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Project: DEL22-012

City of London, Development Services (6th Floor)
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Attn: Paul Di Losa, Sr. Engineering Technologist

Re: **Westmount Shopping Centre Re-Development
Servicing Brief for Zoning By-Law and Official Plan Amendment Application
755, 765, 785 & 815 Wonderland Road South**

INTRODUCTION

Development Engineering (London) Limited [DevEng] has been retained by 785 Wonderland Road Inc. to provide Site Civil Engineering Services to complete a Sanitary Capacity Study and Servicing Brief to support the pending Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) planning processes. The subject property is comprised of Westmount Shopping Centre and Cineplex Odeon Theater located on a 11.56Ha parcel at 755, 765, 785 & 815 Wonderland Road South in London, Ontario. The proposed re-development of the property will include the demolition of the existing movie theater to allow for a mixed-use development with 898 residential units, 40,000m² of office space and 17,000m² of retail/service commercial space across the property. This Servicing Brief and Sanitary Capacity Study have been prepared to address the Engineering comments from the City's Record of Pre-Application Consultation dated May 10, 2022.

STORM

Existing Condition

The property consists of two existing buildings and is primarily covered by an impervious parking lot with interconnected sidewalk and driveway networks throughout. Existing runoff is directed to local catchbasins located across the subject property and conveyed to a 1200mm diameter Private Drain Connection (PDC) which ties into an existing 1200mm diameter Municipal Storm Sewer within the right-of-way (ROW) of Viscount Road. The existing Municipal Storm Sewer system conveys stormwater downstream through several municipal ROW's and easements with an outlet to an open channel (Thorncroft Drain) south of Southdale Road West and is tributary to the Dingman Creek Subwatershed.

Future/Proposed Condition

The proposed re-development of the property is not anticipated to significantly alter the runoff coefficient or the drainage characteristics from the existing condition. Proposed buildings and changes to parking areas will be located on existing hardscaped and on rooftop areas. Grading and servicing modifications will be addressed at a future stage through detailed design as part of a site plan approval process.

The property use will be high density residential, mixed with a commercial component, and therefore will require a Permanent Private Stormwater System (PPS) in accordance with the City of London Design Specifications



and Requirements Manual. The property will be subject to Case 3(a), where a municipal SWM facility does not exist, or is unlikely to be constructed in a timely manner and; an approved sewer is established, but there is no downstream SWMF, which states:

- The flows from a site being developed are to be restricted to those flows which were allowed for the site in the design of the receiving storm sewer; and,
- the major flows are to be controlled on site up to the 100-year event and the site grading is to safely convey up to the 250-year storm event; and,
- 100% of quality and erosion controls are to be provided for the lands to be developed, as per the applicable Subwatershed Study.

Future Site Plan Application designs will address Stormwater Management Controls and lot grading in compliance with the City of London, Design Specifications and Requirements Manual, Ministry of the Environment, Conservation & Parks (MECP) Guidelines and Recommendations, and the SWM criteria and targets for the Dingman Creek Subwatershed. Stormwater Management Controls could include LID efforts; rooftop, parking lot and underground storage for stormwater quantity control up to the 100-year event; and the installation of an Oil and Grit Separator (OGS) for quality control. Water balance assessment can also be reviewed at the detailed design stage.

WATER

Existing Condition

The existing property has a private looped watermain system ranging in size, from 200mm to 250mm diameter. The private watermain loop connects to the existing Municipal Water Distribution network via two existing 300mm diameter watermains, one in the Viscount Road ROW in the southwest corner of the property and the other to an existing 300mm watermain in the Wonderland Road South ROW in the northeast corner of the property. Fire protection across the property includes eight (8) private fire hydrants connected to the private looped watermain system and the sprinkler systems located within the existing buildings. The building has several private service connections to the on site watermain.

Future/Proposed Condition

A future site plan will provide the details necessary to complete all required watermain calculations and watermain analysis to review domestic use, fire protection, and water quality. Through detailed design and in coordination with a mechanical consultant, building construction and more specifically, proposed building heights may need to be reviewed for boosting and the potential need for fire pumps due to the increase in building heights. Other future alterations to the existing private watermain loop that could be implemented are revised fire hydrant locations to suit fire department connections, and separation of the incoming services or premise isolation at each of the two connection points to the Municipal Water Distribution system. The proposed water servicing will be designed to avoid the creation of a non-regulated drinking water system.

SANITARY DESIGN

Existing Condition

The subject property is tributary to an existing 600mm diameter sanitary trunk sewer located in a sanitary sewer easement on the east side of the property, running parallel to Wonderland Road South. Sanitary flows from the existing shopping centre are conveyed to the existing trunk sewer through a small diameter (200mm-300mm dia.) sanitary network with a 300mm outlet pipe connecting to existing sanitary maintenance hole WT890 in the sanitary sewer easement.

A Sanitary Drainage Plan & Sanitary Design Sheet prepared by Earth Tech (Canada) Inc. in August 2002 (Plan File No. 17,028), summarizes at a high level, the tributary area and population in the Westmount Subdivision to the Berkshire Pumping Station. The subject property is located in area A1-C of the 2002 area plan and is included in the total tributary flows to downstream node WT1002. The slope of the existing 675mm diameter sanitary trunk sewer immediately upstream of WT1002 is 0.15% and presents a potential constraint to the wastewater system. This potential constraint is alleviated downstream of WT1002 where the pipe size increases to 750mm diameter and the slope is increased to 0.60%.

From the Earth Tech design sheet, at MH WT1002 there is a design sewage flow of 225.1 L/s and a sewer capacity of 324 L/s, and therefore, there is a reserve capacity of 98.9 L/s in the sewer at this location. However, the design sheet is not discretized enough to determine reserve capacity in individual sections of the upstream sewers where pipe sizes, slopes, and tributary populations are different.

To complete a detailed sanitary sewer analysis that evaluates the receiving trunk sewer runs immediately downstream of the property and the potential constraint in the sewer run between WT1001 and WT1002, a more comprehensive review of the existing tributary areas and populations was required. The existing population from the 2002 design area tributary to the node at WT1002 was noted as 14,189 people. As part of this review the overall Area A1 from the Earth Tech design sheet was discretized into many sub-areas to determine tributary populations at different locations in the trunk sewers. As shown on Fig. 2 and Fig. 3, populations were quantified by summing the actual number of single-family, medium-density and high-density unit counts and applying the design population per unit as outlined below;

- * Low Density = 3 people/unit (30 units/ha where actual number unknown)
- * Medium Density = 2.4 people/unit (75 units/ha where actual number unknown)
- * High Density = 1.6 people/unit (150 units/ha where actual number unknown)

The large area tributary to the sanitary trunk sewer also included several commercial and institutional zoned properties. The population for these properties was quantified using the following;

- * Commercial/Institutional = 100 people/hectare
- * Church = 100 people/hectare
- ** Elementary School = 600 people with an equivalent population of 235 people.
- ** Secondary School = 1500 people with an equivalent population of 587 people.

* design populations from City of London 2022 Design Specification & Requirements Manual, section 3.8.

** equivalent populations on school properties calculated using the formula below;

$$\text{Elementary and Secondary School Equibalent Population} \left(\frac{(\text{Design Pop.} \times 30\text{L/cap}/8 \text{ hours})}{230 \text{ L/cap/day}} \right) \times 3$$

The existing design population of the subject property was calculated in Fig. 3 using OBC table 8.2.1.3.B where a wastewater volume of 5 L/m²/day for the Shopping Centre and 20L/seat/day for the theatre, were divided by



the City of London 230 L/d standard per capita flow to calculate the equivalent population for each of the existing uses. The existing equivalent design population was calculated to be 1,002 people.

$$\text{Shopping Centre Equivalent Population} = \left(\frac{(\text{sq.m of Shopping Centre} \times 5\text{L/m}^2/\text{day})}{230 \text{ L/cap/day}} \right)$$

$$\text{Movie Theater Equivalent Population} = \left(\frac{(\text{Number of Seats} \times 20\text{L/Seat/day})}{230 \text{ L/cap/day}} \right)$$

Based on the calculations above the total population tributary to node WT1002 was calculated to be 18,032, an increase above the design population of 14,189 on the Earth Tech area plan and design sheet.

Future/Proposed Condition

The subject property is proposed to be re-developed as mix-used, with residential, commercial and office space uses. Medium and high-density residential populations have been calculated in Fig.3 using *2.4 people/unit and *1.6 people/unit respectively.

An equivalent design population for the proposed 17,000m² of Shopping Centre Space was calculated to be 370 people based on OBC table 8.2.1.3.B and the equation above.

An equivalent design population for the proposed 40,000m² of Office Space was calculated to be 1,403 people based on OBC table 8.2.1.3.B where OBC provides a wastewater volume of 75 L/9.3m²/day divided by the City of London 230 L/d standard per capita flow to calculate the equivalent population per the formula below.

$$\text{Office Space Equivalent Population} = \left(\frac{(\text{sq.m of Shopping Centre} \times 75\text{L}/9.3\text{m}^2/\text{day})}{230 \text{ L/cap/day}} \right)$$

Referring to Fig. 5, the total population for the re-developed property that includes 874 high-density units, 24 medium-density units, 40,000m² of Office Space and 17,000m² of Shopping Centre Space is 3,230 people. The existing property's population was calculated to be 1,002 people, and therefore the redevelopment proposes an increase of 2,228 people.

To determine if the existing receiving sewers have capacity for the intensification on the subject property an updated Sanitary Drainage Plan & Design Sheet, Fig. 1, has been created using the aforementioned populations and follows the current DSRM standards. The approved 2002 Earth Tech design sheet population was denoted as 14,189 people at node WT1002. The current calculated population tributary to WT1002 with the additional intensification on the subject property was calculated to be 20,260 people. The net increase in population including the subject property intensification is 6,071 people.

The existing population and areas upstream of the subject property were calculated on Fig. 2 and Fig. 3 as described in the Existing Condition section of this brief. Referring to Fig. 1, in area A1, the actual population upstream of the subject property that is tributary to the existing sanitary trunk sewer has been calculated to be 11,839 people inhabiting an area of 249.16 Ha. Area A1 flows are added in the design sheet to the existing sanitary trunk sewer at WT889, immediately upstream of the subject property, and has a calculated peak flow rate of 124.81L/s in an existing 600mm diameter pipe running at 0.20% slope with an available capacity of 274.59L/s.

The subject property shown on Fig. 1, in area A2, has a design flow of 148.63L/s and is added to the design sheet at node WT890. The three pipe runs immediately downstream of the receiving node WT890 were evaluated in the design sheet from WT890 to WT992 where the 600mm diameter pipes have slopes ranging between 0.12% and 0.08%. The 82.1m long 600mm diameter trunk sewer run between WT891 and WT892



is the most restrictive with a slope of 0.08% and a capacity of 173.67L/s. Based on the calculated flows and subject property intensification a reserve capacity of 25.49L/s remains after the flows from the intensified subject property have been added.

The 2002 Earth Tech area plan and design sheet was further discretized on Fig.1 by calculating the population and areas in A3 and A4. Area A3 was added to the Fig.1 design sheet at node WT992 with a population of 2,100 people and an area of 57.42 Ha. Area A4 was added to the Fig.1 design sheet at note WT1001 with a population of 3,091 people and an area of 44.89Ha.

The calculated population tributary to WT1002 including the additional intensification of 2,228 people on the subject property was calculated to be 20,260 people generating a sewage flow of 193.39L/s. The downstream 675mm diameter sewer with a 0.15% slope between has a capacity of 325.56L/s resulting in a reserve capacity of 132.18L/s. The reduction in sewage flow is a function of the per-capita flow reduction from 2002 design flow of 295L/per/day (post 96) and 346L/per/day (pre 96) to the 2022 design flow of 230L/per/day.

Therefore, it is concluded that the sewers in the on-site easement that receive the additional flows from intensification of the site, a total peak sewage of 148.63 L/s, can be conveyed in the existing infrastructure being the 600mm diameter sewer at 0.08% slope with a capacity of 173.66 L/s. The sewers downstream to node WT1002 were also reviewed to have sufficient capacity, and downstream of WT1002 the pipe size increases providing additional conveyance capacity.

SUMMARY

We trust this design brief provides sufficient design justification to support the proposed sanitary servicing strategy and has adequately addressed the engineering requirements, as outlined in the Record of Pre-Application Consultation, in support of the proposed Zoning By-Law and Official Plan Amendment. The following is a summary of key points to be taken away from this brief:

- The existing 11.56 Ha property will be re-developed for mixed-use, with residential, commercial and office space uses.
- Existing services on-site include private sanitary sewers, a private watermain loop and service connections, and a private storm sewer system.
- Review for future stormwater management requirements will be completed through detailed design.
- The property is not anticipated to significantly alter imperviousness from the existing conditions through the re-development therefore, future SWM controls will be focused on maintaining Pre-Post flows and improvements to water quality discharge to the existing receiving municipal storm sewer.
- The existing private watermain loop will be evaluated through detailed design in a future Site Plan Application which will include any required modifications as deemed necessary by the re-development or City.
- The existing sanitary trunk sewer and the tributary population upstream of node WT1002 has been evaluated to complete a comprehensive review of the trunk sewer's capacity.
- The receiving 600mm sanitary trunk sewers immediately downstream of the subject property and 675mm trunk sewer at nodes WT1001 & WT1002 have adequate conveyance capacity to support the proposed intensification with no concerns for surcharging under normal conditions.

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