

2017-0645-05

November 21, 2017

**Joel Cotter**

Director, Planning Approvals Division  
Integrated Planning & Public Works  
City of Waterloo  
100 Regina Street South  
Waterloo, ON N2J 4A8

Dear Mr. Cotter:

**RE: 37-41 King St. – Opinion on Functional Servicing**

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MHBC, on behalf of Lexington Park Real Estate Capital (LPRC), is undertaking a rezoning application for a vacant lot located at 37-41 King Street North in Waterloo. This lot is the proposed location of a new commercial building including retail and office space which will be connected to the adjacent Old Post Office heritage building. WalterFedy was retained by LPRC to provide an opinion regarding the functional servicing of the proposed development. WalterFedy's review consisted of an analysis of water, sanitary, and storm servicing, as well as a review of stormwater management requirements. This review was completed specifically for the proposed site, covering an area of approximately 0.05 ha (0.13 acres) located just north of the existing heritage building on the northwest corner of King Street and Dupont Street.

The existing site is vacant as the previous building was demolished following a fire. After demolition of the building, the surface of the site was paved with asphalt extending to the legal limits of the property. A topographic survey prepared by ACI Survey Consultants, in conjunction with legal plans received from LPRC (also prepared by ACI), and construction drawings for King Street provided by the Region of Waterloo, were utilized to form the opinions presented herein.

The proposed development would involve the removal of the existing asphalt and replacement with a three-storey building as well as extensive interior renovations of the existing heritage building resulting in a total of approximately 3,110 m<sup>2</sup> (33,500 ft<sup>2</sup>) of retail and office space. Neighbouring land uses involve commercial, retail, and residential buildings. A conceptual layout of the facility has been provided for the proposed site, prepared by Martin Simmons Architects, about which WalterFedy has made assumptions to present the findings in the following sections.

**Sanitary Servicing**

According to the Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS) 2017, the sanitary flows from the proposed development are to be sized based on an average daily flow from commercially zoned land of 0.95 Litres/second/ha (core commercial flow rate) coupled with an allowance for extraneous flows amounting to 0.25 L/s/ha for all areas. As such, the proposed development is expected to generate 0.146 L/s of peak sanitary flow based on a peaking factor of 2.5 for commercial land use and a site area of 0.05 ha.

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Despite the current vacant status of the subject lot, a sanitary service exists within the site which connects to the sanitary main located within the King Street North right-of-way (ROW). This sanitary connection was installed to service the previous building on this site. In conjunction with the King Street North road reconstruction and streetscape enhancement project currently underway between the ION LRT tracks and Central Street, the existing sanitary main and service connections have been removed and replaced. At the time of this writing, a 300 mm sanitary sewer exists within the King Street North ROW complete with a 150 mm service connection for the subject lot. It is understood the 150-mm-diameter sanitary service is of sufficient capacity and installed at a sufficient depth to provide gravity service to the proposed development.

Sanitary flow projections within the City of Waterloo's Core Area Infrastructure Assessment (CAIA) were utilized to investigate the available capacity within the system for additional flows related to the proposed development. The City of Waterloo utilized the Region's Population and Land-Use Model (PLUM) Zone forecasts to establish an estimate of the City's population growth between sequential planning horizons (2008, 2016, and 2031). These estimates were converted into water demand and sewage flows, which were subsequently added to the baseline flows. From this data, the CAIA indicated the 225 mm sanitary sewer located within the King Street North ROW would have been operating at 8% of its 52 L/s capacity in 2031. Therefore, it can be concluded that the additional sanitary flow from the proposed development will have a negligible impact on the newly-installed 300 mm sanitary sewer's available capacity.

### **Water Servicing**

The domestic demand for a building with a commercial use can be calculated using guidance provided by the Ministry of the Environment and Climate Change (MOECC) *Design Guidelines for Drinking Water Systems*, 2008. An allowance of 28 m<sup>3</sup>/(ha.d) can be utilized for commercial use and peaked using a peaking factor of 2.0 for Peak Hour demands and 1.5 for Maximum Day Demand as per City Design Criteria. As such, factored for a 10-hour and 14-hour work day for offices and retail space, respectively, and gross floor area estimates provided by Martin Simmons Architects, the domestic water demand can be calculated to be 0.393 L/s Peak Hourly demand and a 0.295 L/s Maximum Day Demand.

In addition, the fire demand can be estimated based on *Water Supply for Public Fire Protection* (FUS 1999). For a building assumed to have non-combustible construction, 1610m<sup>2</sup> area, limited-combustible contents, fully-supervised and automated sprinkler protection, and exterior fire walls as per the NBC providing two-hour separation from surrounding buildings on all sides, the required fire flow can be calculated to be 83.3 L/s or 1321 U.S.gpm.

As per the Region of Waterloo DGSSMS 2017, the water service required shall be able to convey the combination of the Maximum Day Demand and the Fire Demand, totalling to 83.6 L/s, within the pressure and velocity ranges as specified. It is noted that, depending on available pressures within the City's distribution system, a 150-mm-diameter service will be required for this development.

As part of the King Street North road reconstruction and streetscape enhancement project, a 150-mm-diameter water service was installed for the proposed development. As King Street was not accessible at the time of writing, a hydrant flow test could not be completed to verify available flow within the municipal system. However, the City of Waterloo, as part of the CAIA, developed plans identifying locations where the capacity of the existing watermain would be exceeded in the future planning horizons. Based on the findings of the CAIA, it is understood that sufficient flows are and will be available in the future, to service this development.



## **Storm Servicing and Stormwater Management**

Given that the site is located within the highly-developed Waterloo Core Area, a network of storm servicing already exists in the immediate vicinity. At the time the City of Waterloo conducted its baseline conditions assessment of the storm sewer system capacity in 2008, the 300 mm storm sewer located in the King Street North ROW was identified as a bottleneck. However, in addition to the watermain and sanitary sewers, existing storm sewers along King Street North have been removed and replaced as part of the road reconstruction and streetscape enhancement project. A catchbasin was installed in the northeast corner of the subject lot and connected to a 600-mm-diameter storm sewer located on the east side of King Street North. It is understood that the newly-installed storm sewer is designed to provide adequate capacity to today's standards.

The site is currently nearly fully impervious and does not appear to have any inlet controls. Based on the preliminary building design and layout provided by Martin Simmons Architects, the proposed development will simply replace existing impervious areas (existing asphalt) with new impervious areas (proposed building and associated driveways). Therefore, it is assumed that the current storm network will have sufficient capacity to service the development since the quantity of runoff produced from a storm event is unlikely to change. If required, flow control roof drains can be utilized to provide rate control on the site to meet the 2-,5- and 100-Year runoff targets as defined by City of Waterloo design criteria.

It is assumed that any existing asphalt areas which will remain as part of the redevelopment will continue to follow a rear-to-front drainage path towards King Street and be directed into the newly-installed catchbasin in the northeast corner of the site. In a similar manner, the proposed building's roof will drain towards the front of the building and be directed into the catchbasin. Through the design flow calculations, it was determined that a 250 mm storm pipe would be sufficient to convey the design flows associated with this development. According to the Region's Servicing Guidelines, the minimum permitted pipe diameter is 300 mm and, therefore, it can be concluded that the newly-installed catchbasin and storm sewer along King Street will be sufficiently adequate to provide service to the site.

Given that the building occupies the bulk of the site, and that the runoff from the roof can be considered to be clean, it is safe to presume that the proposed configuration of the site will provide 80% long term average total suspended solids removal.

## **Hydro**

An established hydro corridor exists at the rear of the site. An existing utility pole located on 35 King Street North provides service to 35 King Street, 12 Dupont Street, and 43 King Street. The pole is part of the hydro extension from Dupont Street and continues northward to connect to a pole located on 47 King Street, servicing the existing building at 47 King Street North. The pole located at 35 King Street currently blocks access to the parking/loading area to the proposed building on 37-41 King Street North. It is important to note that, while Waterloo North Hydro (WNH) owns and operates the hydro services, no easement exists over this infrastructure. As such, discussions and negotiations are ongoing with WNH with respect to this infrastructure.

## **Other Utilities**

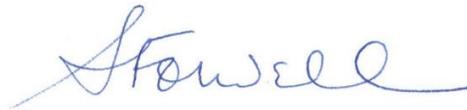
Other utilities such as gas and telecommunications exist within close proximity to the site and can be extended to service the proposed building. Given that the previous building was demolished and the site is currently vacant, connection locations, availabilities, and capacities for other utilities will need to be determined and reviewed prior to approval by each of the individual service providers during detailed design.

Based on our review of all available documentation, we find that the municipal infrastructure is available to support the proposed development.



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**REQUIRED DOMESTIC FLOW**

DGSSMS 2017 AND ONTARIO BUILDING CODE

**WALTERFEDY**

<b>Project</b>	Old Post Office Expansion - FSR Opinion Letter
<b>Project #</b>	2017-0700-10
<b>Designer</b>	JT
<b>Address</b>	37-41 King St. Kitchener, ON
<b>Description</b>	Overall Domestic Flows

Building Description	Area (m <sup>2</sup> )	Units	Persons/Unit	Population	Operating Hours	Demand	Max Daily Peak Factor	Max Hourly Peak Factor	Max Daily Demand (L/s)	Max Hourly Demand (L/s)
Retail #1 (2 storeys)	209.3	n/a	n/a	n/a	14	48 m <sup>3</sup> /ha/day	1.5	2.0	0.017	0.023
Retail #2	225.2	n/a	n/a	n/a	14	48 m <sup>3</sup> /ha/day	1.5	2.0	0.019	0.025
Retail #3	250.9	n/a	n/a	n/a	14	48 m <sup>3</sup> /ha/day	1.5	2.0	0.021	0.028
Office #1	308.7	n/a	n/a	n/a	10	67 m <sup>3</sup> /ha/day	1.5	2.0	0.036	0.048
Office #2	937.4	n/a	n/a	n/a	10	67 m <sup>3</sup> /ha/day	1.5	2.0	0.109	0.146
Office #3	790.4	n/a	n/a	n/a	10	67 m <sup>3</sup> /ha/day	1.5	2.0	0.092	0.123
<b>Total</b>									<b>0.295</b>	<b>0.393</b>

**REQUIRED FIRE FLOW****WALTERFEDY**

Water Supply for Public Fire Protection (FUS 1999)

Project	Old Post Office Expansion - FSR Opinion Letter
Project #	2017-0700-10
Designer	JT
Address	37-41 King St. Kitchener, ON
Description	Fire Flow Calculation

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

F = Required fire flow (LPM)  
 C = Coefficient related to type of construction  
 A = Total floor area (including all storeys but excluding any basement levels at least 50% below grade)

Type of Construction	Non-Combustible Construction	C =	0.8
Description	Unprotected Metal Structural Components, Masonry or Metal Walls. All Structural Members are Non-Combustible but does not qualify as Fire-Resistive		

Floor Area	795.3	m <sup>2</sup>
# Storeys	3	
Fire Resistant Building?	NO	
Vertical Openings and Exterior Vertical Communications protected with minimum one (1) hr rating?	NO	

Area	1610	m <sup>2</sup>
Description	Total Building Floor Area	
Required Fire Flow	7000	L/min

Occupancy Charge	Limited-Combustible Contents		
Fire Flow Reduction	-15%	OR	-1050 L/min
Required Fire Flow	5950	L/min	

Automated Sprinkler Protection	YES	
Designed to NFPA 13 Standard	YES	-30%
Standard Water Supply to Sprinklers and Standpipes	YES	-10%
Fully Supervised System	YES	-10%
Fire Flow Adjustment	-2975	L/min

Exposure 1 (North)	Distance	1	m	Charge	10%
Description	Exterior Wall to be a Fire Wall				

Exposure 2 (East)	Distance	25	m	Charge	10%
Description	Exterior Wall to be a Fire Wall				

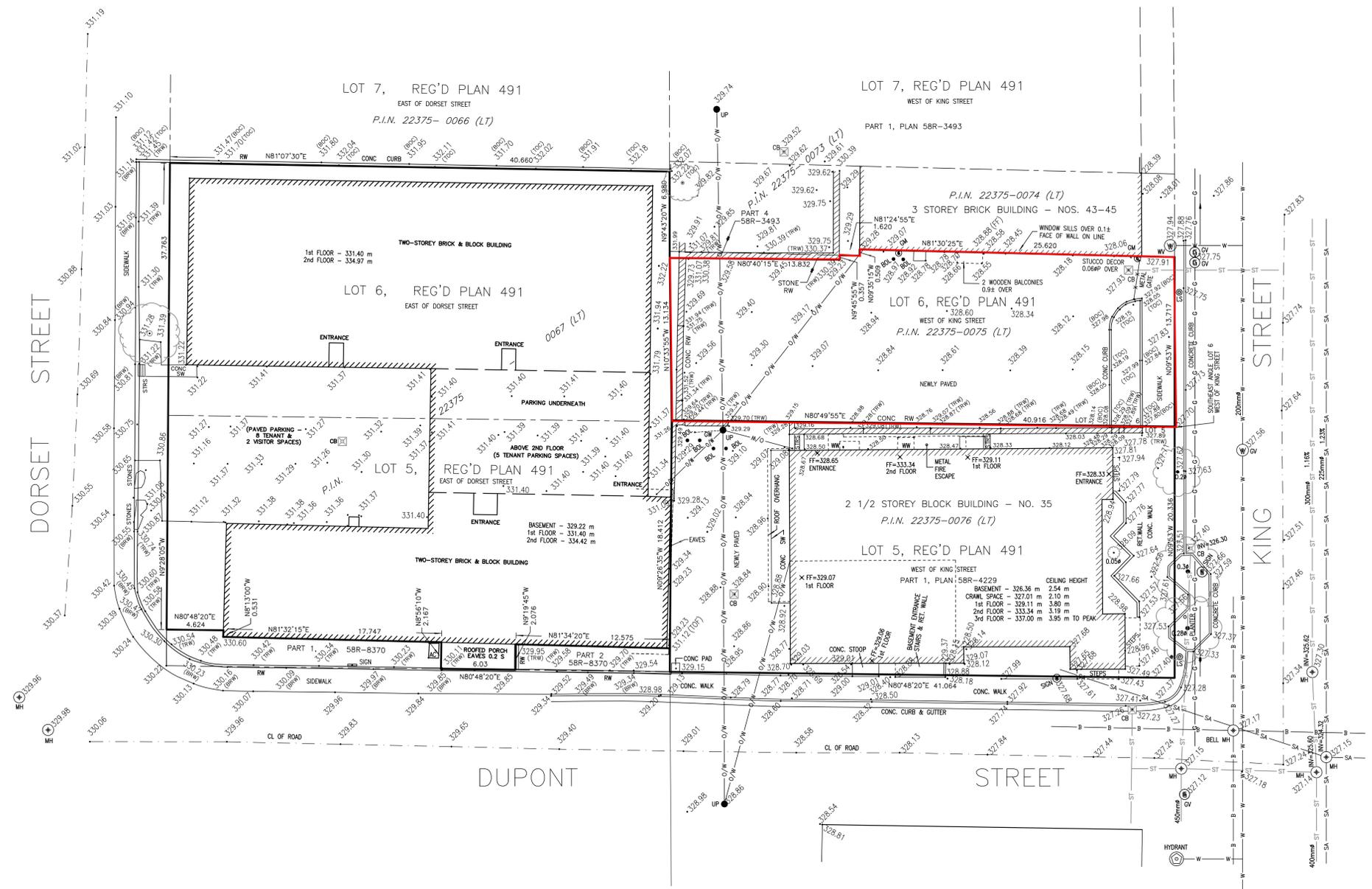
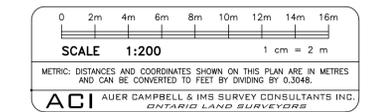
Exposure 3 (West)	Distance	1	m	Charge	10%
Description	Exterior Wall to be a Fire Wall				

Exposure 4 (South)	Distance	12	m	Charge	10%
Description	Exterior Wall to be a Fire Wall				

Total Exposure Charge	40%
Fire Flow Adjustment	2380 L/min

Total Required Fire Flow	5000 L/min
Total Required Fire Flow	1321 U.S. GPM
Total Required Fire Flow	83.3 L/s

**TOPOGRAPHIC SURVEY**  
 SHOWING ALL OF LOTS 5 & 6  
 WEST OF KING STREET  
 AND PART OF LOT 5 AND 6  
 EAST OF DORSET STREET  
 REGISTERED PLAN NO. 491  
 CITY OF WATERLOO  
 REGIONAL MUNICIPALITY OF WATERLOO



- LEGEND**
- SUBJECT PROPERTY
  - FOUND SURVEY MONUMENT
  - PLANTED SURVEY MONUMENT
  - LOT LINE
  - FENCE
  - O/W — O/W — OVERHEAD WIRES
  - H — H — AERIAL HYDRO LINE
  - W — W — WATER LINE
  - SA — SA — SANITARY SEWER LINE
  - ST — ST — STORM SEWER LINE
  - B — B — BELL LINE
  - G — G — GAS LINE
  - TV — TV — CABLE TV
  - CB — CATCH BASIN
  - MH — MANHOLE
  - WV — WATER VALVE
  - GM — GAS VALVE
  - UP — SIGN
  - LS — HYDRO POLE
  - BB — LIGHT STANDARD
  - TV — BELL BOX
  - FH — CABLE TV
  - CON — FIRE HYDRANT
  - DEC — CONIFEROUS TREE
  - BH — DECIDUOUS TREE
  - BH — BORE HOLE
  - BH — WELL
  - BOL — BOLYARD
  - BOC — BOTTOM OF CURB
  - CONC — CONCRETE
  - FF — FINISHED FLOOR
  - RW — RETAINING WALL
  - STRS — STAIRS
  - SW — SIDEWALK
  - TOC — TOP OF CURB
  - TOF — TOP OF FOUNDATION
  - TOW — TOP OF WALL
  - WW — WINDOW WELL

**NOTES**

- 1 - INVERT ELEVATIONS ARE ± FROM EXISTING DRAWINGS.
- 2 - BENCHMARK NOTATION:  
 CITY OF WATERLOO, SOUTHEAST CORNER OF KING STREET NORTH AND BRIDGEPORT ROAD, TABLET FACE IN THE NORTH FOUNDATION WALL OF WATERLOO FEDERAL BUILDING (FACING BRIDGEPORT ROAD), 15.5m EAST FROM NORTHWEST CORNER OF BUILDING AND 9cm BELOW THE FIRST ROW OF BRICKS.  
 ELEVATION: 328.510

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