11 YORKVILLE PARTNERS INC.

11-25 YORKVILLE AVENUE & 16-18 CUMBERLAND STREET

FUNCTIONAL SERVICING REPORT

DECEMBER 14, 2018

11-25 YORKVILLE AVENUE & 16-18 CUMBERLAND STREET

FUNCTIONAL SERVICING REPORT

11 YORKVILLE PARTNERS INC.

FUNCTIONAL SERVICING REPORT - DRAFT

PROJECT NO.: 17M-01494
DATE: DECEMBER, 2018

WSP CANADA GROUP LIMITED
100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON, CANADA L3T 0A1

WSP.COM

SIGNATURES

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TABLE OF CONTENTS

APPENDICES

1 INTRODUCTION

1.1 SCOPE OF MUNICIPAL SERVICING

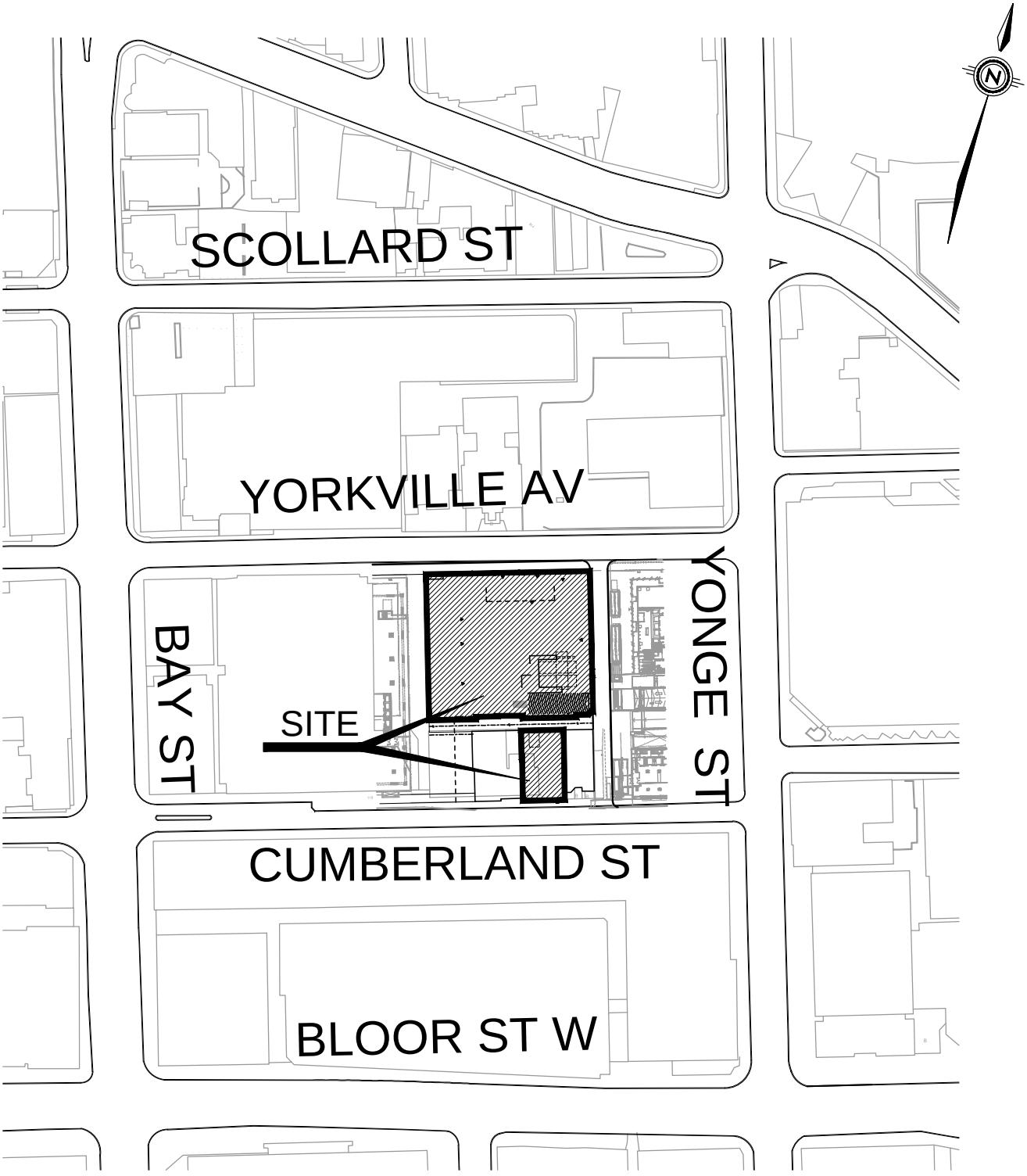
WSP Canada Group Limited (WSP) has been retained by 11 Yorkville Partnership Inc. to prepare a Functional Servicing Report (FSR) in support of the proposed development of 11-25 Yorkville Avenue and 16-18 Cumberland Street in the City of Toronto (herein referred to as Buildings A and B, respectively, or 'site'). The site is located on the south side of Yorkville Avenue just west of Yonge Street and on the north side of Cumberland just west of Yonge Street. The site area is approximately 0.29 ha for Building A and approximately 0.04 ha for Building B for a total site area of approximately 0.32ha. As shown in Figures 1 and 2, the site is bound by Yorkville Avenue to the north, city-owned laneways to the south and east and a 71-storey building (pre-construction) to the west. It is assumed that the existing buildings are serviced by existing infrastructure in the municipal right-of-way (ROW). The purpose of this report is to outline how water, sanitary and storm servicing will be provided for the redevelopment of the site.

1.2 EXISTING CONDITIONS

Currently, 11 Yorkville Avenue is occupied by a 10-storey commercial building with an underground parking structure at its rear. 17 Yorkville Avenue is occupied by a three-storey commercial building with a small backyard area. 19 Yorkville Avenue and 21 Yorkville are both occupied by four-storey commercial buildings. 16 Cumberland Street is occupied by a two-storey commercial building and 18 Cumberland Street is occupied by a two-storey commercial building. We have assumed that all existing buildings have existing services to the municipal sewers. SUE investigation is being undertaken to confirm the service connection location but has not yet been completed. Please refer to Figure 2 for the Pre-Development Plan.

1.3 PROPOSED DEVELOPMENT

The proposed development consists of one 62-storey mixed-use tower (Building A) and one two-storey retail (Building B). Building A will have four (4) below-grade parking levels, 670 residential units and approximately 2,449m^2 of retail space. Privately-Owned Public Space (POPS) and park area will be located west of Building A. Building B will have one below-grade concourse level and two above-ground levels, with a total of 846 m^2 of retail space. All service connections for Building A will be provided from existing infrastructure on Yorkville Avenue and for Building B, service connections will be directed to both Cumberland Street and the laneway on the north side. All vehicle access to Building A will be provided by an entrance at the north east corner of the site that will run along the east side of the site and pass underneath the building to reach the underground parking entrance. Please refer to Figure 3 for the Proposed Development Plan.



CLIENT

11 YORKVILLE PARTNERSHIP INC.

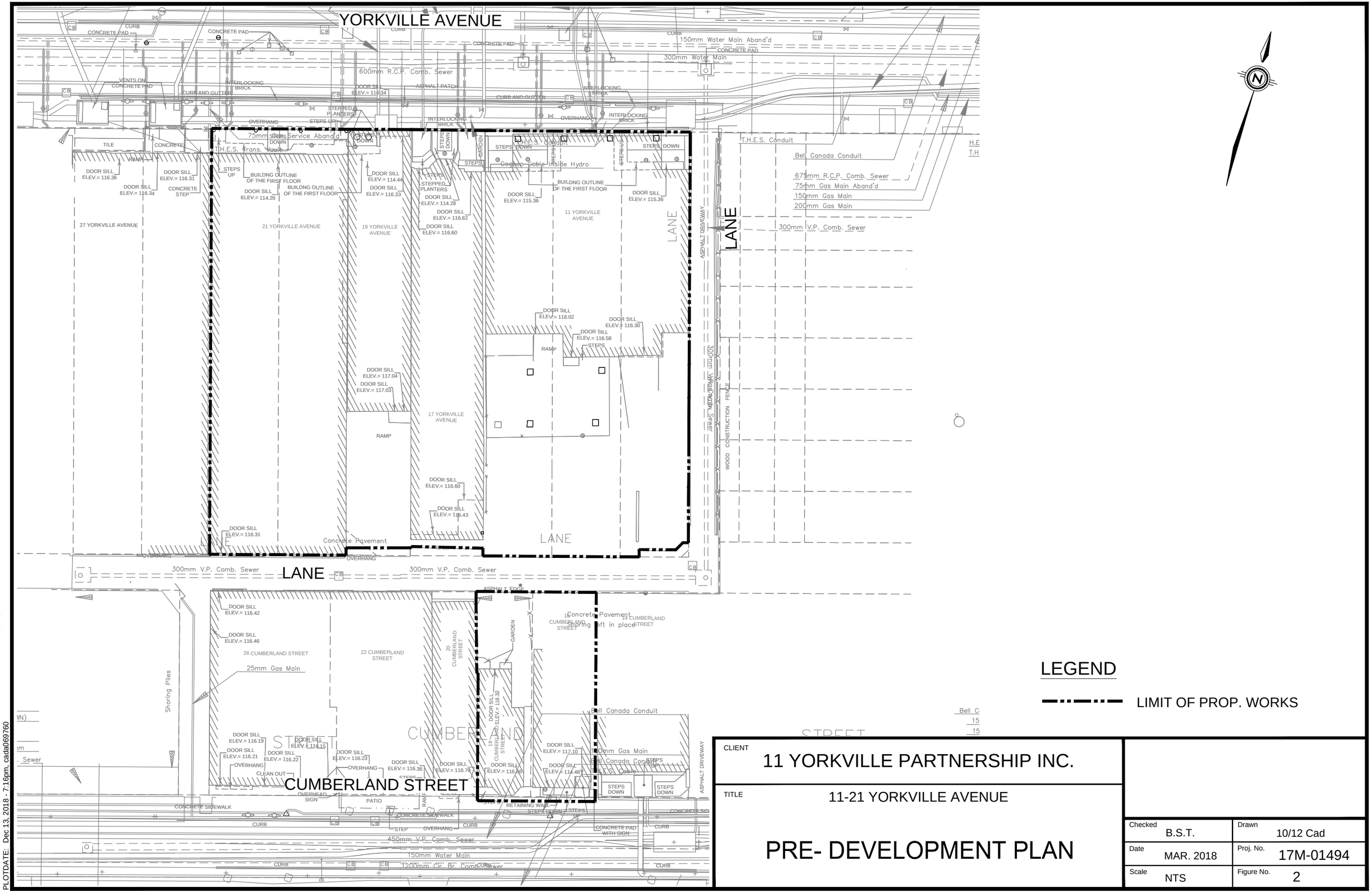
TITLE

11-21 YORKVILLE AVENUE

LOCATION PLAN

wsp

Checked	B.S.T.	Drawn	10/12 Cad
Date	MAR. 2018	Proj. No.	17M-01494
Scale	NTS	Figure No.	1



LEGEND

LIMIT OF PROP. WORKS

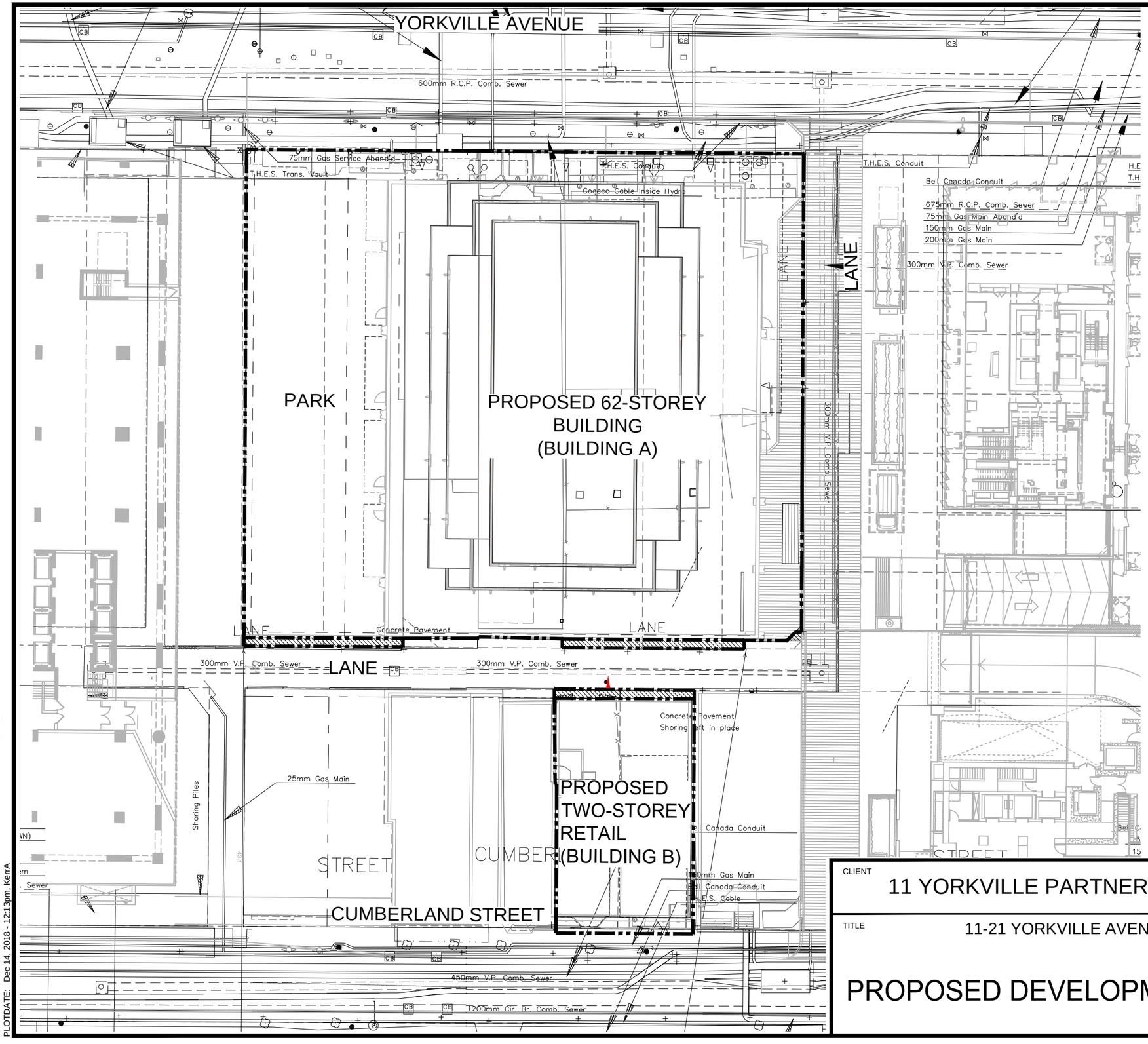
PLOTDATE: Dec 13, 2018 - 7:16pm, cada069760

CLIENT
11 YORKVILLE PARTNERSHIP INC.

TITLE
11-21 YORKVILLE AVENUE

PRE- DEVELOPMENT PLAN

Checked B.S.T.	Drawn 10/12 Cad
Date MAR. 2018	Proj. No. 17M-01494
Scale NTS	Figure No. 2



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LEGEND

LIMIT OF PROP. WORKS

CLIENT

11 YORKVILLE PARTNERSHIP INC.

TITLE

11-21 YORKVILLE AVENUE

PROPOSED DEVELOPMENT PLAN

Checked	B.S.T.	Drawn	10/12 Cad
Date	MAR. 2018	Proj. No.	17M-01494
Scale	NTS	Figure No.	3

PLOTDATE: Dec 14, 2018 - 12:13pm, KerrA

2 SANITARY SEWAGE SYSTEM

2.1 EXISTING CONDITIONS

The existing sewers in the vicinity of the site are a 600 and 675 mm diameter V.P. combined sewer on Yorkville Avenue, and a 300 mm diameter V.P. combined sewer along the public lanes to the east and south of Building A, as shown on Figure 2. The 600 and 675 mm V.P. combined sewer on Yorkville Avenue flows east towards Yonge Street. The 300 mm diameter V.P. combined sewer in the public lane flows east, then north to join the combined sewer on Yorkville Avenue. In addition, there is a 450mm V.P. combined sewer on Cumberland Street and a 1200mm brick combined sewer on Cumberland Street. The 450mm combined sewer flows east and discharges into the 1200mm combined sewer.

2.2 DESIGN PARAMETERS

The following sanitary design criteria have been taken from City of Toronto, Design Criteria for Sewers and Watermain, November 2009:

- 240 L/cap/day average day flow generation rate for residential use on an existing sewer system
- 250 L/cap/day average day flow generation rate for commercial use on an existing sewer system
- Population densities of 2.7 person per suite for existing apartment buildings;
- 1.4 people per single bedroom or studios, 2.1 people per two-bedroom unit and 3.1 people per three bedroom unit.
- Peaking Factor
    - Residential Harmon, Harmon Peaking Factor = $1+14/(4+p^{0.5})$, where p = population in thousands.
    - Institutional/Commercial (included in average flow)
- Infiltration = 0.26 L/s/ha (Dry Weather)
- Foundation Drainage = 3.0 L/s/ha (Wet Weather)

2.3 EXISTING FLOWS TO THE SANITARY SEWER SYSTEM

Using the design criteria noted in Section 2.2, the sanitary flows from the existing buildings are calculated in Table 2.1:

Table 2.1 – Existing Sanitary Flows to Yorkville Avenue

Address	Gross Floor Area (GFA)	Site Area	Population	Average Commercial Flow (250 L/cap/d)	Infiltration Allowance (0.26 L/s/ha)	Total Existing Sanitary Flow
	(m^2)	(ha)	(ppl)	(L/s)	(L/s)	(L/s)
11 Yorkville Avenue	7700	0.077	85	0.25	0.02	0.27
17 Yorkville Avenue	1158	0.039	13	0.04	0.01	0.05
19 Yorkville Avenue	1004	0.025	12	0.03	0.01	0.04
21 Yorkville Avenue	3140	0.079	35	0.10	0.02	0.12
Subtotal - Ex Bldg A	**13002**	**0.219**	**145**	**0.42**	**0.06**	**0.48**
16 Cumberland Street	828	0.021	10	0.03	0.01	0.03
18 Cumberland Street	477	0.016	6	0.02	0.00	0.02
Subtotal - Ex Bldg B	**1305**	**0.037**	**16**	**0.05**	**0.01**	**0.06**
Total	**14,307**	**0.256**	**161**	**0.47**	**0.07**	**0.53**

The total sanitary flow from the existing development was calculated to be 0.53 L/s.

2.4 PROPOSED SANITARY FLOWS

The projected sanitary flows from the development have been estimated using the design criteria outlined in Table 2.2:

Table 2.2 – Proposed Sanitary Flows from Site – Dry Weather

Building	Building A	Building B	Site Total
Residential units	670	0	670
Total Residential Population	1,212	0	1,212
Total Commercial Population	27	10	37
Avg Sanitary Design Flow (L/s)	3.44	0.03	3.47
Residential Peaking Factor	3.74	N/A	3.74
Commercial Peaking Factor	1.00	1.00	1.00
Peak Sanitary Design Flow (L/s)	12.68	0.03	12.71
Infiltration Allowance (0.26 L/s/ha)	0.07	0.01	0.08
Permanent Dewatering Pump Rate (L/s)	6.30	0.63	6.93
Total Sanitary Flow from Site	**19.06**	**0.67**	**19.73**
Net increase in Flow (post - pre)	**18.57**	**0.61**	**19.18**

For more detailed calculation refer to Appendix A.

Based on the calculated sanitary flows found in Table 2.2, the site will generate 19.73 L/s of sanitary flow. Building A will discharge to the existing 600 mm combined sewer along Yorkville Avenue through one 300 mm diameter sanitary service connection. Building B will discharge flow to the existing 300 mm combined sewer in the laneway north of the building via a 100 mm diameter sanitary service connection. This combined sewer ultimately connects to the combined sewer on Yorkville Avenue. Sanitary control maintenance holes will be installed immediately inside the property line for both Buildings A and B, which will be accessible at all times to City staff. Installation of these connections will be coordinated with the City of Toronto connections department. All other internal plumbing will meet Ontario Building Code standards.

2.5 COMPLIANCE WITH MOECC PROCEDURE F-5-5

It is proposed to discharge both sanitary and storm flows from Building A and Sanitary Flows from Building B ultimately discharge to the existing 675 mm combined sewer on Yorkville Avenue. MOECC procedure F-5-5 requires that the total flow in the combined sewer system not increase as a result of the proposed development.

Table 2.3 – Comparison of Pre- and Post-Development Discharge to Yorkville Combined Sewer – Building A

	Pre-Development Flow	Post-Development Flow	Net Change
Sanitary	0.49 L/s	19.06 L/s	18.57 L/s
Storm (2-Year)	63.40 L/s	22.60 L/s	-40.80 L/s
Total	63.89 L/s	41.66 L/s	**-22.23 L/s**

Table 2.4 – Comparison of Pre- and Post-Development Discharge to Yorkville Combined Sewer – Building B

	Pre-Development Flow	Post-Development Flow	Net Change
Sanitary	0.06 L/s	0.67 L/s	0.61 L/s
Storm (2-Year) Note – Storm to Cumberland	0.00 L/s	0.00 L/s	0.00 L/s
Total	0.06 L/s	0.67 L/s	0.61 L/s

Table 2.5 – Comparison of Pre- and Post-Development Discharge to Yorkville Combined Sewer – Site Total

	Pre-Development Flow	Post-Development Flow	Net Change
Sanitary	0.55 L/s	19.73 L/s	19.18 L/s
Storm (2-Year)	63.40 L/s	22.60 L/s	-40.80 L/s
Total	63.95 L/s	42.33 L/s	**-21.62 L/s**

As shown in the table above, there is a net decrease of 21.62 L/s in the total flow draining to the existing Yorkville Ave combined sewer system as a result of the proposed development. Therefore, no capital improvements to the municipal

combined sewer system are required since flow conditions in the existing combined sewer are improved in post-development.

It is proposed to discharge storm flows from Building B to the existing 450 mm combined sewer on Cumberland Avenue. MOECC procedure F-5-5 requires that the total flow in the combined sewer system not increase as a result of the proposed development.

Table 2.6 – Comparison of Pre- and Post-Development Discharge to Cumberland Combined Sewer – Building B

	Pre-Development Flow	Post-Development Flow	Net Change
Sanitary	0.00 L/s	0.00 L/s	0.00 L/s
Storm (2-Year)	7.90 L/s	2.50 L/s	-5.40 L/s
Total	7.90 L/s	2.50 L/s	**-5.40 L/s**

As shown in the table above, there is a net decrease of 5.40 L/s in the total flow draining to the existing Cumberland Ave combined sewer system as a result of the proposed development. Therefore, no capital improvements to the municipal combined sewer system are required since flow conditions in the existing combined sewer are improved in post-development.

2.6 ANALYSIS OF DOWNSTREAM COMBINED SEWERS

The City of Toronto has provided copies of the City's Dorsch model data and Sewer Atlas Maps for the combined sewers on Yorkville Avenue, Yonge Street and the surrounding network of pipes. Those copies of the Dorsch model and Sewer Atlas Maps are provided in Appendix C and are only used as a reference to complete the design sheet for pre and post development. The design sheets and sanitary drainage area plan can be found in Appendix A.

A dry weather downstream sewer analysis was completed for the pre-development and post-development conditions. Pipe capacities remain below 6% in both the pre-development and post-development conditions. This demonstrates that the existing sewer system is capable of accommodating dry weather flow from the proposed development.

A 2-year storm wet weather downstream analysis was completed for the pre-development and post-development conditions. As demonstrated in the Section 2.5 of this report there is a net reduction of flow to the receiving combined sewers during a 2-year or greater storm event. The wet-weather downstream combined sewer design sheets show that the flow is reduced in all downstream sewer sections. Therefore, the proposed development will improve the condition in the receiving sewers during wet weather events.

Since the increase in dry weather flows does not cause any surcharging and the proposed development will reduce wet weather flows, WSP has concluded that the downstream sewer system is adequate for the proposed redevelopment and no downstream sewer improvements are required to service this development.

2.7 GROUNDWATER DISCHARGE

The client has retained EXP to complete a Hydrogeological Investigation for the site dated March 13, 2018, in support of the proposed development. The results of the investigation show that groundwater will be collected in the building's permanent foundation drainage system at a rate of 196m^3/d (2.27L/s) for Building A and 9.0m^3/d (0.10 L/s) for Building B. The investigation shows the groundwater tested on site did not meet the City's sewer use by-law for storm sewers in a number of categories and did not meet the City's sewer use by-law for sanitary sewers for total suspended solids (TSS). It is proposed that groundwater from the site will be discharged to the sanitary/combined sewer system after treating to remove TSS to meet the sewer use By-Law. The proposed treatment system is a settling chamber to settle out TSS. The treatment system will not have any backwash to the City's sewer system. The mechanical engineer for the project has proposed a groundwater sump pump with a maximum discharge rate of 6.30 L/s for Building A and 0.63 L/s for Building B to the receiving combined sewers on Yorkville Avenue and the Laneway respectively. A letter confirming this maximum groundwater pump rate has been included in Appendix F of this report. The proposed site plan includes a proposed groundwater sampling port immediately upstream of the sanitary control manhole. An application for the temporary and permanent groundwater discharge will be made directly to Toronto Water once the mechanical systems for the building have been fully designed. The property owner will enter into Sewer Discharge Agreement with Toronto Water, Environmental Monitoring and Protection for the permanent discharge of groundwater into the City combined sewer.

It should be noted that the 6.30 L/s of pumped groundwater flow for Building A and 0.63 L/s of pumped groundwater flow for Building B has been included in the post development combined sewer design sheets (discussed in Section 2.5).

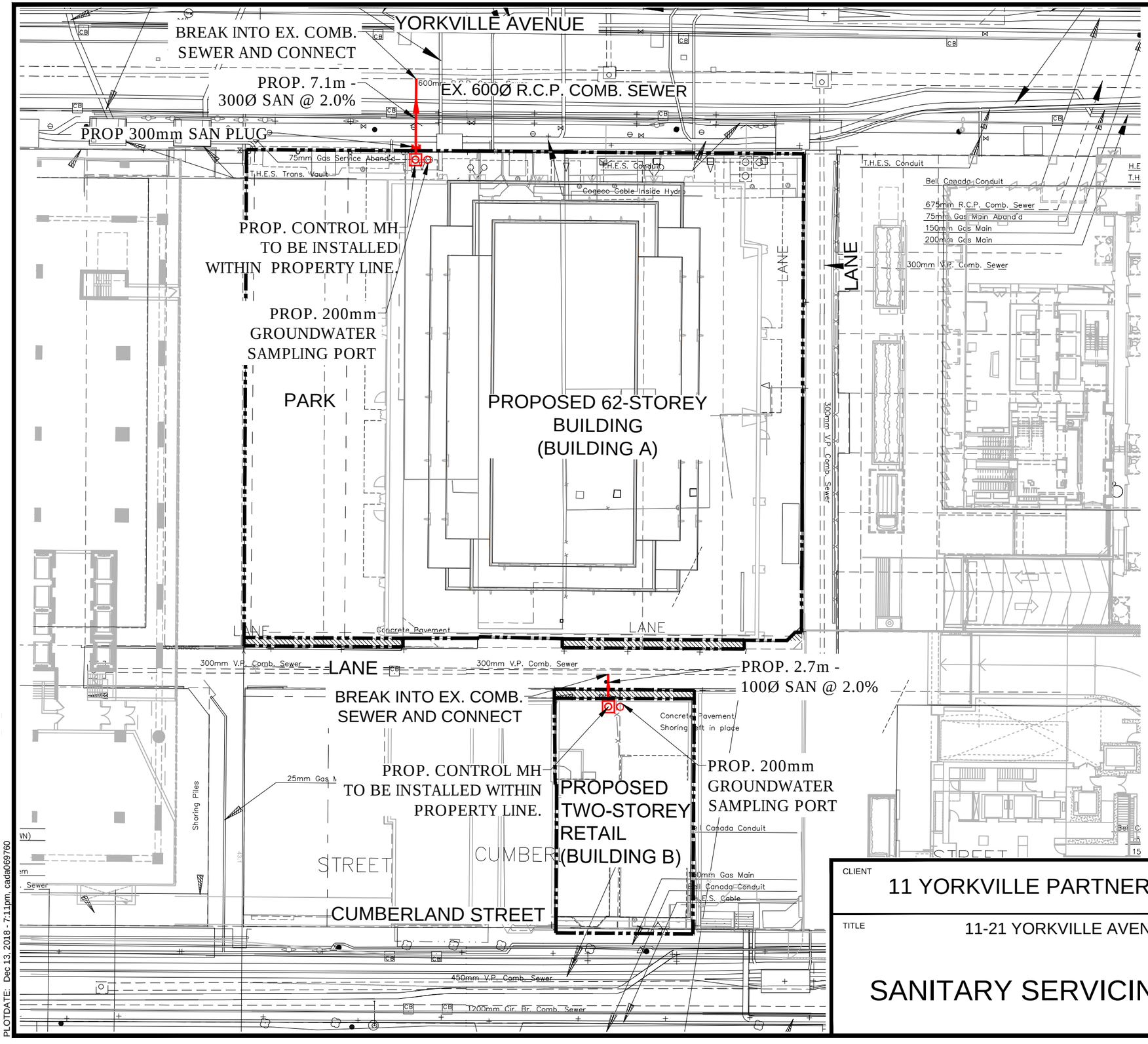
2.8 CONSTRUCTION DEWATERING

During construction the estimated dewatering requirement for the site is approximately 272m^3/d (3.15L/s) for Building A and 14m^3/d (0.16L/s for Building B), as per the findings of the site Hydrogeological Investigation prepared by EXP, dated March 13, 2018. The groundwater tested on site did not meet the City's sewer use by-law for storm sewers in a number of categories and did not meet the City's sewer use by-law for sanitary sewers for total suspended solids (TSS). It is proposed that construction dewatering from the site will be discharged to the sanitary/combined sewer system after treatment to remove TSS to meet the sewer use By-Law.

Looking specifically at Building A, the receiving combined sewer system on Yorkville has capacity to accept 29.68L/s of flow from the site during permanent conditions (design flow + infiltration flows + permanent groundwater flows), as demonstrated in Section 2.7 of this report and therefore can accommodate the construction dewatering flow rate in the

interim condition. The construction dewatering flow rate (3.15L/s) in the interim condition is well under the ultimate condition total flow rate (permanent dewatering flow rate + infiltration flow rate + design flow rate, 29.68 L/s). The pump for construction dewatering will be specified by the contractor at a later date. The contractor will be required to select a pump that has a pump rate greater than the dewatering requirement (3.15L/s) and less than the permanent discharge rate (29.68L/s) to dewater the site with no negative impacts to the downstream receiving sewers. The owner plans to discharge construction dewatering to the sanitary/combined sewer and the specifics will be reviewed and confirm with Toronto Water at the time of the Private Water Discharge Application.

Looking specifically at Building B, the receiving combined sewer system on Yorkville has capacity to accept 0.69L/s of flow from the site during permanent conditions (design flow + infiltration flows + permanent groundwater flows), as demonstrated in Section 2.5 of this report and therefore can accommodate the construction dewatering flow rate in the interim condition. The construction dewatering flow rate (0.16L/s) in the interim condition is well under the ultimate condition total flow rate (permanent dewatering flow rate + infiltration flow rate + design flow rate, 0.69 L/s). The pump for construction dewatering will be specified by the contractor at a later date. The contractor will be required to select a pump that has a pump rate greater than the dewatering requirement (0.16L/s) and less than the permanent discharge rate (0.69L/s) to dewater the site with no negative impacts to the downstream receiving sewers. The owner plans to discharge construction dewatering to the sanitary/combined sewer and the specifics will be reviewed and confirm with Toronto Water at the time of the Private Water Discharge Application.



LEGEND

- LIMIT OF PROP. WORKS
- ROOF OUTLINE
- P1 LEVEL OUTLINE
- EX. COMBINED SEWER
- PROP. SAN CONNECTION

CLIENT
11 YORKVILLE PARTNERSHIP INC.

TITLE
11-21 YORKVILLE AVENUE

SANITARY SERVICING PLAN

Checked B.S.T.	Drawn 10/12 Cad
Date MAR. 2018	Proj. No. 17M-01494
Scale NTS	Figure No. 4

PLOTDATE: Dec 13, 2018 - 7:11pm, cada069760

3 WATER SUPPLY AND APPURTENANCES

3.1 EXISTING CONDITIONS

Existing watermains in the vicinity of the site include a 300 mm watermain on Yorkville Avenue and a 150 mm watermain on Cumberland Street. There is an existing fire hydrant on the north-west corner of Yorkville Avenue and Yonge Street.

3.2 DESIGN PARAMETERS

The following design criteria have been taken from the City of Toronto, Design Criteria for Sewers and Watermain, November 2009:

- Water demand rate of 191 L/person/day for proposed developments;
- Population densities of 1.4 person per unit for one bedroom units;
- Population densities of 1.4 person per unit for studio units;
- Population densities of 2.1 person per unit for two bedroom units;
- Population densities of 3.1 person per unit for three bedroom units;
- Population densities of 2.7 person per unit for existing apartment buildings;
- Peak Hour Factor of Residential (apartments) = 2.50;
- Maximum Day Factor of Residential (apartments) = 1.30;
- Peak Hour Factor of Commercial = 1.20;
- Maximum Day Factor of Commercial = 1.10;
- Retail Equivalent Population of 1.1 people / 100m^2 per floor space;

3.3 DOMESTIC WATER DEMAND

The domestic water demands for the proposed development were calculated using the criteria's outlined by the City of Toronto's, design criteria for sewers and watermains, November 2009. The projected water demands for the proposed development have been estimated in Table 3.1:

Table 3.1 – Design Criteria and Projected Domestic Water Demands from Site

Average Water Consumption Rate	191 litres/person/day
Residential 1 Bedroom Unit & Population Density	382 units / 1.4 people per unit
Residential 2 Bedroom Unit & Population Density	278 units / 2.1 people per unit
Residential 3 Bedroom Unit & Population Density	71 units / 3.1 people per unit
Total Residential Units – Building A	670 units
Total Residential Equivalent Population – Building A	1239 people
Commercial Floor Area – Building A	2,449 m^2
Commercial Floor Area – Building B	846 m^2
Commercial Population Density	1.1 people per 100 m^2 of floor area
Total Commercial Equivalent Population – Building A	27 people
Total Commercial Equivalent Population – Building B	10 people
Peaking Factors	Residential = 2.50 for Peak Hour, 1.30 for Maximum Day Commercial = 1.20 for Peak Hour, 1.10 for Maximum Day
Average Water Demand - Building A	2.74 L/s
Average Water Demand - Building B	0.02 L/s
Peak Water Demands - Building A	**Peak Hour = 6.77 L/s, Maximum Day = 3.55 L/s**
Peak Water Demands - Building B	**Peak Hour = 0.03 L/s, Maximum Day = 0.02 L/s**
Peak Water Demands – Site	**Peak Hour = 6.80 L/s, Maximum Day = 3.58 L/s**

The average day water demand for Building A will be 2.74 L/s and the average day demand for Building B will be 0.02 L/s. The peak hour and maximum day water demands are 6.77 L/s and 3.55 L/s for Building A and 0.03 L/s and 0.02 L/s for Building B, respectively. Please refer to Appendix B for detailed calculations of the domestic water demands.

3.4 PROPOSED WATER SERVICE

For Building A, the proposed water service connections will include two (2) 200 mm diameter fire lines with one (1) 150 mm domestic branch connecting into the north side of the building from the existing 300 mm diameter watermain along Yorkville Avenue. Two separate fire connections separated by a valve and box will satisfy section 3.29.7(4) of the Ontario Building Code, which requires two separate fire connections for buildings exceeding 84.0m in height. Building B will be serviced by one (1) 150 mm shared water line at the south side of the building which will connect to the existing 150 mm watermain on Cumberland Street. In accordance with City standards, water meters and detector check valves will be installed as close to the property line as possible for all domestic connections, and will be accessible from inside the buildings. All other internal plumbing will meet O.B.C. standards. Refer to Figure 5 – Water Servicing Plan for an illustration of the proposed servicing.

3.5 HYDRANT FLOW TEST

The required fire flow for the site was calculated based on the Fire Underwriters Survey (FUS) requirements. The calculations are based on the largest floor area, in addition to 25% of the floor area above, and 25% of the floor area below as the proposed building will be fire-resistive with vertical openings being adequately protected for a one hour fire. The required fire flow calculations are shown in Appendix B and are summarized in Table 3.2 below:

Table 3.2– FUS Fire Flow for Proposed Development

Site	Required Fire Flow	
	USGPM	L/s
Building A	1,732	109
Building B	920	58

A hydrant flow test was completed for the 300mm watermain on Yorkville Avenue in May 2018. The results of this test have been included for reference and can be found in Appendix B. The available fire flow was recorded at 3800 USGPM (240L/s) at a minimum pressure of 140 kpa (20 psi). The available fire flow is much greater than the FUS fire flow for Building A calculated above. Therefore, the watermain on Yorkville adjacent to the site has adequate capacity to support the water demand of the proposed development.

A hydrant flow testing has not yet been completed for Cumberland Street. Once the testing season re-opens after April, hydrant flow tests will be scheduled on the existing 150 mm diameter watermain on Cumberland Street to assess the available capacity of the system. The results of the hydrant flow tests will be compared with the calculated maximum day plus fire demands of the proposed Building B.

YORKVILLE AVENUE

CUT 300Ø V&B INTO EX. 300Ø WATERMAIN

PROP. 200Ø FIRE W/ V&B AND 150Ø DOMESTIC BRANCH W/ V&B - RESIDENTIAL

WATERMAIN CONNECTIONS AS PER T-1105.02-1

EX.300Ø WATERMAIN

PROP. 200Ø FIRE W/ V&B

150mm Water Main Aband'd

300mm Water Main

75mm Gas Service Aband'd

T.H.E.S. Trans. Vault

T.H.E.S. Conduit

Bell Canada Conduit

75mm Gas Main Aband'd

150mm Gas Main

200mm Gas Main

MECHANICAL ROOM

LANE

PARK

PROPOSED 62-STOREY BUILDING (BUILDING A)

CONTRACTOR TO INSTALL DETECTOR CHECK VALVE AND WATER METER INSIDE THE BUILDING MECHANICAL ROOM AT OWNER'S COST

Concrete Pavement

Shoring Piles

25mm Gas Main

PROPOSED TWO-STOREY RETAIL (BUILDING B)

MECHANICAL ROOM

CUMBERLAND STREET

Shoring left in place

Bell Canada Conduit

200mm Gas Main

Bell Canada Conduit

T.H.E.S. Cable

PROP. 150Ø DOM/FIRE W/ V&B

WATERMAIN CONNECTION AS PER T-1105.02-1

EX.150Ø WATERMAIN

LEGEND

- LIMIT OF PROP. WORKS
- ROOF OUTLINE
- P1 LEVEL OUTLINE
- EX. WATERMAIN
- PROP. W/M CONNECTION
- PROP. VALVE & CHAMBER
- PROP. VALVE & BOX

CLIENT

11 YORKVILLE PARTNERSHIP INC.

TITLE

11-21 YORKVILLE AVENUE

WATER SERVICING PLAN

Checked	B.S.T.	Drawn	10/12 Cad
Date	MAR. 2018	Proj. No.	17M-01494
Scale	NTS	Figure No.	5

PLOTDATE: Dec 13, 2018 - 7:09pm, cada069760

4 STORM DRAINAGE AND STORM DRAINAGE

4.1 STORMWATER MANAGEMENT REPORT

In support of the Rezoning Application for Building A and Building B and the Site Plan Application for Building A WSP has prepared a separate Storm Water Management Report. The report titled Stormwater Management Report – 11-25 Yorkville Avenue & 16-18 Cumberland Street, dated December 14, 2018, contains a more detailed analysis of the stormwater management controls being proposed as part of this development. This Functional Servicing Report summarizes key components of the stormwater management.

4.2 EXISTING CONDITIONS

The existing site is currently occupied by commercial buildings, covering the majority of the site. The existing site area for Building A is 2871m^2 (0.287ha) and the existing site area for Building B is 358m^2 (0.036ha). Since the runoff coefficient from the existing site exceeds 0.50, a runoff coefficient of 0.50 was used in the pre-development condition to determine the allowable release rate to the municipal storm sewers. Based on the site areas and a 2-year rainfall intensity of 88.2 mm/hour (for a time of concentration of 10 minutes), the allowable 2-year pre-development release rate from the proposed development is 35.2 L/s for Building A and 4.4 L/s for Building B. The existing site is estimated to have a current runoff coefficient of 0.90 with an existing storm flow rate of 63.3 L/s for Building A and 7.9 L/s for Building B. Based on the existing topographic information, there are no external flows entering the site in its existing condition.

WSP is not aware of any existing stormwater management control on the site and therefore all flows currently leave the site uncontrolled.

4.3 PROPOSED DEVELOPMENT

Building A and Building B will each have proposed stormwater cisterns which will collect stormwater runoff generated from the proposed site. A sump will be provided to detain stormwater to be irrigation, car washing, or toilet flushing of commercial spaces.

The City's WWFMG state that the maximum allowable discharge to a municipal sewer system is the 2-year pre-development flow rate for events of up to and including 100-year intensity. Based on this requirement, the cisterns will be sized to retain the water captured onsite during a 100-year storm and release at a maximum of the 2-year pre-development rate. Building A will be serviced by a proposed 200 mm storm service connection which will direct flow to the existing 675 mm diameter combined sewer on Yorkville Avenue. Building B will be serviced by a 100mm storm service

connection which will direct flow to the existing 450mm diameter combined sewer on Cumberland Ave as shown on Figure 6.

Using the Manning formula with an 'n' of 0.013 and a slope of 2.0%, a 200 mm diameter storm connection can convey a flow of 48.4 L/s, while a 100 mm diameter storm connection can convey a flow of 7.6 L/s, conveyances which are sufficient to meet the allowable respective release rates of 35.2 L/s and 4.4 L/s for Buildings A and B. A 100 mm orifice tube will be placed upstream of the control manhole located at Building A to regulate the flow below the allowable maximum discharge rate. For Building B, a 3-inch (76 mm) diameter SXH Hydrobrake valve has been selected to control runoff from the cistern before entering the control manhole.

4.4 WATER BALANCE

The City of Toronto has recently implemented the Wet Weather Flow Guidelines which require a water balance approach to storm runoff and have set as a minimum standard for the retention of all flows from a 5mm storm event utilizing infiltration, evaporation and rainwater reuse. In order to meet the water balance requirements, the developer is proposing to construct cisterns on the parking garage for Building A and Building B. Stormwater collected in the sumps can be reused for irrigation, car washing, or toilet flushing of commercial spaces. For Building A, the required ester balance volume is 9.39m^3 and 9.39m^3 is provided. For Building B, the required water balance volume is 1.43m^3 and 1.43m^3 is provided. Refer to the Stormwater Management Report for further details.

4.5 STORMWATER QUANTITY CONTROLS

4.5.1 ALLOWABLE OUTFLOW

The 2-year pre-development peak flow was calculated using the rational method with an inlet time of 10 minutes and a run-off coefficient of 0.5. The allowable release rate from the sites were calculated to be 35.2L/s for Building A based on an area of 0.287ha and 7.9L/s for Building B based on an area of 0.036ha. Modelling of the proposed cisterns shows that in a 2-year storm event the actual release rates from the tank is 19.0L/s for Building A and 2.5L/s for Building B. Please note that in addition there is a small area (approximately 160m^2) from the Building A lands that will drain to the municipal sewer system uncontrolled. The uncontrolled flow for the 2-year storm event is 3.6L/s. Refer to the Stormwater Management Report for further details.

4.5.2 REQUIRED STORAGE

As per City requirements, both the minor and major storm events will be controlled to below the 2-year pre-development rate. The development will require cisterns on the below-ground levels to control the storm flow and release stormwater at the maximum allowable rates. In order to achieve the control of the 100-year storm event, the required storage of the

cisterns will be 113.9 m^3 for Building A and 10.5 m^3 for Building B. The storage volume provided is 260m^2 for Building A and 16m^3 for Building B.

The modified rational method was used to determine the storage required to control the post development flows down to the allowable release rates. Refer to Stormwater Management Report for the calculations.

4.6 STORMWATER QUALITY CONTROLS

The City of Toronto's Wet Weather Flow Management Guidelines (WWMFG) requires that all new developments provide long term removal of 80% of Total Suspended Solids (TSS) on an average annual basis.

The proposed roof areas for the development will not be prone to sediment generation and can therefore be considered clean for the purposes of storm water quality control. Building A is covered by mostly roof, with some at-grade hardscape and landscaping (POPS), so there will be some at–grade sediment-generating surfaces or activities. Water quality is proposed to be provided by a Jellyfish Filter Unit (JF4-2-1). Building B is covered mostly by roof. Each site has been designed to achieve the required 80% TSS removal. Please refer to the Stormwater Management Report for more details.

4.7 PROPOSED STORM SERVICE – MINOR DRAINAGE SYSTEM

As previously mentioned and in coordination with the Stormwater Management Report, Building A will be serviced by a 200 mm diameter PVC storm connection connecting to the existing 675 mm diameter combined sewer on Yorkville Avenue. Building B will be serviced by a 100 mm diameter PVC storm connection connecting to the existing 450 mm diameter combined sewer Cumberland Street. Flow controls will restrict the outflows from both cisterns to the allowable release rates described above.

Installation of these connections will be coordinated with the City of Toronto connections department. All other internal plumbing will meet O.B.C. standards.

4.8 PROPOSED STORM SERVICE – MAJOR STORM DRAINAGE SYSTEM

The major storm drainage will be stored on site and released to the minor storm system at a maximum of the allowable release rate from the respective buildings, as indicated in Section 4.5.1 Allowable Outflow. The cisterns will accommodate both the water retention and quantity control, and are currently sized as described in Section4.5.2. The flow controls will control the flow to below the maximum allowable release rate, allowing the storm water to drain by gravity to the control manholes, then to the municipal sewers.

Discharge from the new roof drainage systems and stormwater runoff from the various impervious roof/outdoor amenity and terrace surfaces of the buildings will be directed to the cisterns below ground. The area drains and trench drains will be sized to convey the 100-year storm event to the cisterns without any overflow for all storm events up to the 100-year storm event. The area drains and trench drains will connect through the garage slab to the mechanical storm drainage system inside the buildings which will direct all flows to the cisterns. The building structures will be designed to support the storm water cisterns under the most critical loading conditions (i.e. when cistern is full).

For storms larger than the 100-year design storm, or if the cisterns outlets become blocked, the excess water in the cistern will be directed via an overflow hatch onto the grade and drained via the overland flow route to the municipal R.O.W.

4.9 ANALYSIS OF DOWNSTREAM STORM SEWERS

Storm flow from Building A will be directed to the Yorkville Avenue combined sewer. The Yorkville Avenue receiving sewers, including the storm flow from Building A are analyzed in Section 2.6.

The storm flow from Building B will be directed to the Cumberland Avenue combined sewer. The stormwater management controls being implemented on site will ensure that the flows to the Cumberland Avenue combined sewer are decreased as a result of this development. Therefore, the proposed development will improve the condition in the receiving sewers during wet weather events.

Since the development will reduce wet weather flow in receiving sewers for all storm events WSP has concluded that no downstream storm sewer improvements are required as a result of this development.

YORKVILLE AVENUE

EX. 600Ø R.C.P. COMB. SEWER

600mm R.C.P. Comb. Sewer

BREAK INTO EX. COMB. SEWER AND CONNECT STM SERVICE

PROP 300mm STM PLUG

PROP. 6.9m-200Ø STM @ 2.0%

75mm Gas Service Aband'd

T.H.E.S. Trans. Vault

PROP. CONTROL MH TO BE INSTALLED WITHIN PROPERTY LINE.

PROP STM CONTROL DISCHARGE CHAMBER

T.H.E.S. Conduit

Bell Canada Conduit

675mm R.C.P. Comb. Sewer

75mm Gas Main Aband'd

ACCESS HATCH/ EMERGENCY OVERFLOW

300mm V.P. Comb. Sewer

LANE

PROP. STM TANK 4.6mx4.5mx12.55m = 260m^3 TOTAL AVAILABLE VOLUME

PARK

PROPOSED 62-STOREY BUILDING (BUILDING A)

300mm V.P. Comb. Sewer

LANE

Concrete Pavement

LANE

300mm V.P. Comb. Sewer

LANE

300mm V.P. Comb. Sewer

Concrete Pavement
Shoring left in place

PROP. STM TANK 8m^2 x 2m = 16m^3 TOTAL VOLUME

ACCESS HATCH/ EMERGENCY OVERFLOW

CONTROL MH TO BE INSTALLED WITHIN PROPERTY LINE.

PROPOSED TWO-STOREY RETAIL (BUILDING B)

Shoring Piles

Bell Canada Conduit

STREET

PROP. 3.5m-100Ø STM @ 2.0%

CUMBERLAND STREET

300mm Gas Main

Bell Canada Conduit

T.H.E.S. Cable

EX. 450Ø V.P. COMB. SEWER

BREAK INTO EX. COMB. SEWER AND CONNECT

LEGEND

- LIMIT OF PROP. WORKS
- ROOF OUTLINE
- P1 LEVEL OUTLINE
- EX. COMBINED SEWER
- PROP. STORM CONNECTION

CLIENT

11 YORKVILLE PARTNERSHIP INC.

TITLE

11-21 YORKVILLE AVENUE

STORM SERVICING PLAN

Checked	B.S.T.	Drawn	10/12 Cad
Date	MAR. 2018	Proj. No.	17M-01494
Scale	NTS	Figure No.	6

PLOTDATE: Dec 13, 2018 - 7:14pm, cada069760

5 CONCLUSIONS

5.1 SANITARY

The existing 600 and 675 mm diameter combined sewer on Yorkville Avenue and the existing 300 mm diameter combined sewer in the laneway north of Building B both have sufficient capacity to convey the projected peak sanitary flows. Building A will discharge to the existing 600 mm combined sewer along Yorkville Avenue through one 200 mm diameter sanitary service connection. Building B will discharge flow to the existing 300 mm combined sewer in the laneway north of the building via a 100 mm diameter sanitary service connection. Sanitary control maintenance holes will be installed immediately inside the property lines and will be fitted with backflow prevention devices. The control manholes will be accessible from the outside per City standards. The building sanitary systems will be designed to operate under municipal sewer surcharge conditions.

The downstream combined sewers can adequately accommodate the proposed redevelopment. No downstream combined sewer improvements are required to service the proposed development.

5.2 WATER

Building A will be serviced by two 200 mm diameter PVC fire connections into the existing 300 mm watermain on Yorkville Avenue. One fire connection will have a 150 mm domestic branch. The two fire connections will be separated by a proposed valve. Building B will be serviced by one shared 150 mm diameter connection, which will connect to the existing 150 mm watermain on Cumberland Street. A water meter and a detector check valve will be installed as close to the property line as possible within both buildings. All internal plumbing will meet Ontario Building Code standards. A hydrant flow test on Yorkville has demonstrated sufficient water to provide both domestic water and fire protection. A hydrant flow test is still to be complete for Cumberland Street. Once hydrant flow testing has been completed in the spring, the results will be compared with the calculated maximum day plus fire demands from the proposed development.

5.3 STORM

Building A will be serviced by a 200 mm diameter PVC storm connection along the north side of the building and connect into the existing 675 mm combined sewer. Building B will be serviced by a 100 mm diameter PVC storm connection along the south side of the building connecting to the existing 450 mm diameter combined sewer on Cumberland Street. Storm control maintenance holes will be installed immediately inside the property lines. The control manholes will be accessible from the outside per City standard. The building storm systems will be designed to operate under municipal sewer surcharge conditions.

The proposed development will reduce the storm flows coming from the site to the existing combined sewer system to a 2-year pre-development release rate during all storms up to, and including, the 100-year event. Therefore, WSP has concluded that there will be no negative impacts to the existing combined sewer system as a result of this development.

APPENDIX

A THEORETICAL SANITARY SEWAGE FLOWS & SANITARY DESIGN SHEETS & SANITARY DRAINAGE AREA PLAN (SDR-1)

APPENDIX A
THEORETICAL SANITARY SEWAGE FLOWS

Project: 11 Yorkville Avenue
Job No.: 17M-01494
Date: December 17, 2018

A. Existing Development

Address	Gross Floor Area (GFA)[1]	Site Area	Population[2]	Average Commercial Flow (250 L/cap/d)	Infiltration Allowance (0.26 L/s/ha)	Total Existing Sanitary Flow
	(m^2)	(ha)	(ppl)	(L/s)	(L/s)	(L/s)
11 Yorkville Avenue	7700	0.119	85	0.25	0.03	0.28
17 Yorkville Avenue	1158	0.045	13	0.04	0.01	0.05
19 Yorkville Avenue	1004	0.040	12	0.03	0.01	0.05
21 Yorkville Avenue	3140	0.083	35	0.10	0.02	0.12
Subtotal - Ex Bldg A	**13002**	**0.287**	**145**	**0.42**	**0.07**	**0.49**
16 Cumberland Street	828	0.021	10	0.03	0.01	0.03
18 Cumberland Street	477	0.015	6	0.02	0.00	0.02
Subtotal - Ex Bldg A	**1305**	**0.036**	**16**	**0.05**	**0.01**	**0.06**
Total	**14,307**	**0.323**	**161**	**0.47**	**0.08**	**0.55**

Note 1: Approximate GFA for existing commercial buildings

B. Proposed Development

Residential Unit Type	Total Residential Units	Persons per Unit	Total Residential Population
Building A			
1B, 1B+D & Studio Units	382	1.4	535
2B Units	217	2.1	456
3B Units	71	3.1	221
Total Residential	**670**	**-**	**1,212**
Commercial Type	**GFA (m^2)**	**Density (ppl/100m^2)**	**Total Commercial Population**
Building A			
Retail	2,449	1.1	**27**
Building B			
Retail	846	1.1	**10**
Total Commercial	**3,295**	**-**	**37**

Proposed Flow

Building / Unit Type	Population	Site Area (ha)	Average Flow (240L/cap/d - Residential) (250L/cap/d - Commercial) (L/s)	Harmon Peaking Factor	Peak Sanitary Design Flow (L/s)	Infiltration (0.26L/s/ha) (L/s)	Permanent Dewatering Rate (Pumped Rate) (L/s)	Total Peak Flow (L/s)
Building A - Residential	1,212	N/A	3.37	3.74	12.61	N/A	N/A	N/A
Building A - Retail	27	N/A	0.08	1.00	0.08	N/A	N/A	N/A
Subtotal - Building A	**1,239**	**0.287**	**3.44**	**N/A**	**12.68**	**0.07**	**6.30**	**19.06**
Building B - Retail	10	N/A	0.03	1.00	0.03	N/A	N/A	N/A
Subtotal - Building B	**10**	**0.036**	**0.03**	**N/A**	**0.03**	**0.01**	**0.63**	**0.67**
SITE TOTAL	**1,249**	**0.323**	**3.47**	**N/A**	**12.71**	**0.08**	**6.93**	**19.73**

Total Peak Flow (Building A) = 19.06 L/s
Increase in Peak Flow (Building A) = 18.57 L/s

Total Peak Flow (Building B) = 0.67 L/s
Increase in Peak Flow (Building B) = 0.61 L/s

Total Peak Flow (Site Total) = 19.73 L/s
Increase in Peak Flow (Site Total) = 19.18 L/s

Note 1: 1.4 people per 1B & 1B+D & Studio Unit, 2.1 people per 2B Unit, and 3.1 people per 3B Unit per City of Toronto Design Criteria for Sewers and Watermain, November 2009, page 35
Note 2: Commercial Flow rate based on proposed populations and 1.1 persons/100m2 per City of Toronto Design Criteria for Sewers and Watermain, November 2009, page 34

Peaking Factor = Harmon Formula

Average Daily Flow
Residential flow is based on 240 L/cap/d, per City of Toronto Design Criteria for Sewers and Watermain
Commercial flow is based on 250 L/cap/d, per City of Toronto Design Criteria for Sewers and Watermain

ZONES/PIPES AREAS

	Land Use (hectares)				Population		
Drainage Zone	Total	Residential	Commercial	Institutional	Residential	Commercial	Institutional
Zone 1	0.510508	0.120457	0.201715	0.188336	49	23	17
Zone 2	0.435289	0.09281	0	0.342479	38	0	30
Zone 3	0.503855	0.133519	0.062196	0.30814	54	7	27
Zone 4	2.875343	1.377012	0.183792	1.314539	551	21	114
Zone 5	1.607135	1.41228	0.029974	0.164881	565	4	15
Zone 6	0.612568	0.348386	0.264182	0	140	30	0
Zone 7	9.829049	7.491855	1.08288	1.254314	2997	120	108
Zone 8	6.390357	5.851752	0.538605	0	2341	60	0
Total	22.764104	16.828071	2.363344	3.572689	6735	265	311

EQUIVALENT POPULATION DENSITIES BASED ON LAND USE:		
RESIDENTIAL	400	persons/ha
INDUSTRIAL	136	persons/ha
OFFICES	330	persons/ha
COMMERCIAL & RETAIL	110	persons/ha
SCHOOLS & CHURCHES	86	persons/ha
HOTELS	400	persons/ha
APARTMENTS	400	persons/ha

	Land Use (hectares)					
Pipe Number	Residential	Commercial	Institutional	Length	RES	ICI
17-21 Yorkville	0	0.168386	0	179.34	0	60
4355	0.328812	0	0.188336		132	21
11 Yorkville	0	0.118714	0	200.84	0	85
4356	0	0.137978	0		0	15
16/18 Cumberland	0	0.0358	0		0	16
Lane 2	0.269232				108	0
4357	0.209987	0	0		84	0
4358	0.01417	0	0		6	0
4360	0.038128	0.005599	0.015256		15	2
4361	0.184595	0.026128	0		74	3
4368	0	0	0		0	0
4369	0.107153	0.285402	0		43	31
4370	0.172994	0.10889	0		69	12
4371	0.042091	0.042056	0		17	5
4388	0.172365	0.148568	0		69	16
4389	0.136272	0.173877	0		55	19

APPENDIX A
EXISTING COMBINED SEWER ANALYSIS
PRE-DEVELOPMENT DRY WEATHER
CITY OF TORONTO

TABLE D.1.1

PRE-DEVELOPMENT CONDITIONS - DRY WEATHER

Sanitary Flows

n= 0.013

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 0.260 L/s/ha

COMBINED SEWERSHED AREA: 25.930 ha

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

		SANITARY FLOW CALCULATIONS													Extraneous Flows			BASED ON CITY OF TORONTO ARCHIVE							
		Segment				Cumulative				SANITARY FLOW															
Description / Location / Dissemination Blocks	PIPE ID	Area A (ha)	Population			Area A (ha)	Population			PEAKING FACTOR	Res	Emp	Infiltration Allowance	**Acc SAN Flow**	STM Flow DQ 2 YEAR	**Accm STM**	**TOTAL COMBINED FLOW**	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
			Res	ICI	Total		Res	ICI	Total	M	(L/s)	(L/s)	(L/s)	**(L/s)**	**(L/s)**	**(L/s)**	**(L/s)**	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
Zone 1 from west along Yorkville (4354)		0.511	49	40	89	0.511	49	40	89	4.000	0.54	0.12	0.13	**0.79**			**0.79**								
Existing 17/19/21 Yorkville		0.168	0	60	60	0.168	0	60	60	4.000	0.00	0.17	0.04	**0.22**			**0.22**								
Yorkville Avenue	4355	0.517	132	21	153	1.196	181	121	302	4.000	2.01	0.35	0.13	**2.49**			**2.49**	66.4	600	0.283	0.37	**373.49**	1.32	0.84	0.7%
Existing 11 Yorkville		0.119	0	85	85	0.119	0	85	85	4.000	0.00	0.25	0.03	**0.28**			**0.28**								
Yorkville Avenue	4356	0.138	0	15	16	1.453	181	221	403	4.000	2.01	0.64	0.04	**2.68**			**2.68**	20.4	675	0.358	0.36	**504.35**	1.41	1.59	0.5%
Existing 16-18 Cumberland		0.036	0	16	16	0.036	0	16	16	4.000	0.00	0.05	0.01	**0.06**											
Laneway		0.035	0	0	0	0.071	0	16	16	4.000	0.00	0.05	0.01	**0.06**			**0.06**	72.1	300	0.071	0.51	**69.06**	0.98	1.23	0.1%
Laneway		0.269	108	0	108	0.340	108	16	124	4.000	1.20	0.05	0.07	**1.32**			**1.32**	58.9	300	0.071	0.53	**70.40**	1.00	0.99	1.9%
Yorkville Avenue	4357	0.210	84	0	84	2.002	373	237	611	4.000	4.14	0.69	0.05	**4.88**			**4.88**	42.1	675	0.358	0.45	**563.88**	1.58	0.45	0.9%
Yorkville Avenue	4358	0.014	6	0	6	2.017	378	237	617	4.000	4.20	0.69	0.00	**4.89**			**4.89**	15.5	600	0.283	0.56	**459.48**	1.63	0.16	1.1%
Zone 2 from south along Yonge (4359)		0.435	38	30	68	0.435	38	30	68	4.000	0.42	0.09	0.11	**0.62**			**0.62**								
Yonge Street	4360	0.059	15	1	16	2.511	431	268	701	4.000	4.79	0.77	0.02	**5.58**			**5.58**	27.4	675	0.358	0.30	**460.41**	1.29	0.35	1.2%
Zone 3 from east along Collier (5569)		0.504	54	34	88	0.504	54	34	88	4.000	0.60	0.10	0.13	**0.83**			**0.83**								
Yonge Street	4361	0.211	74	3	77	3.225	559	304	866	3.949	6.13	0.88	0.05	**7.07**			**7.07**	55.2	750	0.442	0.51	**795.04**	1.80	0.51	0.9%
Zone 5 from west along Scollard (4367)		1.607	565	19	584	1.607	565	19	584	3.946	6.19	0.05	0.42	**6.67**			**6.67**								
Zone 4 from west along Scollard (4367)		2.875	551	135	686	2.875	551	135	686	3.952	6.05	0.39	0.75	**7.19**			**7.19**								
Yonge Street	4368	0.000	0	0	0	7.708	1,675	458	2,136	3.644	16.96	1.33	0.00	**18.29**			**18.29**	28.0	750	0.442	4.17	**2273.38**	5.15	0.09	0.8%

PRE-DEVELOPMENT CONDITIONS - DRY WEATHER

Sanitary Flows

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

n= 0.013

Extraneous Flows

Infiltration Allowance = 0.260 L/s/ha

COMBINED SEWERSHED AREA: 25.930 ha

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

		SANITARY FLOW CALCULATIONS													Extraneous Flows			BASED ON CITY OF TORONTO ARCHIVE							
		Segment				Cumulative				SANITARY FLOW															
Description / Location / Dissemination Blocks	PIPE ID	Area A (ha)	Population			Area A (ha)	Population			PEAKING FACTOR	Res	Emp	Infiltration Allowance	**Acc SAN Flow**	STM Flow DQ 2 YEAR	**Accm STM**	**TOTAL COMBINED FLOW**	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
			Res	ICI	Total		Res	ICI	Total	M	(L/s)	(L/s)	(L/s)	**(L/s)**	**(L/s)**	**(L/s)**	**(L/s)**	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
Zone 6 from east along Church (5539)		0.613	140	30	170	0.613	140	30	170	4.000	1.56	0.09	0.16	**1.80**			**1.80**								
Zone 7 from west along Davenport (4352)		9.829	2,997	228	3,225	9.829	2,997	228	3,225	3.443	28.66	0.66	2.56	**31.88**			**31.88**								
Yonge Street	4369	0.393	43	31	75	18.542	4,855	748	5,606	3.257	43.92	2.16	0.10	**46.19**			**46.19**	50.9	900	0.636	1.41	**2149.63**	3.38	0.25	2.1%
Yonge Street	4370	0.282	69	12	82	18.824	4,924	760	5,688	3.251	44.47	2.20	0.07	**46.74**			**46.74**	40.2	900	0.636	1.14	**1932.88**	3.04	0.22	2.4%
Yonge Street	4371	0.084	17	5	22	18.908	4,941	764	5,710	3.250	44.60	2.21	0.02	**46.84**			**46.84**	9.4	900	0.636	1.22	**1999.55**	3.14	0.05	2.3%
Zone 8 from north along Yonge (4387)		6.390	2,341	60	2,401	6.390	2,341	60	2,401	3.532	22.97	0.17	1.66	**24.80**			**24.80**								
Easement	4388	0.321	69	16	86	25.619	7,351	841	8,197	3.086	63.02	2.43	0.08	**65.53**			**65.53**	55.8	1500	1.767	3.70	**13597.24**	7.69	0.12	0.5%
Easement	4389	0.310	55	19	74	25.930	7,406	860	8,271	3.083	63.42	2.49	0.08	**65.99**			**65.99**	67.1	1500	1.767	0.95	**6889.88**	3.90	0.29	1.0%

Notes:
* *Residential and employment populations derived from site areas and population densities as outlined in City of Toronto Design Criteria for Sewers and Watermains*
* *Sewer information based on City of Toronto archive drawings*
* *See Figure 7 for combined sewer tributary areas*

APPENDIX A
EXISTING COMBINED SEWER ANALYSIS
POST-DEVELOPMENT DRY WEATHER
CITY OF TORONTO

TABLE D.1.2

POST-DEVELOPMENT CONDITIONS - DRY WEATHER

Sanitary Flows

n= 0.013

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 0.260 L/s/ha

COMBINED SEWERSHED AREA: 25.930 ha

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

		SANITARY FLOW CALCULATIONS															Extraneous Flows			BASED ON CITY OF TORONTO ARCHIVE							
		Segment					Cumulative				SANITARY FLOW															
Description / Location / Dissemination Blocks	PIPE ID	Area A (ha)	Population			Pumped GW Discharge Rate (L/s)	Area A (ha)	Population			PEAKING FACTOR	Res	Emp	Infiltration Allowance	Pumped GW Discharge Rate	Acc SAN Flow	STM Flow DQ 2 YEAR	Accm STM	TOTAL COMBINED FLOW	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
			Res	ICI	Total			Res	ICI	Total	M	(L/s)	(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
Zone 1 from west along Yorkville (4354)		0.511	49	40	89	0.00	0.511	49	40	89	4.000	0.54	0.12	0.13	0.00	**0.79**			**0.79**								
Building A		**0.287**	**1,212**	**27**	**1,239**	**6.30**	**0.287**	**1,212**	**27**	**1,239**	**3.745**	**12.61**	**0.08**	**0.07**	**6.30**	**19.06**			**19.06**								
Yorkville Avenue	4355	0.517	132	21	153	0.00	1.315	1,393	88	1,481	3.703	14.32	0.25	0.13	6.30	**21.01**			**21.01**	66.4	600	0.283	0.37	**373.49**	1.32	0.84	5.6%
Yorkville Avenue	4356	0.138	0	15	16	0.00	1.453	1,393	103	1,497	3.703	14.32	0.30	0.04	6.30	**20.96**			**20.96**	20.4	675	0.358	0.36	**504.35**	1.41	1.59	4.2%
Building B		**0.036**	**0**	**10**	**10**	**0.63**	**0.036**	**0**	**10**	**10**	**4.000**	**0.00**	**0.03**	**0.01**	**0.63**	**0.67**			**0.67**								
Laneway		0.035	0	0	0	0.00	0.071	0	10	10	4.000	0.00	0.03	0.01	0.63	**0.67**			**0.67**	72.1	300	0.071	0.51	**69.06**	0.98	1.23	1.0%
Laneway		0.269	108	0	108	0.00	0.340	108	10	118	4.000	1.20	0.03	0.07	0.63	**1.93**			**1.93**	58.9	300	0.071	0.53	**70.40**	1.00	0.99	2.7%
Yorkville Avenue	4357	0.210	84	0	84	0.00	2.002	1,585	113	1,699	3.662	16.12	0.33	0.05	6.93	**23.43**			**23.43**	42.1	675	0.358	0.45	**563.88**	1.58	0.45	4.2%
Yorkville Avenue	4358	0.014	6	0	6	0.00	2.017	1,590	113	1,705	3.661	16.17	0.33	0.00	6.93	**23.43**			**23.43**	15.5	600	0.283	0.56	**459.48**	1.63	0.16	5.1%
Zone 2 from south along Yonge (4359)		0.435	38	30	68	0.00	0.435	38	30	68	4.000	0.42	0.09	0.11	0.00	**0.62**			**0.62**								
Yonge Street	4360	0.059	15	1	16	0.00	2.511	1,643	144	1,789	3.651	16.67	0.42	0.02	6.93	**24.03**			**24.03**	27.4	675	0.358	0.30	**460.41**	1.29	0.35	5.2%
Zone 3 from east along Collier (5569)		0.504	54	34	88	0.00	0.504	54	34	88	4.000	0.60	0.10	0.13	0.00	**0.83**			**0.83**								
Yonge Street	4361	0.211	74	3	77	0.00	3.225	1,771	180	1,954	3.626	17.84	0.52	0.05	6.93	**25.35**			**25.35**	55.2	750	0.442	0.51	**795.04**	1.80	0.51	3.2%
Zone 5 from west along Scollard (4367)		1.607	565	19	584	0.00	1.607	565	19	584	3.946	6.19	0.05	0.42	0.00	**6.67**			**6.67**								
Zone 4 from west along Scollard (4367)		2.875	551	135	686	0.00	2.875	551	135	686	3.952	6.05	0.39	0.75	0.00	**7.19**			**7.19**								
Yonge Street	4368	0.000	0	0	0	0.00	7.708	2,887	334	3,224	3.456	27.72	0.97	0.00	6.93	**35.62**			**35.62**	28.0	750	0.442	4.17	**2273.38**	5.15	0.09	1.6%

POST-DEVELOPMENT CONDITIONS - DRY WEATHER

Sanitary Flows

n= 0.013

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 0.260 L/s/ha

COMBINED SEWERSHED AREA: 25.930 ha

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

		SANITARY FLOW CALCULATIONS															Extraneous Flows			BASED ON CITY OF TORONTO ARCHIVE							
		Segment					Cumulative				SANITARY FLOW															
Description / Location / Dissemination Blocks	PIPE ID	Area A (ha)	Population			Pumped GW Discharge Rate (L/s)	Area A (ha)	Population			PEAKING FACTOR	Res	Emp	Infiltration Allowance	Pumped GW Discharge Rate	**Acc SAN Flow**	STM Flow DQ 2 YEAR	**Accm STM**	**TOTAL COMBINED FLOW**	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
			Res	ICI	Total			Res	ICI	Total	M	(L/s)	(L/s)	(L/s)		**(L/s)**	**(L/s)**	**(L/s)**	**(L/s)**	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
Zone 6 from east along Church (5539)		0.613	140	30	170	0.00	0.613	140	30	170	4.000	1.56	0.09	0.16	0.00	**1.80**			**1.80**								
Zone 7 from west along Davenport (4352)		9.829	2,997	228	3,225	0.00	9.829	2,997	228	3,225	3.443	28.66	0.66	2.56	0.00	**31.88**			**31.88**								
Yonge Street	4369	0.393	43	31	75	0.00	18.542	6,067	624	6,694	3.166	53.36	1.80	0.10	6.93	**62.20**			**62.20**	50.9	900	0.636	1.41	**2149.63**	3.38	0.25	2.9%
Yonge Street	4370	0.282	69	12	82	0.00	18.824	6,136	636	6,776	3.161	53.89	1.84	0.07	6.93	**62.73**			**62.73**	40.2	900	0.636	1.14	**1932.88**	3.04	0.22	3.2%
Yonge Street	4371	0.084	17	5	22	0.00	18.908	6,153	640	6,798	3.160	54.02	1.85	0.02	6.93	**62.82**			**62.82**	9.4	900	0.636	1.22	**1999.55**	3.14	0.05	3.1%
Zone 8 from north along Yonge (4387)		6.390	2,341	60	2,401	0.00	6.390	2,341	60	2,401	3.532	22.97	0.17	1.66	0.00	**24.80**			**24.80**								
Easement	4388	0.321	69	16	86	0.00	25.619	8,563	717	9,285	3.021	71.87	2.07	0.08	0.00	**74.02**			**74.02**	55.8	1500	1.767	3.70	**13597.24**	7.69	0.12	0.5%
Easement	4389	0.310	55	19	74	0.00	25.930	8,618	736	9,359	3.019	72.26	2.13	0.08	0.00	**74.47**			**74.47**	67.1	1500	1.767	0.95	**6889.88**	3.90	0.29	1.1%

Notes:
* *Residential and employment populations derived from site areas and population densities as outlined in City of Toronto Design Criteria for Sewers and Watermains*
* *Sewer information based on City of Toronto archive drawings*
* *See Figure 7 for combined sewer tributary areas*

APPENDIX A
EXISTING COMBINED SEWER ANALYSIS
PRE-DEVELOPMENT DRY WEATHER
CITY OF TORONTO

TABLE D.2.1

PRE-DEVELOPMENT CONDITIONS - WET WEATHER - 2 YEAR STORM EVENT

Sanitary Flows

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 3.000 L/s/ha

n= 0.013

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

COMBINED SEWERSHED AREA: 25.930 ha

		SANITARY FLOW CALCULATIONS													Extraneous Flows								BASED ON CITY OF TORONTO ARCHIVE							
		Segment				Cumulative				SANITARY FLOW																			
Description / Location / Dissemination Blocks	PIPE ID	Area A (ha)	Population			Area A (ha)	Population			PEAKING FACTOR	Res	Emp	Infiltration Allowance	**Acc SAN Flow**	STORM TRIBUTARY AREA	RUNOFF COEF.	A X C	ACCUM. A X C	Tc	INTENSITY	**Accm STM**	**TOTAL COMBINED FLOW**	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
			Res	ICI	Total		Res	ICI	Total	M	(L/s)	(L/s)	(L/s)	**(L/s)**	**(ha)**	**C**			(min.)	(mm/hr)	**(L/s)**	**(L/s)**	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
Zone 1 from west along Yorkville (4354)		0.511	49	40	89	0.511	49	40	89	4.000	0.54	0.12	1.53	**2.19**	0.511	0.90	0.46	0.46	10.00	88.19	**112.64**	**114.83**	134.8					1.50	1.50	
Existing 17/19/21 Yorkville		0.168	0	60	60	0.168	0	60	60	4.000	0.00	0.17	0.51	**0.68**	0.168	0.90	0.15	0.15	10.00	88.19	**37.15**	**37.83**								
Yorkville Avenue	4355	0.517	132	21	153	1.196	181	121	302	4.000	2.01	0.35	1.55	**3.91**	0.517	0.90	0.47	1.08	11.50	79.09	**236.69**	**240.59**	66.4	600	0.283	0.37	**373.49**	1.32	0.84	64.4%
Existing 11 Yorkville		0.119	0	85	85	0.119	0	85	85	4.000	0.00	0.25	0.36	**0.60**	0.119	0.90	0.11	0.11	10.00	88.19	**26.19**	**26.80**								
Yorkville Avenue	4356	0.138	0	15	16	1.453	181	221	403	4.000	2.01	0.64	0.41	**3.06**	0.138	0.90	0.12	1.31	12.34	74.87	**272.14**	**275.20**	20.4	675	0.358	0.36	**504.35**	1.41	1.59	54.6%
Existing 16-18 Cumberland		0.036	0	16	16	0.036	0	16	16	4.000	0.00	0.05	0.11	**0.15**	0.000	0.90	0.00	0.00	10.00	88.19	**0.00**	**0.15**								
Laneway		0.035	0	0	0	0.071	0	16	16	4.000	0.00	0.05	0.10	**0.15**	0.035	0.90	0.03	0.03	10.00	88.19	**7.66**	**7.81**	72.1	300	0.071	0.51	**69.06**	0.98	1.23	11.3%
Laneway		0.269	108	0	108	0.340	108	16	124	4.000	1.20	0.05	0.81	**2.05**	0.269	0.90	0.24	0.27	11.23	80.56	**61.26**	**63.32**	58.9	300	0.071	0.53	**70.40**	1.00	0.99	89.9%
Yorkville Avenue	4357	0.210	84	0	84	2.002	373	237	611	4.000	4.14	0.69	0.63	**5.45**	0.210	0.90	0.19	1.77	13.93	68.10	**335.09**	**340.55**	42.1	675	0.358	0.45	**563.88**	1.58	0.45	60.4%
Yorkville Avenue	4358	0.014	6	0	6	2.017	378	237	617	4.000	4.20	0.69	0.04	**4.93**	0.014	0.90	0.01	1.78	14.37	66.45	**329.32**	**334.25**	15.5	600	0.283	0.56	**459.48**	1.63	0.16	72.7%
Zone 2 from south along Yonge (4359)		0.435	38	30	68	0.435	38	30	68	4.000	0.42	0.09	1.31	**1.81**	0.435	0.90	0.39	0.39	10.00	88.19	**96.05**	**97.86**	94.4					1.50	1.05	
Yonge Street	4360	0.059	15	1	16	2.511	431	268	701	4.000	4.79	0.77	0.18	**5.74**	0.059	0.90	0.05	2.23	14.53	65.88	**407.98**	**413.73**	27.4	675	0.358	0.30	**460.41**	1.29	0.35	89.9%
Zone 3 from east along Collier (5569)		0.504	54	34	88	0.504	54	34	88	4.000	0.60	0.10	1.51	**2.21**	0.504	0.90	0.45	0.45	10.00	88.19	**111.18**	**113.38**	118.1					1.50	1.31	
Yonge Street	4361	0.211	74	3	77	3.225	559	304	866	3.949	6.13	0.88	0.63	**7.65**	0.211	0.90	0.19	2.87	14.89	64.65	**515.97**	**523.62**	55.2	750	0.442	0.51	**795.04**	1.80	0.51	65.9%
Zone 5 from west along Scollard (4367)		1.607	565	19	584	1.607	565	19	584	3.946	6.19	0.05	4.82	**11.07**	1.607	0.90	1.45	1.45	10.00	88.19	**354.61**	**365.68**	378.2					1.50	4.20	
Zone 4 from west along Scollard (4367)		2.875	551	135	686	2.875	551	135	686	3.952	6.05	0.39	8.63	**15.07**	2.875	0.60	1.73	1.73	10.00	88.19	**422.96**	**438.03**	463.1					1.50	5.15	
Yonge Street	4368	0.000	0	0	0	7.708	1,675	458	2,136	3.644	16.96	1.33	0.00	**18.29**	0.000	0.90	0.00	6.04	15.40	62.97	**1057.80**	**1076.08**	28.0	750	0.442	4.17	**2273.38**	5.15	0.09	47.3%

PRE-DEVELOPMENT CONDITIONS - WET WEATHER - 2 YEAR STORM EVENT

Sanitary Flows

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 3.000 L/s/ha

n= 0.013

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

COMBINED SEWERSHED AREA: 25.930 ha

		SANITARY FLOW CALCULATIONS													Extraneous Flows									BASED ON CITY OF TORONTO ARCHIVE							
Description / Location / Dissemination Blocks	PIPE ID	Segment				Cumulative				SANITARY FLOW					STORM TRIBUTARY AREA	RUNOFF COEF.	A X C	ACCUM. A X C	Tc	INTENSITY	Accm STM	TOTAL COMBINED FLOW	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
		Area A (ha)	Population			Area A (ha)	Population			PEAKING FACTOR	Res	Emp	Infiltration Allowance	Acc SAN Flow																
			Res	ICI	Total		Res	ICI	Total	M	(L/s)	(L/s)	(L/s)	(L/s)	(ha)	C			(min.)	(mm/hr)	(L/s)	(L/s)	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
Zone 6 from east along Church (5539)		0.613	140	30	170	0.613	140	30	170	4.000	1.56	0.09	1.84	**3.48**	0.613	0.90	0.55	0.55	10.00	88.19	**135.16**	**138.64**	667.6					1.50	7.42	
Zone 7 from west along Davenport (4352)		9.829	2,997	228	3,225	9.829	2,997	228	3,225	3.443	28.66	0.66	29.49	**58.81**	9.829	0.90	8.85	8.85	10.00	88.19	**2168.77**	**2227.58**	141.5					1.50	1.57	
Yonge Street	4369	0.393	43	31	75	18.542	4,855	748	5,606	3.257	43.92	2.16	1.18	**47.26**	0.393	0.90	0.35	15.79	17.42	57.21	**2511.58**	**2558.85**	50.9	900	0.636	1.41	**2149.63**	3.38	0.25	119.0%
Yonge Street	4370	0.282	69	12	82	18.824	4,924	760	5,688	3.251	44.47	2.20	0.85	**47.52**	0.282	0.90	0.25	16.05	17.67	56.57	**2523.60**	**2571.12**	40.2	900	0.636	1.14	**1932.88**	3.04	0.22	133.0%
Yonge Street	4371	0.084	17	5	22	18.908	4,941	764	5,710	3.250	44.60	2.21	0.25	**47.07**	0.084	0.90	0.08	16.12	17.89	56.03	**2511.10**	**2558.17**	9.4	900	0.636	1.22	**1999.55**	3.14	0.05	127.9%
Zone 8 from north along Yonge (4387)		6.390	2,341	60	2,401	6.390	2,341	60	2,401	3.532	22.97	0.17	19.17	**42.31**	2.803	0.90	2.52	2.52	10.00	88.19	**618.44**	**660.75**	619.6					1.50	6.88	
Easement	4388	0.321	69	16	86	25.619	7,351	841	8,197	3.086	63.02	2.43	0.96	**66.41**	0.321	0.90	0.29	18.93	17.94	55.90	**2942.58**	**3008.99**	55.8	1500	1.767	3.70	**13597.24**	7.69	0.12	22.1%
Easement	4389	0.310	55	19	74	25.930	7,406	860	8,271	3.083	63.42	2.49	0.93	**66.84**	0.310	0.90	0.28	19.21	18.06	55.61	**2970.36**	**3037.20**	67.1	1500	1.767	0.95	**6889.88**	3.90	0.29	44.1%

Notes:
* *Residential and employment populations derived from site areas and population densities as outlined in City of Toronto Design Criteria for Sewers and Watermains*
* *Sewer information based on City of Toronto archive drawings*
* *See Figure 7 for combined sewer tributary areas*
* *Existing and Proposed storm flow for 16-18 Cumberland (Building B) are to Cumberland Ave*

APPENDIX A
EXISTING COMBINED SEWER ANALYSIS
POST-DEVELOPMENT DRY WEATHER
CITY OF TORONTO

TABLE D.2.2

POST-DEVELOPMENT CONDITIONS - WET WEATHER - 2 YEAR STORM EVENT

Sanitary Flows

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 3.000 L/s/ha

n= 0.013

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

COMBINED SEWERSHED AREA: **25.930 ha**

		SANITARY FLOW CALCULATIONS															Extraneous Flows										BASED ON CITY OF TORONTO ARCHIVE							
Description / Location / Dissemination Blocks	PIPE ID	Segment					Cumulative				SANITARY FLOW						STORM TRIBUTARY AREA	RUNOFF COEF.	A X C	ACCUM. A X C	Tc	INTENSITY	INC. CONTROLLED STORM FLOW	ACCUM. CONTROLLED STORM FLOW	Accm STM	TOTAL COMBINED FLOW	LENGTH	ACTUAL PIPE SIZE	PIPE AREA (AF)	SLOPE	CAPACITY	VELOCITY	TIME OF FLOW	% Full
		Area A (ha)	Population			Pumped GW Discharge Rate (L/s)	Area A (ha)	Population			PEAKING FACTOR	Res (L/s)	Emp (L/s)	Infiltration Allowance (L/s)	Pumped GW Discharge Rate	Acc SAN Flow (L/s)	(ha)	C			(min.)	(mm/hr)	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(m2)	(%)	(L/s)	(m/s)	(min)	
			Res	ICI	Total			Res	ICI	Total	M																						
Zone 1 from west along Yorkville (4354)		0.511	49	40	89	0.00	0.511	49	40	89	4.000	0.54	0.12	1.53	0.00	**2.19**	0.511	0.90	0.46	0.46	10.00	88.19	0.00	0.00	**112.64**	**114.83**	134.8					1.50	1.50	
Building A		**0.287**	**1,212**	**27**	**1,239**	**6.30**	**0.287**	**1,212**	**27**	**1,239**	**3.745**	**12.61**	**0.08**	**0.86**	**6.30**	**19.85**	**0.016**	**0.90**	**0.01**	**0.01**	**10.00**	**88.19**	**19.00**	**19.00**	**22.53**	**42.38**								
Yorkville Avenue	4355	0.517	132	21	153	0.00	1.315	1,393	88	1,481	3.703	14.32	0.25	1.55	6.30	**22.43**	0.517	0.90	0.47	0.94	11.50	79.09	0.00	19.00	**225.53**	**247.96**	66.4	600	0.283	0.37	**373.49**	1.32	0.84	66.4%
Yorkville Avenue	4356	0.138	0	15	16	0.00	1.453	1,393	103	1,497	3.703	14.32	0.30	0.41	6.30	**21.33**	0.138	0.90	0.12	1.08	12.34	74.87	0.00	19.00	**243.35**	**264.68**	20.4	675	0.358	0.36	**504.35**	1.41	1.59	52.5%
Building B		**0.036**	**0**	**10**	**10**	**0.63**	**0.036**	**0**	**10**	**10**	**4.000**	**0.00**	**0.03**	**0.11**	**0.63**	**0.77**	**0.000**	**0.90**	**0.00**	**0.00**	**10.00**	**88.19**	**0.00**	**0.00**	**0.00**	**0.77**								
Laneway		0.035	0	0	0	0.00	0.071	0	10	10	4.000	0.00	0.03	0.10	0.63	**0.76**	0.035	0.90	0.03	0.03	10.00	88.19	0.00	0.00	**7.66**	**8.42**	72.1	300	0.071	0.51	**69.06**	0.98	1.23	12.2%
Laneway		0.269	108	0	108	0.00	0.340	108	10	118	4.000	1.20	0.03	0.81	0.63	**2.67**	0.269	0.90	0.24	0.27	11.23	80.56	0.00	0.00	**61.26**	**63.93**	58.9	300	0.071	0.53	**70.40**	1.00	0.99	90.8%
Yorkville Avenue	4357	0.210	84	0	84	0.00	2.002	1,585	113	1,699	3.662	16.12	0.33	0.63	6.93	**24.01**	0.210	0.90	0.19	1.54	13.93	68.10	0.00	19.00	**310.63**	**334.63**	42.1	675	0.358	0.45	**563.88**	1.58	0.45	59.3%
Yorkville Avenue	4358	0.014	6	0	6	0.00	2.017	1,590	113	1,705	3.661	16.17	0.33	0.04	6.93	**23.47**	0.014	0.90	0.01	1.55	14.37	66.45	0.00	19.00	**305.91**	**329.38**	15.5	600	0.283	0.56	**459.48**	1.63	0.16	71.7%
Zone 2 from south along Yonge (4359)		0.435	38	30	68	0.00	0.435	38	30	68	4.000	0.42	0.09	1.31	0.00	**1.81**	0.435	0.90	0.39	0.39	10.00	88.19	0.00	0.00	**96.05**	**97.86**	94.4					1.50	1.05	
Yonge Street	4360	0.059	15	1	16	0.00	2.511	1,643	144	1,789	3.651	16.67	0.42	0.18	6.93	**24.19**	0.059	0.90	0.05	2.00	14.53	65.88	0.00	19.00	**384.93**	**409.12**	27.4	675	0.358	0.30	**460.41**	1.29	0.35	88.9%
Zone 3 from east along Collier (5569)		0.504	54	34	88	0.00	0.504	54	34	88	4.000	0.60	0.10	1.51	0.00	**2.21**	0.504	0.90	0.45	0.45	10.00	88.19	0.00	0.00	**111.18**	**113.38**								
Yonge Street	4361	0.211	74	3	77	0.00	3.225	1,771	180	1,954	3.626	17.84	0.52	0.63	6.93	**25.93**	0.211	0.90	0.19	2.64	14.89	64.65	0.00	19.00	**493.70**	**519.63**	55.2	750	0.442	0.51	**795.04**	1.80	0.51	65.4%
Zone 5 from west along Scollard (4367)		1.607	565	19	584	0.00	1.607	565	19	584	3.946	6.19	0.05	4.82	0.00	**11.07**	1.607	0.90	1.45	1.45	10.00	88.19	0.00	0.00	**354.61**	**365.68**	378.2					1.50	4.20	
Zone 4 from west along Scollard (4367)		2.875	551	135	686	0.00	2.875	551	135	686	3.952	6.05	0.39	8.63	0.00	**15.07**	2.875	0.60	1.73	1.73	10.00	88.19	0.00	0.00	**422.96**	**438.03**	463.1					1.50	5.15	
Yonge Street	4368	0.000	0	0	0	0.00	7.708	2,887	334	3,224	3.456	27.72	0.97	0.00	6.93	**35.62**	0.000	0.90	0.00	5.81	15.40	62.97	0.00	19.00	**1036.61**	**1072.22**	28.0	750	0.442	4.17	**2273.38**	5.15	0.09	47.2%

POST-DEVELOPMENT CONDITIONS - WET WEATHER - 2 YEAR STORM EVENT

Sanitary Flows

Residential Avg.Daily Flow = 240 L/d
Commercial Avg.Daily Flow = 250 L/d

Extraneous Flows

Infiltration Allowance = 3.000 L/s/ha

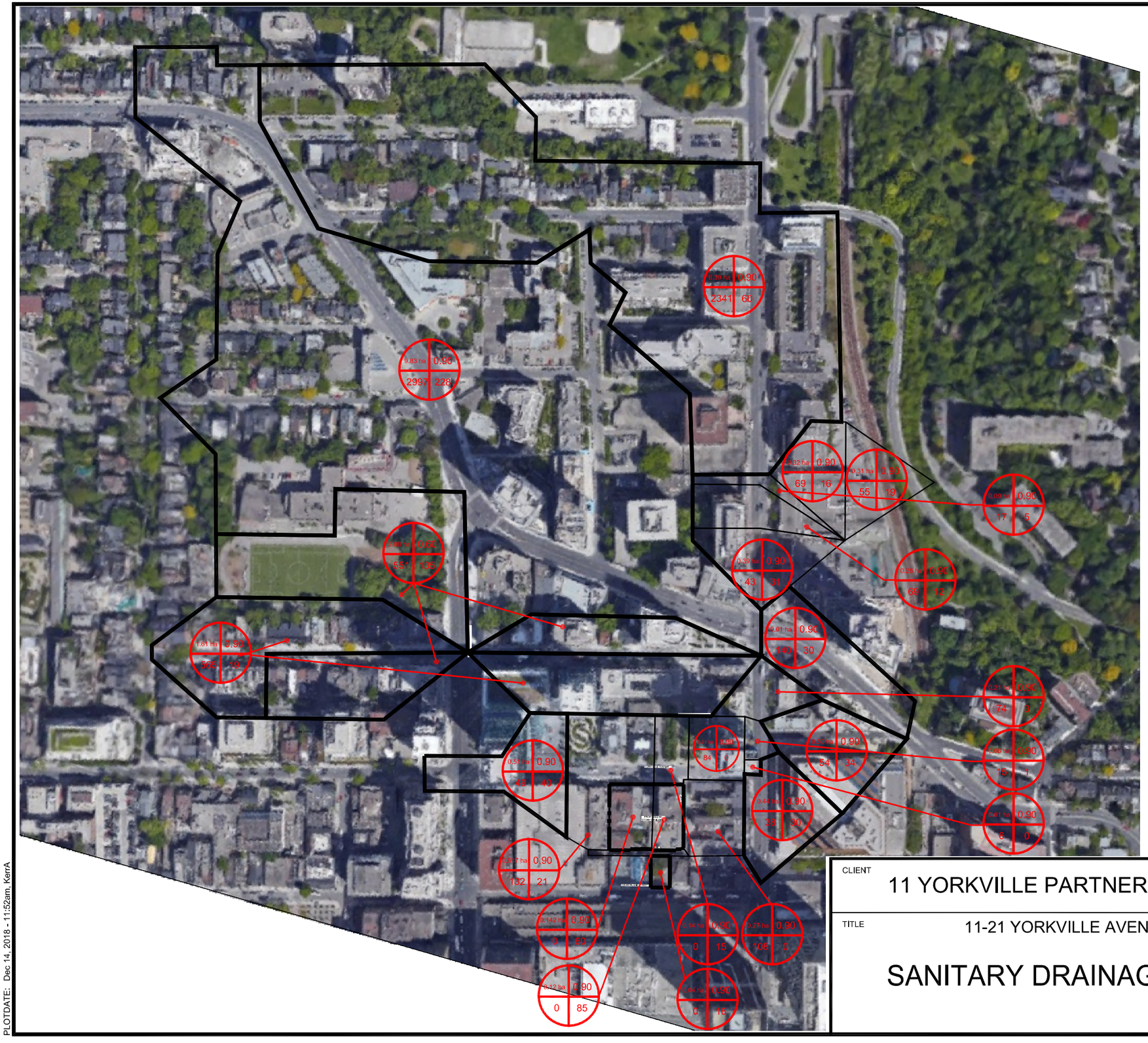
COMBINED SEWERSHED AREA: **25.930 ha**

n= 0.013

Design Sheet No **1 of 2**
Project: **11 Yorkville**
Project no.: **17M-01494**

		SANITARY FLOW CALCULATIONS															Extraneous Flows											BASED ON CITY OF TORONTO ARCHIVE							
		Segment					Cumulative				SANITARY FLOW																							
Description / Location / Dissemination Blocks	PIPE ID	Area A (ha)	Population			Pumped GW Discharge Rate (L/s)	Area A (ha)	Population			PEAKING FACTOR	Res (L/s)	Emp (L/s)	Infiltration Allowance (L/s)	Pumped GW Discharge Rate	**Acc SAN Flow (L/s)**	STORM TRIBUTARY AREA **(ha)**	RUNOFF COEF. **C**	A X C	ACCUM. A X C	Tc (min.)	INTENSITY (mm/hr)	INC. CONTROLLED STORM FLOW **(L/s)**	ACCUM. CONTROLLED STORM FLOW **(L/s)**	**Accm STM (L/s)**	**TOTAL COMBINED FLOW (L/s)**	LENGTH (m)	ACTUAL PIPE SIZE (mm)	PIPE AREA (AF) (m2)	SLOPE (%)	CAPACITY (L/s)	VELOCITY (m/s)	TIME OF FLOW (min)	% Full
			Res	ICI	Total			Res	ICI	Total	M																							
Zone 6 from east along Church (5539)		0.613	140	30	170	0.00	0.613	140	30	170	4.000	1.56	0.09	1.84	0.00	**3.48**	0.613	0.90	0.55	0.55	10.00	88.19	0.00	0.00	**135.16**	**138.64**	667.6					1.50	7.42	
Zone 7 from west along Davenport (4352)		9.829	2,997	228	3,225	0.00	9.829	2,997	228	3,225	3.443	28.66	0.66	29.49	0.00	**58.81**	9.829	0.90	8.85	8.85	10.00	88.19	0.00	0.00	**2168.77**	**2227.58**	141.5					1.50	1.57	
Yonge Street	4369	0.393	43	31	75	0.00	18.542	6,067	624	6,694	3.166	53.36	1.80	1.18	6.93	**63.27**	0.393	0.90	0.35	15.56	17.42	57.21	0.00	19.00	**2494.07**	**2557.34**	50.9	900	0.636	1.41	**2149.63**	3.38	0.25	119.0%
Yonge Street	4370	0.282	69	12	82	0.00	18.824	6,136	636	6,776	3.161	53.89	1.84	0.85	6.93	**63.50**	0.282	0.90	0.25	15.82	17.67	56.57	0.00	19.00	**2506.50**	**2570.00**	40.2	900	0.636	1.14	**1932.88**	3.04	0.22	133.0%
Yonge Street	4371	0.084	17	5	22	0.00	18.908	6,153	640	6,798	3.160	54.02	1.85	0.25	6.93	**63.05**	0.084	0.90	0.08	15.89	17.89	56.03	0.00	19.00	**2494.34**	**2557.39**	9.4	900	0.636	1.22	**1999.55**	3.14	0.05	127.9%
Zone 8 from north along Yonge (4387)		6.390	2,341	60	2,401	0.00	6.390	2,341	60	2,401	3.532	22.97	0.17	19.17	6.93	**49.24**	2.803	0.90	2.52	2.52	10.00	88.19	0.00	0.00	**618.44**	**667.68**	619.6					1.50	6.88	
Easement	4388	0.321	69	16	86	0.00	25.619	8,563	717	9,285	3.021	71.87	2.07	0.96	6.93	**81.83**	0.321	0.90	0.29	18.70	17.94	55.90	0.00	19.00	**2925.90**	**3007.73**	55.8	1500	1.767	3.70	**13597.24**	7.69	0.12	22.1%
Easement	4389	0.310	55	19	74	0.00	25.930	8,618	736	9,359	3.019	72.26	2.13	0.93	6.93	**82.25**	0.310	0.90	0.28	18.98	18.06	55.61	0.00	19.00	**2953.87**	**3036.12**	67.1	1500	1.767	0.95	**6889.88**	3.90	0.29	44.1%

Notes:
* *Residential and employment populations derived from site areas and population densities as outlined in City of Toronto Design Criteria for Sewers and Watermains*
* *Sewer information based on City of Toronto archive drawings*
* *See Figure 7 for combined sewer tributary areas*
* *Existing and Proposed storm flow for 16-18 Cumberland (Building B) are to Cumberland Ave*



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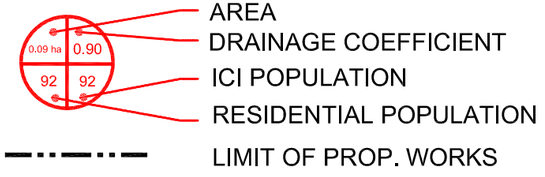


CLIENT
11 YORKVILLE PARTNERSHIP INC.

TITLE
11-21 YORKVILLE AVENUE

SANITARY DRAINAGE PLAN

Checked	B.S.T.	Drawn	10/12 Cad
Date	MAR. 2018	Proj. No.	17M-01494
Scale	NTS	Figure No.	SAN-1

PLOTDATE: Dec 14, 2018 - 11:52am, KerrA

APPENDIX

B DOMESTIC WATER DEMAND, HYDRANT FLOW TESTING RESULTS AND FUS FIRE FLOW CALCULATIONS

THEORETICAL DOMESTIC WATER DEMAND CALCULATIONS
APPENDIX B

Project: 11 Yorkville Avenue
Job No.: 17M-01494
Date: December 17, 2018

Proposed Development

Unit Type	Gross Floor Area (m^2)	Bedrooms # units	Population[1, 2]	Average Water Demand[3] (191 L/cap/d)		Peaking Factor[4]		Peak Water Demand	
				(L/s)	(m^3/day)	Peak Hour	Max. Day	Peak Hour (L/s)	Max. Day (L/s)
1 Bedroom Unit	-	382	535	1.18	102.19	2.50	1.30	2.96	1.54
2 Bedroom Unit	-	217	456	1.01	87.10	2.50	1.30	2.52	1.31
3 Bedroom Unit	-	71	221	0.49	42.21	2.50	1.30	1.22	0.64
Retail - Building A	2,449	-	27	0.06	5.16	1.20	1.10	0.07	0.07
Total - Building A	**2,449**	**670**	**1239**	**2.74**	**236.65**	**-**	**-**	**6.77**	**3.55**
Retail - Building B	846	-	10	0.02	1.91	1.20	1.10	0.03	0.02
Total - Building B	**846**	**-**	**10**	**0.02**	**1.91**	**-**	**-**	**0.03**	**0.02**
Total - Site	**3,295**	**670**	**1249**	**2.76**	**238.56**	**-**	**-**	**6.80**	**3.58**

Note 1: Population equivalent for apartments or condominiums per City of Toronto Design Criteria for Sewers and Watermain:

1 bedroom	1.4 person / unit
2 bedroom	2.1 person / unit
3 bedroom	3.1 person / unit
Townhouse	2.7 person / unit

For 1 bedroom + Den and 2 bedroom + Den, we interpolated.

Note 2: 1.1 people per 100 m^2 of commercial retail space, per City of Toronto Design Criteria for Sewers and Watermain

3.3 people per 100 m^2 of office space, per City of Toronto Design Criteria for Sewers and Watermain

Note 3: Water Demand for Multi-Unit Buildings, per City of Toronto Design Criteria for Sewers and Watermain

Note 4: Peaking Factor for apartments and and commercial uses are per City of Toronto Design Criteria for Sewers and Watermain

APPENDIX B

FIRE FLOW CALCULATIONS
Building A

Project: **11 Yorkville Avenue**
Job No.: **17M-01494**
Date: **###############**

Fire flow required for a given area based on Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (1999)

$$F = 220\ C\sqrt{A}$$

where

F = Fire flow in Litres per minute (Lpm)
C = coefficient related to the type of construction
A = total floor area in square metres

Calculations per FUS

1. *Estimate of Fire Flow*
C = 0.6 for fire resistive construction
A = 2489 m^2

F = 7,000 Lpm (ROUNDED TO NEAREST 1000L/min)

2. *Occupancy Reduction*
25% reduction based on low hazard occupancy

25% reduction of 7000 Lpm = 1,750 Lpm
F = 7000 - 1750 = 5,250 Lpm

3. *Sprinkler Reduction*
30% reduction for NFPA Sprinkler System[2]

30% reduction of 5250 Lpm = 1,575 Lpm
F = 5250 - 1575 = 3,675 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge			
West Side	20.20	10%			
East Side	18.00	15%			
North Side	20.50	10%			
South Side	6.20	20%			
	Total	55%	of	5,250	= 2,888 Lpm

F = 3675 + 2888
F = 6,563 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 1,732 US GPM

Notes

1. If vertical openings and exterior vertical communications are properly protected, (one hour rating) consider only the area of the largest floor plus 25 % of each of the two immediately adjoining floors.
2. Sprinkler protection.

APPENDIX B

FIRE FLOW CALCULATIONS
Building B

Project: **11 Yorkville Avenue**
Job No.: **17M-01494**
Date: **###############**

Fire flow required for a given area based on Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (1999)

$$F = 220\ C\sqrt{A}$$

where

F = Fire flow in Litres per minute (Lpm)
C = coefficient related to the type of construction
A = total floor area in square metres

Calculations per FUS

1. *Estimate of Fire Flow*
C = 0.6 for fire resistive construction
A = 455.3 m^2

F = 3,000 Lpm (ROUNDED TO NEAREST 1000L/min)

2. *Occupancy Reduction*
25% reduction based on low hazard occupancy

25% reduction of 3000 Lpm = 750 Lpm
F = 3000 - 750 = 2,250 Lpm

3. *Sprinkler Reduction*
30% reduction for NFPA Sprinkler System[2]

30% reduction of 2250 Lpm = 675 Lpm
F = 2250 - 675 = 1,575 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge				
West Side	0.00	25%				
East Side	0.00	25%				
North Side	6.20	20%				
South Side	12.50	15%				
	Total	85%	of	2,250	=	1,913 Lpm

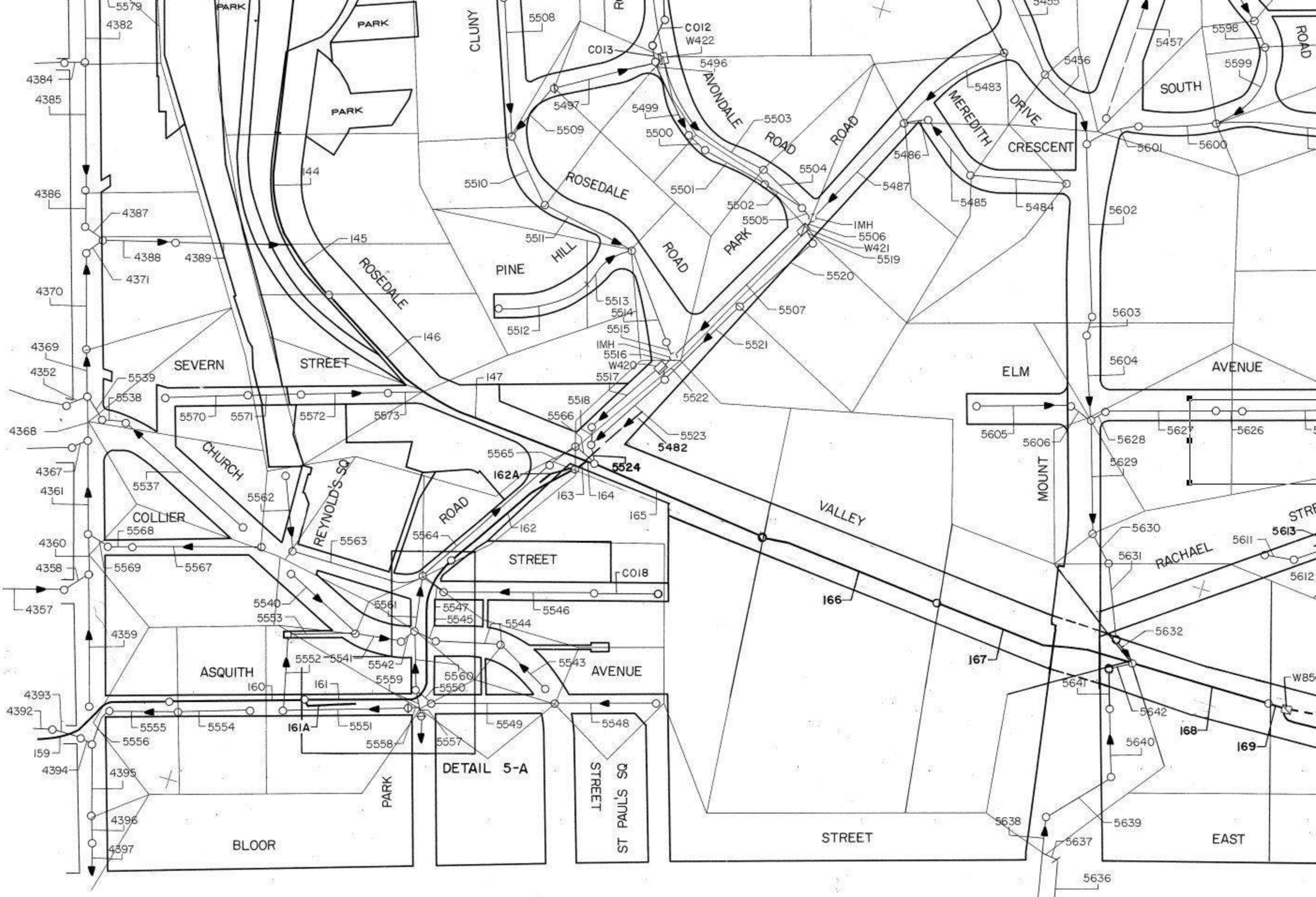
F = 1575 + 1913
F = 3,488 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 920 US GPM

Notes

1. If vertical openings and exterior vertical communications are properly protected, (one hour rating) consider only the area of the largest floor plus 25 % of each of the two immediately adjoining floors.
2. Sprinkler protection.

APPENDIX

C CITY OF TORONTO DORSCH MODEL SHEETS & SEWER ATLAS MAPS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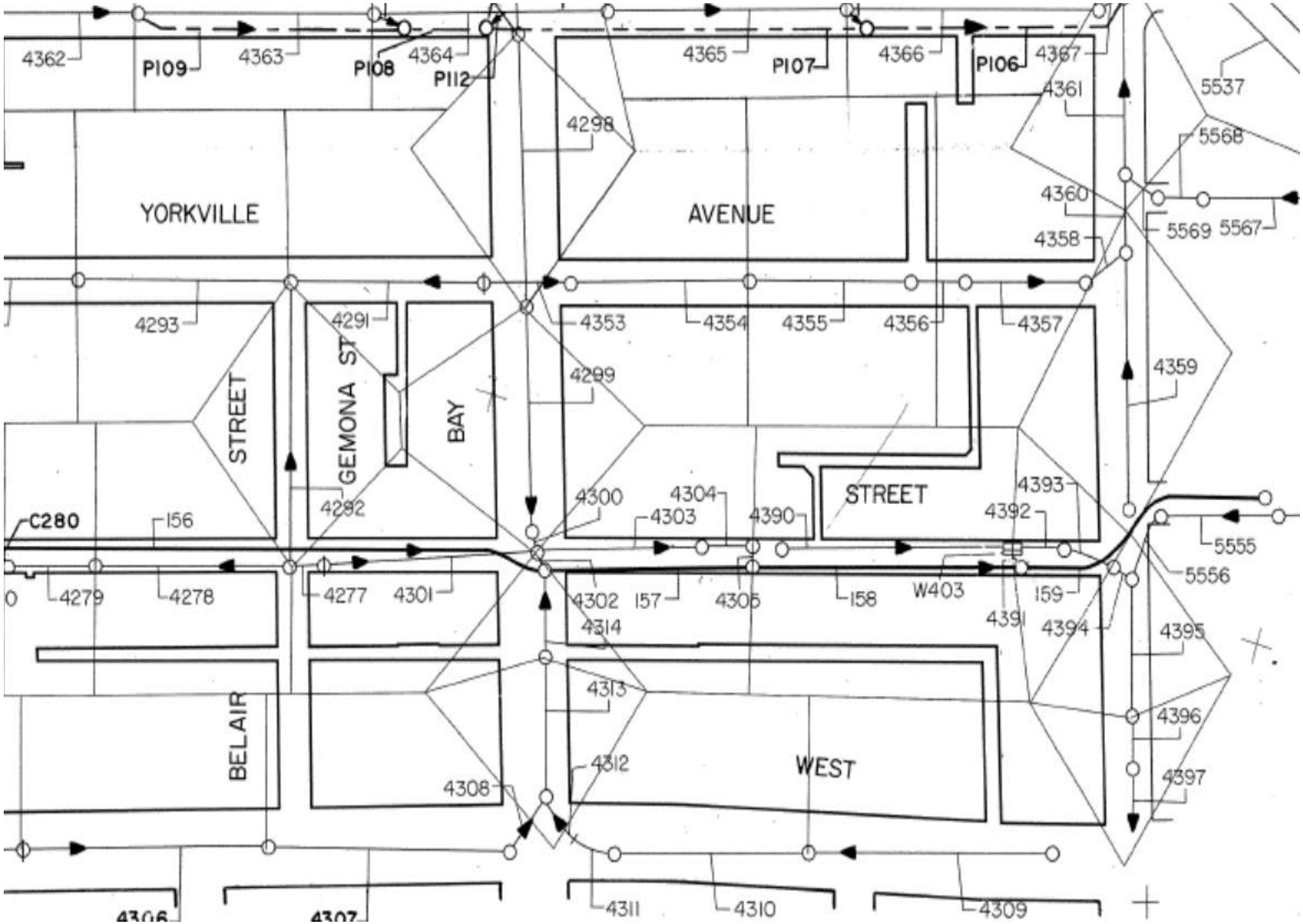
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BELAIR
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WEST
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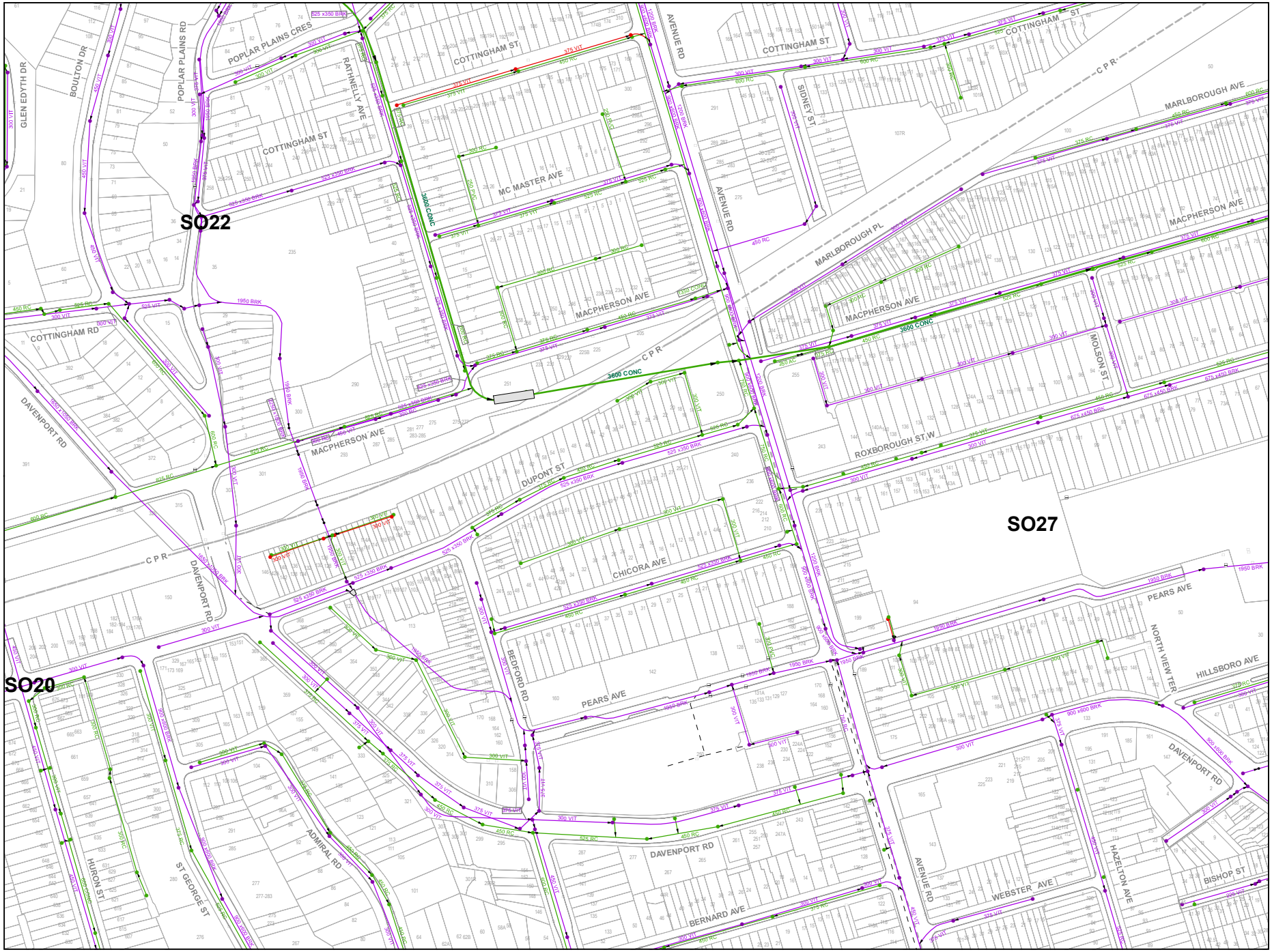
SOUTH CALCULATION AREA

```
 4356  CIRCULAR          0.69/0.69  INFLOW  4355                OUTFLOW  4357          B.NO.  86700                EXIST. COMB.0004356
       YU 112.238  YL 112.165   QF   532   DQ       0   QDLM    1  VNIGHT0.22  DUC   0.14   DLC   0.18   QLM    366   CAP 0000165
       SU 116.048  SL 116.142   AF 0.373   DQD    0.0   HDLM 0.02  HNIGHT0.00  DUS  -2.98   DLS  -3.10   RAIN   8MS2   QLM/8600069
+
       RES     44  A     0.0    VF  1.42   GAMMA 0.93   VDLM 0.30  VNORM 0.0   HUM   0.83   HLM   0.87   QRQLM  366   DY  0000007
       IW     0.0  L     20.4   S  1/ 280   N   0.0130  SCOD 004   DWB   0.0   YUM 113.06   YLM 113.04   VLM   1.43   DH  0000005
+

 4357  CIRCULAR          0.69/0.69  INFLOW  4356                OUTFLOW  4358          B.NO.  86700                EXIST. COMB.0004357
       YU 112.147  YL 111.958   QF   596   DQ     144   QDLM    1  VNIGHT0.25  DUC   0.20   DLC   0.32   QLM    479   CAP 0000117
       SU 116.142  SL 116.155   AF 0.373   DQD    0.3   HDLM 0.02  HNIGHT0.00  DUS  -3.10   DLS  -3.18   RAIN   8MS2   QLM/8600080
+
       RES     44  A     0.54   VF  1.60   GAMMA 0.93   VDLM 0.35  VNORM 0.0   HUM   0.89   HLM   1.01   QRQLM  478   DY  0000019
       IW     0.0  L     42.1   S 1/ 223   N   0.0130  SCOD 004   DWB   0.0   YUM 113.04   YLM 112.97   VLM   1.65   DH  0000012
+

 4358  CIRCULAR          0.69/0.69  INFLOW  4357                OUTFLOW  4360          B.NO.  86700                EXIST. COMB.0004358
       YU 111.918  YL 111.830   QF   669   DQ       0   QDLM    1  VNIGHT0.28  DUC   0.36   DLC   0.42   QLM    469   CAP 0000200
       SU 116.155  SL 116.249   AF 0.373   DQD    0.0   HDLM 0.02  HNIGHT0.00  DUS  -3.18   DLS  -3.31   RAIN   8MS2   QLM/8600070
+
       RES     44  A     0.0    VF  1.79   GAMMA 0.93   VDLM 0.38  VNORM 0.0   HUM   1.05   HLM   1.11   QRQLM  468   DY  0000009
       IW     0.0  L     15.5   S 1/ 177   N   0.0130  SCOD 004   DWB   0.0   YUM 112.97   YLM 112.94   VLM   1.35   DH  0000006

 4359  CIRCULAR          0.38/0.38  INFLOW                    - OUTFLOW  4360          B.NO.  85630                EXIST. COMB.0004359
       YU 112.707  YL 112.079   QF   160   DQ     130   QDLM    0  VNIGHT0.22  DUC  -0.07   DLC   0.51   QLM    111   CAP 0000049
       SU 116.109  SL 116.249   AF 0.113   DQD    0.2   HDLM 0.01  HNIGHT0.00  DUS  -3.10   DLS  -3.28   RAIN   8MS2   QLM/8600069
+
       RES     32  A     0.45   VF  1.41   GAMMA 1.00   VDLM 0.25  VNORM 0.0   HUM   0.31   HLM   0.89   QRQLM  111   DY  0000063
       IW     0.0  L     80.5   S 1/ 128   N   0.0130  SCOD 004   DWB   0.0   YUM 113.01   YLM 112.97   VLM   1.29   DH  0000059

 4360  CIRCULAR          0.69/0.69  INFLOW  4359  4358          OUTFLOW  4361          B.NO.  85640                EXIST. COMB.0004360
   *   YU 111.772  YL 111.689   QF   489   DQ       0   QDLM    1  VNIGHT0.20  DUC   0.45   DLC   0.45   QLM    568   CAP 0000078
       SU 116.249  SL 116.219   AF 0.373   DQD    0.0   HDLM 0.02  HNIGHT0.01  DUS  -3.34   DLS  -3.39   RAIN   8MS2   QLM/8601016
+
       RES     32  A     0.0    VF  1.31   GAMMA 1.00   VDLM 0.31  VNORM 0.0   HUM   1.14   HLM   1.14   QRQLM  567   DY  0000008
       IW     0.0  L     27.4   S 1/ 330   N   0.0130  SCOD 004   DWB   0.0   YUM 112.91   YLM 112.83   VLM   1.52   DH  0000000

 4361  CIRCULAR          0.77/0.76  INFLOW  4360  5569          OUTFLOW  4368          B.NO.  85650                EXIST. COMB.0004361
   *   YU 111.625  YL 111.345   QF   819   DQ      83   QDLM    1  VNIGHT0.28  DUC   0.44   DLC   0.60   QLM    635   CAP 0000184
       SU 116.219  SL 115.725   AF 0.453   DQD    0.1   HDLM 0.02  HNIGHT0.00  DUS  -3.39   DLS  -3.02   RAIN   8MS2   QLM/8600078
+
       RES     32  A     0.29   VF  1.81   GAMMA 1.00   VDLM 0.39  VNORM 0.0   HUM   1.20   HLM   1.36   QRQLM  634   DY  0000028
       IW     0.0  L     55.2   S 1/ 197   N   0.0130  SCOD 004   DWB   0.0   YUM 112.83   YLM 112.70   VLM   1.86   DH  0000015

 4362  CIRCULAR          0.38/0.38  INFLOW                    OUTFLOW  4363  P109    B.NO.  69670                EXIST. COMB.0004362
   *   YU 114.207  YL 113.902   QF   112   DQ     169   QDLM    0  VNIGHT0.15  DUC  -0.10   DLC   0.03   QLM    162   CAP 0000049
       SU 116.417  SL 116.682   AF 0.113   DQD    0.5   HDLM 0.02  HNIGHT0.00  DUS  -1.93   DLS  -2.37   RAIN   8MS2   QLM/8601045
+
       RES     53  A     0.81   VF  0.99   GAMMA 0.70   VDLM 0.27  VNORM 0.0   HUM   0.28   HLM   0.41   QRQLM  162   DY  0000031
       IW     0.0  L     79.3   S 1/ 260   N   0.0130  SCOD 001   DWB   0.0   YUM 114.48   YLM 114.32   VLM   1.43   DH  0000014
```

Contractions used in HVM output...

1st line: pipe number, cross-section, pipe size...width/height(m), inflow and outflow pipes, block number, sewer type, pipe no.

2nd line: YU, YL = upper and lower invert elevations (m)



Toronto Sewer Atlas

Manhole
- Combined
- Dual
- Sanitary
- Storm
- Foundation

Control Manhole
- Combined
- Dual
- Sanitary
- Storm

Outfall
- Outfall

Sewer Pump Station
- 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
- Large Chamber
- Wards Boundary

0 50 100 150 200 Metres

Third Edition
Date: 01/09/2010

General Notes:
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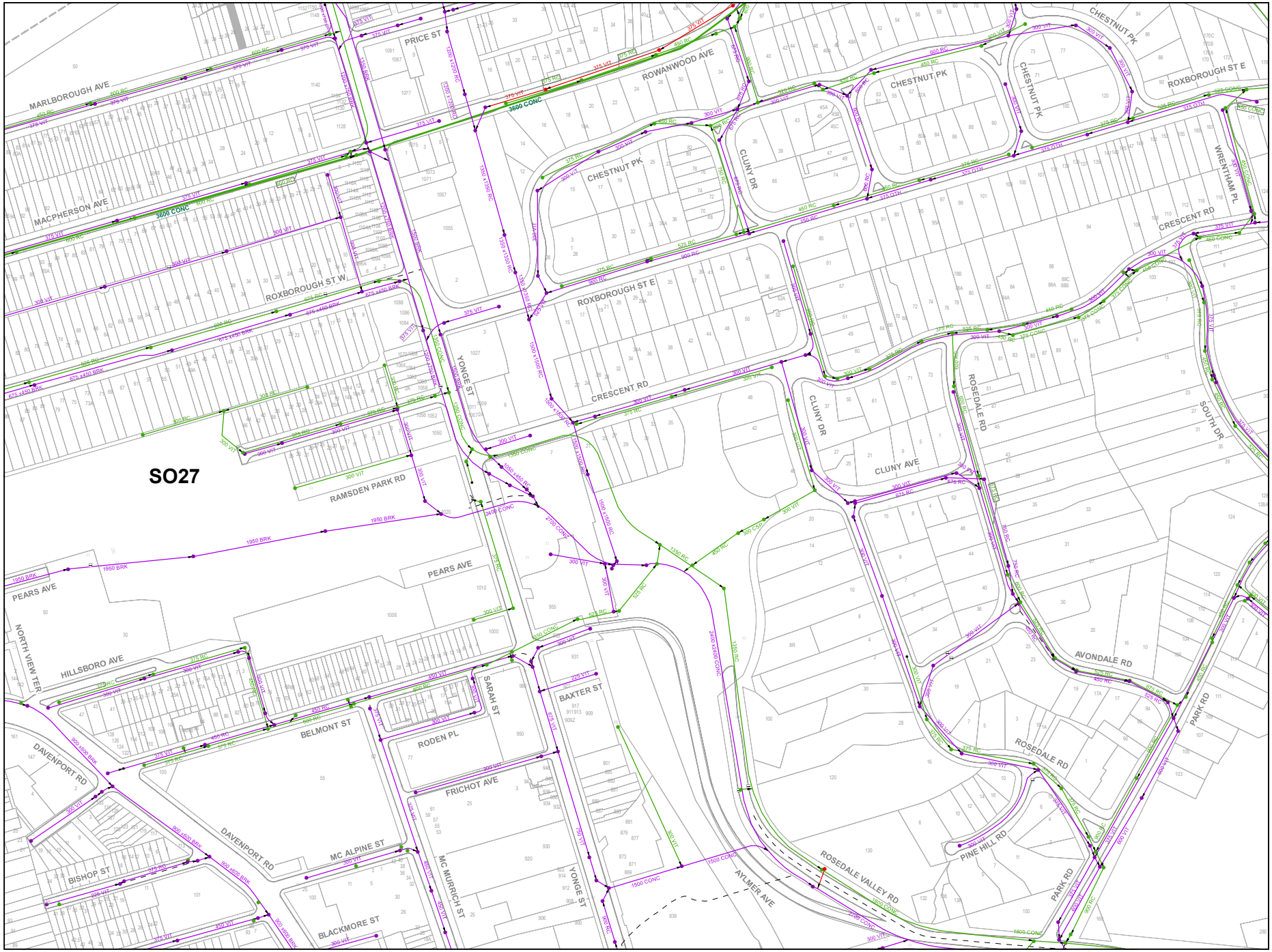
- These maps are for planning purpose only and must not be used for construction, or as a replacement for a utility locate.
- This drawing is not to be reproduced in whole or in part without the express written permission of the City.
- Any discrepancies, inaccuracies, errors and/or omissions in the 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)

N W E S

580	612	646
581	613	647
582	614	648



Toronto Sewer Atlas

Manhole
- Combined
- Dual
- Sanitary
- Storm
- Foundation

Control Manhole
- Combined
- Dual
- Sanitary
- Storm

Outfall
- Outfall

Sewer Pump Station
- 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
- Large Chamber

0 50 100 150 200 Metres

Third Edition
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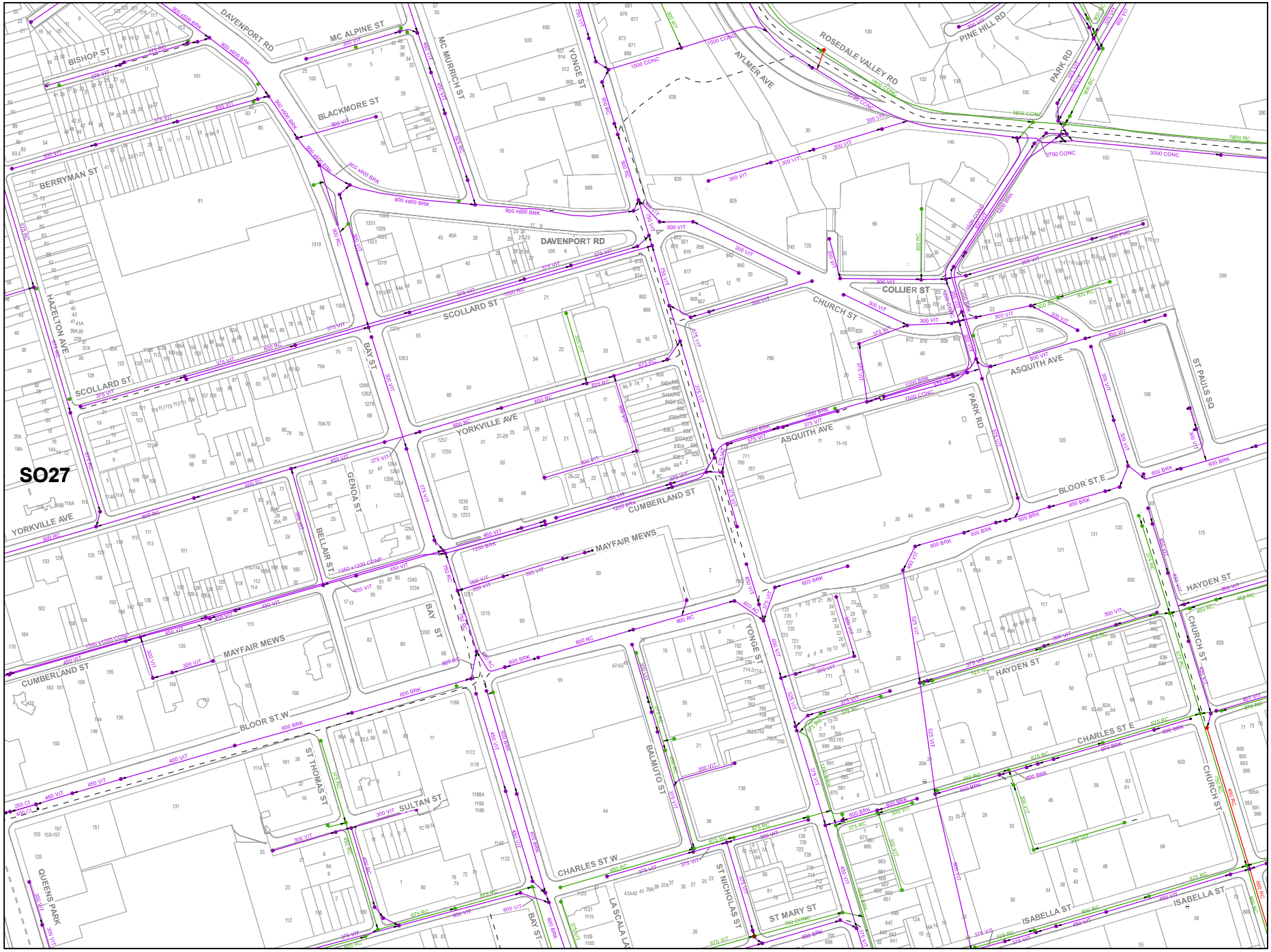
N W E S

612	646	681
613	647	682
614	648	683



Toronto Sewer Atlas

Manhole
- Combined
- Dual
- Sanitary
- Storm
- Foundation

Control Manhole
- Combined
- Dual
- Sanitary
- Storm

Outfall
- Outfall

Sewer Pump Station
- Sewer Pump Station

Catchbasin
- Other
- Twin Inlet Catchbasin

Sewer
- Foundation Drain
- Combined
- Sanitary
- Storm
- Combined Trunk
- Sanitary Trunk
- Storm Trunk
- Abandoned Sewer
- Large Chamber

Boundaries
- River
- Highway
- Curb
- Wards Boundary

0 50 100 150 200 Metres

Third Edition
Date: 01/09/2010

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N W E S

613	647	682
614	648	683
615	649	684

TORONTO SEWER SYSTEM STUDY AREA 8

SOUTH CALCULATION AREA

145 CIRCULAR 2.44/2.44 INFLOW 144 4389 OUTFLOW 146 B.NO. 67270 EXIST. COMB. 145

YU 94.069 YL 93.609 QF 23963 DQ 23 QDLM 350 VNIGHT1.09 DUC -0.57 DLC -0.58 QLM 20959 CAP 3004

SU 99.119 SL 99.296 AF 4.668 DQD 0.2 HDLM 0.20 HNIGHT0.07 DUS -3.18 DLS -3.83 RAIN 8MS2 QLM/QF 0.87

RES 234 A 0.08 VF 5.13 GAMMA 1.00 VDLM 1.95 VNORM 0.0 HUM 1.87 HLM 1.86 QRQLM 20460 DY 0.46

IW 0.0 L 53.3 S 1/ 116 N 0.0130 SCOD 112 DWB 0.0 YUM 95.94 YLM 95.47 VLM 5.52 DH 0.01

4355 CIRCULAR 0.61/0.61 INFLOW 4354 OUTFLOW 4356 B.NO. 86700 EXIST. COMB. 4355

YU 112.546 YL 112.302 QF 388 DQ 219 QDLM 1 VNIGHT0.21 DUC -0.00 DLC 0.15 QLM 379 CAP 9

SU 116.130 SL 116.048 AF 0.292 DQD 0.4 HDLM 0.02 HNIGHT0.00 DUS -2.98 DLS -2.98 RAIN 8MS2 QLM/QF 0.98

RES 44 A 0.82 VF 1.33 GAMMA 0.93 VDLM 0.30 VNORM 0.0 HUM 0.61 HLM 0.76 QRQLM 378 DY 0.24

IW 0.0 L 66.4 S 1/ 272 N 0.0130 SCOD 004 DWB 0.0 YUM 113.15 YLM 113.06 VLM 1.42 DH -0.15

4356 CIRCULAR 0.69/0.69 INFLOW 4355 OUTFLOW 4357 B.NO. 86700 EXIST. COMB. 4356

YU 112.238 YL 112.165 QF 532 DQ 0 QDLM 1 VNIGHT0.22 DUC 0.14 DLC 0.18 QLM 366 CAP 165

SU 116.048 SL 116.142 AF 0.373 DQD 0.0 HDLM 0.02 HNIGHT0.00 DUS -2.98 DLS -3.10 RAIN 8MS2 QLM/QF 0.69

RES 44 A 0.0 VF 1.42 GAMMA 0.93 VDLM 0.30 VNORM 0.0 HUM 0.83 HLM 0.87 QRQLM 366 DY 0.07

IW 0.0 L 20.4 S 1/ 280 N 0.0130 SCOD 004 DWB 0.0 YUM 113.06 YLM 113.04 VLM 1.43 DH -0.05

4357 CIRCULAR 0.69/0.69 INFLOW 4356 OUTFLOW 4358 B.NO. 86700 EXIST. COMB. 4357

YU 112.147 YL 111.958 QF 596 DQ 144 QDLM 1 VNIGHT0.25 DUC 0.20 DLC 0.32 QLM 479 CAP 117

SU 116.142 SL 116.155 AF 0.373 DQD 0.3 HDLM 0.02 HNIGHT0.00 DUS -3.10 DLS -3.18 RAIN 8MS2 QLM/QF 0.80

RES 44 A 0.54 VF 1.60 GAMMA 0.93 VDLM 0.35 VNORM 0.0 HUM 0.89 HLM 1.01 QRQLM 478 DY 0.19

IW 0.0 L 42.1 S 1/ 223 N 0.0130 SCOD 004 DWB 0.0 YUM 113.04 YLM 112.97 VLM 1.65 DH -0.12

4358 CIRCULAR 0.69/0.69 INFLOW 4357 OUTFLOW 4360 B.NO. 86700 EXIST. COMB. 4358

YU 111.918 YL 111.830 QF 669 DQ 0 QDLM 1 VNIGHT0.28 DUC 0.36 DLC 0.42 QLM 469 CAP 200

SU 116.155 SL 116.249 AF 0.373 DQD 0.0 HDLM 0.02 HNIGHT0.00 DUS -3.18 DLS -3.31 RAIN 8MS2 QLM/QF 0.70

RES 44 A 0.0 VF 1.79 GAMMA 0.93 VDLM 0.38 VNORM 0.0 HUM 1.05 HLM 1.11 QRQLM 468 DY 0.09

IW 0.0 L 15.5 S 1/ 177 N 0.0130 SCOD 004 DWB 0.0 YUM 112.97 YLM 112.94 VLM 1.35 DH -0.06

4359 CIRCULAR 0.38/0.38 INFLOW - OUTFLOW 4360 B.NO. 85630 EXIST. COMB. 4359

YU 112.707 YL 112.079 QF 160 DQ 130 QDLM 0 VNIGHT0.22 DUC -0.07 DLC 0.51 QLM 111 CAP 49

SU 116.109 SL 116.249 AF 0.113 DQD 0.2 HDLM 0.01 HNIGHT0.00 DUS -3.10 DLS -3.28 RAIN 8MS2 QLM/QF 0.69

RES 32 A 0.45 VF 1.41 GAMMA 1.00 VDLM 0.25 VNORM 0.0 HUM 0.31 HLM 0.89 QRQLM 111 DY 0.63

IW 0.0 L 80.5 S 1/ 128 N 0.0130 SCOD 004 DWB 0.0 YUM 113.01 YLM 112.97 VLM 1.29 DH -0.59

4360 CIRCULAR 0.69/0.69 INFLOW 4359 4358 OUTFLOW 4361 B.NO. 85640 EXIST. COMB. 4360

YU 111.772 YL 111.689 QF 489 DQ 0 QDLM 1 VNIGHT0.20 DUC 0.45 DLC 0.45 QLM 568 CAP -78

SU 116.249 SL 116.219 AF 0.373 DQD 0.0 HDLM 0.02 HNIGHT0.01 DUS -3.34 DLS -3.39 RAIN 8MS2 QLM/QF 1.16

RES 32 A 0.0 VF 1.31 GAMMA 1.00 VDLM 0.31 VNORM 0.0 HUM 1.14 HLM 1.14 QRQLM 567 DY 0.08

IW 0.0 L 27.4 S 1/ 330 N 0.0130 SCOD 004 DWB 0.0 YUM 112.91 YLM 112.83 VLM 1.52 DH 0.00

4361 CIRCULAR 0.77/0.76 INFLOW 4360 5569 OUTFLOW 4368 B.NO. 85650 EXIST. COMB. 4361

YU 111.625 YL 111.345 QF 819 DQ 83 QDLM 1 VNIGHT0.28 DUC 0.44 DLC 0.60 QLM 635 CAP 184

SU 116.219 SL 115.725 AF 0.453 DQD 0.1 HDLM 0.02 HNIGHT0.00 DUS -3.39 DLS -3.02 RAIN 8MS2 QLM/QF 0.78

RES 32 A 0.29 VF 1.81 GAMMA 1.00 VDLM 0.39 VNORM 0.0 HUM 1.20 HLM 1.36 QRQLM 634 DY 0.28

IW 0.0 L 55.2 S 1/ 197 N 0.0130 SCOD 004 DWB 0.0 YUM 112.83 YLM 112.70 VLM 1.86 DH -0.15

4368 CIRCULAR 0.77/0.76 INFLOW 4367 4361 P106 OUTFLOW 4369 B.NO. 85660 EXIST. COMB. 4368

YU 111.336 YL 110.187 QF 2329 DQ 0 QDLM 3 VNIGHT0.80 DUC 0.21 DLC 0.94 QLM 1397 CAP 931

SU 115.725 SL 115.237 AF 0.453 DQD 0.0 HDLM 0.02 HNIGHT0.00 DUS -3.42 DLS -3.35 RAIN 8MS2 QLM/QF 0.60

RES 32 A 0.0 VF 5.14 GAMMA 1.00 VDLM 1.04 VNORM 0.0 HUM 0.97 HLM 1.70 QRQLM 1393 DY 1.15

IW 0.0 L 28.0 S 1/ 24 N 0.0130 SCOD 004 DWB 0.0 YUM 112.30 YLM 111.89 VLM 3.09 DH -0.74

4369 CIRCULAR 0.92/0.91 INFLOW 4368 4352 5539 OUTFLOW 4370 B.NO. 85670 EXIST. COMB. 4369

YU 110.123 YL 109.409 QF 2203 DQ 53 QDLM 10 VNIGHT0.53 DUC 0.56 DLC 0.31 QLM 2572 CAP -368

SU 115.237 SL 113.954 AF 0.649 DQD 0.1 HDLM 0.04 HNIGHT0.01 DUS -3.64 DLS -3.32 RAIN 8MS2 QLM/QF 1.17

RES 32 A 0.19 VF 3.39 GAMMA 0.98 VDLM 0.94 VNORM 0.0 HUM 1.47 HLM 1.22 QRQLM 2562 DY 0.71

IW 0.0 L 50.9 S 1/ 71 N 0.0130 SCOD 004 DWB 0.0 YUM 111.60 YLM 110.63 VLM 3.96 DH 0.25

4370 CIRCULAR 0.92/0.91 INFLOW 4369 OUTFLOW 4371 B.NO. 85670 EXIST. COMB. 4370

YU 109.324 YL 108.867 QF 1982 DQ 149 QDLM 10 VNIGHT0.48 DUC 0.40 DLC 0.05 QLM 2683 CAP -699

SU 113.954 SL 114.503 AF 0.649 DQD 0.2 HDLM 0.04 HNIGHT0.01 DUS -3.32 DLS -4.67 RAIN 8MS2 QLM/QF 1.35

RES 32 A 0.53 VF 3.05 GAMMA 0.98 VDLM 0.88 VNORM 0.0 HUM 1.31 HLM 0.96 QRQLM 2673 DY 0.46

IW 0.0 L 40.2 S 1/ 88 N 0.0130 SCOD 004 DWB 0.0 YUM 110.63 YLM 109.83 VLM 4.13 DH 0.35

4371 CIRCULAR 0.92/0.91 INFLOW 4370 OUTFLOW 4388 B.NO. 85670 EXIST. COMB. 4371

YU 108.836 YL 108.721 QF 2052 DQ 0 QDLM 10 VNIGHT0.49 DUC 0.08 DLC 0.0 QLM 2683 CAP -630

SU 114.503 SL 114.463 AF 0.649 DQD 0.0 HDLM 0.04 HNIGHT0.01 DUS -4.67 DLS -4.83 RAIN 8MS2 QLM/QF 1.31

RES 32 A 0.0 VF 3.16 GAMMA 0.98 VDLM 0.90 VNORM 0.0 HUM 0.99 HLM 0.91 QRQLM 2673 DY 0.12

IW 0.0 L 9.4 S 1/ 82 N 0.0130 SCOD 004 DWB 0.0 YUM 109.83 YLM 109.63 VLM 4.13 DH 0.08

4388 CIRCULAR 1.53/1.52 INFLOW 4387 4371 OUTFLOW 4389 B.NO. 85670 EXIST. COMB. 4388

YU 108.623 YL 106.590 QF 13944 DQ 127 QDLM 16 VNIGHT1.20 DUC -0.99 DLC -0.99 QLM 3704 CAP 10240

SU 114.463 SL 110.967 AF 1.812 DQD 0.1 HDLM 0.04 HNIGHT0.01 DUS -5.31 DLS -3.85 RAIN 8MS2 QLM/QF 0.27

RES 19 A 0.44 VF 7.70 GAMMA 0.98 VDLM 1.44 VNORM 0.0 HUM 0.53 HLM 0.53 QRQLM 3688 DY 2.03

IW 0.0 L 55.8 S 1/ 27 N 0.0130 SCOD 008 DWB 0.0 YUM 109.15 YLM 107.12 VLM 6.56 DH 0.01

4389 CIRCULAR 1.53/1.52 INFLOW 4388 OUTFLOW 145 B.NO. 85670 EXIST. COMB. 4389

YU 95.526 YL 94.886 QF 7136 DQ 51 QDLM 16 VNIGHT0.61 DUC -0.33 DLC 0.20 QLM 3733 CAP 3403

SU 110.967 SL 99.119 AF 1.812 DQD 0.0 HDLM 0.05 HNIGHT0.01 DUS -14.25 DLS -2.51 RAIN 8MS2 QLM/QF 0.52

RES 19 A 0.18 VF 3.94 GAMMA 0.98 VDLM 0.90 VNORM 0.0 HUM 1.19 HLM 1.72 QRQLM 3717 DY 0.64

IW 0.0 L 67.1 S 1/ 105 N 0.0130 SCOD 009 DWB 0.0 YUM 96.71 YLM 96.61 VLM 3.97 DH -0.53

Contractions used in HVM output...

1st line: pipe number, cross-section, pipe size...width/height(m), inflow and outflow pipes, block number, sewer type, pipe no.

2nd line: YU, YL = upper and lower invert elevations (m)

QF = full flow capacity (L/sec)

DQ = maximum storm runoff from tributary area (L/sec)

QDLM = peak DWF at lower end (L/sec)

VNIGHT = night DWF velocity (m/sec)

DUC, DLC = difference between maximum HGL elevation and section crown elevation at upper and lower ends (m)

(-ve means partial fill)

QLM = maximum flow rate at lower end (L/sec) under a 2yr storm

CAP = free capacity at lower end when loaded by QLM

3rd line: SU, SL = upper and lower surface elevations (m)

AF = cross-sectional area (m2)

DQD = DWF from tributary area (L/sec)

HDLM = flow depth corresponding to QDLM (m)

HNIGHT = night DWF depth (m)

RAIN = storm corresponding to QLM... 8MS2 = 8th Study Area, 2yr model storm

QLM/QF = ratio of maximum flow rate at lower end to full-flow capacity

4th line: RES = population density (residents/ha)

A = tributary area (ha)

VF = flow velocity corresponding to QF (m/sec)

GAMMA = imperviousness ratio

VDLM = flow velocity corresponding to QDLM (m/sec)

VNORM = normal flow velocity for QDLM (m/sec)

HUM, HLM = maximum flow depths above invert at upper and lower ends

QRQLM = portion of storm flow within QLM (L/sec)

DY = difference between upper and lower invert elevations (m)

5th line: IW = industrial/large water inflow (L/sec)

L = segment length (m)

S = slope of pipe

N = Manning's n

SCOD = surface code of tributary area

DWB = backwater build-up under QDLM (m)

YUM, YLM = maximum HGL elevations at upper and lower ends

VLM = flow velocity corresponding to QLM (m/sec)

DH = indicator whether HGL is steeper or flatter than pipe slope

= (YUM-YLM) - DY

APPENDIX

D MECHANICAL LETTERS

M.V. SHORE
ASSOCIATES (1993) LIMITED

Consulting Professional Engineers

December 14, 2018 Project no: 17-052

Attention: **Executive Director, Engineering & Construction Services**
16/F, 55 John Street, Toronto, ON M5V 3C6
c/o: **Avi Bachar, P.Eng. PMP**
Manager, Development Engineering
Engineering and Construction Services

cc: **General Manager, Toronto Water**
c/o: **Manager, Environmental Monitoring & Protection Unit**
30 Dee Ave, Toronto ON M9N 1S8

Address: **11 Yorkville Avenue, Toronto**

Dear Sir or Madame;

This letter is to confirm that the designed pumped discharge rate from the storm water cistern to the discharge chamber will be a maximum flow rate no greater than 19.0L/S (301gpm).

For additional information, please contact the undersigned.

.....
Stephen Tsang, P.Eng.

Seal

1200 Eglinton Avenue East • Suite 402 • Don Mills • Ontario • Canada • M3C 1H9
Phone: (416) 443-1995 • Fax: (416) 443-1415
email: mvs@mvshore.com

M.V. SHORE
ASSOCIATES (1993) LIMITED
Consulting Professional Engineers

April 30, 2018 Project no: 17-052

Attention: **Executive Director, Engineering & Construction Services**
16/F, 55 John Street, Toronto, ON M5V 3C6
c/o: **Avi Bachar, P.Eng. PMP**
Manager, Development Engineering
Engineering and Construction Services

cc: **General Manager, Toronto Water**
c/o: **Manager, Environmental Monitoring & Protection Unit**
30 Dee Ave, Toronto ON M9N 1S8

Address: **11 Yorkville Avenue, Toronto**

Dear Sir or Madame;

This letter is to confirm that the permanent Private Water Drainage system from ground water will be collected and discharged into sanitary control manholes, at a maximum daily peak flow rate of:-

- High-rise building: 196m³/day (average 2.27L/s or 36USgpm) per figure provided in Hydrogeological Assessment Report prepared by EXP Services Ltd dated March 13, 2018)
- Commercial building: 9.0m³/day (average 0.1L/s or 1.6USgpm) per figure provided in Hydrogeological Assessment Report prepared by EXP Services Ltd dated March 13, 2018)

Groundwater pumps will be provided and sized to handle the above flow rate:-

- High-rise building: pump will be sized at 6.3 L/s (100 Usgpm) and is expected to run approximately 8.5 hours per day.

- Commercial building: pump will be sized at 0.63 L/s (10 Usgpm) and is expected to run approximately 3.85 hours per day.

Groundwater pump for each building will discharge water to their respective sanitary control manhole.

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

1200 Eglinton Avenue East • Suite 402 • Don Mills • Ontario • Canada • M3C 1H9
Phone: (416) 443-1995 • Fax: (416) 443-1415
email: mvs@mvshore.com

M.V. SHORE
ASSOCIATES (1993) LIMITED

Consulting Professional Engineers

Once the proposed ground water daily peak flow rate of 196m³/day for the high-rise building and 9m³/day for the commercial building is approved by Engineering Construction Services (ECS), City of Toronto, the Property Owner will not be allowed to amend this flow rate in the future. Should there be any amendment to the daily peak flow rate in the 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.

For additional information, please contact the undersigned.

LICENSED PROFESSIONAL ENGINEER
C.W.C. CHAN
7440503
PROVINCE OF ONTARIO

.....
Bill Chan, P.Eng.

Seal

1200 Eglinton Avenue East • Suite 402 • Don Mills • Ontario • Canada • M3C 1H9
Phone: (416) 443-1995 • Fax: (416) 443-1415
email: mvs@mvshore.com