbour			
All Users			
Year	Influent (m3)	Users	Yearly Consumption Per User (m3)
2012	517,866	1476	350.86
2013	594,656	1507	394.60
2014	684,490	1536	445.63
2015	510,881	1557	328.12
2016	549,908	1582	347.60
Forecast			
2017	597,752	1601	373.36
2018	605,592	1622	373.36
2019	613,433	1643	373.36
2020	621,274	1664	373.36
Conservation Assumption Starts (Meters in place)			
2021	619,677	1685	367.76
2022	617,989	1706	362.24
2023	618,211	1733	356.81
2024	616,318	1754	351.46
2025	614,343	1775	346.19
2026	612,289	1796	340.99
2027	610,158	1817	335.88

APPENDIX B



OPERATING REVENUES AND EXPENDITURES

Appendix B

Table 3 – Page 1

Water Operating Expenditures 2017 - 2027

	Water										
Inflation: 1.5%	Forecast										
Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Operating Expenses											
Water - Overhead	636,318	702,863	611,906	621,084	630,401	639,857	649,454	659,196	669,084	679,120	689,307
Water - Professional (Eng Survey)	17,378	17,639	17,904	18,172	18,445	18,721	19,002	19,287	19,577	19,870	20,168
Water - Plant Repairs & Maintenance	79,577	80,771	81,983	83,212	84,461	85,727	87,013	88,319	89,643	90,988	92,353
Water - Distribution Repairs & Maintenance	109,456	111,098	112,765	114,456	116,173	117,916	119,684	121,480	123,302	125,151	127,029
Water - Taxes	15,854	16,092	16,333	16,578	16,827	17,079	17,336	17,596	17,860	18,128	18,399
Water - Utilities	214,492	217,709	220,975	224,289	227,653	231,068	234,534	238,052	241,623	245,247	248,926
Water - Chemicals, Testing	91,199	92,567	93,955	95,364	96,795	98,247	99,721	101,216	102,735	104,276	105,840
Water - Conservation	1,125	1,142	1,159	1,176	1,194	1,212	1,230	1,249	1,267	1,286	1,306
Water - Vehicles	32,245	32,729	33,220	33,718	34,224	34,737	35,259	35,787	36,324	36,869	37,422
Water - Interest on Existing Debt (net of DC's)	123,611	104,581	84,575	63,541	41,427	18,178	-	-	-	-	-
Water - Amortization	860,497	860,497	860,497	860,497	860,497	860,497	860,497	858,455	825,841	764,805	743,602
Water - (Gain)/Loss on Disposal of Assets											
Water - Transfer to Capital											
Total Operating Costs	2,181,752	2,237,688	2,135,270	2,132,089	2,128,096	2,123,240	2,123,730	2,140,637	2,127,256	2,085,741	2,084,352
Less:											
Water - Amortization	(860,497)	(860,497)	(860,497)	(860,497)	(860,497)	(860,497)	(860,497)	(858,455)	(825,841)	(764,805)	(743,602)
Water- (Gain)/Loss on Disposal of Assets	-	-	-	-	-	-	-	-	-	-	-
Water- Transfer to Capital	-	-	-	-	-	-	-	-	-	-	-
Annual Operating Expenditures	1,321,256	1,377,191	1,274,773	1,271,593	1,267,600	1,262,743	1,263,234	1,282,182	1,301,415	1,320,936	1,340,750

Appendix B

Table 4 – Page 1

Wastewater Operating Expenditures 2017 - 2027

Inflation: 1.5%	Wastewater										
	Forecast										
Description	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Operating Expenses											
Wastewater - Overhead	430,025	474,475	447,116	453,822	460,630	467,539	474,552	481,671	488,896	496,229	503,672
Wastewater - Professional (Eng Survey)	56,317	57,162	58,019	58,889	59,773	60,669	61,579	62,503	63,441	64,392	65,358
Wastewater - Collection Repairs & Maintenance	194,217	197,130	200,087	203,088	206,135	209,227	212,365	215,551	218,784	222,066	225,397
Wastewater - Taxes	19,035	19,321	19,611	19,905	20,203	20,506	20,814	21,126	21,443	21,765	22,091
Wastewater - Utilities	349,363	354,603	359,922	365,321	370,801	376,363	382,008	387,738	393,554	399,458	405,450
Wastewater - Chemicals, Testing & Sludge Disposal	237,108	240,665	244,275	247,939	251,658	255,433	259,264	263,153	267,100	271,107	275,174
Wastewater - Vehicles	20,023	20,323	20,628	20,937	21,251	21,570	21,894	22,222	22,555	22,894	23,237
Wastewater - Interest on Debt (net of DC's)	7,247	6,632	5,993	5,346	4,644	3,930	3,190	2,429	1,624	796	79
Wastewater - Interest on New Debt net of DC's)	0	45,225	44,041	42,816	41,551	109,844	351,095	337,705	323,789	309,325	294,292
Wastewater - Amortization	906,128	906,072	906,072	906,072	890,148	362,905	357,903	357,903	357,903	355,729	355,531
Wastewater - (Gain)/Loss on Disposal of Assets											
Wastewater - Transfer to Capital											
Total Operating Costs	2,219,462	2,321,607	2,305,763	2,324,137	2,326,793	1,887,986	2,144,665	2,152,002	2,159,090	2,163,760	2,170,281
Less:											
Water - Amortization	(906,128)	(906,072)	(906,072)	(906,072)	(890,148)	(362,905)	(357,903)	(357,903)	(357,903)	(355,729)	(355,531)
Water- (Gain)/Loss on Disposal of Assets	-	-	-	-	-	-	-	-	-	-	-
Water- Transfer to Capital	-	-	-	-	-	-	-	-	-	-	-
Annual Operating Expenditures	1,313,334	1,415,535	1,399,691	1,418,065	1,436,646	1,525,081	1,786,762	1,794,098	1,801,186	1,808,031	1,814,750

Appendix B

Table 5 – Page 1

Water and Wastewater Debt Summary 2017 - 2027

WATER SUMMARY	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Beginning Bal	3,797,451	3,378,090	2,938,059	2,476,325	1,991,804	1,483,357	949,787	890,352	828,916	1,780,438	1,688,523
Amount Borrowed	-	-	-	-	-	-	-	-	1,040,000	-	-
Interest Charged	165,554	144,884	123,181	100,394	76,468	51,345	31,231	29,229	68,760	65,622	62,373
Payments in Year	584,915	584,915	584,915	584,915	584,915	584,915	90,665	90,665	157,238	157,538	157,238
Principle Paid	419,361	440,031	461,734	484,521	508,447	533,570	59,434	61,436	88,478	91,915	94,865
Ending Balance	3,378,090	2,938,059	2,476,325	1,991,804	1,483,357	949,787	890,352	828,916	1,780,438	1,688,523	1,593,658

SEWER SUMMARY	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Beginning Bal	2,864,389	3,678,844	3,519,348	3,354,123	3,183,047	4,745,741	4,417,139	12,860,032	12,281,453	11,680,491	11,056,318
Principal Borrowed	900,000	-	-	-	1,740,000	-	9,000,000	-	-	-	-
Interest Charged	49,286	125,355	119,626	113,774	107,545	170,775	518,377	496,906	474,522	451,311	427,952
Payments in Year	134,831	284,851	284,851	284,851	284,851	499,377	1,075,485	1,075,485	1,075,485	1,075,485	999,919
Principle Paid	85,545	159,496	165,225	171,077	177,305	328,602	557,107	578,578	600,962	624,173	571,967
Ending Balance	3,678,844	3,519,348	3,354,123	3,183,047	4,745,741	4,417,139	12,860,032	12,281,453	11,680,491	11,056,318	10,484,351

APPENDIX C

CAPITAL EXPENDITURES

Appendix C

Table 1 – Page 1

Water Capital

2017-2026 Long Term Plan

Water Summary											
Description	Total	Budget	Forecast								
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Capital Expenditures											
PLANTS											
Tay Area Treatment Plant											
Low Lift Building Roof											
Equipment Replacement	120,000	20,000			50,000			50,000			
Membrane Replacement	340,000									290,000	50,000
Increase Plant Capacity/Refurbish (Phase 2) - Engineering	50,000					50,000					
Increase Plant Capacity/Refurbish (Phase 2) - Construction	1,000,000						1,000,000				
Tay Plant Total	1,510,000	20,000	0	0	50,000	50,000	1,000,000	50,000	0	290,000	50,000
Rope Water Treatment Plant											
Replace Treatment Cassettes	61,000							61,000			
Equipment Replacement	85,000	25,000				30,000				30,000	
Rope Plant Total	146,000	25,000	0	0	0	30,000	0	61,000	0	30,000	0
Total Plants	1,656,000	45,000	0	0	50,000	80,000	1,000,000	111,000	0	320,000	50,000
DISTRIBUTION											
Water Standpipes	4,630,000	160,000	0	5,000	0	10,000	200,000	0	4,005,000	240,000	10,000
Distribution Mains	4,492,389	778,149	50,000	798,490	363,800	808,450	251,700	599,400	175,800	366,600	300,000
Water Metering	1,500,000			1,500,000							
Paradise Point/Grandview Beach	4,400,000	4,400,000									
Total Distribution	15,022,389	5,338,149	50,000	2,303,490	363,800	818,450	451,700	599,400	4,180,800	606,600	310,000
Total Capital Expenditures	16,678,389	5,383,149	50,000	2,303,490	413,800	898,450	1,451,700	710,400	4,180,800	926,600	360,000
VEHICLES & EQUIPMENT											
Vehicle Storage (60% of total cost)	-										
Equipment	80,000	0	0	0	0	0	0	0	0	80,000	0
Vehicles	95,000	0	0	0	0	0	0	25,000	25,000	45,000	0
Total Vehicles & Equipment	175,000	-	0	0	0	0	0	25,000	25,000	125,000	0
Capital - Growth Related (per DC study)	2,006,000					46,000	920,000		1,040,000		
Total Non-Growth Related Capital	14,847,389	5,383,149	50,000	2,303,490	413,800	852,450	531,700	735,400	3,165,800	1,051,600	360,000

Appendix C

Table 2 – Page 2

Wastewater Capital

2017-2026 Long Term Plan

Wastewater Summary											
Description	Total	Budget	Forecast								
		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Capital Expenditures											
PLANTS											
Port McNicoll Wastewater Plant											
Equipment Replacement	216,000	126,000			30,000			30,000			30,000
SCADA Upgrade	35,000	35,000									
Septage Receiving	70,000	70,000									
Replace Treatment Cassettes	2,000,000					2,000,000					
Port McNicoll Wastewater Plant Total	2,321,000	231,000	0	0	30,000	2,000,000	0	30,000	0	0	30,000
Victoria Harbour Wastewater Plant											
Equipment Replacement	100,000	40,000				30,000			30,000		
Increase Plant Capacity											
Phase 2 Design	3,500,000	3,000,000			500,000						
Phase 2 Construction	9,000,000					3,000,000	6,000,000				
Victoria Harbour Wastewater Plant Total	12,600,000	3,040,000	0	0	500,000	3,030,000	6,000,000	0	30,000	0	0
Total Plants	14,921,000	3,271,000	0	0	530,000	5,030,000	6,000,000	30,000	30,000	0	30,000
COLLECTION SYSTEM											
Mains & Lift Stations	730,000	90,000	20,000	20,000	60,000	460,000	0	40,000	0	10,000	30,000
Paradise Point/Grandview Beach											
Total Collection System	730,000	90,000	20,000	20,000	60,000	460,000	0	40,000	0	10,000	30,000
Total Capital Expenditures	15,651,000	3,361,000	20,000	20,000	590,000	5,490,000	6,000,000	70,000	30,000	10,000	60,000
VEHICLES & EQUIPMENT											
Vehicle Storage (60% of total cost)		100,000									
Equipment											
Vehicles		25,000	0	0	0	0	0	0	0	25,000	30,000
Total Vehicles & Equipment	180,000	125,000	0	0	0	0	0	0	0	25,000	30,000
Capital - Growth Related (per DC study)	3,729,300	930,000				939,300	1,860,000				
Total Non-Growth Related Capital	12,101,700	2,556,000	20,000	20,000	590,000	4,550,700	4,140,000	70,000	30,000	35,000	90,000

APPENDIX D

RESERVE PROJECTION

Appendix D

Table 1 – Page 1

Water and Wastewater Reserve Balance Projection

(today's \$)

Option 1

Water Reserve	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Beginning Balance		2,051,635	1,030,938	2,082,617	324,632	1,081,549	1,632,251	2,827,066	3,907,584	790,099	1,453,766	2,774,322
Net Change in annual operating & capital		38,494	1,063,412	- 608,261	804,031	515,374	1,260,242	1,108,136	- 266,594	781,572	1,465,589	1,862,897
Reduction to reserve contribution (option 1)			- 22,042	- 36,611	- 50,947	23,417	- 82,611	- 57,577	- 113,525	- 129,205	- 145,033	- 161,007
Additional funding required to fund capital		- 1,079,707		- 1,134,160					- 2,778,706			
Interest Revenue	22,505	20,516	10,309	21,047	3,833	11,911	17,184	29,959	41,340	11,300	-	33,885
Ending Balance	2,051,635	1,030,938	2,082,617	324,632	1,081,549	1,632,251	2,827,066	3,907,584	790,099	1,453,766	2,774,322	4,510,097

Wastewater Reserve	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Beginning Balance		2,578,536	387,108	919,501	1,568,199	1,227,344	1,311,293	1,543,661	1,919,962	2,446,646	3,108,185	3,976,774
Net Change in annual operating & capital		-1,644,952	458,687	490,769	- 81,784	266,117	- 194,158	- 153,737	- 111,036	- 89,069		- 63,063
Additional reserve contribution (option 1)			69,835	149,432	235,656	326,225	421,225	526,625	635,810	749,790	868,653	997,431
Additional funding required to fund capital		- 572,261		- 508,216	- 516,117							
Interest Revenue		25,785	3,871	8,497	13,489	7,724	5,301	3,413	1,910	818	- 64	- 65
Ending Balance	2,578,536	387,108	919,501	1,568,199	1,227,344	1,311,293	1,543,661	1,919,962	2,446,646	3,108,185	3,976,774	4,911,077

Appendix D

Table 2 – Page 1

Water and Wastewater Development Charges Projection

(Today's \$)

Reserve Projection												
Interest Rate: 0.01	2016 Balance	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Water Development Charges		149,152	205,771	265,871	329,547	396,893	422,006	36,527	56,487	79,930	40,384	3,559
Receipts Collected		145,792	148,708	151,682	154,716	157,810	160,966	164,185	167,469	170,819	174,235	177,720
Debt Proceeds												
Capital Spending						(46,000)	(460,000)					
Debt Repayments - existing		(90,665)	(90,665)	(90,665)	(90,665)	(90,665)	(90,665)	(90,665)	(90,665)	(90,665)	(90,965)	(90,666)
Debt Repayments - new (TAWTP - phase 2 - 50% of DC's financed internally)								(53,926)	(53,926)	(53,926)	(53,926)	(53,926)
Debt Repayments - new (standpipe)										(66,572)	(66,572)	(66,572)
Interest Revenue		1,492	2,058	2,659	3,295	3,969	4,220	365	565	799	404	36
Ending Balance	149,152	205,771	265,871	329,547	396,893	422,006	36,527	56,487	79,930	40,384	3,559	(29,850)

Reserve Projection												
Interest Rate: 0.01	2016 Balance	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Wastewater Development Charges		(296,035)	(206,254)	(192,298)	(174,267)	(152,041)	(125,498)	(94,513)	(237,551)	(377,674)	(514,767)	(648,709)
Receipts Collected		192,928	196,787	200,722	204,737	208,831	213,008	217,268	221,614	226,046	230,567	235,178
Debt Proceeds		930,000				930,000	1,860,000					
Capital Spending		(930,000)				(930,000)	(1,860,000)					
Debt Repayments - existing		(100,186)	(100,186)	(100,186)	(100,186)	(100,186)	(100,186)	(100,186)	(100,186)	(100,186)	(100,186)	(38,977)
Debt Repayments - new (VHWWTP - phase 1)			(80,582)	(80,582)	(80,582)	(80,582)	(80,582)	(80,582)	(80,582)	(80,582)	(80,582)	(80,582)
Debt Repayments - new (VHWWTP - phase 2)								(178,593)	(178,593)	(178,593)	(178,593)	(178,593)
Interest Revenue/(Expense)		(2,960)	(2,063)	(1,923)	(1,743)	(1,520)	(1,255)	(945)	(2,376)	(3,777)	(5,148)	(6,487)
Ending Balance	(296,035)	(206,254)	(192,298)	(174,267)	(152,041)	(125,498)	(94,513)	(237,551)	(377,674)	(514,767)	(648,709)	(718,170)

APPENDIX E

METER RATE CALCULATION ANALYSIS

(INFORMATION PURPOSES ONLY)

Appendix E
Table 1 – Page 1
Metered Water Rate Calculation Analysis

METERED WATER RATE CALCULATIONS											
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
METERED RATE STRUCTURE											
A) FIXED CHARGE - MONTHLY FEE											
Residential and Multi-Residential	833.00	833.00	833.00	30.00	29.10	28.23	27.38	26.56	25.76	24.99	24.24
Commercial				36.00	34.92	33.87	32.86	31.87	30.91	29.99	29.09
Increase/(Decrease) (%)				-3%	-3%	-3%	-3%	-3%	-3%	-3%	-3%
Number of Metered Connections: Residential	3,099	3,124	3,149	3,174	3,308	3,333	3,358	3,383	3,408	3,433	3,458
Number of Metered Connections: Commercial	141	143	145	147	149	151	153	155	157	159	161
Total Annual Consumption Based Revenue	2,738,315	2,761,493	2,784,415	2,840,878	2,926,777	2,924,031	2,922,122	2,921,048	2,920,806	2,921,394	2,922,809
Residential Consumption (m3)	713,981	719,655	725,330	731,004	750,156	744,568	738,981	733,397	727,816	722,240	716,670
Commercial Consumption (m3)	39,751	40,347	40,879	41,443	42,007	42,570	43,134	43,698	44,262	44,826	45,390
Total Annual Billed Consumption (m3)	753,732	760,003	766,209	772,447	792,163	787,139	782,116	777,095	772,078	767,066	762,060
B) CONSUMPTION PER BLOCK											
I) Residential and Multi-Residential											
0-15 cubic metres/month	497,463	501,602	505,698	509,815	522,828	519,511	516,196	512,883	509,571	506,263	502,959
16-30 cubic metres/month	211,045	212,801	214,538	216,285	221,806	220,399	218,992	217,587	216,182	214,778	213,377
31-45 cubic metres/month	45,224	45,600	45,973	46,347	47,530	47,228	46,927	46,626	46,325	46,024	45,724
45 + cubic metres/month	-	-	-	-	-	-	-	-	-	-	-
II) Commercial											
0-15 cubic metres/month	25,380	25,761	26,100	26,460	26,820	27,180	27,540	27,900	28,260	28,620	28,980
16-30 cubic metres/month	14,371	14,587	14,779	14,983	15,187	15,390	15,594	15,798	16,002	16,206	16,410
31-45 cubic metres/month											
45 + cubic metres/month											
C) CHARGE PER CUBIC METER											
I) Residential and Multi-Residential											
0-15 cubic metres/month				1.95	1.99	2.03	2.07	2.11	2.15	2.20	2.24
16-30 cubic metres/month				2.10	2.14	2.18	2.23	2.27	2.32	2.36	2.41
31-45 cubic metres/month				2.60	2.65	2.71	2.76	2.81	2.87	2.93	2.99
45 + cubic metres/month				3.25	3.32	3.38	3.45	3.52	3.59	3.66	3.73
II) Commercial											
0-15 cubic metres/month	3.09	3.09	3.09	1.59	1.62	1.65	1.69	1.72	1.76	1.79	1.83
16-30 cubic metres/month	3.09	3.09	3.09	1.59	1.62	1.65	1.69	1.72	1.76	1.79	1.83
31-45 cubic metres/month	3.09	3.09	3.09	1.59	1.62	1.65	1.69	1.72	1.76	1.79	1.83
45 + cubic metres/month	3.09	3.09	3.09	1.59	1.62	1.65	1.69	1.72	1.76	1.79	1.83
Rate Increase				2%	2%	2%	2%	2%	2%	2%	2%
Charge Per Typical House (240m3/year)											
Fixed Charge	833.00	833.00	833.00	360.00	349.20	338.72	328.56	318.71	309.14	299.87	290.87
Consumption Charge	0.00	0.00	0.00	477.00	486.54	496.27	506.20	516.32	526.65	537.18	547.92
Annual Charge Per Typical Household	833.00	833.00	833.00	837.00	835.74	834.99	834.76	835.03	835.79	837.05	838.80
Annual Increase per Typical Household (%)											
Commercial Charge (300m3/year)											
Fixed	-	-	-	432	419	406	394	382	371	360	349
Consumption	1,112	1,112	1,112	572	584	596	607	620	632	645	658
Annual	1,112	1,112	1,112	1,004	1,003	1,002	1,002	1,002	1,003	1,004	1,007

Appendix E
Table 1 – Page 2
Metered Wastewater Rate Calculation Analysis

METERED WASTEWATER RATE CALCULATIONS											
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
METERED RATE STRUCTURE											
A) FIXED CHARGE - MONTHLY FEE											
Residential and Multi-Residential	809.00	809.00	809.00	35.00	33.95	32.93	31.94	30.99	30.06	29.15	28.28
Commercial				42.00	40.74	39.52	38.33	37.18	36.07	34.98	33.94
Increase/(Decrease) (%)				-3%	-3%	-3%	-3%	-3%	-3%	-3%	-3%
Number of Metered Connections: Residential	2,217	2,242	2,267	2,292	2,317	2,342	2,373	2,398	2,423	2,448	2,473
Number of Metered Connections: Commercial	109	111	113	115	117	119	121	123	125	127	129
Total Annual Consumption Based Revenue	1,911,273	1,933,658	1,956,043	3,160,876	3,175,810	3,191,336	3,213,953	3,230,641	3,247,944	3,265,866	3,284,415
Residential Consumption (m3)	960,552	970,903	981,254	991,604	986,926	982,165	979,337	974,391	969,373	964,286	959,133
Commercial Consumption (m3)	30,011	30,328	30,645	30,962	31,279	31,596	31,914	32,231	32,548	32,865	33,182
Total Annual Billed Consumption (m3)	990,562	1,001,230	1,011,898	1,022,567	1,018,205	1,013,761	1,011,251	1,006,622	1,001,921	997,151	992,316
B) CONSUMPTION PER BLOCK											
I) Residential and Multi-Residential											
0-15 cubic metres/month	653,771	660,812	667,853	674,894	672,016	669,083	667,426	664,370	661,268	658,120	654,928
16-30 cubic metres/month	277,357	280,344	283,332	286,319	285,098	283,853	283,150	281,854	280,538	279,202	277,848
31-45 cubic metres/month	59,434	60,074	60,714	61,354	61,092	60,826	60,675	60,397	60,115	59,829	59,539
45 + cubic metres/month	-	-	-	-	-	-	-	-	-	-	-
II) Commercial											
0-15 cubic metres/month	19,620	19,980	20,340	20,700	21,060	21,420	21,780	22,140	22,500	22,860	23,220
16-30 cubic metres/month	10,391	10,348	10,305	10,262	10,219	10,176	10,134	10,091	10,048	10,005	9,962
31-45 cubic metres/month											
45 + cubic metres/month											
C) CHARGE PER CUBIC METER											
I) Residential and Multi-Residential											
0-15 cubic metres/month				1.95	1.99	2.03	2.07	2.11	2.15	2.20	2.24
16-30 cubic metres/month				2.10	2.14	2.18	2.23	2.27	2.32	2.36	2.41
31-45 cubic metres/month				2.65	2.70	2.76	2.81	2.87	2.93	2.98	3.04
45 + cubic metres/month				3.40	3.47	3.54	3.61	3.68	3.75	3.83	3.91
II) Commercial											
0-15 cubic metres/month	3.00	3.00	3.00	1.95	1.99	2.03	2.07	2.11	2.15	2.20	2.24
16-30 cubic metres/month	3.00	3.00	3.00	1.95	1.99	2.03	2.07	2.11	2.15	2.20	2.24
31-45 cubic metres/month	3.00	3.00	3.00	1.95	1.99	2.03	2.07	2.11	2.15	2.20	2.24
45 + cubic metres/month	3.00	3.00	3.00	1.95	1.99	2.03	2.07	2.11	2.15	2.20	2.24
Rate Increase				2%	2%	2%	2%	2%	2%	2%	2%
Charge Per Typical House (380m3/year)											
Fixed Charge	809.00	809.00	809.00	420.00	407.40	395.18	383.32	371.82	360.67	349.85	339.35
Consumption Charge	0.00	0.00	0.00	792.60	808.45	824.62	841.11	857.94	875.09	892.60	910.45
Annual Charge Per Typical Household	809.00	809.00	809.00	1212.60	1215.85	1219.80	1224.44	1229.76	1235.76	1242.44	1249.80
Annual Increase per Typical Household (%)											
Commercial Charge (300m3/year)											
Fixed	-	-	-	504	489	474	460	446	433	420	407
Consumption	1,080	1,080	1,080	702	716	730	745	760	775	791	806
Annual	1,080	1,080	1,080	1,206	1,205	1,205	1,205	1,206	1,208	1,210	1,214