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UD21-044

Functional Servicing and Stormwater Management Report



Project: 1-13 St. Clair Avenue West
Midtown-Yonge Properties Inc.

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Executive Summary

Lithos Group Inc. (Lithos) was retained by Midtown-Yonge Properties Inc. (the “Owner”) to prepare a Functional Servicing and Stormwater Management (FSR-SWM) Report in support of Zoning By-law Amendment application for a proposed mixed-use development at 1-13 St. Clair Avenue West (M4V 1K6), in the City of Toronto (the “City”). The following is a summary of our conclusions:

Storm Drainage

The site stormwater discharge will be controlled to the 2-year pre-development flow as specified by the City’s Wet Weather Flow Management Guidelines (WWFMG). The proposed storm lateral will be connected to the 1350 mm diameter storm sewer along Yonge Street. In order to attain the target flows, quantity controls will be utilized and up to 39.20 m³ of underground storage will be required. The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection, as specified by the Ministry of the Environment, Conservation and Parks (MECP). During Site Plan Control, a detailed analysis will be provided to assess the water quality on site and determine additional measures, in order to achieve a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

The proposed development will connect to the existing 600mm combined sewer on St. Clair Avenue West, through a 150mm diameter sanitary sewer lateral connection, with a minimum grade of 2.00% (or equivalent pipe design). The additional net discharge flow from the proposed development, is anticipated at approximately 6.64 L/s.

As a result, an analysis of the external combined drainage area has been conducted, under dry and wet weather post-development conditions.

According to our results, the property under proposed conditions, will not adversely affect flow conditions downstream and the existing combined infrastructure on St. Clair Avenue West will be able to support the proposed development without the need of any upgrades to the municipal combined sewer infrastructure.

Water Supply

Water supply for the site will be from the existing 300mm diameter watermain on the east side of Yonge Street. It is anticipated that a total design flow of 118.63 L/s will be required to support the proposed development. The results of the fire hydrant flow tests, prepared by Lithos Group Inc., dated July 20, 2021 along St. Clair Avenue West and Yonge Street, reveal that the existing water infrastructure can support the proposed development.

Site Grading

The proposed grades will match current drainage pattern and will improve the existing drainage conditions to meet the City’s/Regional requirements. Grades will be maintained along the property line wherever feasible and overland flow will be directed towards the adjacent right of ways (ROW).

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1.0 Introduction

Lithos Group Inc. (Lithos) was retained by Midtown-Yonge Properties Inc. (the “Owner”) to prepare a Functional Servicing and Stormwater Management (FSR-SWM) Report in support of Zoning By-law Amendment application for a proposed mixed-use development at 1-13 St. Clair Avenue West Street (M4V 1K6), in the City of Toronto (the “City”).

The purpose of this report is to provide site-specific information for the City’s review with respect to infrastructure required to support the proposed development. More specifically, the report will present details on sanitary discharge, water supply and an outline of the storm drainage pattern.

We contacted the City’s engineering department to obtain existing information in preparation of this report. The following documents were available for our review:

- Plan and Profile drawings of Yonge Street, drawing No. Y-16, dated February 1917;
- Plan and Profile drawings of Yonge Street, drawing No. Y-35, dated June 1958;
- Plan and Profile drawings of Yonge Street, drawing No. Y-41, dated June 1967;
- Plan and Profile drawings of St. Clair Avenue West, drawing No. P-890-023, dated July 2005;
- Plan and Profile drawings of St. Clair Avenue West, drawing No. ST-75, dated November 1960;
- HVM Maps and Data of the existing combined sewer network upstream and downstream of the subject site (for reference purposes only);
- Toronto TPUCC DMOG Maps for the area abutting the site;
- Sewer and Water Atlas Maps;
- Site Plan and Site Statistics prepared by Gensler, dated December 10, 2021; and,
- Topographical Survey prepared by R. Avis Surveying Inc., dated July 12, 2021.

2.0 Site Description

The existing site is approximately 0.130 hectare of mixed-use land, located on the southwest side of St. Clair Avenue West Street, in the City of Toronto. It is currently occupied by a twelve-storey retail building. The site area is bound by retail buildings to the west and south, St. Clair Avenue West to the north and Yonge Street to the east. Refer to [Figures 1 and 2](#) following this report, site photographs in [Appendix A](#) and to the topographic survey in [Appendix B](#).

The entire City was recently deemed as an area of basement flooding. As shown in the updated map included in [Appendix B](#), Environmental Assessment (EA) Studies are being performed across the City of Toronto, separated in areas. According to the “*Current Basement Flooding Investigation Environmental Assessment Studies*” for the City of Toronto found online, the site is located in area 44, where the EA Study is in progress.

3.0 Site Proposal

The proposed development will be a 49-storey mixed-use building with an additional mechanical penthouse and will be serviced by one (1) existing underground parking level, below 1 St Clair Avenue, and two (2) proposed underground parking levels below 11-13 St Clair Avenue. The proposed development will be comprised of 340 residential units and retail area of 882.0 m².

The total development will include approximately 34,998 m² of Gross Floor Area (GFA). Please refer to **Appendix B** for the proposed site plan and building site statistics.

4.0 Terms of Reference and Methodology

4.1. Terms of Reference

The Terms of Reference used for the scope of this report were based on the City's Development Guide Servicing Report Terms of Reference, December 2007, the January 2021 Second Edition of the City of Toronto Design Criteria for Sewers and Watermains and the November 2006 Wet Weather Flow Management Guidelines (WWFMG).

4.2. Methodology: Stormwater Drainage and Management

This report provides a detailed Stormwater Management (SWM) review of the pre- and post-development conditions, and comments on opportunities to reduce peak flows. A detailed Stormwater Management (SWM) Report will be prepared at the Site Plan Application stage.

The proposed development will be designed to meet the City's WWFMG and the standards of the Province of Ontario as set out in the Ministry of Environment, Conservation and Parks (MECP) 2003 Stormwater Management Planning and Design Manual (SWMPD). The following design criteria will be reviewed:

- Post-development peak flow for the 100-year event storm flow from the site will be controlled to the two (2)-year event target flow;
- A specified rainfall depth of 5mm is to be retained on-site, as required by the WWFMG; and,
- A safe overland flow will be provided for all flows in excess of the 100-year storm event.

4.3. Methodology: Sanitary Discharge

The sanitary sewage discharge from the site will be determined using sanitary sewer design sheets that incorporate the land use and building statistics as supplied by the design team. The calculated values provide peak sanitary flow discharge that considers infiltration.

The estimated sanitary discharge flows from the proposed site will be calculated based on the criteria shown in **Table 4.1** below.

Table 4.1 – Sanitary Flows

Usage	Design Flow	Units	Population Equivalent
Mixed-use	240	Litres / capita / day	1 Bedroom Unit = 1.4 ppu 2 Bedroom Unit = 2.1 ppu 3 Bedroom Unit = 3.1 ppu Single Family Dwelling = 3.5 ppu
Commercial / Retail	250		1.1 p/100 m ²

Based on the calculated peak flows, the adequacy of the existing infrastructure to support the proposed development will be discussed.

4.4. Methodology: Water Usage

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS). This method is based on the fire protected building floors, the type and combustibility of the structural frame and the separation distances with adjoining building units. The domestic water usage was calculated based on the City's design criteria outlined in [Table 4.2](#).

Table 4.2 – Water Usage

Usage	Water Demand	Units
Residential	190	Litres / capita / day
Commercial / Retail	2.8	Litres / 1.0 m ² / day

Pressure and flow testing have been conducted on the existing hydrants located near the site along St. Clair Avenue West and Yonge Street to obtain existing flows, residual and static pressure.

5.0 Stormwater Management and Drainage

The existing site is approximately 0.130 hectare and is currently occupied by a twelve-storey retail building facilitated by an underground parking level at 1 St Clair Avenue West and by two three-storey retail buildings at 11-13 St Clair Avenue West.

According to available records, there is one (1) existing storm sewer and four (4) combined sewers abutting the subject property. More specifically there are:

- A 600 mm diameter combined sewer on St. Clair Avenue West flowing east;
- A 375 mm diameter combined sewer on St. Clair Avenue West flowing east;
- A 1350x900 mm diameter combined sewer on Yonge Street flowing south;
- A 1200 mm diameter combined sewer on Yonge Street flowing south; and,
- A 1350 mm diameter storm sewer on Yonge Street flowing south.

5.1. Existing Conditions

The future property will be approximately 0.130 hectare. According to the site investigation conducted by our team, the existing site currently drains towards the combined sewer network along Yonge Street.

The existing site is primarily covered by buildings, thus, there is no infiltration onsite. Although the existing run-off coefficient is estimated at 0.90, the WWFMG requires target flow calculations based on a run-off coefficient of 0.50. The input parameters, summarized in **Table 5.1** below, are illustrated in the pre-development drainage area plan in **Figure DAP-1** in **Appendix C**.

Table 5.1 – Pre-development Input Parameters

Drainage Area	Drainage Area (ha)	Design “C”	Tc (min.)
A1 Pre	0.130	0.50	10

Peak flows calculated for the existing conditions are shown in **Table 5.2** below. Detailed calculations are in **Appendix C**.

Table 5.2 – Target Peak Flows

Catchment	Peak Flow Rational Method (L/s)		
	2-year	5-year	100-year
A1 Pre	15.9	23.8	45.1

As shown in **Table 5.2**, pre-development flows from the property, towards the combined network will need to be controlled to the target flow of 15.9 L/s.

5.2. Stormwater Management

In order to meet the WWFMG criteria, the post development flow is to be controlled to the pre development two (2)-year target flow established in **Section 5.1**. Any excess flow will be retained on-site and will ultimately outlet into the existing storm infrastructure on Yonge Street.

The post-development drainage area and runoff coefficient are indicated on **Figure DAP-2**, located in **Appendix C** and summarized in **Table 5.3** below.

Table 5.3 - Post-development Input Parameters

Drainage Area	Drainage Area (ha)	“C”	Tc (min.)
A1 Post	0.130	0.90	10

5.2.1. Water Balance

The City's WWFMG requires 5 mm for Tier 1 of onsite runoff from any rainfall event to be retained over the entirety of the site. A 5 mm of rainfall over the entire site equates to a required water balance volume of 6.50 m³. In order to achieve this, the following low impact development (LID) techniques may be implemented:

- Collecting rainwater in storage tanks to be reused for irrigation purposes; and,
- Green roof and planters.

Detailed calculations will be provided during the detailed design stage of Site Plan Application.

5.2.2. Quantity Controls

As established in [Section 5.1](#) of this report, storm runoff from the existing property, will be controlled to the 2-year pre-development target flow.

Using the City's intensity-duration-frequency (IDF) data, modified rational method calculations were undertaken to determine the maximum storage required during each storm event. Results for the 2, 5 and 100-year storm events are provided in [Table 5.4](#) below. The detailed post-development quantity control calculations are provided in [Appendix C](#).

Table 5.4 – Post-development Quantity Control as per City Requirements

Drainage Area	Storm Event	Target Flow (L/s)	Minimum Underground Storage Required (m ³)
A1 Post (Controlled)	2-year	15.9	7.63
	5-year		16.12
	100-year		39.20

As shown in [Table 5.4](#), in order to control post-development flows to 2-year pre-development conditions, a target flow of 15.9 L/s is to be satisfied. The minimum required on-site storage is 39.20 m³ for the 100-year storm event. This can be achieved through the design and installation of stormwater holding tanks, flow control devices and/or roof storage, details of which will be provided through the detailed design stage of Site Plan Application.

5.2.3. Quality Controls

Stormwater treatment must meet Enhanced Protection criteria as defined by the MECP 2003 SWMPD Manual, including a minimum 80% of total suspended solids removal (TSS). Quality control and the need of additional measures will be discussed during Site Plan Application.

5.3. Proposed Storm Connection

The proposed development will connect to the existing 1350 mm diameter storm sewer along Yonge Street, via a 200mm diameter storm sewer service connection, with a minimum grade of 2.00% (or equivalent pipe design). Details of the proposed Stormwater Management System will be provided during the detailed design stage of Site Plan Application. Servicing Figure (FIG 3) in [Appendix F](#) indicates the stormwater service connection.

6.0 Combined Drainage System

6.1. Existing Combined Drainage System

The existing site is approximately 0.130 hectare of retail use land, located on the south side of St. Clair Avenue West, in the City of Toronto. According to available records, there are four (4) combined sewers, abutting the subject property. More specifically there are:

- A 600 mm diameter combined sewer on St. Clair Avenue West flowing east;
- A 375 mm diameter combined sewer on St. Clair Avenue West flowing east;
- A 1200 mm diameter combined sewer on Yonge Street flowing south; and,
- A 1350x900 mm diameter combined sewer on Yonge Street flowing south.

6.2. Existing Flows

The sanitary flow generated by the proposed development at 1-13 St. Clair Avenue West was compared to the existing flow in order to quantify the net increase in the combined sewer network abutting the subject site.

Using the design criteria outlined in [Section 4.3](#) and existing site information, the sanitary discharge flow from the existing retail building is estimated at 0.71 L/s. Detailed calculations can be found in [Appendix D](#).

6.3. Proposed Flows

According to the proposed development statistics, as well as the design criteria outlined in [Section 4.3](#), the new building will discharge 7.35 L/s (7.07 L/s sanitary flow, 0.04 L/s infiltration and 0.24 L/s groundwater flow) into the City's combined sewer infrastructure.

The additional flow will be considered within the sanitary discharge rate, therefore, there is an increase in sanitary flow of approximately 6.64 L/s. For detailed calculations, refer to the sanitary sewer design sheet in [Appendix D](#).

The capacity of the existing combined sewer network abutting the subject site to accommodate the post-development sanitary flow, will be discussed under [Section 7.0](#) of this report.

6.3.1. Groundwater Flow

According to the “Draft Hydrogeological Assessment” prepared by Pinchin Ltd., dated November 2, 2021, the groundwater level ranges from 137.35 meters above sea level (masl) to 121.55 masl. In addition, the proposed development will be serviced by one (1) existing underground parking level, below 1 St Clair Avenue, and two (2) proposed underground parking levels below 11-13 St Clair Avenue (lowest basement slab elevation at 138.78 masl).

The results of groundwater sampling on site, reveal that groundwater exceeds the City’s limits of total suspended solids for discharging into the storm sewer network, however, it is within the City’s limits for discharging into the sanitary / combined sewer network. Thus, groundwater can be discharged into the combined sewer network without treatment. The results of the Hydrogeological Investigation can be found in **Appendix B**.

6.3.1.1 Long-Term Groundwater Dewatering

According to the “Draft Hydrogeological Assessment”, long-term groundwater discharge, along with the installation of a permanent dewatering system will be required. A groundwater flow rate of 0.24 L/s, assuming 4 hours pump function, is estimated to be discharged on a permanent basis. Based on the Long-Term Groundwater Discharge Letter, prepared by The Mitchell Partnership Inc., dated November 29, 2021, (found in **Appendix B**), the pump will be sized at 0.24 L/s.

As mentioned above, groundwater is in compliance with the City of Toronto sanitary / combined sewer limits, therefore, it will be discharged into the City’s combined sewer network, along St. Clair Avenue West, without treatment. More specifically, groundwater flow will be discharged into the City’s 600mm diameter combined sewer along St. Clair Avenue West. Groundwater will have a sampling access point for the City’s access and inspection.

Under pre-development conditions, groundwater of the existing underground level under 1 St. Clair Avenue West (which will be maintained), is discharged into the combined sewer network abutting the subject site, through an existing weeping tile system. Under post-development conditions, the proposed weeping tile system to be installed to the proposed underground levels below 11 & 13 St. Clair Avenue, will be connected with the existing and there will be a total pump peak flow rate towards the City’s combined sewer network. Due to the fact that the existing underground level at 1 St. Clair Avenue West occupies the majority of the subject site’s underground envelope, there’s no opportunity to completely avoid discharging towards the City’s network or bathtub the existing foundations. According to the City’s guidelines, updated January 2021, we have calculated a conservative existing groundwater discharge flow of 0.39 L/s, while, under the proposed conditions, there will be a pump peak flow rate towards the City’s network of 0.24L/s which improves the overall groundwater discharge conditions.

6.3.1.2 Short-Term Groundwater Dewatering

According to the “Draft Hydrogeological Assessment”, short-term groundwater discharge (during construction) is 95,287 L/day (included safety factor of 2) (1.10 L/s). Following the fact that the existing sanitary network along St. Clair Avenue can accommodate the proposed permanent total flow (7.39 L/s) under post-development conditions, it is anticipated that it will be capable to accommodate the groundwater discharge during construction.

The capacity of the existing combined sewer network along St. Clair Avenue West to accommodate the total post-development flows, will be discussed under **Section 7.0** of this report.

6.4. Proposed Sanitary Connection

The proposed development will connect to the existing 600mm diameter combined sewer along St. Clair Avenue West through a 150 mm diameter lateral sanitary sewer connection at a minimum grade of 2.00% (or equivalent pipe design). Refer to **Figure 3** in **Appendix F** for details.

7.0 Total Flows (MECP F-5-5)

In order to comply with the requirements as per MECP F-5-5 “Determination of treatment requirement for Municipal and Private Combined”:

1. The proposed development should not cause any overflows at the combined sewer overflow (CSO) point/diversion structure, downstream of the subject site, under Dry Weather Flow (DWF) conditions; and,
2. There should be no increase in overflow volumes at downstream CSO points/diversion structures under Wet-Weather Flow (WWF) conditions (sanitary flow and 2-year event flows).

Therefore, the existing flows into the combined network will be compared to the proposed flows, under dry and wet weather conditions.

7.1. Total Existing Flows

Storm Flow

According to site investigation conducted by our design team on September 14, 2021, storm runoff from the property at 1 – 13 St. Clair Avenue West is discharged through laterals into the existing 900x1350 mm combined sewer on Yonge Street.

Sanitary Flow

Sanitary flow from the existing buildings in our site is discharged into the abutting combined sewer network.

To conclude, under pre-development conditions, storm runoff, as well as sanitary flow from the existing building, contribute into the City’s combined sewer network abutting the subject site. Please refer to ‘Pre and Post-Development Site Contribution to Combined Network for Dry and Wet-Weather Flows’, indicated in **DAP-4** and **DAP-5**, respectively (found in **Appendix D**).

As discussed into **Section 6.1**, both the 375mm and 600mm combined sewers along St. Clair Avenue West are eventually connected to the existing 1350 x 900 mm diameter combined sewer along Yonge Street.

Using the City’s intensity-duration-frequency (IDF) data, modified rational method calculations were undertaken to determine the storm flow into the combined sewer network during a 2-year storm event (design sheet 1 of 5 in **Appendix D**). **Table 7.1** shows the existing flows (storm and sanitary) into the combined sewer network from the existing buildings. Detailed calculations can be found in **Appendix C** and **D**.

Table 7.1– Existing Flows into the City’s Combined Sewer Network

	Type of Flow	Dry Weather Flow (L/s)	Wet Weather Flow (L/s)
1-13 St. Clair Avenue West	Existing Sanitary Flow	0.67	0.67
	Infiltration	0.04	0.04
	Foundation Allowance	-	0.39
	Existing Storm Flow (2-year)	-	28.70
	Total	0.71	29.80

7.2. Total Proposed Flows

Under post-development conditions, flows into the City’s existing combined sewer network are shown in **Table 7.2** below.

Table 7.2– Proposed Flows into the City’s Combined Sewer Network

	Type of Flow	Dry Weather Flow (L/s)	Wet Weather Flow (L/s)
1-13 St. Clair Avenue West	Proposed Sanitary Flow	7.07	7.07
	Infiltration	0.04	0.04
	Foundation Allowance	-	-
	Long-Term Groundwater Flow	0.24	0.24
	Proposed Storm Flow (2-year)	-	-
	Total	7.35	7.35

7.2.1. Dry-Weather Flows into the Combined Sewer Network

According to the proposed development’s site statistics, as well as the design criteria outlined in **Section 4.3**, the new building’s sanitary connection will discharge 7.35 L/s (7.07 L/s sanitary, 0.24 L/s groundwater and 0.04 L/s infiltration) to the City’s downstream combined sewer network, during Dry Weather conditions (refer to ‘**Combined Sewer Design Sheet**’ design sheet 2 of 5 in **Appendix D**).

According to the MECP F-5-5 procedure post-development flows into the combined sewer network should not cause any overflows at downstream combined sewer overflow (CSO) point/diversion structure under dry weather conditions.

Due to the sanitary flow increase, an External and a Hydraulic Grade Line analysis were conducted, to assess how the capacity of the existing combined sewer segments, downstream of the proposed development, will be affected by the additional flow.

7.2.1.1 External Downstream Capacity

The external sanitary analysis relies upon plans provided by the City, topographic information, on-site investigation which were conducted by our team and future developments based on the City's development application website, where zoning has been completed and where applications are currently in progress, in order to determine the land use, the population density and the drainage areas towards each sewer segment.

Based on plans provided by the City and topographic information, a combined sewer drainage area plan was developed based on plan and profile maps, to assess the existing flow conditions downstream and upstream from the site. The sanitary flows were calculated using the sanitary sewer design sheets typically associated with the design of combined sewers for municipal design. The data was based on residential / commercial / institutional flows, extraneous infiltration quantities, and peaking factors.

Based on our review of the Combined Drainage Area Plan developed, we have identified all sewer segments upstream and downstream of the proposed development, up to the overflow point, located near the intersection of Yonge Street and Pleasant Boulevard. Please refer to the Combined Drainage Area Plan (**DAP3**) and design sheets for the location of these sewer segments (found in **Appendix D**).

Our analysis shows that during pre-development Dry Weather conditions, the sewer segments do not carry more than 6.6% of their full flow capacity. Under post-development conditions, the maximum design capacity into the existing combined sewers downstream of the proposed development, will be slightly increased at 6.9% (refer to the '**External Combined Sewer Segments**' design sheet 3 of 5 in **Appendix D**).

To conclude, the proposed development will not have any adverse impact towards the existing combined network, as there's plenty of capacity to accommodate the proposed flows. Moreover, the proposed groundwater discharge conditions will be improved versus the existing, and there will be no additional groundwater discharge flow, from the subject development.

7.2.1.2 Hydraulic Grade Line Analysis

The Hydraulic Analysis predicts the capacity in the sewer by calculating the Hydraulic Grade Line (HGL) elevation as a function of flow and compares it to the maximum allowable HGL elevation. To perform this analysis a static model (spread sheet) was prepared (refer to **Appendix D**). The model uses the existing and proposed conditions, in the sewer shed, to estimate the peak sanitary and storm flow into the combined sewer. Infiltration and Inflow (I-I) were considered in the calculation of the peak flow. Using the calculated peak flows, all downstream sewer segments were analyzed, up to the CSO point, located at Yonge Street, to determine whether there will be any surcharging under Dry Weather Conditions.

The results of the Hydraulic Grade Line Analysis under dry weather conditions show that no surcharge will occur under post development conditions. In addition, under post-development conditions the HGL elevations will raise approximately 1cm to the segments prior to the CSO point without, however, increasing water depth at the point where the CSO is located, downstream of site, at Yonge Street (refer to '**Hydraulic Grade Line Analysis / Pre-Development – Dry Weather**' and '**Hydraulic Grade Line Analysis / Post Development – Dry Weather**' design sheets 4 and 5 of 5 in **Appendix D**).

Although there will be a small raise at the existing HGL elevation into the combined sewer network during post-development Dry-Weather conditions, the proposed HGL elevation difference compared to the existing, is considered to be negligible.

To summarize, during Dry Weather conditions, the combined sewer overflow (CSO) occurrence will not be affected and the existing combined sewer infrastructure will be capable to support the proposed development.

7.2.2. Wet-Weather Flows into the Combined Sewer Network

According to our calculations ([Appendix C and D](#)) under post-development conditions, there will be no additional flow discharged within the existing combined sewer infrastructure abutting the subject site on Yonge Street, compared to the pre-development conditions. Storm flow from the proposed development will be redirected from the existing combined sewer network abutting the subject property to the existing storm network on Yonge Street. As established in [Section 7.2](#), it is estimated that a total sanitary design flow of 7.35 L/s will be discharged into the City's existing combined sewer network, during Wet Weather, post-development conditions.

In comparison to the existing conditions, there will be a decrease to the total discharge flow into the combined sewer network, of approximately $(29.80 - 7.35) = 22.45$ L/s, which accounts for a 75.2% decrease in the total Wet Weather combined flow on the City's combined sewer network.

The reason for the total flow decrease is that under the existing conditions storm flow from the site drains towards the City's existing combined sewer network, while, under post development conditions, this flow is controlled into the proposed underground storage tank prior to being discharged into the existing 1350mm storm sewer along Yonge Street. Consequently, there will be no increase in overflows as compared to the existing conditions and this development will not adversely affect the downstream flow during Wet Weather conditions.

8.0 Water Supply System

8.1. Existing System

Based on plans provided by the City, the existing watermain system consists of the following waterlines:

- A 300 mm diameter watermain on the north side of St. Clair Avenue West;
- A 1000 mm diameter watermain on the east side of Yonge Street; and,
- A 300 mm diameter watermain on the east side of Yonge Street.

Hydrant flow tests were carried out by Lithos Group Inc. on July 20, 2021, along St. Clair Avenue West, and Yonge Street to determine the flow and pressure in the existing water network.

- The results of the test along Yonge Street indicates the existing static pressure is 399.90 KPa (58 psi) and 66.96 L/sec (1061.22 USGPM) of water is available with a residual pressure of 344.74 KPa (50 psi). The full detailed report is included in [Appendix E](#).
- The results of the test along St. Clair Avenue West indicates the existing static pressure 427.48 KPa (62 psi) and 66.96 L/sec (1061.22 USGPM) of water is available with a residual pressure of 386.11 KPa (56 psi). The full detailed report is included in [Appendix E](#).

8.2. Proposed Water Supply Requirements

The estimated water consumption was calculated based on the occupancy rates shown on **Table 4.2**, according to the City's watermain design criteria revised in January 2021.

It is anticipated that an average consumption of approximately 1.31 L/s (12,860 L/day), a maximum daily consumption of 1.96 L/s (169,344 L/day) and a peak hourly demand of 2.94 L/s (10,581 L/hr) will be required to service this development with domestic water. Detailed calculations are found in **Appendix E**.

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS) be undertaken to assess the minimum requirement for fire suppression. The fire flow calculations are normally conducted for the largest storey, by area, and for the two immediately adjacent storeys.

As a result, to the above-mentioned method, we have selected Levels 1, 2 and 3 which result the maximum fire flow requirement for this development (worst case scenario).

Table 8.1 illustrates the input parameters used for the FUS calculations. According to our calculations, a minimum fire suppression flow of approximately 116.67 L/s (1849 USGPM) will be required. Refer to detailed calculations found in **Appendix E**.

Table 8.1 – Fire Flow Input Parameters

Parameter	Frame used for Building	Combustibility of Contents	Presence of Sprinklers	Separation Distance			
				North	East	West	South
Value according to FUS options	Non-combustible construction	Limited-Combustible	Yes	30.1m-45.0m	20.1m-30.0m	0.0m-3.0m	3.1-10.0m
Surcharge/reduction from base flow	0.8	25%	30%	5%	10%	25%	20%

In summary, the required design flow is the sum of 'the minimum fire suppression flow' and 'maximum daily demand' ($116.67 + 1.96 = 118.63$ L/s, 1880 USGPM).

8.3. Proposed Watermain Connections

The proposed building will exceed 84.0m in height, therefore, two (2) water sources will be required according to the Ontario Building Code (OBC) to support the proposed development's sprinkler system. The proposed development will be serviced by two (2) 150mm diameter fire and one (1) 100mm diameter domestic water service. According to City's standard drawing T-1104.02-3, the 150mm water service on Yonge Street will be split two (2) meters from the property line and valve and boxes will be installed on each service at the property line. One proposed water service will be connected to the existing 300mm diameter watermain on the west side of Yonge Street for fire and domestic and one to the 300 mm diameter watermain on the north side of St. Clair Avenue West for a secondary fire connection. Refer to the '**Proposed Servicing Figure**' **Figure-3**, for the proposed watermain connection.

9.0 Site Grading

9.1. Existing Grades

The existing site contains a twelve-storey retail building facilitated by an underground parking level at 1 St Clair Avenue West and two three-storey retail buildings at 11-13 St Clair Avenue West. Under pre-development conditions, no external drainage enters the site and the drainage within the site is conveyed to the adjacent right of ways (ROW).

9.2. Proposed Grades

The proposed grades will improve the existing drainage conditions to meet the City's requirements. Grades will be maintained along the property line wherever feasible and overland flow will be directed towards the adjacent right of ways (ROW).

10.0 Conclusions and Recommendations

Based on our investigations, we conclude the following:

Storm Drainage

The site stormwater discharge will be controlled to the 2-year pre-development flow as specified by the City's Wet Weather Flow Management Guidelines (WWFMG). The proposed storm lateral will be connected to the 1350 mm diameter storm sewer along Yonge Street. In order to attain the target flows, quantity controls will be utilized and up to 39.20 m³ of underground storage will be required. The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection, as specified by the Ministry of the Environment, Conservation and Parks (MECP). During Site Plan Control, a detailed analysis will be provided to assess the water quality on site and determine additional measures, in order to achieve a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

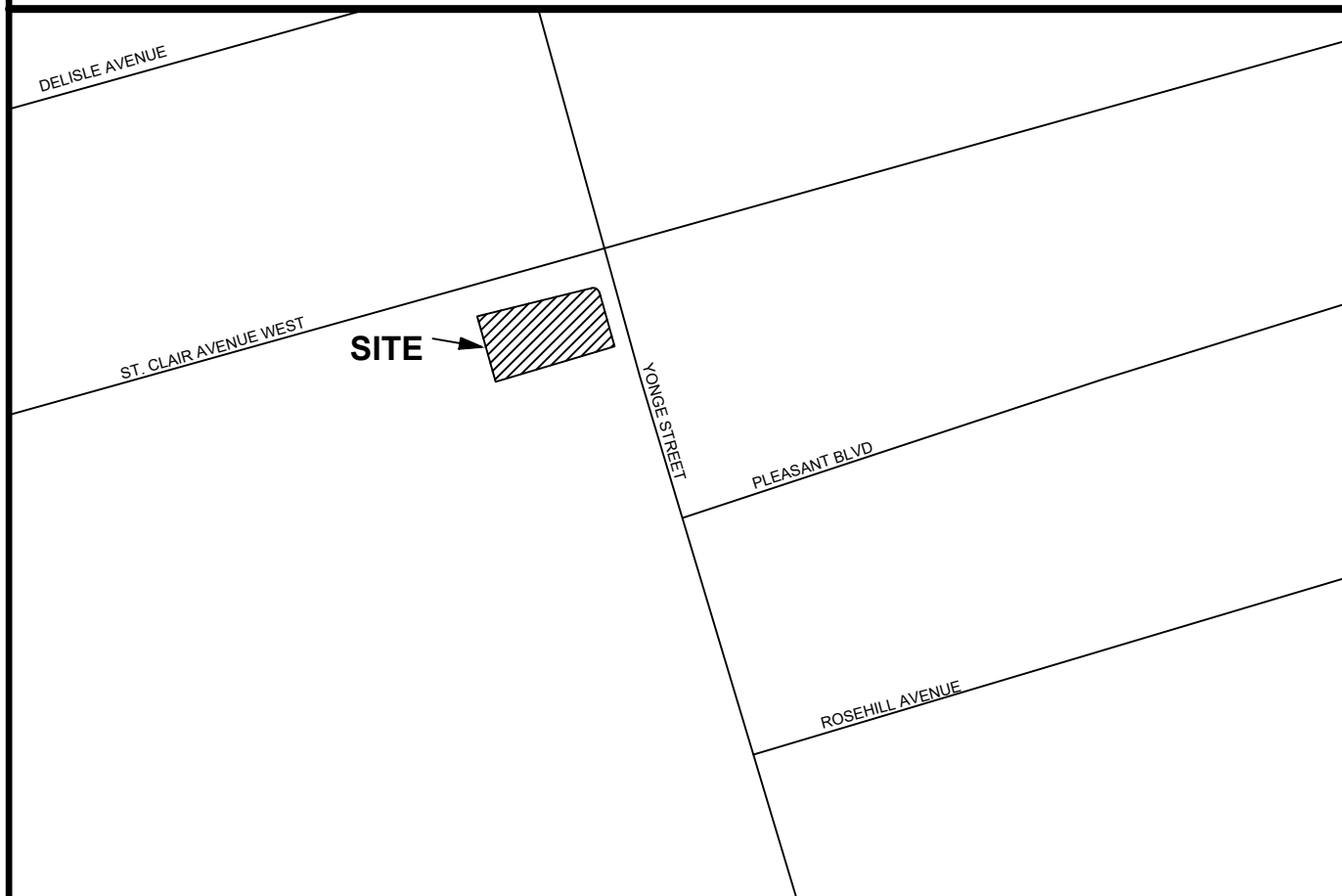
The proposed development will connect to the existing 600mm combined sewer on St. Clair Avenue West, through a 150mm diameter sanitary sewer lateral connection, with a minimum grade of 2.00% (or equivalent pipe design). The additional net discharge flow from the proposed development, is anticipated at approximately 6.64 L/s.

As a result, an analysis of the external combined drainage area has been conducted, under dry and wet weather post-development conditions.

According to our results, the property under proposed conditions, will not adversely affect flow conditions downstream and the existing combined infrastructure on St. Clair Avenue West will be able to support the proposed development without the need of any upgrades to the municipal combined sewer infrastructure.

Water Supply

Water supply for the site will be from the existing 300mm diameter watermain on the east side of Yonge Street. It is anticipated that a total design flow of 118.63 L/s will be required to support the proposed development. The results of the fire hydrant flow tests, prepared by Lithos Group Inc., dated July 20, 2021 along St. Clair Avenue West and Yonge Street, reveal that the existing water infrastructure can support the proposed development.



150 Bermondsay Road , Toronto, Ontario M4A 1Y1

LOCATION PLAN
RESIDENTIAL USE DEVELOPMENT
1-13 ST. CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE:	DECEMBER 2021	PROJECT No:	UD21-044
SCALE:	N.T.S.	FIGURE No:	FIG 1



150 Bermondsay Road , Toronto, Ontario M4A 1Y1

AERIAL PLAN
RESIDENTIAL USE DEVELOPMENT
1-13 ST. CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE:	DECEMBER 2021	PROJECT No:	UD21-044
SCALE:	N.T.S.	FIGURE No:	FIG 2

Appendix A

Site Photographs



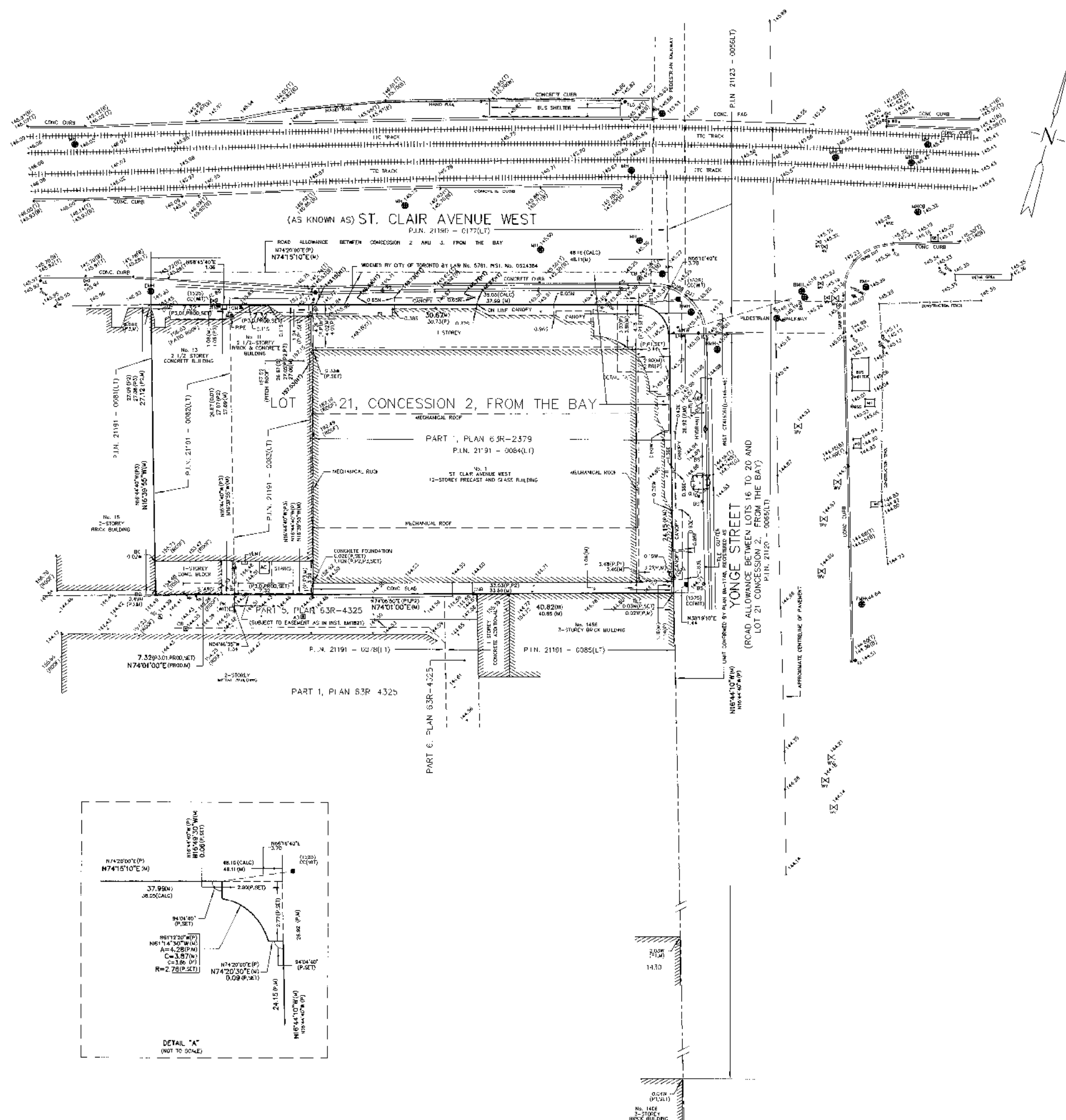
North – East corner of the property along St. Clair Avenue West facing South – West.



South – East corner of the property along Yonge Street facing North – West.

Appendix B

Background Information



BOUNDARY AND TOPOGRAPHICAL SURVEY OF
PART OF LOT 21
CONCESSION 2, FROM THE BAY
(GEOGRAPHIC TOWNSHIP OF YORK)
CITY OF TORONTO

SCALE 1 : 200
R. AVIS SURVEYING INC.

METRIC : DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

©COPYRIGHT: "NO PERSON MAY COPY, REPRODUCE, DISTRIBUTE OR ALTER THIS PLAN IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF R. AVIS, O.L.S."

NOTES AND LEGEND
BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE DERIVED FROM HORIZONTAL CONTROL MONUMENTS No. 020070054 AND No. 020070057, ZONE 18, NAD 83 SYSTEM, CENTRAL MERIDIAN 79° 30' WEST LONGITUDE.
(3) MODIFIED TRANSVERSE MERCATOR PROJECTION, NAD 83 (CSRS-1247)

HCM No. 020070054 N 4838732.588 E 313345.307
HCM No. 020070057 N 4838646.07 E 313322.643

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF TORONTO BENCH MARK No. CT1499, HAVING AN ELEVATION = 150.219 metres.

DISTANCES SHOWN HEREON ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A CORRECTION FACTOR OF 0.999877675.

- DENOTES SURVEY MONUMENT FOUND
- DENOTES SURVEY MONUMENT PLANNED
- SB DENOTES STANDARD IRON BAR
- SSB DENOTES SHORT STANDARD IRON BAR
- IB DENOTES IRON BAR
- CC DENOTES CATCH CROSS
- CB DENOTES CATCH BASIN
- WT DENOTES WITNESS
- MEAS/M DENOTES MEASURED
- N, S, E, W DENOTES NORTH, SOUTH, EAST, WEST
- P1 DENOTES PLAN 63R-1745
- P2 DENOTES PLAN 63R-4325
- P3 DENOTES PLAN OF SURVEY BY C. L. COLEMAN, O.L.S. DATED JANUARY 21, 1983
- U DENOTES INST. No. C40249
- U1 DENOTES INST. No. C40249
- CALC DENOTES CALCULATED FROM P & 1
- CONC DENOTES CONCRETE
- AD DENOTES AREA DRAIN
- AC DENOTES AIR CONDITIONING
- (B) DENOTES BOTTOM OF CURB
- BF DENOTES BOARD FENCE
- BO DENOTES BOLLARD
- BS DENOTES BICYCLE STAND
- BSS DENOTES BUS STOP SIGN
- BMH DENOTES BELL MANHOLE
- EMH DENOTES ELECTRICAL MANHOLE
- FH DENOTES FIRE HYDRANT
- GM DENOTES GAS METER
- (G) DENOTES GUTTER ELEVATION
- GB DENOTES GARBAGE BIN
- (HT) DENOTES BUILDING HEIGHT
- LS DENOTES LIGHT STANDARD
- MH DENOTES MANHOLE
- MHC DENOTES MANHOLE CATCH BASIN
- MP DENOTES METAL POST
- MG DENOTES METAL GRILL
- (TGS) DENOTES TOP OF STAIRS
- TLS DENOTES TRAFFIC LIGHT STANDARD
- (T) DENOTES TOP OF CURB
- WV DENOTES WATER VALVE
- 1525 DENOTES R. AVIS SURVEYING INC., O.L.S.
- EJW DENOTES ELECTRICAL HAND WELL
- WS DENOTES WARNING SIGN
- PROD DENOTES PRODUCTION
- HMH DENOTES HYDRO MANHOLE
- WVC DENOTES WATER VALVE CHAMBER
- 120 DENOTES DECIDUOUS TREE WITH TRUNK DIAMETER 0.10 metres
- 100 DENOTES SPOT ELEVATION

- ALL TOPOGRAPHIC FEATURES AND BOUNDARY ARE SHOWN AT GRADE
- UPDATED ON JULY 7, 2021 TO SHOW ADDITIONAL TOPOGRAPHIC FEATURES WEST OF SUBJECT PROPERTY

AREA = 1298.3 sq. m.

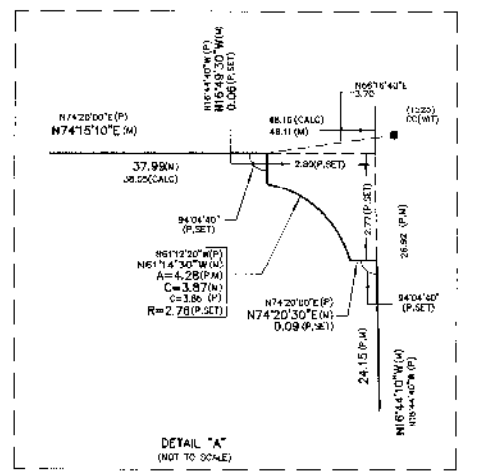
SURVEYOR'S CERTIFICATE
I CERTIFY THAT
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 20th DAY OF AUGUST, 2018.
JULY 12, 2021
DATE
PRADEEPAN RAMACHANDRAN
Ontario Land Surveyor

ASSOCIATION OF ONTARIO
LAND SURVEYORS
PLAN SUBMISSION FORM
2064747

R. AVIS SURVEYING INC.
SUITE 203
235 YORKLAND BOULEVARD
TORONTO, ONTARIO
M2J 4Y8
TEL: (416) 490-8357 FAX: (416) 491-8206
www.ravissurveying.com

CHECKED BY : P.E., O.L.S.
CALCULATED BY : PR/G
DRAWN BY : JB/JK

PROJECT No. : 3014-5
DRAWING No. : 3014-5T-LDWG





**STATISTICS SHOWN ARE FOR 1 ST. CLAIR AVE. W. ONLY

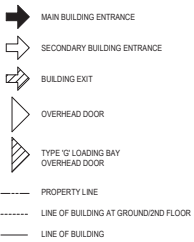
OFFICE REPLACEMENT RATIO = ± 1

AVERAGE GRADE = 145.09
BUILDING HEIGHT ABOVE AVERAGE GRADE = 160.6m
BUILDING HEIGHT (INCLUDING MECHANICAL PENTHOUSE) = 165.6m

*BUILDING HEIGHTS EXCLUDE PARAPETS AND ARCHITECTURAL FEATURES
ARE CALCULATED FROM AVERAGE GRADE TO TOP OF ROOF STRUCTURE

NUMBER OF LONG-TERM BICYCLE PARKING (RESIDENTIAL)	306	306
NUMBER OF LONG-TERM BICYCLE PARKING (ALL OTHER USES)	17	17

A) FIRST STOREY OF BUILDING		6
B) FIRST LEVEL BELOW-GROUND		18
NUMBER OF MALE SHOWER AND CHANGE FACILITIES (NON-RESIDENTIAL)	1	1
NUMBER OF FEMALE SHOWER AND CHANGE FACILITIES (NON-RESIDENTIAL)	1	1
TREE PLANTING AND SOIL VOLUME	REQUIRED	PROPOSED
TOTAL SOIL VOLUME (40% OF SITE AREA)* 66m ² X 30m ³	72m ³	10m ³



Scale
As indicated

© 2015 Gensler

COVID-19

Toronto is in Step Three of the Province's Roadmap to Reopen. Get health updates and information about COVID-19 vaccines at [toronto.ca/covid19](https://www.toronto.ca/covid19) (<https://www.toronto.ca/home/covid-19>).

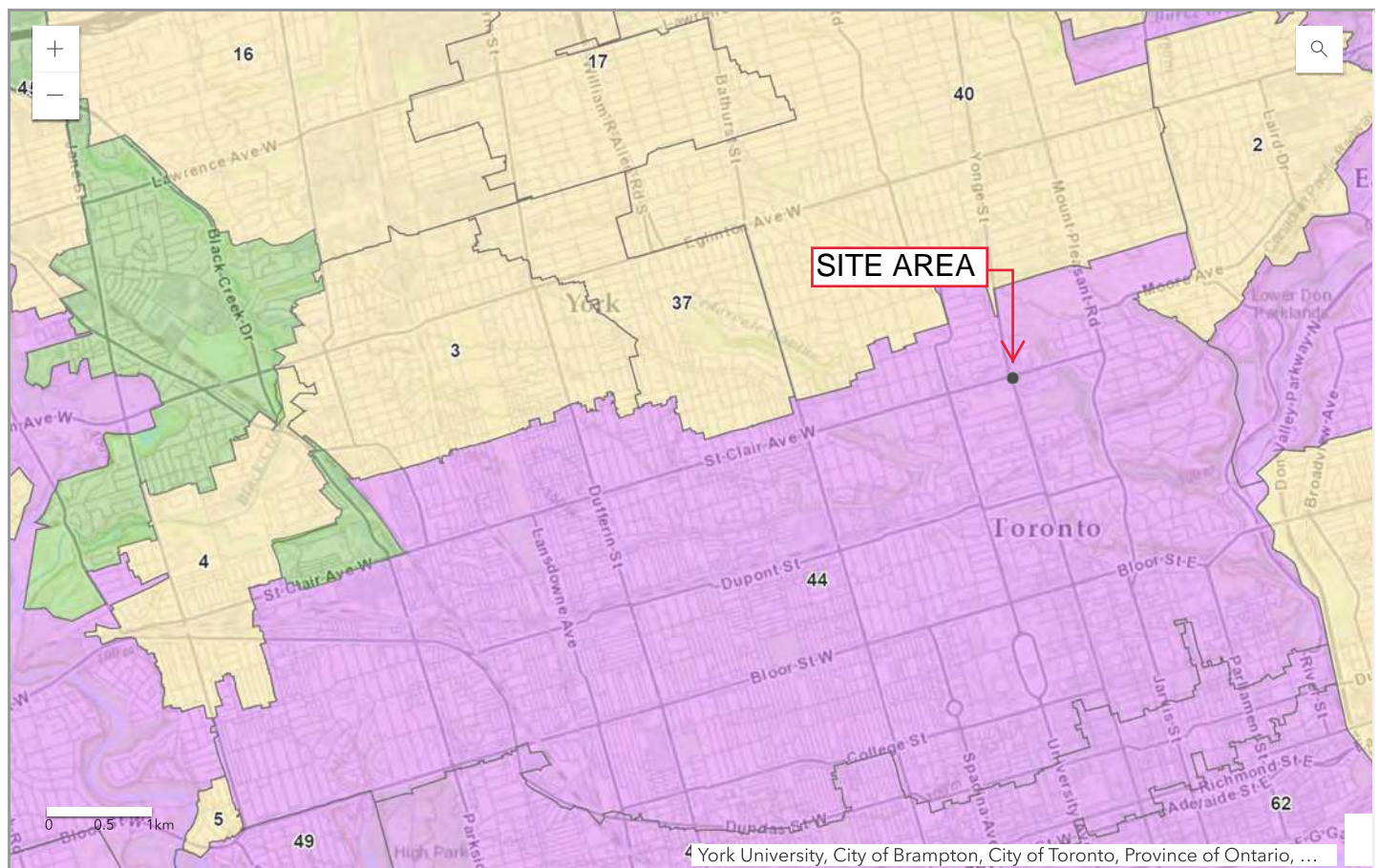
Basement Flooding Protection Program Map

The Basement Flooding Protection Program will examine the entire city. Environmental Assessment (EA) study area boundaries are defined by "sanitary subsewersheds" (i.e. areas that are serviced by the same local sewer infrastructure) and are prioritized based on past flooding experiences. Enter your address or click on one of the study areas for more information.

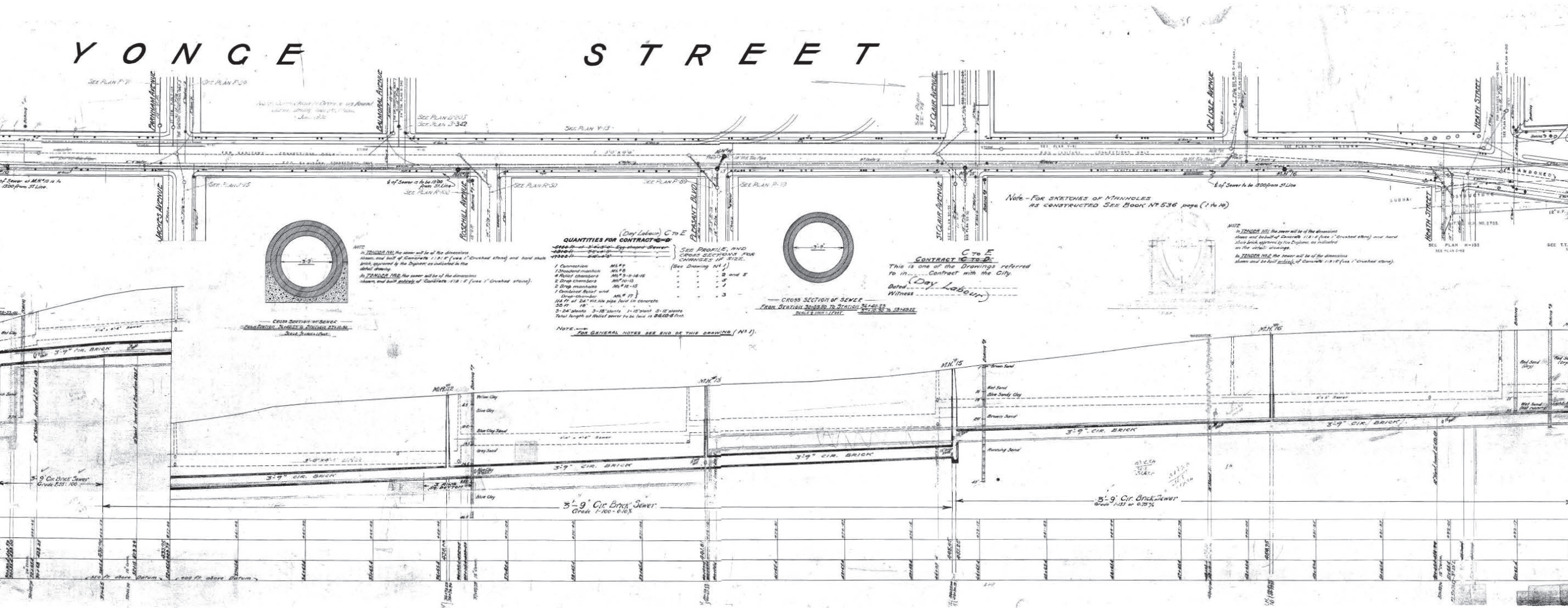
Map Legend

- Basement Flooding Study Completed
- Basement Flooding Study in Progress (started before 2019)
- Basement Flooding Study in Progress (started in 2019)

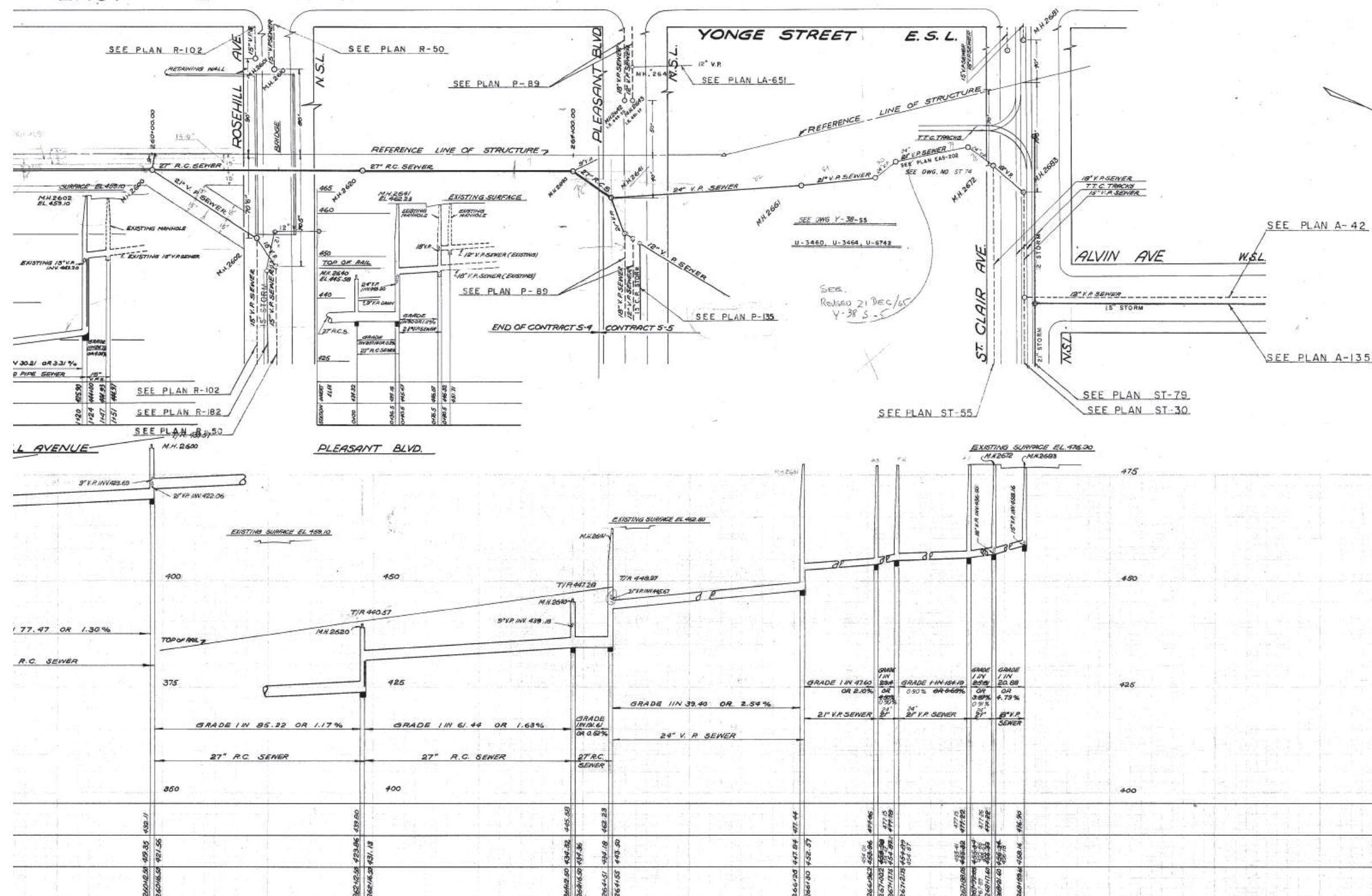
For more information enter an address in the search bar and/or click on the shaded area in the map



YONGE STREET
PART OF Y-16-1

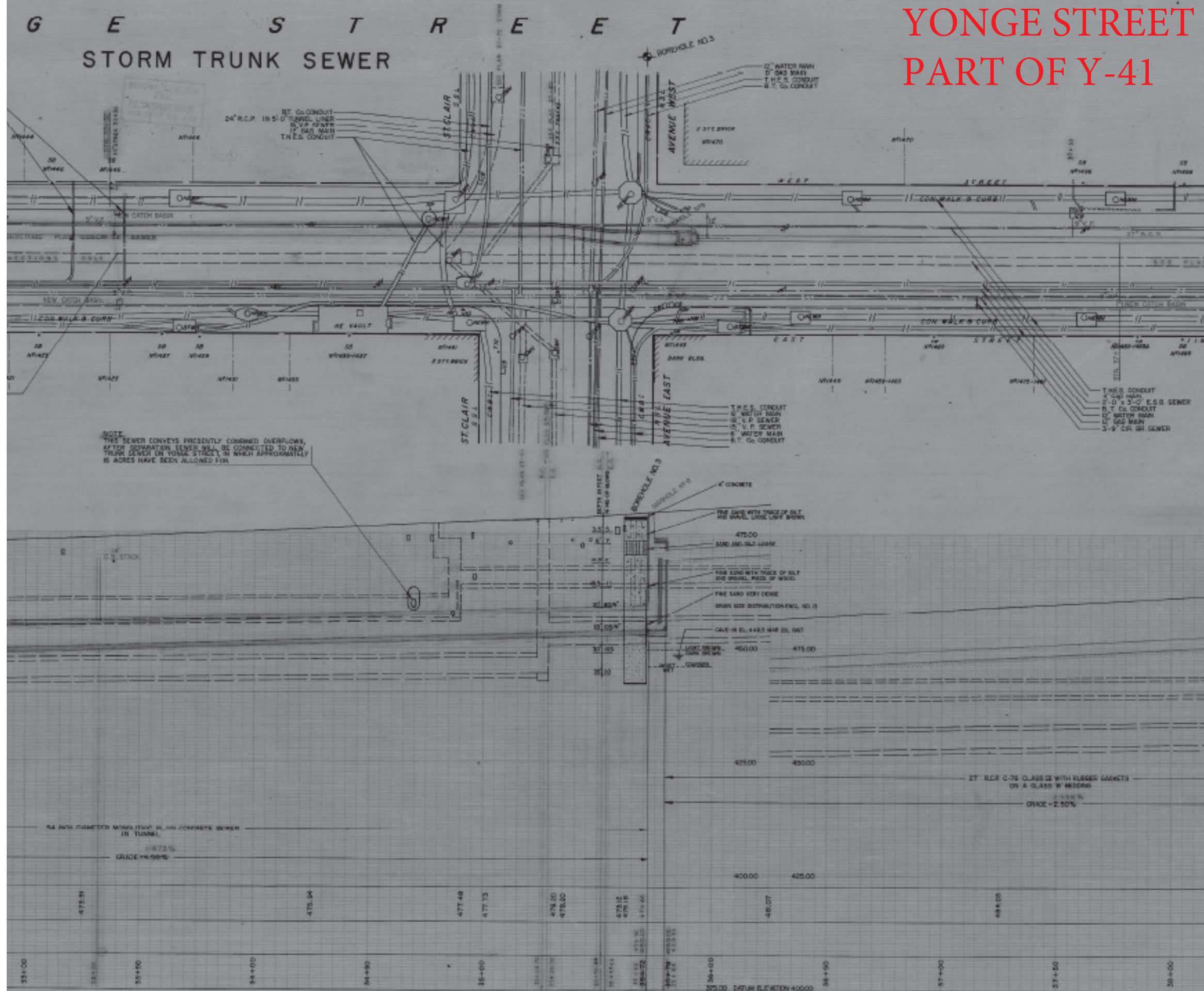


SEE PLAN Y-13
SEE PLAN Y-16



STORM TRUNK SEWER

YONGE STREET PART OF Y-41





Toronto
Sewer
Atlas

- Large Chamber

Manhole

Combined

Dual

Sanitary

Storm

Foundation
- Control Manhole

Combined

Dual

Sanitary

Storm
- Outfall

Outfall

Sewer Pump Station

Catchbasin

Other

Twin Inlet Catchbasin

- Sewer

Foundation Drain

Combined

Sanitary
- Storm

Combined Trunk

Sanitary Trunk

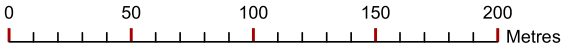
Storm Trunk

Abandoned Sewer
- River

Highway

Curb

Wards Boundary

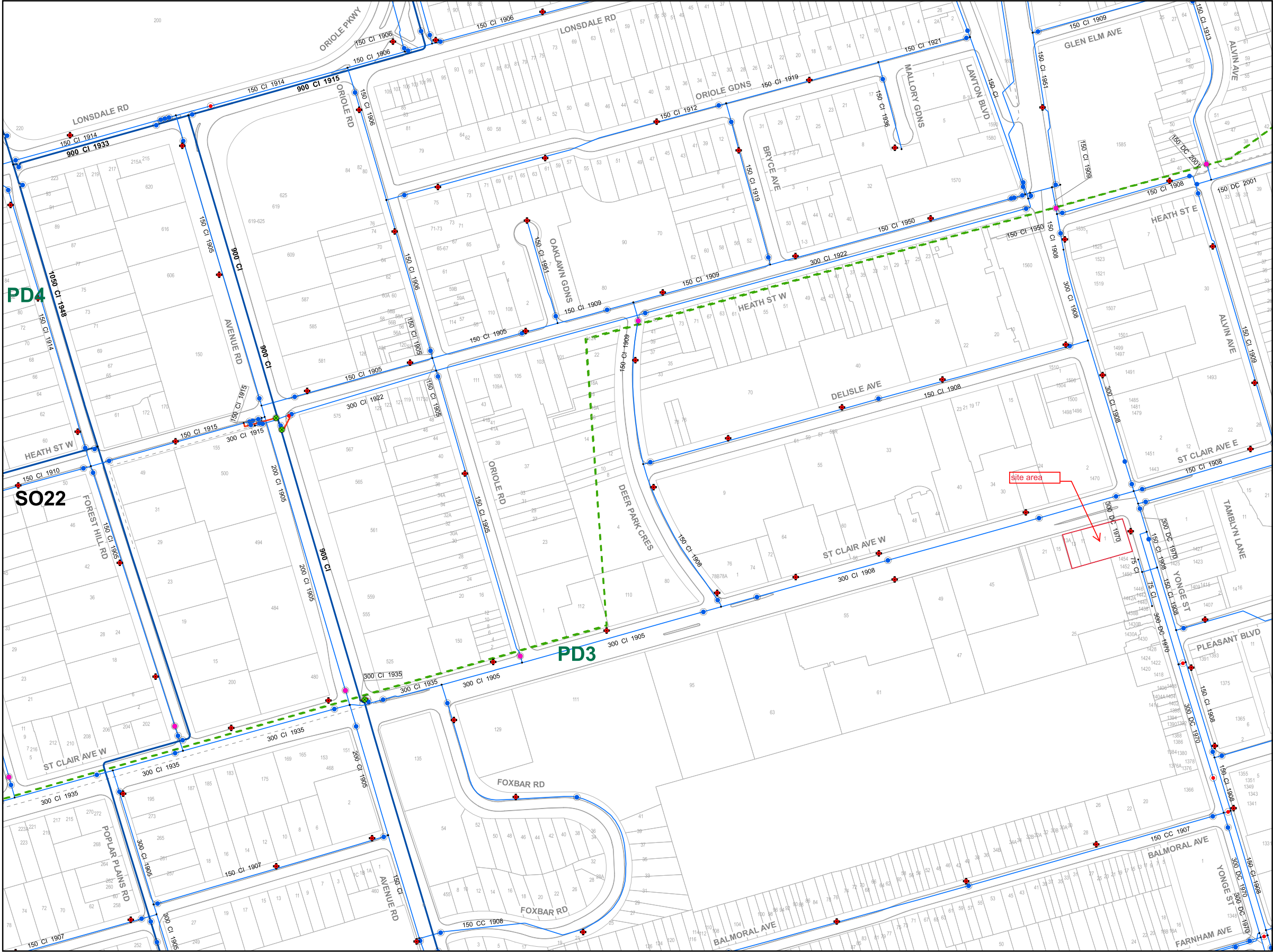


General Notes:

- The maps were prepared based on the most current data available to Toronto Water as of the Map Source Date.
- These maps are for planning purpose only and must not be used for construction, or as a replacement for a utility locate.
- This drawing is not to be reproduced in whole or in part without the express written permission of the City.
- Any discrepancies, inaccuracies, errors and/or omissions in the maps should be reported to Toronto Water, Water Infrastructure Management. (18th Floor, Metro Hall, 55 John St, Toronto, ON, M5V 3C6) (Tel: 416-392-3957)



578	610	644
579	611	645
580	612	646



Toronto Water Atlas

Hydrant

Other

City of Toronto

Private

Meter

Pressure District Valve

Open

Closed

Metro Connection Valve

Open

Closed

Valve

Open

Closed

Chamber

Sanitary Pump Station

Watermain

Distribution

Transmission

Metro Connection

Encasement

Abandoned Main

Forcemain

Reservoir

Pressure District Boundary

River

Highway

Curb

Wards Boundary

0

50

100

150

200

Metres

General Notes:

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N

W

E

S

578	610	644
579	611	645
580	612	646



November 2, 2021

Midtown-Yonge Properties Inc.
121 King Street West, Suite 200
Toronto, Ontario M5H 3T9

E-mail: adrain@slateam.com

Attention: Adrian Tarapacky, Director

Re: Hydrogeological Assessment – Proposed Residential Development

1, 11 & 13 St. Clair Avenue West, Toronto, Ontario
Pinchin File: 295679.004

Pinchin Ltd. (Pinchin) is pleased to provide Midtown-Yonge Properties Inc. (Client) this letter report which provides a Hydrogeological Assessment of the properties at 1, 11 & 13 St. Clair Avenue West, Toronto (the Site) with regards to a proposed mixed-use development.

This letter provides a conservative estimate of the volume of water that may require management during the construction and operations phases of development of the Site. An evaluation of the quality of groundwater that could theoretically be discharged as part of the potential Site dewatering is also provided.

As part of the Hydrogeological Assessment, Pinchin is undertaking a long-term water level monitoring program as per the City of Toronto's (the City's) guidelines. The results of the long-term monitoring will be provided in the Final Hydrogeology Assessment letter report, which will be completed in May 2022.

This hydrogeological investigation was prepared in accordance with the Ontario Water Resources Act, Ontario Regulation 387/04, and the Toronto Municipal Code – Sewers. The Sewer Use By-Law samples comprised un-filtered water and were submitted for the analysis of the complete City of Toronto (City) Storm and Sanitary Sewer Use Bylaw parameter suite.

1.0 INTRODUCTION AND BACKGROUND

The Site is located at the southwest corner of the intersection of Yonge Street and St. Clair Avenue West, in the City of Toronto (Figure 1).

As per the City of Toronto interactive map, the Site has civic addresses of 1, 11 & 13 St. Clair Avenue West, Toronto, Ontario with Postal Code M4V 1K6.

The Site is occupied by three buildings (Site Buildings A, B and C), located on the south side of St. Clair Avenue West. Site Building A is occupied by office tenants. Site Building B is occupied by a restaurant. Site Building C is occupied by a restaurant and a health spa. Separate single-level basements are present beneath each of the Site Buildings and are used for storage and utility rooms.

7.0 CONCLUSIONS

Pinchin provides the following conclusions arising out of the Hydrogeology Assessment activities to date:

- The Site is located on the South Slope Physiographic Region, and the Bevelled Till Plains Physiographic Landform and deposited with stone-poor, sandy silt to silty sand-textured till, and is underlain by Georgian Bay Formation bedrock;
- The soil stratigraphy generally comprises till deposits (silty sand till and/or clayey silt till) and interlayered sand and silty clay, underlain by shale bedrock that was encountered at the depth of approximately 53.3 mbgs;
- The groundwater levels measured in October 2021 ranged from 137.35 masl to 121.55 masl in elevation. The average of the recent groundwater levels (excluding the deep well at BH/MW5) was calculated to be 136.82 masl. The shallow groundwater flow direction was inferred to be to the east/northeast;
- The estimated K-values ranged from 3.3×10^{-3} cm/sec to 6.8×10^{-3} cm/sec for the sand soils, from 3.2×10^{-6} cm/sec to 3.3×10^{-5} cm/sec for the clayey silt soils, and was estimated at 6.0×10^{-7} cm/sec for the silty clay soils. At the well locations where the recovery was too fast to complete a rising head test, the K can be expected to be greater than 2×10^{-3} cm/sec;
- The construction dewatering assessment completed including groundwater and stormwater inflows indicates a total dewatering rate estimate of 95,287 L/day (including a Safety Factor of 2);
- The long-term subdrainage discharge was estimated to be 5,048 L/day (including a Safety Factor of 2);
- An EASR registration will be required for the construction phase dewatering;
- A PTTW will not be required for the long-term subdrainage discharge for the operation of the proposed building; and
- Groundwater quality assessment completed as per City of Toronto Sewer Use Bylaw indicated that the water generated at the Site cannot be discharged directly into the local sewer systems without appropriate treatment for TSS, and, potentially, manganese and phosphorous.

8.0 RECOMMENDATIONS

The groundwater quality assessment indicated that exceedances of applicable water quality standards may be present if the water contains a lot of sediment. It is recommended that a filtered sample for analysis of selected parameters be obtained to simulate the effects of filtration on parameter concentrations of manganese and phosphorous.

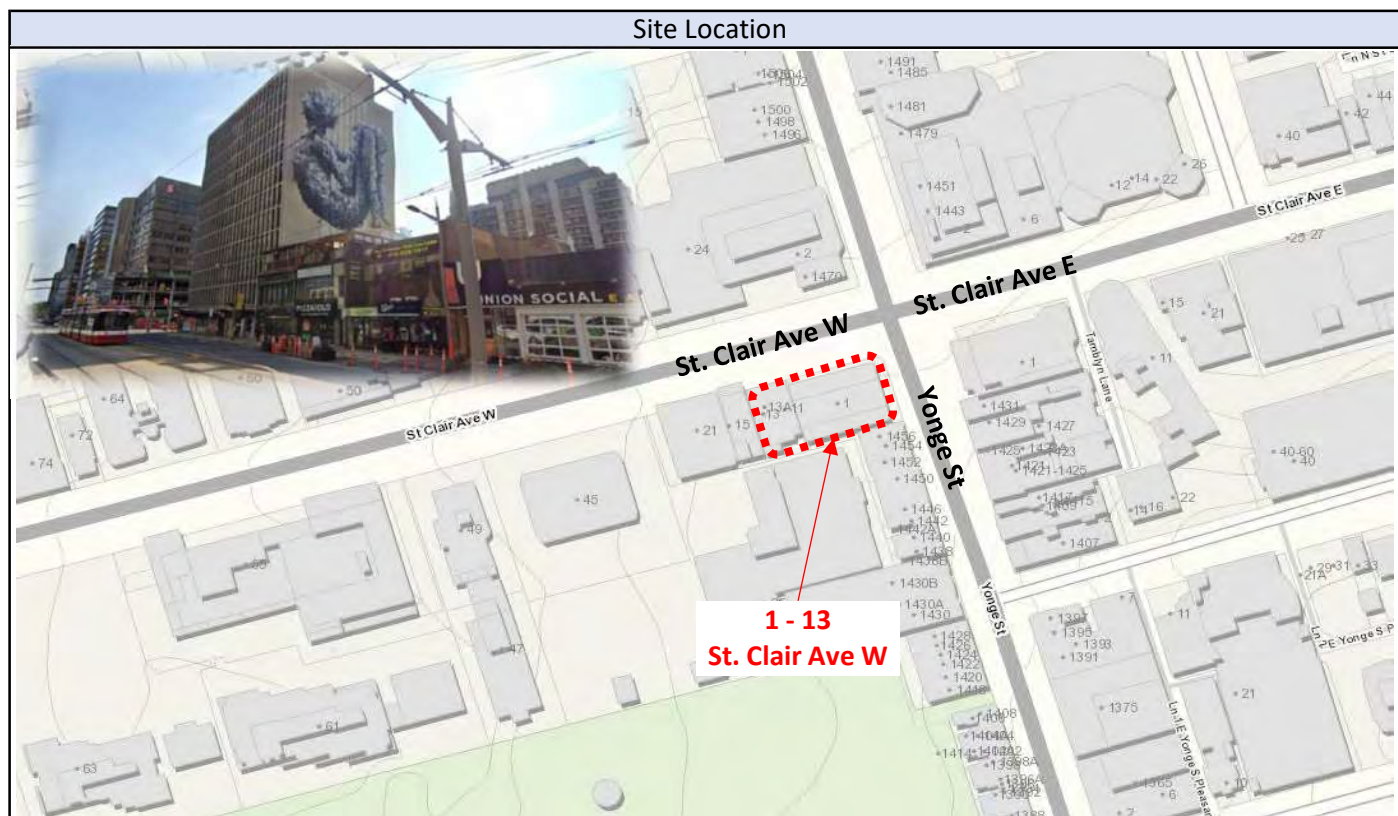
General Information			
Date:	September 14, 2021	Report No. :	R21-09-14-01
Project No. :	PUD21-044	Address :	1 - 13 St. Clair Avenue West
Owner :	Midtown-Yonge Properties Inc.	Region/Municipality:	Toronto

Attendants			
	Name	Title	Contact Info.
Inspector	Stefanos Kaloutas	Project Coordinator	647-856-5566
Inspector			
Inspector			

Environmental Condition			
<input type="checkbox"/> Sunny	<input type="checkbox"/> Cold	<input type="checkbox"/> Light Rain	<input type="checkbox"/> Windy
<input checked="" type="checkbox"/> Partly Cloudy	<input type="checkbox"/> Cool	<input type="checkbox"/> Heavy Rain	<input type="checkbox"/> Foggy
<input type="checkbox"/> Cloudy	<input type="checkbox"/> Warm	<input type="checkbox"/> Light Snow	
Temperature : 20°C	<input type="checkbox"/> Hot	<input type="checkbox"/> Heavy Snow	

On-site Limitations/Difficulties
1 - Ongoing traffic at St. Clair Avenue and Yonge Street.
2 - 13A St. Clair Av. W. does not have access to the roof as 11 St. Clair uses the facilities for quests.

Existing Facilities at Project/Site
The subject site consists of:
a) a 12-storey office building (1 St. Clair Ave W), and
b) two (2) 2-storey retail buildings (11 & 13 St. Clair Ave W).



General Information	
Date: September 14, 2021	Report No. : R21-09-14-01
Project No. : PUD21-044	Address : 1 - 13 St. Clair Avenue West
Owner : Midtown-Yonge Properties Inc.	Region/Municipality: Toronto

Detailed Description of the investigation activity (including areas inspected and findings)**Purpose of Investigation:**

Locate site servicing laterals and identify discharge patterns on the roof and properties.

Investigation Details:

- 1 - 1 St. Clair Av. W. was investigated to identify roof discharge leads and existing site servicing connections.
- 2 - 11 St. Clair Av. W. was investigated for storm drainage patterns on the roof and servicing connections.
- 3 - 13 St. Clair Av. W. was investigated in the basement and the lateral connections were identified.

Investigation Findings:

- 1- There are multiple roof weir drains which directly convey the flow to the combined sewer along Yonge St. The existing sanitary servings are located at 15.6m and 16.6m from the north property line of 1 St. Clair Av. W. The existing 150mm water servicing is located 0.2 m away from the south property line of the subject building. The roofs are all collected through mechanical connections and directly discharged at the 900x1350 mm E.S.Br Combined Sewer along Yonge St.
- 2 - The 150mm sanitary lateral for 11 St. Clair Av. W. was capped and abandoned. The existing 50mm water main was located on the west property line of the subject property. The roof leads all connect to the sanitary stack and directly discharge to the combined 900x1350 mm E.S.Br Combined Sewer along Yonge St.
- 3 - The sanitary lateral for 13 St. Clair Av. W. is located along the East property line of the subject property extending laterally to the 375mm V.P. Combined sewer along St. Clair Av. W. The 25mm water servicing is located 1m to the East with a lateral towards St. Clair Av.

Summary:

- 1 - All storm is collected by mechanical connections and directly discharge through laterals to 900x1350 mm E.S.Br Combined Sewer along Yonge St. for properties 1-13A St. Clair Av. W.
- 2 -13 St. Clair existing 150 mm sanitary lateral connecting to 375 V.P Comb Sewer.

General Information	
Date: September 14, 2021	Report No. : R21-09-14-01
Project No. : PUD21-044	Address : 1 - 13 St. Clair Avenue West
Owner : Midtown-Yonge Properties Inc.	Region/Municipality: Toronto

Photos



Figure 1: 1 St. Clair Ave W - Two (2) 150mm sanitary laterals towards Yonge St. Laterals are set back 15.6m and 16.6m from north property line.

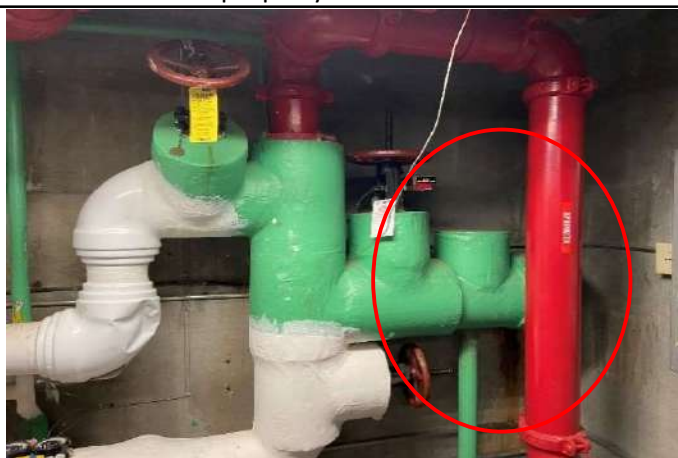


Figure 2: 1 St. Clair Ave W - water servicing on P-1 level from Yonge av.



Figure 3: 1 St. Clair Ave W - water servicing overview

General Information	
Date: September 14, 2021	Report No. : R21-09-14-01
Project No. : PUD21-044	Address : 1 - 13 St. Clair Avenue West
Owner : Midtown-Yonge Properties Inc.	Region/Municipality: Toronto

Photos



Figure 6: 11 St. Clair Av. W. 50 mm watermain lateral connection towards St. Clair Av W.



Figure 7: 11 St. Clair. Av. W. 150 mm Sanitary lateral capped

General Information	
Date: September 14, 2021	Report No. : R21-09-14-01
Project No. : PUD21-044	Address : 1 - 13 St. Clair Avenue West
Owner : Midtown-Yonge Properties Inc.	Region/Municipality: Toronto

Photos



Figure 4: 13 St. Clair Ave W - 100mm sanitary cleanout conveying commercial flow



Figure 9: 13 St. Clair Ave W - Abandoned sanitary pipe

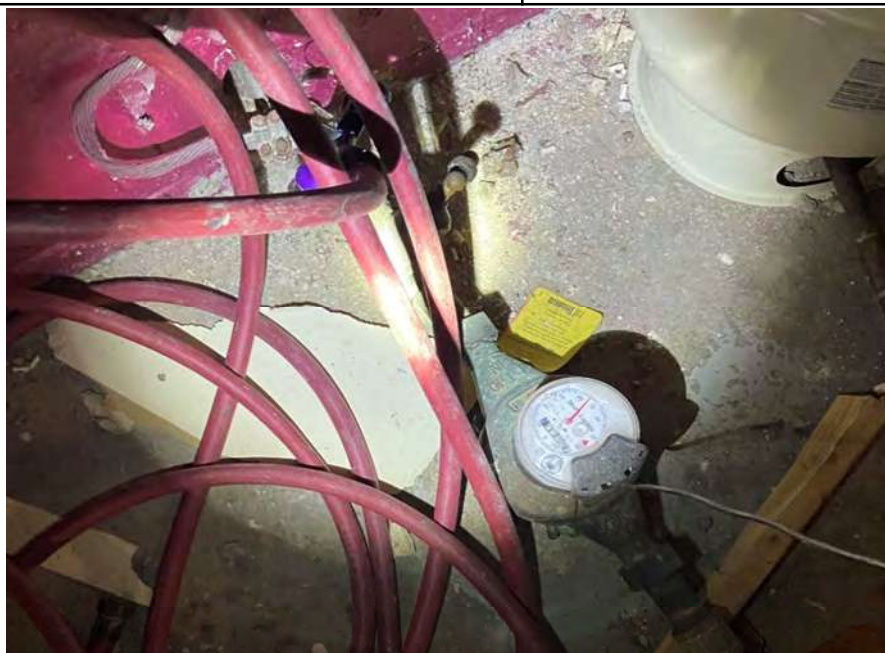


Figure 10: 25 mm watermain lateral connection towards St. Clair Av.

General Information	
Date: September 14, 2021	Report No. : R21-09-14-01
Project No. : PUD21-044	Address : 1 - 13 St. Clair Avenue West
Owner : Midtown-Yonge Properties Inc.	Region/Municipality: Toronto

Photos



Figure 8: Roof weirs located on highest section of the roof



Figure 6: Roof weir with mechanical lead on central courtyard of building roof



Figure 10: Lower section of roofs on each side with two (2) weir drains on each roof to convey the flow. Facing North.

Report Prepared By:
Inspector Initials:

General Information			
Date:	September 14, 2021	Report No. :	R21-09-14-01
Project No. :	PUD21-044	Address :	1 - 13 St. Clair Avenue West
Owner :	Midtown-Yonge Properties Inc.	Region/Municipality:	Toronto

Photos



Figure 10: The covered roof top at 11 and 13 and 13A as used as a padio gutter systems collect and diectly connects to the sanititary lateral towards Yonge St.

Report Prepared By:
Inspector Initials:



THE MITCHELL PARTNERSHIP INC.
CONSULTING ENGINEERS

285 YORKLAND BOULEVARD
TORONTO, ON CANADA M2J 1S5
E tmp@tmptoronto.com
P 416-499-8000

tmptoronto.com

November 29, 2021

ATTENTION: CHIEF ENGINEER AND EXECUTIVE DIRECTOR, ENGINEERING AND CONSTRUCTION SERVICES
C/O MANAGER, DEVELOPMENT ENGINEERING

CC: GENERAL MANAGER, TORONTO WATER
C/O MANAGER, ENVIRONMENTAL MONITORING AND PROTECTION UNIT
30 DEE AVE, TORONTO ON M9N 1S9

RE: 1 - 13 ST. CLAIR AVENUE WEST – PRIVATE WATER DISCHARGE LETTER

Dear Sir and Madam,

This letter is to confirm that groundwater from the Private Water Drainage System of the 1 - 13 will be collected and discharged into the combined sewer control manhole of the Site located at 1 -13 St. Clair Ave W

The groundwater sump pumps will be sized at [0.24 L/sec] (groundwater peak flow rate) and are expected to run approximately [4 hours per day].

This peak flow rate will be used for assessing capacity for the peak discharge flow into the City's Sanitary sewer system.

Once the proposed groundwater peak flow rate of [0.24 L/sec] is approved by Engineering Construction Services (ECS), City of Toronto at the zoning stage, the property owner will not be allowed to amend this flow rate in the future. Should there be any amendment to the peak flow rate of [0.24 L/sec] in future, the property owner shall re-submit either the updated pump schedule or a revised letter to ECS. In addition, the sewer capacity will need to be re-assessed.

Yours very truly,

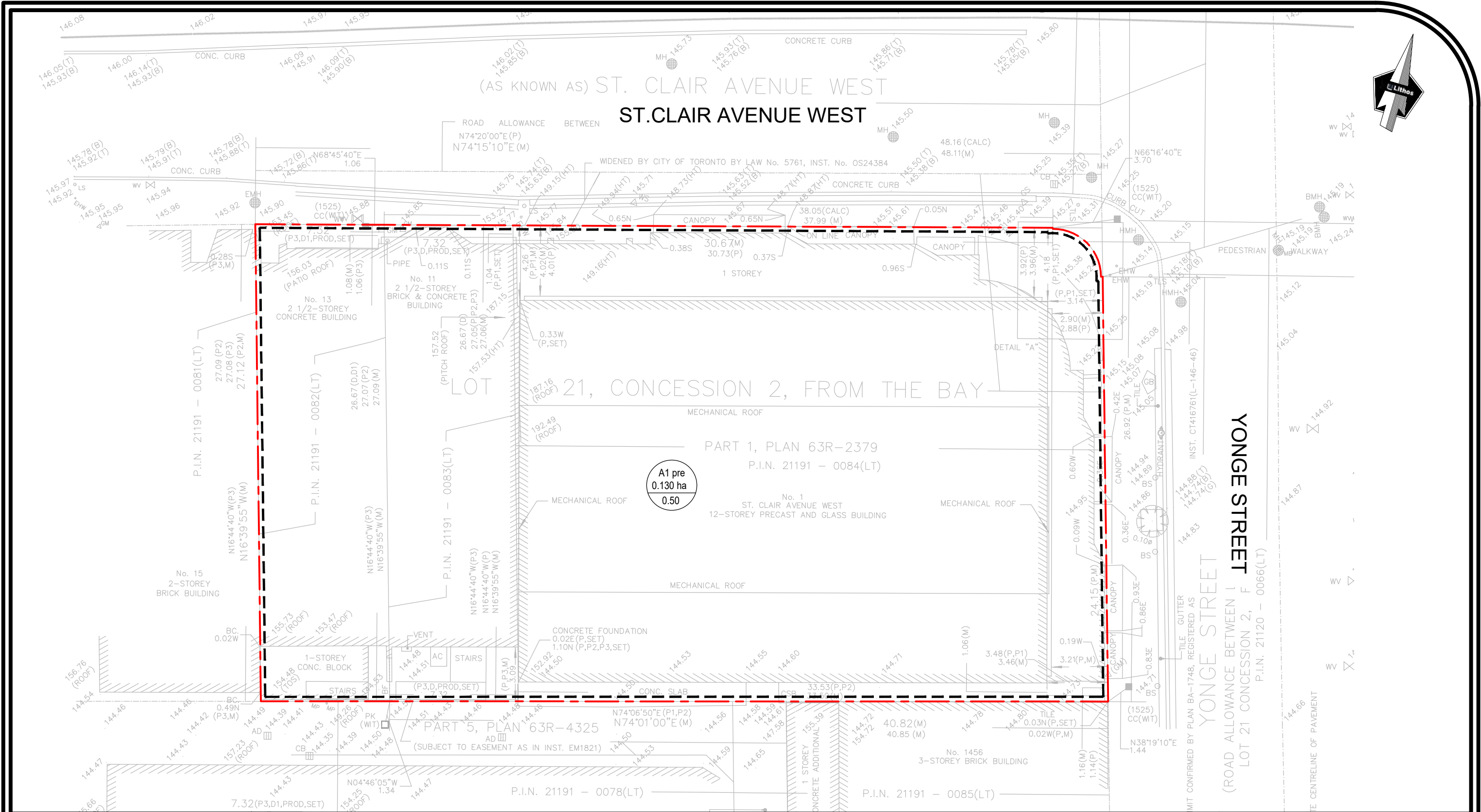
THE MITCHELL PARTNERSHIP INC.

A handwritten signature in black ink, appearing to read 'S Orchard', is placed below the company name.

Steve Orchard, P.Eng
Partner

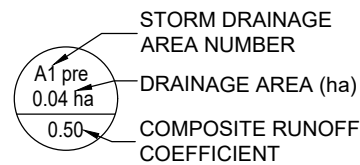
Appendix C

Storm Analysis



150 Bermondsay Road , Toronto, Ontario M4A 1Y1

LEGEND



--- PRE-DEVELOPMENT STORM DRAINAGE AREA
--- PROPERTY LINE

PRE-DEVELOPMENT
DRAINAGE AREA PLAN
MIXED USE DEVELOPMENT
1-13 ST. CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE: DECEMBER 2021 PROJECT No: UD21-044

SCALE: N.T.S. FIGURE No: DAP 1



Prepared By: Gina Liaropoulou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc

Rational Method Pre-Development Flow Calculation

1-13 St. Clair Avenue
West File No. UD21-044
City of Toronto
Date: December 2021

Input Parameters

Area Number	Area (ha)	C	Tc (min.)
A1 Pre	0.130	0.50	10

Rational Method Calculation for the City of Toronto

Event 2-Year
a = 21.80
c = -0.78

Formula:	$I = aT^c$	
	a,c	Constants
	T	Time of concentration
	I	Rainfall intensity

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m ³ /s)	Q (L/s)
A1 Pre	0.130	0.50	0.06	10	88.2	0.016	15.9

Event 5-Year
a = 32.00
c = -0.79

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m ³ /s)	Q (L/s)
A1 Pre	0.130	0.50	0.06	10	131.8	0.024	23.8

Event 100-Year
a = 59.70
c = -0.80

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m ³ /s)	Q (L/s)
A1 Pre	0.130	0.50	0.06	10	250.3	0.045	45.1

ST.CLAIR AVENUE WEST

P.I.N. 21190 - 0177(LT)

ROAD ALLOWANCE BETWEEN CONCESSION 2 AND 3, FROM THE BAY
N74°20'00"E(P)
N74°15'10"E(M)

WIDENED BY CITY OF TORONTO BY LAW No. 5761, INST. No. OS24384

CONCRETE CURB

PEDESTRIAN

YONGE STREET

ALLOWANCE BETWEEN LOTS 16 TO 20 AND
21 CONCESSION 2, FROM THE BAY

P.I.N. 21120 - 0066(LT)

TILE GUTTER
PLAN BA-1748, REGISTERED AS

YONGE STREET

POST-DEVELOPMENT
DRAINAGE AREA PLAN
MIXED USE DEVELOPMENT
1-13 ST.CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE: DECEMBER 2021

PROJECT No: UD21-044

SCALE: N.T.S.

FIGURE No: DAP 2



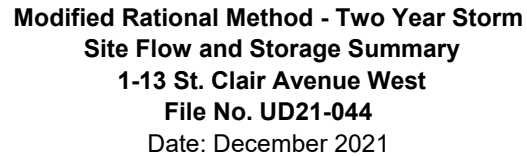
150 Bermondsay Road , Toronto, Ontario M4A 1Y1

LEGEND

A1 post
0.04 ha
0.50

STORM DRAINAGE
AREA NUMBER
DRAINAGE AREA (ha)
COMPOSITE RUNOFF
COEFFICIENT

POST-DEVELOPMENT STORM
DRAINAGE AREA
PROPERTY LINE



Controlled A1 Post

Drainage Areas	A1 Post	
Area (A1) =	0.130	ha
"C" =	0.90	
AC1 =	0.117	
Tc =	10.0	min
Time Increment =	5.0	min
Release Rate =	15.9	L/s
Min.Storage =	7.63	m ³

a=	21.80
c=	-0.78
l=	$A(T)^c$

Appendix C



Modified Rational Method - Five Year Storm
Site Flow and Storage Summary
1-13 St. Clair Avenue West
File No. UD21-044
Date: December 2021

Prepared By: Gina Liaropoulou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc

		Controlled A1 Post			
		Drainage Areas		A1 Post	
		Area (A1) =		0.130	ha
		"C" =		0.90	
		AC1 =		0.117	
		Tc =		10.0	min
		Time Increment =		5.0	min
		Allowable Release Rate =		15.9	L/s
		Min.Storage =		16.12	m ³
5 Year Design Storm					
a=	32.00				
c=	-0.79				
I=	A(T) ^c				
(1)	(2)	(3)	(4)	(5)	(6)
Time	Rainfall Intensity	Storm Runoff (A1 Post)	Runoff Volume (A1 Post)	Target Released Volume (A1 Post)	Total Required Storage (A1 Post)
(min)	(mm/hr)	(m³/s)	(m³)	(m³)	(m³)
10.0	131.8	0.043	25.66	9.54	16.12
15.0	95.7	0.031	27.94	14.31	13.63
20.0	76.2	0.025	29.68	19.08	10.60
25.0	63.9	0.021	31.10	23.85	7.26
30.0	55.3	0.018	32.32	28.62	3.70
35.0	49.0	0.016	33.38	33.39	0.00
40.0	44.1	0.014	34.33	38.16	0.00
45.0	40.2	0.013	35.19	42.93	0.00
50.0	37.0	0.012	35.98	47.70	0.00
55.0	34.3	0.011	36.71	52.47	0.00
60.0	32.0	0.010	37.38	57.23	0.00
65.0	30.0	0.010	38.02	62.00	0.00
70.0	28.3	0.009	38.61	66.77	0.00
75.0	26.8	0.009	39.18	71.54	0.00
80.0	25.5	0.008	39.71	76.31	0.00
85.0	24.3	0.008	40.22	81.08	0.00
90.0	23.2	0.008	40.70	85.85	0.00
95.0	22.3	0.007	41.17	90.62	0.00
100.0	21.4	0.007	41.62	95.39	0.00
105.0	20.6	0.007	42.04	100.16	0.00
110.0	19.8	0.006	42.46	104.93	0.00
115.0	19.1	0.006	42.86	109.70	0.00
120.0	18.5	0.006	43.24	114.47	0.00
125.0	17.9	0.006	43.61	119.24	0.00
130.0	17.4	0.006	43.97	124.01	0.00
135.0	16.9	0.005	44.32	128.78	0.00
140.0	16.4	0.005	44.66	133.55	0.00
145.0	15.9	0.005	44.99	138.32	0.00
150.0	15.5	0.005	45.31	143.09	0.00
155.0	15.1	0.005	45.63	147.86	0.00
160.0	14.7	0.005	45.93	152.63	0.00
165.0	14.4	0.005	46.23	157.40	0.00



Modified Rational Method - Hundred Year Storm

Site Flow and Storage Summary

1-13 St. Clair Avenue West

File No. UD21-044

Date: December 2021

Prepared By: Gina Liaropoulou, P.E., M.A.Sc.

Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc

		Controlled A1 Post			
		Drainage Areas		A1 Post	
		Area (A1) =	0.130	ha	
		"C" =	0.90		
		AC1 =	0.117		
		T _c =	10.0	min	
		Time Increment =	5.0	min	
		Allowable Release Rate =	15.9	L/s	
		Min.Storage =	39.20	m ³	
100 Year Design Storm					
a=	59.70				
c=	-0.80				
I=	A(T) ^c				
(1)	(2)	(3)	(4)	(5)	(6)
Time	Rainfall Intensity	Storm Runoff (A1 Post)	Runoff Volume (A1 Post)	Target Released Volume (A1 Post)	Total Required Storage (A1 Post)
(min)	(mm/hr)	(m³/s)	(m³)	(m³)	(m³)
10.0	250.3	0.081	48.74	9.54	39.20
15.0	181.0	0.059	52.85	14.31	38.55
20.0	143.8	0.047	55.98	19.08	36.91
25.0	120.3	0.039	58.54	23.85	34.69
30.0	103.9	0.034	60.71	28.62	32.10
35.0	91.9	0.030	62.61	33.39	29.23
40.0	82.6	0.027	64.31	38.16	26.15
45.0	75.1	0.024	65.84	42.93	22.92
50.0	69.1	0.022	67.24	47.70	19.55
55.0	64.0	0.021	68.54	52.47	16.07
60.0	59.7	0.019	69.74	57.23	12.51
65.0	56.0	0.018	70.87	62.00	8.86
70.0	52.8	0.017	71.93	66.77	5.15
75.0	49.9	0.016	72.92	71.54	1.38
80.0	47.4	0.015	73.87	76.31	0.00
85.0	45.2	0.015	74.77	81.08	0.00
90.0	43.2	0.014	75.63	85.85	0.00
95.0	41.3	0.013	76.46	90.62	0.00
100.0	39.7	0.013	77.24	95.39	0.00
105.0	38.2	0.012	78.00	100.16	0.00
110.0	36.8	0.012	78.73	104.93	0.00
115.0	35.5	0.012	79.43	109.70	0.00
120.0	34.3	0.011	80.11	114.47	0.00
125.0	33.2	0.011	80.77	119.24	0.00
130.0	32.2	0.010	81.40	124.01	0.00
135.0	31.2	0.010	82.02	128.78	0.00
140.0	30.3	0.010	82.62	133.55	0.00
145.0	29.5	0.010	83.20	138.32	0.00
150.0	28.7	0.009	83.77	143.09	0.00
155.0	27.9	0.009	84.32	147.86	0.00
160.0	27.2	0.009	84.86	152.63	0.00
165.0	26.6	0.009	85.38	157.40	0.00

Appendix D

Sanitary Data Analysis



Rational Method Existing Storm Flow Into the Combined Network

1-13 St. Clair Avenue West
City of Toronto
File No. UD21-044
Date: December 2021

Prepared by: Gina Liaropoulou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Input Parameters

	Area	C	Tc
	(ha)		(min.)
Area draining	0.130	0.90	10

Rational Method Calculation

Event 2 yr
IDF Data Set City of Toronto
Event a = 21.80
IDF Data Set c = -0.780

Type	Area (ha)	"C"
Landscaped	0.000	0.25
Hardscaped	0.130	0.90
Total Area (A2)	0.130	0.90

	A	C	AC	Tc	I	Q	Q
	(ha)			(min.)	(mm/h)	(m ³ /s)	(L/s)
Area Draining Towards Yonge Street	0.130	0.90	0.117	10	88.2	0.029	28.70



Appendix D



EXTERNAL COMBINED SEWER SEGMENTS
DRY WEATHER
1-13 St. Clair Avenue West
City of Toronto

450 L/c/day - new commercial/residential
250 L/c/day - existing institutional/commercial
240 L/c/day - existing residential
q = average daily per capita flow (c.m./day)
Q (p) = peak population flow (L/s)
Q (l) = peak extraneous flow (L/s)
Q (oc) = peak flow from schools & churches (L/s)
Q (C) = peak flow from commercial area (L/s)
Q (d) = peak design flow (L/s)

Population Density = Semi-detached - 2.7 Persons/unit, Commercial - 1.1 Persons/100 sq.m, Apartments - 2 Persons/home, School & church - 86 Person/ha
M = Peaking Factor (residential) = $1 + 14/(4+P^{0.5})$ where P = population in 1000's
l = unit of peak extraneous flow
Q(p) = $PqM/86.4$ (L/s)
Q(l) = lA (L/s) where l = 0.26 L/s/ha, and A = drainage area (ha)
Q(C) = based on Y L/p/day - residential equivalent (see below)
 $Q(d) = Q(p) + Q(l) + Q(sc) + Q(Ch) + Q(In) + Q(C)$

LOCATION											POPULATION								Peak Factor (residential) M (dimensionless)		Infiltration Area (hectares)		F L O W S (CUMMULATIVE)											
DESCRIPTION	Sewer Segment based on HVM figure	Drainage Area	Infiltration Area	Single Family Dwelling	Semi-detached	Townhouses	Residential	Commercial	Office	Future Developments (Residential)	Future Developments (Commercial)	RESIDENTIAL (@ 270 people/ha) (persons)	COMMERCIAL (@ 110people/ha) (persons)	OFFICE (@ 330people/ha) (persons)	TOTAL RESIDENTIAL (cumulative) (persons)	TOTAL COMMERCIAL (cumulative) (persons)	TOTAL OFFICE (cumulative) (persons)	TOTAL PEOPLE (cumulative) (persons)					RESIDENTIAL	INFILTRATION	COMMERCIAL	OFFICE	EXISTING PEAK FLOW (Cumulative)	PROPOSED FLOW Q(prop.)* (L/s)	TOTAL PEAK DESIGN FLOW (Cumulative) (L/s)	GRADE (used) (%)	max.flow Capacity (L/s)	PIPE SIZE (mm)	Pre-development % of DESIGN CAPACITY (%)	Post-development % of DESIGN CAPACITY (%)
		column number	1	2	3		4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
DOWNSTREAM SEWER SEGMENTS																																		
Sewer Segment	#2354	5.40	0.44	0	0.43	0.12	2.30	7.95	8.22	0	0	971	875	2713	971	875	2713	4558	3.81	0.44	10.27	0.11	2.53	7.85	20.77	6.64	27.4	0.53%	447.5	600	4.7%	6.1%		
Sewer Segment	#2355	0.04	0.04	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	4.50	0.04	0.00	0.01	0.00	0.00	20.79	6.64	27.4	6.17%	1525.1	600	1.4%	1.8%		
Sewer Segment	#89	10.60	1.86	0.7	1.33	1.75	16.89	6.40	3.79	3434	176	10629	880	1251	10629	880	1251	12760	2.93	1.86	86.46	0.48	2.55	3.62	113.90	6.64	120.5	0.39%	1741.1	900x1350	6.6%	6.9%		
Weir	#W414																																	

- NOTES:
1. Calculated flows are estimated based on the existing development within the drainage area.
 2. The population equivalent for medium density development (apartments) was assumed at 270 people/hectare.
 3. The above calculations assume only sanitary flow from the drainage area in the combined sewers
 4. Proposed or under construction development upstream and downstream from the subject site have been taken into account for the equivalent population serviced by the examined sewer network.
 5. The post development flow can be supported by the existing sanitary network, thus the sewers can support the proposed development.



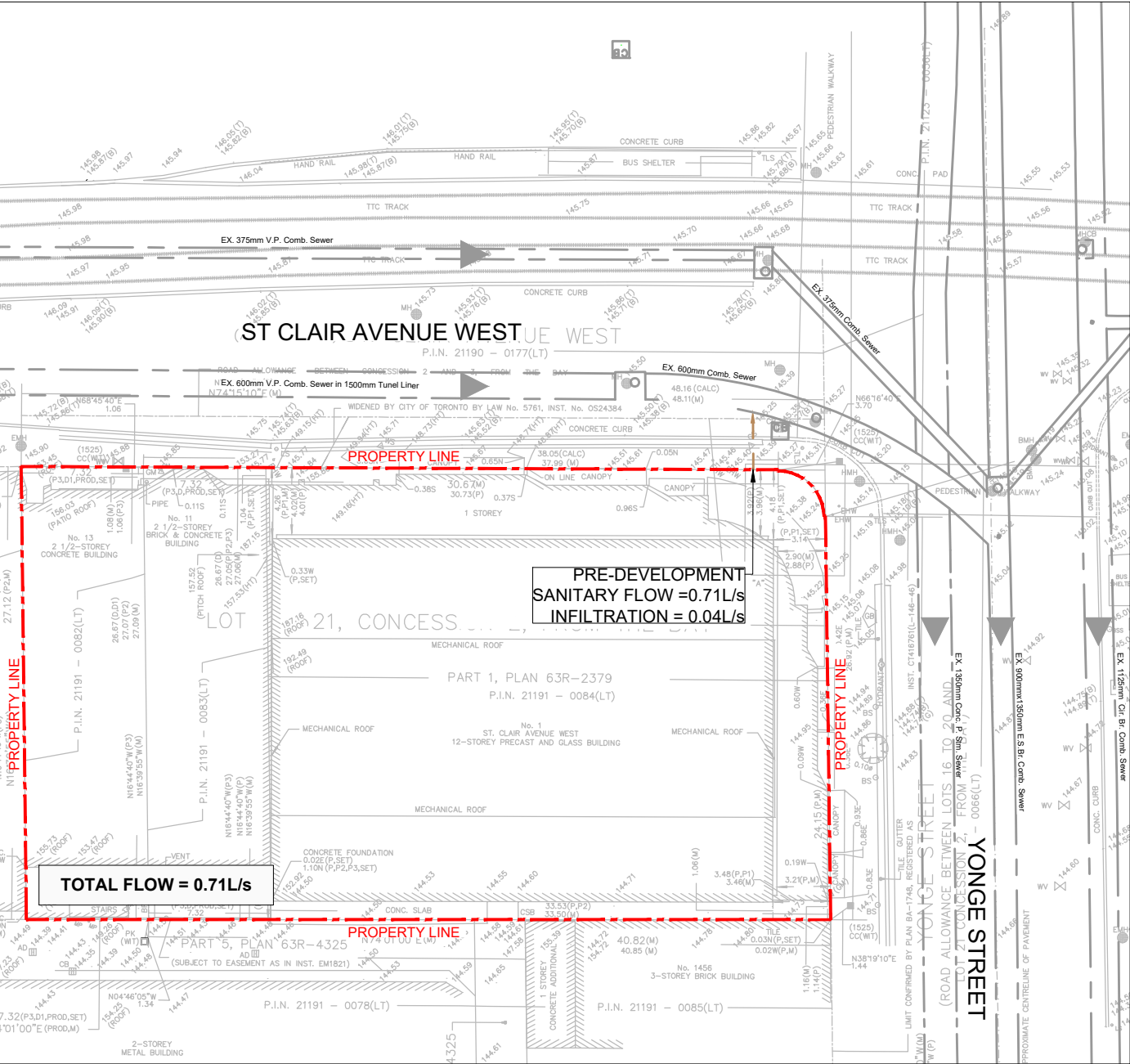
Prepared by: Gina Liaropoulou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.
Date: December 2021

Project: 1-13 St. Clair Avenue West
Project: UD21-044
City of Toronto

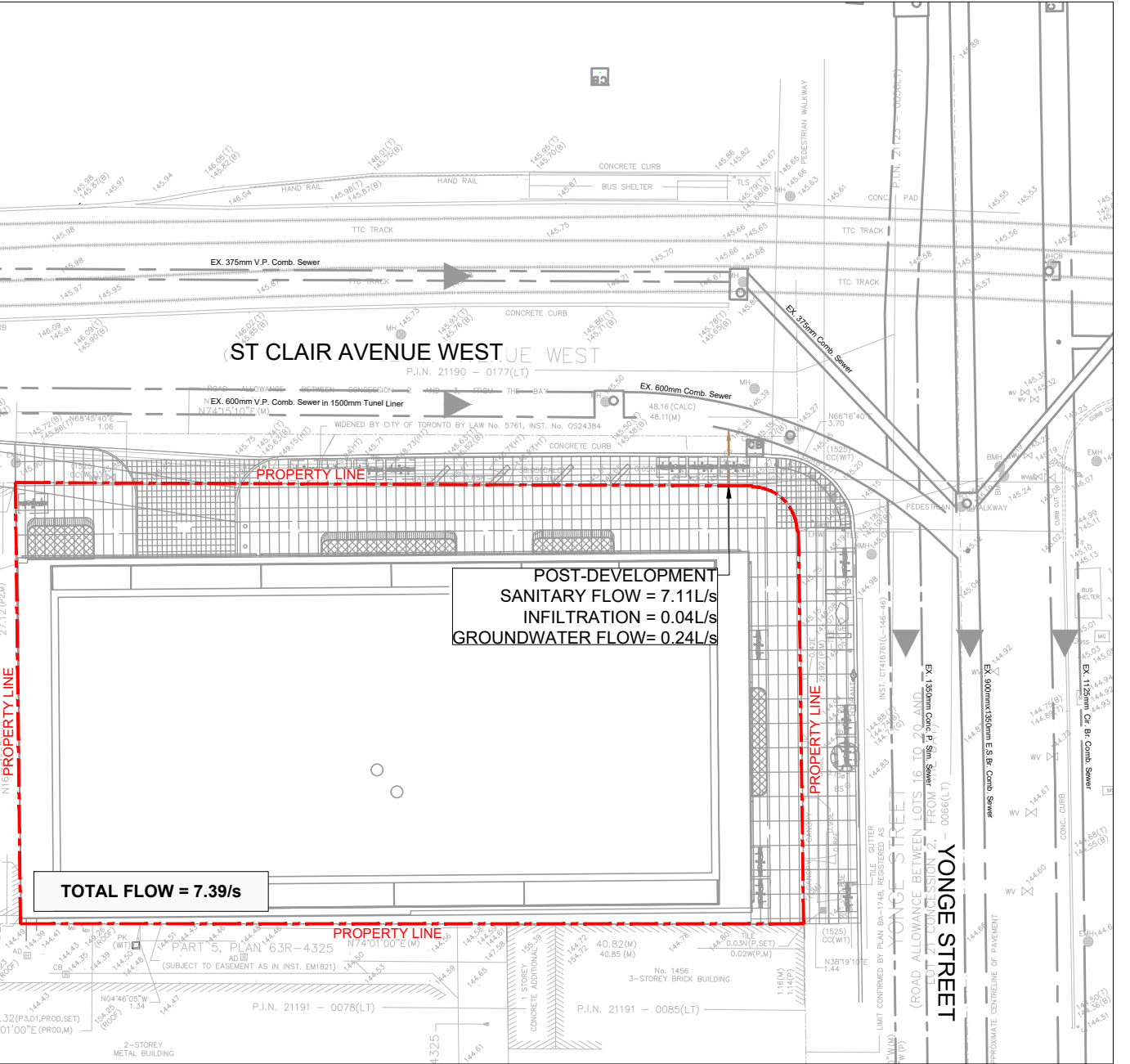
DRY-WEATHER FLOWS
• SANITARY FLOWS



PRE-DEVELOPMENT
FLOWS



POST-DEVELOPMENT
FLOWS



150 Bermondsay Road , Toronto, Ontario M4A 1Y1

LEGEND

- PROPERTY LINE
- EXISTING COMBINED SEWER
- - - EXISTING STORM SEWER

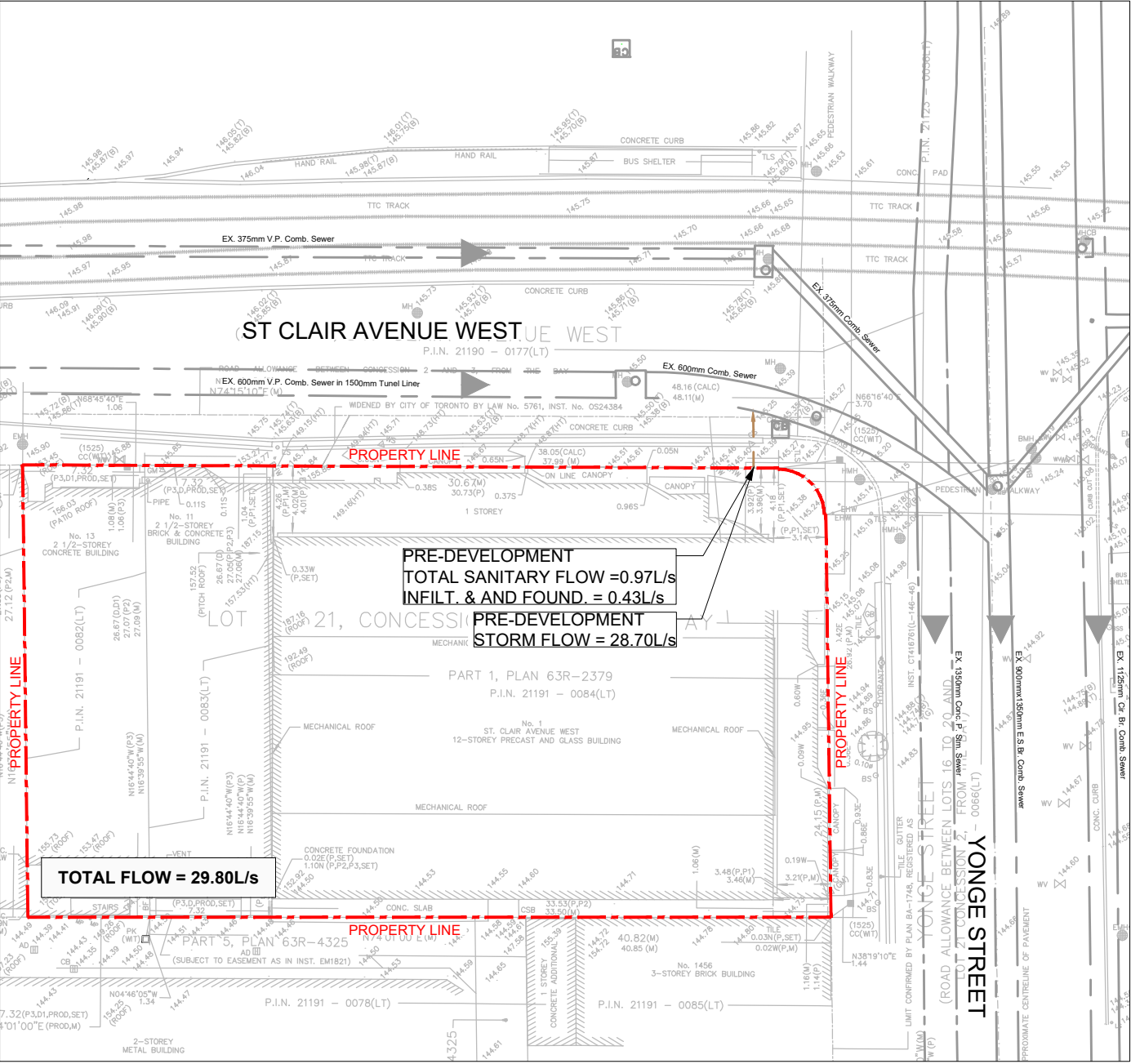
→ SANITARY FLOW

PRE AND POST-DEVELOPMENT SITE CONTRIBUTION TO COMBINED SEWER DRY-WEATHER FLOWS MIXED USE DEVELOPMENT 1-13 ST. CLAIR AVENUE W, TORONTO, ONTARIO	
DATE: DECEMBER 2021	PROJECT No: UD21-044
SCALE: N.T.S.	FIGURE No: DAP 4

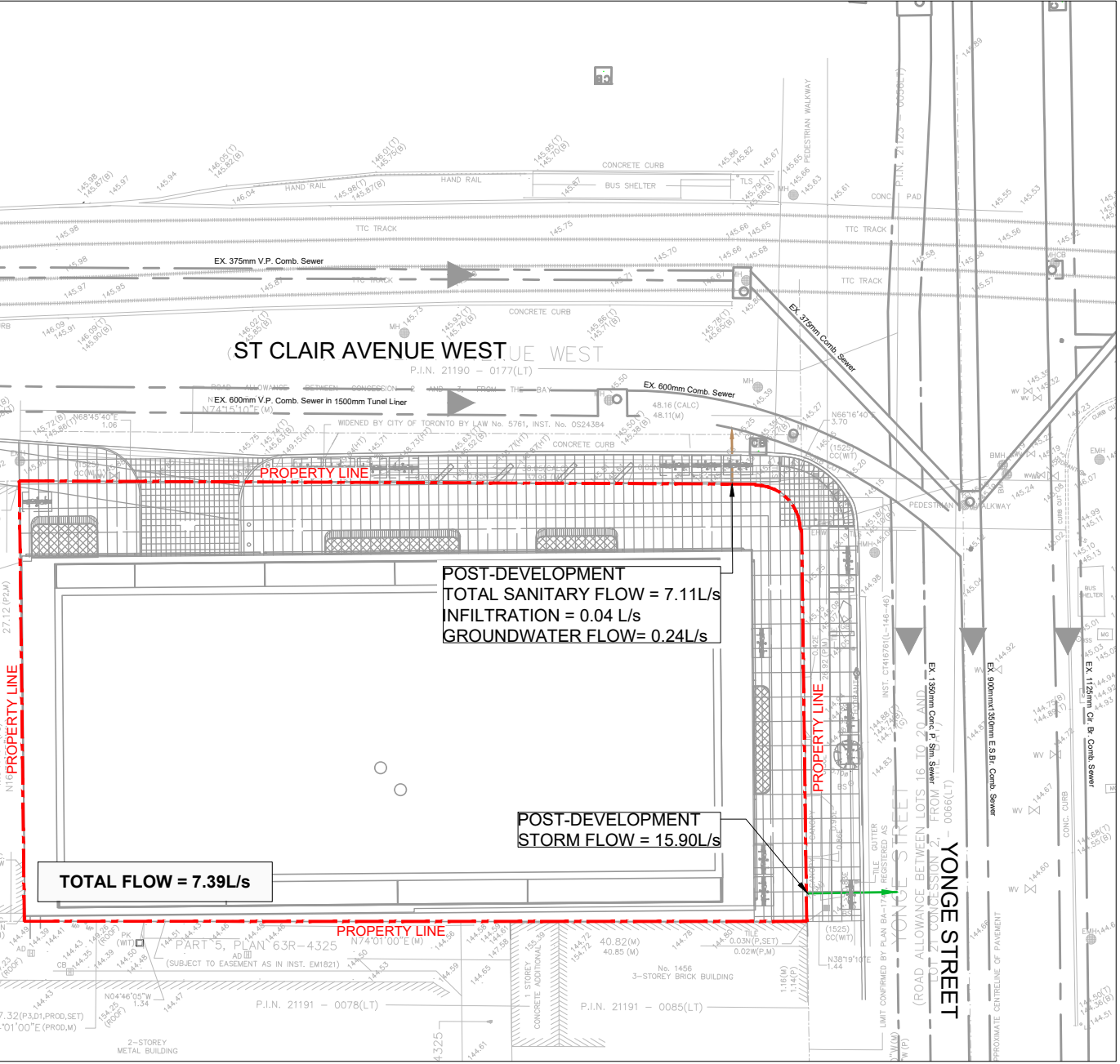
WET-WEATHER FLOWS
• SANITARY FLOWS



PRE-DEVELOPMENT
FLOWS



POST-DEVELOPMENT
FLOWS



LEGEND

- PROPERTY LINE
- EXISTING COMBINED SEWER
- EXISTING STORM SEWER

- SANITARY FLOW
- STORM FLOW

PRE AND POST-DEVELOPMENT SITE CONTRIBUTION TO COMBINED SEWER WET-WEATHER FLOWS MIXED USE DEVELOPMENT 1-13 ST. CLAIR AVENUE W, TORONTO, ONTARIO	
DATE: DECEMBER 2021	PROJECT No: UD21-044
SCALE: N.T.S.	FIGURE No: DAP 5



HYDRAULIC GRADE LINE ANALYSIS

PRE - DEVELOPMENT CONDITIONS - DRY WEATHER

1-13 St. Clair Avenue West

City of Toronto

250 L/c/day - commercial/office
240 L/c/day - residential

q = average daily per capita flow (c.m./day)

Q (p) = peak population flow (L/s)
Q (l) = peak extraneous flow (L/s)
Q (C) = peak flow from commercial area (L/s)
Q (d) = peak design flow (L/s)

Population Density = Single Family Dwelling - 3.5 Persons/unit,Commercial - 1.1 Persons/100 sq.m,Semi-detached & Townhouses - 2.7 Persons/unit

M = Peaking Factor (residential) = $1 + 14/(4+P^{.5})$ where P = population in 1000's

I = unit of peak extraneous flow
Q(p) = $PqM/86.4$ (L/s)
Q(l) = IA (L/s) where I = 0.26 L/s/ha, and A = drainage area - commercial area (ha)
Q(C) = based on Y L/p/day - residential equivalent (see below)

Q(d) = Q(p) + Q(l) + Q(C)

DESCRIPTION	Sewer Segment	EXISTING PEAK FLOW (Cumulative) (L/s)	GRADE (used) (%)	Max. Allowable Flow (L/s)	PIPE SIZE (mm)	Pre-development % of DESIGN CAPACITY (%)	PIPE LENGTH (m)	GROUND ELEVATION (m)	UPPER INVERT (m)	UPPER OBVERT (m)	LOWER INVERT (m)	LOWER OBVERT (m)	FULL FLOW VELOCITY (m/s)	FULL FLOW CAPACITY (L/s)	Q/Qf	D/Df	HGL SLOPE	WATER DEPTH (m)	CRITICAL DEPTH Yc (m)	U/s HGL (m)	U/s obv-HGL (m)	MANHOLE LOSS	D/s HGL (m)	D/s obv-HGL (m)	U/s SURCHARGE (m)	FREEBOARD (m)
column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
DOWNSTREAM SEWER SEGMENTS																										
Sewer Segment	#2354	20.77	0.53%	447.5	600	4.6%	119.9	145.60	141.80	142.40	141.16	141.76	1.58	447.01	0.046	0.140	0.0000114	0.084	0.000	141.88	0.52	0.04	141.28	0.48	0.00	3.72
Sewer Segment	#2355	20.79	6.17%	1525.1	600	1.4%	24.2	145.10	141.09	141.69	139.60	140.20	5.39	1525.17	0.014	0.040	0.0000115	0.024	0.000	141.12	0.58	0.44	140.07	0.13	0.00	3.98
Sewer Segment	#89	113.90	0.39%	1741.1	900x1350	6.5%	91.8	143.48	139.02	140.37	138.67	140.02	1.78	1130.54	0.101	0.210	0.0000046	0.284	0.000	139.31	1.07	0.05	139.00	1.02	0.00	4.17
Weir	#W414																									

- NOTES:
1. Calculated flows are estimated based on the existing development within the drainage area.
2. The above calculations assume only sanitary flow from the drainage area in the combined sewers



Prepared by: Gina Liaropoulou, P.E., M.A.Sc.

Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Date : December 2021

Project: 1-13 St. Clair Avenue West

Project: UD21-044

City of Toronto



HYDRAULIC GRADE LINE ANALYSIS

POST - DEVELOPMENT CONDITIONS - DRY WEATHER

1-13 St. Clair Avenue West

City of Toronto

250 L/c/day - commercial/office
240 L/c/day - residential

q = average daily per capita flow (c.m./day)

Q (p) = peak population flow (L/s)

Q (l) = peak extraneous flow (L/s)

Q (C) = peak flow from commercial area (L/s)

Q (d) = peak design flow (L/s)

Population Density = Single Family Dwelling - 3.5 Persons/unit, Commercial - 1.1 Persons/100 sq.m, Semi-detached & Townhouses - 2.7 Persons/unit

M = Peaking Factor (residential) = $1 + 14/(4+P^{.5})$ where P = population in 1000's

l = unit of peak extraneous flow

Q(p) = $PqM/86.4$ (L/s)

Q(l) = IA (L/s) where l = 0.26 L/s/ha, and A = drainage area - commercial area (ha)

Q(C) = based on Y L/p/day - residential equivalent (see below)

Q(d) = Q(p) + Q(l) + Q(C)

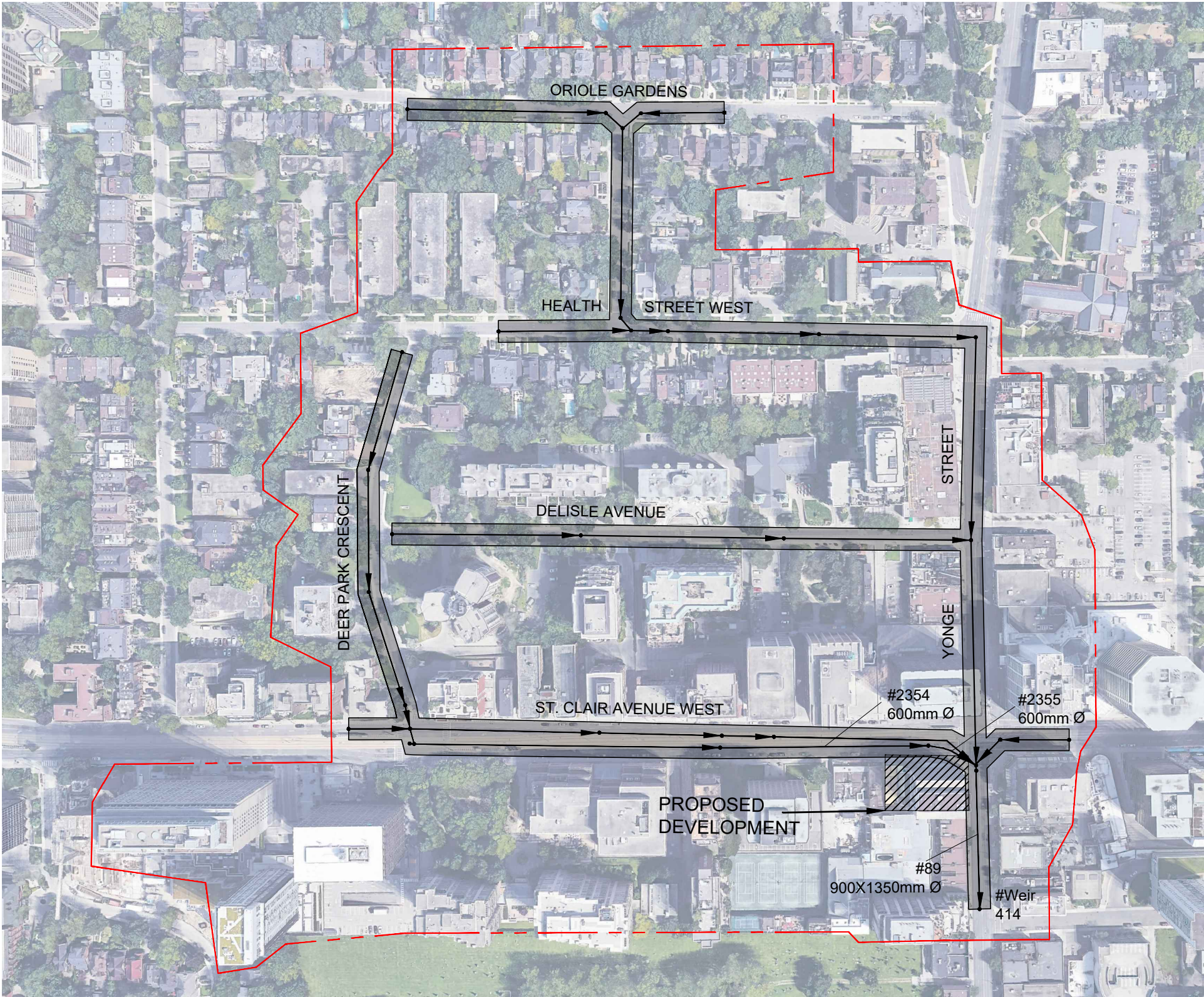
DESCRIPTION	Sewer Segment	EXISTING PEAK FLOW (Cummulative) (L/s)	GRADE (used) (%)	Max. Allowable Flow (L/s)	PIPE SIZE (mm)	Pre-development % of DESIGN CAPACITY (%)	PIPE LENGTH (m)	GROUND ELEVATION (m)	UPPER INVERT (m)	UPPER OBVERT (m)	LOWER INVERT (m)	LOWER OBVERT (m)	FULL FLOW VELOCITY (m/s)	FULL FLOW CAPACITY (L/s)	Q/Qf	D/Df	HGL SLOPE	WATER DEPTH (m)	CRITICAL DEPTH Yc (m)	U/s HGL (m)	U/s obv-HGL (m)	MANHOLE LOSS	D/s HGL (m)	D/s obv-HGL (m)	U/s SURCHARGE (m)	FREEBOARD (m)
column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
DOWNSTREAM SEWER SEGMENTS																										
Sewer Segment	#2354	27.41	0.53%	447.5	600	6.1%	119.9	145.60	141.80	142.40	141.16	141.76	1.58	447.01	0.061	0.162	0.0000199	0.097	0.000	141.89	0.50	0.04	141.30	0.46	0.00	3.71
Sewer Segment	#2355	27.43	6.17%	1525.1	600	1.8%	24.2	145.10	141.09	141.69	139.60	140.20	5.39	1525.17	0.018	0.060	0.0000200	0.036	0.000	141.13	0.56	0.44	140.08	0.12	0.00	3.97
Sewer Segment	#89	120.54	0.39%	1741.1	900x1350	6.9%	91.8	143.48	139.02	140.37	138.67	140.02	1.78	1130.54	0.107	0.215	0.0000051	0.290	0.000	139.31	1.06	0.05	139.01	1.01	0.00	4.17
Weir	#W414																									

- NOTES:
1. Calculated flows are estimated based on the existing development within the drainage area.
 2. The above calculations assume only sanitary flow from the drainage area in the combined sewers



Prepared by: Gina Liaropoulou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.
Date : December 2021

Project: 1-13 St. Clair Avenue West
Project: UD21-044
City of Toronto



DOWNSTREAM SANITARY SEWER SEGMENT INFORMATION				
SEWER SEGMENT	TYPE	SIZE (mm)	LENGTH (m)	SLOPE (%)
#2324	CIRC	600	120	0.53
#2355	CIRC	600	24	6.17
#89	EGG	900x1350	92	0.39



150 Bermondsay Road , Toronto, Ontario M4A 1Y1

LEGEND

--- TRUNK SEWER
- - - DRAINAGE AREA

— EX. COMB. SEWER
■ INFILTRATION AREA

● EXISTING MANHOLE
#2712 NUMBERED SEGMENT AS INDICATED IN "EXTERNAL COMBINED SEWER SEGMENTS" DESIGN SHEET

DOWNSTREAM
COMBINED NETWORK
MIXED USE DEVELOPMENT
1-13 ST. CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE: DECEMBER 2021 PROJECT No: UD21-044
SCALE: N.T.S. FIGURE No: DAP 3

Appendix E

Water Data Analysis



WATER DEMAND

1-13 St. Clair Avenue West

Project No: UD21-044

Date: December 2021

Prepared by: Gina Liaropoulou, P.E., M.A.Sc.

Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Fire Flow Calculation

1 $F = 220 C (A)^{1/2}$

Where F= Fire flow in Lpm

C= construction type coefficient

= 0.8 non-combustible construction

A = total floor area in sq.m. excluding basements, includes garage*

Area Applied

Level 1 = 985.0 m² 100%

Level 2 = 985.0 m² 25%

Level 3 = 969.0 m² 25%

= 1,474 sq.m.

F = 6,755.97 L/min

$F(\text{No.1}) = 220C\sqrt{A}$

F = 7,000 L/min

$F(\text{No.1})$ Round to nearest 1000 l/min

Note 1: The levels indicated, reference the floors with the largest areas (refer to building stats)

2 Occupancy Reduction

25% Reduction for Non-Combustible occupancy

F = 5250 L/min

$F(\text{No.2}) = F(\text{No.1}) \times \text{occupancy reduction/charge}(\%)$

3 Sprinkler Reduction

30% Reduction for NFPA Sprinkler System

F = 3675 l/min

$F(\text{No.3}) = F(\text{No.2}) \times \text{sprinkler reduction}(\%)$

4 Separation Charge

25% West 0 m to 3m

5% North 30.1 m to 45.0m

20% South 3.1m to 10.0m

10% East 20.1m to 30.0m

60% Total Separation Charge,

F = 3,150.00 L/min

$F(\text{No.4}) = F(\text{No.2}) \times \text{separation charge}(\%)$

F = 6,825.00 L/min

$F(\text{tot}) = F(\text{No.3}) + F(\text{No.4})$

F = 7,000.00

$F(\text{tot})$ Round to nearest 1000 l/min

116.67 L/s

F = 1849 US GPM

Domestic Flow Calculations

Residential Population = 581 from Sanitary Calculations

Retail Area (m²) = 882.00 from Site Statistics

Average Day Demand (Residential Use) = 190 L/cap/day

Average Day Demand (Commercial Use) = 2.8 L/m²/day

1 US Gallon=3.785 L

Average Day Demand (Total)= 1.31 L/s

= 21 US GPM

1 US GPM=15.85L/s

Max. Daily Demand Peaking Factor = 1.5

Max. Daily Demand = 1.96 L/s

=

31 US GPM

or

Max. Hourly Demand Peaking Factor = 2.25

Max. Hourly Demand = 2.94 L/s

=

47 US GPM

Max Daily Demand = 1.96 L/s

Fire Flow = 116.67 L/s

Required 'Design' Flow = 118.63 L/s
1880 US GPM

Note: Required 'Design' Flow is the maximum of either:

- 1) Fire Flow + Maximum Daily Demand
- 2) Maximum Hourly Demand



WATER DEMAND

1-13 St. Clair Avenue West

Project No: UD21-044

Date: December 2021

Prepared by: Gina Liaropoulou, P.E., M.A.Sc.

Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Pressure Losses

Hazen-Williams Formula

$$V = kCR_h^{0.63}XS^{0.54}$$

k= 0.85 - conversion factor (0.849 for SI units and 1.318 for US customary units)

C= 140 - roughness coefficient (PVC : 140-150)

S= h_f/L

Rh= D/4 - hydraulic radius (D/4 for full flow, A/P_w for partially flow)

Fire Fighting and Domestic Head Loss

Flow Requirements= 118.63 l/s
 Diameter= 150 mm
 Area= 1.77E-02
 L= 20 m
 V= 6.71 m/s
 S= 2.25E-01
 R_h= 0.04
 H_f= 4.50 m
 = 6.40 psi

Flow Test (dated: July 20, 2021)

when: Static Pressure = 62 psi
 Residual Pressure = 52 psi

Flow (gpm) = 0 0 L/s
 Flow (gpm) = 1500.79 94.7 L/s

$$Q_R = Q_F \times \frac{h_f^{0.54}}{h_f^{0.54}}$$

Pressure (psi)	Flow (L/s)
62	0.0
52	94.7

Based on the Pressure/Flow relationship, we have to confirm that the flow requirement of 118.63 L/s can be provided at minimum pressure (20.3 psi + Losses) as set out by the FUS guidelines

49.5	118.63
------	--------

Fire Flow is above minimum of 26.70 psi (20.3+H_f)

Since the flow of 118.63 L/s required for the proposed development is provided in the existing watermain at 49.5 psi (which is more than the minimum of 35.35 psi), it is anticipated that the existing watermain infrastructure can support the proposed development.

Flow available at 20psi = 3257 gpm = 205.51 L/s

$$\begin{aligned}
 Q_{\text{avail @ 20psi}} &= Q_T \left(\frac{(P_S - P_A)}{(P_S - P_R)} \right)^{0.54} \\
 &= 1500.79 \times \left(\frac{(62 - 20)}{(62 - 52)} \right)^{0.54} \\
 &= 3257 \text{ gpm}
 \end{aligned}$$



WATER DEMAND

1-13 St. Clair Avenue West

Project No: UD21-044

Date: December 2021

Prepared by: Gina Liaropoulou, P.E., M.A.Sc.

Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Pressure Losses

Hazen-Williams Formula

$$V = kCR_h^{0.63}XS^{0.54}$$

k= 0.85 - conversion factor (0.849 for SI units and 1.318 for US customary units)

C= 140 - roughness coefficient (PVC : 140-150)

S= h_f/L

Rh= D/4 - hydraulic radius (D/4 for full flow, A/P_w for partially flow)

Fire Fighting and Domestic Head Loss

Flow Requirements= 118.63 l/s
Diameter= 150 mm
Area= 1.77E-02
L= 3.2 m
V= 6.71 m/s
S= 2.25E-01
R_h= 0.04
H_f= 0.72 m
= 1.02 psi

Flow Test (dated: July 20, 2021)

when: Static Pressure = 58 psi
Residual Pressure = 40 psi

Flow (gpm) = 0 0 L/s
Flow (gpm) = 1299.72 82.0 L/s

$$Q_R = Q_F \times \frac{h_f^{0.54}}{h_f^{0.54}}$$

Pressure (psi)	Flow (L/s)
58	0.0
40	82.0
32.0	118.63

Based on the Pressure/Flow relationship, we have to confirm that the flow requirement of 118.63 L/s can be provided at minimum pressure (20.3 psi + Losses) as set out by the FUS guidelines

Fire Flow is above minimum of 21.32 psi (20.3+H_f)

Since the flow of 118.63 L/s required for the proposed development is provided in the existing watermain at 32.0 psi (which is more than the minimum of 21.32 psi), it is anticipated that the existing watermain infrastructure can support the proposed development.

Flow available at 20psi = 1946 gpm = 122.76 L/s

$$\begin{aligned}Q_{\text{avail @ 20psi}} &= Q_T ((P_S - P_A) / (P_S - P_R))^{0.54} \\&= 1299.72 \times ((75 - 20) / (75 - 40))^{0.54} \\&= 1946 \text{ gpm}\end{aligned}$$

General Information

Report No. : **FHR-21-07-20-02** Date : **July 20,2021**

Project No. : **PUD21-044**

Site Address/Location: **1-13 St. Clair Avenue West**

Region/Municipality: **Toronto**

Residual Fire Hydrant Description/Location : **HY10094 - 55 ST CLAIR AVE W**

Flow Fire Hydrant Description/Location : **HY1359469 - 30 ST CLAIR AVE W**

Watermain Pipe Size (mm) : **300**

Test Equipment Orifice Size (in) : **2.5**

Test Equipment Orifice coefficient : **0.9**

Date of test: **July 20,2021**

Time of test: **9:00 AM**

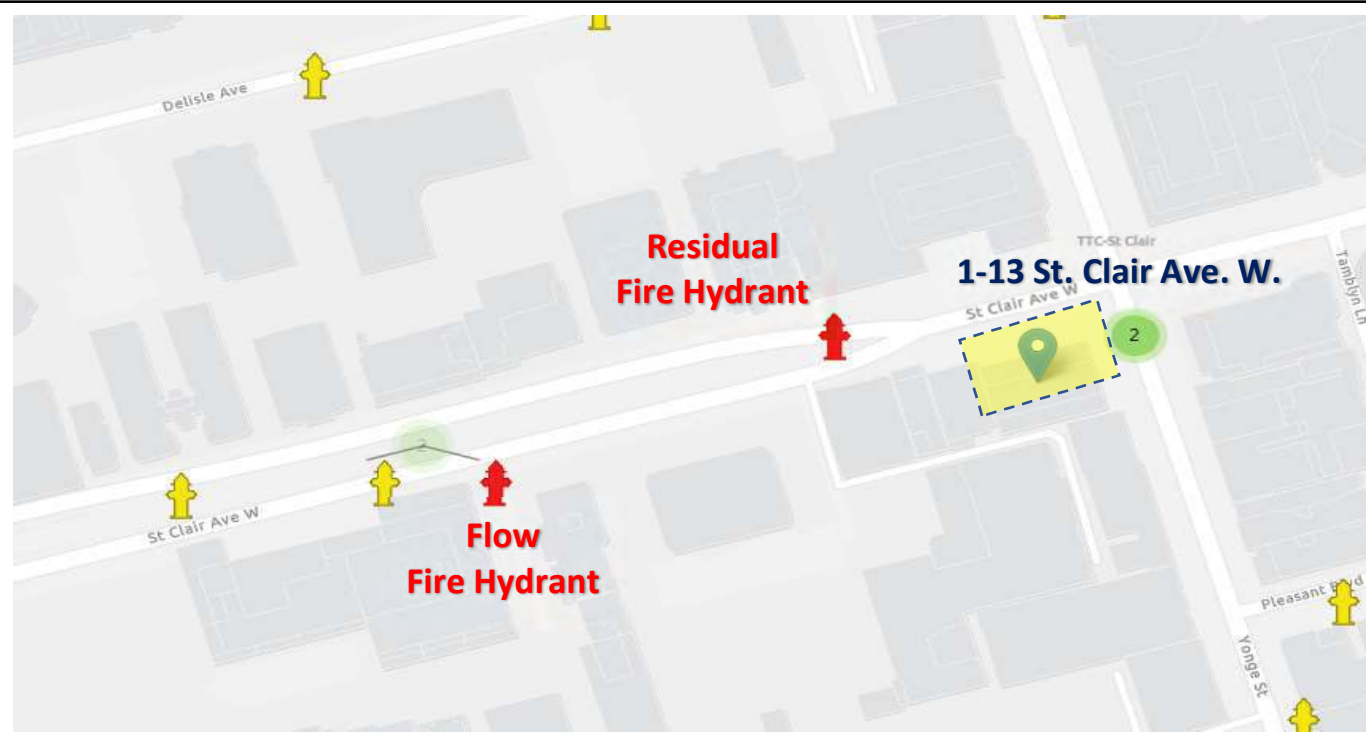
Temperature: **+ 25 °C**

Testing Method : **NFPA 291 (Recommended Practice for Fire Flow Testing and Marking of Hydrants)**

Attendants

	Name	Title	Contact Info.
Lithos Inspector	Stefanos Kaloutas	Project Coordinator	647-856-5566
Lithos Inspector	Naveen Jaishankar	Trainee Civil Engineer	437-227-2430
Toronto Water Rep.	Anthony	Watermains worker 3	416-876-1719

Site Plan/Sketch



Pressure Readings (PSIG)

Flow Hydrant's Outlet Condition	C-0 { Outlet #1 : Close Outlet #2 : Close	C-1 { Outlet #1 : Open Outlet #2 : Close	C-2 { Outlet #1 : Open Outlet #2 : Open
Residual Fire Hydrant	62	56	52
Flow Fire Hydrant	-	40	20

General Information

Report No. : **FHR-21-07-20-02**

Date : **July 20,2021**

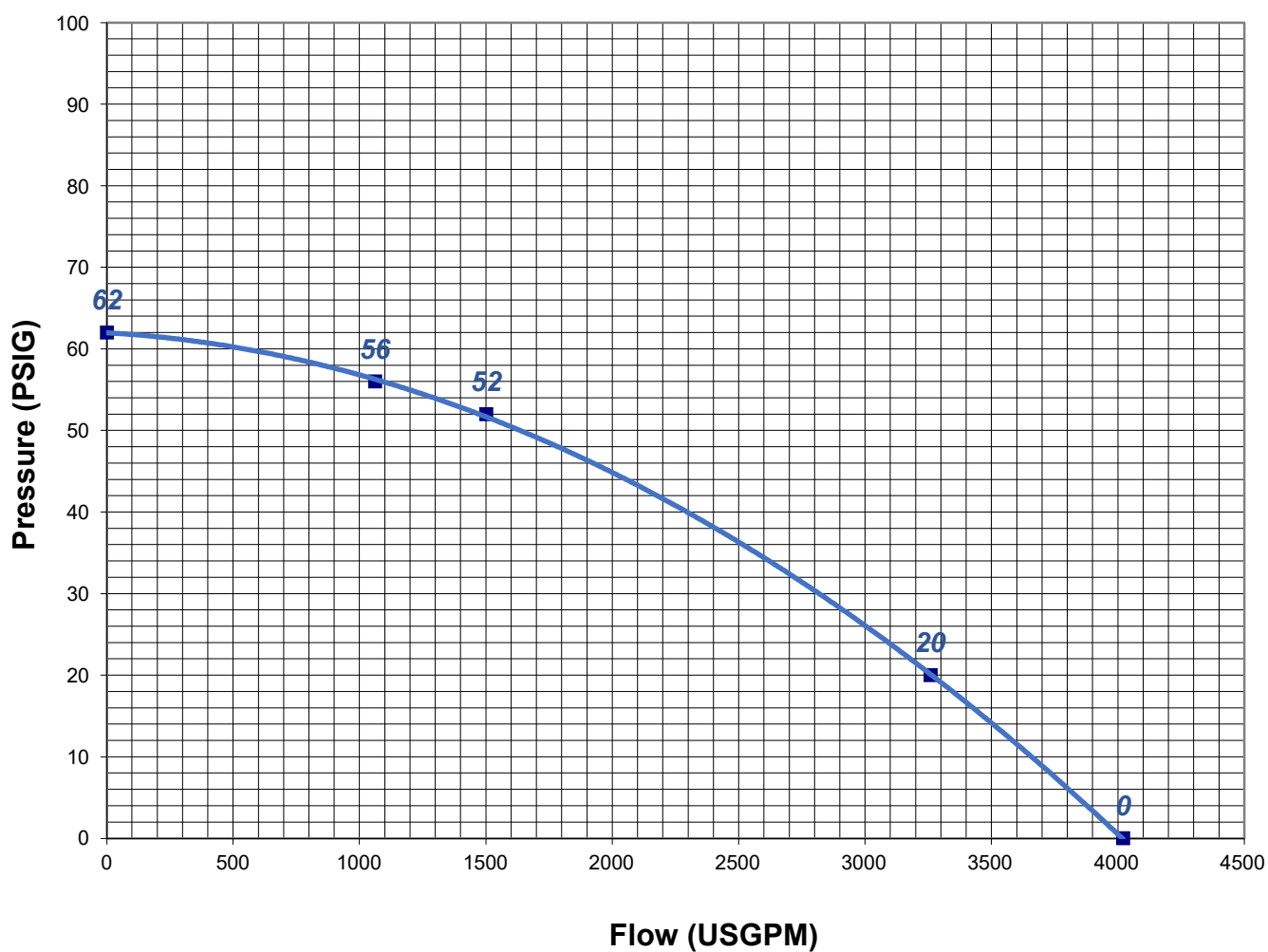
Project No. : **PUD21-044**

Site Address/Location: **1-13 St. Clair Avenue West**

Pressure-Flow Table

Condition		C-0	C-1	C-2	C(20)	C(0)
Pressure (PSIG)		62	56	52	20	0
Flow	(USGPM)	0	1061.22	1500.79	3257.43	4019.87
	(L/S)	0.00	66.96	94.70	205.54	253.65

Pressure-Flow Graph



Result

Maximum available flow at 20PSI = 3257.43 USGPM or 205.54 L/s

General Information

Report No. : **FHR-21-07-20-03** Date : **July 20,2021**

Project No. : **PUD21-044**

Site Address/Location: **1-13 St. Clair Avenue West**

Region/Municipality: **Toronto**

Residual Fire Hydrant Description/Location : **HY1355590 - 1493 YONGE ST**

Flow Fire Hydrant Description/Location : **HY12139 - 1456 YONGE ST**

Watermain Pipe Size (mm) : **300**

Test Equipment Orifice Size (in) : **2.5**

Test Equipment Orifice coefficient : **0.9**

Date of test: **July 20,2021**

Time of test: **9:30 AM**

Temperature: **+ 25 °C**

Testing Method : **NFPA 291 (Recommended Practice for Fire Flow Testing and Marking of Hydrants)**

Attendants

	Name	Title	Contact Info.
Lithos Inspector	Stefanos Kaloutas	Project Coordinator	647-856-5566
Lithos Inspector	Naveen Jaishankar	Trainee Civil Engineer	437-227-2430
Toronto Water Rep.	Anthony	Watermains worker 3	416-876-1719

Site Plan/Sketch



Pressure Readings (PSIG)

Flow Hydrant's Outlet Condition	C-0 { Outlet #1 : Close Outlet #2 : Close	C-1 { Outlet #1 : Open Outlet #2 : Close	C-2 { Outlet #1 : Open Outlet #2 : Open
Residual Fire Hydrant	58	50	40
Flow Fire Hydrant	-	40	15

General Information

Report No. : **FHR-21-07-20-03**

Date : **July 20,2021**

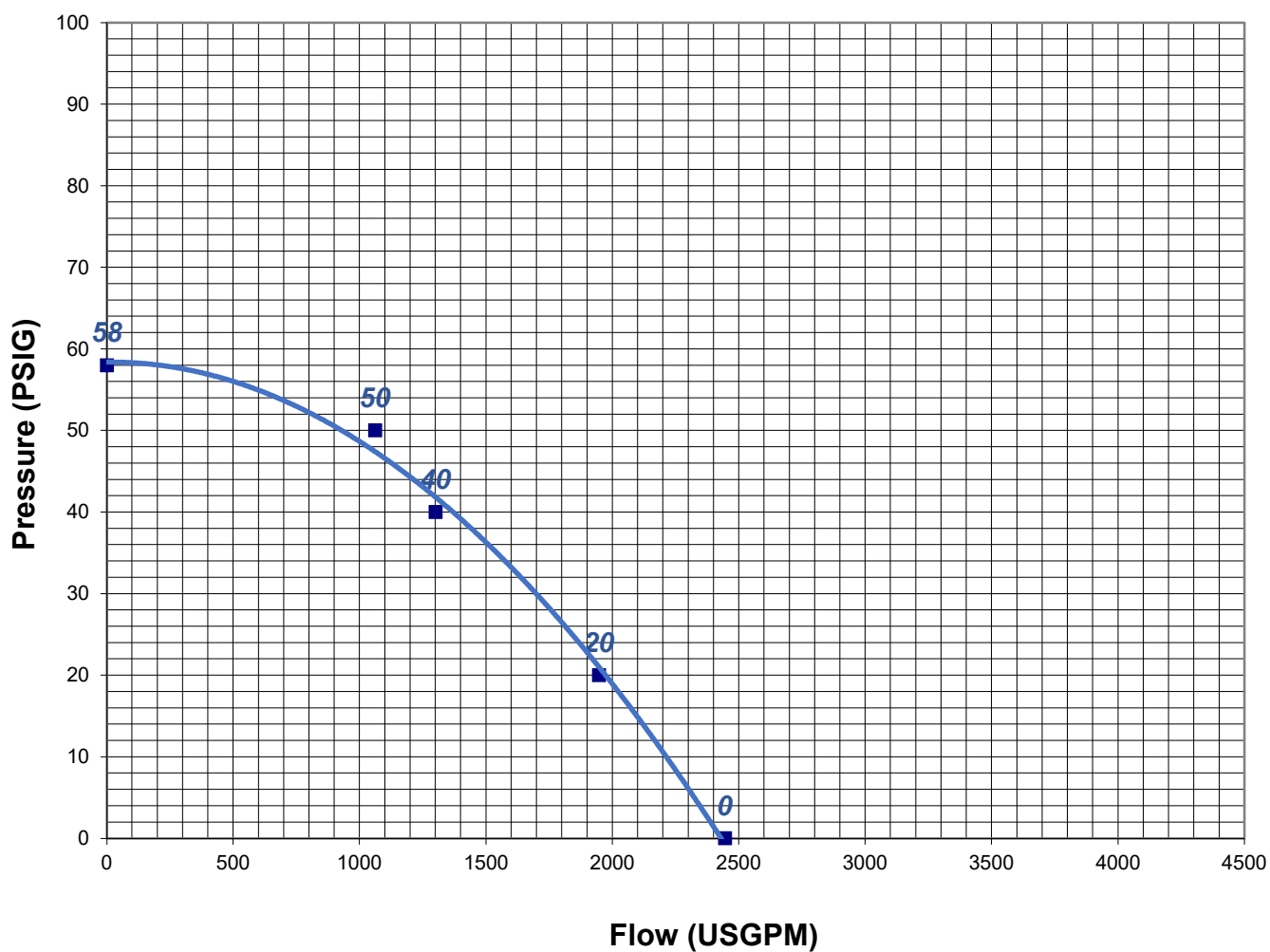
Project No. : **PUD21-044**

Site Address/Location: **1-13 St. Clair Avenue West**

Pressure-Flow Table

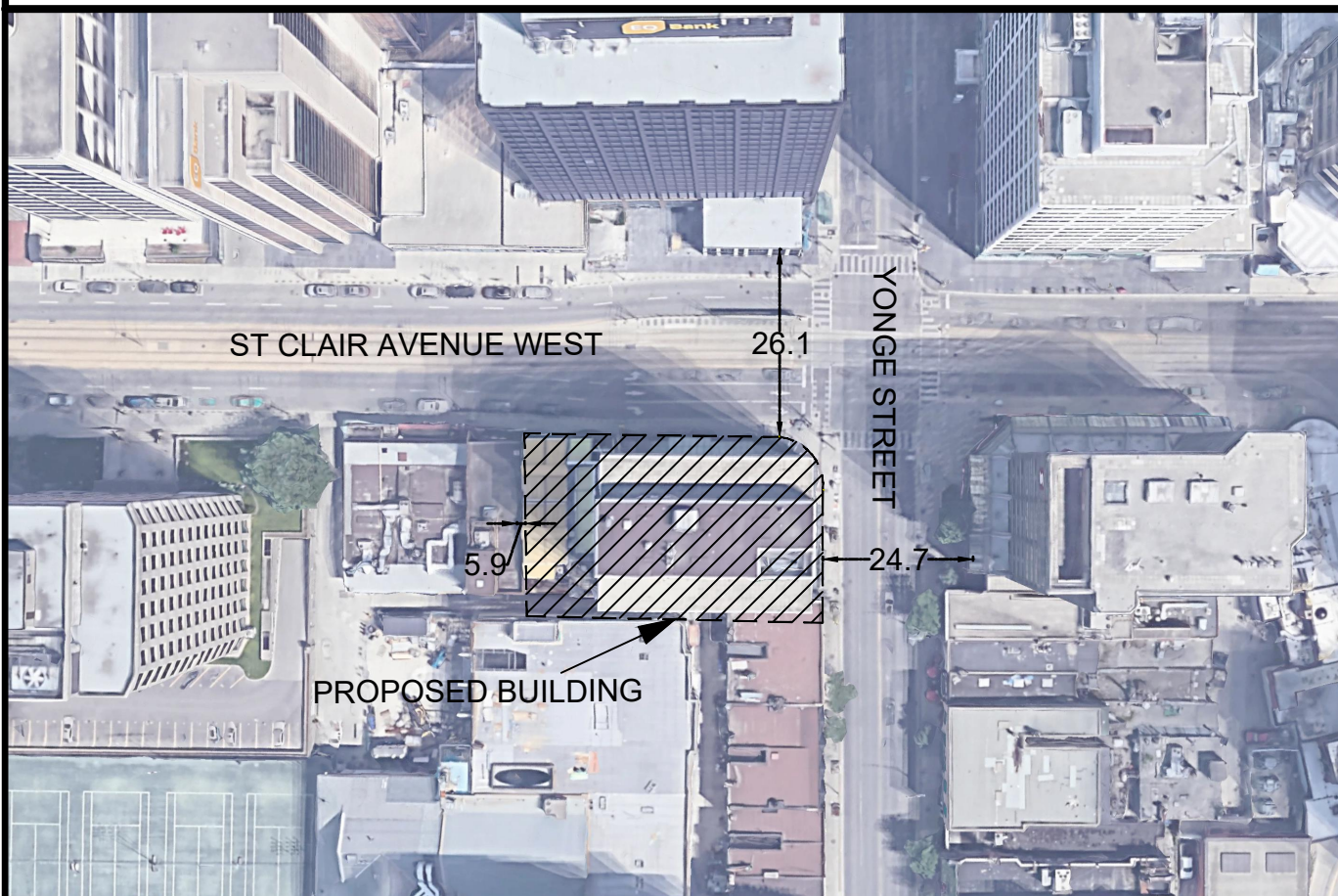
Condition		C-0	C-1	C-2	C(20)	C(0)
Pressure (PSIG)		58	50	40	20	0
Flow	(USGPM)	0	1061.22	1299.72	1945.75	2444.87
	(L/S)	0.00	66.96	82.01	122.78	154.27

Pressure-Flow Graph



Result

Maximum available flow at 20PSI = 1945.75 USGPM or 122.78 L/s



SEPARATION DISTANCES

MIXED USE DEVELOPMENT
1 ST. CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE: DECEMBER 2021

PROJECT No: UD21-044

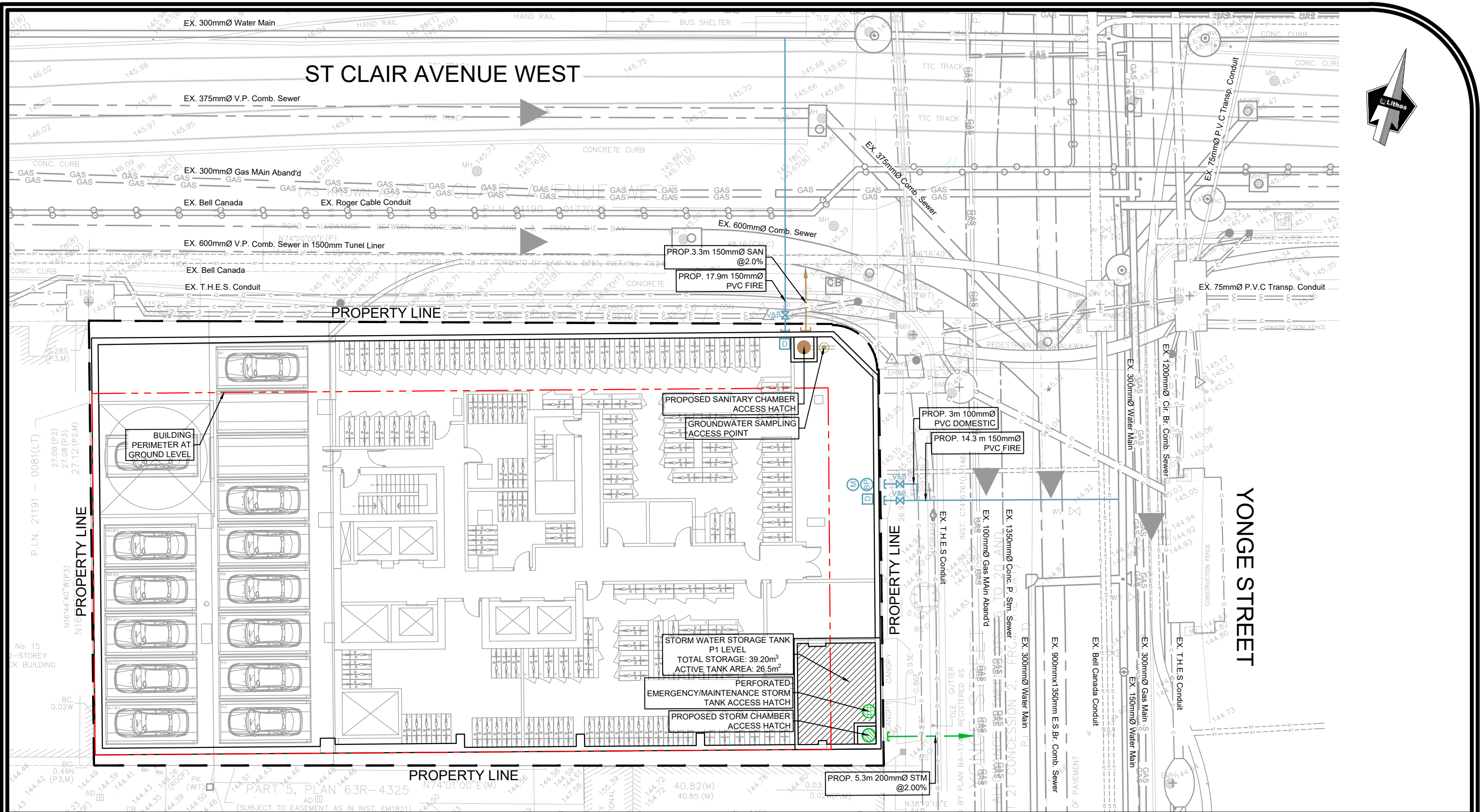
SCALE: N.T.S.

FIGURE No: FIG 4

150 Bermondsey Road, North York, Ontario, M4A 1Y1

Appendix F

Engineering Figures



150 Bermondsey Road, North York, Ontario, M4A 1Y1

LEGEND

---	PROPERTY LINE	---	EX. GASMAIN	---	EX. BELL CANADA CONDUIT
---	EXISTING COMBINED SEWER	---	EX. T.H.E.S. CONDUIT/CABLE	---	PROPOSED SANITARY SEWER
---	EXISTING WATERMAIN	---	EX. COBUILT (GT,WFI)	---	PROPOSED STORMWATER SEWER
---	EXISTING STORMWATER SEWER	---	EX. ROGERS CABLE CONDUIT	---	PROPOSED WATERMAIN

PROPOSED SERVICING FIGURE
MIXED USE DEVELOPMENT
1-13 ST. CLAIR AVENUE WEST,
TORONTO, ONTARIO

DATE: DECEMBER 2021	PROJECT No: UD21-044
SCALE: N.T.S.	FIGURE No: FIG 3