3303 Dominion Road – Wastewater Servicing Review

Organization: Town of Fort Erie.	GM BluePlan Project No: 621039
Attention: Brad Johnston	Date: August 10, 2023
Project: Wastewater Servicing Review	
RE: 3303 Dominion Road	

Prepared by:

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Table of Contents

This technical memo summarizes the results of the wastewater system capacity review of the proposed 3303 Dominion Road development, located along the west side of the Dominion Road and Charleston Drive Intersection, in Fort Erie.

1 Development Overview

The proposed development, shown in **Figure 1**, consists of 13 townhouse units, parking areas and grass areas. **Table 1** provides an overview of the proposed site wastewater flows estimated using the Sanitary Design Parameters listed in the Functional Servicing Report (FSR) provided by Hallex Engineering Ltd. It is our understanding that the development will connect to the existing 200 mm sanitary sewer along Dominion Road flowing west towards Burleigh Road North to the Shirley Rd SPS, until ultimately discharging at the Crystal Beach Wastewater Treatment Plant (**Figure 2**).

Figure 1. Development Location off of Dominion Road

Table 1. Development Flows

Source	Unit Type	Units	Density	Area (ha)	Total Design Population	Flow Generation (L/cap/day)	Average Dry Weather Flow (L/s)	Peaking Factor	Peak DWF (L/s)	RDII (L/s)	PWWF (L/s)
FSR	Town-houses	13	6ppu	0.41	78	275	0.25	26 by Building Code fixtures calculation (Modified to use 4.0 Harmon's PF)	0.99	0	**6.5 (modified 0.99*)**
GMBP Review		13	1.81ppu	0.41	24	255	0.07	4.0 (Harmon's PF)	0.28	0*	**0.28**

*It is noted that because the proposed development is part of an existing serviced property, the existing baseline system flow accounts for the site's wet weather flow contributions. Therefore, for the purposes of this development analysis, the peak DWF of **0.99 L/s** was used as a conservative estimate of peak flows.

2 Basis of Analysis

Further, the Town's most recent Pollution Prevention and Control Plan and Wastewater Master Plan (PPCP&MP) Study and Niagara Region's 2022 Water and Wastewater Master Plan Update (MSPU) Update Study were used to support the assessment of existing system capacities, identification of planned system upgrades, and identification of system performance objectives.

2.1 Level of Service Targets

Pump Station Level of Service Target

Niagara Region owns and operates the wastewater pumping stations within the Town. The Region's pump station firm capacities are designed to safely convey the peak wet weather flows from a design allowance of 0.286 L/s/ha for new developments and 0.4 L/s/ha for existing areas, and a peaking factor based on Harmon formula with values between 2 and 4 for average dry weather flows. Following the methodology for assessing upgrade needs:

- Pump station flow capacity was assessed using the Region's 0.286 L/s/ha design allowance for new developments and 0.4 L/s/ha for existing areas for wet weather flows; and
- Manage excess wet weather flows, using storage, to not trigger overflows under the design 5 year storm

Gravity Sewer Level of Service Targets

The Town owns and maintains the majority of trunk sewers within the wastewater system.

For existing sewer capacities, sewer performance criteria were assessed using the following conditions:

- Maintaining depth of flow in pipes equal to or less than obvert elevation ($d/D \leq 1$); and, if failing to do so then,
- Maintain system hydraulic grade line (HGL) of a surcharging sewer below the basement protection freeboard of 1.8 meters below grade.

The Town has identified a current system performance target of meeting the design 5 year storm.

3 Baseline Understanding

3.1 Overview of Downstream System

The proposed development will tie-into an existing 200 mm sewer along Dominion Road, which flows west to Burleigh Road North and continues until the Shirley Road SPS where it is pumped back into gravity sewers and flows south until ultimately discharging to the Crystal Beach Wastewater Treatment Plant. **Figure 2** shows the flow path from the development to the Shirley Road SPS.

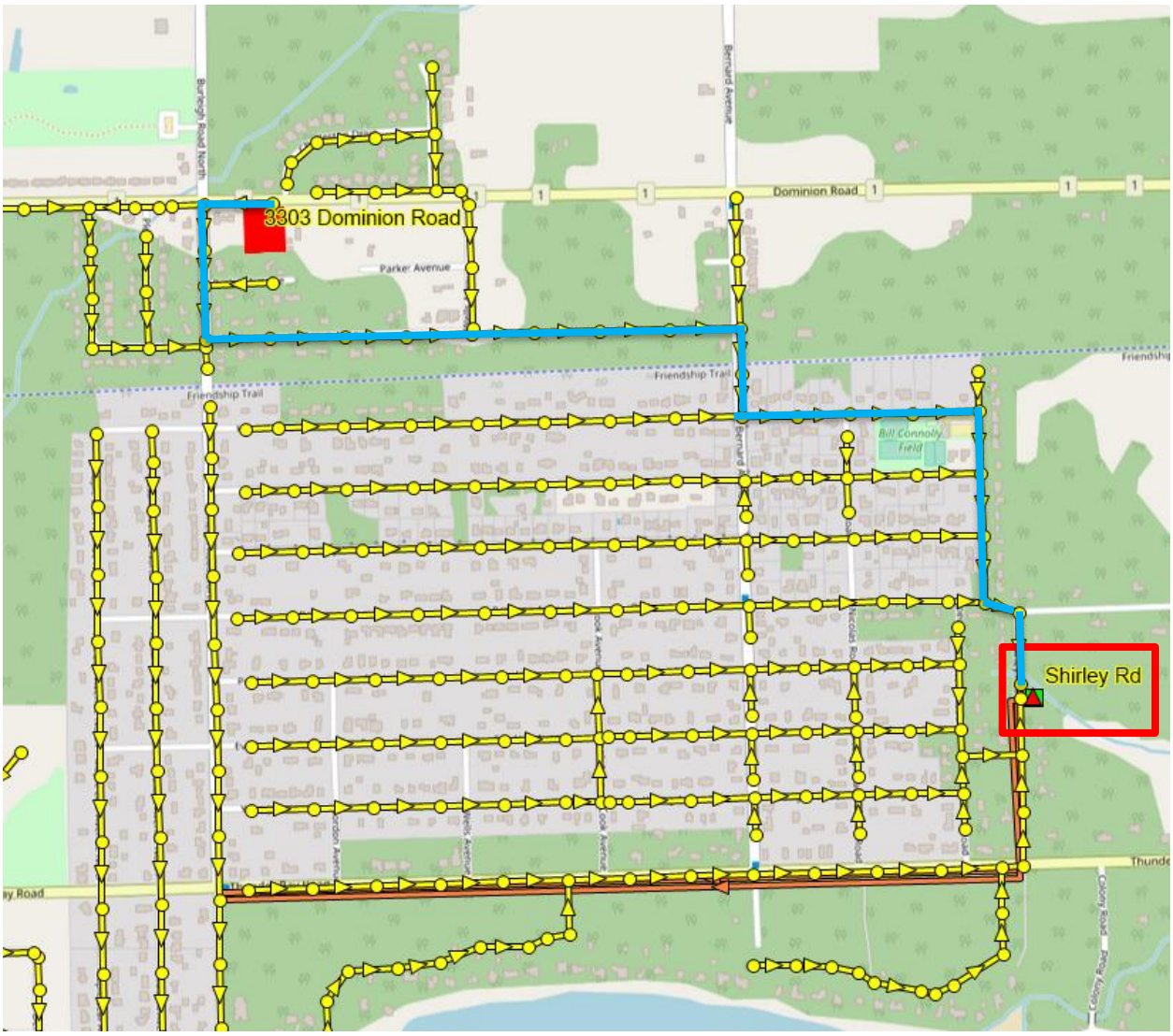

Figure 2. Proposed Development (red) and Wastewater System. Conveyance from the proposed site ties into Dominion Road, conveyance to the Shirley Road SPS. Flow route to Shirley Road (blue).

3.2 Previous Assessment and Upgrade Recommendations

The Town's PPCP&MP identified the Shirley Road SPS catchment as having peak 5 year I&I flows within the existing SPS capacity with no sewer surcharging. Both the Town's 2017 PPCP&MP and the 2021 MSPU recommended a capacity upgrade, upgrades to the Station inline with the MSPU upgrades are underway, as such the analysis was completed using the Station's post-upgrade capacity.

The 2021 MSPU identified the Crystal Beach WWTP as having surplus capacity to support 2051 flows based on the MSPU criteria.

3.3 Previous Growth Assumptions

The recommendations outlined in **Section 3.2** were based on a total projected growth of 334 people and 146 jobs within the Shirley Road SPS catchment, and 2,697 people and 547 jobs within the Crystal Beach WWTP catchment in the 2021 MSPU. The proposed development's 78 people is within the previous 2051 growth projection for the system.

4 Capacity Assessment

4.1 Shirley Road Sewage Pumping Station

The existing operational capacity of the Shirley Road SPS is 57.0 L/s. **Table 2** provides a summary of the flows to the station using the Region's wet weather design allowance and 5 year design storm.

Table 2. Pump Station Impacts

Scenario	Growth Population	Pump Station Capacity (L/s)	Peak Dry Weather Flows (L/s)	Peak Wet Weather Flow (L/s) Using Design Allowance	Peak Wet Weather Flow (L/s) 5 Year Design Storm
Existing	0	57.0	8.1	88.5	44.9
Existing + 3303 Dominion Road	0	57.0	9.1	89.5	46.25
2021 MSPU Growth Projection to 2051	334	57.0	14.1	95.0	51.4

Based on the SPS capacity analysis:

- The SPS 5 year design storm are lower than the Regions' design allowance, as such, the 5 year design storm flows are used as the basis of the SPS capacity needs. The station's peak design flow of 51.4 L/s is within the station's operational firm capacity of 57 L/s however.

The existing Shirley Road SPS has sufficient capacity to support the proposed development at 3303 Dominion Road.

4.2 Existing System Performance – Gravity Sewers

Under existing conditions, modelling indicates that the existing 200 mm sewer downstream of the proposed development has sufficient capacity under the current 5 year design flows. **Table 3** provides a summary of the downstream sewer performance:

Table 3. Sewer Performance in a 5 year design storm scenario

Scenario Flows	Dominion Road to Grove Avenue (200 mm sewer)	Grove Avenue to Hyman Avenue (375 mm sewer)	Hyman Avenue to Shirley Rd SPS (450 mm sewer)
Existing	Within Obvert	Within Obvert	Within Obvert
Existing + 3303 Dominion Road	Within Obvert	Within Obvert	Within Obvert

Based on the sewer capacity analysis:

- There sufficient capacity in the downstream sewers to accommodate the existing and future 5 year design storm within the existing sewer obvert.
- The existing gravity sewers have capacity to support the proposed development and do not require upgrades to facilitate the development approval

5 Recommendations

Based on the above analysis,

- The existing sewers downstream of the development have sufficient capacity to accommodate the proposed 3303 Dominion Road development.
- Under the 5 year design storm, the existing and future peak wet weather flows remain within the Shirley Road sewage pump station and the Crystal Beach WWTP capacity.

Based on the above, the existing system can support the development at 3303 Dominion Road.

Yours Truly,

GM BluePlan Engineering Ltd.

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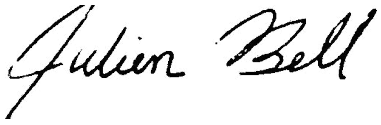

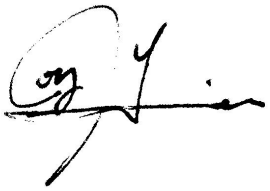

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