

*File: 25009*

## FUNCTIONAL SERVICING REPORT

**7800 Lundy's Lane, Niagara Falls**  
**August 2025**

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### **INTRODUCTION**

Upper Canada Consultants has been retained to undertake and provide a Functional Servicing Report to address the servicing needs and requirements as part of a Zoning Bylaw submission for the proposed development. The project site located at the above noted address, is situated west of Montrose Road and east of Kalar Road on the south side of Lundy's Lane (Regional Road 20). The development site has historically been utilized as a Super 8 Motel with an associated parking lot and swimming pool.

The 0.70-hectare development site is currently occupied with two existing 2-storey motel buildings with a total of 70 units. The proposed development will result in a conversion of the existing motel rooms to residential apartments as well as the construction of an additional 6-storey, 67-unit mixed-use apartment building fronting Lundy's Lane with 130m<sup>2</sup> of commercial space.

The proposed site plan will result in a total of 137 residential units and will include associated asphalt road, concrete curb, catch basins, storm sewers, sanitary sewers, and watermain.

The objectives of this study are as follows:

1. Identify domestic and fire protection water service needs for the site;
2. Identify sanitary servicing needs for the site; and,
3. Identify stormwater management needs for the site.

### **WATER SERVICING**

There is an existing 300mm diameter PVC municipal watermain (2006) located on the north side of Kalar Road fronting the proposed development site. Per engineering drawings provided by the City of Niagara Falls, a single water service of unknown size currently provides domestic water supply for the property. There is an existing municipal hydrant located on the north side of Lundy's Lane (Regional Road 20) situated in line with the east property line.

Due to the proposed development characteristics, it is expected that a 200mm diameter water service will be required to provide adequate domestic and fire water supply for the development site. In this case, the existing water services would be disconnected and abandoned as part of future servicing designs.

Due to the specifications, it is expected the new apartment building will require an internal sprinkler system. The existing hydrant on Lundy's Lane is within 45m of the building and therefore, no new hydrant is expected for this development. The internal fire suppression system will be designed by the Sprinkler System Engineer with calculations and design specifications provided at the Building Permit stage.

As required by the City of Niagara Falls, a calculation has been conducted to determine the domestic water supply requirements for the proposed development. Utilizing a population density of 1.6 persons per unit, a residential population of 220 persons can be attributed to this development. Additionally, the commercial space (130m<sup>2</sup>) has been attributed a daily average water use of 5 L/m<sup>2</sup>/day based on the shopping centre land usage within the MOE Drinking Water Design Guidelines.

This has been calculated to require an average domestic water demand of **0.70 L/s** for this site. This value utilizes a residential demand of 270 L/cap/day in line with the minimum MOE drinking Water Design Guidelines, and is greater than the 240 L/cap/day used as part of the 2021 Regional Water Master Servicing Plan Update. Therefore, this will result in a maximum daily demand of 1.26 L/s and peak demand of 1.89 L/s utilizing maximum and peak rate factors of 1.8 and 2.7 respectively per the Drinking Water Guidelines for overall populations of 25,000-50,000 persons.

As required by the City of Niagara Falls, a minimum fire flow calculation has been conducted for each building (Appendix A) utilizing the 'Water Supply for Public Fire Protection' per the Fire Underwriters Survey (FUS, 2020). Table 1 below outlines the minimum fire flow requirements for each building.

<b>Table 1. Fire Flow Requirements</b>	
Proposed Building	66.7 L/s
Existing East Building	183.3 L/s
Existing West Building	150.0 L/s

Per the FUS Calculations, the development will require a maximum fire flow rate of approximately 183L/s. However, as the development is within the 'Tourism Area' of Niagara Falls, it is expected that the development meets the City's criteria to require a minimum fire flow rate of 300L/s. The calculations for the proposed building include the expected requirement of an internal fire suppression (sprinkler) system.

As the exact building conditions and design cannot be confirmed at this time, the calculation utilizes conservative assumptions that may differ from future Site Plan Applications and Building Permit submissions. The 'minimum required flow rates calculated as part of this report are merely an estimate, and the buildings' future internal Sprinkler System Engineer will provide the minimum flow calculations and requirements necessary to provide adequate fire protection as required as part of future building permit submissions.

Hydrant Flow Testing has been conducted by Niagara Regional Fire Protection on the existing hydrant on Lundy's Lane with the results and further fire flow calculations included in Appendix A. Using the Hydrant Flow Test Data, Fire Flow Calculations have determined the existing hydrant will provide approximately 413L/s of fire flow.

The static pressures (70psi) at the hydrants aligned within the range (60-80psi) of calculated static pressures for this area noted within the 2021 Niagara Regional Master Water Servicing Plan Update (MSPU). Therefore, as the available fire flows in proximity to this development will be significantly greater than those required by the FUS, it is expected that the municipal infrastructure will have sufficient supply for the proposed development.

### **SANITARY SERVICING**

There are two municipal sanitary sewers on Lundy's Lane (Regional Road 20) fronting the development site conveying flows westerly. The 375mm diameter AC sanitary sewer located on the south side of Lundy's Lane will act as the sanitary outlet for the proposed development.

The upper limit of the existing sanitary sewer is located just east of Beaverdams Road and only services properties on the south side of the road allowance. The sewer was originally constructed as a combined sewer for the Lundy's Lane roadway however a storm sewer was later constructed removing stormwater flows from this sewer. Sanitary flows are conveyed westerly prior to turning north through the #8159 Lundy's Lane property to Spring Blossom Drive, and ultimately discharge to the Dorchester Road Regional Sanitary Pumping Station.

The existing sanitary service will be analyzed for suitability as a functional sanitary outlet as part of future detailed design. In case a new sanitary outlet is required, it is expected that a 200mm diameter service will connect directly to the existing sanitary manhole located just east of the development entrance on Lundy's Lane.

An analysis of existing and future peak sanitary flows discharging from the development site to the existing sanitary system has been conducted and included in Appendix B. The analysis utilizes a residential population of 1.6 persons/unit due to the apartment usage under future conditions with a peak flow rate of 255 L/person/day, and commercial flow rate of 28 m<sup>3</sup>/ha/day. Additionally, a flow rate of 200 L/bed/day for motels with a peaking factor of 2.0 has been utilized for existing motel conditions per 2023 MECP Design Criteria. An infiltration rate of 0.28 L/s/ha has been used in accordance with the 2021 Niagara Regional MSPU and MECP Design Criteria for Sewers.

The flow analysis concluded that the proposed development will result in a total peak wet weather flow of **2.88L/s** - greater than the existing 0.56L/s discharging to the sanitary system under existing conditions. Therefore, the proposed development will result in an increase of 2.31L/s under future development conditions. The total peak flow of 2.88L/s will occupy 2.1% of the capacity of the sanitary sewer immediately downstream of the development site. It is expected that the municipal sanitary sewer system will have sufficient capacity for the development.

## **STORMWATER MANAGEMENT PLAN**

As part of the site development for the proposed residential development, the following is a summary of the stormwater management plan.

The criteria provided by the City of Niagara Falls and Region of Niagara for this development includes the requirement to control future development stormwater flows to allowable levels from this site for up to and including the 100-year design storm event. It is also required to improve stormwater quality levels to MECP Normal Protection (70% TSS removal) levels prior to discharge to the existing storm sewer on Lundy's Lane (Regional Road 20).

### **Existing Conditions**

As confirmed by aerial imagery provided by both Niagara Navigator and the Brock University Niagara Air Photo Index, the subject property has been developed as a motel since at least 1955. By 1960, the property had further motel properties on both adjacent properties fronting Lundy's Lane and backed onto a forest as part of the adjacent St. George Serbian Orthodox Church located at 6085 Montrose Road.

At present, there is an existing 675mm diameter storm sewer conveying flows westerly on Lundy's Lane (Regional Road 20) fronting the development site. An Existing Overall Storm Drainage Area Plan (Figure 1) in Appendix C has been created to outline the general stormwater characteristics of the property.

Three overall drainage areas have been delineated in order to properly determine the existing stormwater conditions:

1. Drainage Area EX10 – consists of the internal parking lot area directing stormwater flows to two catch basins expected to discharge to the Lundy's Lane storm sewer system;
2. Drainage Area EX20 – consists of the existing west building rooftop and surrounding exterior lands that directs flows to a swale along the west property boundary conveying flows south, discharging to the adjacent southerly lands; and,
3. Drainage Area EX 30 - consists of the existing east building rooftop and surrounding exterior lands that directs flows to a swale along the east property boundary conveying flows south, discharging to the adjacent southerly lands.

Weighted impervious calculations have been conducted (Appendix C) for each of the drainage areas. A Modified Rational Method has been conducted using the City of Niagara Falls IDF Curves for the 5 and 100 year design storm events to determine the peak stormwater flows discharging to both the Lundy's Lane storm sewer system and the adjacent St. Georges Church lands. The results of the peak flow calculations are included in Table 2 below.

**Table 2. Existing Peak Stormwater Flows**

Storm Event (Return Period)	To Lundy's Lane	To Southerly St. George's Property		
	Drainage Area <b>EX10</b>	Drainage Area <b>EX20</b>	Drainage Area <b>EX30</b>	Total
5 Year	79.4	20.6	18.2	38.8
100 Year	126.6	32.9	29.1	61.9

### **Proposed Conditions**

The proposed development will result in the construction of an apartment building fronting Lundy's Lane as well as a reconfiguration of the internal parking lot with a minor extension along the south portion of the site.

It will be required that stormwater flows are restricted to existing levels prior to discharge from the site for the 5 and 100 year design storm events. Stormwater flows from the existing rooftop areas will continue to function as occurs under existing conditions. All flows from within the site as well as the new apartment building rooftop will be collected within the future on-site storm sewer system and discharge to the existing storm sewer on Lundy's Lane. Stormwater quality enhancements are expected to be provided by an Oil/Grit Separator, CB Shield or other ETV Verified stormwater quality enhancement device prior to discharge from the site.

### **CONCLUSIONS AND RECOMMENDATIONS**

Therefore, based on the above comments and design calculations, the following summarizes the servicing for this site.

1. The existing 300mm diameter watermain will have sufficient capacity to provide both domestic and fire protection water supply.
2. The existing 375mm diameter municipal sanitary sewer will have adequate capacity for the proposed development.
3. Stormwater quantity controls will be provided to existing levels prior to discharge from the site.
4. Stormwater quality controls will be provided to Normal Protection levels prior to discharge from the site.
5. The site extreme stormwater overland flow route is to Lundy's Lane.



Based on the above and the accompanying calculations, there exists adequate municipal servicing for this development. We trust the above comments and enclosed calculations are satisfactory for approval. If you have any questions or require additional information, please do not hesitate to contact our office.

Yours very truly,

  
Kurt Tiessen, P.Eng.  
August 25, 2025  
Encl.





UPPER CANADA  
CONSULTANTS  
*ENGINEERS / PLANNERS*

## APPENDICES

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**UPPER CANADA  
CONSULTANTS**  
*ENGINEERS / PLANNERS*

## **APPENDIX A**

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**Fire Underwriters Survey Calculations  
Hydrant Flow Test Results  
Hydrant Fire Flow Calculations**

# Fire Underwriters Survey

## Water Supply for Public Fire Protection (2020) Calculations

### 7500 Lundy's Lane

Required Fire Flow in Litres per Minute

F= 

11,000	(L/m)
183.33	(L/s)
2,906	(USgmp)

### Type of Construction

Ordinary Construction (brick or other masonry walls, combustible floor and interior). C=

1.00

Total Floor Area in square metres (including all stories, excluding basements at least 50% below grade)

A= 813.5 (m<sup>2</sup>)

**NOTE:** Fire Walls that meet or exceed Nation Building Code of Canada (2 hour fire resistance) divide building.

Total Number of Floors

2

### 2. Combustibility of Contents (*may not reduce fire flow demand below 2,000 L/min*)

Limited Combustible =

-15%

### 3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).

No 0%

Water supply standard for both system and fire department hose lines (Yes/No).

No 0%

Is system fully monitored (Yes/No).

No 0%

Total Sprinkler Reduction to Overall Fire Flow Demand

0%

### 4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

EXISTING EAST BUILDING	
Distance to Nearest Building to the North	60.0 m 0%
Distance to Nearest Building to the South	- 0%
Distance to Nearest Building to the East	2.0 m 25%
Distance to Nearest Building to the West	2.0 m 25%

Total Spacial Separation to Adjacent Structures

50%

### Additions

Is roof wood shingles or shakes (Yes/No).

No

## Fire Underwriters Survey

### Water Supply for Public Fire Protection (2020) Calculations

#### 7500 Lundy's Lane

Required Fire Flow in Litres per Minute

F=	9,000	(L/m)
	150.00	(L/s)
	2,378	(USgmp)

#### Type of Construction

Ordinary Construction (brick or other masonry walls, combustible floor and interior). C=

1.00

Total Floor Area in square metres (including all stories, excluding basements at least 50% below grade)

A= 641.2 (m<sup>2</sup>)

**NOTE:** Fire Walls that meet or exceed Nation Building Code of Canada (2 hour fire resistance) divide building.

Total Number of Floors

2

#### 2. Combustibility of Contents (*may not reduce fire flow demand below 2,000 L/min*)

Limited Combustible =

-15%

#### 3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).

No 0%

Water supply standard for both system and fire department hose lines (Yes/No).

No 0%

Is system fully monitored (Yes/No).

No 0%

Total Sprinkler Reduction to Overall Fire Flow Demand

0%

#### 4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

EXISTING WEST BUILDING

Distance to Nearest Building to the North

60.0 m 0%

Distance to Nearest Building to the South

- 0%

Distance to Nearest Building to the East

10.3 m 15%

Distance to Nearest Building to the West

13.5 m 15%

Total Spacial Separation to Adjacent Structures

30%

#### Additions

Is roof wood shingles or shakes (Yes/No).

No

# Fire Underwriters Survey

## Water Supply for Public Fire Protection (2020) Calculations

### 7800 Lundy's Lane

Required Fire Flow in Litres per Minute

F=	4,000	(L/m)
	66.67	(L/s)
	1,057	(USgpm)

### Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry or concrete)

0.80

Total Floor Area in square metres (including all stories, excluding basements at least 50% below grade)

A= 708 (m<sup>2</sup>)

**NOTE:** Fire Walls that meet or exceed Nation Building Code of Canada (2 hour fire resistance) divide building.

Total Number of Floors

1.5

### 2. Combustibility of Contents (*may not reduce fire flow demand below 2,000 L/min*)

Limited Combustible

-15%

### 3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).

Yes -30%

Water supply standard for both system and fire department hose lines (Yes/No).

Yes -10%

Is system fully monitored (Yes/No).

Yes -10%

Total Sprinkler Reduction to Overall Fire Flow Demand

-50%

### 4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

FUTURE BUILDING	
Distance to Nearest Building to the North	60.0 m 0%
Distance to Nearest Building to the South	17.5 m 15%
Distance to Nearest Building to the East	2.0 m 25%
Distance to Nearest Building to the West	13.7 m 15%

Total Spacial Separation to Adjacent Structures

55%

### Additions

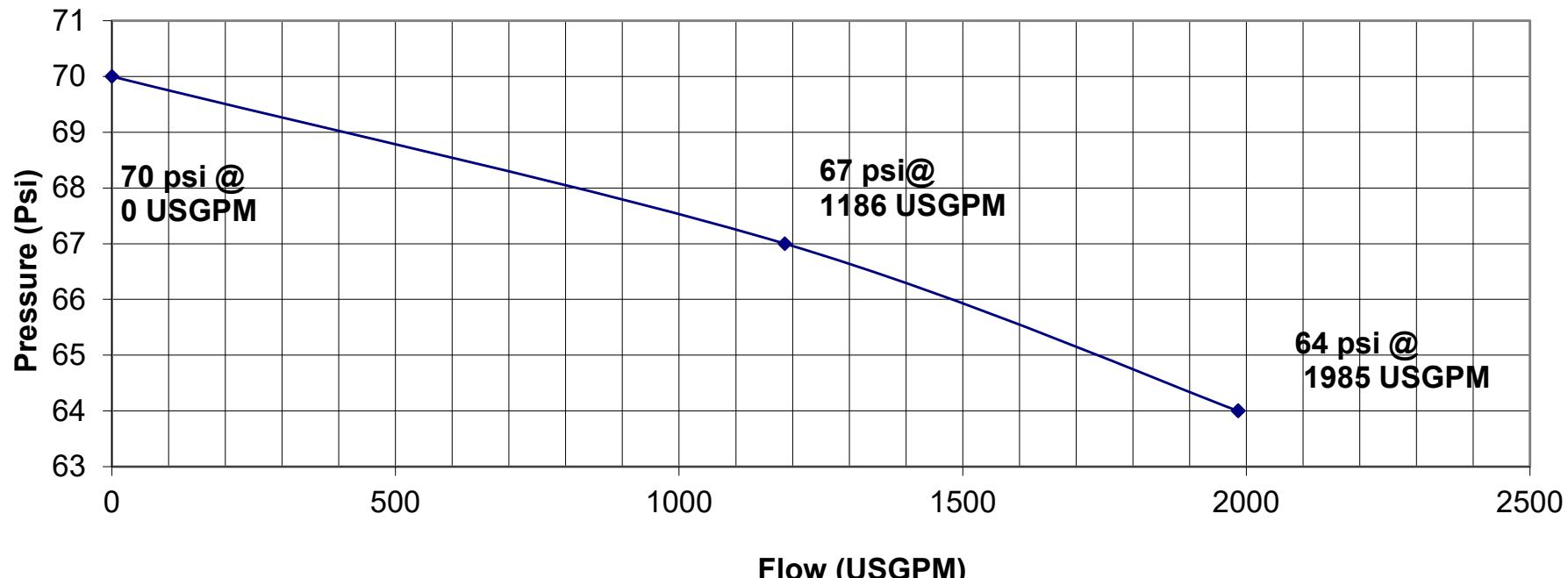
Is roof wood shingles or shakes (Yes/No).

No

**NIAGARA REGIONAL FIRE PROTECTION INC.**
**Flow Test Location: 7797 Lundy's Lane**

Static Pressure (Psi)	70	Pitot Reading 1	50	# of Outlets Flowed 1	1
Residual Pressure 1 (Psi)	67	Outlet Size 1	2.5	# of Outlets Flowed 2	2
Residual Pressure 2 (Psi)	64	Pitot Reading 2	35	# of Outlets Flowed 3	2
Residual Pressure 3 (Psi)	64	Outlet Size 2	2.5		
Coefficient value	0.9	Pitot Reading 3	35		
		Outlet Size 3	2.5		
		Flow 1 Calculated	1186.5		
		Flow 2 Calculated	1985.4		
		Flow 3 Calculated	1985.4		

### Water Graph



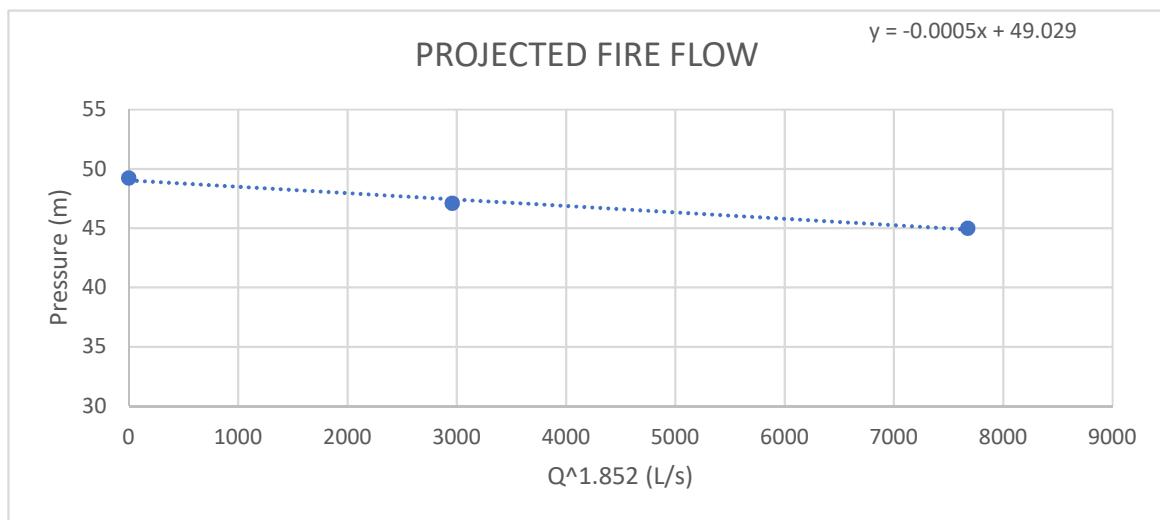
# FIRE FLOW CALCULATION SHEET

**Project:** 7800 Lundy's Gatta  
**Project Number:** 25009  
**Date:** April 11, 2025  
**Prepared By:** Kurt Tiessen, P.Eng.

**Flow Test Provided by:** Niagara Regional Fire Protection  
**Data of Test:** April 11, 2025  
**Hydrant Location:** 7797 Lundy's Lane

## FLOW TEST RESULTS

TEST	PRESSURE (psi)	FLOW RATE (USGPM)	FLOW RATE (L/s)	$Q^{1.852}$	PRESSURE (m)
STATIC	70	0	0	0	49.22
RESIDUAL 1	67	1186.5	74.86	2958.49	47.11
RESIDUAL 2	64	1985.4	125.26	7676.11	45.00



## FIRE FLOW FORMULA (y = ax + b)

$$a = -0.0005$$

$$b = 49.029$$

## FIRE FLOW AT A SPECIFIED PRESSURE

$$\begin{aligned} \text{Pressure} &= 20 \text{ psi} \\ \text{Pressure} &= 14.064 \text{ m} \\ Q^{1.852} &= 69930.00 \\ \text{Flow, } Q &= 412.96 \text{ L/s} \\ \text{Flow, } Q &= 6545.59 \text{ USGPM} \end{aligned}$$

## PRESSURE AT SPECIFIED FIRE FLOW

$$\begin{aligned} \text{Flow (Q)} &= 0 \text{ L/s} \\ Q^{1.852} &= 0.00 \\ \text{Pressure} &= 49.03 \text{ m} \\ \text{Pressure} &= 69.72 \text{ psi} \end{aligned}$$



UPPER CANADA  
CONSULTANTS  
*ENGINEERS / PLANNERS*

## APPENDIX B

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### Sanitary Sewer Calculations

UPPER CANADA CONSULTANTS  
3-30 HANNOVER DRIVE  
ST.CATHARINES, ONTARIO  
L2W 1A3

DESIGN FLOWS												SEWER DESIGN							
RESIDENTIAL: 255 LITRES/PERSON/DAY (AVERAGE DAILY FLOW - MECP)												PIPE ROUGHNESS:	0.013 FOR MANNING'S EQUATION						
COMMERCIAL: 28 m3/HA/DAY (AVERAGE DAILY FLOW - MECP)												PIPE ROUGHNESS:	0.013 FOR MANNING'S EQUATION						
MOTELS: 200 LITRES/BED/DAY (MECP DESIGN CRITERIA)												PIPE SIZES:	1.016 IMPERIAL EQUIVALENT FACTOR						
INFILTRATION RATE: 0.286 L / s / ha (M.O.E FLOW ALLOWANCE IS BETWEEN 0.10 & 0.28 L / s / ha)												PERCENT FULL:	TOTAL PEAK FLOW / CAPACITY						
POPULATION DENSITY: 1.6 PERSONS / APARTMENT UNIT																			
MUNICIPALITY:	CITY OF NIAGARA FALLS											SANITARY SEWER DESIGN SHEET							
PROJECT :	7800 LUNDY'S LANE											Peaking Factor= $M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = design population in thousands							
PROJECT NO:	25009																		
LOCATION			AREA			POPULATION				ACCUMULATED PEAK FLOW				DESIGN FLOW					
Location and Description	From M.H	To M.H.	Increment (hectares)	Accumulated (hectares)	Number of Units	Population Density (persons/unit)	Population Increment	Population Served	Total	Peaking Factor	Flow (L/s)	Infiltration	Total Peak Flow (L/s)	Pipe Diameter (mm)	Pipe Length (m)	Pipe Slope (%)	Full Flow (m/s)	Full Flow Capacity (L/s)	Percent Full
<b>EXISTING CONDITIONS</b>																			
7500 LUNDY'S LANE	EX MH	EX MH	0.70	0.70	78					2.00	0.36	0.20	0.56	375	83.3	0.54	1.18	134.41	0.4%
<b>FUTURE CONDITIONS</b>																			
FUTURE DEVELOPMENT			0.70		137	1.6	219	219	4.13	2.67									
			0.013							2.00	0.01								
TOTAL	PROP MH	EX MH		0.70							2.68	0.20	<b>2.88</b>	200	10.0	1.00	1.06	34.22	8.4%
	EX MH	EX MH		0.70							2.68	0.20	2.88	375	83.3	0.54	1.18	134.41	2.1%



## **APPENDIX C**

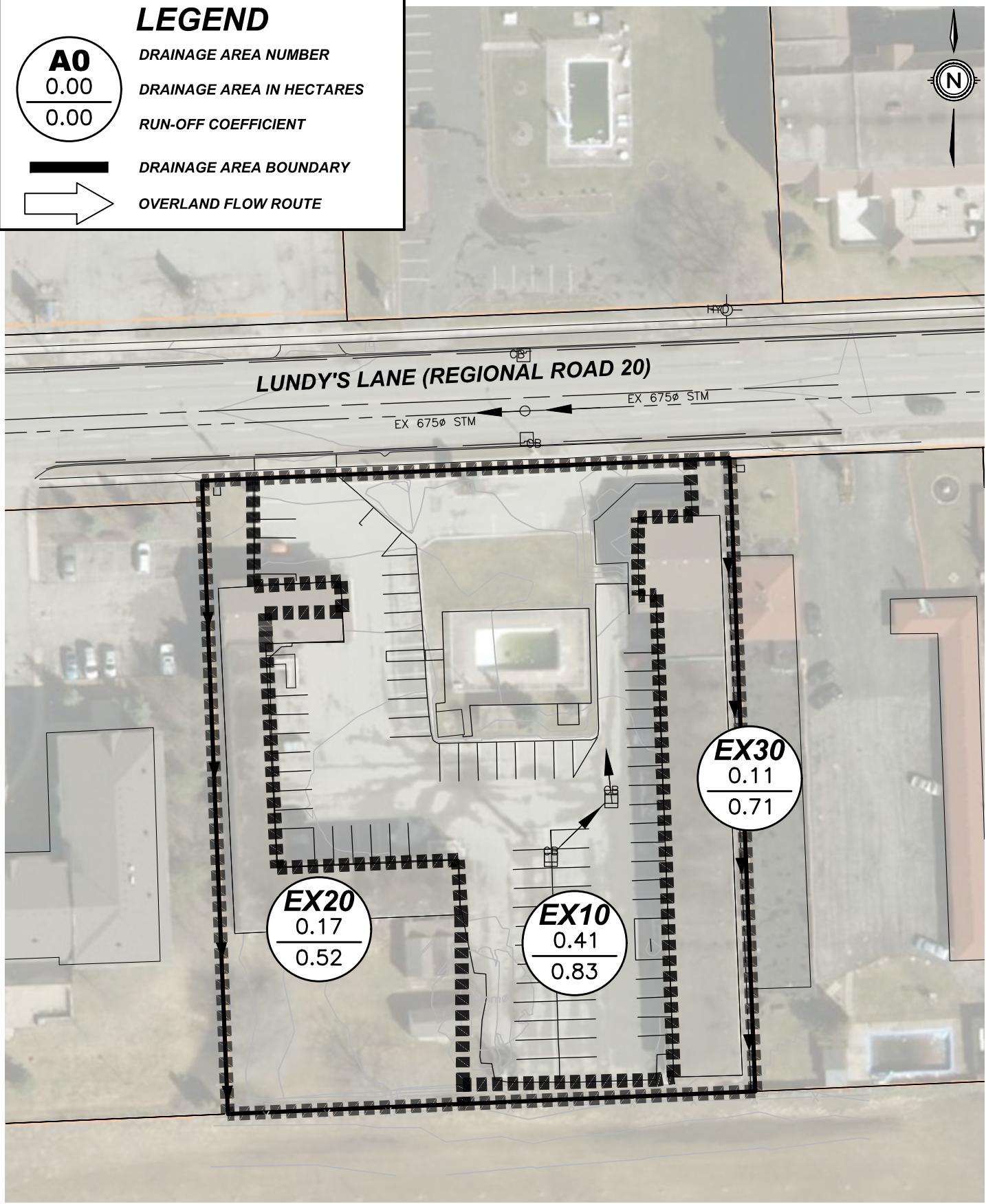
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**Figure 1 – Existing Overall Storm Drainage Area Plan  
Weighted Impervious Calculations  
Modified Rational Method Calculations – 5 & 100 Year Storm Events**

## LEGEND

**AO**  
0.00  
0.00

- DRAINAGE AREA NUMBER
- DRAINAGE AREA IN HECTARES
- RUN-OFF COEFFICIENT
- DRAINAGE AREA BOUNDARY
- OVERLAND FLOW ROUTE



**UPPER CANADA  
CONSULTANTS**  
ENGINEERS / PLANNERS

**7500 LUNDY'S LANE**  
**CITY OF NIAGARA FALLS**  
**EXISTING OVERALL STORM DRAINAGE AREA PLAN**

DATE	2025-06-26
SCALE	1:200 m
REF No.	25009
DWG No.	FIGURE 1

## Weighted Imperviousness Percentage Calculation Worksheet

Project Name: 7500 LUNDY'S LANE  
 Project Number: 25009  
 Date: June 2025  
 Person: K.Tiessen

### EX10 - EXISTING CONDITIONS

	<i>Footprint</i>	<i>Runoff Coefficient</i>	<i>Effective Impervious Area</i>
Impervious - Existing Buildings, Parking Lot & Pool	3756.2 m <sup>2</sup>	0.90	3380.6 m <sup>2</sup>
Pervious - Landscape	389.0 m <sup>2</sup>	0.20	77.8 m <sup>2</sup>
<b>TOTAL CATCHMENT IMPERVIOUS AREAS</b>	<b>3,458 m<sup>2</sup></b>		
<b>TOTAL CATCHMENT AREA</b>	<b>4,145 m<sup>2</sup></b>		
	<b>EFFECTIVE RUNOFF COEFFICIENT</b>		<b>0.83</b>

### EX20 - EXISTING CONDITIONS

	<i>Footprint</i>	<i>Runoff Coefficient</i>	<i>Effective Impervious Area</i>
Impervious - Existing Building & Parking Lot	771.4 m <sup>2</sup>	0.90	694.3 m <sup>2</sup>
Pervious - Landscape	938.4 m <sup>2</sup>	0.20	187.7 m <sup>2</sup>
<b>TOTAL CATCHMENT IMPERVIOUS AREAS</b>	<b>882 m<sup>2</sup></b>		
<b>TOTAL CATCHMENT AREA</b>	<b>1,710 m<sup>2</sup></b>		
	<b>EFFECTIVE RUNOFF COEFFICIENT</b>		<b>0.52</b>

### EX30 - EXISTING CONDITIONS

	<i>Footprint</i>	<i>Runoff Coefficient</i>	<i>Effective Impervious Area</i>
Impervious - Existing Building	813.5 m <sup>2</sup>	0.90	732.2 m <sup>2</sup>
Pervious - Landscape	295.1 m <sup>2</sup>	0.20	59.0 m <sup>2</sup>
<b>TOTAL CATCHMENT IMPERVIOUS AREAS</b>	<b>791 m<sup>2</sup></b>		
<b>TOTAL CATCHMENT AREA</b>	<b>1,109 m<sup>2</sup></b>		
	<b>EFFECTIVE RUNOFF COEFFICIENT</b>		<b>0.71</b>

**MODIFIED RATIONAL METHOD FLOW CALCULATION**  
**5 YEAR STORM EVENT**

**PROJECT: 7500 LUNDY'S LANE, NIAGARA FALLS**

DESCRIPTION	LOCATION					TIME OF FLOW		STORMWATER ANALYSIS				
	FROM M.H.	TO M.H.	PIPE LENGTH (m)	INCREMENT AREA (hectares)	TOTAL AREA (hectares)	TO UPPER END (min)	IN SECTION (min)	RUNOFF COEFF	SECTION A X R	ACCUMLD A x R	RAINFALL INTENSITY (mm/hr)	PEAK FLOW (L/s)
<b>EXISTING CONDITIONS</b>												
EX10 - PARKING LOT		LUNDY'S		0.41	0.41	10.00	0.00	0.830	0.340	0.340	83.954	79.4
<b>TOTAL TO LUNDY'S LANE</b>												79.4
EX20 - WEST ROOFTOP		ST.GEORGE		0.17	0.17	10.00	0.00	0.520	0.088	0.088	83.954	20.6
EX30 - EAST ROOFTOP		ST.GEORGE		0.11	0.11	10.00	0.00	0.710	0.078	0.078	83.954	18.2
<b>TOTAL TO ST. GEORGES</b>												38.8
<b>DESIGN BY:</b>	UPPER CANADA CONSULTANTS 30 HANNOVER DRIVE, UNIT 3 ST. CATHARINES, ON L2W 1A3				<b>RAINFALL PARAMETERS:</b> Time to Upper End = 10 min. City of Niagara Falls - 5 Year IDF Curve				a = 719.50	mm/hr	b = 6.34	minutes
<b>DESIGN BY:</b>	K.TIESSEN, P.ENG.								c = 0.77			
<b>DATE:</b>	JUNE 2025											

**MODIFIED RATIONAL METHOD FLOW CALCULATION**  
**100 YEAR STORM EVENT**

**PROJECT: 7500 LUNDY'S LANE, NIAGARA FALLS**

<b>DESCRIPTION</b>	<b>LOCATION</b>					<b>TIME OF FLOW</b>		<b>STORMWATER ANALYSIS</b>				
	<b>FROM M.H.</b>	<b>TO M.H.</b>	<b>PIPE LENGTH (m)</b>	<b>INCREMENT AREA (hectares)</b>	<b>TOTAL AREA (hectares)</b>	<b>TO UPPER END (min)</b>	<b>IN SECTION (min)</b>	<b>RUNOFF COEFF</b>	<b>SECTION A X R</b>	<b>ACCUMLD A x R</b>	<b>RAINFALL INTENSITY (mm/hr)</b>	<b>PEAK FLOW (L/s)</b>
<b>EXISTING CONDITIONS</b>												
EX10 - PARKING LOT		LUNDY'S		0.41	0.41	10.00	0.00	0.830	0.340	0.340	133.938	126.6
<b>TOTAL TO LUNDY'S LANE</b>												
EX20 - WEST ROOFTOP		ST.GEORGE		0.17	0.17	10.00	0.00	0.520	0.088	0.088	133.938	32.9
EX30 - EAST ROOFTOP		ST.GEORGE		0.11	0.11	10.00	0.00	0.710	0.078	0.078	133.938	29.1
<b>TOTAL TO ST. GEORGES</b>												
<b>DESIGN BY:</b>	<b>UPPER CANADA CONSULTANTS</b> <b>30 HANNOVER DRIVE, UNIT 3</b> <b>ST. CATHARINES, ON L2W 1A3</b>					<b>RAINFALL PARAMETERS:</b>			<b>a =</b>	<b>1264.60</b>	<b>mm/hr</b>	
<b>DESIGN BY:</b>	<b>K.TIESSEN, P.ENG.</b>					Time to Upper End = 10 min.			<b>b =</b>	<b>7.72</b>	<b>minutes</b>	
<b>DATE:</b>	<b>JUNE 2025</b>					City of Niagara Falls - 100 Year IDF Curve			<b>c =</b>	<b>0.78</b>		