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May 28, 2024

CL 8-2024, May 23, 2024
PEDC 5-2024, May 8, 2024
PDS 16-2024, May 8, 2024

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS
LOCAL AREA MUNICIPALITIES

SENT ELECTRONICALLY

2023 Reserve Water and Wastewater Treatment Capacities
PDS 16-2024

Regional Council, at its meeting held on May 23, 2024, passed the following recommendation of its Planning and Economic Development Committee:

That Report PDS 16-2024, dated May 8, 2024, respecting 2023 Reserve Water and Wastewater Treatment Capacities, **BE RECEIVED** and **BE CIRCULATED** to the Ministry of the Environment, Conservation and Parks, and Local Area Municipalities.

A copy of PDS 16-2024 is enclosed for your reference.

Yours truly,

Ann-Marie Norio
Regional Clerk
js
CLK-C 2024-058

cc: I. Stetic, Manager, Water Wastewater Infrastructure
M. Sergi, Commissioner, Growth, Strategy and Economic Development
N. Oakes, Executive Assistant to the Commissioner, Growth, Strategy and Economic Development

Subject: 2023 Reserve Water and Wastewater Treatment Capacities

Report To: Planning and Economic Development Committee

Report date: Wednesday, May 8, 2024

Recommendations

1. That Report PDS 16-2024 **BE RECEIVED** for information**;** and
2. That Report PDS 16-2024 **BE CIRCULATED** to the Ministry of the Environment, Conservation and Parks, and Local Area Municipalities.

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 therefore could result in a financial impact related to specific future applications.

Analysis

The Infrastructure Planning and Development Engineering section of Growth Strategy and Economic Development 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. 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 desktop exercise, 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. On-going phasing and staging strategy work with our local municipal partners will further refine this assessment for understanding development capacities.

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. There are various developments across the Region that will require sewage pumping station upgrades to occur to provide the necessary development capacity to proceed, which are outlined in the Region's 2021 Water Wastewater Master Servicing Plan Update (MSPU). Continued investment in the sustainability of the existing WTP and WWTP is of paramount importance to ensure that the capacity continues to be available for existing users and future developments.

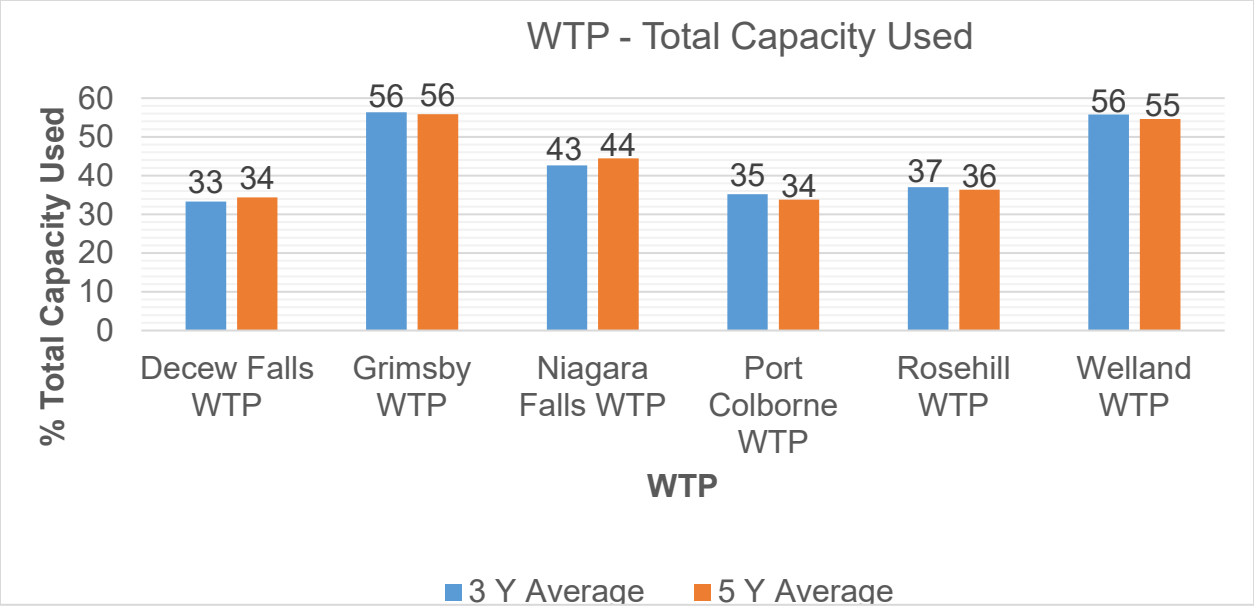
For municipal wastewater treatment, weather is the key factor that results in peak wet weather flow, which impacts the collection and trunk sewers in both local and regional systems through Rainfall Derived Inflow and Infiltration (RDI&I). Wet weather flows can have substantial impact on available WWTP capacities and a direct impact on the limitations of available servicing capacity for future growth.

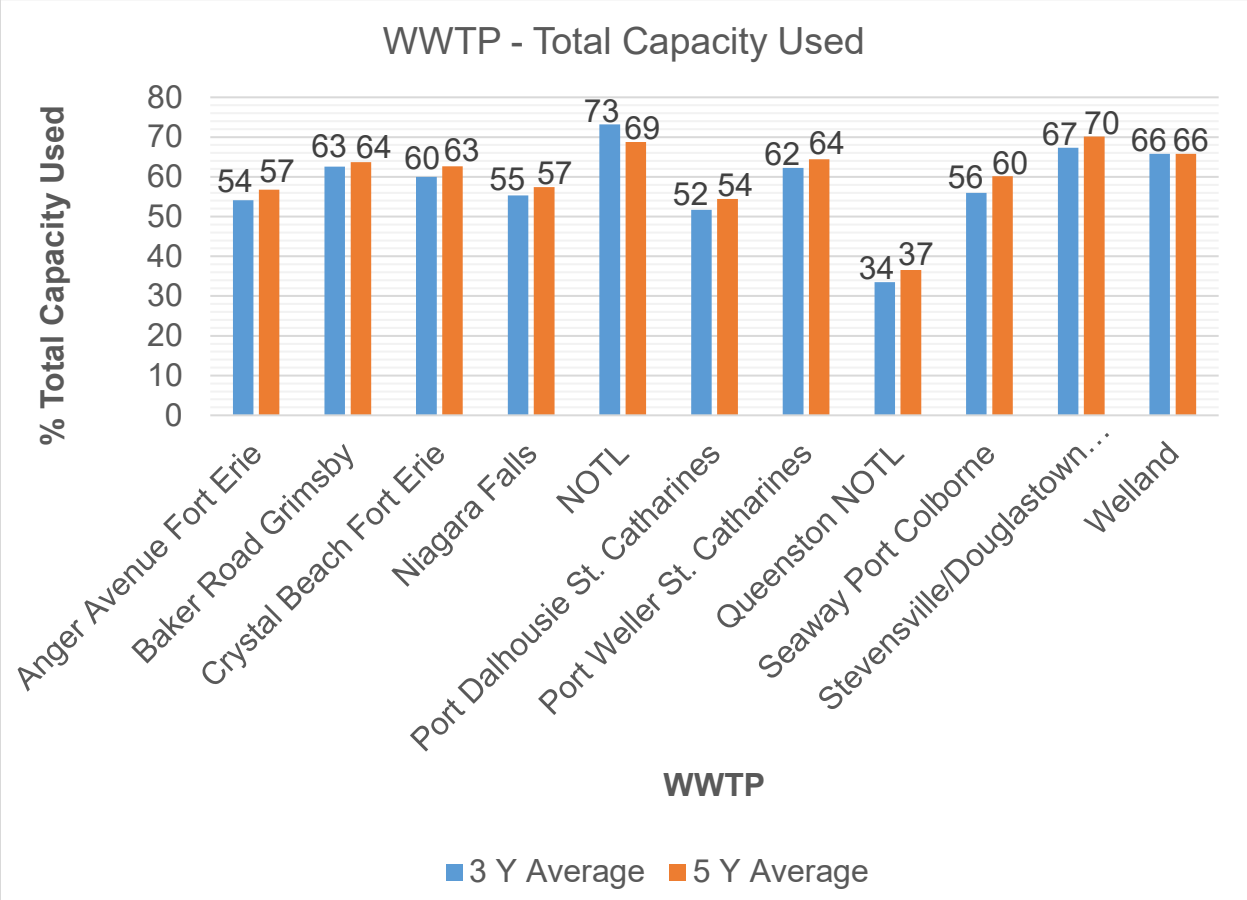
Appendices 1 and 2 provide annual average daily flows and five-year average flows from 2019 to 2023 for the water and wastewater treatment plants, respectively. Appendices 3 and 4 provide a summary of Niagara's six water treatment facilities and eleven wastewater treatment facilities presenting their respective reserve capacities.

A comparison of the total capacity used over a 5-year period versus a 3-year period was completed to determine if recent growth and flow conditions have any significant impacts. For the WTP's the averaging daily flows over a 5-year period versus a 3-year period in the Reserve Capacity calculations for 2023 does not show a compelling difference or significant trend. For the WWTP's, there is a general trend of a slightly reduced annual average daily flow except for NOTL WWTP. This can partially be due to several infill and infiltration (I&I) reduction and capacity restoration projects within the recent years. Additionally, due to COVID over the last few years, there may have been some impacts on flows.

Figure 1 shows a comparison of the total capacities used for WTPs and WWTPs when daily flows are averaged over the last 3 and 5 years.

Figure 1: Total Capacity Used – Annual Flows Averaged over 3-Year and 5-Year Period





If all the major infrastructure sustainability investments are carried out, all of Niagara's WTPs and WWTPs will be able to accommodate growth beyond the minimum 10-year period (Appendix 3 and Appendix 4).

Niagara Official Plan and Water/Wastewater Master Servicing Plan

The new Niagara Official Plan was approved by the Regional Council and subsequently approved and adopted by the Province on November 4, 2022. As part of the Plan, the Region completed extensive background review, consultation, and supporting studies in 2022 and 2023, which resulted in policies and mapping to managing growth and the economy while protecting the natural environment, resources and agricultural land, and providing infrastructure to support developments of the whole region. The approval of the Niagara Official Plan helps the Region prepare for the anticipated population of 694,000 people and 272,000 jobs by 2051.

The anticipated growth out to 2051 from the Niagara Official Plan process was utilized in the 2021 Master Servicing Plan Update (MSPU) to determine the required water and wastewater growth capital projects for the future while maintaining the existing infrastructure.

The 2021 MSPU is a critical component in the Region's planning for growth and provides the framework and vision for the water and wastewater servicing needs for the lake-based service areas of the Region to 2051 and beyond. The 2021 MSPU evaluates the ability of the existing and planned water and wastewater infrastructure to continue servicing the Region's existing users, to prepare for servicing anticipated growth, and to evaluate and develop recommended strategies in an efficient and effective manner. This included consideration for Regional water and wastewater infrastructure to be aligned with the urban expansion and intensification areas identified in the Niagara Official Plan review. Additionally, the potential impacts of estimated growth beyond 2051 was considered due to the longer useful life of water and wastewater infrastructure assets.

Recent growth projections and development densities provided by LAMs have been proposing greater amounts of growth than originally anticipated in the 2021 MSPU. The Region is continuing to work with LAMs to better understand these development pressures and projections as alignment of infrastructure, growth and financing are critical to the success of Niagara. These updated growth projections will influence the next MSPU, which will be commencing in 2025.

Wet Weather Management

The Niagara wastewater systems are a mix of separated and combined sewer systems. Each system is experiencing varying levels of impact during wet weather conditions. Climate change continues to create changing weather conditions and the wastewater systems are experiencing, in most cases, high peak flows under rainfall events. To accommodate the anticipated growth from Niagara 2051 and to maintain an existing servicing level for the wastewater infrastructure, system capacity upgrades (upgrades to trunk sewers, pumping stations, etc.) and the upstream management (storage, peak shaving, diversion) together with peak flow management (I&I reduction projects) for every wastewater system were investigated. 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 to use free capacity for growth, to protect the environment, and mitigate potential basement flooding.

The wet weather management program currently identifies, in the 2021 MSPU, overall preliminary priority, staging of location and target amount of I&I reduction across all systems. This program provides for a proactive and targeted approach to addressing wet weather impacts.

The Region has been aiding Local Area Municipalities by funding the CSO Control Program as a part of the overall Wet Weather Management Strategy 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 Local Area Municipalities. Therefore, it is important to continue working collaboratively to facilitate ongoing development throughout the region and provide the requisite servicing and capacity allocation in a responsible way to service the communities.

The available funding for the 2023 CSO Control Program has been fully utilized and subscribed with applications from the Municipal partners. A separate report on the 2024 CSO Control Program is anticipated to be presented to the Planning and Economic Development Committee as well.

Staff 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. The Region is also represented at the Expert Stakeholder Committee (ESC) for the Guideline to Undertaking Flow Monitoring of New Construction and will work with all

interested parties to move forward with a consistent approach for the review the flow monitoring of new subdivisions.

South Niagara Servicing Solution and South Niagara Wastewater Treatment Plant

Although this report identifies there is short term capacity available at the existing Niagara WWTP, it only considers the treatment capacity at the plant for the next 10 years. It does not consider the constraints in the existing sanitary collection system, wet weather flow issues, consideration for development demands and longer-term growth, or the required infrastructure improvements to get the flows to the plant.

As part of Niagara 2051, there was an update to the Water and Wastewater MSPU. The MSPU used updated population and employment growth forecasts based on a 2051 planning horizon. Based on the Niagara 2051 planning review, the implementation of the South Niagara Servicing Solution and timing of the new South Niagara Wastewater Treatment Plant (SNWWTP) continues to be supported and necessary to accommodate growth.

In Niagara Falls, there is not enough capacity in the existing sewer system nor at the existing treatment plant to meet the increasing system demands resulting from growth, as well as the increased wet weather flows due to aging infrastructure and climate change. The South Niagara Servicing Solution is essential to unlocking the development potential in the broader South Niagara area and the capital program to support the servicing solution will provide greater flexibility for developments in St. Catharines, Niagara Falls, Thorold, and Niagara-on-the-Lake. The total growth is estimated to be over 90,000 people and jobs to the year 2051 and the South Niagara Servicing Solution also considers potential long-term growth beyond 2051. The ability to redirect existing flows to the south, provide additional capacity in the new trunk sewer, provide flexibility for storage in the trunk sewer, and ultimately treat the wastewater flows at the new SNWWTP all contribute to a significant wet weather management program. In addition, the location of the new SNWWTP will provide flexibility for the potential for additional wet weather management through potential connections of other service areas such as Chippawa, Thorold, St.Catharines, Niagara Falls and Niagara-on-the-Lake. Through the analysis undertaken as part of the Class EA process, it is estimated that the new South Niagara Serving Solution will result in a reduction of over 60% of wet weather volume overflow to the environment.

This servicing solution is integral to the overall growth servicing strategy that supports the anticipated residential and employment growth in the Niagara Falls, Niagara-on-the-

Lake, Thorold, and St. Catharines service areas. This total growth is estimated to be over 90,000 people and jobs in the area out to the year 2051. The South Niagara Servicing Solution also considers potential long-term growth beyond 2051.

Queenston Wastewater Treatment Plant

As part of the South Niagara Servicing solution, a variety of opportunities were explored to redirect flows from Queenston WWTP to Niagara Falls and decommission the plant. However, during the recently finished Queenston – St. David's Wastewater Servicing Strategy EA, preferred and supported option is keeping the plant to enhance the wastewater system operational flexibility.

Alternatives Reviewed

No alternatives reviewed.

Relationship to Council Strategic Priorities

The report aligns with responding to our current community needs and planning for future growth, which is Council's Priority of Equitable Region.

Simultaneously, the report helps ensuring current and future infrastructure is resilient emphasizing Council's Priority for a Green and Resilient Region.

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

- PW 39-2021, September 9, 2021, South Niagara Falls Wastewater Treatment Plant – Budget and Property
- PDS 13-2023, May 10, 2023, 2022 Reserve Water and Wastewater Treatment Capacities
- PDS 17-2022, June 15, 2022, Official Plan Recommendations Report for Adoption

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Recommended by:
Michelle Sergi, MCIP, RPP
Commissioner
Growth Strategy and Economic Development

Submitted by:
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Chief Administrative Officer

This report was prepared in consultation with Phill Lambert, Acting Director, W-WW Services, Susan Dunsmore, Acting Director, Infrastructure Planning and Development Engineering, John Brunet, AD Water Operations and Maintenance and Jason Oatley, Manager WW Quality & Compliance.

Appendices

Appendix 1	Annual Average Daily Flow 2019 to 2023 WTP
Appendix 2	Annual Average Daily Flow 2019 to 2023 WWTP
Appendix 3	Water Reserve Capacity Calculations for 2023
Appendix 4	Wastewater Reserve Capacity Calculations for 2023

Appendix 1: WTP Annual Average Daily Flow 2019 - 2023

Water Treatment Plant	Rated Capacity (m^3/d)	Average Daily Flow (m3/d)					5 Year Average 2019 / 23	3 Year Average 2021 / 23
		2019	2020	2021	2022	2023		
Decew Falls WTP	227,300	53,303	53,390	50,824	52,970	52,830	52,663	52,208
Grimsby WTP	44,000	14,029	15,726	14,872	14,809	14,610	14,809	14,764
Niagara Falls WTP	145,584	43,400	40,145	40,125	42,164	43,050	41,777	41,780
Port Colborne WTP	36,000	7,282	6,870	6,387	6,953	8,310	7,160	7,217
Rosehill WTP	50,026	11,188	11,024	11,710	13,025	12,710	11,931	12,482
Welland WTP	65,000	22,579	24,670	24,675	24,162	24,100	24,037	24,312

Appendix 2: WWTP Annual Average Daily Flow 2019 - 2023

Wastewater Treatment Plant	Rated Capacity (m^3/d)	Average Daily Flow (m3/d)					5 Year Average 2019 / 23	3 Year Average 2021 / 23
		2019	2020	2021	2022	2023		
Anger Avenue WWTP	24,500	14,624	15,146	13,580	13,171	12,992	13,903	13,248
Baker Road WWTP	31,280	19,975	20,910	17,952	17,081	23,700	19,923	19,578
Crystal Beach WWTP	9,100	5,874	6,276	5,688	5,256	5,423	5,703	5,456
Niagara Falls WWTP	68,300	41,489	41,360	35,242	35,197	42,902	39,238	37,780
NOTL WWTP	8,000	4,687	5,237	5,142	5,602	6,823	5,498	5,856
Port Dalhousie WWTP	61,350	35,095	36,681	34,113	31,793	29,176	33,372	31,694
Port Weller WWTP	56,180	36,881	39,211	33,751	33,176	38,024	36,208	34,983
Queenston WWTP	500	198	213	135	142	225	183	168
Seaway WWTP	19,600	12,580	13,472	11,299	10,200	11,391	11,789	10,964
Stevensville/Douglastown	2,289	1,670	1,729	1,592	1,552	1,479	1,604	1,541
Welland WWTP	54,550	34,643	37,137	33,617	34,288	39,800	35,897	35,902

Appendix 3: WTP Reserve Capacities for 2023

Water Treatment Plant	Permit To Take Water [1]	Rated Treatment Capacity	Theoretical Ave Day Capacity	90% of Ave Day Capacity [2]	5-Year Ave Day Flow	Peaking Factor	Total Capacity Used	Reserve Treatment Capacity 90% MLD	Design Flow Rate [3] 246 Lcd	Reserve Serviceable Population Equivalents	10-Year Forecast Population Res & Emp	Surplus Population 10-Year Projection
	MLD											
DeCew Falls	227.0	227.3	153.3	138.0	52.7	1.483	34%	85.3	246	346,748	30,223	316,525
Grimsby	44.0	44.0	26.5	23.9	14.8	1.659	56%	9.0	246	36,585	17,037	19,548
Niagara Falls	145.5	145.6	94.0	84.6	41.8	1.548	44%	42.8	246	173,984	28,700	145,284
Port Colborne	45.5	36.0	21.2	19.1	7.2	1.700	34%	11.9	246	48,374	2,032	46,342
Rosehill	78.0	50.0	32.8	29.5	11.9	1.525	36%	17.6	246	71,545	7,151	64,394
Welland	110.0	65.0	44.0	39.6	24.0	1.476	55%	15.6	246	63,415	18,388	45,027

Note 1: Original MOE approved quantity of raw water permitted (Permit To Take Water).
Note 2: Region's 2021 W&WW MSP requires planning process for expansion when plant capacity exceeds 80%,
and expansion should be completed when capacity exceeds 90%.
Note 3: Region's 2021 W&WW MSP new design criteria calls for 240 Lcd residential consumption and 270 Led employment consumption
This is equivalent to 246 Lcd for both, using the 79% and 21% residential and employment share, respectively.

Appendix 4: WWTP Reserve Capacity for 2023

Wastewater Treatment Plant	MECP Rated Capacity	90% of Plant Capacity[1]	5-Year Average Daily Flow	Total Capacity Used	Reserve Treatment 90%Capacity	Design Flow Rate [2]	Reserve Serviceable Population	10-Year Forecast Population	Surplus Population 10-Year
	m^3/d				m^3/d	356 Lcd	Equivalents	Res & Emp	Projection
Anger Avenue (Fort Erie)	24,500	22,050	13,903	57%	8,147	356	22,886	4,730	18,156
Baker Road (Grimsby)	31,280	28,152	19,923	64%	8,229	356	23,114	20,442	2,672
Crystal Beach (Fort Erie)	9,100	8,190	5,703	63%	2,487	356	6,986	1,081	5,905
Niagara Falls [3]	68,300	61,470	39,238	57%	22,232	356	62,450	22,309	40,141
NOTL	8,000	7,200	5,498	69%	1,702	356	4,780	1,036	3,744
Port Dalhousie (St. Catharines	61,350	55,215	33,372	54%	21,843	356	61,358	13,784	47,574
Port Weller (St. Catharines)	56,180	50,562	36,208	64%	14,354	356	40,319	9,392	30,927
Queenston (NOTL) [4]	500	450	183	37%	267	356	751	34	717
Seaway (Port Colborne)	19,600	17,640	11,789	60%	5,851	356	16,437	2,008	14,429
Stevensville/Douglastown	2,289	2,060	1,604	70%	456	356	1,280	994	286
Welland	54,550	49,095	35,897	66%	13,198	356	37,072	18,235	18,837

Note 1: Region's 2021 W&WW MSP requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

Note 2: Region's 2021 W&WW MSP new design criteria calls for 255 Lcd residential and 310 Led employment generation rate including 90 Lcd of extraneous flow allowance. An equivalent of 356 Lcd is applied using 80% and 20% for residential and employment growth share, respectively.

Note 3: The Niagara Falls WWTP assessment includes the sewage flows from the St. David's area of Niagara-on-the-Lake.

Note 4: 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 years within the tributary area.