Subject: 2018 Reserve Water and Wastewater Treatment Capacities

Report to: Planning and Economic Development Committee

Report date: Wednesday, September 11, 2019

Recommendations

1. That this report **BE RECEIVED** and **CIRCULATED** to the Ministry of the Environment, Conservation and Parks and Niagara Area Municipalities for their information and future reference.

Key Facts

- The purpose of this report is to inform Council of the reserve treatment capacities at Niagara's Water and Wastewater Treatment facilities. This reporting is required by the Ministry of Environment, Conservation and Parks (MECP).
- The data contained in this report assists in commenting on new development proposals and related servicing as well as planning for future treatment capacity.
- All of Niagara Water Treatment Plants (WTPs) and Wastewater Treatment Plants (WWTPs) are positioned to accept growth beyond the minimum 10 year horizon.

Financial Considerations

This report provides Council with historical and projected treatment capacity and flow data. There are no direct financial implications in receiving this report.
The reserve treatment capacities at the water and wastewater (W&WW) facilities are considered in commenting on new development proposals and related servicing and, as a result, could result in a financial impact related to specific future applications.

Analysis

The Infrastructure Planning and Development Engineering section of Planning and Development Services Department annually reports on an assessment of the average daily W&WW flows based on the previous five years, as recorded at our various facilities compared to MECP rated capacities for the facilities. Included in the analysis are the 10-year growth projections in accordance with Niagara 2041 *(How we Grow, Flow and Go).*

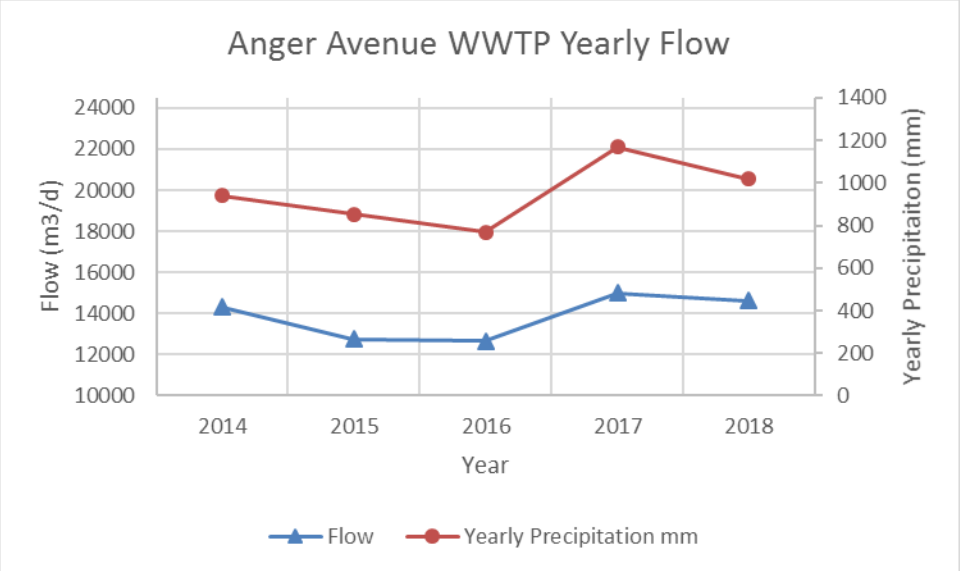
A key objective of this report is to highlight potential capacity constraints and allow sufficient lead time to plan for future capacity increases through the W&WW capital programs so that development may continue unencumbered. This is a ‘desktop’

exercise, which compares five-year (annual) average flows to the respective MECP Environmental Compliance Approval(s), formerly known as Certificate of Approval(s) for each facility, then incorporates 10-year growth forecasts into the calculation. Ongoing phasing and staging strategy works with our local municipal partners will further refine this assessment for understanding development capacity.

This assessment does not reflect specific compliance, quality, sustainability, risk, or operational deficiencies at the treatment plants or trunk conveyance/transmission systems, which may affect the Region's ability to approve new development or permit servicing extensions.

For municipal wastewater treatment, weather is the key factor that results in peak wet weather flows, which impacts the collection and trunk sewers in both local and regional systems through "Rainfall Derived Inflow and Infiltration" (RDI&I). Even though, it is expected to record higher flows due to population growth, the annual average daily flows to the WWTPs are higher due to the wet weather flows entering the systems. Just for an example, Figure 1 illustrates a direct correlation of wastewater plant flows and yearly precipitation at Anger Avenue WWTP, located in Fort Erie.

Figure 1: Correlation of Wastewater Flows with Precipitation



Wet weather flows can have substantial impact on available WWTP capacities and a direct impact on the limitations of available servicing capacity for future growth.

Appendix 1 and 2 provide the annual average daily flows and five year average from 2014 to 2018 for the W&WW treatment plants, respectively. Appendices 3 and 4 provide a summary of Niagara's six water treatment facilities and eleven wastewater treatment facilities presenting their respective reserve capacities.

All of Niagara's WTPs and WWTPs are positioned to accept growth beyond the minimum 10-year period (Appendix 3 and Appendix 4).

Wet Weather Management

In order to accommodate the anticipated growth from Niagara 2041, the 2016 W&WW Master Servicing Plan (MSP) investigated capacity upgrades (upgrades to trunk sewers, pumping station capacities, etc.), upstream management (storage, peak shaving, diversion), and peak flow management (flow reduction, Inflow & infiltration (I&I) reduction projects) for every wastewater system. Based on this review, there are wet weather projects listed with identified areas for targeted I&I removal to offset the requirement to upgrade and expand more expensive infrastructure all the way to the WWTPs. It is crucial to achieve the I&I reductions in order to offset the capacity needs from growth, to protect the environment, and mitigate potential basement flooding.

Niagara Region and Area Municipalities are continuing to work collaboratively to facilitate ongoing development throughout the region and provide the requisite servicing and capacity allocation in a responsible way to service the communities. In addition, the Region has been supporting Area Municipalities by funding the CSO Control program under the Wet Weather Management Program to support various I&I related projects and programs on the municipal side. This program has been reducing the impacts of I&I and has been a benefit to both, the Region and the Area Municipalities.

The Wet Weather Management team is working with the Development Industry including Public Works Officials, Building Officials, Developers, Consultants and Contractors to raise awareness on the wet weather management issues and potential upcoming changes to address this.

Alternatives Reviewed

No alternatives were studied.

Relationship to Council Strategic Priorities

The report highlights all Regional Water and Wastewater Systems reserve capacities to support Growth Management Strategy providing surplus population that could be serviced over a 10-year forecasted period.

The report also provides MECP and local municipal partners operational summary and reserve capacity projections for Region's Water and Wastewater Treatment facilities.

Other Pertinent Reports

- PDS 33-2018, September 5, 2018, 2017 Reserve Water and Wastewater Treatment Capacities
- PW 22-2017, May 30, 2017, 2016 Water and Wastewater Master Servicing Plan Update

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Appendices

APPENDIX 1

ANNUAL AVERAGE DAILY FLOW 2014 TO 2018
WATER TREATMENT PLANTS

Water Treatment Facility Location	Rated Capacity (m^3/d)	Average Daily Flow (m^3/d) 2014	Average Daily Flow (m^3/d) 2015	Average Daily Flow (m^3/d) 2016	Average Daily Flow (m^3/d) 2017	Average Daily Flow (m^3/d) 2018	5 Year Average Daily Flow (m^3/d) 2014 to 2018
Decew Falls WTP	227,300	52,358	53,723	54,903	54,321	56,090	54,279
Grimsby WTP	44,000	15,079	16,652	15,699	14,020	14,866	15,263
Niagara Falls WTP	145,584	43,731	45,186	47,350	45,192	44,780	45,248
Port Colborne WTP	36,000	8,570	8,908	7,719	8,735	8,864	8,559
Rosehill WTP	50,026	12,831	13,182	13,148	12,388	12,862	12,882
Welland WTP	102,300	20,714	20,164	21,858	21,590	22,538	21,373

APPENDIX 2

ANNUAL AVERAGE DAILY FLOW 2014 TO 2018
WASTEWATER TREATMENT PLANTS

Wastewater Treatment Facility Location	Rated Capacity (m^3/d)	Average Daily Flow (m^3/d) 2014	Average Daily Flow (m^3/d) 2015	Average Daily Flow (m^3/d) 2016	Average Daily Flow (m^3/d) 2017	Average Daily Flow (m^3/d) 2018	5 year Average Daily Flow (m^3/d) 2014 to 2018
Anger Avenue WWTP	24,500	14,306	12,755	12,661	15,000	14,624	13,869
Baker Road WWTP	31,280	20,482	17,549	16,999	20,897	19,975	19,180
Crystal Beach WWTP	9,100	5,755	5,005	4,676	5,915	5,874	5,445
Niagara Falls WWTP	68,300	36,657	40,782	35,880	44,684	41,489	39,898
NOTL WWTP	8,000	5,046	3,911	4,021	4,561	4,687	4,445
Port Dalhousie WWTP	61,350	34,785	30,091	29,616	34,823	35,095	32,882
Port Weller WWTP	56,180	35,148	30,856	29,650	32,090	36,881	32,925
Queenston WWTP	500	230	234	278	234	198	235
Seaway WWTP	19,600	12,000	11,064	9,103	12,082	12,580	11,366
Stevensville/Douglastown Lagoon	2,289	1,234	1,192	1,314	1,635	1,670	1,409
Welland WWTP	54,550	35,886	32,164	29,728	35,407	34,643	33,566

APPENDIX 3

Regional Water Treatment Facilities
Reserve Capacity Calculation for 2018

Treatment Facility	Permit To Take Water (1) (ML/D)	Rated Treatment Capacity (ML/D)	Peaking Factor (2)	Theoretical Average Day Capacity (ML/D)	90% of Average Day Capacity (3) (ML/D)	5-Year Average Day Flow (ML/D)	% of Total Capacity Used	Reserve Treatment Capacity (Based on 90%) (ML/D)	Design Flow Rate (275 l/c/d)	Reserve Serviceable Population (Equivalents)	10-Year Forecast For Population (Residential & Employment)	Surplus Population Over 10-Year Projection
DeCew Falls WTP	227.0	227.3	1.561	145.6	131.0	54.3	37%	76.8	275	279,273	30,398	248,875
Grimsby WTP	44.0	44.0	1.676	26.3	23.7	15.3	58%	8.4	275	30,545	14,771	15,774
Niagara Falls WTP	145.5	145.5	1.569	92.7	83.4	45.2	49%	38.2	275	138,909	23,782	115,127
Port Colborne WTP	45.5	36.0	1.564	23.0	20.7	8.6	37%	12.1	275	44,000	1,552	42,448
Rosehill WTP	78.0	50.0	1.526	32.8	29.5	12.9	39%	16.6	275	60,364	6,375	53,989
Welland WTP	110.0	102.3	1.517	67.4	60.7	21.4	32%	39.3	275	142,909	12,292	130,617

(1) Original MOE approved quantity of raw water permitted (Permit To Take Water).

(2) The peaking factors used are based on an average of actual flow rates of maximum day versus average day flows over the past three years at each facility.

(3) Region's W&WW MSP (GM BluePlan, 2017) requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

APPENDIX 4

Regional Wastewater Treatment Facilities
Reserve Capacity Calculation for 2018

Treatment Facility	MOE Plant Rated Capacity (m^3/day)	90 % of Plant Capacity (1) (m^3/day)	5-Year Average Daily Flow (m^3/day)	% of Total Capacity Used	Reserve Treatment Capacity (Based on 90%) (m^3/day)	Design Flow Rate (4) (365 L/c/d)	Reserve Serviceable Population (Equivalents)	10-Year Forecast For Population (Residential & Employment)	Surplus Population Over 10-Year Projection
Anger Avenue (Fort Erie) WWTP	24,500	22,050	13,869	57%	8,181	365	22,413	4,277	18,136
Baker Road (Grimsby) WWTP	31,280	28,152	19,180	61%	8,972	365	24,580	16,791	7,789
Crystal Beach (Fort Erie) WWTP	9,100	8,190	5,445	60%	2,745	365	7,521	1,443	6,078
Niagara Falls WWTP	68,300	61,470	39,898	58%	21,572	365	59,100	19,980	39,120
NOTL WWTP (3)	8,000	7,200	4,445	56%	2,755	365	7,548	2,644	4,904
Port Dalhousie (St. Catharines) WWTP	61,350	55,215	32,882	54%	22,333	365	61,187	15,005	46,182
Port Weller (St. Catharines) WWTP	56,180	50,562	32,925	59%	17,637	365	48,321	10,052	38,269
Queenston (NOTL) WWTP (3)	500	450	235	47%	215	365	589	99	490
Seaway (Port Colborne) WWTP	19,600	17,640	11,366	58%	6,274	365	17,190	1,622	15,568
Stevensville/Douglastown Lagoon	2,289	2,060	1,409	62%	651	365	1,783	795	988
Welland WWTP	54,550	49,095	33,566	62%	15,529	365	42,546	12,912	29,634

(1) Region's W&WW MSP (GM BluePlan, 2017) requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

(2) The Niagara Falls WWTP assessment includes the sewage flows from the St. David's area of Niagara-on-the-Lake.

(3) The Queenston WWTP in Niagara-on-the-Lake has a unique capacity commitment of 226 m^3/d for the following properties: Niagara Parks Commission (75 m^3/d), Niagara Falls Bridge Commission (63 m^3/d), Shalamar Campground (38 m^3/d) and Ontario Power Generation (50 m^3/d). Due to these commitments and limited UAB, limited residential growth is expected within the next 10 year period within the tributary area.

(4) Design Flow Rate incorporated 90 L/c/d of extraneous flow allowance