MEMO

DATE	October 21, 2020	**PROJECT NO.**	1967-5752
RE	71 Main Street South Town of Halton Hills		

TO	Planning and Development, Town of Halton Hills
FROM	Madeline Carter, P.Eng. & Nick Constantin, P.Eng.
CC	Cindy Prince, Vice President, Amico Affiliates

This memo was prepared as an update to the previously approved Functional Servicing & Stormwater Management Report prepared by Crozier on August 15, 2017 for the development located at 69-79 Main Street South and 94-98 Mill Street, in the Town of Halton Hills.

The proposed development concept has been modified slightly from the previous design. The number of residential units has been increased to 169 from 125. The commercial area has been reduced from 1,667 m^2 to 369 m^2, with the residential area increasing from 13,412 m^2 to 15,578 m^2. The total gross floor area (GFA) of 17,431 m^2 of the proposed development concept has decreased slightly from the previous design which had a GFA of 18,194 m^2. The equivalent population was calculated based on 1.68 people per unit, which was provided by the Region in 2015.

Table 1: Equivalent Population Calculation for Residential Use

Scenario	Number of Units	Equivalent Population
Proposed Concept – Approved FSR August 15, 2017	125	210
Proposed Development Concept Plan June 15, 2020	169	284

The servicing calculations for water demand and sanitary flow, as well as the Fire Flow calculations have been updated to reflect the latest Site Statistics as provided on the Site Plan prepared by IBI Group Architects, dated June 15, 2020. The design calculations, as well as an updated Water Usage and Sanitary Discharge Report have been provided with this memo.

Water Servicing

The water demand calculations were updated based on the revised development concept plan. The increase in number of units results in an increase in the water demand compared to the previously approved calculations. The maximum daily domestic water demand increased 0.45 L/s as seen below in Table 2. The existing demand scenario presented is from the FSR (August 2017) and is based on the current use of the building.

Table 2: Water Demand Calculations

Scenario	Land Use	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Maximum Hourly Demand (L/s)
Existing Demand August 15, 2017	Residential	0.24	0.55	0.97
	Commercial	0.04	0.10	0.10
	Combined	**0.28**	**0.64**	**1.07**
Proposed Demand – Approved FSR August 15, 2017	Residential	0.67	1.50	2.67
	Commercial	0.05	0.11	0.11
	Combined	**0.72**	**1.61**	**2.78**
Proposed Development Concept Plan June 15, 2020	Residential	0.90	2.03	3.61
	Commercial	0.01	0.02	0.02
	Combined	**0.91**	**2.06**	**3.64**

The fire flow calculations were updated for the new development concept using the Fire Underwriter's Survey. We confirmed the type of construction (non-combustible), occupancy reduction (low hazard) and the type of sprinkler system (NFPA) with the Client. The fire flow decreased slightly from the previous approved design with a new requirement of 13,269 L/min (221.15 L/s) for a duration of 3.0 hours.

Please note that the Fire Underwriters Survey calculated value for the estimated fire flow is a conservative estimate. The Mechanical Engineer should review and prepare detailed fire calculations for the proposed building concept.

A hydrant flow test was previously completed for the property by Vipond on September 14, 2015. Results from the test indicated that at 20 psi residual pressure in the municipal watermain, a minimum of 6000 US GPM (378.54 L/s) is projected to be available within the municipal system. As such, we anticipate that the marginal increase in demand as a result of the modified building concept will not be a concern, and the water services remain sufficient to meet the demands of the proposed development.

Sanitary Servicing

The sanitary servicing calculations were updated based on the proposed development concept and the Region of Halton Water and Wastewater Linear Design Manual, dated April 2019. The commercial area in the proposed development concept is smaller than the previously approved design. The additional residential units and reduced commercial area result in an increase of 0.79 L/s for the sanitary design flow. The existing condition presented is from the FSR (August 2017) and is based on the current use of the building.

Table 3: Sanitary Flow Calculations

Condition	Land Use	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)
Existing Aug 15, 2017	Residential	0.24	3.85	0.92	0.08	**1.18**
	Commercial	0.04		0.15		
	Combined	**0.29**		**1.10**		
Proposed Approved FSR Aug 15, 2017	Residential	0.67	4.14	2.77	0.08	**3.01**
	Commercial	0.05	3.52	0.17		
	Combined	**0.72**	-	**2.94**		
New Site Plan June 15, 2020	Residential	0.90	4.07	**3.72**	0.08	**3.80**
	Commercial	0.01				
	Combined	**0.91**				

Conclusions & Recommendations

Based on the information contained in this memo, we offer the following conclusions:

- The revised building concept results in a marginal increase in water demand, which we anticipate can be accommodated by the existing infrastructure. The proposed development, with a maximum hourly demand of 3.64 L/s can be serviced by the existing municipal watermain infrastructure.

- The revised building concept results in a design sanitary flow of 3.80 L/s, which is also a slight increase in flows from the previously approved design. We anticipate that this will not generate any concern related to the available capacity of the municipal sanitary system.

Based on the aforementioned conclusions and recommendations, we suggest the approval of the Site Plan Application from the perspective of functional servicing.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Madeline Carter, P.Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.

Nick Constantin, P.Eng.
Senior Project Manager

DD/MC/kb

Encl.

- Water Demand Calculation – Revised October 2020
- Fire Flow Calculations – Revised October 2020
- Sanitary Flow Calculations – Revised October 2020
- Water Usage and Sanitary Discharge Report

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CF CROZIER & ASSOCIATES

REVISED - Domestic Water Demand

Project: **71 Main Street Development**
Job No.:   **1967-5752**   **Revised: 20-Oct-20**

Proposed Site Conditions

A.   **Proposed Units**

One Bedroom	68
Two Bedroom	94
Three Bedroom	7
TOTAL	**169**

B.   **Area's** (m^2)

Total Residential Units GFA   15,578
Commercial and Amenities GFA   369
Site Area   2,773.0

C.   **Design Criteria**

Population per Hectare[1] = $\dfrac{\text{1.68 ppu * (\# units)}}{\text{area}}$

Population per Hectare =   1,024   p/ha
Total Population =   284
Note 1: Apartment population density Population density per email confirmation from Tim Skrins - Region of Halton, dated September 29, 2015

Residential Average Consumption Rate[2]=   275.0   L/cap/d
                Apartments   Max Day Factor[2]   =   2.25
                Apartments   Peak Hour Factor[2] =   4.0

Average Day Demand	275	x	284	=			78,078	L/day	=	0.90	L/s
Maximum Day Demand	275	x	284	x	2.25	=	175,676	L/day	=	2.03	L/s
Peak Hour Demand	275	x	284	x	4.0	=	312,312	L/day	=	3.61	L/s

Note 3: Average Consumption Rate, Max day Factor and Peak Hour Factor each determined from Section 2.4, Halton Water Wastewater Linear Design Manual

D.   **Commercial**

Approximate floor area of the proposed commercial   Total =   369.00   sq.m

Commercial Average Consuption Rate[3]=   24,750.0   L/ha/day

Retail population density			90.00	persons/ha	
Equivalent population			90.00 *	0.0369 =	3 people

                Commercial   Max Day Factor[3]   =   2.25
                Commercial   Peak Hour Factor[3] =   2.25
Note 4: Average Consumption Rate, Max day Factor and Peak Hour Factor each determined from Section 2.4, Halton Water Wastewater Linear Design Manual

E.   **Commercial Demands**

Average Day Demand	24,750	x	0.04			=	900	L/day	=	0.01	L/s
Maximum Day Demand	24,750	x	0.04	x	2.25	=	2,100	L/day	=	0.02	L/s
Peak Hour Demand	24,750	x	0.04	x	2.25	=	2,100	L/day	=	0.02	L/s

F.   **Total Domestic Demand (Residential + Retail)**

Average Day Demand	78,078.00		+	900	=	79,000	L/day	=	**0.91**	**L/s**
Maximum Day Demand	175,675.50		+	2,100	=	177,800	L/day	=	**2.06**	**L/s**
Peak Hour Demand	312,312.00		+	2,100	=	314,400	L/day	=	**3.64**	**L/s**

Note 5: Average consumption rate, max day factor and peak hour factor per Section 2.4, Halton Water Wastewater Linear Design Manual

CF CROZIER & ASSOCIATES

FIRE FLOW CALCULATIONS
PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

Project:	**McGibbon Development 71 - 79 Main Street South**	**Date: 10/20/2020**
Job No.:	**1967-5752**	

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

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

where

F = Fire flow in Litres per minute (Lpm)
C = coefficient related to the type of construction
  = 1.5 for wood frame construction (structure essentially all combustible)
  = 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
  = 0.8 for non-combustible construction (unprotected metal structural components)
  = 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = total floor area in square metres

Calculations per FUS

1.   *Estimate of Fire Flow*
    C = 0.8 for non-combustible construction   Per email with Amico dated October 15, 2020

Largest Podium GFA

Level	GFA	Applied GFA
1	2452	2452
2	2089	522
3	2089	522
Total		3497

A = 2452 m^2 (largest GFA plus 25% of GFA for two immediately adjoining floors)[1]

    F =   10,407 Lpm

2.   *Occupancy Reduction*
    15% reduction based on low hazard occupancy ('apartments, Office Buildings, Public Buildings')
    Limited Combustibility   Per email with Amico dated October 15, 2020
        15% reduction of 10407 Lpm =   1,561 Lpm
    F = 10407 - 1561 =   8,846 Lpm

3.   *Sprinkler Reduction*
    30% reduction for NFPA Sprinkler System[2]   Per email with Amico dated October 15, 2020
        30% reduction of 8846 Lpm =   2,654 Lpm
    F =   8846 - 2654 =   6,192 Lpm

4.   *Separation Charge*

Face	Distance (m)	Charge
West Side	20.00	15%
East Side	0.00	25%
North Side	0.00	25%
South Side	15.00	15%

                    Total   80%   of   8,846 = 7,077 Lpm

        F = 6192 + 7077
        F =   13,269 Lpm   221.15 L/s   (2,000 Lpm < F < 45,000 Lpm; OK)
        F =   3,501 US GPM

Notes
1. GFA based on data provided by IBI Group Architects on Site Stats dated June 15, 2020
2. Assumed to have sprinkler protection.

CF CROZIER & ASSOCIATES

FIRE FLOW CALCULATIONS
PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

Project: **McGibbon Development   71 - 79 Main Street South**   **Date: 10/20/2020**
Job No.:   **1967-5752**

    5.   *Duration*

Required Duration of Fire Flow	
Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.3
4,000	1.5
5,000	1.8
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

L/s	Duration
221.15	3.0

CF CROZIER & ASSOCIATES

REVISED SANITARY FLOW

Project:	**McGibbon Development 71 - 79 Main Street South**
Job No.:	**1967-5752** **Revised:** **20-Oct-20**

A. Proposed Development

Residential Unit Type	Total Res. Units
One Bedroom	68
Two Bedroom	94
Three Bedroom	7
Totals	**169**

Site area =   **0.2773**   **ha**

Population per Hectare =	1.68 ppu * (# units)
	area
Population per Hectare =	1024 p/ha
Total Population	284 capita

Note 1: Population density per email confirmation from Tim Skrins - Region of Halton, dated September 29, 2015

B. Proposed Flow

Unit Type	Gross Floor Area (m^2)	Site Area (ha)	Population[2]	Average Sanitary Flow (L/s)	Average Sanitary Flow (m^3/day)	Harmon Peaking Factor[3]	Peak Flow L/s
Residential	15,578		284	0.90	78.08		
Commercial and Amenities	369	0.277	3	0.01	0.91	4.07	3.72
			Total	0.91	78.99		

Note 2: Commercial flows designed using 90 person per Hectare. Table 3-2, Halton Water Wastewater Linear Design Manual

Note 3: Peaking Factor = Harmon Formula, Updated per Halton Region Design Guidelines Version 4.0, April 2019

C. Infiltration

Site Area (ha)	Infiltration Rate[4] (L/ha/s)	Total Infiltration (L/s)
0.2773	0.286	0.08

Note 4: Infiltration = 0.286 L/ha/s   Section 3.2.4, Halton Water Wastewater Linear Design Manual

D. Total Proposed Site Flow

	Peak Flow (L/s)
Proposed Flow	3.72
Infiltration	0.08
Total	**3.80**

Proposed Design Flow

The sewage design flow from the proposed development is: **3.80 L/s**

The Regional Municipality of Halton
1151 Bronte Road
Oakville ON L6M 3L1

Dear Sir/Madam:

Re: **Water Usage and Sanitary Discharge Report for 69-79 Main Street South and 94-98 Mill Street, Town of Halton Hills, ON**

Background

Amico Affiliates proposes to construct a commercial/residential building with a footprint of 2,452 m^2 at 69-79 Main Street South and 94-98 Mill Street, Part of Lot 18, Con.9 in the Town of Halton Hills (Georgetown). The site is currently occupied by commercial/residential properties. The site has an area of 0.28 ha and no landscaping is proposed.

The Region of Halton Water and Wastewater Linear Design Manual (April 2019) has been used to calculate the water usage and sanitary discharge for occupant loadings. The proposed development does not require process or cooling water.

Water Usage

Residential/Commercial Building

- ◆ Occupant Load   275 L/cap/d x 284 occupants (Residential)
=78.1 m^3/d
24, 750 L/ha/day x 0.037 ha (Commercial)
=0.92 m^3/d

Total water usage = 79.02 m^3/d (0.91 L/s)

Sanitary Discharge

Residential/Commercial Building

- ◆ Occupant Load   275 L/cap/d x 284 occupants (Residential)
=78.1 m^3/d
24, 750 L/ha/day x 0.037 ha (Commercial)
=0.92 m^3/d

Total sanitary discharge = 79.02 m^3/d (0.91 L/s)

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Madeline Carter, P. Eng.
Project Engineer