

Wastewater System Financial Plan

For the Corporation of the City of Thunder Bay



Prepared January 2015

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Executive Summary

The City of Thunder Bay revised its Capital Financing and Debt Policy in 2014. Corporate Report No. 2014.019 (Accounting & Budgets) outlined a Corporate Debt Management Strategy that included the development of a long-term financial plan for Wastewater before the end of 2014.

The Wastewater long-term financial plan outlines the projected operating and capital plan for the next 20 years, with the goal of achieving financial sustainability, full-cost recovery and affordability for consumers while maintaining the City's existing service levels for sewage collection and treatment. The forecast demonstrates that these goals have been met through a combination of limiting increases in the sewer surcharge rate and the issuance of new debt.

Assumptions

In developing the Wastewater long-term financial plan a number of key assumptions were used:

- User Fees - the sewer surcharge rate, currently 75% of water rates for 2014 increases to 90% in 2015 and water rates increase as outlined in the Water Authority Financial Plan, approved in 2013;
- Operating costs increase by 2.5% annually;
- Administrative interdepartmental charges applied annually to wastewater by supporting areas (such as Accounts Receivable, Fleet, Stores, Cashiers, Corporate Information Technology, etc.,) are expected to be controlled at an increase of 2.5% annually;
- Utilities costs increase by 7.0% annually until 2017 and 2.5% thereafter;
- Annual operating expenses including interest and principal repayments on long-term debt reach \$20 million by 2021 and increase gradually thereafter;
- Capital requirements continue to be made in accordance with the Environment Division's current asset management plans with \$167.1 million expected to be spent through 2034 on wastewater capital infrastructure and \$10.4 million for the construction of storm sewers as part of the Pollution Prevention Control Plan, including an increase of 1.9% annually for inflation;
- Debt financing of \$53.5 million through 2034 is required to meet infrastructure demands due to the capital intensive nature of the operations and long life of the related assets;
- The debt service ratio target for Wastewater operations should not exceed 30% and the upper limit target should be 15% in future years, as approved in the Corporate Debt Management Strategy.

The projected Statement of Operations for the years 2014 through 2034 is included in Appendix A. Given the projections are based on a number of assumptions, actual results may vary significantly from projections and therefore it is important to monitor annual results and compare them to the long-term financial plan.

Introduction

Currently, there is no long-term financial plan for Wastewater operations. As part of the Debt Management Strategy outlined in Corporate Report No. 2014.019 (Accounting & Budgets), it was recommended that a long-term financial plan for rate-supported Wastewater operations to support borrowing requests be completed in 2014.

The goal in developing the Wastewater long-term financial plan is to achieve financial sustainability of the operations while striking a balance between limiting sewer surcharge rate increases and debt levels in order to continue providing sewage collection and treatment services to the City. These goals have been met as demonstrated in the 20 year forecast (through 2034) in Appendix A.

It is important to note that the management of stormwater in the City currently receives significant funding through the sewer surcharge rate. Development of a Stormwater Master Plan is underway and a preferred Financing Strategy and potential funding sources for allocating stormwater program costs will be recommended. Upon approval of the Financing Strategy recommended under the Stormwater Master Plan, the Wastewater long-term financial plan will be revised accordingly.

Sewer Surcharge Rate

Wastewater billings are based on a sewer surcharge rate (75% in 2014) on water consumption and access charges. As noted in the 2013 Water Authority Financial Plan (bain smith business valuation + consulting inc.), it is assumed that water consumption will continue to decline by 4% in 2014, 3% in 2015, 2% in 2016, 1% in 2017 and become stable in 2018 at approximately 10.7 million cubic metres. The new water rates approved in the 2013 Water Authority Financial Plan continue to be affordable over the long term.

The wastewater operations do not rely on the use of municipal tax dollars. However, in order to obtain financial sustainability over the long term, an increase in the sewer surcharge rate is necessary to cover the cost of operations and capital infrastructure renewal requirements.

At present, approximately 10% of the funds collected through the sewer surcharge rate are spent on stormwater operating and capital programs.

Debt

The Capital Financing and Debt Policy governs the use and administration of capital financing and debt. Borrowing for wastewater infrastructure is often at higher levels than tax-supported assets and over longer terms (20 years) reflecting the long life of these types of assets. Therefore, higher debt service ratio targets are generally adopted for operations of this nature. The Debt Management Strategy recommended that the debt service ratio target for Wastewater operations not exceed 30% and that efforts be made to achieve an upper limit of 15% in future years.

Current debt outstanding (\$31 million) represents financing for the Water Pollution Control Plant Secondary Treatment Expansion, addition of Ultraviolet (UV) Light Disinfection and the construction of the Cogeneration Plant with a debt service ratio of 26% expected for 2014. It is anticipated that additional debt of \$53.5 million through 2034 will be required to fund capital infrastructure renewals. Debt service ratios are projected to remain above 20% through 2024 after which it is projected that the ratio will decline from 18.3% to 9.5% from 2025 through 2034.

Environment Division – Wastewater Operations

The Environment Division within the Infrastructure and Operations Department is responsible for wastewater collection and treatment in an environmentally conscious manner. Through the City's Atlantic Avenue Water Pollution Control Plant, primary and secondary treatment, phosphorus and ammonia removal and anaerobic sludge digestion is provided. The wastewater treatment and collection system consists of:

- 1 Wastewater Treatment Plant
- 4 Wastewater Pumping Stations
- 516 Kilometres of Collection Mains
- 33,769 Service Connections
- 5,931 Manholes

In addition, operational and maintenance activities for the following stormwater infrastructure is funded from the sewer surcharge rate:

- 5 Stormwater Pumping Stations
- 320 Kilometres of Storm Collection Mains
- 373 Outlets to Receiving Waters
- 2 Stormwater Detention Ponds
- 11,010 Catchbasins
- 4,184 Manholes
- 1 Boulevard Lake Dam

The Infrastructure and Operations Department is committed to continual improvement of wastewater operations. In 2013, the wastewater treatment plant processed an average of 82 million litres per day of influent; generating a total of ~1.7 million cubic metres of digester gas and 9,377 tonnes of biosolids. The majority of the digester gas (96%) was consumed by the plant's cogeneration system to produce electricity and hot water that was used throughout the facility to reduce energy costs. In 2013 and 2014, a number of initiatives were completed and aimed at reducing overall electrical consumption. Annual savings of over 2 million kW per year are expected as a result.

A detailed summary of plant operations, processes, capital projects and the Ontario Ministry of the Environment's requirements in terms of compliance limits and objectives is available and published annually as part of the City of Thunder Bay's "Wastewater Treatment Annual Report".

Operating Budget

Wastewater's operating budget includes the costs of day-to-day operations in administering the sewage collection and treatment system for the City. This includes maintenance of linear assets in the wastewater collection system, operational costs for the Atlantic Avenue Water Pollution Control Plant, lab services, and \$1.1M of the City's stormwater operating costs. The majority of operating costs are

made up of personnel services, utilities, and materials including maintenance and parts and supplies. Per the 2014 Wastewater budget, operating expenses were budgeted at \$16.6 million including interest and principal repayments on long term debt.

A number of assumptions on operating expenses included in the projections are consistent with the 2013 Water Authority’s Financial Plan. All operating expenses are assumed to increase by 2.5% annually through 2034 while utilities are expected to increase by 7% annually through 2017 and 2.5% thereafter. More details on the operating expenses are included in the projected Statement of Operations in Appendix A.

Recent changes to the operating budget include expected increased energy costs for the recently constructed pumping station at Prince Arthur’s Landing. Operational costs for this station will increase as buildings become occupied and further development takes place. The wastewater treatment operations were expanded to provide a 24 hour operator shift rotation, 7 days per week. In order to implement the shift, additional operational staff was hired in 2013 to fulfill the new schedule. Further, additional resources have been assigned for the development of a city wide Stormwater Master Plan, various storm system programs and to further study sewer system performance.

Capital Budget

As indicated in the City’s comprehensive Asset Management Plan (“AMP”), the following table outlines the City’s sanitary sewer network assets.

Sanitary Sewer Inventory		
Asset Type	Asset Sub-Type	Quantity
Sanitary	Sewers less than or equal to 600mm	450,425.88 m
	Sewers greater than 600 mm	66,059.00 m
	Total Sewers	516,484.88 m
	Relining	Pooled assets
	Water Pollution Control Plant	1
	Pumping Stations	4

Per the AMP, this data was extracted from the City’s GIS database and the Environment Division’s October 2009 Asset Management Report: “Capital Planning Study Report, Phase 2 – Sewage System” then input into the CityWide Solutions software for further analysis.

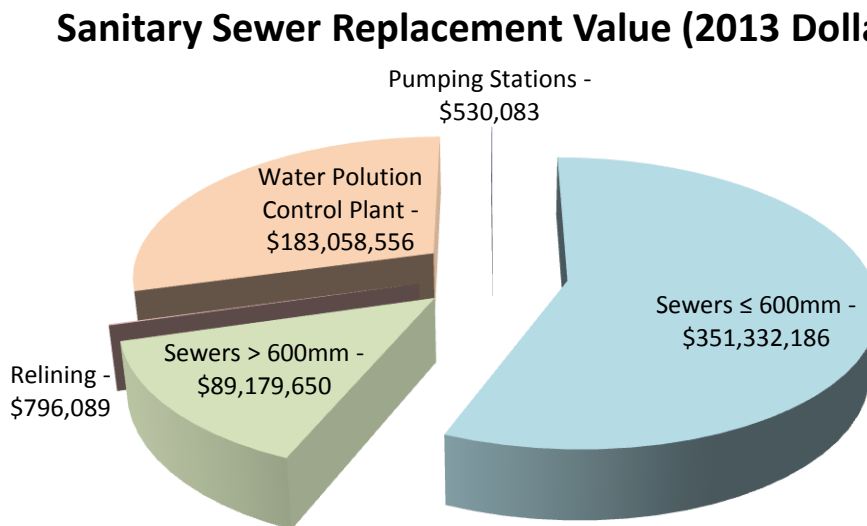
Wastewater’s annual capital budget reflects the proper maintenance and upgrading to the assets outlined in the table. Sewer main rehabilitation and replacement is conducted based on inspections and noted defects, while plant and pumping station maintenance varies based on the components. In some cases, minor maintenance occurs regularly and major maintenance on process equipment occurs annually. Rehabilitation at the plant and pumping stations occurs annually also.

Future capital costs included in the projections have been provided by the Environment Division and have been increased by 1.9% annually for inflation. Annual capital expenses for sanitary sewer system renewal/rehabilitation will increase over time from \$1 million in 2015 to \$4.6 million in 2021. Through

2034 there is no expectation of any large, one-time capital costs. Per the projected Statement of Operations, approximately \$5.5 million of wastewater capital expenses are expected to be incurred annually through 2020, while in 2021 and 2022 wastewater capital expenses are expected to be approximately \$11 million each year due in part to the need to replace aging emergency power generators (3) at the Plant resulting in an additional \$5.5 million spread out over these two years. From 2023 to 2034, wastewater capital expenses increase from \$7.9 million annually to \$9.7 million including inflation.

The Pollution Prevention Control Plan project is currently included in the wastewater capital budget but the nature of the project includes the construction of new storm sewers in areas where combined storm sewers exist. It is projected that the remaining 13 km of storm/sanitary separation will cost \$10.4 million and be completed by 2020. All other storm sewer capital projects included in this projection are tax supported capital and therefore the offsetting capital out of revenue has also been included in the estimates so these projects do not have an impact on wastewater rates.

The replacement value of the sanitary sewer network assets in 2013 dollars totals \$625 million, with the replacement cost based on the bid analysis average for sanitary sewer replacement and restoration, and insurance values for plant and pumping stations. The following chart demonstrates the breakdown of the replacement values:



Debt Financing

Given the very capital-intensive nature of Wastewater operations and the long life expectancy of Wastewater assets, it is appropriate that the City incur debt financing to fund a portion of future capital expenditures. While debt increases the cost of a project, debt financing can also help address the costs associated with deferring capital infrastructure maintenance and upgrading.

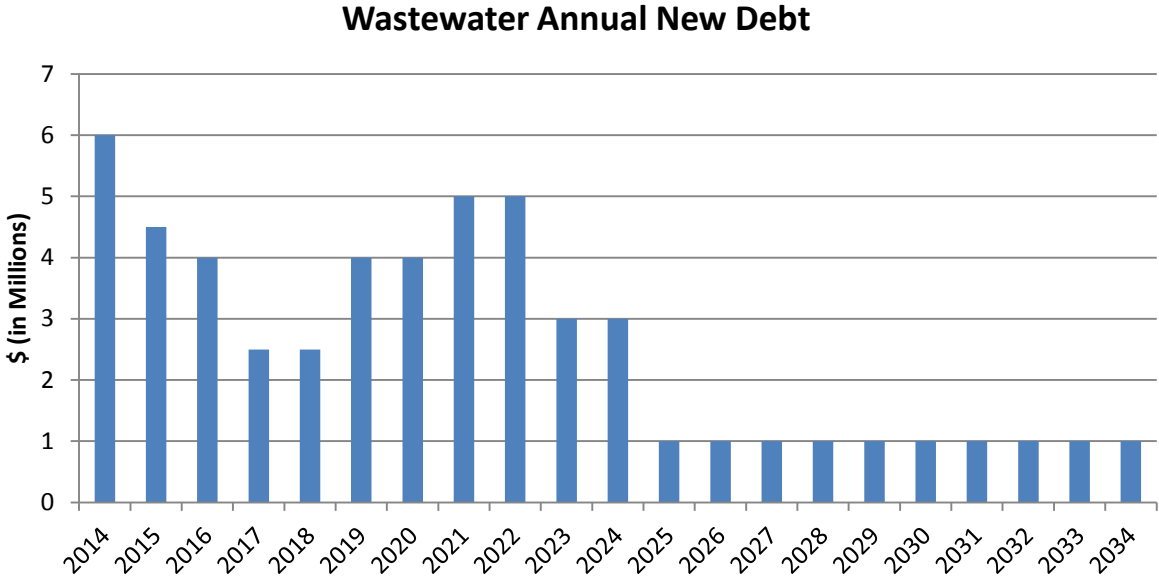
Furthermore, one of the key concepts in the Ontario Ministry of Infrastructure’s Municipal Infrastructure Strategy is “intergenerational equity” which refers to shifting the burden of infrastructure investments across the generations that benefit from that infrastructure.

Up until now, funding for wastewater capital expenditures has relied heavily upon the wastewater reserve fund. Given the significant capital investments over the past few years, this has resulted in a diminished reserve fund balance. The long term financial plan proposes new debt to fund a portion of future capital infrastructure to help address this.

The City’s existing debt represents financing for the Water Pollution Control Plant, UV and Cogeneration Plant and the current balance of debt outstanding is \$31 million. Included in this long term financial plan, additional debt of \$53.5 million through 2034 will be required to fund capital infrastructure renewals. Total outstanding debt will be highest in 2022 at approximately \$38.7 million and begin to decrease each year reaching \$20 million by 2034.

New debt in 2014 and 2015 is proposed to be at higher amounts than future years representing the need to address the significant capital expenditures incurred over the past few years. In 2017, new debt levels drop to \$2.5 million and increase gradually up to \$5.0 million in 2021 and 2022 due to increased capital needs and then drop again to \$1 million annually from 2025 through 2034. Where possible, maintaining consistent debt levels helps to maintain or smooth out cash outflows which, in turn, helps to maintain more consistent surcharge rates.

The following chart illustrates the projected annual new debt incurred through 2034:



The Debt Management Strategy recommends that the debt service ratio target for Wastewater operations not exceed 30% and that efforts be made to achieve an upper limit of 15% in future years. Debt service ratios are projected to be highest in 2014 at 26.3% and remain above 20% through 2024

after which it is projected that the ratio will decline from 18.3% to 9.5% from 2025 through 2034. It is assumed that all new debt will be incurred over 20 year terms with semi-annual payments and an interest rate of 4% compounded semi-annually.

Sewer Surcharge Revenue

In order to cover the cost of operations and capital infrastructure requirements, sewer surcharge revenue is projected to increase to \$35.4 million by 2034 up from \$17.3 million in 2014. This increase is necessary to help achieve financial sustainability for Wastewater operations.

Currently, Wastewater billings are based on a sewer surcharge rate of 75% on water consumption and access charges. As indicated in the 2014 budget package it is expected that this surcharge rate will need to be increased in future years. At this time, the long term financial plan projects that the surcharge rate will increase to 90% in 2015 and remain at that level through 2034.

Affordability for Consumers

Sewer and water rates are considered affordable when the combined sewer and water costs are 4% of median household income. In Thunder Bay, estimated household average income was \$80,680 in 2013. Under this Plan, the residential water and wastewater costs for 200m³ are projected to total \$1,049 in 2015 which is equal to 1.3% of household income.

In comparing the proposed 2015 rates to municipalities in Ontario, in 2013 the cost for the same volume of water across Ontario ranged from \$328 to \$1,659 in Brampton and Georgian Bluffs respectively.

Thunder Bay rates for sewer and water services also include the costs associated with portions of the stormwater operating and capital programs. Approximately \$50 per year of the funds collected through each residential water and wastewater bill is allocated to fund existing stormwater program costs.

A water credit program in the amount of \$200 annually is available for low income seniors and low income persons with disabilities.

Reserve Balance

During the periods covered in the long term financial plan, there are some years where it will be necessary to use funds accumulated in the reserve fund to finance capital expenditures when operating revenues in the same period are not sufficient to fund both operating and capital expenses of that year.

However, based on the assumptions used in the projections, by 2034 the City's Wastewater operations will accumulate a reserve fund balance of \$25.0 million that can be used for significant capital requirements.

The reserve fund balance begins to accumulate at a more rapid pace after 2026 reflecting the maturity of two large debentures for the Water Pollution Control Plant that originated in 2004 (maturing in 2024) and 2005 (maturing in 2025) in the amounts of \$20 million and \$23 million respectively.

Summary

The Wastewater long term financial plan was developed to demonstrate the projected operating and capital needs of Wastewater operations over the next 20 years to support revenue requirements and borrowing requests. The plan was developed with the goal of achieving financial sustainability, full-cost recovery and affordability for consumers while maintaining the City's existing service levels for sewage collection and treatment. The forecast demonstrates that these goals have been met through of combination of limiting increases in the sewer surcharge rate and the issuance of new debt in order to maintain appropriate debt service ratios.

The projected Statement of Operations is included in Appendix A. Given the projections are based on a number of assumptions, actual results may vary significantly from projections. Therefore it is important to monitor annual results and compare them to the long-term financial plan as well as update the plan accordingly should there be any potential changes to the assumptions used in the projections.

References

Asset Management Plan for the Corporation of the City of Thunder Bay - Road Network, Sidewalk Network, Bridges & Culverts, Water Distribution Network, Sanitary Sewer Network, Storm Sewer Network, Facilities and Fleet, 2014 Version 2

BMA Municipal Study 2014

City of Thunder Bay Wastewater Treatment Annual Report, 2013

City of Thunder Bay Water Authority Financial Plan 2013 – Financial Plan #024-301 (bain smith business valuation + consulting inc.)

Debt Management Strategy, Corporate Report No. 2014.019, January 2014

Appendix A – Projected Statement of Operations

The Corporation of the City of Thunder Bay
 Environment Division - Wastewater Operations
 Projected Statement of Operations
 For the years ended December 31, 2014 to 2034

Notes and Assumptions

Note 1

Wastewater Rate Revenue

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Projected Water Rate Revenue Subject to Sewer Surcharge	25,744,400	25,845,600	26,341,600	26,990,800	27,800,500	28,634,515	29,493,550	30,378,357	31,289,708	32,228,399	33,195,251	34,191,109	35,216,842	36,273,347	37,361,547	38,482,393	39,636,865	40,825,971	41,846,620	42,892,786	43,965,106
Increase Year over Year		0.4%	1.9%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	2.5%	2.5%	2.5%
Sewer Surcharge @	75%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Only 89% of Water Billings subject to Sewer Surcharge	17,184,400	20,702,326	21,099,622	21,619,631	22,268,201	22,936,247	23,624,334	24,333,064	25,063,056	25,814,948	26,589,396	27,387,078	28,208,690	29,054,951	29,926,599	30,824,397	31,749,129	32,701,603	33,519,143	34,357,122	35,216,050
Other Metered Sewage	78,400	80,752	83,175	85,670	88,240	90,887	93,614	96,422	99,315	102,294	105,363	108,524	111,780	115,133	118,587	122,145	125,809	129,583	133,470	137,474	141,598
Total Wastewater Rate Revenue	17,262,800	20,783,078	21,182,797	21,705,301	22,356,441	23,027,134	23,717,948	24,429,486	25,162,371	25,917,242	26,694,759	27,495,602	28,320,470	29,170,084	30,045,186	30,946,542	31,874,938	32,831,186	33,652,613	34,494,596	35,357,648

Wastewater Rate Revenue % Increase

Year over Year (including consumption)	7.8%	20.4%	1.9%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	2.5%	2.5%	2.5%
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Sewer Surcharge Rate % Increase Year

Over Year	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
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Other Metered Sewage and Program Revenue increase by 3% annually.

Note 2

Operating Expenses will increase by 2.5% annually.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%

Note 3

Utilities charges will increase by 7% for the next 4 years and 2.5% thereafter.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	7.0%	7.0%	7.0%	7.0%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%

Note 4

Storm sewer capital other than Pollution Prevention Control is currently tax supported capital. Therefore projected tax supported storm sewer capital revenue and expenses have a net zero impact on wastewater. These figures have been included for information purposes given a portion of wastewater operations includes some work related to storm sewer and have been increased by 1.9% annually for inflation.

Note 5

Wastewater capital expenditures for 2014 are in accordance with the 2014 Rate Supported Budget. Projected wastewater capital expenditures have been provided by the Environment Division upon review of future capital requirements and have been increased by 1.9% annually for inflation. Pollution Prevention Control is included in the Wastewater Capital Budget but the nature of the project results in the construction of new storm sewers in areas where combined storm sewers exist. Refer to Note 4 regarding tax supported storm sewer capital.

Note 6

Capital carryforward represents capital projects budgeted and approved by Council in a prior year but not yet spent. For the purposes of this long-term plan, the capital carryforward existing at the end of 2013 has been allocated over a 3 year time frame (completed by 2016). All other capital expenditures have been included in the year they are budgeted for only.

Note 7

All new debt will be incurred over a term of 20 years with semi-annual payments and an interest rate of 4% compounded semi-annually. Due to the timing between the debt application and receipt of the proceeds, the debt is temporarily financed by the Municipality. Interest on temporary financing will be charged at 4% but at a rate of 50% for the first year and 100% for the second year.

Note 8

Interest earned on the reserve fund balance has not been calculated.

