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UD19-048

Functional Servicing and Stormwater Management Report

Project: 400 Albert Street

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Statement of Conditions

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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 Rezoning 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

A more detailed Stormwater Management report will be prepared at the Site Plan Application. The property's existing drainage pattern is separated into two drainage areas (one flowing north towards Lyon Street and one flowing south-east towards Slater Street). Following that fact, our analysis assumes that the drainage pattern is maintained under Post-development conditions.

The site stormwater discharge will be controlled to the 5-year pre-development flows according to the City of Ottawa IDF curves. Two (2) proposed storm laterals will be connected to the existing 300 mm storm sewer on Lyon Street and to the existing 525 mm diameter storm sewer on Slater Street. In order to attain the target flows and meet the City's guidelines, quantity controls will be utilized and up to 92.4 m^3 and 90.9 m^3 of storage will be required to meet the allowable flows towards Lyon Street and Slater Street, respectively.

The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection as specified by the Ministry of the Environment, Conservation and Parks (MECP). During Site Plan Application, a detailed analysis will be provided to assess the water quality on site and determine additional measures in order to achieve a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

The flow from the proposed development will be directed to a proposed sanitary manhole to be located at the west side of the property and through a 250 mm lateral sanitary connection, will be finally discharged to the 250mm diameter sanitary sewer on Bay Street. The additional net discharge flow from the proposed development, is anticipated at approximately 19.39 L/s. According to our analysis, the existing infrastructure has the capacity to support the additional sanitary flow from 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 West Podium by the existing 200 mm diameter watermain on the east side of Bay Street. It is anticipated that a total design flow of 125.25 L/s, for Towers A, B and the East Podium, and 74.68 L/s, for Tower C and the West Podium, will be required to support the proposed development. Boundary conditions from the City were not received until the time of preparation of this report, to determine if the City's 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 Zoning 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. More specifically, the report will present details on sanitary discharge, water supply and an outline of the storm drainage pattern.

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

- 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 22, 2019;
- Statistics prepared by IBI GROUP, dated August 21, 2019;
- 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 on the north-west side 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

The proposed development will consist of one (1) three-storey podium with two (2) high-rise, 18-storey and 33-storey residential towers, and one (1) three-storey podium with one (1) high-rise, 38-storey residential tower. The proposed development will consist with a total of 898 residential units as well as 5,442 m^2 of retail space, facilitated by one (1) level 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 brief Stormwater Management (SWM) review of the pre-development and post-development conditions and comments on opportunities to reduce peak flows, as per the City of Ottawa guidelines. A detailed Stormwater Management (SWM) report will be prepared at the Site Plan Application stage.

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)	1.8 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	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
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 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.

Two (2) internal drainage areas were identified in the existing site:

1. A1 Pre – Storm runoff from the north-east portion of the site, which incorporates the runoff from the north outdoor parking area and the existing building's rooftop, being discharged into the City's storm network along Lyon Street;
2. A2 Pre – Storm runoff from the south parking area of the site facing Slater Street and a portion of the north-west corner of the site facing Albert Street, draining overland towards Slater Street. Those areas are captured by existing catch basins before being discharged into the City's storm network along Slater Street.

For details, please refer to **DAP-1** in **Appendix C.**

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.)
A1 Pre (Parking Area and Building-north-east)	0.135	0.90	0.50	20
A2 Pre (Parking Area – south and north-west)	0.480	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
A1 Pre (Lyon Street)	9.8	13.2	22.5
A2 Pre (Slater Street)	34.7	46.8	80.0

As shown in **Table 5-2**, post-development flows towards Lyon and Slater Street will need to be controlled to the target flows of 13.2 L/s and 46.8 L/s, respectively.

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 two (2) internal drainage areas:

1. A1 Post – Storm runoff from the rooftops of Tower A and from the East Podium's terraces, is controlled in the underground storage tank located in the north side of the property;

2. A2 Post – Storm runoff from the rooftop of Towers C & B, from the West Podium's terraces and from the south driveway area, is controlled in the underground storage tank located in the south side of the property;

The pre and post-development drainage areas and runoff coefficients are summarized in **Table 5-3** below.

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 and East Podium)	0.247	0.90*	10
A2 Post (Towers C, B, West Podium and driveway area)	0.368	0.90*	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) storm sewer networks, therefore, quantity control analysis has been prepared for each storm network adjacent to the site in order to assess the pre to post development impacts on each network.

5.2.1.1 Post-development flows towards Lyon and Slater Street

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	Storm Event	Target Flow (L/s)	Required Storage Tank Volume (m^3)
A1 Post- Towards Lyon Street (Controlled)	2-year	13.2	22.7
	5-year		36.6
	100-year		92.4
A2 Post- Towards Slater Street (Controlled)	2-year	46.8	14.3
	5-year		29.4
	100-year		90.9

As shown in **Table 5-4**, in order to control post-development flows to the 5-year pre-development conditions, a target flow of 13.2 L/s towards Lyon and of 46.8 L/s, towards Slater Street's storm network, is to be satisfied. The on site storage required in order to meet the allowable release rates for Lyon Street and Slater Street, is calculated at 92.4 m^3 and 90.9 m^3 respectively, for the 100-year storm event. This can be achieved through the design and installation of stormwater holding tanks, flow control devices and/or roof storage, details of which will be provided through the detailed design stage of Site Plan Application.

5.2.2. Quality Controls

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

5.3. Proposed Storm Connection

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

Proposed storm connection on Lyon Street
Storm discharge from the rooftop of Tower A and from the East Podium's terraces will be connected to the existing manhole located at the north side of the property and through the existing 200 mm storm sewer will finally discharge at the 300 mm storm sewer on Lyon Street, with a minimum grade of 2.00% (or equivalent pipe design).

Proposed storm connection towards Slater Street
Storm discharge from the rooftop of Towers C & B, from the West Podium's terraces and from the south driveway 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).

Orifice controls, as required, will be designed to meet the allowable release rates to the municipal system and will be defined at the detailed design stage, of Site Plan Application. Therefore, since the post-development discharge rate will meet the 5-year pre-development rate, it is anticipated that this development will not adversely affect flow conditions downstream. Flows above the 100-year event will be conveyed both overland and within pipes to the adjacent municipal right-of-ways (ROW).

The **'Proposed Servicing Plan' Figure-3** in **Appendix F** indicates the stormwater service connections.

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.

The sewers mentioned above connect to the 900 mm diameter sanitary trunk sewer located at the intersection between Lyon Street and Slater Street.

6.2. Existing and Proposed 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 0.25 L/s.

Similarly, using the design criteria and the proposed development statistics, the new building will discharge 19.64 L/s into the City's infrastructure.

The additional flow will be considered within the sanitary discharge rate, therefore, there is an increase in sanitary flow of approximately 19.39 L/s within the City's sewer network.

A sanitary external analysis has been prepared in order to indicate that the new development will not adversely affect downstream flow conditions. For detailed calculations refer to the sanitary sewer design sheet in **Appendix D.**

6.3. Existing Downstream Capacity

The external sanitary analysis rely upon plans provided by the City, topographic information, and on-site investigation, which were conducted by our team, in order to determine the land use, the population density and the drainage areas towards each sewer segment. Based on the information above, we assessed the existing flow conditions downstream and upstream of the site. The sanitary flows were calculated using the sanitary sewer design sheets typically associated with the design of sanitary pipes for municipal design. The data was based on residential / commercial flows, extraneous infiltration quantities, and peaking factors.

Based on our review of the Sanitary Drainage Area Plan developed, we have identified all sewer segments upstream and downstream of the proposed development, up to the 900mm sanitary trunk sewer located at the intersection between Lyon Street and Slater Street. Please refer to the **Downstream Sanitary Network Drainage Area Plan** (**DAP-3**) and design sheet for the location of these sewer segments (found in **Appendix D**). The proposed development will connect to a proposed manhole to be located at the west side of the property and through the 250 mm lateral sanitary sewer connection will finally discharge at the 250mm diameter sanitary sewer on Bay Street. External Sanitary Analysis has been developed in order to review how the additional sanitary flows from the proposed development will affect the municipal network downstream.

6.3.1. Dry-Weather Conditions

Our analysis shows that under pre-development conditions, the capacity of the existing sanitary sewer network downstream of the proposed development does not carry more than 45.0% of it's full flow capacity. Refer to design sheet "**External Sanitary Sewer Segments (Dry Weather)**" in **Appendix D**.

The proposed development will increase the flow into the existing network, resulting to a maximum post-development design capacity of 96.1%, into the existing City's sewer network. Refer to design sheet "**External Sanitary Sewer Segments (Dry Weather)**" in **Appendix D**.

6.3.2. Wet-Weather Conditions

An external analysis under extreme wet weather flows including a WWF value has been incorporated into the design, according to the City's Sewer Design Guidelines. Under pre-development wet-weather conditions, the capacity of the existing sanitary sewer network upstream and downstream of the site, does not carry more than 63.2% of it's full flow capacity. Refer to design sheet " **External Sanitary Sewer Segments (Wet Weather)**" in **Appendix D**.

Our analysis shows that the proposed development will increase the flow into the existing network downstream, resulting to a maximum design capacity of 96.2%. Refer to design sheet "**External Sanitary Sewer Segments (Wet Weather)**" in **Appendix D**.

The proposed development will increase the sanitary flows into the downstream network; however, there is adequate capacity to the City's network to accommodate the additional sanitary flow under both dry and wet-weather conditions

6.4. Proposed Sanitary Connection

The proposed development will connect to a proposed sanitary manhole to be located at the west side of the property, through the 250 mm lateral sanitary connection, at a minimum grade of 2.00% (or equivalent pipe design), and will finally discharge at the 250mm diameter sanitary sewer on Bay Street. Refer to **'Proposed Servicing Plan' Figure-3** in **Appendix F**, for the proposed sanitary connection.

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 West Podium will be connected to the existing 200 mm diameter watermain on the east side of Bay Street.

Towers A, B and East Podium

It is anticipated that an average consumption of approximately 3.50 L/s (320,400 L/day), a maximum daily consumption of 8.58 L/s (741,312 L/day) and a peak hourly demand of 18.80 L/s (67,680 L/hr) will be required to service Towers A, B and East Podium with domestic water.

The fire flow requirements we 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 111.67 L/s (1,849 USGPM) will be required. Refer to detailed calculations 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	3.1m to 10.0m
Surcharge/reduction from base flow	0.6	15%	30%	0%	0%	0%	20%

In summary, the required design flow is the sum of 'the minimum fire suppression flow' and 'maximum daily demand' (116.67+8.58 = 125.25 L/s, 1,985 USGPM).

Table 7-2 summarizes the anticipated water demand for the proposed development based on the City of Ottawa Guidelines – Water Distribution.

Table 7-2 – Water Demand

Design Parameter	Anticipated Demand[1] (L/min)
Average Day Demand	3.50
Max Day + Fire Flow	8.58 + 116.67 = 125.25
Max Hour Demand	18.80
1. Water demand calculations per City of Ottawa Guidelines. See **Appendix E** for detailed calculations.	

Boundary conditions from the City were not received until the time of preparation of this report, to determine if the City's water infrastructure can support the proposed development.

Towers C and West Podium

According to our calculations based on the City's watermain design criteria, as far as the domestic water consumption for Tower C and West Podium is concerned, it is anticipated that an average consumption of approximately 3.21 L/s (277,344 L/day), a maximum daily consumption of 8.02 L/s (692,928 L/day) and a peak hourly demand of 17.63 L/s (63,468 L/hr) will be required.

The fire flow requirements we 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 (1,056 USGPM) will be required. 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 10.0m	10.1m to 20.0m	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 + 8.02 = 74.68 L/s, 1184 USGPM).

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

Table 7-4 – Water Demand

Design Parameter	Anticipated Demand[1] (L/min)
Average Day Demand	3.21
Max Day + Fire Flow	8.02 + 66.67 = 74.68
Max Hour Demand	17.63
1. Water demand calculations per City of Ottawa Guidelines. See **Appendix E** for detailed calculations.	

Boundary conditions from the City were not received until the time of preparation of this report, to determine if the City's water infrastructure can support the proposed development.

7.3. Proposed Watermain Connection

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

Towers A, B and East Podium

The proposed development will be serviced by a 200 mm diameter waterline that will distribute the development with fire and domestic water. The proposed water lateral will connect on the 200mm existing watermain on Albert Street.

Tower C and West Podium

The proposed development will be serviced by a 200 mm diameter waterline that will distribute the development with fire and domestic water. The proposed water lateral will connect on the 200mm existing watermain on Bay Street.

According to City standards the watermains will be constructed with a minimum depth of cover of 2.4m. Refer to **'Proposed Servicing Plan' Figure-3** in **Appendix F**, for the proposed water connection.

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 0.615 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

A more detailed Stormwater Management report will be prepared at the Site Plan Application. The property's existing drainage pattern is separated into two drainage areas (one flowing north towards Lyon Street and one flowing south-east towards Slater Street). Following that fact, our analysis assumes that the drainage pattern is maintained under Post-development conditions.

The site stormwater discharge will be controlled to the 5-year pre-development flows according to the City of Ottawa IDF curves. Two (2) proposed storm laterals will be connected to the existing 300 mm storm sewer on Lyon Street and to the existing 525 mm diameter storm sewer on Slater Street. In order to attain the target flows and meet the City's guidelines, quantity controls will be utilized and up to 92.4 m^3 and 90.9 m^3 of storage will be required to meet the allowable flows towards Lyon Street and Slater Street, respectively.

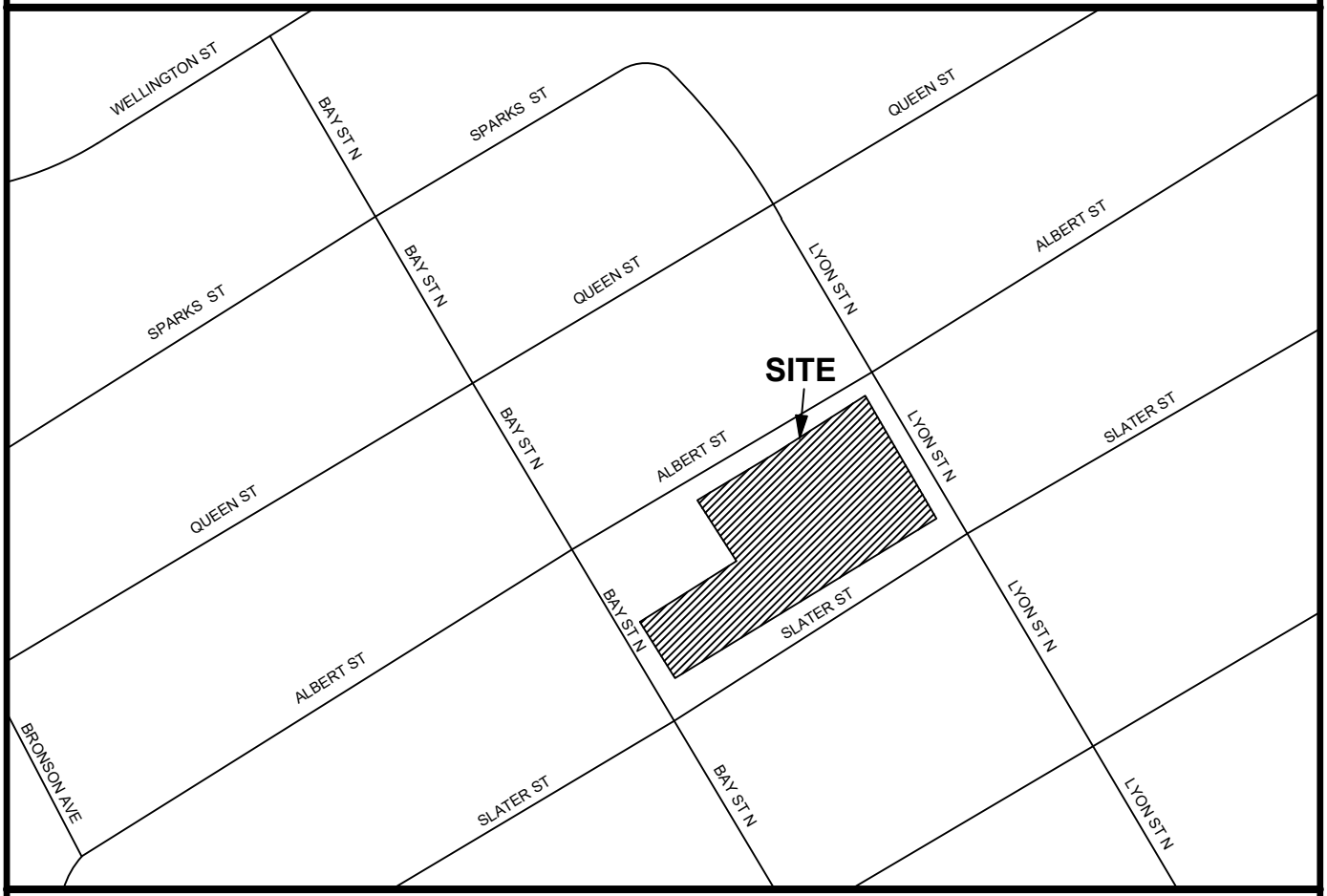
The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection as specified by the Ministry of the Environment, Conservation and Parks (MECP). During Site Plan Application, a detailed analysis will be provided to assess the water quality on site and determine additional measures in order to achieve a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

The flow from the proposed development will be directed to a proposed sanitary manhole to be located at the west side of the property and through a 250 mm lateral sanitary connection, will be finally discharged to the 250mm diameter sanitary sewer on Bay Street. The additional net discharge flow from the proposed development, is anticipated at approximately 19.39 L/s. According to our analysis, the existing infrastructure has the capacity to support the additional sanitary flow from 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 West Podium by the existing 200 mm diameter watermain on the east side of Bay Street. It is anticipated that a total design flow of 125.25 L/s, for Towers A, B and the East Podium, and 74.68 L/s, for Tower C and the West Podium, will be required to support the proposed development. Boundary conditions from the City were not received until the time of preparation of this report, to determine if the City's 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 2019	PROJECT No:	UD19-048
SCALE:	N.T.S.	FIGURE No:	FIG 1

Lithos

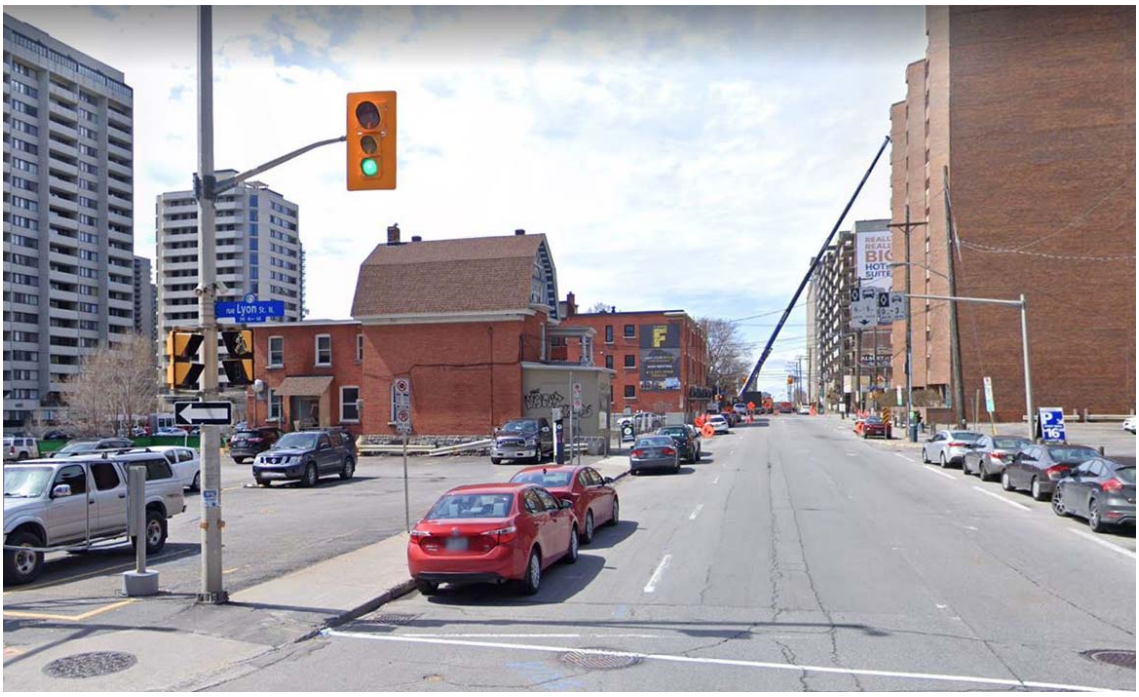
150 Bermondsey Road, North York, Ontario, M4A 1Y1

AERIAL PLAN
MIXED USE DEVELOPMENT
ALBERT STREET
TORONTO, ONTARIO

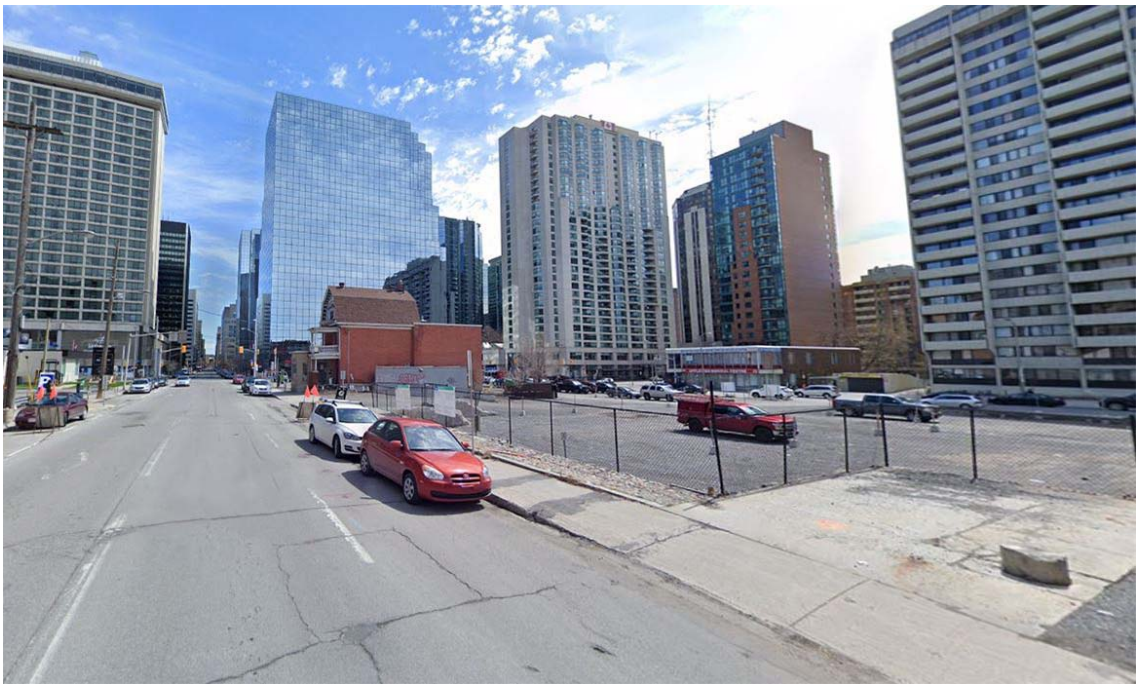
DATE:	AUGUST 2019	PROJECT No:	UD19-048
SCALE:	N.T.S.	FIGURE No:	FIG 2

APPENDIX A
Site Photographs

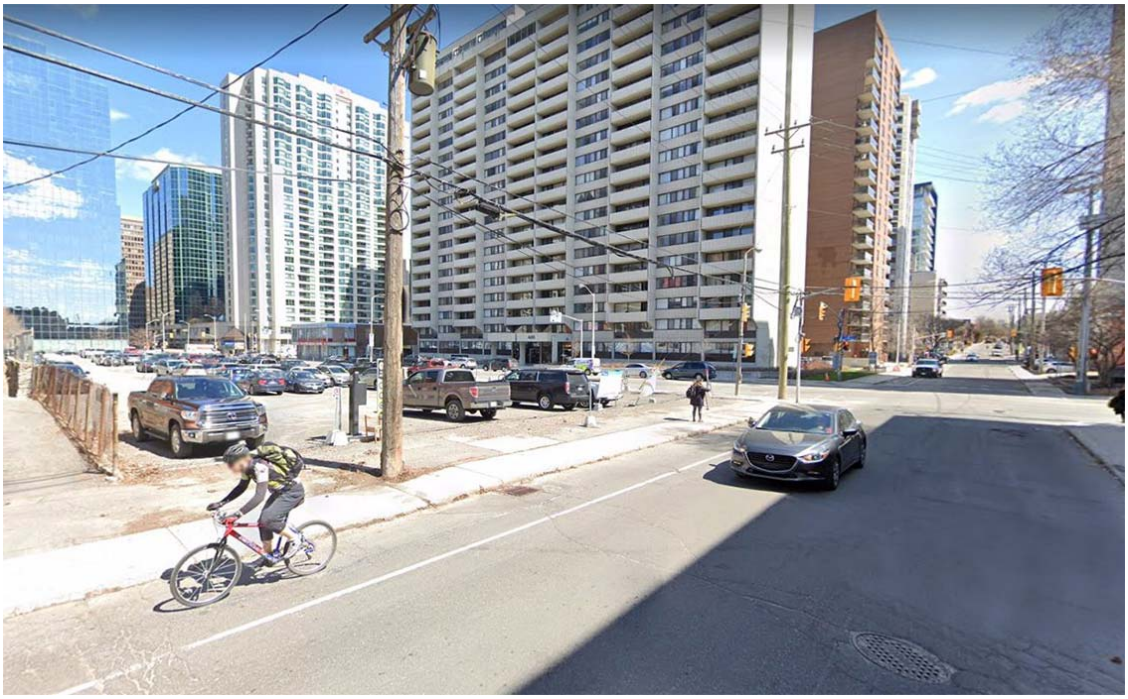
North-East Corner of property facing South-East



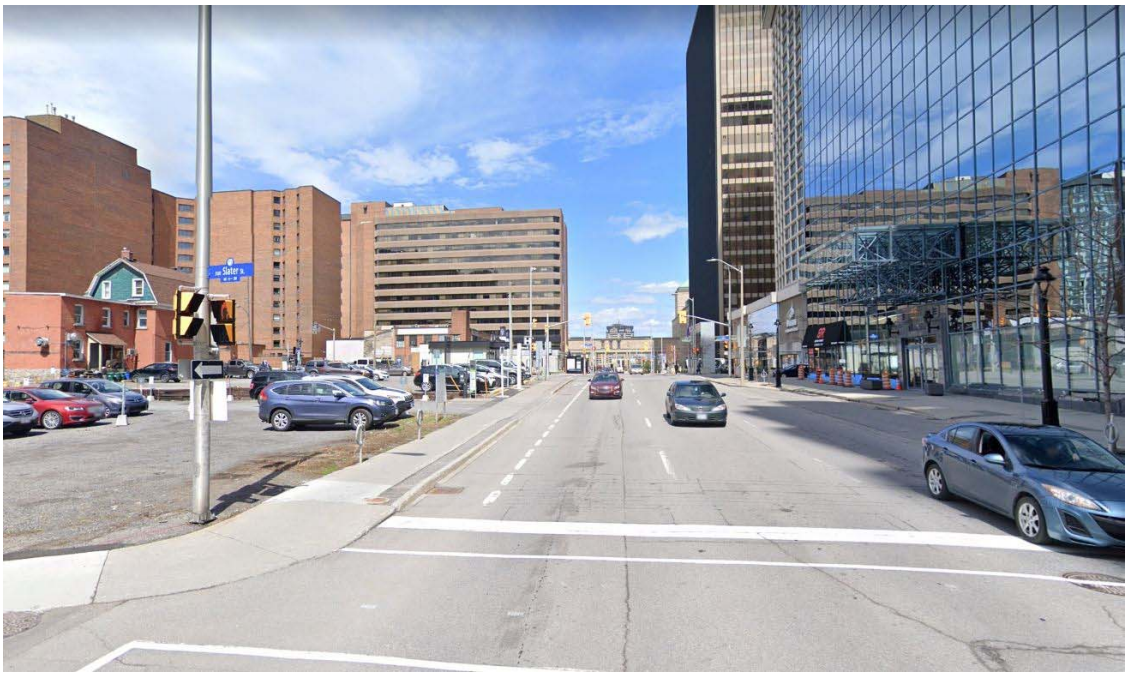
North-East Corner of property facing South-West



North-West Corner of property facing North-East

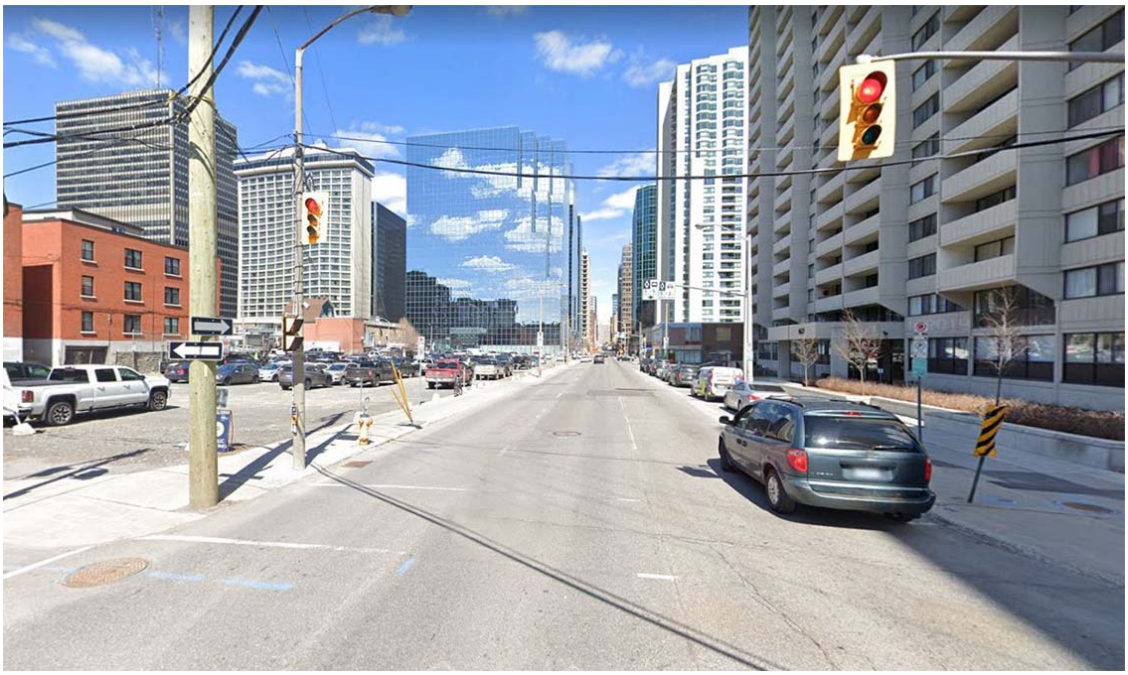


North-West Corner of property facing South-East

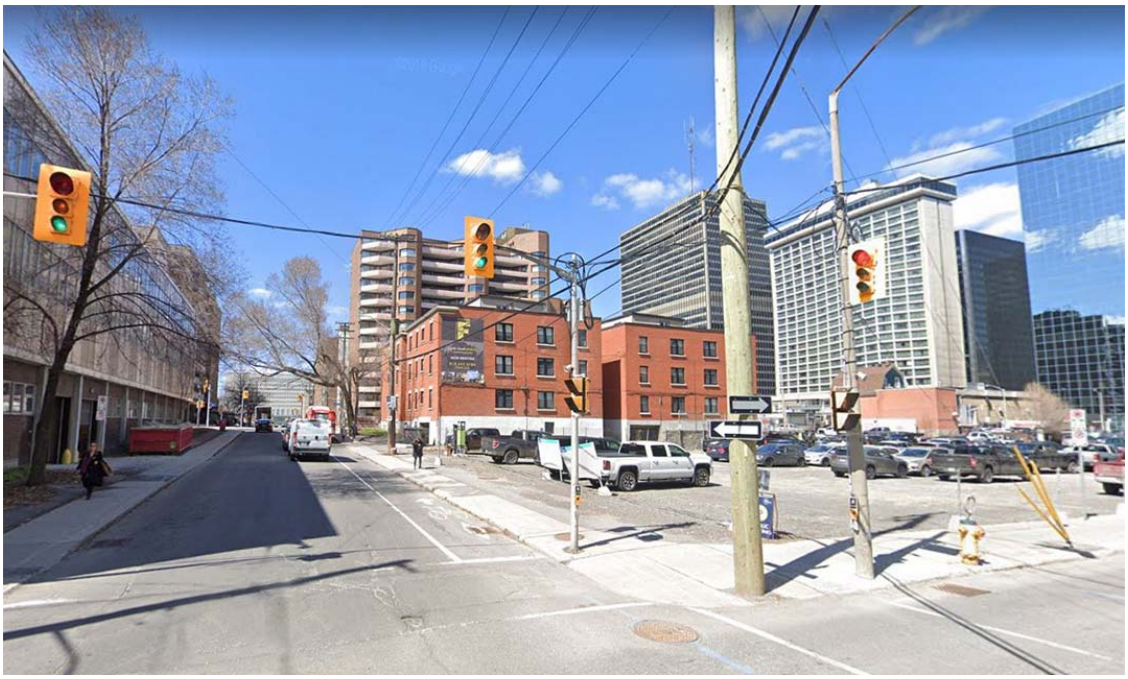


South-East Corner of property facing North-West

South-East Corner of property facing South-West

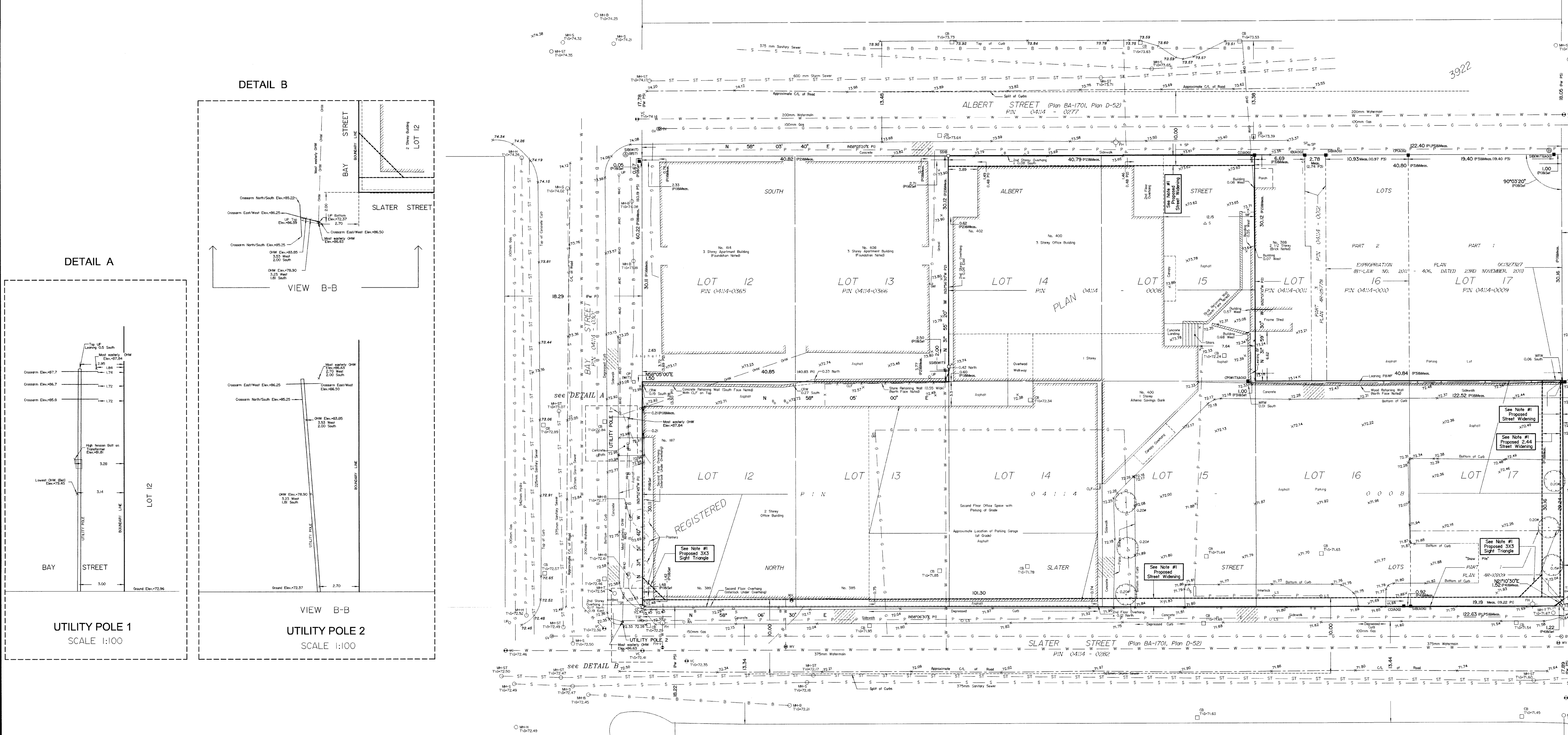


South-West Corner of property facing North-East



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).

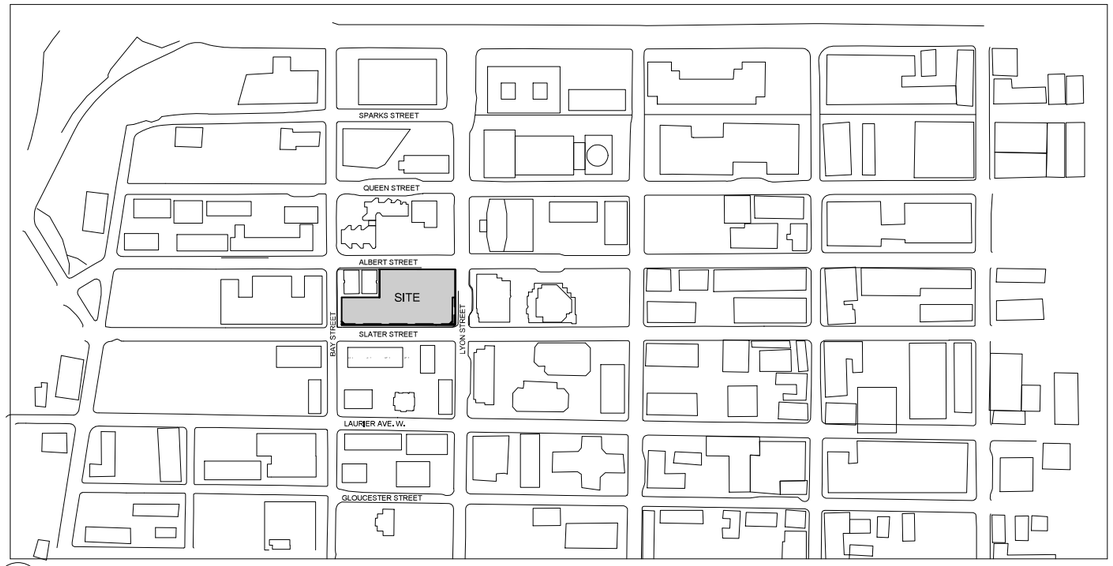
Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

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

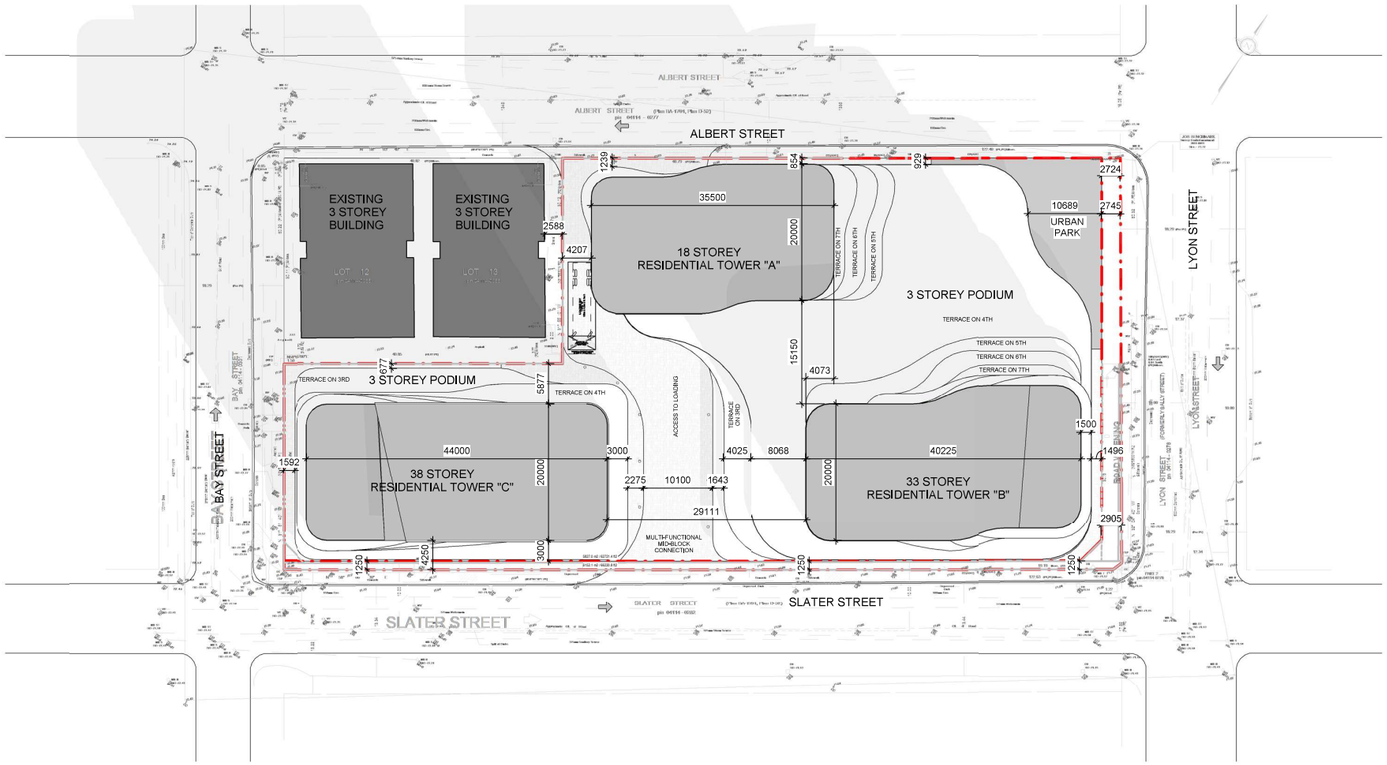
Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

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



3 CONTEXT PLAN
Scale: NTS



2 SITE PLAN
Scale: 1 : 400

400 Albert Street - Ottawa

Augus: 20, 2019

PRELIMINARY PROJECT STATISTICS

	TOTAL	
SUMMARY	**SQ.M.**	**SQ.FT.**
Site Area	6,152	66,197
Net Site Area	5,827	62,699
Total GCA	80,423	865,351
Total GFA	61,932	666,388
Total Retail Area (Ground and 2nd)	5,442	57,500
URBAN PARK Area	400	4,304
Total Number of Units	898	

PROJECT STATISTICS

	TOTAL		
Tower A (18 Storeys) - North	**SQ.M.**	**SQ.FT.**	
Total Tower GCA	11,623	125,063	
Total Tower GFA	8,470	91,137	excluding 4th floor (Amenity)
Total Number of Units (tower)	140		Assuming 4th floor is Amenities
Tower B (33 Storeys) - SE	**SQ.M.**	**SQ.FT.**	
Podium GCA (shared with Tower A)	9,154	98,497	
Total Tower GCA	24,900	267,924	
Total GCA	34,714	373,523	
Total GFA	25,624	275,714	excluding 3rd & 4th floor (Amenity)
Total Number of Units (tower)	319		Assuming 4th floor is Amenities
Tower C (38 Storeys) - SW	**SQ.M.**	**SQ.FT.**	
Podium GCA	2,874	30,924	
Total Tower GCA	30,555	328,772	
Total GCA	34,086	366,765	
Total GFA	27,838	299,537	
Total Number of Units (tower)	439		

Notes:
*Amenity Areas were deducted from GFA.

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

109 Atlantic Avenue, Toronto, ON, M6K 1X4

ISSUES

No.	DESCRIPTION	DATE

SEAL

PRIME CONSULTANT
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
08/22/19

SHEET TITLE
CONTEXT, SITE PLAN AND SITE STATISTICS

SHEET NUMBER
A100

PLOTTED: 2019-08-22

400 Albert Street - Ottawa

August 21, 2019

BUILDING STATISTICS - TOWER A

				GCA		DEDUCTIONS		GFA		SA			
										RESIDENTIAL		RETAIL SALEABLE	
	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.
TOWER A	MPH	1	0	708	7618.1	708.0							
	LEVELS 7 - 18 (RES.)	12	10	8,496	91,417	1356.0	14,591	7140.0	76,826	7333.2	78,905		0
	6	1	10	748	8048.5	113.0	1,216	635.0	6832.6				
	5	1	10	808	8694.1	113.0	1215.9	695.0	7478.2				
	4	1		863	9,286	863.0	9,286	0.0	0	0.0	0		
	TOTAL	**16**	**140**	**11,623**	**99,035**	**3,153**	**26,308**	**8,470**	**76,826**	**7,333**	**78,905**	**0**	**0**

BUILDING STATISTICS - TOWER B

				GCA		DEDUCTIONS		GFA		SA			
										RESIDENTIAL		RETAIL SALEABLE	
	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.
TOWER B	MPH	1	0	660	7101.6	660.0	7,102	0.0	0.0				
	LEVELS 7 - 33 (RES.)	27	11	22,410	241,132	3510.0	37,768	18900.0	203,364	19386.0	208,593		
	6	1	11	830	8930.8	130.0	1,399	700.0	7,532	718.0			
	5	1	11	830	8930.8	130.0	1,399	700.0	7,532	718.0			
	4 (indoor amenity)	1		830	8930.8	830.0	8,931	0.0	0	0.0			
PODIUM	LEVELS 3 (indoor ame	1		3,174	34152.2	3174.0	34152.2	0.0	0.0			0.0	
SHARED	LEVEL 2 (retail)	1		3,118	33549.7	147.0	1581.7	2971.0	31968.0			3004.0	32323.0
WITH TOWER	LEVEL 1 mezz												
A	LEVEL 1 GROUND	1		2,862	30,795	509	5,477	2353.0	25,318			2034.0	21,886
	TOTAL	**34**	**319**	**34,714**	**373,523**	**9,090**	**97,808**	**25,624**	**275,714**	**20,822**	**208,593**	**5,038**	**54,209**

BUILDING STATISTICS - TOWER C

				GCA		DEDUCTIONS		GFA		SA			
										RESIDENTIAL		RETAIL SALEABLE	
	LEVEL	NUMBER OF TYPICAL LEVELS	UNITS PER FLOOR	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.	SQ.M.	SQ.FT.
TOWER C	MPH	1	0	657	7069.3	657.0	7069.3	0.0	0.0				
	LEVELS 4 - 38 (RES.)	35	12	30,555	328,772	4515.0	48,581	26040.0	280,190	26670.0	286,969		
PODIUM	LEVELS 3 (RES.))	1	9	873	9393.5	371	3992.0	502	5401.5	520	5595.2		
	LEVEL 2 (RES.)	1	10	873	9393.5	303.0	3260.3	570.0	6133.2	588.0	6326.9		
	LEVEL 1 mezz												
	LEVEL 1 GROUND	1	0	1,128	12,137	402.0	4325.5	726.0	7,812			404.0	4,347
	TOTAL	**39**	**439**	**34,086**	**366,765**	**6,248**	**67,228**	**27,838**	**299,537**	**27,778**	**298,891**	**404**	**4,347**

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

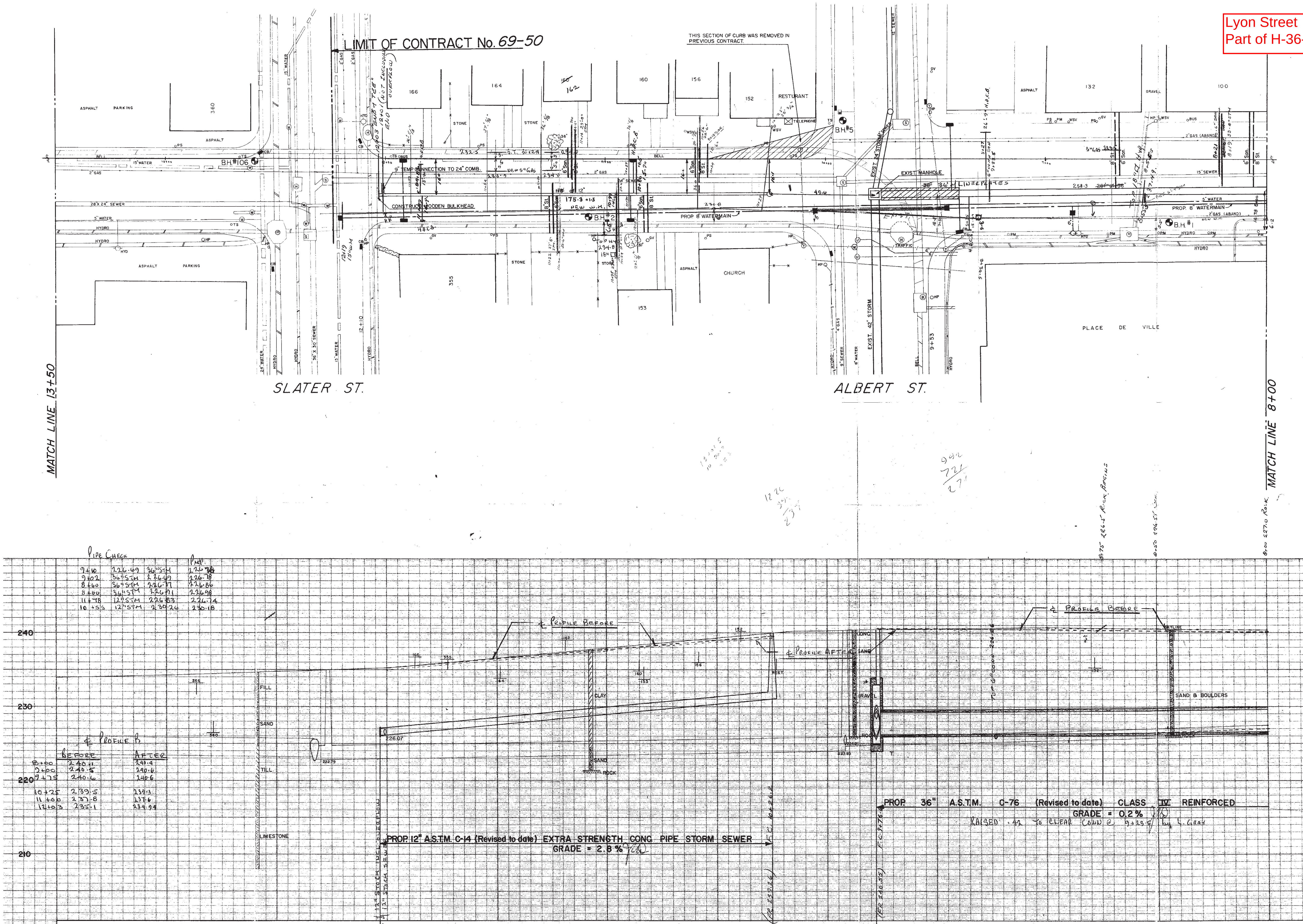
9 IN PIPE SEWER — GRADE 1 IN 112 OR 0.89%

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

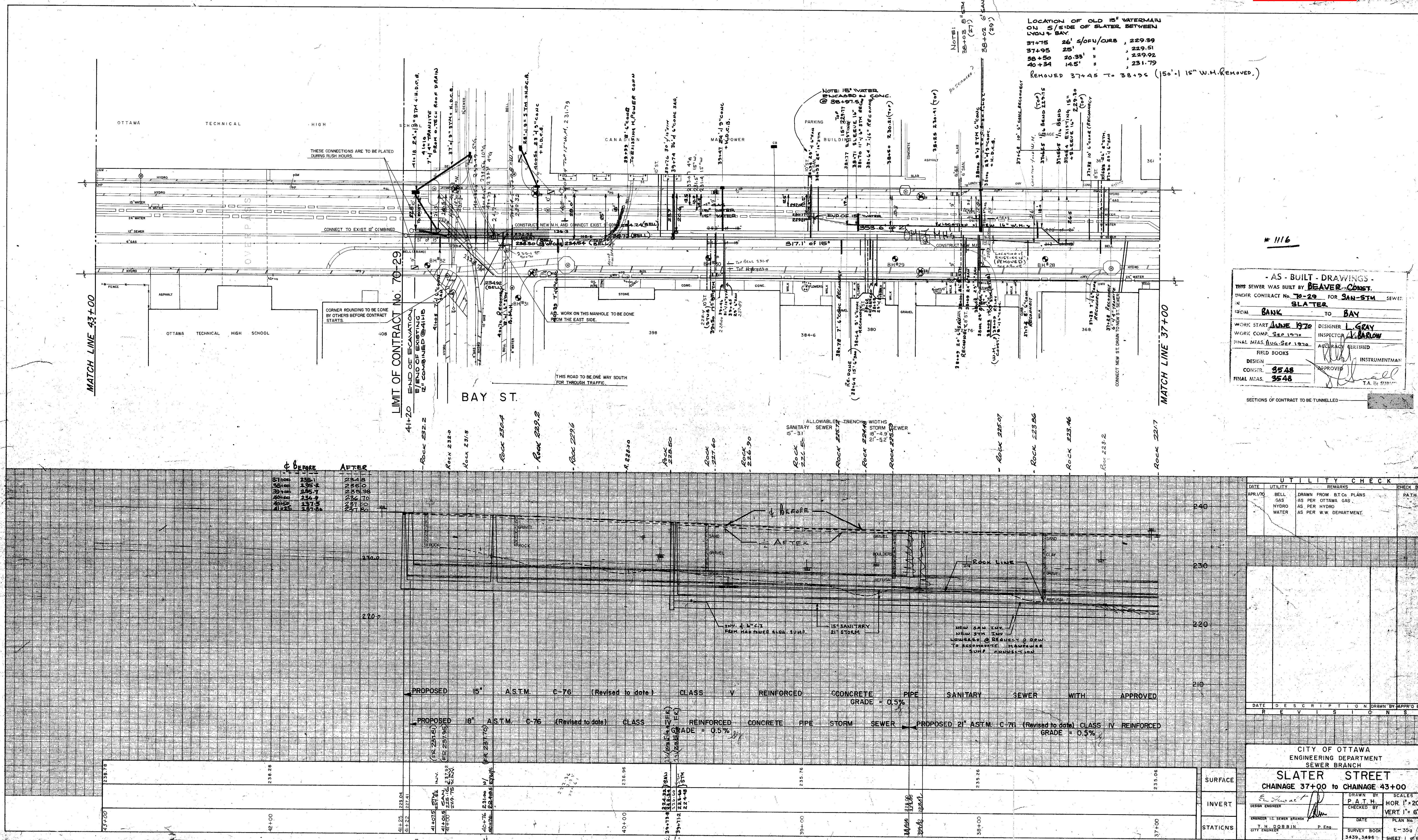
48 ST

12 ST

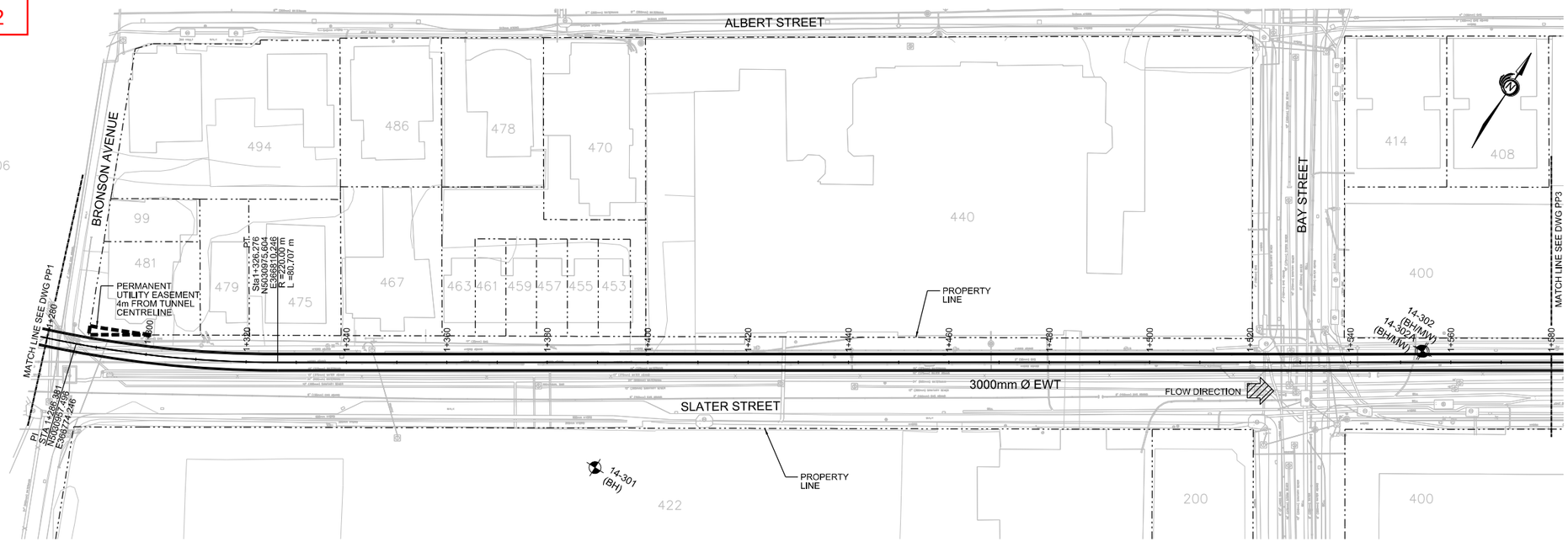
36 ST

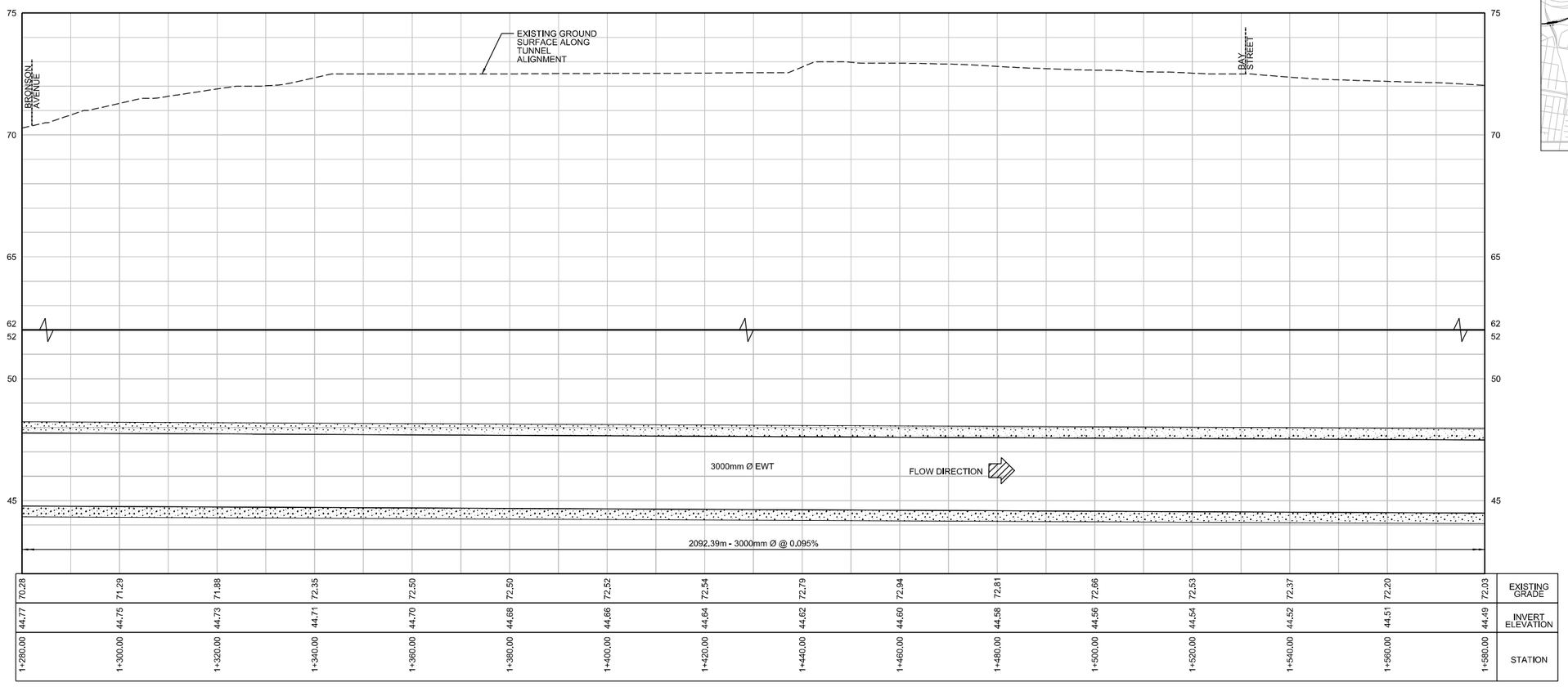
42 ST

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.

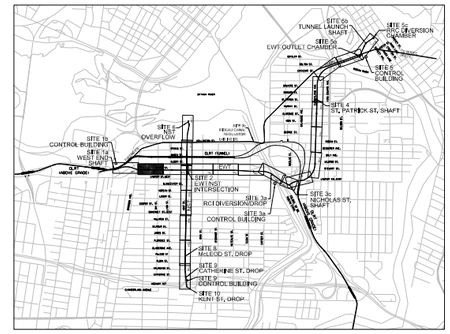
Const. Inspector

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

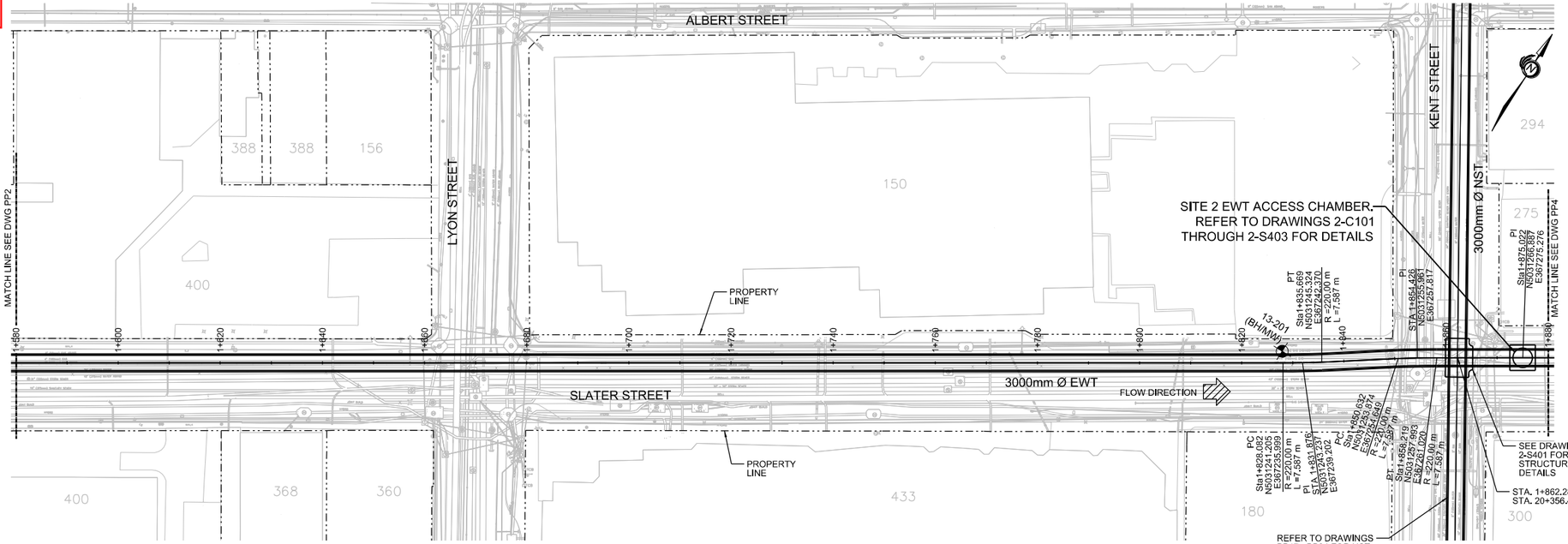
NOTE:

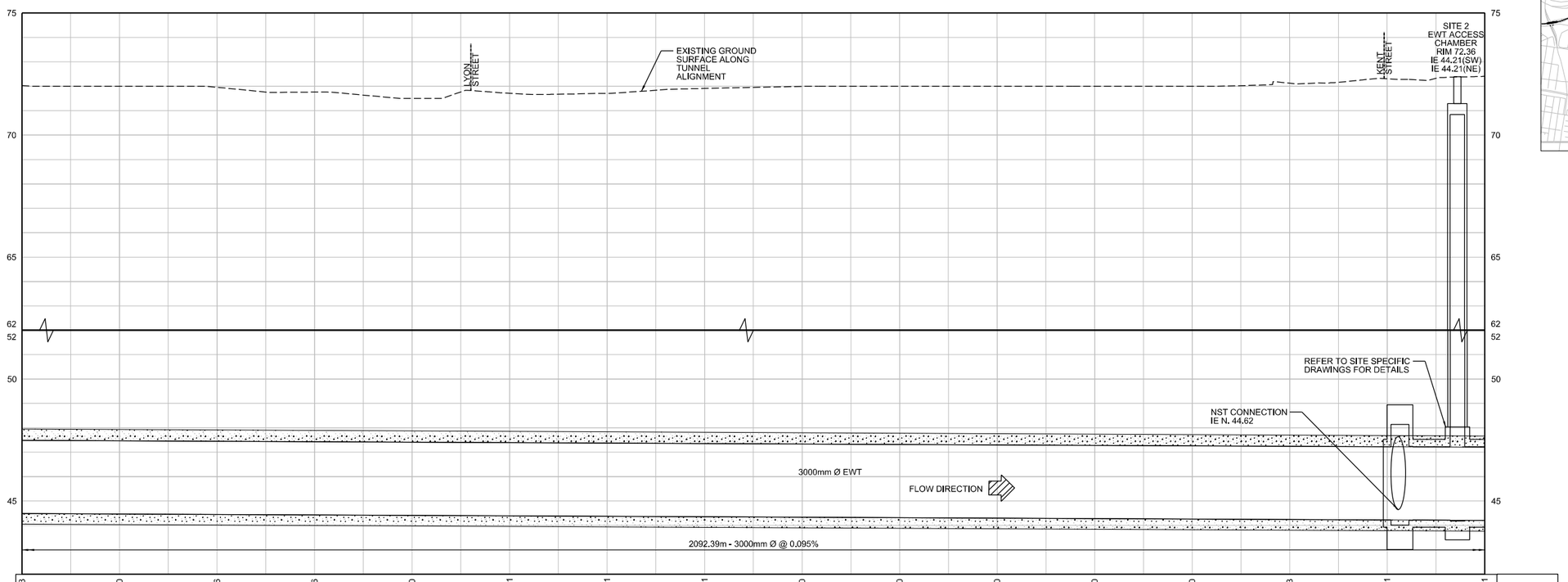
1. SEE NOTES ON DRAWING PP1.

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.

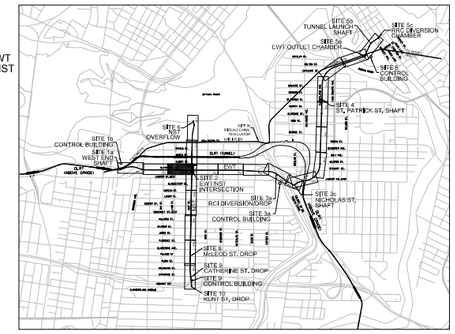
Const. Inspector

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:

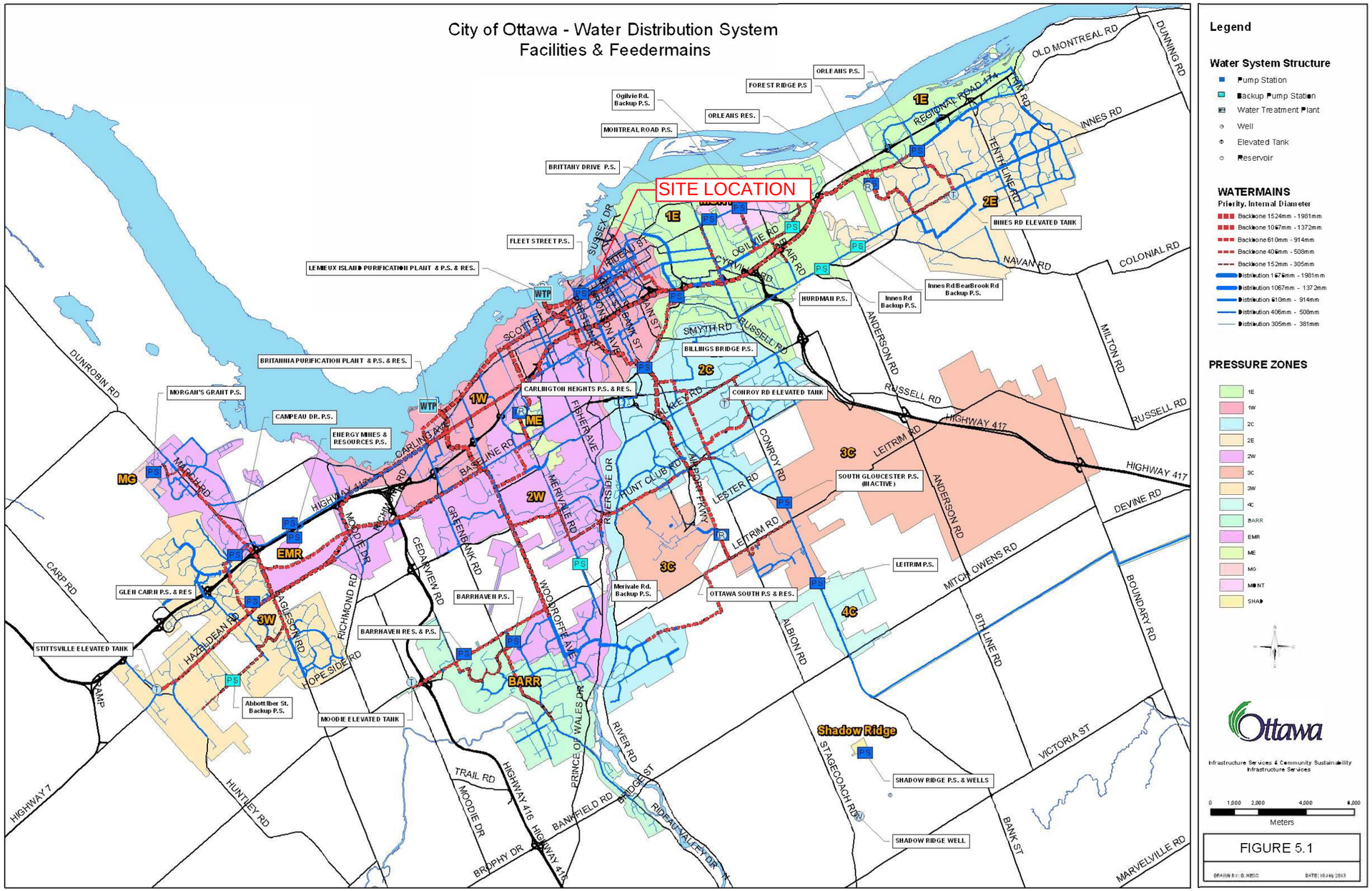
1. SEE NOTES ON DRAWING PP1.

PLOT TIME: 11:29:52 AM

PLOT DATE: 2016\06\28

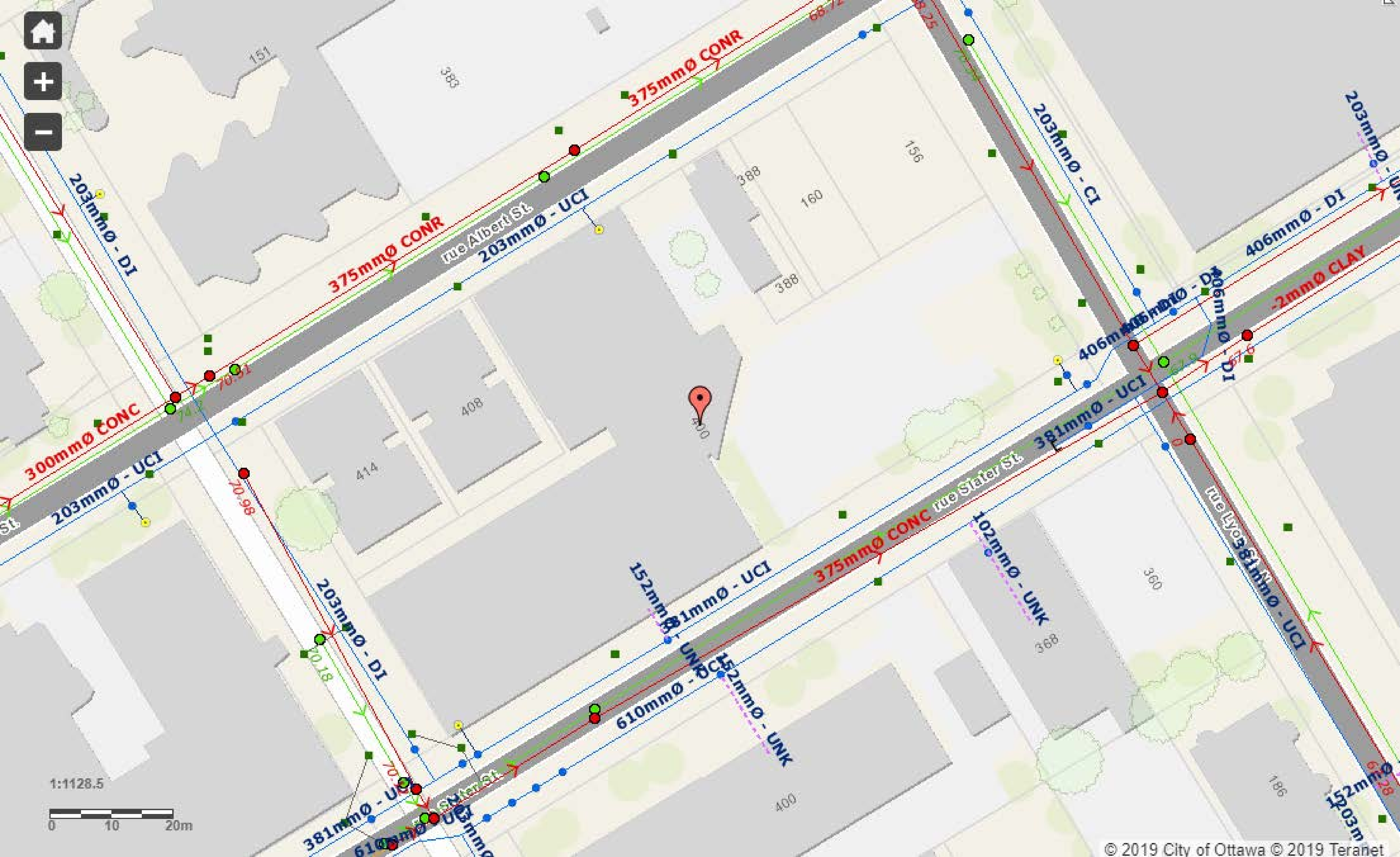
202-pp3.dgn

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
rue Albert St.
203mmØ - UCI
203mmØ - DI
300mmØ CONC
203mmØ - UCI
203mmØ - CI
406mmØ - DI
-2mmØ CLAY
381mmØ - UCI
rue Slater St.
375mmØ CONC
102mmØ - UNK
152mmØ - UNK
610mmØ - UCI
203mmØ - DI
381mmØ - UCI
rue Lyon St.
381mmØ - UCI
152mmØ - UNK
151
383
156
388
160
388
408
414
400
360
368
400
186
70.98
70.18
1:1128.5
0
10
20m
© 2019 City of Ottawa © 2019 Teranet

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*

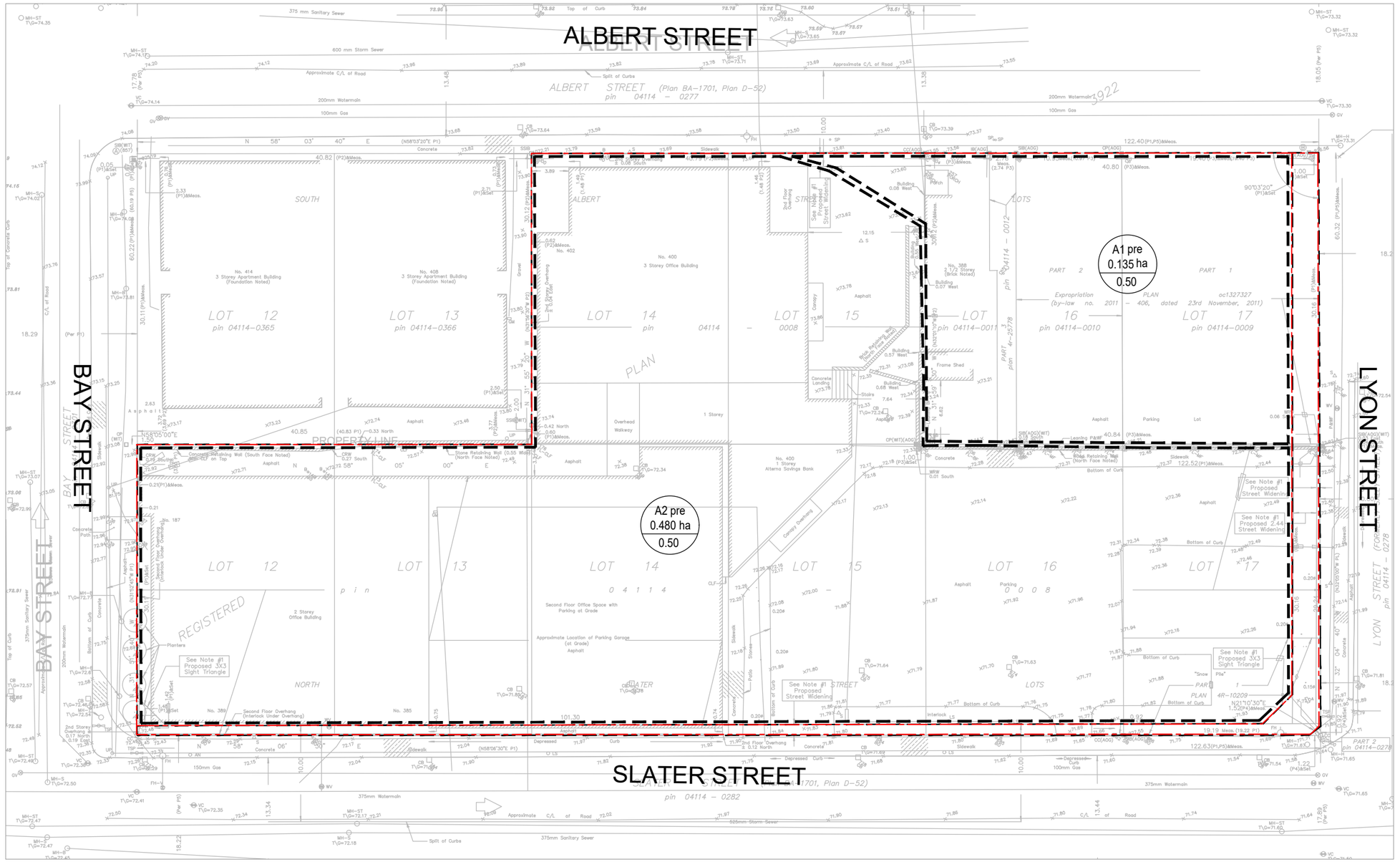
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

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



DRAINAGE AREA	AREA (ha)	TOTAL AREA (ha)
A1 PRE (towards Lyon Street)	0.135	0.615
A2 PRE (towards Slater Street)	0.480	

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 2019	PROJECT No: UD19-048
SCALE: N.T.S.	FIGURE No: DAP1

Lithos

Prepared By: Matina Sakoutsiou, M.Arch
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Rational Method
Pre-Development Flow Calculation

400 Albert Street
File No. UD19-048
City of Ottawa
Date: August 2019

Input Parameters

Area Number	Area (ha)	C	Tc (min.)
A1 pre (towards Lyon Street)	0.135	0.50	20

Rational Method Calculation

Event 2 yr
IDF Data Set City of Ottawa
a = 732.95
b = 6.199
c = 0.810

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (towards Lyon Street)	0.135	0.50	0.07	20	52.0	0.010	9.8

Event 5 yr
IDF Data Set City of Ottawa
a = 998.07
b = 6.053
c = 0.814

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (towards Lyon Street)	0.135	0.50	0.07	20	70.3	0.013	13.2

Event 100 yr
IDF Data Set City of Ottawa
a = 1735.69
b = 6.014
c = 0.820

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (towards Lyon Street)	0.135	0.50	0.07	20	120.0	0.022	22.5

Lithos

Prepared By: Matina Sakoutsiou, M.Arch
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.

Rational Method
Pre-Development Flow Calculation
400 Albert Street
File No. UD19-048
City of Ottawa
Date: August 2019

Input Parameters

Area Number	Area (ha)	C	Tc (min.)
A2 pre (towards Slater Street)	0.480	0.50	20

Rational Method Calculation

Event 2 yr
IDF Data Set City of Ottawa
a = 732.95
b = 6.199
c = 0.810

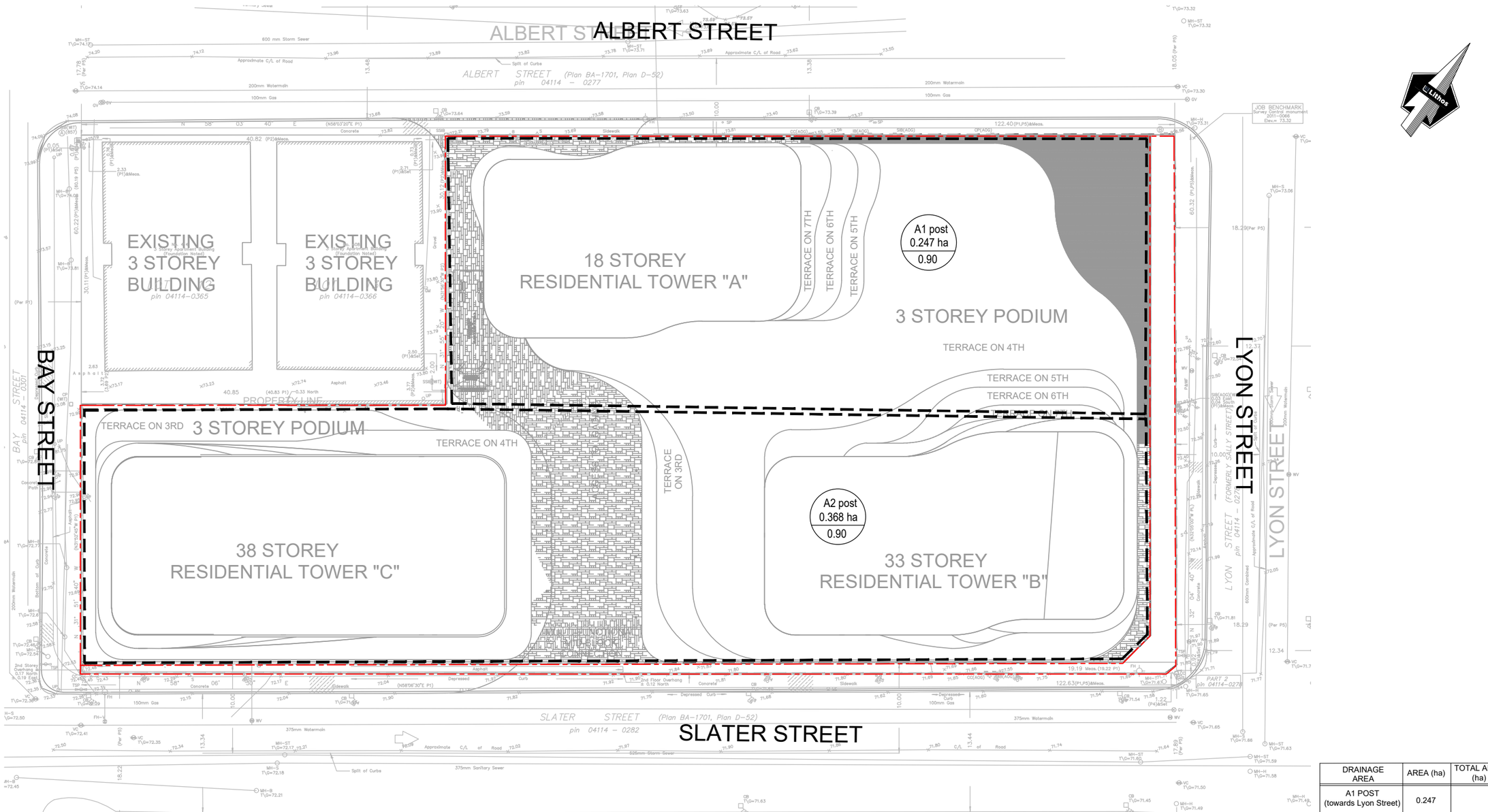
Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A2 pre (towards Slater Street)	0.480	0.50	0.24	20	52.0	0.035	34.7

Event 5 yr
IDF Data Set City of Ottawa
a = 998.07
b = 6.053
c = 0.814

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A2 pre (towards Slater Street)	0.480	0.50	0.24	20	70.3	0.047	46.8

Event 100 yr
IDF Data Set City of Ottawa
a = 1735.69
b = 6.014
c = 0.820

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A2 pre (towards Slater Street)	0.480	0.50	0.24	20	120.0	0.080	80.0



DRAINAGE AREA	AREA (ha)	TOTAL AREA (ha)
A1 POST (towards Lyon Street)	0.247	0.615
A2 POST (towards Slater Street)	0.368	

Lithos

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

LEGEND

A1 post / 0.04 ha / 0.50 — STORM DRAINAGE AREA NUMBER; DRAINAGE AREA (ha); COMPOSITE RUNOFF COEFFICIENT

POST-DEVELOPMENT STORM DRAINAGE AREA

PROPERTY LINE

POST-DEVELOPMENT DRAINAGE AREA PLAN

MIXED USE DEVELOPMENT
400 ALBERT STREET
OTTAWA, ONTARIO

DATE: AUGUST 2019	PROJECT No: UD19-048
SCALE: N.T.S.	FIGURE No: DAP2

Modified Rational Method - Two Year Storm

Site Flow and Storage Summary

Site Flow and Storage Summary

400 Albert Street, Ottawa

Prepared By: Matina Sakoutsiou, M.Arch.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Date: August 2019

Drainage Area A1 Post - Towards Lyon Street

Drainage Areas	A1 Post	
Area =	**0.247**	ha
"C" =	**0.90**	
AC =	**0.22**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Allowable Release Rate =	**13.2**	**L/s**
Min. Storage =	**22.7**	**m^3**

2-Year Design Storm	
a=	732.95
b=	6.199
c=	0.810
I =	$a / (T_C + b)^c$

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff**	**Runoff Volume**	**Target Released Volume**	**Released Volume (A1 Post)**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
10.0	76.8	0.047	28.46	7.90	20.55
15.0	61.8	0.038	34.33	11.85	22.47
20.0	52.0	0.032	38.56	15.81	22.75
25.0	45.2	0.028	41.84	19.76	22.08
30.0	40.0	0.025	44.51	23.71	20.80
35.0	36.1	0.022	46.76	27.66	19.10
40.0	32.9	0.020	48.70	31.61	17.09
45.0	30.2	0.019	50.42	35.56	14.85
50.0	28.0	0.017	51.95	39.52	12.43
55.0	26.2	0.016	53.33	43.47	9.86
60.0	24.6	0.015	54.59	47.42	7.17
65.0	23.2	0.014	55.75	51.37	4.38
70.0	21.9	0.014	56.83	55.32	1.51
75.0	20.8	0.013	57.83	59.27	0.00
80.0	19.8	0.012	58.78	63.23	0.00
85.0	18.9	0.012	59.66	67.18	0.00
90.0	18.1	0.011	60.50	71.13	0.00
95.0	17.4	0.011	61.29	75.08	0.00
100.0	16.7	0.010	62.04	79.03	0.00
105.0	16.1	0.010	62.76	82.98	0.00
110.0	15.6	0.010	63.45	86.94	0.00
115.0	15.0	0.009	64.11	90.89	0.00
120.0	14.6	0.009	64.74	94.84	0.00
125.0	14.1	0.009	65.35	98.79	0.00
130.0	13.7	0.008	65.94	102.74	0.00
135.0	13.3	0.008	66.50	106.69	0.00
140.0	12.9	0.008	67.05	110.65	0.00
145.0	12.6	0.008	67.58	114.60	0.00
150.0	12.3	0.008	68.09	118.55	0.00
155.0	11.9	0.007	68.59	122.50	0.00
160.0	11.7	0.007	69.07	126.45	0.00
165.0	11.4	0.007	69.54	130.40	0.00

Modified Rational Method - Five Year Storm

Site Flow and Storage Summary

Site Flow and Storage Summary

400 Albert Street, Ottawa

Prepared By: Matina Sakoutsiou, M.Arch.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Date: August 2019

Drainage Area A1 Post - Towards Lyon Street

Drainage Areas	A1 Post	
Area =	**0.247**	ha
"C" =	**0.90**	
AC =	**0.22**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Allowable Release Rate =	**13.2**	**L/s**
Min. Storage =	**36.6**	**m^3**

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

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff**	**Runoff Volume**	**Target Released Volume**	**Released Volume (A1 Post)**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
10.0	104.2	0.064	38.60	7.90	30.70
15.0	83.6	0.052	46.44	11.85	34.58
20.0	70.3	0.043	52.06	15.81	36.25
25.0	60.9	0.038	56.40	19.76	36.65
30.0	53.9	0.033	59.94	23.71	36.23
35.0	48.5	0.030	62.92	27.66	35.25
40.0	44.2	0.027	65.48	31.61	33.87
45.0	40.6	0.025	67.74	35.56	32.17
50.0	37.7	0.023	69.75	39.52	30.24
55.0	35.1	0.022	71.57	43.47	28.10
60.0	32.9	0.020	73.23	47.42	25.81
65.0	31.0	0.019	74.76	51.37	23.39
70.0	29.4	0.018	76.18	55.32	20.85
75.0	27.9	0.017	77.49	59.27	18.22
80.0	26.6	0.016	78.73	63.23	15.50
85.0	25.4	0.016	79.89	67.18	12.71
90.0	24.3	0.015	80.99	71.13	9.86
95.0	23.3	0.014	82.03	75.08	6.95
100.0	22.4	0.014	83.02	79.03	3.99
105.0	21.6	0.013	83.96	82.98	0.98
110.0	20.8	0.013	84.86	86.94	0.00
115.0	20.1	0.012	85.72	90.89	0.00
120.0	19.5	0.012	86.55	94.84	0.00
125.0	18.9	0.012	87.35	98.79	0.00
130.0	18.3	0.011	88.12	102.74	0.00
135.0	17.8	0.011	88.86	106.69	0.00
140.0	17.3	0.011	89.57	110.65	0.00
145.0	16.8	0.010	90.26	114.60	0.00
150.0	16.4	0.010	90.93	118.55	0.00
155.0	15.9	0.010	91.58	122.50	0.00
160.0	15.6	0.010	92.21	126.45	0.00
165.0	15.2	0.009	92.83	130.40	0.00

Modified Rational Method - Hundred Year Storm

Site Flow and Storage Summary

Site Flow and Storage Summary

400 Albert Street, Ottawa

Prepared By: Matina Sakoutsiou, M.Arch.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Date: August 2019

Drainage Area A1 Post - Towards Lyon Street

Drainage Areas	A1 Post	
Area =	**0.247**	ha
"C" * =	**1.00**	
AC =	**0.25**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Allowable Release Rate =	**13.2**	**L/s**
Min. Storage =	**92.4**	**m^3**

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

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

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff**	**Runoff Volume**	**Target Released Volume**	**Released Volume (A1 Post)**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
10.0	178.6	0.123	73.51	7.90	65.60
15.0	142.9	0.098	88.24	11.85	76.38
20.0	120.0	0.082	98.76	15.81	82.95
25.0	103.8	0.071	106.88	19.76	87.12
30.0	91.9	0.063	113.46	23.71	89.75
35.0	82.6	0.057	118.98	27.66	91.32
40.0	75.1	0.052	123.74	31.61	92.13
45.0	69.1	0.047	127.92	35.56	92.35
50.0	64.0	0.044	131.64	39.52	92.12
55.0	59.6	0.041	135.00	43.47	91.53
60.0	55.9	0.038	138.06	47.42	90.64
65.0	52.6	0.036	140.87	51.37	89.50
70.0	49.8	0.034	143.48	55.32	88.15
75.0	47.3	0.032	145.90	59.27	86.63
80.0	45.0	0.031	148.17	63.23	84.94
85.0	43.0	0.029	150.30	67.18	83.13
90.0	41.1	0.028	152.32	71.13	81.19
95.0	39.4	0.027	154.22	75.08	79.14
100.0	37.9	0.026	156.03	79.03	77.00
105.0	36.5	0.025	157.76	82.98	74.78
110.0	35.2	0.024	159.41	86.94	72.47
115.0	34.0	0.023	160.99	90.89	70.10
120.0	32.9	0.023	162.50	94.84	67.66
125.0	31.9	0.022	163.96	98.79	65.17
130.0	30.9	0.021	165.36	102.74	62.61
135.0	30.0	0.021	166.71	106.69	60.01
140.0	29.2	0.020	168.01	110.65	57.37
145.0	28.4	0.019	169.27	114.60	54.68
150.0	27.6	0.019	170.50	118.55	51.95
155.0	26.9	0.018	171.68	122.50	49.18
160.0	26.2	0.018	172.83	126.45	46.38
165.0	25.6	0.018	173.95	130.40	43.54

Modified Rational Method - TwoYear Storm

Site Flow and Storage Summary

Site Flow and Storage Summary

400 Albert Street, Ottawa

Prepared By: Matina Sakoutsiou, M.Arch.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Date: August 2019

Drainage Area A2 Post - Towards Slater Street

Drainage Areas	A2 post	
Area =	**0.368**	ha
"C" =	**0.90**	
AC =	**0.33**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Allowable Release Rate =	**46.8**	**L/s**
Min. Storage =	**14.3**	**m^3**

2-Year Design Storm	
a=	732.95
b=	6.199
c=	0.810
I =	$a / (T_C + b)^c$

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff**	**Runoff Volume**	**Target Released Volume**	**Released Volume (A1 Post)**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
10.0	76.8	0.071	42.40	28.10	14.30
15.0	61.8	0.057	51.14	42.15	8.99
20.0	52.0	0.048	57.44	56.20	1.24
25.0	45.2	0.042	62.33	70.25	0.00
30.0	40.0	0.037	66.31	84.30	0.00
35.0	36.1	0.033	69.67	98.35	0.00
40.0	32.9	0.030	72.56	112.40	0.00
45.0	30.2	0.028	75.11	126.45	0.00
50.0	28.0	0.026	77.39	140.50	0.00
55.0	26.2	0.024	79.45	154.55	0.00
60.0	24.6	0.023	81.33	168.60	0.00
65.0	23.2	0.021	83.07	182.65	0.00
70.0	21.9	0.020	84.67	196.70	0.00
75.0	20.8	0.019	86.17	210.75	0.00
80.0	19.8	0.018	87.57	224.80	0.00
85.0	18.9	0.017	88.89	238.85	0.00
90.0	18.1	0.017	90.13	252.90	0.00
95.0	17.4	0.016	91.32	266.95	0.00
100.0	16.7	0.015	92.44	281.00	0.00
105.0	16.1	0.015	93.51	295.05	0.00
110.0	15.6	0.014	94.54	309.10	0.00
115.0	15.0	0.014	95.52	323.16	0.00
120.0	14.6	0.013	96.46	337.21	0.00
125.0	14.1	0.013	97.36	351.26	0.00
130.0	13.7	0.013	98.24	365.31	0.00
135.0	13.3	0.012	99.08	379.36	0.00
140.0	12.9	0.012	99.89	393.41	0.00
145.0	12.6	0.012	100.68	407.46	0.00
150.0	12.3	0.011	101.44	421.51	0.00
155.0	11.9	0.011	102.18	435.56	0.00
160.0	11.7	0.011	102.90	449.61	0.00
165.0	11.4	0.010	103.60	463.66	0.00

Modified Rational Method - Five Year Storm

Site Flow and Storage Summary

Site Flow and Storage Summary

400 Albert Street, Ottawa

Prepared By: Matina Sakoutsiou, M.Arch.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Date: August 2019

Drainage Area A2 Post - Towards Slater Street

Drainage Areas	A2 post	
Area =	**0.368**	ha
"C" =	**0.90**	
AC =	**0.33**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Allowable Release Rate =	**46.8**	**L/s**
Min. Storage =	**29.4**	**m^3**

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

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff**	**Runoff Volume**	**Target Released Volume**	**Released Volume (A1 Post)**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
10.0	104.2	0.096	57.51	28.10	29.41
15.0	83.6	0.077	69.19	42.15	27.03
20.0	70.3	0.065	77.56	56.20	21.36
25.0	60.9	0.056	84.04	70.25	13.79
30.0	53.9	0.050	89.30	84.30	5.00
35.0	48.5	0.045	93.74	98.35	0.00
40.0	44.2	0.041	97.56	112.40	0.00
45.0	40.6	0.037	100.92	126.45	0.00
50.0	37.7	0.035	103.92	140.50	0.00
55.0	35.1	0.032	106.63	154.55	0.00
60.0	32.9	0.030	109.11	168.60	0.00
65.0	31.0	0.029	111.38	182.65	0.00
70.0	29.4	0.027	113.49	196.70	0.00
75.0	27.9	0.026	115.46	210.75	0.00
80.0	26.6	0.024	117.30	224.80	0.00
85.0	25.4	0.023	119.03	238.85	0.00
90.0	24.3	0.022	120.66	252.90	0.00
95.0	23.3	0.021	122.21	266.95	0.00
100.0	22.4	0.021	123.69	281.00	0.00
105.0	21.6	0.020	125.09	295.05	0.00
110.0	20.8	0.019	126.43	309.10	0.00
115.0	20.1	0.019	127.72	323.16	0.00
120.0	19.5	0.018	128.95	337.21	0.00
125.0	18.9	0.017	130.14	351.26	0.00
130.0	18.3	0.017	131.28	365.31	0.00
135.0	17.8	0.016	132.38	379.36	0.00
140.0	17.3	0.016	133.45	393.41	0.00
145.0	16.8	0.015	134.48	407.46	0.00
150.0	16.4	0.015	135.48	421.51	0.00
155.0	15.9	0.015	136.45	435.56	0.00
160.0	15.6	0.014	137.39	449.61	0.00
165.0	15.2	0.014	138.30	463.66	0.00

Modified Rational Method - Hundred Year Storm

Site Flow and Storage Summary

Site Flow and Storage Summary

400 Albert Street, Ottawa

Prepared By: Matina Sakoutsiou, M.Arch.
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Date: August 2019

Drainage Area A2 Post - Towards Slater Street

Drainage Areas	A2 Post	
Area =	**0.368**	ha
"C" * =	**1.00**	
AC =	**0.37**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Allowable Release Rate =	**46.8**	**L/s**
Min. Storage =	**90.9**	**m^3**

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

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

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff**	**Runoff Volume**	**Target Released Volume**	**Released Volume (A1 Post)**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
10.0	178.6	0.183	109.52	28.10	81.42
15.0	142.9	0.146	131.46	42.15	89.31
20.0	120.0	0.123	147.14	56.20	90.94
25.0	103.8	0.106	159.23	70.25	88.98
30.0	91.9	0.094	169.04	84.30	84.74
35.0	82.6	0.084	177.27	98.35	78.92
40.0	75.1	0.077	184.36	112.40	71.95
45.0	69.1	0.071	190.58	126.45	64.13
50.0	64.0	0.065	196.13	140.50	55.62
55.0	59.6	0.061	201.13	154.55	46.58
60.0	55.9	0.057	205.69	168.60	37.09
65.0	52.6	0.054	209.88	182.65	27.23
70.0	49.8	0.051	213.76	196.70	17.06
75.0	47.3	0.048	217.38	210.75	6.62
80.0	45.0	0.046	220.76	224.80	0.00
85.0	43.0	0.044	223.93	238.85	0.00
90.0	41.1	0.042	226.93	252.90	0.00
95.0	39.4	0.040	229.77	266.95	0.00
100.0	37.9	0.039	232.47	281.00	0.00
105.0	36.5	0.037	235.04	295.05	0.00
110.0	35.2	0.036	237.50	309.10	0.00
115.0	34.0	0.035	239.85	323.16	0.00
120.0	32.9	0.034	242.11	337.21	0.00
125.0	31.9	0.033	244.27	351.26	0.00
130.0	30.9	0.032	246.36	365.31	0.00
135.0	30.0	0.031	248.37	379.36	0.00
140.0	29.2	0.030	250.32	393.41	0.00
145.0	28.4	0.029	252.20	407.46	0.00
150.0	27.6	0.028	254.02	421.51	0.00
155.0	26.9	0.028	255.78	435.56	0.00
160.0	26.2	0.027	257.50	449.61	0.00
165.0	25.6	0.026	259.16	463.66	0.00

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	0.615	0	0	0	0	0	0	0	0	0.00	0.00	4.00	0.00	0.09	0.05	0.08	0.62	0.172	**0.25**	-	-	-	-	-
Proposed Condition																								
Mixed Use Development	0.615	0	0	0	0	0	0	0	898	1616	5	3.66	19.15	0.54	0.31	0.31	0.62	0.172	**19.64**	9.3	250	2.0%	84.10	23.35%
																	Total Net Flow		19.39					

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: 0.615 Ha

Infitration Allowance (Dry Weather) - 0.05 Litres / s / grosss ha
Infitration Allowance (Wet Weather) - 0.28 Litres / s / grosss ha
Infitration 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: Matina Sakoutsiou M.A.Sc.
Reviewed by: Nick Moutzouris, P.Eng., M.A.Sc.
Date: August 2019

Project: 400 Albert Street
Project: UD19-048
City of Ottawa Sheet 1 OF 3

DOWNSTREAM SANITARY SEWER SEGMENT INFORMATION

SEWER SEGMENT	TYPE	SIZE (mm)	LENGTH (m)	SLOPE (%)
#1	CIRCULAR	250	28.05	3.07
#2	CIRCULAR	250	3.30	0.36
#3	CIRCULAR	375	14.81	5.35
#4	CIRCULAR	375	51.44	0.23

Lithos

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

LEGEND

- DRAINAGE AREA
- SANITARY TRUNK SEWER
- EXISTING SANITARY SEWER
- EXISTING MANHOLE
- #1 NUMBERED SEGMENT AS INDICATED IN "EXTERNAL SANITARY SEWER SEGMENTS" DESIGN SHEET
- Resident. / 0.344 ha / 0.60 — LAND-USE TYPE / DRAINAGE AREA (ha) / COMPOSITE RUNOFF COEFFICIENT

DOWNSTREAM SANITARY NETWORK
MIXED USE DEVELOPMENT
400 ALBERT STREET
OTTAWA, ONTARIO

DATE: AUGUST 2019 | PROJECT No: UD19-048

SCALE: N.T.S. | FIGURE No: DAP3

EXTERNAL SANITARY SEWER SEGMENTS

DRY WEATHER

400 Albert Street

CITY OF OTTAWA

280 L/gross ha/day - existing commercial
280 L/c/day - existing residential

q = average daily per capita flow (c.m./day)
Q (p) = peak population flow (L/s)
Q (I) = peak extraneous flow (L/s)
Q (C) = peak flow from commercial area (L/s)
Q (d) = peak design flow (L/s)

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

I = unit of peak extraneous flow
Q(p) = PqM/86.4 (L/s)
Q(I) = IA (L/s) where I = 0.05 L/s/ha, and A = drainage area - commercial area (ha)
Q(C) = based on Y L/p/day - residential equivalent (see below)
Q(d) = Q(p) + Q(I) + Q(C)

LOCATION						POPULATION					FLOWS (CUMMULATIVE)										
DESCRIPTION	Sewer Segment	Drainage Area (hectares)	Homes (units)	Residential (hectares)	Commercial (hectares)	RESIDENTIAL (@ 280 people/unit) (persons)	TOTAL RESIDENTIAL (cummulative) (persons)	**TOTAL** PEOPLE (cummulative) (persons)	Peak Factor (residential) M (dimensionless)	Drainage Area (cummulative) (hectares)	RESIDENTIAL Q (p) (L/s)	INFILTRATION Q (I) (L/s)	COMMERCIAL Q (C) (L/s)	**EXISTING PEAK FLOW (Cummulative)** (L/s)	**PROPOSED FLOW Q(prop.)*** (L/s)	**TOTAL PEAK DESIGN FLOW (Cummulative)** (L/s)	GRADE (used) (%)	**Max. Allowable Flow** (L/s)	PIPE SIZE (mm)	Pre-development % of DESIGN CAPACITY (%)	Post-development % of DESIGN CAPACITY (%)
column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
DOWNSTREAM SEWER SEGMENTS																					
Sewer Segment	# 1	0.06	0	0.00	0.46	0	0	0	4.00	0.06	0.00	0.00	14.88	14.88	**19.39**	**34.3**	3.07%	**104.2**	250	14.3%	32.9%
Sewer Segment	# 2	0.10	0	0.00	0.00	0	0	0	4.00	0.16	0.00	0.01	0.00	14.89	**19.39**	**34.3**	0.36%	**35.7**	250	41.7%	96.1%
Sewer Segment	# 3	0.06	0	0.00	0.30	0	0	0	4.00	0.22	0.00	0.01	9.72	24.63	**19.39**	**44.0**	5.35%	**405.5**	375	6.1%	10.9%
Sewer Segment	# 4	0.27	0	2.65	0.12	742	742	742	3.88	0.49	9.33	0.02	3.89	37.88	**19.39**	**57.3**	0.23%	**84.1**	375	45.0%	68.1%

NOTES:

1. Calculated flows are estimated based on the existing development within the drainage area.
2. The population equivalent for medium density development (appartments) was assumed at 280 people/hectare.
3. The post development flow can be supported by the existing sanitary network, thus the sewers can support the proposed development.

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Date: August 2019

Project: 400 Albert Street
Project: UD19-048
City of Toronto

EXTERNAL SANITARY SEWER SEGMENTS

WET WEATHER

400 Albert Street

CITY OF OTTAWA

280 L/gross ha/day - existing commercial
280 L/c/day - existing residential

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

q = average daily per capita flow (c.m./day)
Q (p) = peak population flow (L/s)
Q (I) = peak extraneous flow (L/s)
Q (C) = peak flow from commercial area (L/s)
Q (d) = peak design flow (L/s)

I = unit of peak extraneous flow
Q(p) = PqM/86.4 (L/s)
Q(I) = IA (L/s) where I = 0.28 L/s/ha, and A = drainage area - commercial area (ha)
Q(C) = based on Y L/p/day - residential equivalent (see below)
Q(d) = Q(p) + Q(I) + Q(C)

SANITARY FLOW

LOCATION						POPULATION								2-Year Event Storm Flow														
														Commercial		Road												
DESCRIPTION	Sewer Segment based on HVM figure	Drainage Area (hectares)	Homes (units)	Residential (hectares)	Commercial (hectares)	RESIDENTIAL (@ 280 people/unit) (persons)	TOTAL RESIDENTIAL (cummulative) (persons)	**TOTAL** PEOPLE (cummulative) (persons)	Peak Factor (residential) M (dimensionless)	Drainage Area (cummulative) (hectares)	RESIDENTIAL Q (p) (L/s)	INFILTRATION Q (I) (L/s)	COMMERCIAL Q (C) (L/s)	Area (ha)	Coefficient	Area (ha)	Coefficient	**STORM Q (S)** (L/s)	**EXISTING PEAK FLOW (Cummulative)** (L/s)	**PROPOSED FLOW Q(prop.)*** (L/s)	**TOTAL PEAK DESIGN FLOW (Cummulative)** (L/s)	GRADE (used) (%)	**Max. Allowable Flow** (L/s)	PIPE SIZE (mm)	Pre-development % of DESIGN CAPACITY (%)	Post-development % of DESIGN CAPACITY (%)
column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
DOWNSTREAM SEWER SEGMENTS																										
Sewer Segment	# 1	0.06	0	0.00	0.46	0	0	0	4.00	0.06	0.00	0.02	14.88	0.00	0.00	0.00	0.00	0.00	14.89	**19.39**	**34.3**	3.07%	**104.2**	250	14.3%	32.9%
Sewer Segment	# 2	0.10	0	0.00	0.00	0	0	0	4.00	0.16	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	14.94	**19.39**	**34.3**	0.36%	**35.7**	250	41.9%	96.2%
Sewer Segment	# 3	0.06	0	0.00	0.30	0	0	0	4.00	0.22	0.00	0.06	9.72	0.06	0.68	0.04	0.90	15.08	39.81	**19.39**	**59.2**	5.35%	**405.5**	375	9.8%	14.6%
Sewer Segment	# 4	0.27	0	2.65	0.12	742	742	742	3.88	0.49	9.33	0.14	3.89	0.00	0.00	0.00	0.00	0.00	53.16	**19.39**	**72.5**	0.23%	**84.1**	375	63.2%	86.3%

NOTES:

1. Calculated flows are estimated based on the existing development within the drainage area.
2. The population equivalent for medium density development (appartments) was assumed at 280 people/hectare.
3. The post development flow can be supported by the existing sanitary network, thus the sewers can support the proposed development.

Lithos

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Project: 400 Albert Street
Project: UD19-048
City of Toronto

APPENDIX E
Water Data Analysis

WATER DEMAND

400 Albert Street
File No: UD19-048
Date: August 2019
Prepared by: Matina Sakoutsiou
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Fire Flow Calculation

Tower 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=	2971.00	m^2	100%
Level 3=	3174.00	m^2	25%
Level 1=	2353.00	m^2	25%
=	4,352.8	sq.m.	
F =	8,708.75	L/min	*F(No.1) = 200C √A*
F =	9,000	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 = 7650 L/min *F(No.2) = F(No.1) x occupancy reduction/charge(%)*

3 Sprinkler Reduction
30% Reduction for NFPA Sprinkler System
F = 5355 l/min *F(No.3) = F(No.2) x sprinkler reduction(%)*

4 Separation Charge

20%	West	3.1m to 10m
0%	North	Road
0%	South	Road
0%	East	Road

20% Total Separation Charge

F =	1,530.00	L/min	*F (No.4) = F(No.2) x separation charge(%)*
F =	6,885.00	L/min	*F (tot) = F(No.3) + F(No.4)*
F =	7,000	L/min	*F(tot) Round to nearest 1000 l/min*
	116.67	L/s	
F =	1849	US GPM	

Domestic Flow Calculations

Population=	826	Persons		
Office Area =	5038.0	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=	3.35	L/s		
	53	US GPM		1 US GPM=15.852L/s
Average Commercial Water Demand=	0.15	L/s		
	2	US GPM		

Max. Daily Residential Demand Peaking Factor= 2.5
Max. Daily Commercial Demand Peaking Factor = 1.5
Max. Daily Demand = 8.58 L/s = 136 US GPM

or

Max. Hourly Residential Demand Peaking Factor = 2.2
Max. Hourly Commercial Demand Peaking Factor = 1.8
Max. Hourly Demand = 18.80 L/s = 298 US GPM

Max Daily Demand =	**8.58**	**L/s**
Fire Flow =	**116.67**	**L/s**

Required 'Design' Flow =	**125.25**	**L/s**
	1985	**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 2019
Prepared by: Matina Sakoutsiou
Reviewed By: Nick Moutzouris, P.Eng., M.A.Sc.

Fire Flow Calculation

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=	570.00 m^2	100%
Level 1=	726.00 m^2	25%
Level 3=	502.00 m^2	25%
=	877.0 sq.m.	
F =	3,909.07 L/min	*F(No.1) = 200C √A*
F =	4,000 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 = 3400 L/min *F(No.2) = F(No.1) x occupancy reduction/charge(%)*

3 Sprinkler Reduction
30% Reduction for NFPA Sprinkler System
F = 2380 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 = 1,190.00 L/min *F (No.4) = F(No.2) x separation charge(%)*
F = 3,570.00 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

Population=	790	Persons		
Office Area =	404.0	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=	3.20	L/s		
	51	US GPM		1 US GPM=15.852L/s
Average Commercial Water Demand=	0.01	L/s		
	0	US GPM		

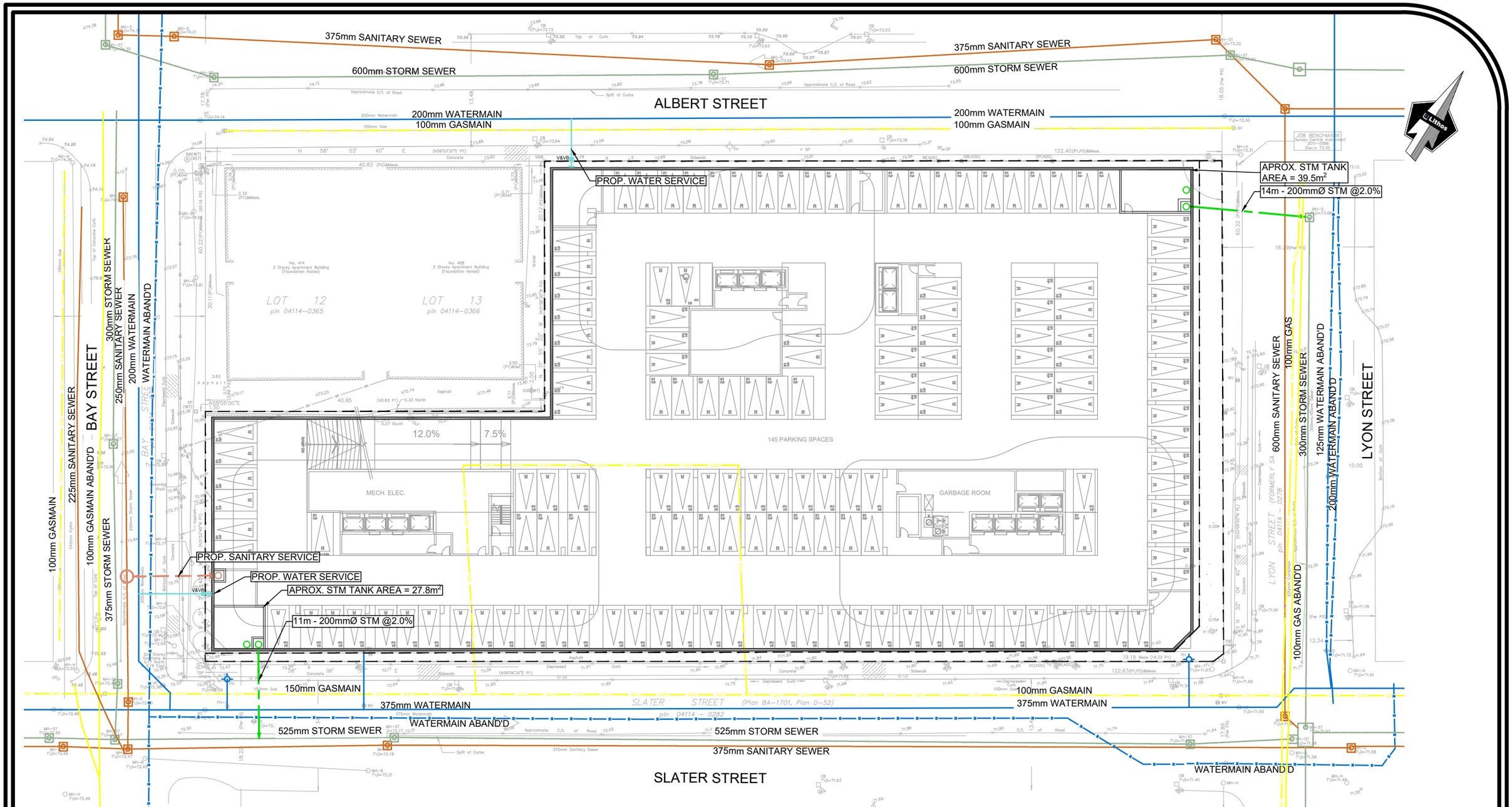
Max. Daily Residentail Demand Peaking Factor= 2.5
Max. Daily Commercial Demand Peaking Factor = 1.5
Max. Daily Demand = 8.02 L/s = 127 US GPM
or
Max. Hourly Residential Demand Peaking Factor = 2.2
Max. Hourly Commercial Demand Peaking Factor = 1.8
Max. Hourly Demand = 17.63 L/s = 280 US GPM

Max Daily Demand = 8.02 L/s
Fire Flow = 66.67 L/s

Required 'Design' Flow = 74.68 L/s
1184 US GPM

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

APPENDIX F
Engineering Drawings



Lithos

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

LEGEND

- PROPERTY LINE
- EXISTING STORM
- EXISTING SANITARY
- EXISTING WATER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN
- PROPOSED STORMWATER SEWER
- EXISTING GASMAIN
- WATERMAIN ABANDONED
- GASMAIN ABANDONED

PROPOSED SERVICING FIGURE

MIXED USE DEVELOPMENT
400 ALBERT STREET
OTTAWA, ONTARIO

DATE: AUG 2019	PROJECT No: UD19-048
SCALE: N.T.S.	FIGURE No: FIG-3