



**Forever Homes Meadowlily Limited Partnership**

# **Functional Servicing Report**

**168 Meadowlily Road South**

**June 2024 - 22-5208**

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**Appendices (provided as separate document)**

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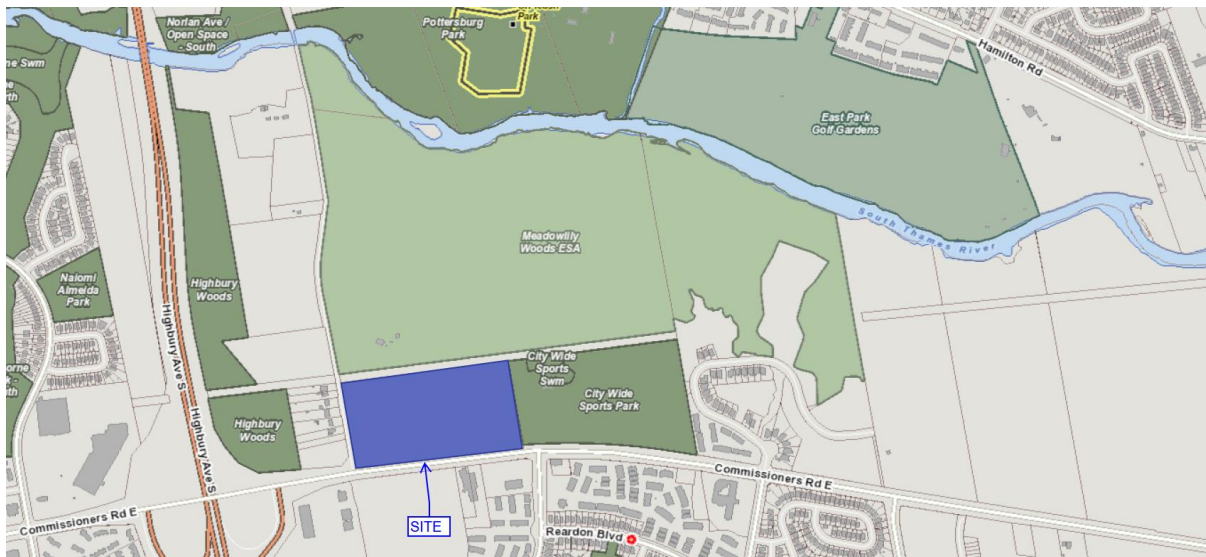
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## 1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by Forever Homes Meadowlily Limited Partnership (Client) to complete a preliminary assessment of the servicing requirements for developing 168 Meadowlily Road South (site) in the City of London, Ontario. The development site is approximately 8.3 hectares (ha) and will consist of medium-density and high-density residential buildings, a local road and park with a multi-use trail. This report assessed the feasibility of providing water, sanitary and stormwater management (SWM) servicing for the proposed development and outlines the servicing approach for the site. Refer to **Figure 1** for the site location.

**Figure 1: Site Location**



### 1.1 Background Information

A list of background information used to characterize the site include:

- City as-builts 24269, 29054 to 29060;
- City Sanitary Sewer Design Sheet for Meadowlily Road;
- Site Geotechnical Report (EXP, 2022); and
- Interim Hydrogeological Assessment (EXP, 2022).

## 2.0

## Existing Conditions

The site is primarily undeveloped agricultural land with rectangular geometry measuring 8.3 ha. It slopes generally to the north, fronting Meadowlily Road South to the west and Commissioners Road East to the south, bordering City Wide Sports Park to the east and Meadowlily Woods Environmentally Significant Area (ESA) to the north.

In terms of existing adjacent services, there is an existing 200 millimetre (mm) sanitary sewer located on Meadowlily Road South, extending approximately 40 metres (m) north of the intersection at Commissioners Road East. The Sanitary sewer flows south connecting to the system within the Summerside Subdivision. An existing 400 mm watermain is located on the south side of Commissioners Road East and is part of the Southeast Pumping Station System. There is an existing 600 mm low pressure watermain that runs along the north side of Commissioners Road East that bends and continues on Meadowlily Road South. There is an existing 375 mm storm sewer located on Meadowlily Road South that extends to the site and outlets from a 600 mm sewer into the Thames River at the north limit of Meadowlily Road South.

## 3.0 Proposed Development

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The site consists of two medium-density and two high-density residential blocks. A local street (Street A) with grass boulevards and sidewalks is proposed, connecting to Meadowlily Road South and Commissioners Road East. Sanitary, water and stormwater services extend within the site through Street A, from Meadowlily Road South and Commissioners Road East. Street A provides access for the development blocks. Each development block will be designed through the City's Site Plan Approval process. Private onsite SWM facilities will service each individual block.

Approximately 1.10 ha of land at the northern part of the site has been identified as the ESA area and buffer. Additionally, a 0.36 ha parkland with a multi-use pathway is proposed between the ESA buffer and residential units. The concept prepared by Monteith Brown Planning Consultants (MBPC) is provided in **Figure 2**.

## Sanitary Servicing

The City's as-built information, along with relevant sanitary design information and drainage area maps associated with nearby developments, including the Summerside Subdivision development, were reviewed as background information. Hydraulic analysis of the existing 200 mm sanitary sewer and downstream system within the Summerside Subdivision, located south of the site, was completed to assess the existing capacities. The existing sanitary system outlets to a Municipal Pumping Station at Cudmore Crescent. According to City as-built drawing 24269, the system is designed to allow future development flows associated with a population of 1333 people from 168 Meadowlily Road South (the development site). The design criteria to estimate the populations and sanitary flows are based on the City's 2024 Design Specifications and Requirements Manual (DSRM), summarized below:

- Medium-density (townhomes) – 2.4 persons per unit;
- High-density (apartments) – 1.6 persons per unit;
- Per capita flow rate – 230 litres per person per day (L/cap/day);
- Infiltration – 0.1 litres per second per hectare (L/s/ha); and
- Peaking factor – Harmon.

The existing sanitary system was designed to receive 15.3 litres per second (L/s) of sanitary flow from the site.

Recent adjacent developments have used a portion of the allocated capacity for the site. The development at 101 Meadowlily Road South has a privately owned and operated pumping station that discharges the sewage generated at a rate of 7 L/s. The existing sanitary maintenance hole on Meadowlily Road South is the outlet for the forcemain. This discharge reduces the available sewage capacity for the site to 8.3 L/s. This new available capacity equals a population of approximately 700 people.

The total design population for the site is approximately 1653 people which equates to a flow of 16.7 L/s. The full development flow from the site exceeds the available capacity in the receiving system. Only a portion of the site can be serviced by the existing sanitary sewer on Meadowlily Road South without upgrades made downstream.

The City is undergoing an Environmental Assessment (EA) for Meadowlily Road South to design and construct a future pumping station along the street. Dillon has coordinated with the City's EA team to consider servicing the site with the future pumping station. As detailed design and the Meadowlily Road EA progress Dillon will continue to communicate the sanitary servicing requirements.

As there is capacity within the existing sanitary sewers system, Dillon proposes a phased construction of the site to allow development and servicing up to the existing available capacity while the pumping station EA and construction is completed. The existing sanitary sewer can service blocks 1 to 3 (two medium-density residential blocks and one high-density residential block) and is shown as Phase 1 in **Figure 3**. Calculations providing a breakdown of the populations and sanitary flows (existing, Phase 1 and full build-out) are included as **Appendix A**.

Based on the number of units included in Phase 1, a population of 593 is calculated and equates to a flow of 6.5 L/s. New 200 mm sanitary sewers are proposed to service the development extending along Street A and connecting to the existing sanitary sewer on Meadowlily Road South. As the EA and design of the future pumping station and extension of a sanitary sewer along Meadowlily continues, coordination is required to provide the remaining servicing requirements for the site.



## 5.0

## Water Servicing

An existing 400 mm high pressure watermain located along the south side of Commissioners Road East is intended to service areas with elevations above 270 m. Based on the topographic data, the site is above an elevation of 270 m and will therefore be serviced by this existing 400 mm high pressure watermain.

Water servicing for the proposed development has been assessed in accordance with the City's 2024 DSRM and the Ministry of the Environment Conservation and Park's (MECP) Design Guidelines for Drinking-Water Systems to ensure compliance with minimum pressures and velocities. A 300 mm watermain along Street A and the Meadowlily Road South boulevard is proposed to service the site. Two connection points to the existing 400 mm watermain on Commissioners Road East provide adequate pressures and turnover rates. This satisfies domestic as well as fire-flow demand and water quality requirements. All of the residential blocks within the development are serviced off of this proposed 300 mm watermain.

## 5.1

### Hydraulic Modelling

A preliminary hydraulic model of a proposed water servicing network for the site has been created using WaterCAD CONNECT Edition. The sections below outline key input parameters and summarize the results of the model simulations. The scope of the model includes full buildout of the site's residential blocks (as shown in **Figure 4**), partial buildout with just Phase 1 (as shown in **Figure 5**), as well as zero build-out scenario. The hydraulic design of the water distribution system is in accordance with the City's 2024 DSRM.

Domestic water demands at each junction within the development are based on the following:

- Average Day Demand (ADD) = 255 L/cap/day;
- Maximum Day Demand (MDD) = 3.5 x ADD; and
- Peak Hourly Demand (PHD) = 7.8 x ADD.

Demands are applied to the model based on full occupancy. Population is based on the land use and number of units proposed for development. Population density estimates are based on the following:

- High Density Residential = 1.6 people per unit; and
- Medium Density Residential = 2.4 people per unit.

Hazen-Williams friction factors (C-Factor) assigned to pipes in the hydraulic model are:

- 100 C-factor for 150 mm pipes;
- 110 C-factor for 200 mm and 250 mm pipes; and
- 120 C-factor for 300 mm pipes and over.

The hydraulic grade elevations at the connection points are set to approximately 319 m based on the hydraulic grade line (HGL) of the Southeast Pumping Station System per the City 2024 DSRM.

The following design criteria based on City standards are to be satisfied by the hydraulic model:

- Fire flow demands for high density private development blocks is calculated using the Ontario Building Code (OBC) method. 150 L/s required fire demand has been estimated based on OBC method;
- Street level minimum fire demand for single family detached low density residential areas equals 76 L/s;
- Maximum residual pressure should not exceed 550 kilopascals (kPa) (80 pounds per square inch [psi]) and a minimum residual pressure should not be below 275 kPa (40 psi);
- Maximum day demand plus fire flow at a pressure not less than 140 kPa (20 psi) should be maintained at any hydrant lateral or potential fire service connection;
- The maximum velocity in the pipe should not exceed 1.5 metres per second (m/s) during maximum domestic flow conditions or 2.4 m/s during fire flow conditions.

Results of the hydraulic modelling indicate that all the above design criteria are met using a 300 mm watermain along Street A. The private development blocks are adequately serviced from this watermain to meet domestic demands along with minimum fire-flow requirements as determined using the OBC method. A summary of

the demand and fire flow calculations can be found in **Appendix B**. The required minimum operating pressures and maximum velocity criteria are also satisfied. All fire hydrants will have available fire flows which exceed 150 L/s with a residual pressure of 140 kPa (20 psi) and a maximum velocity of 2.4 m/s.

As per the City's standards, water quality scenarios must be considered for full build out of the proposed phases, as well as zero buildout. The water age within the proposed watermain network was analyzed for the zero buildout (municipal road only), as well as full buildout under the ADD scenario. For both scenarios the maximum water age at the junctions within the network meet the requirements of water age, not exceeding 72 hours as per City standards.

## 6.0

## Stormwater Management

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In accordance with the City standards, a preliminary SWM strategy has been developed for the site and is documented in the accompanying SWM Report. Per City as-builts, the outlet for post-development flows from the site is the existing 375 mm storm sewer located on Meadowlily Road South. Post-development release rates will be controlled as per City requirements and as described in the SWM report. Onsite storage and treatment controls will be necessary to manage the flows being sent to the municipal storm sewer.

Storm sewers will extend along Street A to provide servicing and connections to the proposed blocks. As described in the SWM report low impact development (LID) features are proposed along the boulevard of Street A. The proposed LIDs are bioswales that will filter runoff from the road to catch basins connected to the storm sewers within Street A. The LID features will provide the necessary SWM treatment of the runoff from the Street A right-of-way.

## 7.0

## Sediment and Erosion Control

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Proper sediment and erosion controls are to be developed during the detailed design stage to manage flows to external properties and the SWM system. A Sediment and Erosion Control Plan is required to help maintain temporary measures during construction, guiding repairs and/or upgrades as needed, until such a time as the permanent site controls are established. Catch basins and overland flow routes must be protected as specified by the Sediment and Erosion Control Plan.

## 8.0

## Conclusion

The servicing report confirms that it is feasible to service the site using the adjacent existing services. Relevant design guidelines and codes were used to assess the servicing feasibility. Proposed sanitary sewers, watermains, and storm sewers can be extended from the existing services throughout the site for the proposed development. Restrictions to the sanitary servicing capacity indicate that the site should be developed in two phases. Phase 1 will allow development up to the existing sanitary capacity and Phase 2 will be full buildout, after construction of a new pumping station on Meadowlily Road South is completed. An EA for the pumping station is currently being completed. The existing water and storm water services are capable of servicing the full buildout conditions. Further detailed engineering and analyses is required as development proceeds and/or external modifications are made.

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