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UD19-048

Functional Servicing and Stormwater Management Report

Project: 400 Albert Street

Albert and Main Holdings Inc.

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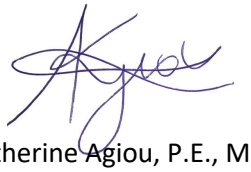

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Issues and Revisions Registry

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FSR/SWM Report	08-26-2019	Issued for 1st Zoning Application
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FSR/SWM Report	08-18-2020	Issued for 1st Site Plan Application

Statement of Conditions

This Report / Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner / Client, the City of Ottawa and its affiliates (the "Intended User"). No one other than the Intended User has the right to use and rely on the Work without first obtaining the written authorization of Lithos Group Inc. and its Owner. Lithos Group Inc. expressly excludes liability to any party except the intended User for any use of, and/or reliance upon, the work.

Executive Summary

Lithos Group Inc. (Lithos) was retained by Albert and Main Holdings Inc. (the "Owner") to prepare a Functional Servicing and Stormwater Management Report in support of a Site Plan Application, for a proposed mixed-use development located north-west of the intersection between Slater Street and Lyon Street, at 400 Albert Street (K1R 5B2), in the City of Ottawa (the "City"). The following summarizes our conclusions:

Storm Drainage

The proposed development will consist of one (1) three-storey podium with two (2) high-rise, 23-storey and 29-storey residential towers, and one (1) three-storey podium with one (1) high-rise, 35-storey residential tower. For Towers A, B along with the East podium, stormwater flow will connect to the existing 600 mm diameter storm sewer on Albert Street. For Tower C and the West podium, stormwater flow will be discharged in the existing 525 mm diameter storm sewer on Slater Street. Total post-development storm flows from the proposed development and the parkland dedication area, will meet the 5-year pre-development flow. In order to achieve the target flows and meet the City's Regulations, quantity controls will be utilized and up to 193.0 m^3 of total on site storage will be required for the proposed development. The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection as specified by the Ministry of Environment, Conversation and Parks (MECP). Water quality control can be provided by the rooftop/terraces. Additional quality control measures will also be required by the MECP, provided by the proposed Stormfilter system SFPD 0806, for the driveway areas, which are exposed to oil and grit, for a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

The proposed development will consist of Towers A, B and C along with the West and East podium. Towers A and B along with the East podium will be constructed under a separate phase from the Tower C and the West podium and should be able to function independently. More specifically, Towers A and B will be connected to the existing 375mm sanitary sewer on Albert Street through a 200mm diameter sanitary sewer lateral connection with a minimum grade of 2.50% (or equivalent pipe design), while Tower C will be connected to the existing 250mm sanitary sewer on Bay Street through a 150mm diameter sanitary sewer lateral connection, with a minimum grade of 2.50% (or equivalent pipe design), respectively.

The additional net discharge flow from Towers A, B and C, is anticipated at approximately 12.59 L/s and 9.09 L/s respectively. Confirmation is anticipated by the City on whether the existing sanitary infrastructure along Albert Street and Bay Street can support the proposed development.

Water Supply

Water supply for the proposed development will be provided from two (2) separate water connections. More specifically, Towers A and B, along with the East Podium, will be connected to the existing 200 mm diameter watermain on the south side of Albert Street, while Tower C and the West Podium to the existing 375 mm diameter watermain on the north side of Slater Street.

It is anticipated that a total design flow of 110.28 L/s, for the Albert Street connection, and 74.11 L/s, for the Slater Street connection, will be required to support the proposed development. Based on the boundary conditions received from the City, it is revealed that the existing water infrastructure can support the proposed development

Site Grading

The proposed grades will improve the existing drainage conditions to meet the City's/Regional requirements. Grades will be maintained along the property line wherever feasible and emergency overland flow will be gravity driven to the adjacent right-of-way's (ROW).

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1.0 Introduction

Lithos Group Inc. (Lithos) was retained by Albert and Main Holdings Inc. (the "Owner") to prepare a Functional Servicing and Stormwater Management Report in support of a Site Plan Application for a proposed mixed-use development located at 400 Albert Street in the City of Ottawa (the "City").

The purpose of this report is to provide site-specific information for the City's review with respect to infrastructure required to support the proposed development regarding storm drainage, sanitary discharge and water supply.

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

- As built plans of:
    - Slater Street, drawing No. PP2 and No. PP3, dated June 30, 2016;
    - Slater Street, drawing No. E-35, dated September 1970;
    - Albert Street, drawing No. A-3-3;
    - Lyon Street, drawing No. H-36-f, dated October 7 1969;
    - Bay Street, drawing No. R430, dated February 6 1970
- Site Plan prepared by IBI GROUP, dated August 17, 2020;
- Site Statistics prepared by IBI GROUP, dated August 14, 2020;
- Topographical Survey prepared by Annis, O'Sullivan, Vollebekk Ltd., dated March 28, 2014;

2.0 Site Description

The existing site is approximately 0.615 hectares and is comprised of one (1) three-storey commercial building with outdoor parking area. The site is located north-west of the intersection between Slater Street and Lyon Street and is bound by residential development and Bay Street to the west, Albert Street to the north, Lyon Street to the east and Slater Street to the south. Refer to **Figures 1** and **2** following this report and site photographs in **Appendix A**.

3.0 Site Proposal

Under post-development conditions, approximately 0.032 ha will be conveyed to the City due to the road widening along Albert Street, Lyon Street and Slater Street; therefore, the proposed site area will be 0.583 hectares.

In addition, the proposed site will be comprised of two (2) ownerships as follows:

- Mixed use development;
- Parkland to be dedicated to the City.

The proposed mixed-use development will include one (1) three-storey podium with two (2) high-rise, 23-storey and 29-storey residential towers, and one (1) three-storey podium with one (1) high-rise, 35-storey residential tower.

The northeast portion of the site, with an area of 402.15m^2, will be dedicated to the City to be used as parkland. The proposed development will be serviced by three (3) levels of underground parking. Please refer to **Appendix B** for site plan and building statistics.

4.0 Terms of Reference and Methodology

4.1. Terms of Reference

The following references and technical guidelines were consulted in the present study:

- **City of Ottawa Servicing Study Guidelines**, online edition,
- **City of Ottawa Sewer Design Guidelines**, (2012),
- **City of Ottawa Design Guidelines – Water Distribution**, (2010),
- **Ministry of Environment, Conservation and Park (MECP) Guidelines for the Design of Water Systems** (2008)
- **MECP Guidelines for the Design of Sanitary** Sewage Systems (2008)
- **MECP Stormwater Planning and Design Manual** (2003)
- **Ontario Building Code** (2010)

4.2. Methodology: Stormwater Drainage and Management

This report provides a detailed Stormwater Management (SWM) review of the pre-development and post-development conditions and comments on opportunities to reduce peak flows. This is illustrated on a proposed servicing connection plan.

The stormwater management criteria for this development are based on the City of Ottawa Sewer Design Guidelines, as well as the Ministry of Environment, Conservation and Parks (MECP) 2003 Stormwater Management Planning and Design Manual (SWMPD). The following design criteria will be reviewed:

- Post-development peak flow for the 100-year storm event from the site should be controlled to the 5-year target flow. A 20-minute time of concentration and a 10 min inlet time derived from City of Ottawa IDF curves, were considered for connection to a dedicated storm sewer;
- For connection to a dedicated storm sewer, when the imperviousness of the existing property is greater than 50%, the maximum value of the runoff coefficient, “c”, used in calculating the pre-development peak runoff rate is limited to 0.50;
- A safe overland flow will be provided for all flows in excess of the 100-year storm event.

4.3. Methodology: Sanitary Discharge

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

The estimated sanitary discharge flows from the proposed site will be calculated based on the criteria shown **Table 4-1** below. (Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines)

Table 4-1 – Sanitary Design Criteria

Design Parameter	Value
Residential Units (Average Apartment)	Bachelor Unit =1.4 people/unit 1 Bedroom Unit=1.4 people/unit 2 Bedroom Unit=2.1 people/unit 3 Bedroom Unit=3.1 people/unit
Average Daily Residential Flow	280 L/person/day
Residential Peak Factor	$PF = 1 + (14/(4+(P/1000)^{1/2})$
Commercial Floor Space	50000 L/ha/day
Commercial Peaking Factor	1.5 if commercial contribution >20%, otherwise 1.0
Infiltration and Inflow Allowance	0.28 L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	1.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s

4.4. Methodology: Water Usage

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS). This method is based on the floor area of the building to be protected, the type and combustibility of the structural frame and the separation distances with adjoining building units.

Section 4.3.22 of the City Design guidelines for water distribution provides guidance for determining the method for estimating Fire Demand. As indicated, the requirements for levels of fire protection on private property are covered in the Ontario Building Code. Section 7.2.11 of the OBC addresses the installation of water service pipes and fire service mains. Part 3 of the OBC outlines the requirement for Fire Protection, Occupant Safety, and Accessibility; and subsection A-3.2.5.7 provides the provisions for firefighting. Based on trained personnel responding to the emergency, and water supply being delivered through a municipal, the required minimum provision for water supply flow rates shall not be less than 2,700L/min or greater than 9,000L/min (OBC Section A.3.2.5.7, Table 2). The City of Ottawa was contacted in August 2019 to obtain boundary conditions based on an estimated water demand.

The domestic water usage was calculated based on the City of Ottawa Guidelines – Water Distribution outlined in **Table 4-2** that follows.

Table 4-2 – Water Usage

Design Parameter	Value
Average Residential Day Demand	350 L/person/day
Maximum Residential Day Demand	2.5 x Average Day Demand
Maximum Residential Hour Demand	2.2 x Max Day Demand
Average Commercial Day Demand	2.5 L/m^2/d
Maximum Commercial Day Demand	1.5 x Average Day Demand
Maximum Commercial Hour Demand	1.8 x Max Day Demand
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During Peak Hour Demand desired operating pressure is within	350kPa and 480KPa
Minimum pressure during normal operating conditions (average day to maximum hour demand)	275kPa
During normal operating conditions, pressure must not exceed	552kPa
Minimum pressure during fire flow plus maximum day demand	140kPa

5.0 Stormwater Management and Drainage

5.1. Existing Conditions

The existing site contains one (1) three-storey commercial development with outdoor parking area. The site drains towards the intersection between Albert Street and Lyon Street and towards Slater Street. Moreover, no external areas drain towards the subject property.

According to available records, there are four (4) storm sewers abutting the subject property. More specifically:

- A 375mm diameter storm sewer on Bay Street flowing south;
- A 600mm diameter storm sewer on Albert Street flowing east;
- A 525mm diameter storm sewer on Slater Street flowing east; and
- A 300mm diameter storm sewer on Lyon Street flowing south.

The storm sewers along Albert, Bay and Slater Street are eventually connected to the existing 675mm diameter storm sewer located at the intersection of Albert Street and Kent Street further downstream, flowing east.

Moreover, the existing site is primarily covered by impermeable areas, thus there is no significant infiltration onsite. Although the existing run-off composite coefficient is estimated at 0.9, the City of Ottawa Guidelines require target flow calculations based on a run-off coefficient of 0.5. **Table 5-1** shows the input parameters which are illustrated on the pre-development drainage area plan in **Figure DAP-1** in **Appendix C**.

Table 5-1 – Target Input Parameters

Catchment	Drainage Area (ha)	Actual "C"	Design "C"	Tc (min.)
A Total Pre	0.583	0.90	0.50	20

Peak flows calculated for the existing conditions are shown in **Table 5-2** below. Detailed calculations are in **Appendix C**.

Table 5-2 – Target Peak Flows

Catchment	Peak Flow Rational Method (L/s)		
	2-year	5-year	100-year
A Total Pre	42.1	56.9	65.7

As shown in **Table 5-2**, post-development flows will need to be controlled to the target flows of 56.9 L/s.

5.2. Proposed Conditions

In order to meet the City's Stormwater Management criteria, the development flow rate is to be controlled to the five (5)-year target flow established in **Section 5.1**. Overland flow from the site will be directed towards the adjacent right-of-ways.

The site consists of five (5) internal drainage areas:

1. A1 Post – Storm runoff from the rooftops of Towers A, B and the East Podium's terraces, is controlled in the underground storage tank 1 located in the north side of the property;
2. A2 Post – Storm runoff from the rooftop of Tower C and the West Podium's terraces is controlled in the underground storage tank 2 located in the south side of the property;
3. A3 Post – Storm runoff from the mid block connection area controlled in the underground storage tank 2 located in the south side of the property;
4. A4 Post – Uncontrolled runoff towards the adjacent right of ways;
5. A5 Post – Uncontrolled runoff from the Parkland dedication area flowing towards Lyon Street.

The post-development drainage areas and runoff coefficients are indicated in **Figure DAP-2**, located in **Appendix C** and summarized in **Table 5-3** below.

Table 5-3 – Post-development Input Parameters

Drainage Area	Drainage Area (ha)	"C"	Tc (min.)
A1 Post (Tower A, B and East Podium)	0.332	1.00	10
A2 Post (Tower C West Podium and midblock connection area)	0.130	1.00	10
A3 Post (Midblock connection area)	0.069	1.00	10
A4 Post (Uncontrolled runoff towards the adjacent right of ways)	0.013	1.00	10
A5 Post (Uncontrolled runoff from the Parkland dedication area flowing towards Lyon Street)	0.040	1.00	10

* "C" value for the 100 year storm event is increased by 25%, with a maximum of 1.0 per City's Sewer Design Guidelines.

5.2.1. Quantity Controls

As mentioned in **Section 5.1** storm runoff from the existing property drains towards two (2) eventually connected storm sewer networks, therefore, quantity control analysis has been prepared taking into account a total storm flow towards the storm infrastructure adjacent to the site.

Using the City's intensity-duration-frequency (IDF) data, modified rational method calculations were undertaken to determine the maximum storage required during each storm event. Results for the 2, 5, and 100-year storm events are provided in **Table 5-4**. The detailed post-development quantity control calculations are provided in **Appendix C**.

Table 5-4 – Post-development Quantity Control as Per City Requirements

Storm Event	Target Flow (L/s)	Required Towers' A and B Storage Tank 1 Volume (m^3)	Required Tower's C Storage Tank 2 Volume (m^3)	Maximum Release Rate from Towers' A and B Storage Tank1 (L/s)	Maximum Release Rate from Tower's C Storage Tank 2 (L/s)	Uncontrolled Flow (L/s)	Uncontrolled Flow from the Parkland Dedication Area (L/s)	Total Release Rate (L/s)
2-year	56.9	27.3	18.5	9.7	5.0	2.5	6.8	24.1
5-year		44.7	29.7	12.5	6.4	3.4	9.3	31.5
100-year		117.8	75.2	20.1	10.2	6.4	19.9	56.6

As shown in **Table 5-4**, in order to control post-development flows to the 5-year pre-development conditions, a target flow of 56.9 L/s, is to be satisfied. The required on-site storage is accommodated by the use of two underground storage tanks, one for Towers A and B – Tank 1, and one for Tower C- Tank 2. **Table 5-4,** illustrates the minimum required on-site storage for each storage tank, which is 117.8 m^3 for Towers' A and B Storage Tank1, and 75.2 m^3 for Tower's C Storage Tank2, respectively.

5.2.2. Towers' A and B underground Storage Tank1

A storage tank for Towers' A and B, is proposed to meet the quantity control requirements, set forth by the City's Guidelines. Controlled stormwater flows from the Towers' A and B rooftop, along with the East Podium's terrace will be gravity driven into the stormwater storage tank1 located on the North portion of the property. The North holding tank will have an active storage depth of 1.07m above the invert of the outlet pipe, accounting for a quantity control maximum storage of 117.80 m^3, during the hundred-year storm, and will outlet through a 95mm diameter orifice plate, ultimately reaching the 600mm storm sewer on Albert Street, through gravity.

The proposed Storage tank1 will have a total footprint area of 110.04m^2. Refer to **Figure 3B**, included in **Appendix C**, for the minimum tank design requirements. Storm tank will also include a perforated access hatch and in case of emergency will overflow towards Albert Street. Additional details of the tank design will also be provided by the mechanical engineer.

5.2.3. Tower's C underground Storage Tank2

In regards to storage tank 2, volumes from the driveway area will be gravity driven into the proposed Stormfilter system SFPD 0806, prior being discharged into the Tower's C underground Storage Tank2 at the South west portion of the site. In addition, controlled stormwater flows from the Tower's C rooftop, along with the West Podium's terrace will be gravity driven into the South west storage tank. The 100-year storm resulted into an underground structure of 75.2 m^3, with an active storage depth of 0.71m , controlled by a 75mm orifice plate with a maximum release rate of 10.2 L/s towards the 525mm storm sewer on Slater Street.

The proposed South West tank will have a total footprint area of 106.51m^2. Refer to **Figure 3B**, included in **Appendix C**, for the minimum tank design requirements. Storm tank will also include a perforated access hatch and in case of emergency will overflow towards Slater Street. Additional details of the tank design will also be provided by the mechanical engineer.

5.3. Quality Controls

For MECP Enhanced Level protection, the removal of 80% total suspended solids (TSS) is required. Stormwater discharged from the proposed development's rooftop area that will not be polluted by car waste, is considered "clean" and will be driven into the underground storage tanks. Contaminated water from the midblock connection, will be driven into the manufactured treatment device (Stormfilter SFPD 0806 with four 18in cartridges) before being discharged into the Tower's C underground storage tank2 at the South west portion of the site. The detailed quality control calculations can be found in **Appendix C**. A summary of the site quality control is included in below.

Table 5-5– Site TSS Removal

Drainage Area	Drainage Area (ha)	Overall TSS Removal	Additional Quality Control Required
Buildings A, B and C Rooftops and Terraces	0.461	70%	Inherent
Midblock Connection Area	0.069	10%	SPFD 0806
Total	**0.530**	**80%**	

5.4. Proposed Storm Connection

The proposed development will have two (2) storm connections, on Albert Street and on Slater Street.

Proposed storm connection on Albert Street

Storm discharge from the rooftop of Towers A & B and from the East Podium's terraces will be connected to the existing 600 mm storm sewer on Albert Street, via a 200mm storm sewer with a minimum grade of 2.00% (or equivalent pipe design). Refer to engineering drawing "**SS-01**" (submitted separately).

Proposed storm connection towards Slater Street

Storm discharge from the rooftop area of Tower C and from the West Podium's terrace, as well as from the midblock connection area will be connected to the existing 525 mm diameter storm sewer along Slater Street, via a 200 mm storm sewer service connection, with a minimum grade of 2.00% (or equivalent pipe design). Refer to engineering drawing "**SS-01**" (submitted separately).

The post-development 100-year storm flow has been designed to match the five (5)-year pre-development storm flow. Therefore, this development will not adversely affect flow conditions downstream and the existing infrastructure on Slater Street and on Albert Street will be adequate to service this development. Flows above the 100-year event will be conveyed within pipes and overland to the adjacent municipal right-of-way (ROW). Refer to engineering drawing "**SG-01"** (submitted separately) for overland flow in excess of the 100-year storm event.

6.0 Sanitary Drainage System

6.1. Existing Sanitary Drainage System

The existing site is comprised of one (1) three-storey commercial building with parking area. According to available records, there are five (5) sanitary sewers abutting the subject property. More specifically:

- A 375mm diameter sanitary sewer on Albert Street flowing east;
- A 600mm diameter trunk sanitary sewer on Lyon Street flowing south;
- A 225mm diameter sanitary sewer on Bay Street flowing south;
- A 250mm diameter sanitary sewer on Bay Street flowing south; and
- A 375mm diameter sanitary sewer on Slater Street flowing east.

6.2. Existing Sanitary Flows

The sanitary flow generated by the proposed development at 400 Albert Street was compared to the existing flow in order to quantify the net increase in the sanitary sewer.

Using the design criteria outlined in **Section 4.3** and existing site information, the sanitary discharge flow from the existing commercial building is estimated at 0.24 L/s into the City's infrastructure..

6.3. Proposed Sanitary Flows

Towers A and B - Phase I

Using the design criteria and the proposed development statistics, Towers A and B will discharge 12.59 L/s to the existing sanitary network at Albert Street.

Tower C - Phase II

Similarly, a calculated flow of 9.09 L/s is anticipated to be discharged to the existing sanitary network at Bay Street.

For detailed calculations refer to the sanitary sewer design sheet in **Appendix D.**

The proposed development will slightly increase the sanitary flows into the downstream networks; however, whether there is adequate capacity to the City's infrastructure to accommodate the additional sanitary flow under both dry and wet-weather conditions, confirmation is anticipated by the City.

6.4. Proposed Sanitary Connection

The proposed development will consist of Towers A, B and C along with the West and East podium. Towers A and B along with the East podium will be constructed under a separate phase from the Tower C and the West podium and should be able to function independently. Two (2) separate sanitary connections will be provided for the proposed three (3) buildings, one for the 23-storey Tower A along with the 29-storey Tower B and one for the 35-storey Tower C.

Towers A&B – Phase I

More specifically, Towers A and B will be connected to the existing 375mm sanitary sewer on Albert Street through a 200mm diameter sanitary sewer lateral connection with a minimum grade of 2.50% (or equivalent pipe design). Refer to engineering drawing "**SS-01**" (submitted separately) for details.

Tower C – Phase II

In addition, Tower C will be connected to the existing 250mm sanitary sewer on Bay Street through a 150 mm diameter sanitary sewer lateral connection, with a minimum grade of 2.50% (or equivalent pipe design). Refer to engineering drawing "**SS-01**" (submitted separately) for details.

7.0 Water Supply System

7.1. Existing System

The subject property lies within the City of Ottawa 1W pressure zone. The existing watermain system consists of a 200 mm diameter watermain on the south side of Albert Street, a 375 mm diameter watermain on the north side of Slater Street and a 200 mm diameter watermain on the east side of Bay Street.

7.2. Proposed Water Supply Requirements

The estimated water consumption was calculated based on the occupancy rates shown on **Table 4-2**, according to the City's watermain design criteria. Water supply for the site will be provided by the two (2) separate water connections for the proposed development. More specifically, Towers A and B, along with the East Podium, will be connected to the existing 200 mm diameter watermain on the south side of Albert Street, while Tower C and the West Podium by the existing 375 mm diameter watermain on the north side of Slater Street.

Towers A and B – Phase I (Albert connection)

It is anticipated that an average domestic water consumption of approximately 4.15 L/s (358,560 L/day), a maximum daily consumption of 10.28 L/s (888,192 L/day) and a peak hourly demand of 22.57 L/s (81,252 L/hr) will be required to service Towers A, B, and the East Podium.

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS) be undertaken to assess the minimum requirement for fire suppression. The fire flow calculations is normally conducted for the largest storey, by area, and for the two immediately adjacent storeys. **Table 7-1** illustrates the input parameters used for the FUS calculations. According to our calculations, a minimum fire suppression flow of approximately 100.00 L/s (1,585 USGPM) will be required to service the Towers A, B, and the East Podium. Detailed calculations can be found in **Appendix E**.

Table 7-1- Fire Flow Input Parameters

Parameter	Frame used for Building	Combustibility of Contents	Presence of Sprinklers	Separation Distance			
				North	East	South	West
Value according to FUS options	Fire-Resistive Construction	Limited-Combustible	Yes	Road	Road	Road	10.1m to 20.0 m
Surcharge/reduction from base flow	0.6	15%	30%	0%	0%	0%	15%

In summary, the required design flow is the sum of 'the minimum fire suppression flow' and 'maximum daily demand' (100.00 + 10.28 = 110.28 L/s, 1748 USGPM).

Table 7-2 summarizes the anticipated water demand for Towers A and B based on the City of Ottawa Guidelines – Water Distribution.

Table 7-2 – Water Demand

Design Parameter	Anticipated Demand[1] (L/min)
Average Day Demand	249
Max Day + Fire Flow	617 + 6000 = 6617
Max Hour Demand	1354
1. Water demand calculations per City of Ottawa Guidelines. See **Appendix E** for detailed calculations.	

Tower C- Phase II (Slater connection)

According to our calculations based on the City's watermain design criteria, as far as the domestic water consumption for Tower C is concerned, it is anticipated that an average consumption of approximately 2.98 L/s (257,472 L/day), a maximum daily consumption of 7.45 L/s (643,680 L/day) and a peak hourly demand of 16.38 L/s (58,968 L/hr) will be required.

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS) be undertaken to assess the minimum requirement for fire suppression. The fire flow calculations is normally conducted for the largest storey, by area, and for the two immediately adjacent storeys. **Table 7-3** illustrates the input parameters used for the FUS calculations. According to our calculations, a minimum fire suppression flow of approximately 66.67 L/s (1,057 USGPM) will be required to service Tower C. Detailed calculations can be found in **Appendix E**.

Table 7-3 – Fire Flow Input Parameters

Parameter	Frame used for Building	Combustibility of Contents	Presence of Sprinklers	Separation Distance			
				North	East	South	West
Value according to FUS options	Fire-Resistive Construction	Limited-Combustible	Yes	3.1m to 10m	10.1m to 20m	Road	Road
Surcharge/reduction from base flow	0.6	15%	30%	20%	15%	0%	0%

In summary, the required design flow is the sum of 'the minimum fire suppression flow' and 'maximum daily demand' (66.67 + 7.45 = 74.11 L/s, 1175 USGPM).

Table 7-4 summarizes the anticipated water demand for the Tower C based on the City of Ottawa Guidelines – Water Distribution.

Table 7-4 – Water Demand

Design Parameter	Anticipated Demand[1] (L/min)
Average Day Demand	179
Max Day + Fire Flow	447 + 4000 = 4447
Max Hour Demand	983
1. Water demand calculations per City of Ottawa Guidelines. See **Appendix E** for detailed calculations.	

7.3. Watermain Analysis Results

Upon completion of the detailed calculations in order to determine the anticipated domestic water consumption and the required minimum fire flow for the proposed development, the calculation results were provided to the City of Ottawa. As a result, the above noted values were used to generate the municipal watermain network boundary conditions.

Table 7-5 below summarizes the boundary conditions provided by the City of Ottawa for the existing municipal watermain network along Slater and Albert Street.

Table 7-5– Boundary Conditions Provided by the City

Municipal Watermain Boundary Condition	Slater Street Connection	Albert Street Connection
Minimum HGL	106.5	106.5
Maximum HGL	116.5	116.5
Max Day + Fire Flow (100 L/s)	110.5	106.0

Table 7-6 below summarizes the calculated water demands for the proposed development under the various operating conditions and compares the anticipated operating pressures at the watermains to the normal operating pressures outlined in the City of Ottawa Design Guidelines. In addition, booster pumps will be used to increase the water pressure to the upper floors, in order the entire proposed development to function properly.

Table 7-6- Watermain Analysis Results

Watermain Connection	Design Parameter	Anticipated Demand (L/s)	Approximate Design Operating Pressures (psi) / Relative Head (m)	Normal Municipal Operating Pressures (psi)
Slater Street	Average Demand	2.98	63 psi (44.1m)	50-70 psi
	Peak Hour Demand	16.38	49 psi (34.1m)	40-70 psi
	Max Day + Fire Flow Demand	74.11	54 psi (38.1m)	20 psi (min)
Albert Street	Average Demand	4.15	61 psi (42.8m)	50-70 psi
	Peak Hour Demand	22.57	47 psi (32.8m)	40-70 psi
	Max Day + Fire Flow Demand	110.28	46 psi (32.3m)	20 psi (min)

As indicated in the **Table 7-6** above, the results of the watermain analysis based on boundary conditions provided by the City, along Slater and Albert Street, reveal that the existing water infrastructure will support the proposed development. The boundary conditions received by the City of Ottawa can be found in **Appendix E**.

7.4. Proposed Watermain Connection

Two (2) separate connections will be provided to the proposed development. The connections will be as follows:

Towers A and B – Phase I (Albert Street)

The proposed development will be serviced by a 150mm diameter waterline that will distribute the Towers A, B, along with the East podium with fire and domestic water. The proposed water lateral will connect on the 200mm existing watermain on Albert Street.

Tower C – Phase II (Slater Street)

The proposed development will be serviced by a 150mm diameter waterline that will distribute the Tower C along with the West Podium with fire and domestic water. The proposed water lateral will connect on the 375mm existing watermain on Slater Street.

According to City standards the watermains will be constructed with a minimum depth of cover of 2.4m. Refer to engineering drawing "**SS-01**" (submitted separately) for details.

8.0 Erosion and Sediment Control

Soil erosion occurs naturally and is a function of soil type, climate topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction.

Catch basins will have filter fabric installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

- Limit extend of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install filter cloth between catch basins and frames.
- Plan construction at proper time to avoid flooding.

Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not following under silt barriers.
- Clean and change filter cloth at catch basins.

9.0 Site Grading

9.1. Existing Grades

The existing site is approximately 0.583 hectares and is currently occupied by one (1) three-storey commercial building and by outdoor parking area. Moreover, it is located between Lyon Street, Albert Street, Slater Street and Bay Street, in the City of Ottawa. The site drains into the existing stormwater system inside the property and overland towards the adjacent right of ways (ROW).

9.2. Proposed Grades

The proposed grades will improve the existing drainage conditions to meet the City's/Regional requirements. Grades will be maintained along the property line wherever feasible and emergency overland flow will be directed towards the intersection between Slater Street and Lyon Street. Existing drainage patterns on adjacent properties will not be altered and stormwater runoff from the subject development will not affect the adjacent properties.

10.0 Conclusions and Recommendations

Based on our investigations, we conclude the following:

Storm Drainage

The proposed development will consist of one (1) three-storey podium with two (2) high-rise, 23-storey and 29-storey residential towers, and one (1) three-storey podium with one (1) high-rise, 35-storey residential tower. For Towers A, B along with the East podium, stormwater flow will connect to the existing 600 mm diameter storm sewer on Albert Street. For Tower C and the West podium, stormwater flow will be discharged in the existing 525 mm diameter storm sewer on Slater Street. Total post-development storm flows from the proposed development and the parkland dedication area, will meet the 5-year pre-development flow. In order to achieve the target flows and meet the City's Regulations, quantity controls will be utilized and up to 193.0 m^3 of total on site storage will be required for the proposed development. The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection as specified by the Ministry of Environment, Conversation and Parks (MECP). Water quality control can be provided by the rooftop/terraces. Additional quality control measures will also be required by the MECP, provided by the proposed Stormfilter system SFPD 0806, for the driveway areas, which are exposed to oil and grit, for a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

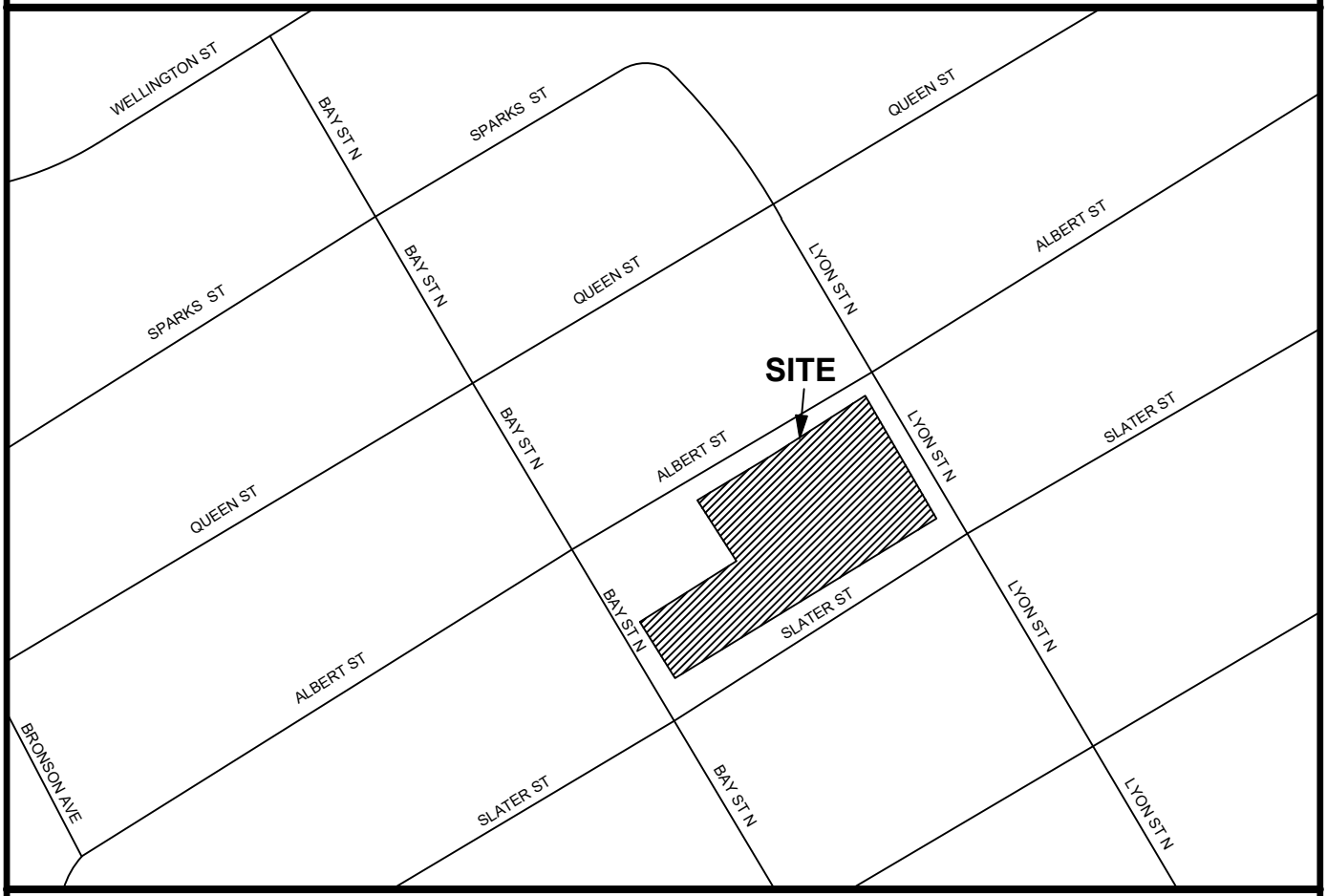
The proposed development will consist of Towers A, B and C along with the West and East podium. Towers A and B along with the East podium will be constructed under a separate phase from the Tower C and the West podium and should be able to function independently. More specifically, Towers A and B will be connected to the existing 375mm sanitary sewer on Albert Street through a 200mm diameter sanitary sewer lateral connection with a minimum grade of 2.50% (or equivalent pipe design), while Tower C will be connected to the existing 250mm sanitary sewer on Bay Street through a 150mm diameter sanitary sewer lateral connection, with a minimum grade of 2.50% (or equivalent pipe design), respectively.

The additional net discharge flow from Towers A, B and C, is anticipated at approximately 12.59 L/s and 9.09 L/s respectively. Confirmation is anticipated by the City on whether the existing sanitary infrastructure along Albert Street and Bay Street can support the proposed development.

Water Supply

Water supply for the proposed development will be provided from two (2) separate water connections. More specifically, Towers A and B, along with the East Podium, will be connected to the existing 200 mm diameter watermain on the south side of Albert Street, while Tower C and the West Podium to the existing 375 mm diameter watermain on the north side of Slater Street.

It is anticipated that a total design flow of 110.28 L/s, for the Albert Street connection, and 74.11 L/s, for the Slater Street connection, will be required to support the proposed development. Based on the boundary conditions received from the City, it is revealed that the existing water infrastructure can support the proposed development



Lithos

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

LOCATION PLAN
MIXED USE DEVELOPMENT
ALBERT STREET
TORONTO, ONTARIO

DATE:	AUGUST 2020	PROJECT No:	UD19-048
SCALE:	N.T.S.	FIGURE No:	FIG 1

Lithos

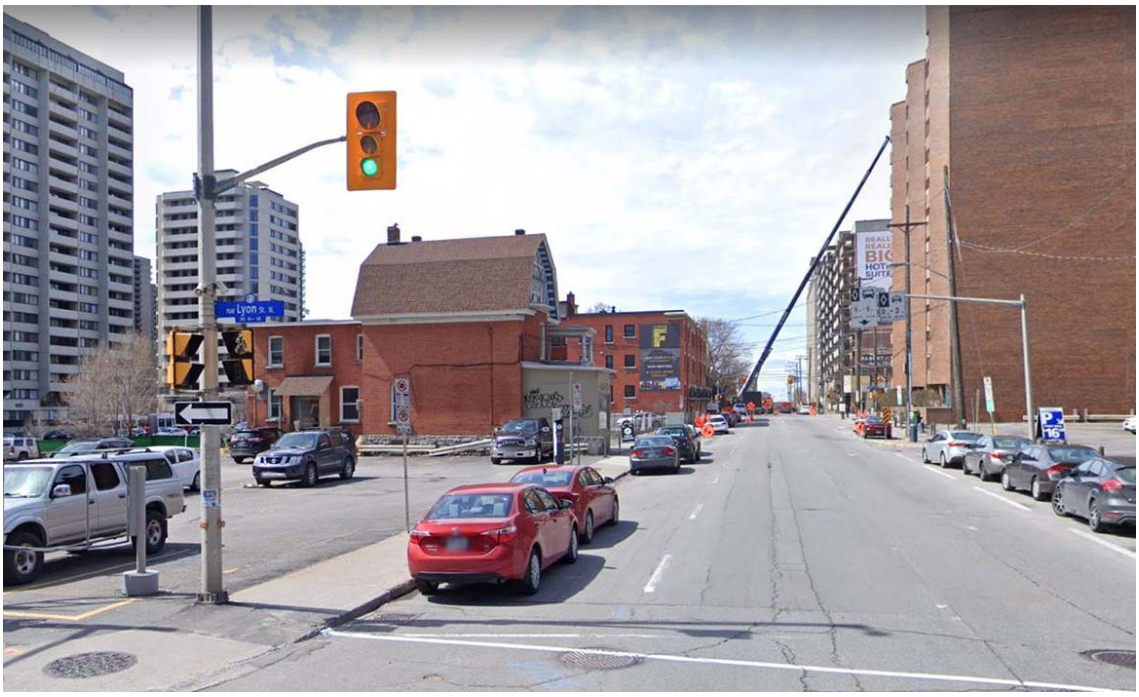
150 Bermondsey Road, North York, Ontario, M4A 1Y1

AERIAL PLAN
MIXED USE DEVELOPMENT
ALBERT STREET
TORONTO, ONTARIO

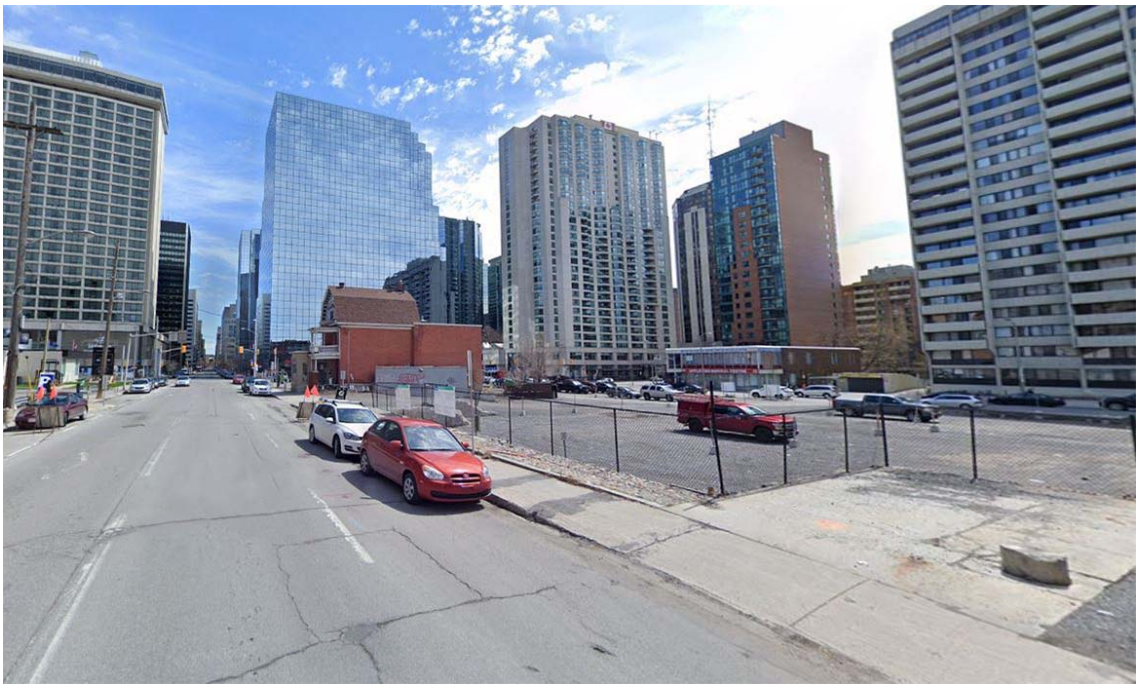
DATE:	AUGUST 2020	PROJECT No:	UD19-048
SCALE:	N.T.S.	FIGURE No:	FIG 2

APPENDIX A
Site Photographs

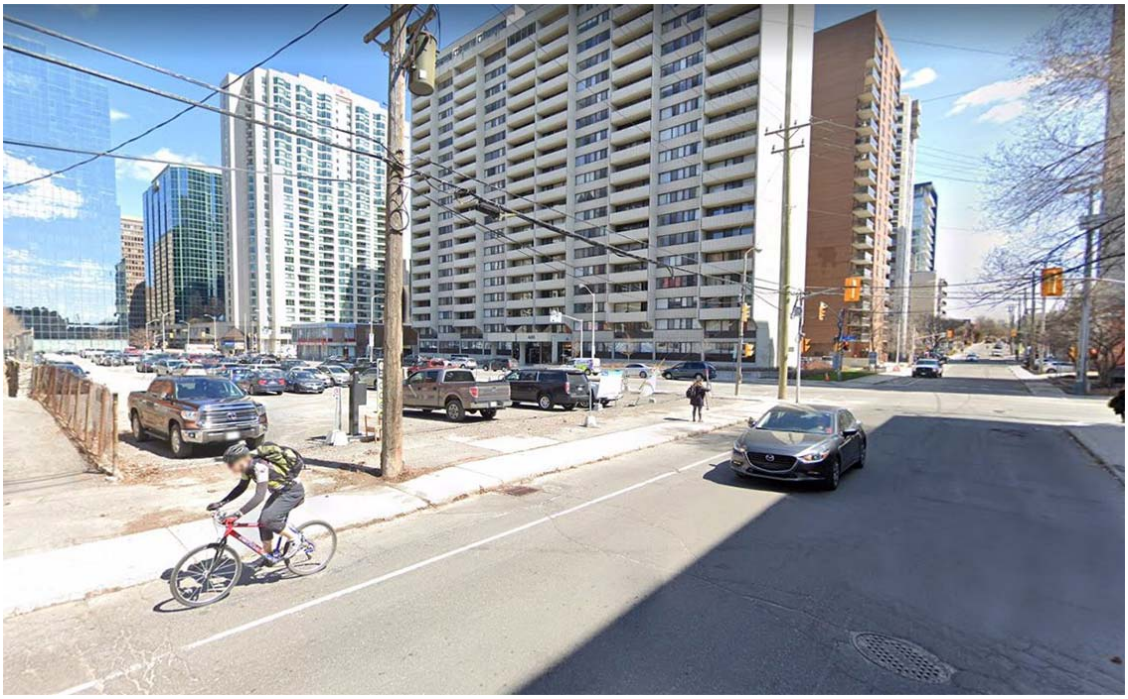
North-East Corner of property facing South-East



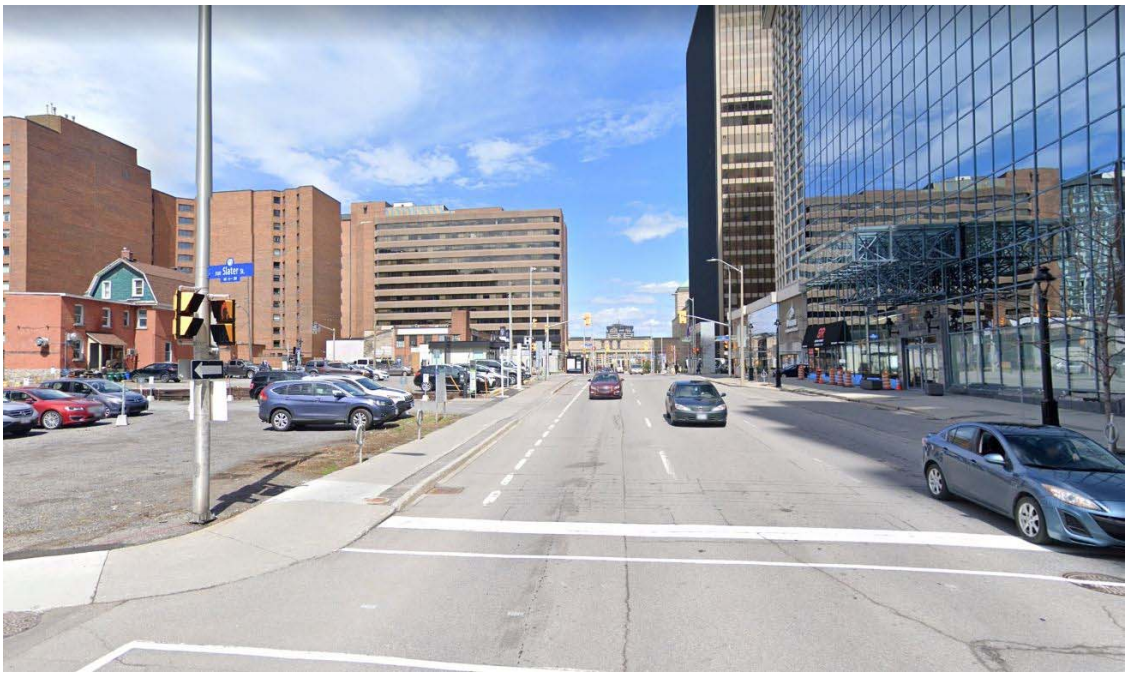
North-East Corner of property facing South-West



North-West Corner of property facing North-East

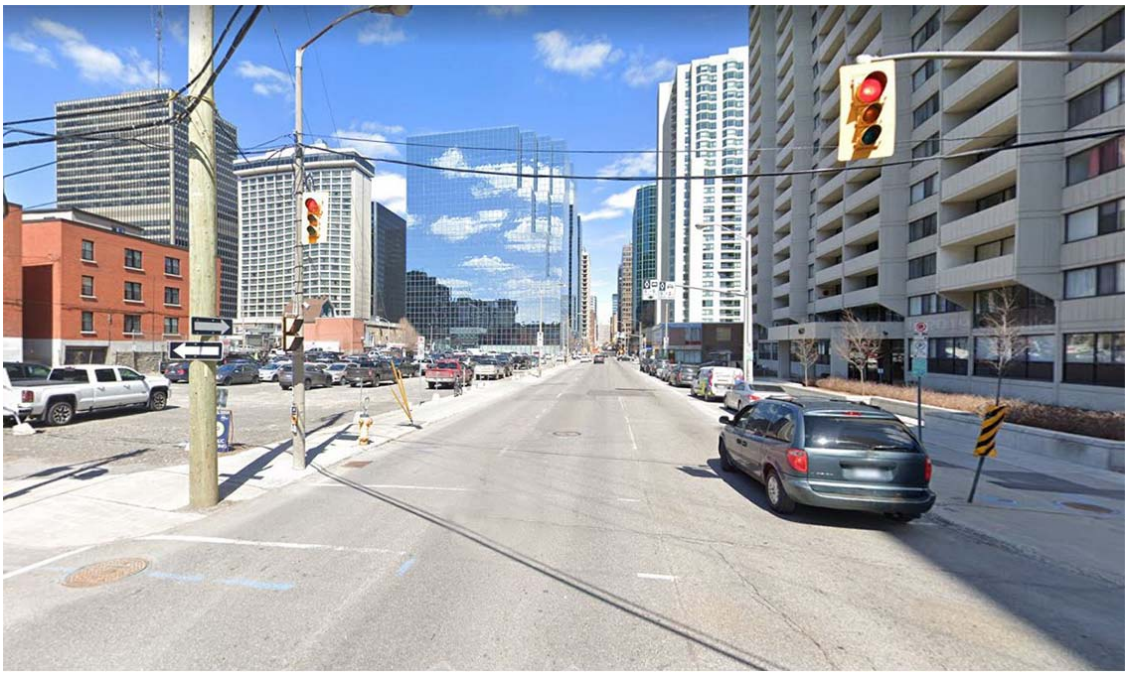


North-West Corner of property facing South-East

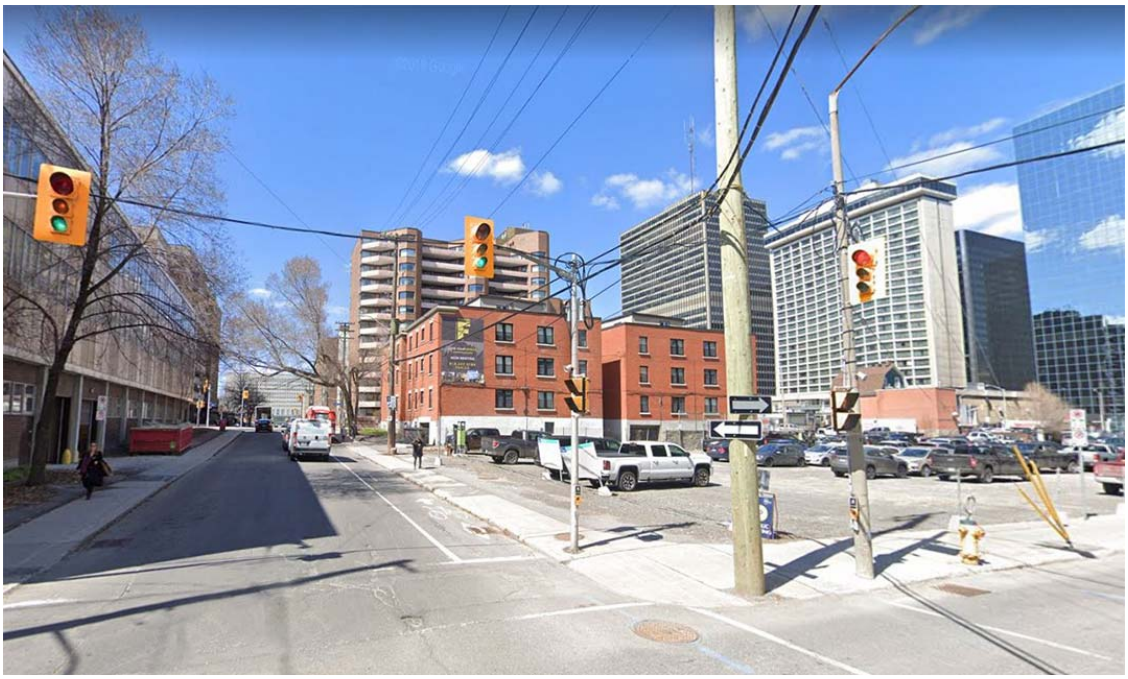


South-East Corner of property facing North-West

South-East Corner of property facing South-West

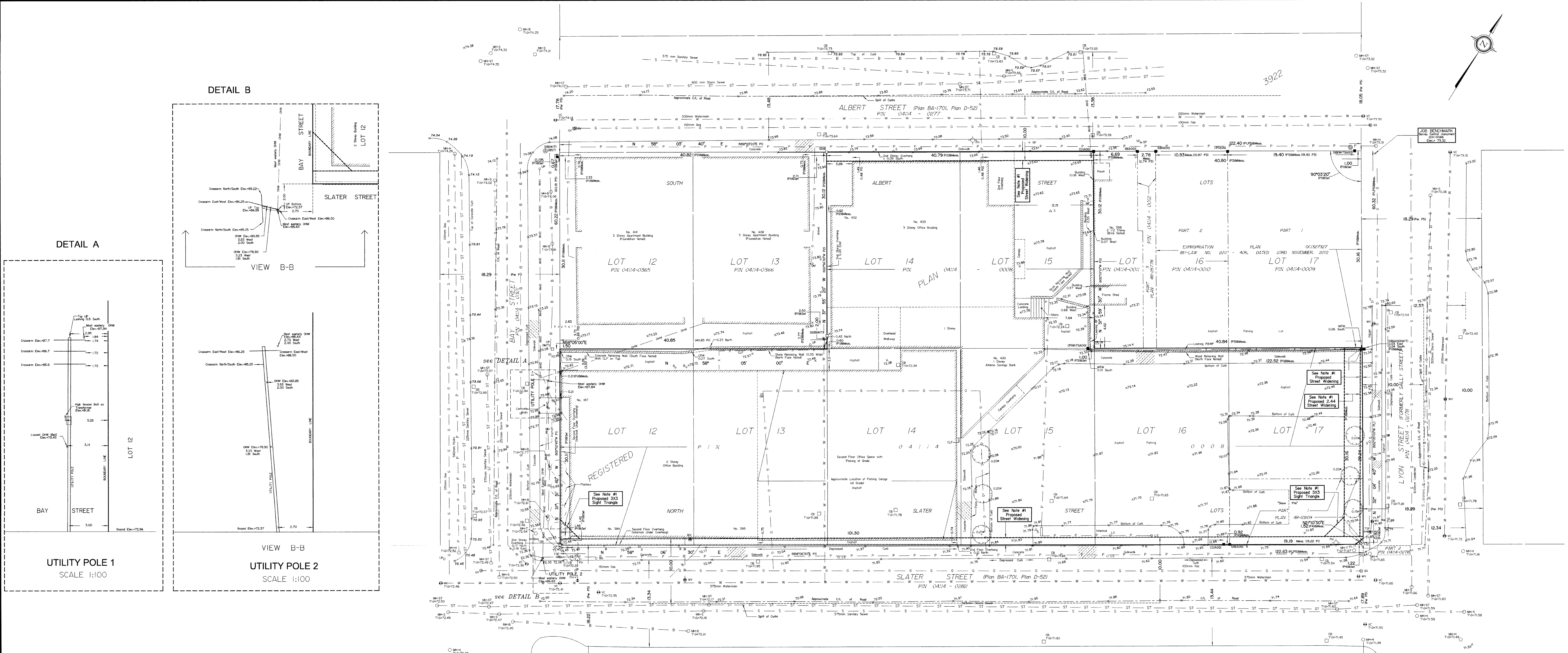


South-West Corner of property facing North-East



South-West Corner of property facing North-West

APPENDIX B
Background Information



TOPOGRAPHICAL PLAN OF SURVEY

LOTS 12, 13, 14, 15, 16 AND PART OF LOT 17 (North Slater Street) AND LOTS 14 & 15 (South Albert Street) REGISTERED PLAN 3922 CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.
REVISION NOTE: Hydro Pole Details added August 31, 2015

Scale 1 : 200
8.0 6.0 4.0 2.0 0 4 8 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act, the Land Titles Act and the regulations made under them.
2. The survey was completed on the 28th day of March, 2014.

April 1st/2014 (Date) — Edward M. Lancaster, Ontario Land Surveyor

Notes & Legend

	Denotes	
—■—	-	Survey Monument Found
SIB	-	Standard Iron Bar
IB	-	Iron Bar
CC	-	Cut Cross
CP	-	Concrete Pin
(WIT)	-	Witness
Meas.	-	Measured
(AOG)	-	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	-	(AOG) Plan dated March 31, 2011
(P2)	-	(AOG) Plan dated 1993 (Topo)
(P3)	-	Plan 4R-25778
(P4)	-	Plan 4R-10209
(P5)	-	Plan D-52
○ MH-ST	-	Maintenance Hole (Storm Sewer)
○ MH-S	-	Maintenance Hole (Sanitary)
○ MH-B	-	Maintenance Hole (Bell)
○ MH-T	-	Maintenance Hole (Traffic)
○ MH-H	-	Maintenance Hole (Hydro)
○ MH-G	-	Maintenance Hole (Gas)
VC	-	Valve Chamber (Watermain)
— ST —	-	Underground Storm Sewer
— S —	-	Underground Sanitary Sewer
— W —	-	Underground Water
— P —	-	Underground Power
— G —	-	Underground Gas
○ UP	-	Utility Pole
○ LS	-	Light Standard
□ CB	-	Catch Basin
FH	-	Fire Hydrant
WV	-	Water Valve
○ SP	-	Water Stand Post
GV	-	Gas Valve
GM	-	Gas Meter
TSP	-	Traffic Signal Post
	-	Deciduous Tree
○ B	-	Bollard
△ S	-	Sign
CLF	-	Chain Link Fence
BF	-	Board Fence
P&WF	-	Post and Wire
WRW	-	Wood Retaining Wall
CRW	-	Concrete Retaining Wall
OHW	-	Overhead Wires
Ø	-	Diameter
+ 65.00	-	Location of Elevations
+ 65.00	-	Top of Concrete Curb Elevation
C/L	-	Centreline
———	-	Property Line

NOTE #1: The Location of all Sight Triangles and Street Widening are Preliminary and must be approved by The City of Ottawa before any design work is undertaken.

SITE AREA: 0.4920 HECTARES

Topographic data was collected under Winter Conditions. Snow cover and ice preclude determining location and elevation of some topographical data that is otherwise visible.

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
4. Underground Utilities shown on this plan are compiled from the City of Ottawa Plans D-11-18, D-11-19, D-11-24 & H-36-F.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999936.

Bearings are MTM grid, derived from Can-Net 3.0 Real Time Network GPS observations on reference points A and B, shown hereon, having a bearing of N57°44'40"E and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 3.0 Real Time Network GPS observations and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. Point A Northing 5031142.75 Easting 366956.47
. Point B Northing 5031207.57 Easting 367059.18

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 14581-14 Broccolini PtLts12-17 PL3922 T F2 | AE

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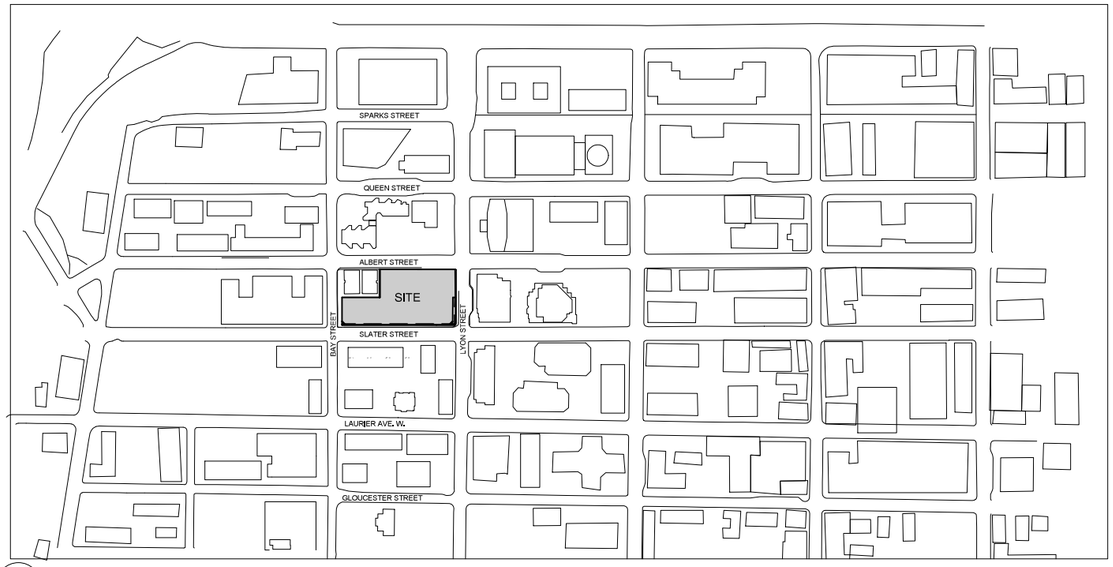
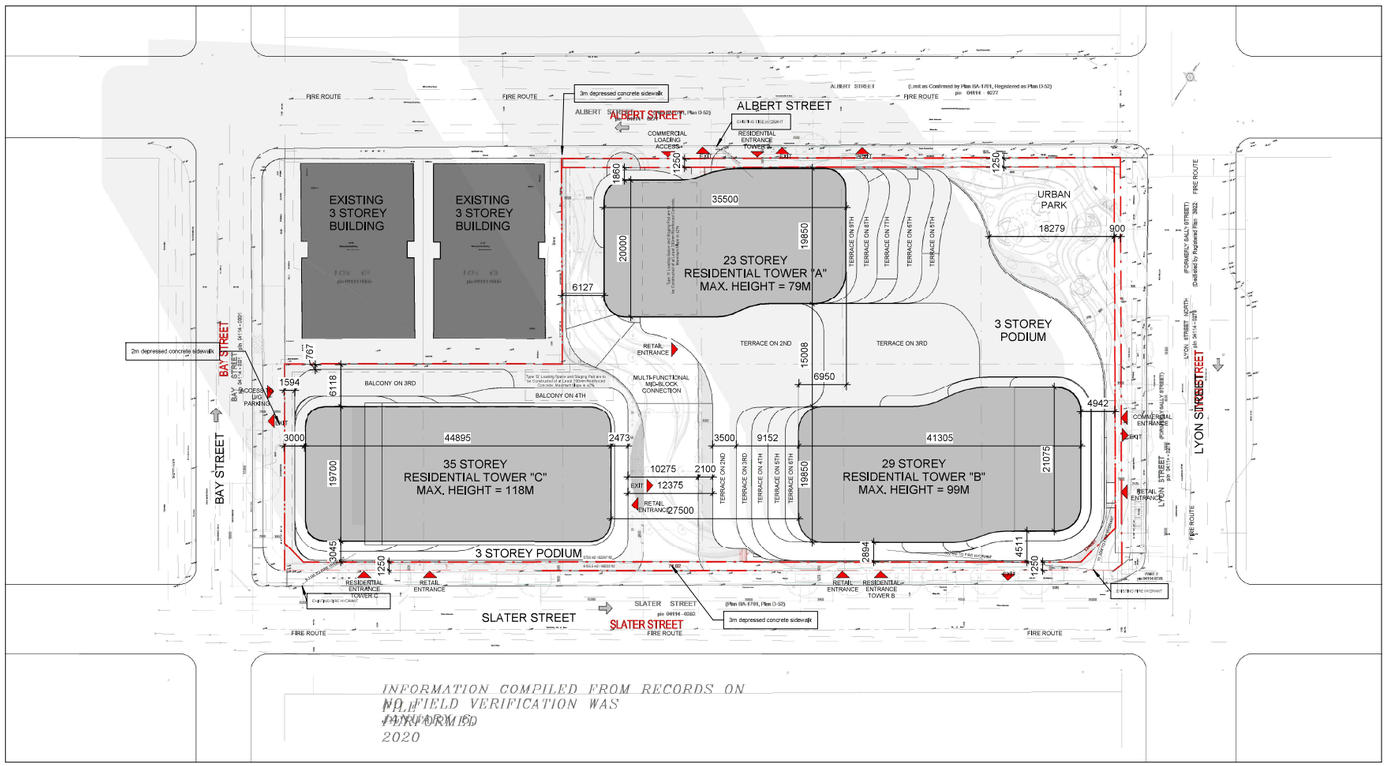


3 CONTEXT PLAN
Scale: NTS



INFORMATION COMPILED FROM RECORDS ON
NO FIELD VERIFICATION WAS
PERFORMED
2020

2 SITE PLAN
Scale: 1 : 400

400 Albert Street - Ottawa

August 14, 2020

PROJECT STATISTICS

	TOTAL	
SUMMARY	**SQ.M.**	**SQ.FT.**
Site Area	6,156	66,233
Net Site Area	5,832	62,756
Total GCA (Above Grade)	77,518	834,095
Total GFA	61,098	657,409
Total GSA (Residential)	57,829	622,526
Total NSA (Residential + Retail)	61,820	665,183
Building Efficiency	79.7%	
Total Retail GFA (Ground and 2nd)	2,769	29,799
URBAN PARK Area	402	4,326
Total Number of Units	385	

PROJECT STATISTICS

	TOTAL	
Tower A (23 Storeys) - North	**SQ.M.**	**SQ.FT.**
Total Tower GCA	15,671	168,620
Total Tower GFA	12,568	135,236
Total Tower GSA	12,585	135,466
Total Tower NSA	12,896	138,759
Building Efficiency	82.3%	
Total Number of Units (tower only)	210	
Tower B (29 Storeys) - SE	**SQ.M.**	**SQ.FT.**
Podium GCA (shared with Tower A)	7,680	82,631
Podium GFA (shared with Tower A)	5,126	55,160
Podium GSA (shared with Tower A)	2,202	23,707
Podium NSA (Res. + Retail)	4,684	50,404
Building Efficiency	61.0%	
Total Number of Units (podium only)	36	
Total Tower GCA	22,611	243,290
Total Tower GFA	18,545	199,543
Total Tower GSA	18,628	200,541
Total Tower NSA	19,005	204,488
Building Efficiency	84.1%	
Total Number of Units (tower only)	313	
Total GCA	30,290	325,921
Total GFA	23,671	254,703
Total GSA	20,830	224,248
Total NSA (Res. + Retail)	23,689	254,893
Building Efficiency	78.2%	
Total Number of Units (tower+podium)	349	
Tower C (35 Storeys) - SW	**SQ.M.**	**SQ.FT.**
Podium GCA	2,796	30,089
Total Tower GCA	28,761	309,464
Total GCA	31,557	339,553
Total GFA	24,858	267,470
Total GSA	24,414	262,812
Total NSA (Res. + Retail)	25,235	271,532
Building Efficiency	80.0%	
Total Number of Units (tower)	426	

UNDERGROUND PARKING GCA	SQ.M.	SQ.FT.
P1	5658	60,880
P2	5658	60,880
P3	5658	60,880
TOTAL	**16974**	**182640.24**

PARKING PROVIDED	UNDERGROUND
VISITOR	81
RESIDENTIAL	340
TOTAL	**421**

AMENITY AREAS PROVIDED	BUILDINGS A&B (m2)	BUILDING C (m2)
INDOOR	1175.3	857
OUTDOOR	461.05	435
TOTAL	**1636.35**	**1292.11**

UNIT MIX			
UNIT TYPE	**BUILDINGS A**	**BUILDING B**	**BUILDING C**
STUDIO	2	24	33
1B	133	141	197
2B	86	133	196
3B	8	32	0
TOTAL	**229**	**330**	**426**
TOTAL NUMBER OF UNITS		**985**	

LOADING SPACES	BUILDINGS A&B&C
RESIDENTIAL	1
COMMERCIAL	1
TOTAL	**2**

BICYCLE PARKING PROVIDED	REQUIRED	PROVIDED
RETAIL 1 PER 250m2	11	12
RESIDENTIAL	493	620
TOTAL	**504**	**632**

GARBAGE BINS			
TYPE	**BUILDINGS A**	**BUILDING B**	**BUILDING C**
GARBAGE (3CY)	5	6	7
RECYCLING (4CY)	3	3	4
GLASS, METAL AND PLASTIC (3CY)	2	2	3
ORGANIC (240L CARTS)	10	13	16
TOTAL	**20**	**24**	**30**

CLIENT
5015218 Ontario Inc. and Albert & Main Developments Inc.

109 Atlantic Avenue, Toronto, ON, M6K 1X4

ISSUES

No.	DESCRIPTION	DATE
01	ISSUED FOR REZONING	2019-08-29
02	ISSUED FOR REZONING	2020-05-04
03	ISSUED FOR SPA	2020-08-14

SEAL
ONTARIO ASSOCIATION OF ARCHITECTS
MANSOOR H. KAZEROUNI
LICENCE
5860

PRIME CONSULTANT
IBI
IBI GROUP
55 St. Clair Avenue West, 7th Floor,
Toronto, ON M4V 2Y7, Canada
tel 416 596 1930 fax 416 596 0644
ibigroup.com

PROJECT
400 Albert Street
383 Slater Street/400 Albert Street
Ottawa, Ontario

PROJECT NO.
120068

SCALE
As indicated

DATE
14/08/20

SHEET TITLE
CONTEXT, SITE PLAN AND SITE STATISTICS

SHEET NUMBER
A100

400 Albert Street - Ottawa

August 17, 2020

BUILDING STATISTICS - TOWER A

	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	GCA		DEDUCTIONS		GFA (OTTAWA DEF.)		NSA RESIDENTIAL		NSA RETAIL SALEABLE		EFFICIENCY	INDOOR AMENITY		OUTDOOR AMENITY		PRIVATE BALCONIES & TERRACES		UNIT MATRIX				
				SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	NSA/GCA	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	STUDIO	1B	2B	3B	TOTAL
TOWER A	MPH	1	0	706.6	7,603	706.6		0.0	0					0.00%					0	0					0
	LEVEL 23	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					0	0		6	4	0	10
	LEVEL 22	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					0	0		6	4	0	10
	LEVEL 21	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					0	0		6	4	0	10
	LEVEL 20	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 19	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 18	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 17	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 16	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 15	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 14	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 13	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 12	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 11	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 10	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					29	307		6	4	0	10
	LEVEL 9	1	10	706.6	7,603	115.5	1,243	591.1	6,360	606.8	6,529			85.88%					43	459		6	4	0	10
	LEVEL 8	1	10	751.7	8,088	115.5	1,243	636.2	6,846	652.6	7,022			86.82%					57	618		6	2	2	10
	LEVEL 7	1	11	811.5	8,732	120.2	1,293	691.3	7,438	708.8	7,627			87.34%					58	620		6	4	1	11
	LEVEL 6	1	12	871.2	9,374	122.9	1,322	748.3	8,052	766.7	8,250			88.01%					67	723		8	2	2	12
	LEVEL 5	1	13	940.6	10,121	151.4	1,629	789.2	8,492	808.6	8,701			85.97%					48	511		7	5	1	13
	LEVEL 4	1	14	990.4	10,657	153.5	1,652	836.9	9,005	857.1	9,222			86.54%					45	479		8	4	2	14
	TOTAL (TOWER A)	**21**	**210**	**15,671**	**168,620**	**3,103**	**33,384**	**12,568**	**135,236**	**12,896**	**138,759**	**0**	**0**						**631.1**	**6,790**	**0**	**125**	**77**	**8**	**210**
																					0%	**60%**	**37%**	**4%**	100%

BUILDING STATISTICS - TOWER B

	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	GCA		DEDUCTIONS		GFA (OTTAWA DEF.)		NSA RESIDENTIAL		NSA RETAIL SALEABLE		EFFICIENCY	INDOOR AMENITY		OUTDOOR AMENITY		PRIVATE BALCONIES & TERRACES		UNIT MATRIX				
				SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	NSA/GCA	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	STUDIO	1B	2B	3B	TOTAL
TOWER B	MPH	1	0	641.7	6,904	641.7	6,904	0.0	0	0.0	0			0.00%					0	0					0
	LEVEL 29	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 28	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 27	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 26	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 25	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 24	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVELS 23	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 22	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 21	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 20	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					69.7	750	1	5	5	1	12
	LEVEL 19	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					69.7	750	1	5	5	1	12
	LEVEL 18	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					69.7	750	1	5	5	1	12
	LEVEL 17	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					69.7	750	1	5	5	1	12
	LEVEL 16	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					88.6	953	1	5	5	1	12
	LEVEL 15	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					88.6	953	1	5	5	1	12
	LEVEL 14	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					88.6	953	1	5	5	1	12
	LEVEL 13	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					88.6	953	1	5	5	1	12
	LEVEL 12	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					114.5	1,232	1	5	5	1	12
	LEVEL 11	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					114.5	1,232	1	5	5	1	12
	LEVEL 10	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					114.5	1,232	1	5	5	1	12
	LEVEL 9	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					114.5	1,232	1	5	5	1	12
	LEVEL 8	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 7	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					0	0	1	5	5	1	12
	LEVEL 6	1	12	840.0	9,038	131.4	1,414	708.6	7,625	726.2	7,814			86.45%					37.7	406	1	5	5	1	12
	LEVEL 5	1	12	879.6	9,464	132.0	1,420	747.6	8,044	765.8	8,240			87.06%					47.5	511	0	6	4	2	12
	LEVEL 4	1	13	929.3	9,999	138.4	1,489	790.9	8,510	809.9	8,715			87.15%					320	3,443	0	7	4	2	13
	TOTAL (TOWER B)	**27**	**313**	**22,610.6**	**243,290**	**4,065.7**	**43,747**	**18,544.9**	**199,543**	**19,004.5**	**204,488**	**0.0**	**0**						**1,496.4**	**16,101**	**24**	**133**	**128**	**28**	**313**
																					8%	**42%**	**41%**	**9%**	100%

SHARED PODIUM A&B	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	GCA		DEDUCTIONS		GFA (OTTAWA DEF.)		NSA RESIDENTIAL		NSA RETAIL SALEABLE		EFFICIENCY	INDOOR AMENITY		OUTDOOR AMENITY		PRIVATE BALCONIES & TERRACES		UNIT MATRIX				
				SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	NSA/GCA	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	STUDIO	1B	2B	3B	TOTAL
PODIUM TOWER A	LEVEL 3	1	15	1,278.8	13,760	355.9	3,829	922.9	9,930	944.1	10,159			73.83%							0	6	9	0	15
	LEVEL 2	1	4	343.0	3,691	148.6	1,599	194.4	2,092	198.2	2,133			57.78%							2	2			4
	SUBTOTAL PODIUM TOWER A		**19**	**1,621.8**	**17,451**	**504.5**	**5,428**	**1,117.3**	**12,022**	**1,142.3**	**12,291**	**0**	**0**								**2**	**8**	**9**	**0**	**19**
PODIUM TOWER B	LEVEL 3	1	11	1,017.4	10,947	291.4	3,135	726.0	7,812	744.7	8,013			73.20%	264	2,841	387	4,164	238	2,561	0	5	3	3	11
	LEVEL 2	1	6	2,118.3	22,793	1,135.7	12,220	982.6	10,573	359.8		636.0	6,843	47.01%	911	9,802	74	796	151	1,625	0	3	2	1	6
	LEVEL 1	1	0	2,922.0	31,441	621.5	6,687	2,300.5	24,753			1,981.0	21,316	67.80%	0	0	0	0	0	0	0	0	0	0	0
	SUBTOTAL PODIUM TOWER B		**17**	**6,057.7**	**65,181**	**2,048.6**	**22,043**	**4,009.1**	**43,138**	**1,104.5**	**11,884**	**2,617.0**	**28,159**		**1,175.0**	**12,643**	**461.0**	**4,960**	**389.0**	**4,186**	**0**	**8**	**5**	**4**	**17**
TOTAL SHARED PODIUM (PODIUM TOWER A + B)			**36**	**7,679.5**	**82,631**	**2,553.1**	**27,471**	**5,126.4**	**55,160**	**2,246.8**	**24,176**	**2,617.0**	**28,159**		**1,175.0**	**12,643**	**461.0**	**4,960**	**389.0**	**4,186**	**2**	**16**	**14**	**4**	**36**
																					0%	**47%**	**29%**	**24%**	100%

BUILDING STATISTICS - TOWER C

	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	GCA		DEDUCTIONS		GFA (OTTAWA DEF.)		NSA				EFFICIENCY	INDOOR AMENITY		OUTDOOR AMENITY		PRIVATE BALCONIES & TERRACES		UNIT MATRIX				
										RESIDENTIAL		RETAIL SALEABLE													
				SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	NSA/GCA	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	STUDIO	1B	2B	3B	TOTAL
TOWER C	MPH	1	0	706.2	7,599	706.2	7,599	0.0	0					0.00%											0
	LEVEL 35	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 34	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 33	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 32	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 31	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 30	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 29	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 28	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 27	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 26	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 25	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 24	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVELS 23	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 22	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 21	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 20	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					68	731.68	1	6	6	0	13
	LEVEL 19	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					68	731.68	1	6	6	0	13
	LEVEL 18	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					68	731.68	1	6	6	0	13
	LEVEL 17	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					68	731.68	1	6	6	0	13
	LEVEL 16	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					86	925.36	1	6	6	0	13
	LEVEL 15	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					86	925.36	1	6	6	0	13
	LEVEL 14	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					86	925.36	1	6	6	0	13
	LEVEL 13	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					86	925.36	1	6	6	0	13
	LEVEL 12	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					104	1119.04	1	6	6	0	13
	LEVEL 11	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					104	1119.04	1	6	6	0	13
	LEVEL 10	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					104	1119.04	1	6	6	0	13
	LEVEL 9	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					104	1119.04	1	6	6	0	13
	LEVEL 8	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 7	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 6	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 5	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%							1	6	6	0	13
	LEVEL 4	1	13	876.7	9,433	135.5	1,458	741.2	7,975	759.7	8,174			86.65%					314	3378.64	1	6	6	0	13
	TOTAL (TOWER C)	**33**	**416**	**28,760.6**	**309,464**	**5,042.2**	**54,254**	**23,718.4**	**255,210**	**24,310.4**	**261,580**	**0.0**	**0**						**1,346.0**	**14,483.0**	**32**	**192**	**192**	**0**	**416**
																					8%	**46%**	**46%**	**0%**	100%

	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	GCA		DEDUCTIONS		GFA (OTTAWA DEF.)		NSA				EFFICIENCY	INDOOR AMENITY		OUTDOOR AMENITY		PRIVATE BALCONIES & TERRACES		UNIT MATRIX				
										RESIDENTIAL		RETAIL SALEABLE													
				SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	NSA/GCA	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	STUDIO	1B	2B	3B	TOTAL
PODIUM	LEVEL 3	1	10	876.7	9,433	298.3	3,210	578.4	6,224	593.1	6,382			67.65%	84	904	50	538	266	2862.16	1	5	4	0	10
	LEVEL 2	1	0	876.7	9,433	876.7	9,433	0.0	0	0.0	0			0.00%	773	8,317	385	4,143	0	0	0	0	0	0	0
	LEVEL 1	1	0	1,043.0	11,223	482.0	5,186	561.0	6,036			331.8	3,570	31.81%	0	0	0	0	0	0	0	0	0	0	0
	TOTAL (PODIUM TOWER C)	**3**	**10**	**2,796.4**	**30,089**	**1,657.0**	**17,829**	**1,139.4**	**12,260**	**593.1**	**6,382**	**331.8**	**3,570**		**857.0**	**9,221**	**435.0**	**4,681**	**266.0**	**2,862**	**1**	**5**	**4**	**0**	**10**
																					10%	**50%**	**40%**	**0%**	100%
	TOTAL (TOWER C + PODIUM C)	**36**	**426**	**31,557.0**	**339,553**	**6,699.2**	**72,083**	**24,857.8**	**267,470**	**24,903.5**	**267,962**	**331.8**	**3,570**		**857**	**9,221**	**435**	**4,681**	**1,612.0**	**17,345**	**33**	**197**	**196**	**0**	**426**
																					8%	**46%**	**46%**	**0%**	100%

Albert Street
Part of A3-3

T BAY

9" Sewer

Book 162 Page 63

LYON

15" Sewer

9" Sewer

12 IN PIPE SEWER

MH

WW

Hyd

Book 186, Page *

SEE

24"

107.50
122
8.0

107.20

107.
122
229.6

7.14

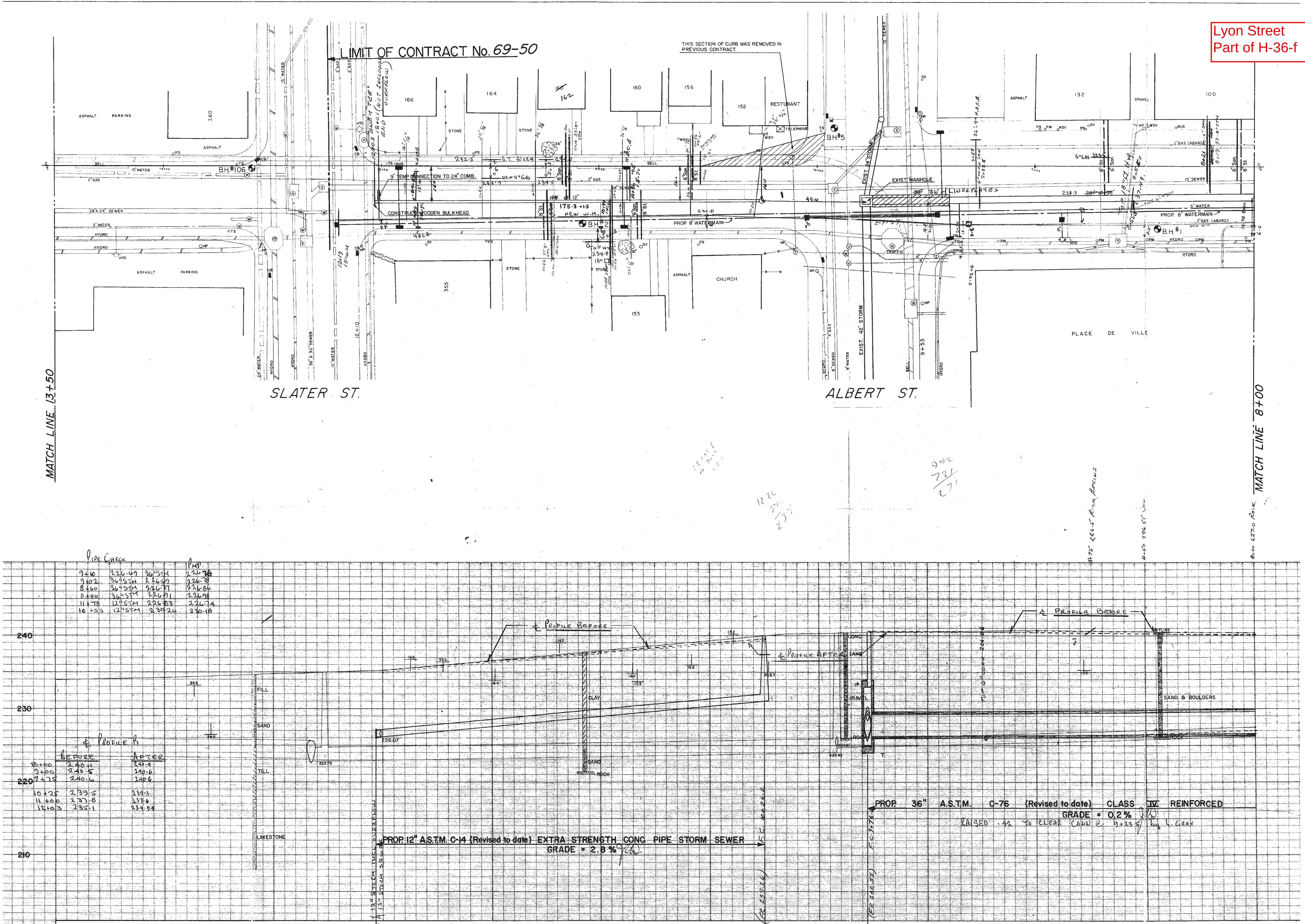
9 IN PIPE SEWER — GRADE 1 IN 112 OR 0.89%

12 IN PIPE SEWER — GRADE 1 IN 121 OR 0.83%

12 IN PIPE SEWER — GRADE 1 IN 495 OR 2.02%

15" GR 1 IN 94 OR 1.07%

Lyon Street
Part of H-36-f



Lyon Street
Part of R-430

MERGE PROPOSED PROFILE GRADE ON LYON ST. TEMPORARILY TO SUIT EXISTING SLATER ST.

SCALES

PLAN – 1" = 20'
PROFILE – HORIZ. 1" = 20'
VERT. 1" = 6'

L.V.C. = 150'
P.I. = 12+40
ELEV. = 234.77

E.V.C.

B.V.C.

– 0.60%

– 2.50%

L.V.C. = 150'
P.I. = 9+75
ELEV. = 241.40

E.V.C.

B.V.C.

+ 0.64%

12" A.S.T.M. C-14 (Revised to date) EXTRA STRENGTH LONG PIPE STORM SEWER
GRADE = 2.3%

36" A.S.T.M. C-76 (Revised to date) CLASS III REINFORCED
GRADE = 0.2%

MATCH LINE 13+50

MATCH LINE 8+00

SLATER ST.

ALBERT ST.

PARKING LOT

SHOPPING CENTRE

RESTAURANT

GREEK ORTHODOX CHURCH

SKYLINE MOTEL

BRICK WALL TO LINE

ENCROACH 0.08'

ENCROACH 0.12'

GARAGE

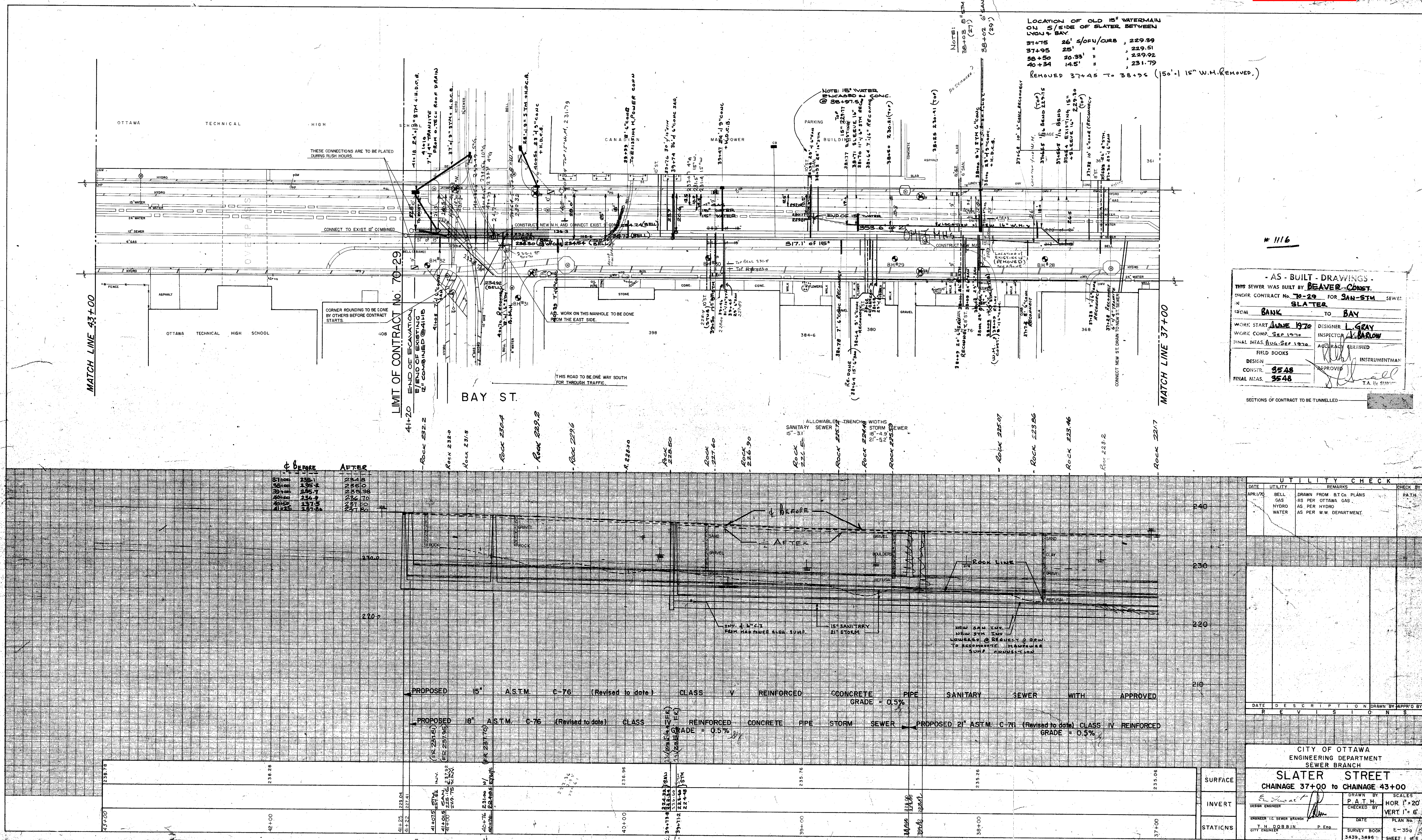
48 ST

12 ST

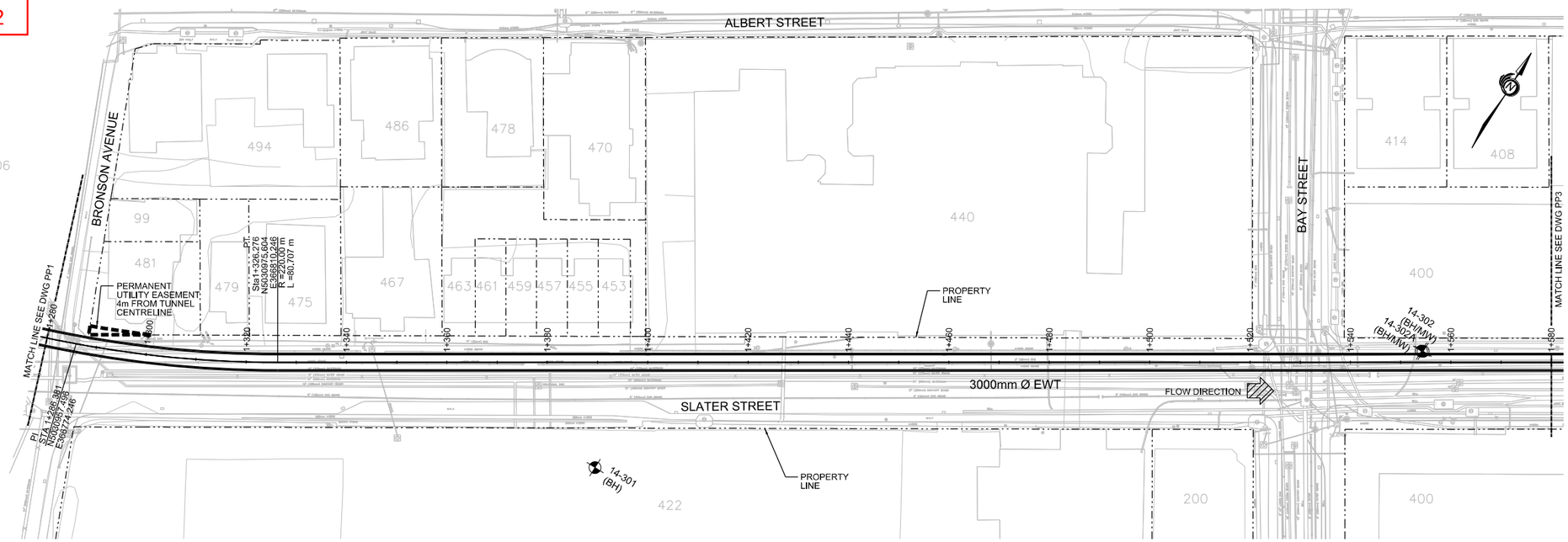
36 ST

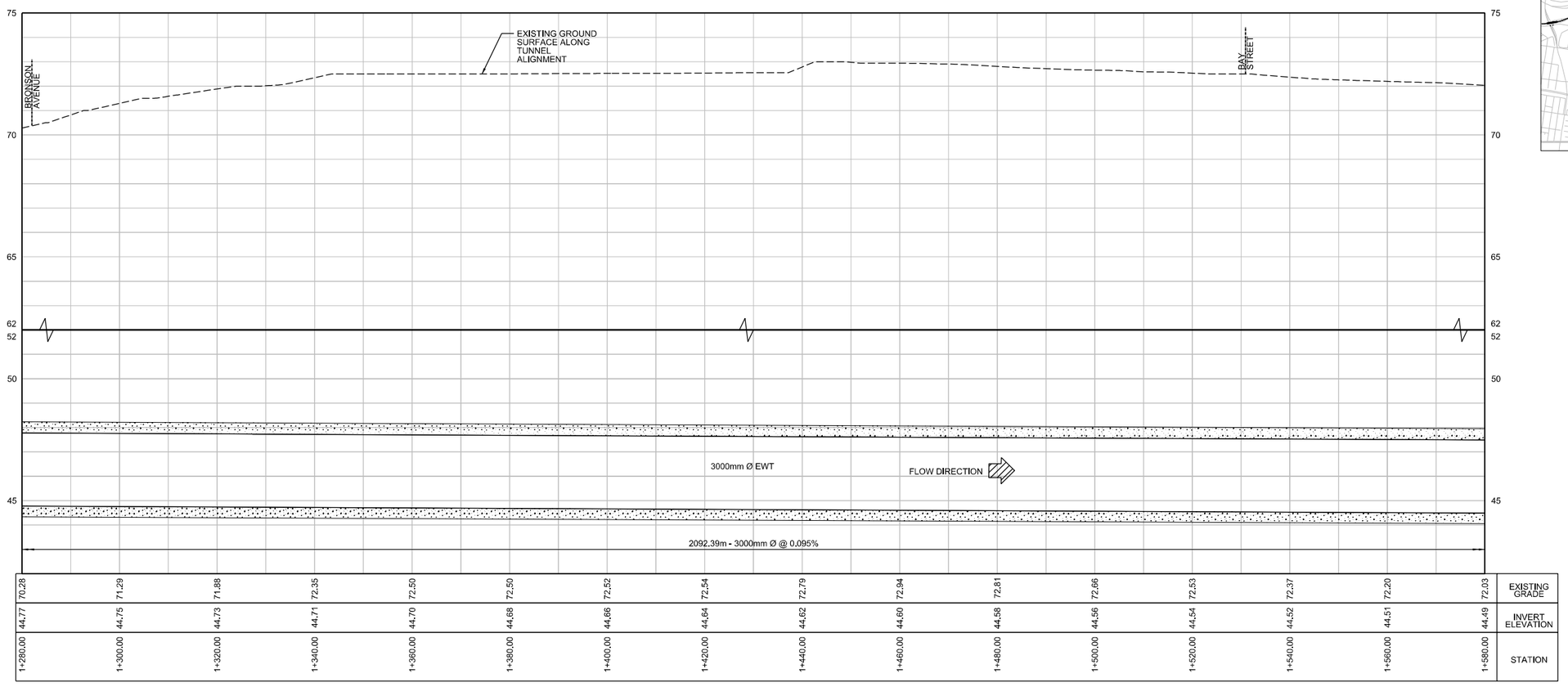
42 ST

Slater Street
dwg No. 1116



Slater Street
dwg No. PP2





EXISTING GRADE	70.28	71.29	71.88	72.35	72.50	72.50	72.52	72.54	72.79	72.94	72.81	72.66	72.53	72.37	72.20	72.03		
INVERT ELEVATION	44.77	44.75	44.73	44.71	44.70	44.68	44.66	44.64	44.62	44.60	44.58	44.56	44.54	44.52	44.51	44.49		
STATION	1+280.00	1+300.00	1+320.00	1+340.00	1+360.00	1+380.00	1+400.00	1+420.00	1+440.00	1+460.00	1+480.00	1+500.00	1+520.00	1+540.00	1+560.00	1+580.00		

OTTAWA COMBINED SEWAGE STORAGE TUNNEL

CIVIL PLAN AND PROFILE STA 1+280 TO STA 1+580 EAST-WEST TUNNEL

W. Newell, P. Eng.
General Manager, Infrastructure Services

R. Dempsey, P. Eng.
Senior Engineer, Infrastructure Services

Stantec CH2MHILL

LICENSED PROFESSIONAL ENGINEER C. QUINTERO 100012301 JUNE 24/16 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER P. PITRE 100012758 JUNE 24/16 PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD14-2036	PP2

Asset No.

Asset Group

Des.	Chk'd.
C. Quintero	P.Pitre
Dwn.	Chk'd.
J. Arico	C. Quintero
Utility Circ. No.	Index No.

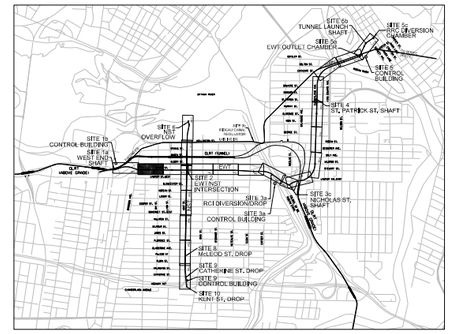
Const. Inspector

Scale:
HORIZONTAL 500
0m 5 10 20
0m 2 4
VERTICAL 100

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
2	ISSUED FOR CONSTRUCTION	D.L.	2016/06/30
1	ISSUED FOR TENDER	J.A.	2015/10/01
C	ISSUED FOR 95% DESIGN	J.A.	2015/02/27
B	ISSUED FOR 70% DESIGN	M.D.	2014/08/29
A	ISSUED FOR PRELIMINARY DESIGN	M.D.	2014/04/18



KEY PLAN

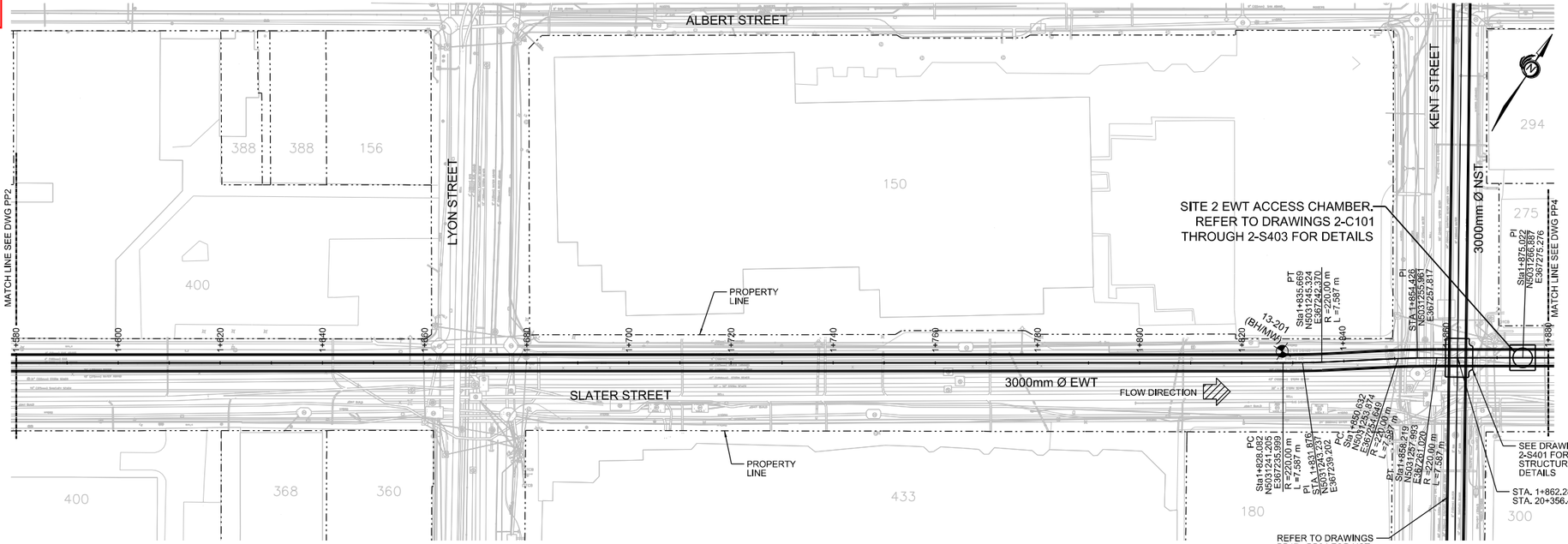
NOTE:

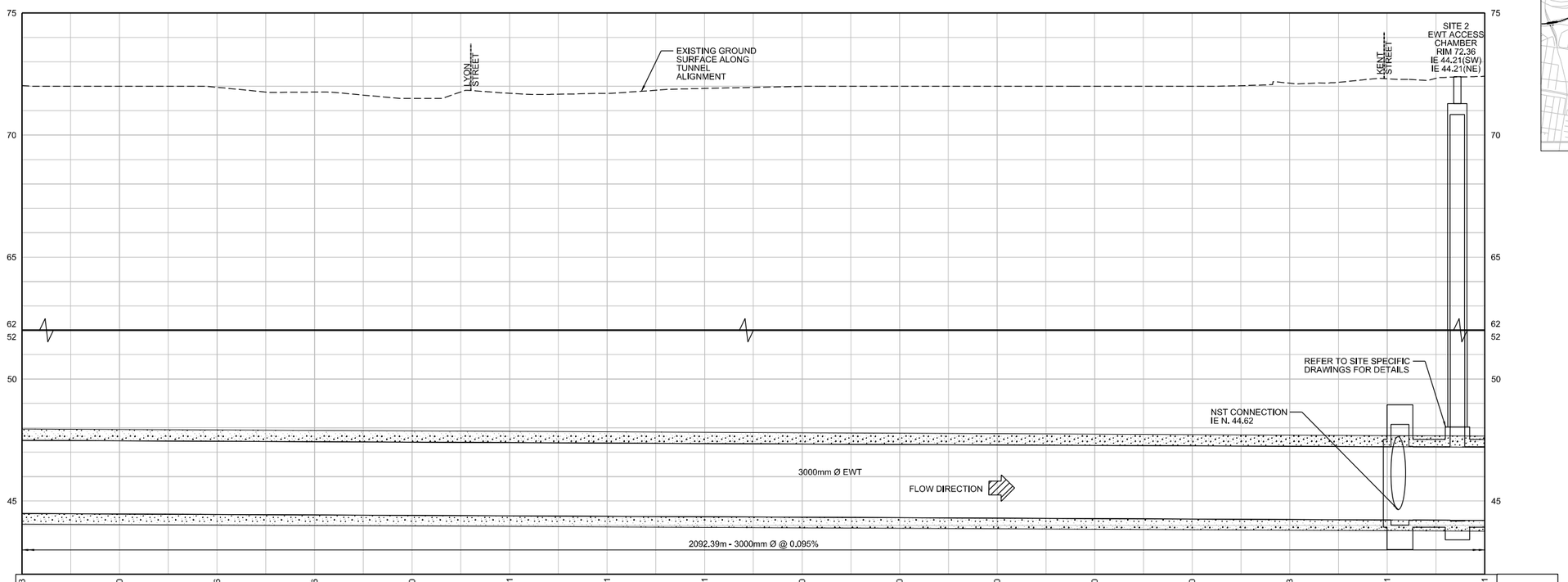
1. SEE NOTES ON DRAWING PP1.

Page Setup: —

Slater Street
dwg No. PP3

Drawing Frame: 790mm x 534mm City of Ottawa





STATION	INVERT ELEVATION	EXISTING GRADE
1+580.00	44.49	72.03
1+600.00	44.47	72.00
1+620.00	44.45	71.96
1+640.00	44.43	71.76
1+660.00	44.41	71.50
1+680.00	44.39	71.71
1+700.00	44.37	71.71
1+720.00	44.35	71.91
1+740.00	44.33	72.00
1+760.00	44.32	72.00
1+780.00	44.30	72.00
1+800.00	44.28	72.00
1+820.00	44.26	72.00
1+840.00	44.24	72.13
1+860.00	44.22	72.31
1+862.26	44.62 (NST)	
1+880.00	44.20	72.41

OTTAWA COMBINED SEWAGE STORAGE TUNNEL

CIVIL PLAN AND PROFILE STA 1+580 TO STA 1+880 EAST-WEST TUNNEL

W. Newell, P. Eng.
General Manager, Infrastructure Services

R. Dempsey, P. Eng.
Senior Engineer, Infrastructure Services

Stantec CH2MHILL

LICENSED PROFESSIONAL ENGINEER C. QUINTERO 100012301 JUNE 30 2016 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER P. PITRE 100012758 JUNE 24 PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD14-2036	PP3

Asset No.

Asset Group

Des.	Chk'd.
C. Quintero	P.Pitre
Dwn.	Chk'd.
J. Arico	C. Quintero
Utility Circ. No.	Index No.

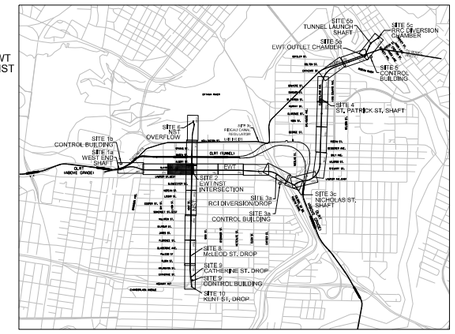
Const. Inspector

Scale:
HORIZONTAL 500
0m 5 10 20
0m 2 4
VERTICAL 100

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
2	ISSUED FOR CONSTRUCTION	D.L.	2016/06/30
1	ISSUED FOR TENDER	J.A.	2015/10/01
C	ISSUED FOR 95% DESIGN	J.A.	2015/02/27
B	ISSUED FOR 70% DESIGN	M.D.	2014/08/29
A	ISSUED FOR PRELIMINARY DESIGN	M.D.	2014/04/18



KEY PLAN

NOTE:

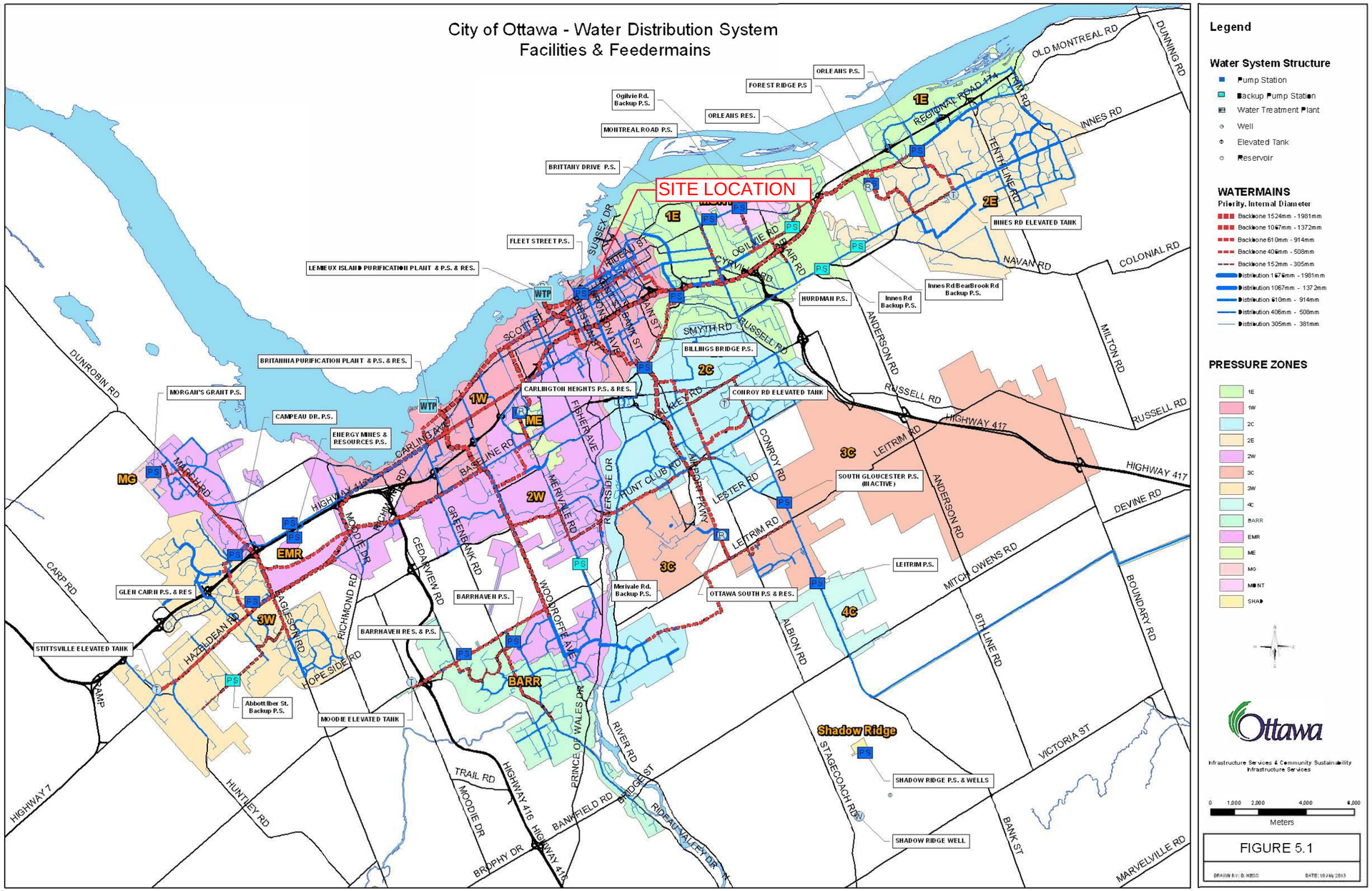
1. SEE NOTES ON DRAWING PP1.

PLOT TIME: 11:29:52 AM

PLOT DATE: 2016\06\28

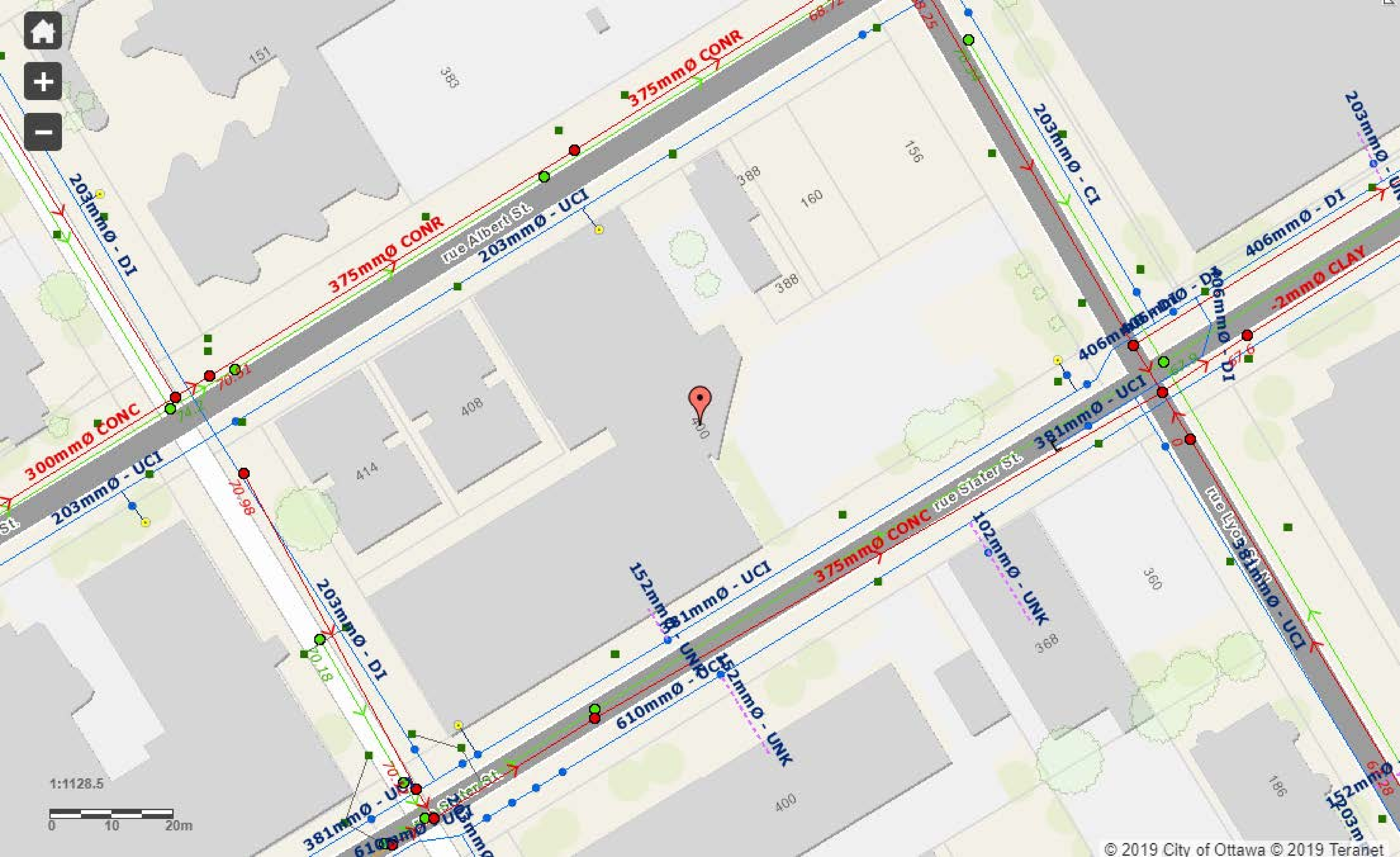
202-pp3.dgn

478477



Source: City of Ottawa GIS infrastructure database

Figure 5.1: City of Ottawa Water Distribution System, Facilities and Feedermains


375mmØ CONR
375mmØ CONR
375mmØ CONR
300mmØ CONC
203mmØ - DI
203mmØ - UCI
203mmØ - UCI
rue Albert St.
203mmØ - CI
203mmØ - DI
406mmØ - DI
-2mmØ CLAY
381mmØ - UCI
rue Slater St.
375mmØ CONC
381mmØ - UCI
610mmØ - UCI
152mmØ - UNK
102mmØ - UNK
203mmØ - DI
rue Lyon St.
70.98
70.18
1:1128.5
0
10
20m
383
151
156
388
160
388
408
414
400
360
368
186
400
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Pre-application Consultation Meeting Minutes

Address: 400 Albert Street (388 & 400 Albert, 156 & 160 Lyon)
Formal Pre-consultation File No.: PC2019-0134
Date: May 27, 2019, 2:30pm – 4:00pm
Location: Room 4102E, City Hall, 110 Laurier Ave W
City Contact: Andrew McCreight

City of Ottawa Staff Present:
Andrew McCreight – File Lead, Planner, Development Review - Central
John Wu – Infrastructure Project Manager
Wally Dubyk – Transportation Project Manager
Christopher Moise – Urban Design
Jennifer Hemmings – Parks
Mark Gordon – Planning Student

Invitees Present:
Daniel Bryne – Main and Main, Applicant
Mansoor Kazerouni – IBI
Ron Jack – Parsons
Shawn Barber – Centretown Citizens Community Association
Jack Hanna - Centretown Citizens Community Association

Introductions and Acknowledgements

- Round table introductions
- Acknowledgement that a NDA has been signed by members of the community association

Overview of Proposal (Daniel Bryne & Mansoor Kazerouni)

- Current plan is for the majority of the site to be purpose built rental units. Could be all rental but have not completely ruled out ownership condominiums units.
- The guiding principles of the project come from the City of Ottawa and the Ottawa Lands Development Corporation with the purchase of 156 & 160 Lyon. These include making improvements to the public realm, iconic architecture (more notable that typical Ottawa high-rises), incorporating sustainable elements, and include affordable housing program. Closing on the lands in roughly 3 weeks.
- Main and Main aims for LEED standard but does not pursue the accreditation
- Interested in connecting to the Federal Government's District Energy heating tunnels. Unsure of who to contact, Feds, NCC, ROW?
- Affordable housing agreement to be negotiated, but the requirement through the Lyon property purchases is for seven units to be affordable housing.
- Three towers, 18-38 storeys. 38 storey building at the south west corner of the site on an individual three storey podium. 33 storey tower located at the south

east corner and 18 storey tower near the middle of the site on a shared 3 storey podium.

- Towers will have distinct curvilinear form, removes blunt corners and opens up space between the towers. Still refining details of the architecture.
- Design approach for block permeability.
- Separate podiums allow for a mid-block lane. Primarily for pedestrians but also for loading/deliveries to large retail store.
- Pulled the podium back at the corner of Albert and Lyon Street to create an urban park of around 400m^2.
- Large shared podium is targeting a grocery store. Has 20,000ft^2 floorplate. Planning on commercial second floor – some retail, possibly commercial on the third floor – office space. Lobbies for residential towers to be located on Lyon Street, Slater Street, and Albert Street. Design looking for synergy between food store and urban park.
- Single ramp from Bay Street to underground parking. One parking garage across entire site. Unsure about amount of parking. Will have to find the right balance of parking. Only looking to serve residents/workers on site, not to rent out excess spaces to other people. Preliminary estimate of 10-15% more parking spaces than previous proposal. Idea is to target active transportation and minimize parking to only satisfy demand. Car-sharing programs may be explored as well.
- Interested in commercial parking and visitor parking split.
- Phasing – dig out basement as one phase. Then build east towers at the same time while the other tower is capped. May end up building them all at one time given Ottawa's current population growth.
- City's requirement of outright ownership of parkland is problematic for the configuration of the parking garage. This may result in the park being in located based on underground parking configuration rather than what is best from a urban design perspective.
- Previous building concept had "no back of house" looked great on paper but wasn't feasible so the lane had to be reconfigured.
- Podium rooftop greenspaces are for resident use only, not public space
- Targeting neighborhood commercial tenants not attempting to become a shopping destination within Ottawa.

Preliminary Comments from the City

Planning Comments (Andrew McCreight)

- Will look into how to reactivate the current applications and how to move them forward procedurally. Both the Zoning and Site Plan applications will be subject to a new circulation fee, but the existing file numbers can be kept. More details to be included in the e-mail follow-up.
- Will provide a legal template for sign over of the previous reports given the potential change in property ownership during an active application.

- New reports and plans will be required given that the site has expanded and the proposed use has changed. If the previous owner signs over the reports you may reuse relevant information in the new reports.
- Application process will effectively be staring over, with new signs posted on site and community circulations will be required as previous application only included 400 Albert proper.
- City requires minimum of 400m^2 parkland to be provided. This cannot include areas for road widening or otherwise designated.
- Mid-block connection should be more than a connection from A to B, should be an enhanced public space. Look at how this space will function at different times of day and seasons. Think about lighting, seating, public art etc.
- Revise midblock perspective to show the concept now that grocery store loading has been added to the lane. Same consideration for the urban park in the rendering details, which currently has the look of an entrance plaza.
- Would like to see successful examples for loading bays being included on a primarily pedestrian lane. Work this into the Planning Rationale with specific examples and photos.
- The building height causes some concern. The site covered by two height guidelines. One for views plane protection of parliament and another for the neighbourhood secondary plan.
- Anything above the parliament view plane will be hard to support. May want to lower the 38 and 33 storey towers and increase the 18 if you are looking to maintain the overall GFA.
- Want to see background silhouette analysis before the proposed height can be considered. Focus on view 8A and 8B in analysis. Look at other examples of view plane analysis.
- Would like to see a 1:1 ratio of bike parking to residential units to encourage active transportation.
- Floor plate of tower “C” is bulky, could be trimmed or better articulated to reduce the impact of the “slab” floorplate.
- Submission will need another section 37 analysis in the Planning Rationale to determine applicability.

Infrastructure Comments (John Wu)

- No major issues with previous proposal. Now that the new property has been acquired the reports will need to be redone and submitted using current standards/guidelines.
- Maintain current storm water runoff patterns.
- Would be beneficial if engineering consultant calls John Wu to have a quick conversation to verify number of connections, size etc.

Transportation Comments (Wally Dubyk)

- Albert Street and Slater Street are undergoing redesigns. Please include this consideration within your report.
- Update old reports.
- Screening report form with vehicles per hour generated by the site will be required. From this the City will identify intersections to be studied.
- Right of way protection must be identified on plans for all perimeter streets. Albert requires 1.5m.
- See the City's updated standards for modal splits in traffic studies.
- More details and comments provided in email follow-up.

Parks Comments (Jennifer Hemmings)

- Previous discussion on parks for the site. Interested in having the park and the mid-block lane connected.
- Strata parks are not feasible, too many issues around ownership of the park and structural maintenance. Therefore, the City will be looking for at least 400sq.m of parkland dedication and such land is to be unencumbered. Lands associated with road widening or sight triangles will not count towards size requirements.
- Need to look at setbacks from the property line.
- Need to look at the form of the buildings to ensure a successful public space/Urban plaza. Building overhanging raises concerns.
- The City has approximately $61,000 in development charges for the park (based on proposal). This is not much given the hard surface required.
- Opportunity for the City and Developer to work together to ensure the space is successful and delivered early. Take on design and construction working with the City.
- Park can be used for staging during construction.
- Maintenance may not be to the level that the private development may expect. Private and City can work together on maintenance.
- See City resources such as Park Development Manual.

Urban Design (Christopher Moise)

- There are street designs for Slater and Albert that should be addressed for compatibility and design;
- NW corner site should be massed in at development potential (use existing zoning ~37m) and address relationships to west 4th floor terrace tower adjacencies. Perhaps the east side of the tower would be a more appropriate location;
- Potential for loading conflict with mid-block pedestrian connection needs further description and design development.
- Strongly recommended that this proposal go to the Urban Design Review Panel for an informal presentation. This is a major project and the more time and think you spend with the city to fully participate and work through the design development the smoother the application should go

Community Association **(Shawn Barber & Jack Hana)**

- Previous application for the site had about half the number of units. There are concerns about how many vehicles the new proposal will bring.
- Traffic will go onto Bay Street which is a narrow street and a major cyclist connection with bike lanes.
- One way streets surrounding site create a circulation pattern around the block.
- Can support the increase in unit density on the site but have concerns about providing too much parking as it will generate more vehicle traffic.
- Including green elements, affordable housing, and quality architecture are all positives.
- Downtown is filling up, we are getting more small greenspaces but where are the new large public greenspaces? Rooftop could be that, and it should be publicly accessible.
- Could control delivery times on lane to reduce issues of conflict between pedestrians and deliveries.
- Discussed a temporary community garden at the site of tower three with the previous owner. Community is still interested in the possibility.
- People want a grocery store and a hardware store.
- Commercial (retail) could play on the proximity to the LRT station
- Concerned about the previous owner's application to extent the temporary use of a parking lot. Don't want to see the site sit as a parking lot for three years or more.
- Concerns about affordability. Want a social mix, not just wealthy young professionals; society does better with integration.
- Look at social studies, like the National Housing Strategy, and possibility of Inclusionary Zoning on the horizon.
- Need to have an open dialogue around affordable housing.
- This a big significant development – requires ample consultation.
- Need the public space and realm improvements throughout and around the site.
- Site offers good opportunity for bike rentals with proximity to the O-Train.
- Would like to discuss a development forum/partnership with the owner/applicant.

Next Steps

- Applicant to submit informal review with the City of Ottawa's Urban Design Review Panel.
- Have engineering consultant contact John Wu.
- Recommended to schedule a second pre-consultation with City staff to go over proposal details before submitting.
- It is recommended that the applicant team seek input from the Ward Councillor and neighbouring property owners, including the Centretown Citizens Community Association.

4.1 General Content

☒ Executive Summary (for larger reports only).

Comments: *Page iii*

☒ Date and revision number of the report.

Comments: *Page i*

☒ Location map and plan showing municipal address, boundary, and layout of proposed development.

Comments: *Figure 1 and Figure 3 in Appendix F*

☒ Plan showing the site and location of all existing services.

Comments: *Figure 3 in Appendix F*

☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

Comments: *Appendix B*

☒ Summary of Pre-consultation Meetings with City and other approval agencies.

Comments: *Appendix B*

☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

Comments: *N/A. Reference to the City's guidelines are included in Section 4.0 pg. 2*

☒ Statement of objectives and servicing criteria.

Comments: *Section 4.2 (Stormwater Criteria), Section 4.3 (Sanitary Sewer Criteria), Section 4.4 (Water Usage Criteria)*

☒ Identification of existing and proposed infrastructure available in the immediate area.

Comments: *Section 5.1 (ex. storm sewers), Section 6.1 (ex. sanitary sewers), Section 7.1 (ex. water system)*

☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

Comments: *N/A*

☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

Comments: *N/A during Zoning Application*

☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

Comments: *N/A*

☐ Proposed phasing of the development, if applicable.

Comments: *N/A*

☐ Reference to geotechnical studies and recommendations concerning servicing.

Comments: *N/A*

☒ All preliminary and formal site plan submissions should have the following information:

- ☒ Metric scale
- ☒ North arrow (including construction North)
- ☒ Key plan
- ☒ Name and contact information of applicant and property owner
- ☒ Property limits including bearings and dimensions
- ☒ Existing and proposed structures and parking areas
- ☒ Easements, road widening and rights-of-way
- ☒ Adjacent street names

Comments: *Existing and proposed structures and parking areas are included in topo survey and architectural dwgs. Name and owner info. can be found in zba cover letter.*

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available

Comments: *Not available*

☒ Availability of public infrastructure to service proposed development

Comments: *Section 5.2.1.1, Section 6.3*

☒ Identification of system constraints

Comments: *N/A*

☒ Identify boundary conditions

Comments: *Upon receipt of the City of Ottawa boundary conditions.*

☒ Confirmation of adequate domestic supply and pressure

Comments: *Upon receipt of the City of Ottawa boundary conditions.*

☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

Comments: *Section 7.2 and Appendix E*

☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

Comments: *N/A*

☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

Comments: *N/A*

☐ Address reliability requirements such as appropriate location of shut-off valves

Comments: *N/A*

☐ Check on the necessity of a pressure zone boundary modification.

Comments: *N/A*

☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

Comments: *Appendix E*

☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

Comments: *Appendix E and Figure-3 at Appendix F*

☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

Comments: *N/A*

☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

Comments: *Section 4.4*

☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

Comments: *Appendix B*

4.3 Development Servicing Report: Wastewater

☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

Comments: *Section 4.3*

☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.

Comments: *N/A*

☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

Comments: *N/A*

☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

Comments: *Section 6.1*

☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)

Comments: *Section 6.3*

☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

Comments: *N/A*

☐ Special considerations such as contamination, corrosive environment etc.

Comments: *N/A*

4.4 Development Servicing Report: Stormwater

☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

Comments: *N/A*

☒ Analysis of available capacity in existing public infrastructure.

Comments: *Section 5.3*

☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

Comments: *DAP1 and 2 in Appendix C*

☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

Comments: *Section 5.2.2*

☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

Comments: *N/A during Zoning Application Stage*

☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

Comments: *Section 5.3*

☐ Set-back from private sewage disposal systems.

Comments: *N/A*

☐ Watercourse and hazard lands setbacks.

Comments: *N/A*

☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

Comments: *N/A*

☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

Comments: N/A

☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).

Comments: Appendix C

☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.

Comments: N/A

☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.

Comments: Section 5.2 and Appendix C

☐ Any proposed diversion of drainage catchment areas from one outlet to another.

Comments: N/A

☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.

Comments: Section 5.3 and Figure 3 in Appendix F

☒ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.

Comments: Section 5.3 and Figure 3 in Appendix F

☒ Identification of potential impacts to receiving watercourses

Comments: Section 5.3 and Figure 3 in Appendix F

☒ Identification of municipal drains and related approval requirements.

Comments: Section 5.3 and Figure 3 in Appendix F

☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.

Comments: *Section 5.3 and Figure 3 in Appendix F*

☐ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

Comments: *N/A*

☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.

Comments: *N/A*

☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

Comments: *Section 8.0*

☐ Identification of floodplains - proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.

Comments: *N/A*

☐ Identification of fill constraints related to floodplain and geotechnical investigation.

Comments: *N/A*

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

Comments: *N/A*

☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

Comments: *N/A*

☐ Changes to Municipal Drains.

Comments: *N/A*

☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

Comments: *N/A*

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

Comments: *Section 9.0*

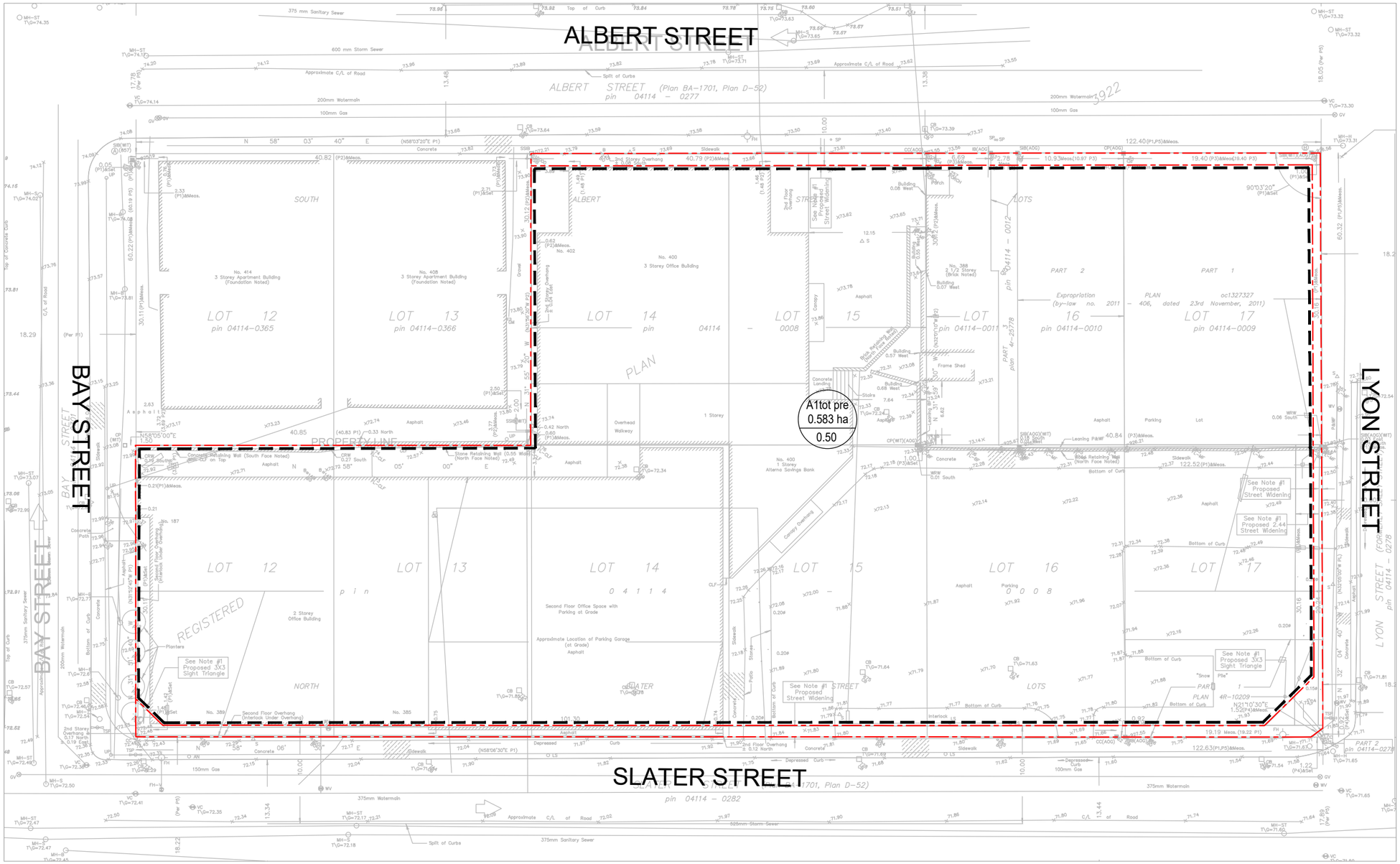
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

Comments: *N/A*

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Comments: *Signed and stamped by Ontario engineer*

APPENDIX C
Storm Analysis



Lithos

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

LEGEND

A1 pre
0.04 ha
0.50

- STORM DRAINAGE AREA NUMBER
- DRAINAGE AREA (ha)
- COMPOSITE RUNOFF COEFFICIENT
- PRE-DEVELOPMENT STORM DRAINAGE AREA
- PROPERTY LINE

PRE-DEVELOPMENT DRAINAGE AREA PLAN

MIXED USE DEVELOPMENT
400 ALBERT STREET
OTTAWA, ONTARIO

DATE: AUGUST 2020	PROJECT No: UD19-048
SCALE: N.T.S.	FIGURE No: DAP1

Lithos

Rational Method
Pre-Development Flow Calculation

400 Albert Street

File No. UD19-048

Prepared By: Catherine Agiou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

City of Ottawa

Date: August 2020

Area Number	Area (ha)	Actual Coefficient	Design Coefficient
Area towards City's infrastructure	0.583	0.90	0.50

Rational Method Calculation

Area towards City's infrastructure

Event 2-year IDF Data Set City of Ottawa a = 732.950 b= 6.199 c= 0.81

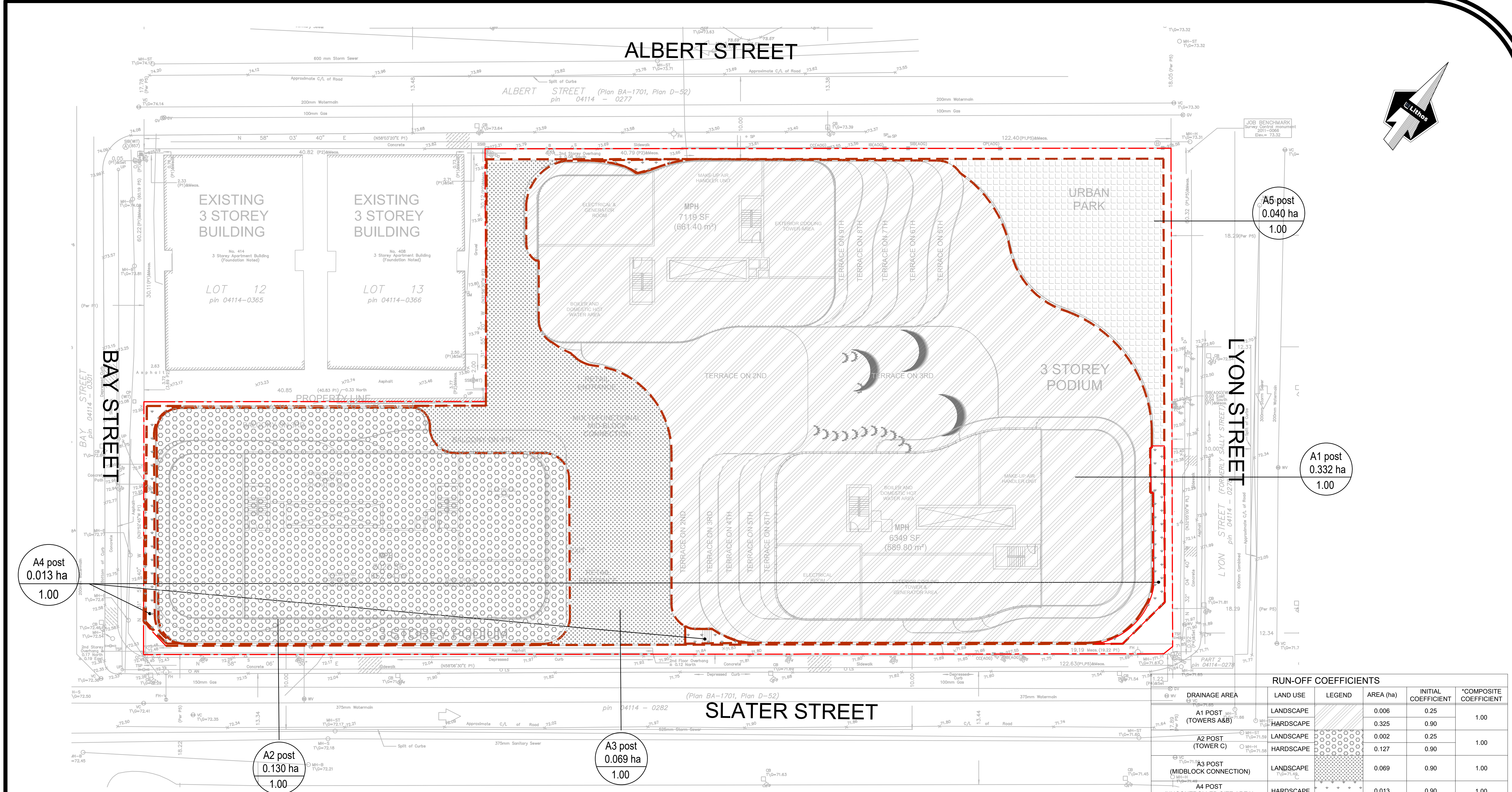
Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
Atot pre	0.583	0.50	0.29	20	52.03	0.042	42.1

Event 5-year IDF Data Set City of Ottawa a = 998.071 b= 6.053 c= 0.814

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
Atot pre	0.583	0.50	0.29	20	70.25	0.057	56.9

Event 100-year IDF Data Set City of Ottawa a = 1174.184 b= 6.014 c= 0.82

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
Atot pre	0.583	0.50	0.29	20	81.15	0.066	65.7



RUN-OFF COEFFICIENTS

DRAINAGE AREA	LAND USE	LEGEND	AREA (ha)	INITIAL COEFFICIENT	*COMPOSITE COEFFICIENT
A1 POST (TOWERS A&B)	LANDSCAPE		0.006	0.25	1.00
	HARDSCAPE		0.325	0.90	
A2 POST (TOWER C)	LANDSCAPE		0.002	0.25	1.00
	HARDSCAPE		0.127	0.90	
A3 POST (MIDBLOCK CONNECTION)	LANDSCAPE		0.069	0.90	1.00
A4 POST (UNCONTROLLED SITE AREA)	HARDSCAPE		0.013	0.90	1.00
A5 POST (PARKLAND DEDICATION AREA)	LANDSCAPE		0.006	0.25	1.00
	HARDSCAPE		0.034	0.90	

Lithos

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

LEGEND

A1 post — STORM DRAINAGE AREA NUMBER

0.04 ha — DRAINAGE AREA (ha)

0.50 — COMPOSITE RUNOFF COEFFICIENT

POST-DEVELOPMENT STORM DRAINAGE AREA

PROPERTY LINE

POST-DEVELOPMENT DRAINAGE AREA PLAN

MIXED USE DEVELOPMENT
400 ALBERT STREET
OTTAWA, ONTARIO

DATE: AUGUST 2020	PROJECT No: UD19-048
SCALE: N.T.S.	FIGURE No: DAP2

Modified Rational Method - 2 Year Storm

Site Flow and Storage Summary

400 Albert Street, Ottawa

File No. UD19-048
Date: August 2020
Prepared By: Catherine Agiou, P.E., M.A.Sc.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Drainage Area A1 Post

Rooftops (Towers A & B) - Controlled In Underground Tank 1

Area (A1) = **0.332** ha
"C" = **0.89**
AC1= **0.29**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **62.8** L/s

Drainage Area A2 Post

Rooftops (Tower C) - Controlled In Underground Tank 2

Area (A2) = **0.130** ha
"C" = **0.89**
AC2= **0.12**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **24.6** L/s

Drainage Area A3 Post

Mid Block Connection Area - Controlled In Underground Tank 2

Area (A3) = **0.069** ha
"C" = **0.90**
AC3= **0.06**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **13.25** L/s

Drainage Area A4 Post

Uncontrolled Site Area

Area (A4) = **0.013** ha
"C" = **0.90**
AC4 = **0.01**
Tc = **10.0** min
Time Increment = **5.0** min
Release Rate = **2.5** L/s

Drainage Area A5 Post

Parkland Dedication Area

Area (A5) = **0.040** ha
"C" = **0.80**
AC5 = **0.03**
Tc = **10.0** min
Time Increment = **5.0** min
Release Rate = **6.8** L/s

Total Site

5-yr Pre-Development Site Release Rate = **56.9** L/s

Parkland Dedication Uncontrolled Flow= **6.8** L/s
Uncontrolled Flow = **2.5** L/s
Design Controlled Release Rate (95mm orifice plate) (Tank 1) = **9.7** L/s
Design Controlled Release Rate (75mm orifice plate) (Tank 2) = **5.0** L/s

Total Site Release Rate Achieved = **24.1** L/s

2-Year Design Storm

a= 732.95
b= 6.199
c= 0.810
I = a / (TC + b)c

Tributary Area (A1)	ha	C
Landsc.Area (A1)	0.006	0.25
Hardsc. Area (A1)	0.325	0.90
Total	0.332	0.89

Tributary Area (A2)	ha	C
Landsc.Area (A2)	0.002	0.25
Hardsc. Area (A2)	0.127	0.90
Total	0.130	0.89

Tributary Area (A3)	ha	C
Landsc.Area (A3)	0.000	0.25
Hardsc. Area (A3)	0.069	0.90
Total	0.069	0.90

Tributary Area (A4)	ha	C
Landsc.Area (A4)	0.000	0.25
Hardsc. Area (A4)	0.013	0.90
Total	0.013	0.90

Tributary Area (A5)	ha	C
Landsc.Area (A5)	0.006	0.25
Hardsc. Area (A5)	0.034	0.90
Total	0.040	0.80

Tower A , B and East Podium

Max. Storage Tank1 Size = **27.3** m^3
Storage Tank1 footpring Area = **110.04** m^2

Tower C, West Podium and Mid block connection area

Max. Storage Tank2 Size = **18.5** m^3
Stor. Tank footpring Area = **106.51** m^2

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Time	Rainfall Intensity	Storm Runoff (A1 Post)	Runoff Volume (A1 Post)	Storm Runoff (A2 Post)	Runoff Volume (A2 Post)	Storm Runoff (A3 Post)	Runoff Volume (A3 Post)	Storm Runoff (A4 Post)	Runoff Volume (A4 Post)	Storm Runoff (A5 Post)	Runoff Volume (A5 Post)	Total Storm Runoff Volume - Tank 1	Released Volume - Tank 1	Storage Volume Tank 1	Storage Depth of Tank1	Total Storm Runoff Volume - Tank 2	Released Volume - Tank 2	Storage Volume Tank 2	Storage Depth of Tank2
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m^3)	(m^3)	(m^3)	(m)
10.0	76.8	0.063	37.67	0.025	14.75	0.013	7.95	0.002	1.48	0.007	4.11	37.67	20.14	17.5	0.16	22.70	10.22	12.5	0.12
15.0	61.8	0.050	45.44	0.020	17.79	0.011	9.59	0.002	1.79	0.006	4.95	45.44	18.12	27.3	0.25	27.38	9.20	18.2	0.17
20.0	52.0	0.043	51.04	0.017	19.98	0.009	10.77	0.002	2.01	0.005	5.56	51.04	24.16	26.9	0.24	30.75	12.27	18.5	0.17
25.0	45.2	0.037	55.38	0.014	21.68	0.008	11.69	0.001	2.18	0.004	6.04	55.38	30.20	25.2	0.23	33.37	15.33	18.0	0.17
30.0	40.0	0.033	58.92	0.013	23.07	0.007	12.43	0.001	2.32	0.004	6.42	58.92	36.24	22.7	0.21	35.50	18.40	17.1	0.16
35.0	36.1	0.029	61.90	0.012	24.23	0.006	13.06	0.001	2.44	0.003	6.75	61.90	42.29	19.6	0.18	37.30	21.47	15.8	0.15
40.0	32.9	0.027	64.48	0.011	25.24	0.006	13.60	0.001	2.54	0.003	7.03	64.48	48.33	16.1	0.15	38.85	24.54	14.3	0.13
45.0	30.2	0.025	66.74	0.010	26.13	0.005	14.08	0.001	2.63	0.003	7.28	66.74	54.37	12.4	0.11	40.21	27.60	12.6	0.12
50.0	28.0	0.023	68.77	0.009	26.92	0.005	14.51	0.001	2.71	0.002	7.50	68.77	60.41	8.4	0.08	41.43	30.67	10.8	0.10
55.0	26.2	0.021	70.60	0.008	27.64	0.005	14.90	0.001	2.78	0.002	7.70	70.60	66.45	4.1	0.04	42.54	33.74	8.8	0.08
60.0	24.6	0.020	72.27	0.008	28.29	0.004	15.25	0.001	2.84	0.002	7.88	72.27	72.49	0.0	0.00	43.54	36.80	6.7	0.06
65.0	23.2	0.019	73.81	0.007	28.90	0.004	15.57	0.001	2.90	0.002	8.05	73.81	78.53	0.0	0.00	44.47	39.87	4.6	0.04
70.0	21.9	0.018	75.23	0.007	29.45	0.004	15.87	0.001	2.96	0.002	8.20	75.23	84.57	0.0	0.00	45.33	42.94	2.4	0.02
75.0	20.8	0.017	76.56	0.007	29.97	0.004	16.15	0.001	3.01	0.002	8.35	76.56	90.61	0.0	0.00	46.13	46.00	0.1	0.00
80.0	19.8	0.016	77.81	0.006	30.46	0.003	16.42	0.001	3.06	0.002	8.48	77.81	96.65	0.0	0.00	46.88	49.07	0.0	0.00
85.0	18.9	0.015	78.98	0.006	30.92	0.003	16.66	0.001	3.11	0.002	8.61	78.98	102.69	0.0	0.00	47.59	52.14	0.0	0.00
90.0	18.1	0.015	80.09	0.006	31.35	0.003	16.90	0.001	3.15	0.002	8.73	80.09	108.73	0.0	0.00	48.25	55.20	0.0	0.00
95.0	17.4	0.014	81.14	0.006	31.77	0.003	17.12	0.001	3.19	0.002	8.85	81.14	114.77	0.0	0.00	48.89	58.27	0.0	0.00
100.0	16.7	0.014	82.14	0.005	32.16	0.003	17.33	0.001	3.23	0.001	8.95	82.14	120.82	0.0	0.00	49.49	61.34	0.0	0.00
105.0	16.1	0.013	83.09	0.005	32.53	0.003	17.53	0.001	3.27	0.001	9.06	83.09	126.86	0.0	0.00	50.06	64.41	0.0	0.00
110.0	15.6	0.013	84.00	0.005	32.89	0.003	17.72	0.001	3.31	0.001	9.16	84.00	132.90	0.0	0.00	50.61	67.47	0.0	0.00
115.0	15.0	0.012	84.87	0.005	33.23	0.003	17.91	0.000	3.34	0.001	9.25	84.87	138.94	0.0	0.00	51.13	70.54	0.0	0.00
120.0	14.6	0.012	85.71	0.005	33.56	0.003	18.08	0.000	3.37	0.001	9.34	85.71	144.98	0.0	0.00	51.64	73.61	0.0	0.00
125.0	14.1	0.012	86.51	0.005	33.87	0.002	18.25	0.000	3.40	0.001	9.43	86.51	151.02	0.0	0.00	52.12	76.67	0.0	0.00
130.0	13.7	0.011	87.29	0.004	34.17	0.002	18.42	0.000	3.44	0.001	9.52	87.29	157.06	0.0	0.00	52.59	79.74	0.0	0.00
135.0	13.3	0.011	88.04	0.004	34.47	0.002	18.58	0.000	3.46	0.001	9.60	88.04	163.10	0.0	0.00	53.04	82.81	0.0	0.00
140.0	12.9	0.011	88.76	0.004	34.75	0.002	18.73	0.000	3.49	0.001	9.68	88.76	169.14	0.0	0.00	53.48	85.87	0.0	0.00
145.0	12.6	0.010	89.46	0.004	35.02	0.002	18.88	0.000	3.52	0.001	9.75	89.46	175.18	0.0	0.00	53.90	88.94	0.0	0.00
150.0	12.3	0.010	90.14	0.004	35.29	0.002	19.02	0.000	3.55	0.001	9.83	90.14	181.22	0.0	0.00	54.31	92.01	0.0	0.00
155.0	11.9	0.010	90.79	0.004	35.55	0.002	19.16	0.000	3.57	0.001	9.90	90.79	187.26	0.0	0.00	54.70	95.07	0.0	0.00
160.0	11.7	0.010	91.43	0.004	35.80	0.002	19.29	0.000	3.60	0.001	9.97	91.43	193.30	0.0	0.00	55.09	98.14	0.0	0.00
165.0	11.4	0.009	92.05	0.004	36.04	0.002	19.42	0.000	3.62	0.001	10.04	92.05	199.35	0.0	0.00	55.46	101.21	0.0	0.00
170.0	11.1	0.009	92.66	0.004	36.28	0.002	19.55	0.000	3.65	0.001	10.10	92.66	205.39	0.0	0.00	55.83	104.28	0.0	0.00
175.0	10.9	0.009	93.24	0.003	36.51	0.002	19.67	0.000	3.67	0.001	10.17	93.24	211.43	0.0	0.00	56.18	107.34	0.0	0.00
180.0	10.6	0.009	93.82	0.003	36.73	0.002	19.79	0.000	3.69	0.001	10.23	93.82	217.47	0.0	0.00	56.53	110.41	0.0	0.00
185.0	10.4	0.009	94.37	0.003	36.95	0.002	19.91	0.000	3.71	0.001	10.29	94.37	223.51	0.0	0.00	56.86	113.48	0.0	0.00
190.0	10.2	0.008	94.92	0.003	37.16	0.002	20.03	0.000	3.74	0.001	10.35	94.92	229.55	0.0	0.00	57.19	116.54	0.0	0.00
195.0	10.0	0.008	95.45	0.003	37.37	0.002	20.14	0.000	3.76	0.001	10.41	95.45	235.59	0.0	0.00	57.51	119.61	0.0	0.00
200.0	9.8	0.008	95.97	0.003	37.57	0.002	20.25	0.000	3.78	0.001	10.46	95.97	241.63	0.0	0.00	57.82	122.68	0.0	0.00
205.0	9.6	0.008	96.48	0.003	37.77	0.002	20.36	0.000	3.80	0.001	10.52	96.48	247.67	0.0	0.00	58.13	125.74	0.0	0.00
210.0	9.4	0.008	96.98	0.003	37.97	0.002	20.46	0.000	3.82	0.001	10.57	96.98	253.71	0.0	0.00	58.43	128.81	0.0	0.00
215.0	9.2	0.008	97.47	0.003	38.16	0.002	20.56	0.000	3.84	0.001	10.63	97.47	259.75	0.0	0.00	58.72	131.88	0.0	0.00
220.0	9.1	0.007	97.94	0.003	38.35	0.002	20.67	0.000	3.85	0.001	10.68	97.94	265.79	0.0	0.00	59.01	134.94	0.0	0.00
225.0	8.9	0.007	98.41	0.003	38.53	0.002	20.76	0.000	3.87	0.001	10.73	98.41	271.83	0.0	0.00	59.29	138.01	0.0	0.00
230.0	8.8	0.007	98.87	0.003	38.71	0.002	20.86	0.000	3.89	0.001	10.78	98.87	277.87	0.0	0.00	59.57	141.08	0.0	0.00
235.0	8.6	0.007	99.32	0.003	38.88	0.001	20.96	0.000	3.91	0.001	10.83	99.32	283.92	0.0	0.00	59.84	144.15	0.0	0.00
240.0	8.5	0.007	99.76	0.003	39.06	0.001	21.05	0.000	3.93	0.001	10.88	99.76	289.96	0.0	0.00	60.11	147.21	0.0	0.00
245.0	8.3	0.007	100.19	0.003	39.23	0.001	21.14	0.000	3.94	0.001	10.92	100.19	296.00	0.0	0.00	60.37	150.28	0.0	0.00
250.0	8.2	0.007	100.62	0.003	39.39	0.001	21.23	0.000	3.96	0.001	10.97	100.62	302.04	0.0	0.00	60.62	153.35	0.0	0.00
255.0	8.1	0.007	101.04	0.003	39.56	0.001	21.32	0.000	3.98	0.001	11.02	101.04	308.08	0.0	0.00	60.88	156.41	0.0	0.00
260.0	8.0	0.007	101.45	0.003	39.72	0.001	21.41	0.000	3.99	0.001	11.06	101.45	314.12	0.0	0.00	61.12	159.48	0.0	0.00
265.0	7.8	0.006	101.85	0.003	39.88	0.001	21.49	0.000	4.01	0.001	11.10	101.85	320.16	0.0	0.00	61.37	162.55	0.0	0.00
270.0	7.7	0.006	102.25	0.002	40.03	0.001	21.57	0.000	4.02	0.001	11.15	102.25	326.20	0.0	0.00	61.61	165.61	0.0	0.00

Modified Rational Method - 5 Year Storm

Site Flow and Storage Summary

400 Albert Street, Ottawa

File No. UD19-048
Date: August 2020
Prepared By: Catherine Agiou, P.E., M.A.Sc.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Drainage Area A1 Post

Rooftops (Towers A & B) - Controlled In Underground Tank 1

Area (A1) = **0.332** ha
"C" = **0.89**
AC1= **0.29**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **85.2** L/s

Drainage Area A2 Post

Rooftops (Tower C) - Controlled In Underground Tank 2

Area (A2) = **0.130** ha
"C" = **0.89**
AC2= **0.12**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **33.3** L/s

Drainage Area A3 Post

Mid Block Connection Area - Controlled In Underground Tank 2

Area (A3) = **0.069** ha
"C" = **0.90**
AC3= **0.06**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **17.97** L/s

Drainage Area A4 Post

Uncontrolled Site Area

Area (A4) = **0.013** ha
"C" = **0.90**
AC4 = **0.01**
Tc = **10.0** min
Time Increment = **5.0** min
Release Rate = **3.4** L/s

Drainage Area A5 Post

Parkland Dedication Area

Area (A5) = **0.040** ha
"C" = **0.80**
AC5 = **0.03**
Tc = **10.0** min
Time Increment = **5.0** min
Release Rate = **9.3** L/s

Total Site

5-yr Pre-Development Site Release Rate = **56.9** L/s

Parkland Dedication Uncontrolled Flow= **9.3** L/s
Uncontrolled Flow = **3.4** L/s

Design Controlled Release Rate (95mm orifice plate) (Tank 1) = **12.5** L/s

Design Controlled Release Rate (75mm orifice plate) (Tank 2) = **6.4** L/s

Total Site Release Rate Achieved = **31.5** L/s

5-Year Design Storm	
a=	998.07
b=	6.053
c=	0.814
I =	a / (TC + b)c

Tributary Area (A1)	ha	C
Landsc.Area (A1)	0.006	0.25
Hardsc. Area (A1)	0.325	0.90
Total	0.332	0.89

Tributary Area (A2)	ha	C
Landsc.Area (A2)	0.002	0.25
Hardsc. Area (A2)	0.127	0.90
Total	0.130	0.89

Tributary Area (A3)	ha	C
Landsc.Area (A3)	0.000	0.25
Hardsc. Area (A3)	0.069	0.90
Total	0.069	0.90

Tributary Area (A4)	ha	C
Landsc.Area (A4)	0.000	0.25
Hardsc. Area (A4)	0.013	0.90
Total	0.013	0.90

Tributary Area (A5)	ha	C
Landsc.Area (A5)	0.006	0.25
Hardsc. Area (A5)	0.034	0.90
Total	0.040	0.80

Tower A , B and East Podium

Max. Storage Tank1 Size = **44.7** m^3
Storage Tank1 footpring Area = **110.04** m^2

Tower C, West Podium and Mid block connection area

Max. Storage Tank2 Size = **29.7** m^3
Stor. Tank footpring Area = **106.51** m^2

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (A1 Post) (m^3/s)	Runoff Volume (A1 Post) (m^3)	Storm Runoff (A2 Post) (m^3/s)	Runoff Volume (A2 Post) (m^3)	Storm Runoff (A3 Post) (m^3/s)	Runoff Volume (A3 Post) (m^3)	Storm Runoff (A4 Post) (m^3/s)	Runoff Volume (A4 Post) (m^3)	Storm Runoff (A5 Post) (m^3/s)	Runoff Volume (A5 Post) (m^3)	Total Storm Runoff Volume - Tank 1 (m^3)	Released Volume - Tank 1 (m^3)	Storage Volume Tank 1 (m^3)	Storage Depth of Tank1 (m)	Total Storm Runoff Volume - Tank 2 (m^3)	Released Volume - Tank 2 (m^3)	Storage Volume Tank 2 (m^3)	Storage Depth of Tank2 (m)
10.0	104.2	0.085	51.10	0.033	20.01	0.018	10.78	0.003	2.01	0.009	5.57	51.10	20.14	31.0	0.28	30.79	10.22	20.6	0.19
15.0	83.6	0.068	61.47	0.027	24.07	0.014	12.97	0.003	2.42	0.007	6.70	61.47	18.12	43.4	0.39	37.04	9.20	27.8	0.26
20.0	70.3	0.057	68.91	0.022	26.98	0.012	14.54	0.002	2.71	0.006	7.51	68.91	24.16	44.7	0.41	41.52	12.27	29.3	0.27
25.0	60.9	0.050	74.67	0.019	29.23	0.011	15.76	0.002	2.94	0.005	8.14	74.67	30.20	44.5	0.40	44.99	15.33	29.7	0.28
30.0	53.9	0.044	79.35	0.017	31.07	0.009	16.74	0.002	3.12	0.005	8.65	79.35	36.24	43.1	0.39	47.81	18.40	29.4	0.28
35.0	48.5	0.040	83.29	0.016	32.61	0.008	17.57	0.002	3.28	0.004	9.08	83.29	42.29	41.0	0.37	50.18	21.47	28.7	0.27
40.0	44.2	0.036	86.68	0.014	33.94	0.008	18.29	0.001	3.41	0.004	9.45	86.68	48.33	38.4	0.35	52.23	24.54	27.7	0.26
45.0	40.6	0.033	89.67	0.013	35.11	0.007	18.92	0.001	3.53	0.004	9.78	89.67	54.37	35.3	0.32	54.03	27.60	26.4	0.25
50.0	37.7	0.031	92.34	0.012	36.15	0.006	19.48	0.001	3.63	0.003	10.07	92.34	60.41	31.9	0.29	55.63	30.67	25.0	0.23
55.0	35.1	0.029	94.75	0.011	37.10	0.006	19.99	0.001	3.73	0.003	10.33	94.75	66.45	28.3	0.26	57.09	33.74	23.4	0.22
60.0	32.9	0.027	96.95	0.011	37.96	0.006	20.46	0.001	3.82	0.003	10.57	96.95	72.49	24.5	0.22	58.41	36.80	21.6	0.20
65.0	31.0	0.025	98.97	0.010	38.75	0.005	20.88	0.001	3.89	0.003	10.79	98.97	78.53	20.4	0.19	59.63	39.87	19.8	0.19
70.0	29.4	0.024	100.84	0.009	39.48	0.005	21.28	0.001	3.97	0.003	10.99	100.84	84.57	16.3	0.15	60.76	42.94	17.8	0.17
75.0	27.9	0.023	102.59	0.009	40.16	0.005	21.65	0.001	4.04	0.002	11.18	102.59	90.61	12.0	0.11	61.81	46.00	15.8	0.15
80.0	26.6	0.022	104.22	0.009	40.80	0.005	21.99	0.001	4.10	0.002	11.36	104.22	96.65	7.6	0.07	62.80	49.07	13.7	0.13
85.0	25.4	0.021	105.76	0.008	41.41	0.004	22.32	0.001	4.16	0.002	11.53	105.76	102.69	3.1	0.03	63.72	52.14	11.6	0.11
90.0	24.3	0.020	107.21	0.008	41.98	0.004	22.62	0.001	4.22	0.002	11.69	107.21	108.73	0.0	0.00	64.60	55.20	9.4	0.09
95.0	23.3	0.019	108.59	0.007	42.51	0.004	22.91	0.001	4.27	0.002	11.84	108.59	114.77	0.0	0.00	65.43	58.27	7.2	0.07
100.0	22.4	0.018	109.90	0.007	43.03	0.004	23.19	0.001	4.33	0.002	11.98	109.90	120.82	0.0	0.00	66.22	61.34	4.9	0.05
105.0	21.6	0.018	111.15	0.007	43.52	0.004	23.45	0.001	4.37	0.002	12.12	111.15	126.86	0.0	0.00	66.97	64.41	2.6	0.02
110.0	20.8	0.017	112.34	0.007	43.98	0.004	23.70	0.001	4.42	0.002	12.25	112.34	132.90	0.0	0.00	67.69	67.47	0.2	0.00
115.0	20.1	0.016	113.48	0.006	44.43	0.003	23.94	0.001	4.47	0.002	12.37	113.48	138.94	0.0	0.00	68.37	70.54	0.0	0.00
120.0	19.5	0.016	114.58	0.006	44.86	0.003	24.18	0.001	4.51	0.002	12.49	114.58	144.98	0.0	0.00	69.03	73.61	0.0	0.00
125.0	18.9	0.015	115.63	0.006	45.27	0.003	24.40	0.001	4.55	0.002	12.61	115.63	151.02	0.0	0.00	69.67	76.67	0.0	0.00
130.0	18.3	0.015	116.65	0.006	45.67	0.003	24.61	0.001	4.59	0.002	12.72	116.65	157.06	0.0	0.00	70.28	79.74	0.0	0.00
135.0	17.8	0.015	117.63	0.006	46.05	0.003	24.82	0.001	4.63	0.002	12.82	117.63	163.10	0.0	0.00	70.87	82.81	0.0	0.00
140.0	17.3	0.014	118.57	0.006	46.42	0.003	25.02	0.001	4.67	0.002	12.93	118.57	169.14	0.0	0.00	71.44	85.87	0.0	0.00
145.0	16.8	0.014	119.49	0.005	46.78	0.003	25.21	0.001	4.70	0.001	13.03	119.49	175.18	0.0	0.00	71.99	88.94	0.0	0.00
150.0	16.4	0.013	120.38	0.005	47.13	0.003	25.40	0.001	4.74	0.001	13.12	120.38	181.22	0.0	0.00	72.53	92.01	0.0	0.00
155.0	15.9	0.013	121.24	0.005	47.47	0.003	25.58	0.001	4.77	0.001	13.22	121.24	187.26	0.0	0.00	73.05	95.07	0.0	0.00
160.0	15.6	0.013	122.07	0.005	47.79	0.003	25.76	0.001	4.80	0.001	13.31	122.07	193.30	0.0	0.00	73.55	98.14	0.0	0.00
165.0	15.2	0.012	122.88	0.005	48.11	0.003	25.93	0.000	4.84	0.001	13.40	122.88	199.35	0.0	0.00	74.04	101.21	0.0	0.00
170.0	14.8	0.012	123.67	0.005	48.42	0.003	26.09	0.000	4.87	0.001	13.48	123.67	205.39	0.0	0.00	74.51	104.28	0.0	0.00
175.0	14.5	0.012	124.44	0.005	48.72	0.003	26.26	0.000	4.90	0.001	13.57	124.44	211.43	0.0	0.00	74.98	107.34	0.0	0.00
180.0	14.2	0.012	125.19	0.005	49.01	0.002	26.41	0.000	4.93	0.001	13.65	125.19	217.47	0.0	0.00	75.43	110.41	0.0	0.00
185.0	13.9	0.011	125.92	0.004	49.30	0.002	26.57	0.000	4.96	0.001	13.73	125.92	223.51	0.0	0.00	75.87	113.48	0.0	0.00
190.0	13.6	0.011	126.63	0.004	49.58	0.002	26.72	0.000	4.98	0.001	13.81	126.63	229.55	0.0	0.00	76.30	116.54	0.0	0.00
195.0	13.3	0.011	127.33	0.004	49.85	0.002	26.87	0.000	5.01	0.001	13.88	127.33	235.59	0.0	0.00	76.71	119.61	0.0	0.00
200.0	13.0	0.011	128.00	0.004	50.12	0.002	27.01	0.000	5.04	0.001	13.96	128.00	241.63	0.0	0.00	77.12	122.68	0.0	0.00
205.0	12.8	0.010	128.67	0.004	50.38	0.002	27.15	0.000	5.06	0.001	14.03	128.67	247.67	0.0	0.00	77.52	125.74	0.0	0.00
210.0	12.6	0.010	129.32	0.004	50.63	0.002	27.29	0.000	5.09	0.001	14.10	129.32	253.71	0.0	0.00	77.92	128.81	0.0	0.00
215.0	12.3	0.010	129.96	0.004	50.88	0.002	27.42	0.000	5.11	0.001	14.17	129.96	259.75	0.0	0.00	78.30	131.88	0.0	0.00
220.0	12.1	0.010	130.58	0.004	51.12	0.002	27.55	0.000	5.14	0.001	14.24	130.58	265.79	0.0	0.00	78.67	134.94	0.0	0.00
225.0	11.9	0.010	131.19	0.004	51.36	0.002	27.68	0.000	5.16	0.001	14.30	131.19	271.83	0.0	0.00	79.04	138.01	0.0	0.00
230.0	11.7	0.010	131.79	0.004	51.60	0.002	27.81	0.000	5.19	0.001	14.37	131.79	277.87	0.0	0.00	79.40	141.08	0.0	0.00
235.0	11.5	0.009	132.37	0.004	51.83	0.002	27.93	0.000	5.21	0.001	14.43	132.37	283.92	0.0	0.00	79.76	144.15	0.0	0.00
240.0	11.3	0.009	132.95	0.004	52.05	0.002	28.05	0.000	5.23	0.001	14.50	132.95	289.96	0.0	0.00	80.10	147.21	0.0	0.00
245.0	11.1	0.009	133.52	0.004	52.27	0.002	28.17	0.000	5.25	0.001	14.56	133.52	296.00	0.0	0.00	80.44	150.28	0.0	0.00
250.0	10.9	0.009	134.07	0.003	52.49	0.002	28.29	0.000	5.28	0.001	14.62	134.07	302.04	0.0	0.00	80.78	153.35	0.0	0.00
255.0	10.8	0.009	134.62	0.003	52.70	0.002	28.40	0.000	5.30	0.001	14.68	134.62	308.08	0.0	0.00	81.11	156.41	0.0	0.00
260.0	10.6	0.009	135.15	0.003	52.91	0.002	28.52	0.000	5.32	0.001	14.74	135.15	314.12	0.0	0.00	81.43	159.48	0.0	0.00
265.0	10.4	0.009	135.68	0.003	53.12	0.002	28.63	0.000	5.34	0.001	14.79	135.68	320.16	0.0	0.00	81.75	162.55	0.0	0.00
270.0	10.3	0.008	136.20	0.003	53.32	0.002	28.74	0.000	5.36	0.001	14.85	136.20	326.20	0.0	0.00	82.06	165.61	0.0	0.00

Modified Rational Method - 100 Year Storm

Site Flow and Storage Summary

400 Albert Street, Ottawa

File No. UD19-048
Date: August 2020
Prepared By: Catherine Agiou, P.E., M.A.Sc.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

*** C value for the 100 year storm event is increased by 25%, with a maximum of 1.0 per City's Sewer Design Guidelines**

Drainage Area A1 Post

Rooftops (Towers A & B) - Controlled In Underground Tank 1

Area (A1) = **0.332** ha
"C" = **1.00**
AC1= **0.33**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **164.5** L/s

Drainage Area A2 Post

Rooftops (Tower C) - Controlled In Underground Tank 2

Area (A2) = **0.130** ha
"C" = **1.00**
AC2= **0.13**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **64.3** L/s

Drainage Area A3 Post

Mid Block Connection Area - Controlled In Underground Tank 2

Area (A3) = **0.069** ha
"C" = **1.00**
AC3= **0.07**
Tc = **10.0** min
Time Increment = **5.0** min
Max. Release Rate = **34.22** L/s

Drainage Area A4 Post

Uncontrolled Site Area

Area (A4) = **0.013** ha
"C" = **1.00**
AC4 = **0.01**
Tc = **10.0** min
Time Increment = **5.0** min
Release Rate = **6.4** L/s

Drainage Area A5 Post

Parkland Dedication Area

Area (A5) = **0.040** ha
"C" = **1.00**
AC5 = **0.04**
Tc = **10.0** min
Time Increment = **5.0** min
Release Rate = **19.9** L/s

Total Site

5-yr Pre-Development Site Release Rate = 56.9 L/s

Parkland Dedication Uncontrolled Flow= 19.9 L/s
Uncontrolled Flow = 6.4 L/s

Design Controlled Release Rate (95mm orifice plate) (Tank 1) = 20.1 L/s

Design Controlled Release Rate (75mm orifice plate) (Tank 2) = 10.2 L/s

Total Site Release Rate Achieved = 56.6 L/s

100-Year Design Storm	
a=	1735.69
b=	6.014
c=	0.820
I =	a / (TC + b)c

Tributary Area (A1)	ha	C
Landsc.Area (A1)	0.006	0.25
Hardsc. Area (A1)	0.325	0.90
Total	0.332	0.89

Tributary Area (A2)	ha	C
Landsc.Area (A2)	0.002	0.25
Hardsc. Area (A2)	0.127	0.90
Total	0.130	0.89

Tributary Area (A3)	ha	C
Landsc.Area (A3)	0.000	0.25
Hardsc. Area (A3)	0.069	0.90
Total	0.069	0.90

Tributary Area (A4)	ha	C
Landsc.Area (A4)	0.000	0.25
Hardsc. Area (A4)	0.013	0.90
Total	0.013	0.90

Tributary Area (A5)	ha	C
Landsc.Area (A5)	0.006	0.25
Hardsc. Area (A5)	0.034	0.90
Total	0.040	0.80

Tower A , B and East Podium

Max. Storage Tank1 Size = 117.8 m^3
Storage Tank1 footpring Area = **110.04** m^2

Tower C, West Podium and Mid block connection area

Max. Storage Tank2 Size = 75.2 m^3
Stor. Tank footpring Area = **106.51** m^2

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Time	Rainfall Intensity	Storm Runoff (A1 Post)	Runoff Volume (A1 Post)	Storm Runoff (A2 Post)	Runoff Volume (A2 Post)	Storm Runoff (A3 Post)	Runoff Volume (A3 Post)	Storm Runoff (A4 Post)	Runoff Volume (A4 Post)	Storm Runoff (A5 Post)	Runoff Volume (A5 Post)	Total Storm Runoff Volume - Tank 1	Released Volume - Tank 1	Storage Volume Tank 1	Storage Depth of Tank1	Total Storm Runoff Volume - Tank 2	Released Volume - Tank 2	Storage Volume Tank 2	Storage Depth of Tank2
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3/s)	(m^3)	(m^3)	(m^3)	(m^3)	(m)	(m^3)	(m^3)	(m^3)	(m)
10.0	178.6	0.164	98.69	0.064	38.56	0.034	20.53	0.006	3.83	0.020	11.94	98.69	20.14	78.6	0.71	59.09	10.22	48.9	0.46
15.0	142.9	0.132	118.47	0.051	46.29	0.027	24.65	0.005	4.60	0.016	14.33	118.47	18.12	100.3	0.91	70.93	9.20	61.7	0.58
20.0	120.0	0.110	132.60	0.043	51.81	0.023	27.59	0.004	5.15	0.013	16.04	132.60	24.16	108.4	0.99	79.39	12.27	67.1	0.63
25.0	103.8	0.096	143.50	0.037	56.06	0.020	29.85	0.004	5.57	0.012	17.35	143.50	30.20	113.3	1.03	85.92	15.33	70.6	0.66
30.0	91.9	0.085	152.33	0.033	59.52	0.018	31.69	0.003	5.91	0.010	18.42	152.33	36.24	116.1	1.05	91.21	18.40	72.8	0.68
35.0	82.6	0.076	159.75	0.030	62.42	0.016	33.23	0.003	6.20	0.009	19.32	159.75	42.29	117.5	1.07	95.65	21.47	74.2	0.70
40.0	75.1	0.069	166.14	0.027	64.91	0.014	34.56	0.003	6.45	0.008	20.09	166.14	48.33	117.8	1.07	99.47	24.54	74.9	0.70
45.0	69.1	0.064	171.75	0.025	67.10	0.013	35.73	0.002	6.66	0.008	20.77	171.75	54.37	117.4	1.07	102.83	27.60	75.2	0.71
50.0	64.0	0.059	176.74	0.023	69.05	0.012	36.77	0.002	6.86	0.007	21.37	176.74	60.41	116.3	1.06	105.82	30.67	75.2	0.71
55.0	59.6	0.055	181.25	0.021	70.82	0.011	37.71	0.002	7.03	0.007	21.92	181.25	66.45	114.8	1.04	108.52	33.74	74.8	0.70
60.0	55.9	0.051	185.37	0.020	72.42	0.011	38.56	0.002	7.19	0.006	22.42	185.37	72.49	112.9	1.03	110.99	36.80	74.2	0.70
65.0	52.6	0.048	189.14	0.019	73.90	0.010	39.35	0.002	7.34	0.006	22.87	189.14	78.53	110.6	1.01	113.25	39.87	73.4	0.69
70.0	49.8	0.046	192.64	0.018	75.26	0.010	40.08	0.002	7.47	0.006	23.30	192.64	84.57	108.1	0.98	115.34	42.94	72.4	0.68
75.0	47.3	0.044	195.89	0.017	76.54	0.009	40.75	0.002	7.60	0.005	23.69	195.89	90.61	105.3	0.96	117.29	46.00	71.3	0.67
80.0	45.0	0.041	198.94	0.016	77.73	0.009	41.39	0.002	7.72	0.005	24.06	198.94	96.65	102.3	0.93	119.11	49.07	70.0	0.66
85.0	43.0	0.040	201.80	0.015	78.85	0.008	41.98	0.002	7.83	0.005	24.41	201.80	102.69	99.1	0.90	120.83	52.14	68.7	0.64
90.0	41.1	0.038	204.51	0.015	79.90	0.008	42.54	0.001	7.94	0.005	24.73	204.51	108.73	95.8	0.87	122.45	55.20	67.2	0.63
95.0	39.4	0.036	207.07	0.014	80.90	0.008	43.08	0.001	8.03	0.004	25.04	207.07	114.77	92.3	0.84	123.98	58.27	65.7	0.62
100.0	37.9	0.035	209.50	0.014	81.85	0.007	43.58	0.001	8.13	0.004	25.34	209.50	120.82	88.7	0.81	125.44	61.34	64.1	0.60
105.0	36.5	0.034	211.82	0.013	82.76	0.007	44.07	0.001	8.22	0.004	25.62	211.82	126.86	85.0	0.77	126.82	64.41	62.4	0.59
110.0	35.2	0.032	214.03	0.013	83.62	0.007	44.53	0.001	8.30	0.004	25.88	214.03	132.90	81.1	0.74	128.15	67.47	60.7	0.57
115.0	34.0	0.031	216.15	0.012	84.45	0.007	44.97	0.001	8.39	0.004	26.14	216.15	138.94	77.2	0.70	129.42	70.54	58.9	0.55
120.0	32.9	0.030	218.18	0.012	85.24	0.006	45.39	0.001	8.47	0.004	26.39	218.18	144.98	73.2	0.67	130.63	73.61	57.0	0.54
125.0	31.9	0.029	220.13	0.011	86.01	0.006	45.80	0.001	8.54	0.004	26.62	220.13	151.02	69.1	0.63	131.80	76.67	55.1	0.52
130.0	30.9	0.028	222.02	0.011	86.74	0.006	46.19	0.001	8.61	0.003	26.85	222.02	157.06	65.0	0.59	132.93	79.74	53.2	0.50
135.0	30.0	0.028	223.83	0.011	87.45	0.006	46.56	0.001	8.69	0.003	27.07	223.83	163.10	60.7	0.55	134.02	82.81	51.2	0.48
140.0	29.2	0.027	225.58	0.010	88.14	0.006	46.93	0.001	8.75	0.003	27.28	225.58	169.14	56.4	0.51	135.06	85.87	49.2	0.46
145.0	28.4	0.026	227.28	0.010	88.80	0.005	47.28	0.001	8.82	0.003	27.49	227.28	175.18	52.1	0.47	136.08	88.94	47.1	0.44
150.0	27.6	0.025	228.92	0.010	89.44	0.005	47.62	0.001	8.88	0.003	27.68	228.92	181.22	47.7	0.43	137.06	92.01	45.1	0.42
155.0	26.9	0.025	230.51	0.010	90.06	0.005	47.95	0.001	8.94	0.003	27.88	230.51	187.26	43.2	0.39	138.01	95.07	42.9	0.40
160.0	26.2	0.024	232.05	0.009	90.66	0.005	48.27	0.001	9.00	0.003	28.06	232.05	193.30	38.7	0.35	138.94	98.14	40.8	0.38
165.0	25.6	0.024	233.55	0.009	91.25	0.005	48.59	0.001	9.06	0.003	28.24	233.55	199.35	34.2	0.31	139.83	101.21	38.6	0.36
170.0	25.0	0.023	235.01	0.009	91.82	0.005	48.89	0.001	9.12	0.003	28.42	235.01	205.39	29.6	0.27	140.71	104.28	36.4	0.34
175.0	24.4	0.023	236.42	0.009	92.37	0.005	49.19	0.001	9.17	0.003	28.59	236.42	211.43	25.0	0.23	141.56	107.34	34.2	0.32
180.0	23.9	0.022	237.81	0.009	92.91	0.005	49.47	0.001	9.23	0.003	28.76	237.81	217.47	20.3	0.18	142.38	110.41	32.0	0.30
185.0	23.4	0.022	239.15	0.008	93.44	0.004	49.75	0.001	9.28	0.003	28.92	239.15	223.51	15.6	0.14	143.19	113.48	29.7	0.28
190.0	22.9	0.021	240.47	0.008	93.95	0.004	50.03	0.001	9.33	0.003	29.08	240.47	229.55	10.9	0.10	143.98	116.54	27.4	0.26
195.0	22.4	0.021	241.75	0.008	94.45	0.004	50.29	0.001	9.38	0.002	29.24	241.75	235.59	6.2	0.06	144.75	119.61	25.1	0.24
200.0	22.0	0.020	243.00	0.008	94.94	0.004	50.55	0.001	9.43	0.002	29.39	243.00	241.63	1.4	0.01	145.50	122.68	22.8	0.21
205.0	21.6	0.020	244.23	0.008	95.42	0.004	50.81	0.001	9.48	0.002	29.54	244.23	247.67	0.0	0.00	146.23	125.74	20.5	0.19
210.0	21.1	0.019	245.43	0.008	95.89	0.004	51.06	0.001	9.52	0.002	29.68	245.43	253.71	0.0	0.00	146.95	128.81	18.1	0.17
215.0	20.8	0.019	246.60	0.007	96.35	0.004	51.30	0.001	9.57	0.002	29.82	246.60	259.75	0.0	0.00	147.65	131.88	15.8	0.15
220.0	20.4	0.019	247.75	0.007	96.80	0.004	51.54	0.001	9.61	0.002	29.96	247.75	265.79	0.0	0.00	148.34	134.94	13.4	0.13
225.0	20.0	0.018	248.87	0.007	97.24	0.004	51.77	0.001	9.66	0.002	30.10	248.87	271.83	0.0	0.00	149.01	138.01	11.0	0.10
230.0	19.7	0.018	249.98	0.007	97.67	0.004	52.00	0.001	9.70	0.002	30.23	249.98	277.87	0.0	0.00	149.67	141.08	8.6	0.08
235.0	19.3	0.018	251.06	0.007	98.09	0.004	52.23	0.001	9.74	0.002	30.36	251.06	283.92	0.0	0.00	150.32	144.15	6.2	0.06
240.0	19.0	0.018	252.12	0.007	98.50	0.004	52.45	0.001	9.78	0.002	30.49	252.12	289.96	0.0	0.00	150.95	147.21	3.7	0.04
245.0	18.7	0.017	253.16	0.007	98.91	0.004	52.67	0.001	9.82	0.002	30.62	253.16	296.00	0.0	0.00	151.58	150.28	1.3	0.01
250.0	18.4	0.017	254.18	0.007	99.31	0.004	52.88	0.001	9.86	0.002	30.74	254.18	302.04	0.0	0.00	152.19	153.35	0.0	0.00
255.0	18.1	0.017	255.18	0.007	99.70	0.003	53.09	0.001	9.90	0.002	30.86	255.18	308.08	0.0	0.00	152.79	156.41	0.0	0.00
260.0	17.8	0.016	256.17	0.006	100.09	0.003	53.29	0.001	9.94	0.002	30.98	256.17	314.12	0.0	0.00	153.38	159.48	0.0	0.00
265.0	17.6	0.016	257.14	0.006	100.47	0.003	53.49	0.001	9.98	0.002	31.10	257.14	320.16	0.0	0.00	153.96	162.55	0.0	0.00
270.0	17.3	0.016	258.09	0.006	100.84	0.003	53.69	0.001	10.01	0.002	31.21	258.09	326.20	0.0	0.00	154.53	165.61	0.0	0.00

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Orifice Design

400 Albert Street
File No. UD19-048
Date: August 2020
Prepared By: Catherine Agiou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Towers A, B and West Podium - Tank 1
Orifice Equation for 95mm Plate

$$Q = C \times A \times \sqrt{2 \times g \times h}$$

100 yr event			**5 yr event**			**2 yr event**		
d=	95	mm	d=	95	mm	d=	95	mm
C=	0.62		C=	0.62		C=	0.62	
A=	0.007	m^2	A=	0.007	m^2	A=	0.007	m^2
g=	9.81	m/s^2	g=	9.81	m/s^2	g=	9.81	m/s^2
h=	1.07	m	h=	0.41	m	h=	0.25	m
Q=	**20.1**	**L/s**	**Q=**	**12.5**	**L/s**	**Q=**	**9.7**	**L/s**

Lithos

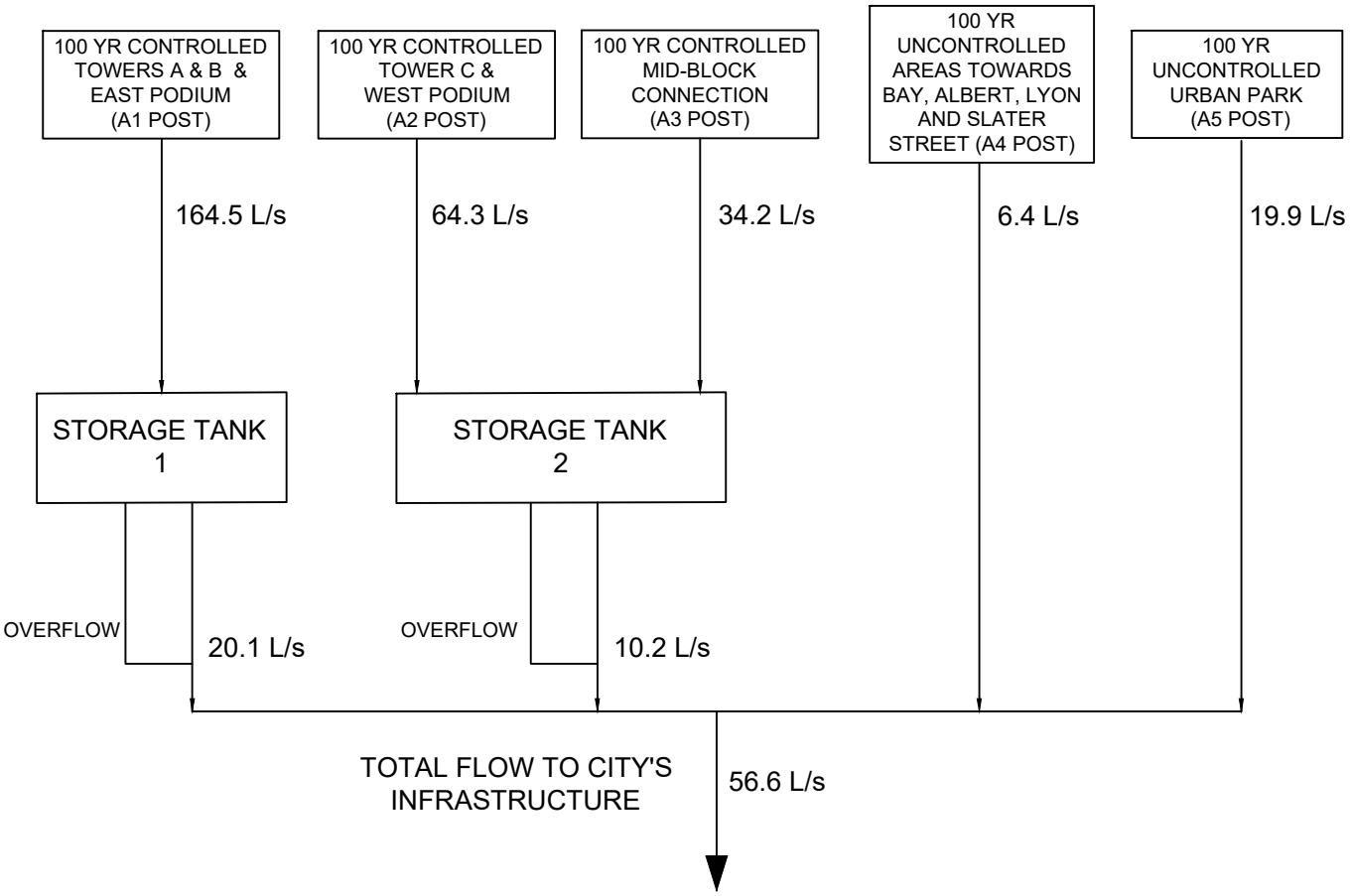
Orifice Design

400 Albert Street
File No. UD19-048
Date: August 2020
Prepared By: Catherine Agiou, P.E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Tower C, West Podium and Mid Block connection - Tank 2
Orifice Equation for 75mm Plate

$$Q = C \times A \times \sqrt{2 \times g \times h}$$

100 yr event			**5 yr event**			**2 yr event**		
d=	75	mm	d=	75	mm	d=	75	mm
C=	0.62		C=	0.62		C=	0.62	
A=	0.004	m^2	A=	0.004	m^2	A=	0.004	m^2
g=	9.81	m/s^2	g=	9.81	m/s^2	g=	9.81	m/s^2
h=	0.71	m	h=	0.28	m	h=	0.17	m
Q=	**10.2**	**L/s**	**Q=**	**6.4**	**L/s**	**Q=**	**5.0**	**L/s**

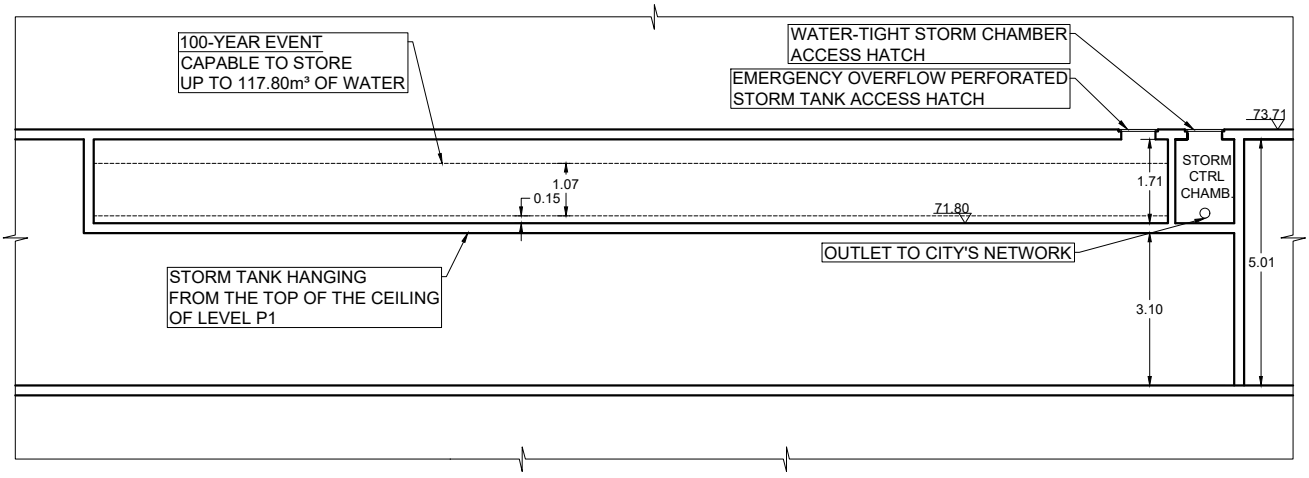


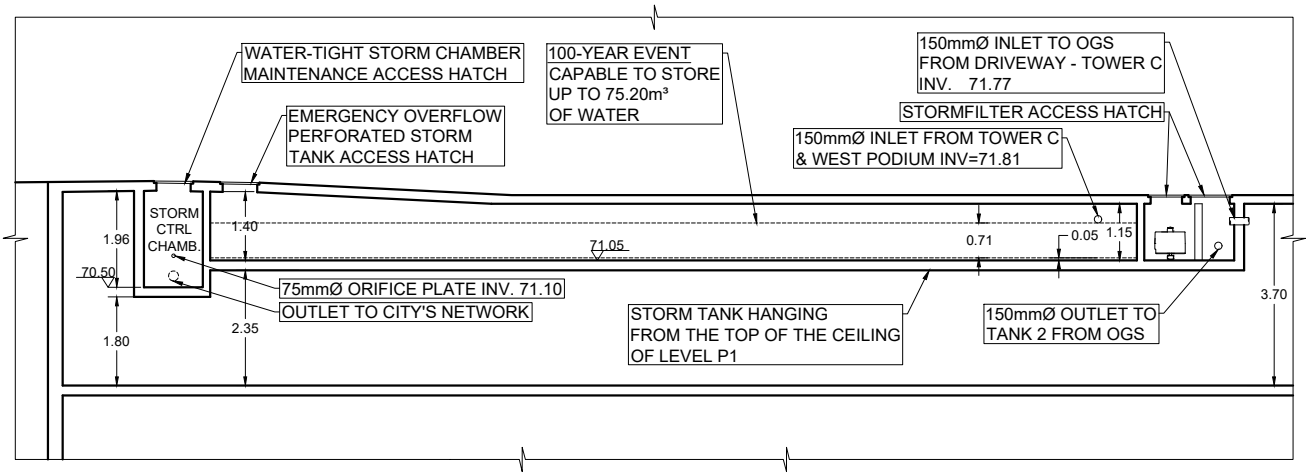
Lithos

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

TANK DESIGN
MIXED USE DEVELOPMENT
400 ALBERT STREET
TORONTO, ONTARIO

DATE:	AUGUST 2020	PROJECT No:	UD19-048
SCALE:	N.T.S.	FIGURE No:	FIG 3A





Lithos

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

TANK DESIGN
MIXED USE DEVELOPMENT
400 ALBERT STREET
TORONTO, ONTARIO

DATE:	AUGUST 2020	PROJECT No:	UD19-048
SCALE:	N.T.S.	FIGURE No:	FIG 3B

Determining Number of Cartridges for Flow Based Systems

Date	**7/29/2020**	**Black Cells =**	**Calculation**

Site Information

Project Name	**400 Albert Street**		
Project Location	**Ottawa, ON**		
OGS ID	**Stormfilter**		
Drainage Area, Ad	**0.16**	ac	(0.064 ha)
Impervious Area, Ai	**0.16**	ac	
Pervious Area, Ap	**0.00**		
% Impervious	**100%**		
Runoff Coefficient, Rc	**0.90**		
Treatment storm flow rate, Q_{treat}	**0.11**	cfs	(3.2 L/s)
Peak storm flow rate, Q_{peak}	**0.68**	cfs	(19.3 L/s)

Filter System

Filtration brand	**StormFilter**	
Cartridge height	**18**	in
Specific Flow Rate	**2.00**	gpm/ft²
Flow rate per cartridge	**15.00**	gpm

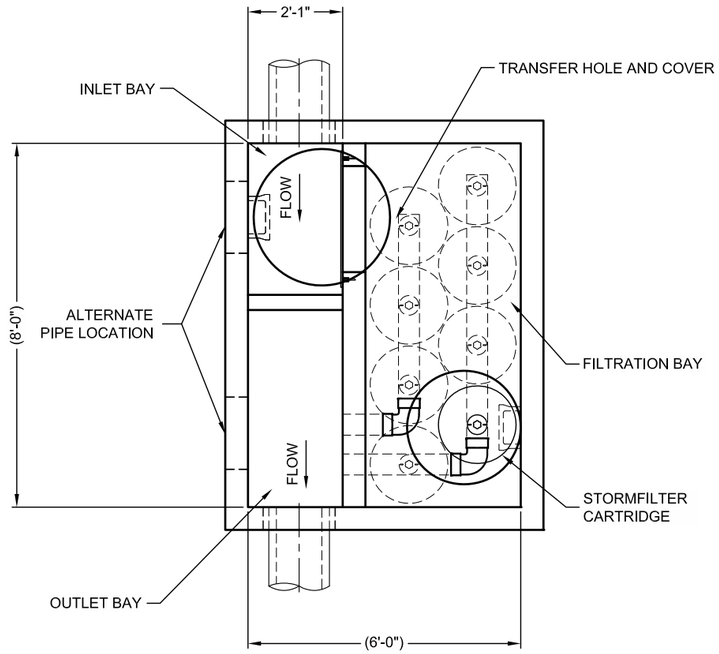
SUMMARY

Number of Cartridges	4
Media Type	Perlite

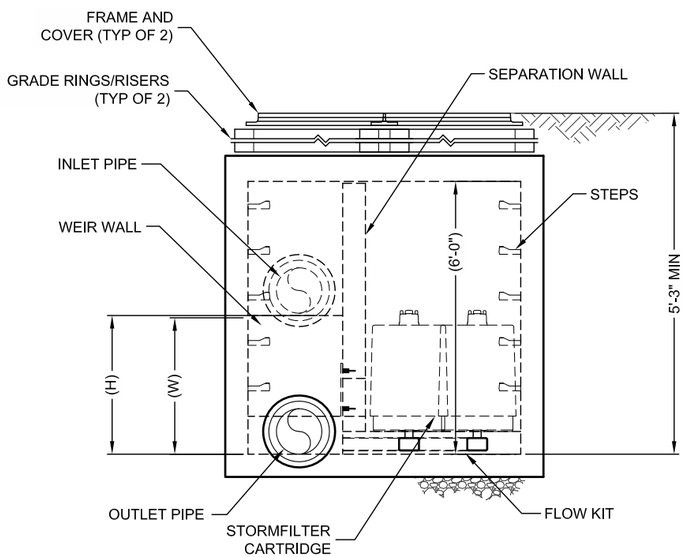
Event Mean Concentration (EMC)	**150**	mg/L
Annual TSS Removal	**80%**	
Percent Runoff Capture	**90%**	

Recommend SFPD 0806

200 Enterprise Drive
Scarborough, ME 04074
Phone 877-907-8676
Fax 207-885-9825



PLAN



ELEVATION

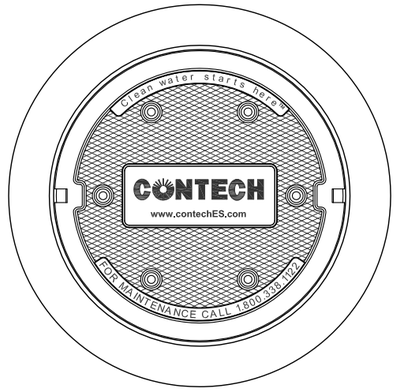
The Stormwater Management StormFilter®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,322,629; 5,324,579; 5,707,527; 5,985,157; 6,027,639; 6,946,065; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

STORMFILTER DESIGN TABLE

- THE 8' x 6' PEAK DIVERSION STORMFILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.
- THE PEAK DIVERSION STORMFILTER IS AVAILABLE IN A LEFT INLET (AS SHOWN) OR RIGHT INLET CONFIGURATION.
- ALL PARTS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.

CARTRIDGE HEIGHT	27"		18"		LOW DROP	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	3.05'		2.3'		1.8'	
HEIGHT OF WEIR (W)	3.00'		2.25'		1.75'	
TREATMENT BY MEDIA SURFACE AREA	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	10	5



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (CSF, PERLITE, ZPG)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	*	*	*
OUTLET PIPE	*	*	*

INLET BAY RIM ELEVATION	*
FILTER BAY RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

PERFORMANCE SPECIFICATION

FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES**. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **37 SECONDS**. SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM)**. SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
F. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

THE STORMWATER MANAGEMENT STORMFILTER 8' x 6' PEAK DIVERSION STORMFILTER STANDARD DETAIL

Lithos

Water Quality Calculations

400 Albert Street
File No. UD19-048
Date: August 2020

Surface	Method	Effective TSS Removal	Area (ha)	% Area of Controlled Site	Overall TSS Removal
Buildings A, B and C Rooftops and Terraces	Inherent	80%	0.461	87%	70%
Midblock Connection Area	SPFD 0806	80%	0.069	13%	10%
Total			0.530	100%	80%

Note: Uncontrolled water does not account in the above calculations

APPENDIX D
Sanitary Data Analysis

Lithos

SANITARY SEWER DESIGN SHEET

400 Albert Street

CITY OF OTTAWA

LOCATION		RESIDENTIAL												COMMERCIAL			INFILTRATION			SEWER DESIGN					
	SECTION (ha.)	SINGLE FAMILY DWELLING @ 3.4 ppu	SEMI-DETACHED / DUPLEX / TOWNHOUSE @ 2.7 ppu	STACKED TOWNHOUSE @ 2.3 ppu	BACHELOR @1.4 ppu	1 BED @1.4 ppu	2 BED @2.1 ppu	3 BED @3.1 ppu	AVERAGE @1.8 ppu	TOTAL RESIDENTIAL POPULATION population	AVERAGE RES. FLOW @ 280 L/c/d (L/s)	HARMON PEAKING FACTOR	RES. PEAK FLOW (L/s)	COMMERCIAL AREA (ha.)	AVERAGE COMMERCIAL FLOW @50000/L/ha/d (L/s)	COMMERCIAL PEAK FLOW (L/s)	TOTAL ACCUM. AREA (ha.)	INFILT. @ 0.28 L/s/ha. (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE DIA. (mm)	SLOPE (%)	FULL FLOW CAPACITY n = 0.013 (L/sec)	% of DESIGN CAPACITY (%)
column number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Existing Condition																								
Retail	0.583	0	0	0	0	0	0	0	0	0.00	0.00	4.00	0.00	0.09	0.05	0.08	0.58	0.163	**0.24**	-	-	-	-	-
Proposed Condition																								
Site Area	0.583																							
Towers A, B and East Podium - Towards Albert Street		0	0	0	26	274	219	40	0	1004	3	3.80	12.36	0.26	0.15	0.15	0.29	0.082	**12.59**	12.75	200	2.5%	51.86	24.28%
Tower C and West Podium Towards Bay Street		0	0	0	33	197	196	0	0	734	2	3.88	9.23	0.03	0.02	0.02	0.29	0.082	**9.33**	9.76	150	2.5%	24.08	38.75%
																Total Net Flow towards Albert Street=			12.59					
																Total Net Flow towards Bay Street=			9.09					

Average Residential Flow Rate - 280 Litres / capita / day
Average Daily Flow Commercial - 50,000 Litres / gross ha / day
Average Daily Flow Institutional - 50,000 Litres / gross ha / day
Average Daily Flow Industrial - 35,000 Litres / gross ha / day
Site Area: 0.583 Ha

Infiltration Allowance (Dry Weather) - 0.05 Litres / s / grosss ha
Infiltration Allowance (Wet Weather) - 0.28 Litres / s / grosss ha
Infiltration Allowance (Total I/I) - 0.33 Litres / s / grosss ha
Peaking Factor = $1 + [14 / (4 + P^{0.5})]$, P=Population in thousands

Lithos

Prepared By: Catherine Agiou, P. E., M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.
Date: August 2020

Project: 400 Albert Street
Project: UD19-048
City of Ottawa Sheet 1 OF 1

APPENDIX E
Water Data Analysis

WATER DEMAND

400 Albert Street
File No: UD19-048
Date: August 2020
Prepared By: Catherine Agiou, P. E., M.A.Sc.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Fire Flow Calculation

Slater Street - Tower C

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

Where F= Fire flow in Lpm
C= construction type coefficient
= 0.6
A = total floor area in sq.m. excluding basements

			Area Applied
Level 2=	876.70	m^2	100%
Level 3=	876.70	m^2	25%
Level 1=	1043.00	m^2	25%
=	1,356.6	sq.m.	
F =	4,861.88	L/min	*F(No.1) = 200C √A*
F =	5,000	L/min	*F(No.1) Round to nearest 1000 l/min*

Note: The levels indicated, reference the floors with the largest areas (refer to architectural design)

2 Occupancy Reduction
15% reduction for limited-combustible occupancy
F = 4250 L/min *F(No.2) = F(No.1) x occupancy reduction/charge(%)*

3 Sprinkler Reduction
30% Reduction for NFPA Sprinkler System
F = 2975 l/min *F(No.3) = F(No.2) x sprinkler reduction(%)*

4 Separation Charge

0%	West	Road
20%	North	3.1m to 10m
0%	South	Road
15%	East	10.1m to 20m
35%	Total Separation Charge	

F = 1,488.00 L/min *F (No.4) = F(No.2) x separation charge(%)*
F = 4,463.00 L/min *F (tot) = F(No.3) + F(No.4)*
F = 4,000 L/min *F(tot) Round to nearest 1000 l/min*
66.67 L/s
F = 1057 US GPM

Domestic Flow Calculations

Tower C

Population=	734	Persons		
Office Area =	331.8	m^2		
Average Day Demand (Residential) =	350.0	L/person/day		
Average Day Demand (Commercial) =	2.5	L/m^2/day	(OBC)	1 US Gallon=3.785 L
Average Residential Water Demand=	2.97	L/s		
	47	US GPM		1 US GPM=15.852L/s
Average Commercial Water Demand=	0.01	L/s		
	0	US GPM		

Max. Daily Residential Demand Peaking Factor= 2.5
Max. Daily Commercial Demand Peaking Factor = 1.5
Max. Daily Demand = 7.45 L/s = 118 US GPM
or
Max. Hourly Residential Demand Peaking Factor = 2.2
Max. Hourly Commercial Demand Peaking Factor = 1.8
Max. Hourly Demand = 16.38 L/s = 260 US GPM

Max Daily Demand = 7.45 L/s
Fire Flow = 66.67 L/s

Required 'Design' Flow = 74.11 L/s
1175 US GPM

Note: Required 'Design' Flow is the maximum of either:
1) Fire Flow + Maximum Daily Demand
2) Maximum Hourly Demand

WATER DEMAND

400 Albert Street
File No: UD19-048
Date: August 2020
Prepared by: Catherine Agiou, P.E., M.A.Sc.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Fire Flow Calculation

Albert Street - Towers A and B

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

Where F= Fire flow in Lpm
C= construction type coefficient
= 0.6
A = total floor area in sq.m. excluding basements

			Area Applied
Level 2=	2461.00	m^2	100%
Level 1=	2922.00	m^2	25%
Level 3=	2295.80	m^2	25%
=	3,765.5	sq.m.	
F =	8,099.95	L/min	*F(No.1) = 200C√A*
F =	8,000	L/min	*F(No.1) Round to nearest 1000 l/min*

Note: The levels indicated, reference the floors with the largest areas (refer to architectural design)

2 Occupancy Reduction
15% reduction for limited-combustible occupancy
F = 6800 L/min *F(No.2) = F(No.1) x occupancy reduction/charge(%)*

3 Sprinkler Reduction
30% Reduction for NFPA Sprinkler System
F = 4760 l/min *F(No.3) = F(No.2) x sprinkler reduction(%)*

4 Separation Charge

15%	West	10.1m to 20m
0%	North	Road
0%	South	Road
0%	East	Road
15%	Total Separation Charge	

F = 1,020.00 L/min *F (No.4) = F(No.2) x separation charge(%)*
F = 5,780.00 L/min *F (tot) = F(No.3) + F(No.4)*
F = 6,000 L/min *F(tot) Round to nearest 1000 l/min*
100.00 L/s
F = 1585 US GPM

Domestic Flow Calculations

Towers A + B

Population= 1004 Persons
Office Area = 2617.0 m^2
Average Day Demand (Residential) = 350.0 L/person/day
Average Day Demand (Commercial) = 2.5 $L/m^2/day$ (OBC)
Average Residential Water Demand= 4.07 L/s
64 US GPM
Average Commercial Water Demand= 0.08 L/s
1 US GPM

1 US Gallon=3.785 L
1 US GPM=15.852L/s

Max. Daily Residentail Demand Peaking Factor= 2.5
Max. Daily Commercial Demand Peaking Factor = 1.5
Max. Daily Demand = 10.28 L/s = 163 US GPM

or

Max. Hourly Residential Demand Peaking Factor = 2.2
Max. Hourly Commercial Demand Peaking Factor = 1.8
Max. Hourly Demand = 22.57 L/s = 358 US GPM

Max Daily Demand = 10.28 L/s
Fire Flow = 100.00 L/s

Required 'Design' Flow = 110.28 L/s
1748 US GPM

Note: Required 'Design' Flow is the maximum of either:
1) Fire Flow + Maximum Daily Demand
2) Maximum Hourly Demand

From: Wu, John
To: catherine@lithosgroup.ca
Subject: RE: 400 Albert Street - Boundary conditions
Date: January 22, 2020 10:53:05 AM
Attachments: image001.png
400 Albert Jan 2020.pdf

The following are boundary conditions, HGL, for hydraulic analysis at 400 Albert (zone 1W) assumed to be connected to the 203mm on Albert and 381mm on Slater (see attached PDF for location).

Minimum HGL = 106.5m

Maximum HGL = 116.5m

MaxDay + FireFlow (100 L/s) = 110.5m, Slater connection

MaxDay + FireFlow (100 L/s) = 106.0m, Albert connection

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

John

From: catherine@lithosgroup.ca <catherine@lithosgroup.ca>
Sent: January 20, 2020 10:22 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: 'Matina Sakoutsiou' <matinas@lithosgroup.ca>
Subject: RE: 400 Albert Street - Boundary conditions

Good Morning John,

Yes, the three towers share the same basement.

Thank you,

Catherine Agiou, P.E., M.A.Sc.
Project Designer / Coordinator

Lithos Group Inc.
150 Bermondsey Road, Unit #200
Toronto, Ontario M4A 1Y1
Direct: (437) 889-9950 T: (416) 750-7769
Catherine@LithosGroup.ca
www.LithosGroup.ca

From: Wu, John <John.Wu@ottawa.ca>
Sent: January 20, 2020 9:37 AM
To: catherine@lithosgroup.ca
Subject: RE: 400 Albert Street - Boundary conditions

Is it internal connected? all three?

From: catherine@lithosgroup.ca <catherine@lithosgroup.ca>
Sent: January 17, 2020 1:24 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: 'Matina Sakoutsiou' <matinas@lithosgroup.ca>
Subject: 400 Albert Street - Boundary conditions

I hope this email finds you well.

Kindly find attached the relative data in order to provide us the boundary conditions for the subject site.

Note that the connections will be as follows:

- Domestic Water : Tower A + C to the 200mm watermain along Albert Street
  Tower B to the 375mm watermain along Slater Street.

- Fire Service : The entire property will be serviced by the 375mm watermain along Slater Street.

Thank you for your help.

Should you have any questions, please let us know.

Sincerely,

Catherine Agiou, P.E., M.A.Sc.
Project Designer / Coordinator

Lithos Group Inc.
150 Bermondsey Road, Unit #200
Toronto, Ontario M4A 1Y1
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