Established 1793
Incorporated
Wolford 1850
Merrickville 1860
Amalgamated 1998

Telephone (613) 269-4791
Facsimile (613) 269-3095

VILLAGE OF MERRICKVILLE-WOLFORD

Agenda for Council
Council Chambers

Special Council Meeting 10:00 a.m. Friday, September 11, 2020

*****IMPORTANT NOTICE: This meeting will be held in person at the Council Chambers. However, due to the Provincial Emergency Orders still in effect, we are unable to safely accommodate the public at this meeting. In order to ensure transparency, an audio recording of this meeting will be posted on the website immediately following adjournment.*****

1. **Call to Order**
2. **Disclosure of Pecuniary Interest and the general nature thereof**
3. **Approval of the Agenda**
4. **Planning:** 44-2020 re: Authorize Acquisition of Parts 1 and 2, 15R12089 and Blocks 21 to 28 inclusive, Plan 15M13
5. **Water/Wastewater:** Preliminary Infiltration and Inflow Report of Jp2g Consultants Inc.
6. **By-laws:** 45-2020 re: Appoint Deputy Chief Building Official
7. **Next meeting of Council**: Monday, September 14, 2020 at 6:00 p.m.
8. **Confirming By-Law:** 46-2020 re: Confirm Proceedings of Council meeting of September 11, 2020
9. **Adjournment**.

For Clerk's use only, if required:

Recorded Vote Requested By:

Cameron	Y	N
Foster	Y	N
Halpenny	Y	N
Molloy	Y	N
Struthers	Y	N

Resolution Number: R - - 20

Date: September 11, 2020

Moved by: Cameron Foster Halpenny Molloy

Seconded by: Cameron Foster Halpenny Molloy

Be it hereby resolved that:

The Council of the Corporation of the Village of Merrickville-Wolford does hereby approve the agenda of the special Council meeting of September 11, 2020 as:

___ circulated.

___ amended.

Carried / Defeated

_____

J. Douglas Struthers, Mayor

For Clerk's use only, if required:

Recorded Vote Requested By:

Cameron	Y	N
Foster	Y	N
Halpenny	Y	N
Molloy	Y	N
Struthers	Y	N

Resolution Number: R - - 20

Date: September 11, 2020

Moved by: Cameron Foster Halpenny Molloy

Seconded by: Cameron Foster Halpenny Molloy

Be it hereby resolved that: By-law 44-2020, being a by-law to authorize the acquisition of the property legally described as Parts 1 and 2, 15R12089 and Blocks 21 to 28 inclusive, Plan 15M13, be read a first and second time, and that By-law 44-2020 be read a third and final time and passed.

Carried / Defeated

_____

J. Douglas Struthers, Mayor

THE CORPORATION OF THE VILLAGE OF MERRICKVILLE-WOLFORD
BY-LAW 44-2020

BEING A BY-LAW TO AUTHORIZE THE ACQUISITION OF THE PROPERTY LEGALLY DESCRIBED AS PARTS 1 AND 2, 15R12089 AND BLOCKS 21 to 28 INCLUSIVE, PLAN 15M13

WHEREAS section 9 of the *Municipal Act, 2001,* as amended, provides that a municipality has the capacity, rights, powers and privileges of a natural person for the purpose of exercising its authority under this or any other Act;

AND WHEREAS section 5(3) of the Municipal Act, 2001 states that municipal power, including a municipality's capacity, rights, powers and privileges, shall be exercised by by-law, unless the municipality is specifically authorized to do otherwise;

AND WHEREAS the Council of the Corporation of the Village of Merrickville-Wolford wishes to acquire the land as legally described below;

NOW THEREFORE the Council of the Corporation of the Village of Merrickville-Wolford hereby enacts as follows:

1. The transfer of the real property legally described as Parts 1 and 2, 15R12089 and Blocks 21 to 28 inclusive, Plan 15M13 to the Village of Merrickville-Wolford at no cost or expense to the Village is hereby authorized.
2. The aforementioned land is intended for future road allowances.
3. The Village does not require this land to be appraised prior to the transfer.
4. The CAO/Clerk/Director of Economic Development is hereby authorized to execute any documents required for the aforementioned transfer to be completed.

This by-law shall come into force and take effect immediately upon the final passing thereof.

Read a first, second and third time and passed on the 11th day of September, 2020.

_____
J. Douglas Struthers, Mayor

_____
Doug Robertson, CAO/Clerk

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE Aug. 13, 2020

GEORGE N. BRACKEN
ONTARIO LAND SURVEYOR

PLAN 15R 12089
RECEIVED AND DEPOSITED.

DATE August 12, 2020

Melanie Froom
REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF GRENVILLE. (No.15)

LAND TITLES SCHEDULE

PART	STREET/LOT	REG'D PLAN	PIN
1	PART OF LOT 190 PART OF ST. JOHN & EDWARD STREET PART OF LOT 1, BLOCK 16	6	PART OF 68108-0653(LT)
2	PART OF LOTS 190 & 191 PART OF ST. JOHN STREET PART OF LOTS 1 & 9, BLOCK 16		
3	PART OF EDWARD STREET PART OF LOT 1, BLOCK 16		

PLAN OF SURVEY OF
PART OF ST. JOHN STREET
(CLOSED BY BY-LAW 05-07, INST. No. GC8754)
PART OF EDWARD STREET
(CLOSED BY BY-LAW 05-07, INST. No. GC8754)
PART OF LOTS 1 AND 9, BLOCK 16
PART OF LOTS 190 AND 191
REGISTERED PLAN No. 6
GEOGRAPHIC VILLAGE OF MERRICKVILLE
VILLAGE OF MERRICKVILLE/WOLFORD
COUNTY OF GRENVILLE
GEORGE N. BRACKEN, O.L.S.

SCALE 1 : 500

0 5 10 15 20 25 50 METRES

METRIC: DISTANCES & COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

BEARING REFERENCE

BEARINGS SHOWN ON THIS PLAN ARE UTM GRID BEARINGS, USING REAL TIME NETWORK OBSERVATIONS, AND ARE REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 18 (75°00' WEST LONGITUDE) NAD83 (CSRS)

FOR BEARING COMPARISONS, A ROTATION FACTOR OF 00°35'00" CLOCKWISE WAS APPLIED TO BEARINGS ON P1 AND P4

LEGEND

■	DENOTES SURVEY MONUMENT FOUND
□	DENOTES SHORT STANDARD IRON BAR PLANTED
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
CP	DENOTES CONCRETE PIN
RPL	DENOTES ROCK PLUG
X—X	DENOTES FENCE
(1442)	DENOTES J. KENNEDY, O.L.S.
(1697)	DENOTES J. SHIPMAN, O.L.S.
(1433)	DENOTES R.C. McBURNEY, O.L.S.
(1054)	DENOTES G. BRACKEN, O.L.S.
(J-B)	DENOTES JORDAN BENNET GEOMATICS INC.
(783)	DENOTES K. WISEMAN, O.L.S.
P1	DENOTES REGISTERED PLAN 15M-13
P2	DENOTES REGISTERED PLAN No. 6
P3	DENOTES PLAN 15R-11945
P4	DENOTES PLAN 15R-11145

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 11th. DAY OF AUG., 2020.

DATE: Aug. 12 2020

GEORGE N. BRACKEN
ONTARIO LAND SURVEYOR

INTEGRATION DATA

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999642.

OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 18,NAD83 (CSRSX1997.0) COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O. REG. 216/10.

POINT ID	NORTHING	EASTING
A	4972888.95	433910.28
B	4973128.18	433941.20

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

Callon Dietz INCORPORATED
ONTARIO LAND SURVEYORS
CARLETON PLACE LONDON NORTH BAY
info@callondietz.com callondietz.com

SURVEY BY: AO	DRAWN BY: GNB	FILE No: 20-0642	PLAN No: E-1170

ISO 9001 REGISTERED

For Clerk's use only, if required:

Recorded Vote Requested By:

Cameron	Y	N
Foster	Y	N
Halpenny	Y	N
Molloy	Y	N
Struthers	Y	N

Resolution Number: R - - 20

Date: September 11, 2020

Moved by: Cameron Foster Halpenny Molloy

Seconded by: Cameron Foster Halpenny Molloy

Be it hereby resolved that:

The Council of the Corporation of the Village of Merrickville-Wolford does hereby receive the draft Preliminary Infiltration and Inflow Report of Jp2g Consultants Inc. dated August 7, 2020, for information purposes.

Carried / Defeated

_____

J. Douglas Struthers, Mayor

Preliminary Infiltration and Inflow Report

Village of Merrickville-Wolford
Merrickville, Ontario

Prepared for

MERRICKVILLE-WOLFORD
Jewel of the Rideau

The Village of Merrickville-Wolford
Project File No. 19-5031D

Prepared by

Jp2g Consultants Inc.
1150 Morrison Drive, Suite 410, Ottawa, Ontario, K2H 8S9
T.613.828.7800 F.613.828.2600
Jp2g Project No. 19-5031D

Aug 7, 2020 - Draft

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1 Executive Summary

The Village of Merrickville wastewater treatment plant has an 800 m^3/day annual daily average rated capacity. The average influent flow to the plant over 2014 - 2018 is 619 m3/day, though high sanitary flows in the spring melts, particularly in 2017 when the plant experienced a peak flow of 3058 m3/day, have initiated a review of the system capacity. The May 15, 2018 MOE Plant Inspection Report # 1-I96OE highlighted this issue and the Municipality engaged Jp2g to perform this Infiltration and Inflow (I&I) Study as part of their on-going effort to reduce extraneous flows. This study will follow the procedures outlined in the Federation of Canadian Municipalities Best Practice Guideline "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems".

Catchment areas are defined by the areas draining to the St. Lawrence Street main, to the Church Street main and to the header on Main Street collecting all flows to the pump station.

The findings are summarized below:

Catchment Area	Ground Water Infiltration (GWI)		Rainfall Derived Infiltration and Inflow (RDII)				
	(m3/day)	(L/s/ha)	(m3/day)	(L/Ha.day)	(L/d/km.cm)	(L/week/ km.cm)	(L/s/ha)
Main Street	82	0.09	255	23182	6922	4235	0.27
Church Street	29	0.02	38	2235	963	6283	0.03
St. Lawrence Street	67	0.03	631	26292	11856	10259	0.30
Total	178	0.04	924	17769	7133	7334	0.21
Guideline Limit		0.12 (Ontario Ministry of the Environment)		11,200 to 12000 (Greater Vancouver Regional District Liquid Waste Management Plan, Ministere de L'Environment du Quebec)	3000 to 5000 (Ministere de L'Environment du Quebec)	1400 (Ontario Ministry of the Environment)	0.28 (City of Ottawa Design Value)

Table 1 – Summary of Findings

All catchment areas are above the 1400 L/cm.km per peak week noted by the MOE Sewer System Design Guidelines as the threshold above which it is economical to pursue rehabilitation. Main Street and St Lawrence Street are both above the 12,000 L/Ha/day limit recommended by the Quebec Ministry of the Environment. Church Street is within acceptable levels per hectare and per pipe length-diameter.

A review of the flow profiles of each catchment area reveals that Church Street flows remain relatively stable even during rainfall events. St. Lawrence Street flows peak drastically and quickly during a rainfall event, which likely indicate direct storm water inflow to the sanitary sewer in that catchment area. This is possibly due to direct roof drain connections to sanitary, sump pump connections to sanitary, unsealed sanitary manhole covers, or a combination thereof.

St Lawrence Street is the largest area and its flows follow the plant flow profile closely, whereas Church Street remains relatively flat even during rainfall events. Both Main Street and St Lawrence Street exceed guidelines for acceptable infiltration and inflow amounts per hectare and per km.cm of pipe. The large peaks in flow on St. Lawrence Street and the steadily above-average flows on Main Street are the major contributing areas to the overall excessive I&I. Based on the analysis of flow data, the St. Lawrence Street catchment is most impacted by direct inflow and the Main Street catchment is most impacted by groundwater infiltration and these areas should be given a high priority for corrective action.

Recommended actions are as follows:

1. <u>CCTV Inspection in Main Street and St. Lawrence Street Catchment Areas - Work completed in 2019</u>

2. Pipe Grouting to reduce infiltration
3. Manhole Inspection and Sealing Program to reduce infiltration and inflow
4. Inspection and Disconnection from Sanitary System of Dwelling Roof Leader and Sump Connections
5. Public Awareness Campaign to gain public support to disconnect roof leaders and sump connections
6. Stormwater System Assessment to confirm capacity for alternative outlets for inflow.

2 Background

2.1 Context and Scope

The Village of Merrickville owns a communal wastewater collection and treatment system. The system consists of 5.95 km of gravity pipeline (ranging from 200mm to 300mm in diameter), one (1) pumping station with associated forcemain and a 800 m^3/day annual daily average rated capacity sequencing batch reactor with Integrated Surge Anoxic Mixing waste water treatment plant. The maximum hydraulic capacity of the plant is 3,800 m^3/day, though practical experience reported from the plant operators indicates difficulties in maintaining required effluent criteria at flows above the average daily rated capacity. The plant was constructed in 2010 and has been operational since that time. Within the Village there are approximately 385 municipal sewer connections to the sanitary sewer network and 29 equivalent lots approved to be connected in the future, servicing approximately 797 residents.

The average influent flow to the plant over 2014 - 2018 is 619 m3/day, though high sanitary flows in the spring melts, particularly in 2017 when the plant experienced a peak flow of 3058 m3/day, have initiated a review of the system capacity. The May 15, 2018 MOE Plant Inspection Report # 1-I96OE highlighted this issue and recommended "that the Municipality of Merrickville-Wolford review and update any/all of it's current Water and Sewer use by-laws to provide an enforceable prohibition of un-authorized connections to its sewage collection system." This action will assist with the reduction of long-term inflow due to illegal stormwater connections to the sanitary collection system. The Village has also initiated a sanitary sewer grouting program with the aim to reduce direct infiltration into the sanitary sewer system. 2019 sewer grouting along Brock Street was completed.

In addition to the above actions, the Municipality has engaged Jp2g to perform this Infiltration and Inflow (I&I) Study. This study will follow the procedures outlined in the Federation of Canadian Municipalities Best Practice Guideline "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems". This procedure establishes flows in various catchment areas using flow monitors. The results of the individual wet weather and dry weather flow analysis in each catchment area will aid in quantifying and isolating infiltration and inflow and will provide supporting information for CCTV inspection, infrastructure repair prioritization, inspection of sump pump and roof drain connections to the system, and installation of stormwater collection infrastructure.

2.2 Methodology

The following is the outline of the strategy recommended by the Federation of Canadian Municipalities' 2003 Best Practice Guide: "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems".

Stage 1: Knowledge of the Sewer System

1.1 Review system information and compile into a Sewer Map which includes details of the system infrastructure including street names, flood plains, pump stations and treatment plants, piping layouts, sizing and slopes, etc.

1.2 Interview staff and prepare a Field Information and Observation Map which overlays notes on the system performance onto the Sewer Map and includes maintenance and operations data of infiltration observations in manholes and pipes, potential inflow sources, presence of sediments in manholes, traces of surcharge in manholes, high level of water during wet weather, emergency pumping sites, abnormal dry weather flows, location of overflow and basement flooding events, manholes in low lying areas, and CCTV inspection results.

1.3 Determine sub-basins using the above information. Each sub-basin should be less than 500 hectares and complete with a permanent structure for flow monitoring (pumping station treatment plant, flow meter, etc).

Stage 2: Monitoring Flows

Flows are recorded at manholes receiving from each sub-basin area, main pump stations and treatment plants. Flow monitoring is performed with continuous flow monitors and data loggers through wet and dry seasons (April to August, for example) to determine the parameters that allow for the calculation of infiltration (the lowest of the recorded dry weather flow), and calculation of inflow (total flow during rainfall event excluding dry weather flow).

2.1 Determine Dry Weather and Wet Weather Flow by performing continuous flow monitoring in each sub-basin area during wet weather and dry weather periods.

2.2 Determine Emergency/Bypass Flow. If overflows occur during rainfall events the flows must be monitored and included in the wet weather flow calculation.
2.3 Gather Rainfall and Plant Flows for the period of dry and wet weather flow to confirm dry and wet weather periods. Treatment and pump station flow data will be used to confirm total flows of all sub-basin areas.
2.4 Evaluate sub-basin infiltration and inflow to narrow the scope of further investigation to the areas that have excessive infiltration and inflow to find exact points of infiltration and inflow.
2.5 Determine the methods to be used for further investigation such as smoke testing, dye testing, building plumbing inspection, manhole inspection, flow isolation, TV inspection, lateral testing.

Stage 3: Sewer Assessment and Analysis

3.1 Perform testing/investigation and determine points of infiltration/inflow.
3.2 Perform a structural assessment of the sewer system where points of infiltration and inflow have been discovered to determine the degree of remediation required.
3.3 Perform a hydraulic assessment of the sewer system to determine if sections of the system are not performing as expected and if increases in drainage capacity are required.
3.4 Prepare a report that compiles all flow test results, investigation results, analysis, recommendations for remediation options, and costs for recommended options

Stage 4: System Remediation Plan Development

4.1 Establish priorities in remediation work based on the cost of the required work, the improvement in performance of the work, social implications, plant performance and operation and maintenance costs.
4.2 Prepare design and construction drawings of remediation work.

Stage 5: System Remediation Plan Implementation

5.1 Perform construction of remediation work
5.2 Perform flow monitoring to ensure the predicted improvements in flow reduction have been achieved.
5.3 Update sewer maps and records based on the remediation work.

Stage 1 and Stage 2 will be assessed in this report. Stage 3 -5 are dependent on the findings under State 1-2.

2.3 Definitions

Infiltration: water entering a sewer system, including building sewers, from the ground through such means as defective pipes, pipe joints, connections or manhole walls.

Inflow: water discharged to a sanitary sewer system, including service connections, from sources such as roof leaders, cellar, yard or area drains, foundation drains, drainage from springs and swampy areas, manhole covers, interconnections from storm sewers, combined sewers and catch basins, storm waters, surface runoff, street wash waters or drainage.

Base Sanitary Flow: The wastewater flow generated from building domestic and process systems only.

L/d/ km.cm: A characterization of the amount of pipe in a catchment area equal to the total length of pipe segments multiplied by the diameter of those segments. This value is intended to reflect not just the length of pipe but the size of the pipe, as a larger surface area of pipe and a larger number of joints with larger perimeters would provide more opportunity for infiltration to occur.

2.4 References

- Federation of Canadian Municipalities' 2003 Best Practice Guide: "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems".
- U.S. EPA Sewer System Infrastructure Analysis and Rehabilitation
- Ministry of the Environment Sanitary Sewer System Programme 1-0019-66 Drawing
- Ministry of the Environment Design Guidelines for Sewer Works, 2008
- MOE Plant Inspection Report # 1-I96OE

- Jp2g Letter January 20, 2020: MOE Procedure D-5-1 “Calculating and Reporting Uncommitted Reserve Capacity at Sewage and Water Treatment Plants.”
- Jp2g Letter January 20, 2020: Merrickville STP capacity Review

3 Investigation

3.1 Knowledge of the Sewer System

Review of the existing sewer system drawings shows that the sewer along Main Street is a main header which collects flows from the Church Street and St. Lawrence Street main sewers and then terminates at the sewage lift station to be lifted to the sewage treatment plant. Catchment areas are determined by areas draining to St. Lawrence Street, to Church Street and to Main Street and are shown in the figure below.

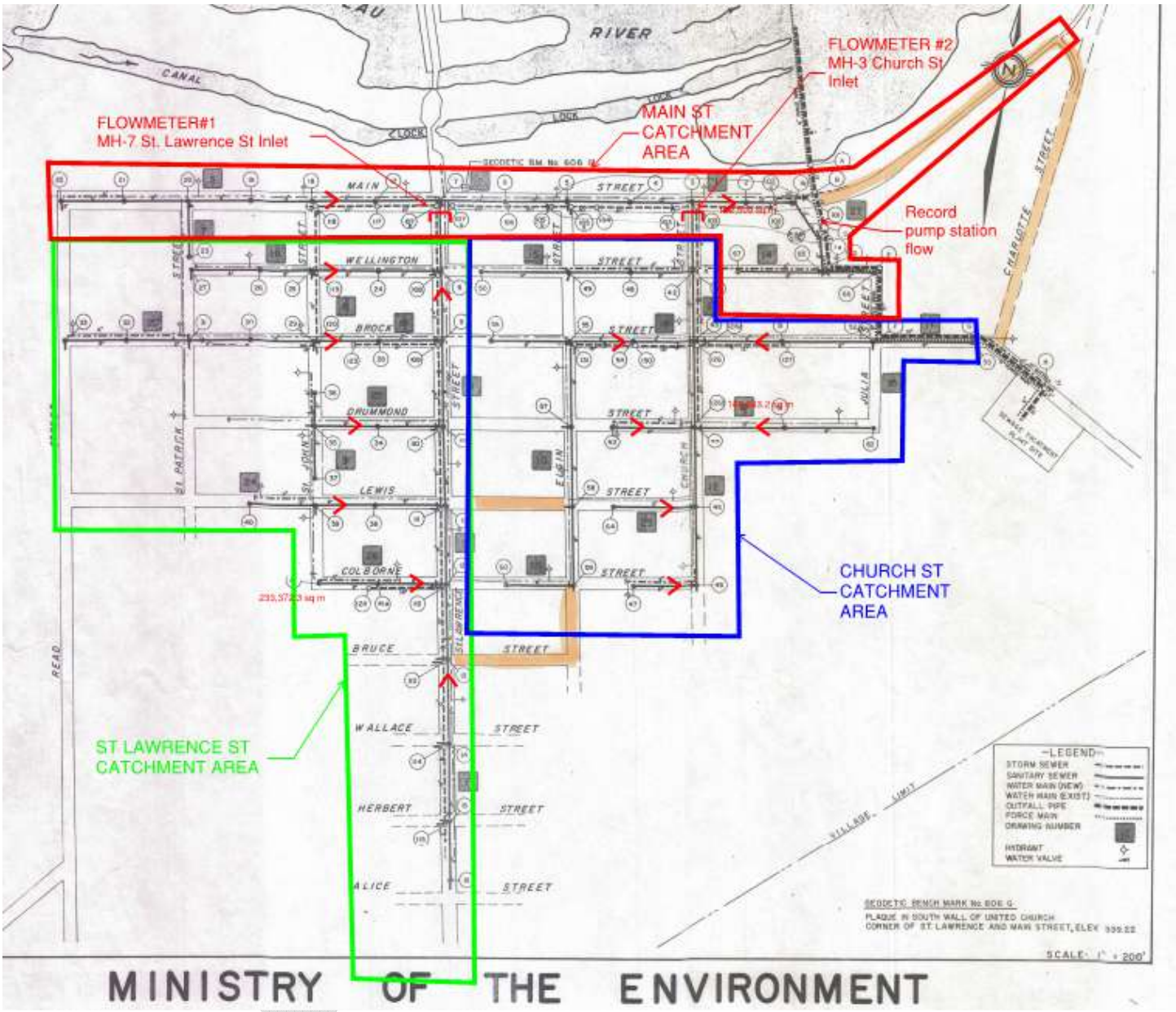

Figure 1: Catchment Areas

In this study catchment areas are defined in terms of area, the amount of pipe within each catchment, and the number of sanitary connections in each catchment. This will help align with the various benchmarking parameters available. The details of each catchment area are as follows:

	Area (Ha)	Pipe (km.cm)	Connections
Main St	11	36.84	84
Church St	17	39.47	137
St. Lawrence St	24	53.22	153
Total	52	129.53	374

Table 2 – Catchment Area Details

3.2 Monitoring Flows

Flow monitors were installed in two locations on Main Street. One flow monitor was installed at manhole 7 where the collected outlet from St. Lawrence street connects to Main Street. A second monitor was installed in manhole 3 where the collected flow from Church Street connects to Main St. Flows for Main Street were calculated by subtracting the St. Lawrence and Church Street flows from the daily influent flow recorded at the treatment plant.

The flow monitors used for this study were Greyline AVFM ultrasonic area-velocity type flow meters simultaneously measuring depth of flow in the pipe and flow velocity. Sensors were secured inside the pipe discharging into the respective manhole with a metal retaining band that ensured the sensor was level. Battery-powered data recording boxes were secured to the manhole ladder rungs at the top of the manhole for easy data retrieval throughout the flow monitoring period. Monitors were installed by Ontario Clean Water Agency employees under the supervision of Jp2g Consultants Inc. staff. Data was collected starting March 17th, 2020, with measurements taken at 2 minute intervals.

Several days of flow information were lost due to sensors being covered by a buildup of sanitary wipes covering the sensors. On those occasions it was also impossible to derive flow data for Main Street, which is calculated as the remainder of total flow at the plant less the flow of the other catchment areas. Compounding this, the only numbers that were recorded by the sensors for long time periods were large pulses of water that temporarily uncovered the sensors for less than two minutes. The small number of data points at such a high flow created a false average daily flow value higher than even the plant total flow. Therefore, average flow values were manually interpolated for the time periods that the sensors were covered.

Rainfall data was gathered from the Environment Canada website. The closest weather station with complete daily rainfall data is the Ottawa International Airport, approximately 50km away.

The collected flow information for the plant and for each catchment area is provided in the figure below.

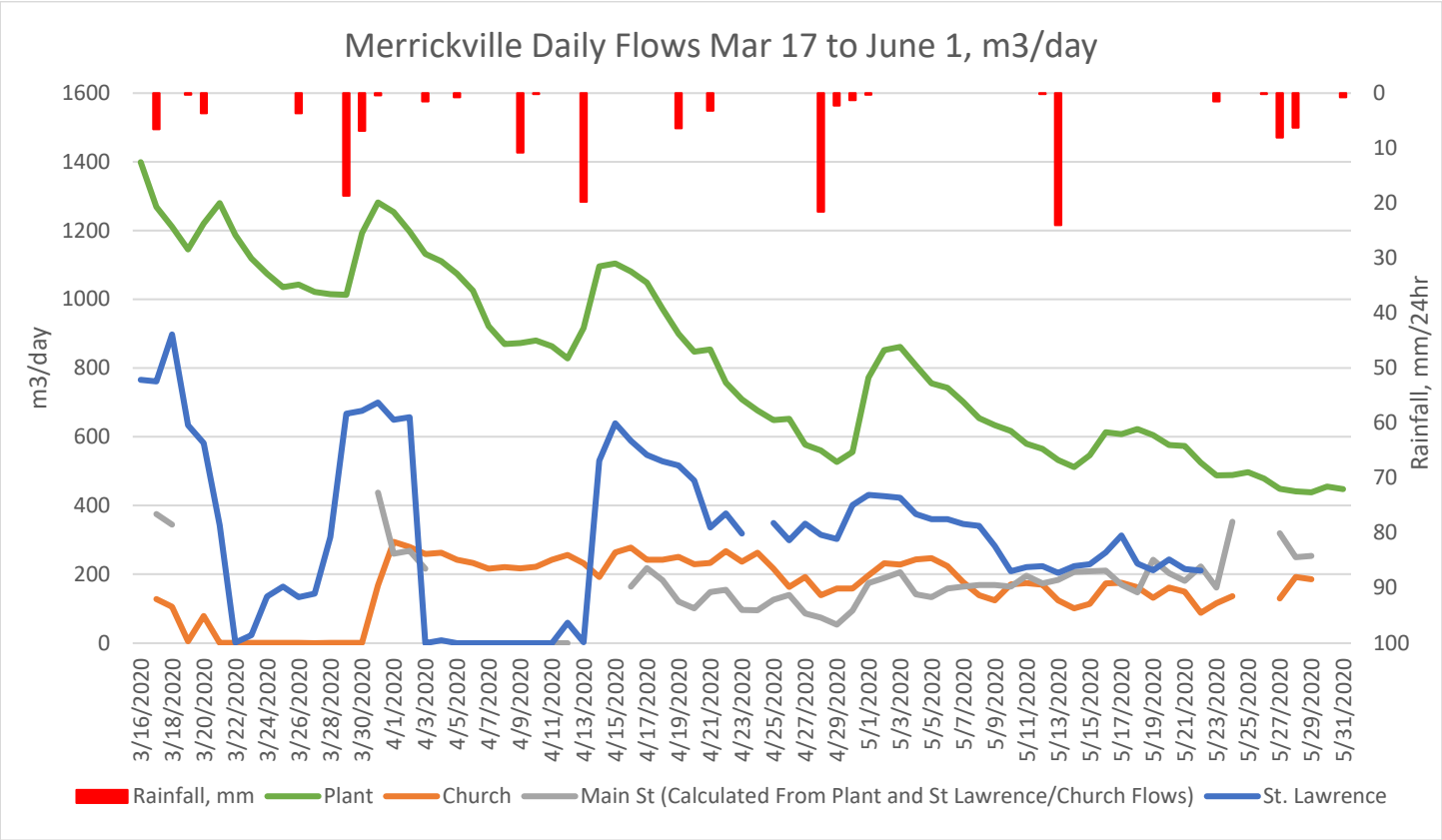

Figure 2: Merrickville Flows March 17th to June 1st, 2020

4 Analysis

4.1 Infiltration and Inflow Analysis Procedure

Infiltration and inflow amounts are determined in accordance with the following procedure from the Federation of Canadian Municipalities' 2003 Best Practice Guide: "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems" and the U.S. EPA Sewer System Infrastructure Analysis and Rehabilitation:

- Plot wastewater flow rate as a function of time
- Establish the estimated wastewater production rate based on water supply records and draw the line on the plot for this flow (waste water production rate is normally comparable to potable water production).
- Draw a line through the lower limit of the recorded flows. The distance between this line and the wastewater production rate provides an estimate of the infiltration.
- The area left above the infiltration line is an estimate of the inflow.

4.2 Benchmarking Data of Acceptable Infiltration and Inflow Amounts

Many benchmarking values are available for infiltration and inflow; some related to the overall area of a catchment, or the size and length of pipe in a catchment, or the number of buildings serviced in a catchment (connections).

The following values are benchmarking figures from various sources

Infiltration And Inflow Limit Benchmarking		
Parameter Value	**Source**	**Notes**
11 200 l/ha/d as a result of a storm with less than a five year return period (infiltration + inflow design allowance)	Greater Vancouver Regional District, Liquid Waste Management Plan, February 2001	Table 3-1: Federation of Canadian Municipalities' 2003 Best Practice Guide: "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems".
12 000 l/ha/d or 3,000 l/cm/km/d (average infiltration in existing systems)	Ministere de l'Environment du Quebec, Directive 004, 1989	Table 3-1: Federation of Canadian Municipalities' 2003 Best Practice Guide: "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems".
5000 l/cm/km/day or 150 l/m/d (further investigations were required when infiltration exceeds one or both parameters)	Ministere de l'Environnement du Quebec, Guide technique sur la realisation des etudes preliminaires, October 1988	Table 3-1: Federation of Canadian Municipalities' 2003 Best Practice Guide: "Infiltration/Inflow Control/Reduction For Wastewater Collection Systems".
1400 L/km.m (average flow in a peak week)	MOE Sewer System Design Guidelines, 2008	This is noted as the level below which it is not "economical for rehabilitation".
Dry weather I/I: 0.05 L/s/ha Wet Weather I/I: 0.28 L/s	City of Ottawa Design Guidelines - Sewer Technical Bulletin ISTB-2018-01	Allowances for new sewer system design

Table 3 – Benchmarking Infiltration and Inflow Limits

4.3 Dry Weather Analysis

The objective of the dry weather flow analysis is to determine the infiltration rate and the base sanitary flow rate. The lower limit of waste water flow during dry weather periods is a combination of the base sanitary flow from domestic and process uses and the groundwater infiltration. The base sanitary flow of the whole system is determined from the water plant records. The portion of this base sanitary flow used in each catchment area is estimated to be proportionate to the number of sanitary system connections in each catchment area. These base sanitary flows are subtracted from the minimum flows in each catchment area to define the groundwater infiltration rate in each area.

Throughout June the average recorded waste water flow was 347m3/day and represents the dry weather minimum flow for the system. The minimum water supply is estimated to be 300 L/cap/day x 797 people = 239 m3/day. The Federation of Canadian Municipalities Best Practice Guide states that "In general, around 70 percent of the water consumed is returned to the wastewater system in summer. This figure increases to about 90 percent in the winter months." The base sanitary flow is then estimated to be 239 m3/day x 0.7 = 167 m3/day and is apportioned to each catchment area by the relative number of connections.

Catchment Area	Avg. Dry Weather Flows	Base Sanitary Flow	Groundwater Infiltration (GWI)	
	(m3/day)	(m3/day) (1)	(m3/day)	(L/s/ha)
Main Street	120	38	82	0.09
Church St	90	61	29	0.02
St. Lawrence St	135	68	67	0.03
Total	345	167	178	0.04
MOE Guideline	N/A			0.12
City of Ottawa Design				0.05

Table 4 Summary Table for Dry Weather Analysis

This analysis has shown that the Main Street catchment has the highest unit rate of infiltration though it is still within the MOE Guideline limits during dry weather conditions it is above the target design value for City of Ottawa sewer systems.

Excess Ground Water Infiltration originates from causes such as poorly grouted sanitary main connections, underground structure cracking, deteriorating or displaced pipe joints, root intrusion, hydrogen sulfide corrosion, pipe defects and cracking from loading, sump pump connections in low lying areas, drainage tile in low lying areas, etc. Infiltration generally increases over time, as the condition of the sanitary sewer network deteriorates.

Monitoring results indicate that GWI flows are likely highest during the spring melt period. During the peak melting time, it is difficult to separate ground water infiltration from inflow sources. Outside of the spring period, there are clear GWI differences between the catchment areas. These could be due to the material, age and condition of the various sanitary mains, together with subsurface soil conditions. The cost effectiveness of rehabilitating this pipe for the purpose of obtaining GWI improvements should be carefully considered in conjunction with other options to reduce extraneous flows.

Since the Main Street catchment area has the highest unit groundwater infiltration rates it is recommended that sewer grouting based on review of CCTV inspections focus on the Main Street catchment in order to address repairs and/or localized relining.

4.4 Wet Weather Analysis

The objective of the wet weather analysis is to characterize the wet weather flows and determine to what extent Rainfall Derived Infiltration and Inflow (RDII) may be occurring in each catchment area. Peak wet weather flow was measured on March 18th, 2020 with the total flow of 1269 m3/day. St. Lawrence Street catchment was measured at 766m3/day, Church Street at 128m3/day and Main Street was calculated at 375m3/day. The flow measured at the St. Lawrence Street catchment was approximately 50% of the total system flow, which is proportionate to the relative area of the catchment and also to the number of connections.

The rainfall-derived inflows for each catchment area are summarized below:

	Base Sanitary Flow	GWI	Wet Weather Flow		Rainfall Derived Infiltration and Inflow (RDII)				
	(m3/day)	(m3/day)	(m3/day) (1)	(m3/week average) (2)	(m3/day)	(L/Ha.day)	(L/d/km.cm)	(L/week/ km.cm)	(L/s/ha)
Main St	38	82	375	156	255	23182	6922	4235	0.27
Church St	61	29	128	248	38	2235	963	6283	0.03
St. Lawrence St	68	67	766	546	631	26292	11856	10259	0.30
Total	167	178	1269	950	924	17769	7133	7334	0.21
Guideline Limit						11,200 to 12000	3000 to 5000	1400	0.28

Notes:

1) Peak wet weather flow measured on March 18th, 2020 – higher RDII was encountered at the plant earlier in March and in April, before measured data was gathered for catchment areas, so these wet weather flows do not represent the worst case for the system.

2) Average peak flow week of April 14-21st used. Previous weeks with higher flows have incomplete data

Table 5 – Summary Table for Wet Weather Analysis

Short term spikes in raw sewage flow rates due to a rainfall event are normally due to rainwater leader connections, manhole cover leakage, combined sewer sections and sump pump connections. Since the sudden peak in flow rate can cause operational issues in the sewage treatment plant, a program of replacing manhole covers with sealed covers (particularly in locations where manholes covers are prone to flooding) and disconnecting rain water leaders, sump pumps, etc. where they are discovered as part of other projects is recommended.

The most important recommendation within the municipal right of way is to identify and confirm if there are any stormwater catchbasins directly connected to the sanitary sewer main. The stormwater catchbasins would collect significant amounts of rainwater and a direct connection to the sanitary main could account for a significant portion of the excess inflows that are observed. This information could be obtained through interviews with system operators and/or through dye testing. Once these direct connection locations are known, recommendations for correcting the issue can be developed.

It would also be cost effective to identify and seal existing manholes that are allowing storm water to flow into sanitary sewers. Disconnecting sump pumps and roof drains from the sanitary sewer system will need to be done in conjunction with the confirmation of stormwater outlet availability and/or development and implementation of an improved storm water management system. The improved storm water management infrastructure would provide an outlet for the diverted storm water coming from sump pumps, roof drains and other storm drains.

The St. Lawrence and Main Street catchment areas received the highest rainfall-derived flows and exhibited large peaks coinciding with the largest increases in flows at the plant. It is recommended that flow reduction efforts focus on these catchment areas.

4.5 Summary of Infiltration and Inflow Analysis

All catchment areas are above the 1400 L/cm.km per peak week noted by the MOE Sewer System Design Guidelines as the threshold above which it is economical to pursue rehabilitation. Main Street and St Lawrence Street are both above the 12,000 l/Ha/day limit recommended by the Quebec Ministry of the Environment. Church Street is within acceptable levels per hectare and per pipe length-diameter.

A review of the flow profiles of each catchment area reveals that Church Street flows remain relatively stable even during rainfall events. St. Lawrence Street flows peak drastically and quickly during a rainfall event, which could indicate a direct storm system connection to the sanitary sewer in that catchment area.

St Lawrence Street is the largest area and its flows follow the plant flow profile closely, whereas Church Street remains relatively flat even during rainfall events. Both Main Street and St Lawrence Street exceed guidelines for acceptable infiltration and inflow amounts per hectare and per km.cm of pipe. The large peaks in flow on St. Lawrence Street and the steadily above-average flows on Main Street are the major contributing areas to the overall excessive I&I. Based on the analysis of flow data, the St. Lawrence Street catchment is most impacted by direct inflow and the Main Street catchment is most impacted by groundwater infiltration and these areas should be given a high priority for corrective action.

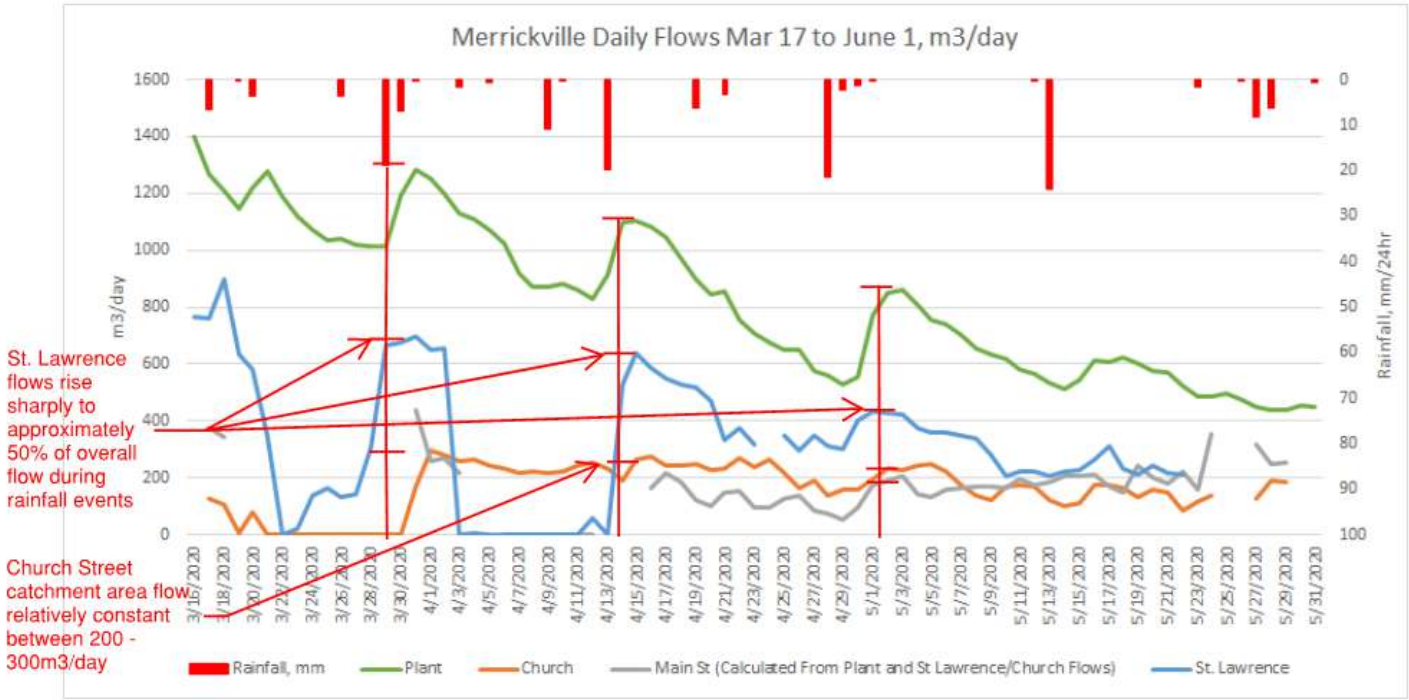

Figure 3: Merrickville Wet Weather Flow Analysis

5 Recommendations (For Discussion)

On the basis of our I & I Study, it is recommended that the Village continue with the Inflow and Infiltration Reduction Plan for Merrickville and include the following components:

1. CCTV Inspection – Completed

2. Pipe Grouting - Underway

   The flow monitoring program indicates that a large part of the infiltration is from the Main Street catchment area and inflow from the St. Lawrence catchment area; therefore, the on-going pipe grouting program should focus on these catchment areas.

3. Manhole Inspection and Sealing Program

   It is recommended that the municipality initiate an inspection program for all sanitary manholes in the municipality. This could be one of the key methods of identifying sources of direct inflow into the sanitary system from the municipal right of way. The inspections would ideally take place during rainfall events and would identify locations where grade and slope issues allow water to pool over the manhole lids and gain direct access, or gain access through cracked manhole adjustment components. Selected manholes would then be reviewed in greater detail in order to provide specific recommended solutions to the inflow issue. Examples of specific recommendations might include replacing perforated, damaged or unsealed manhole covers with sealed covers, or providing structure risers with limited regrading to increase frame heights and keep water from pooling on the lids.

4. Inspection of Dwelling Roof Leader and Sump Connections

   The municipality should consider enforcing the proposed sewer use bylaw and undertake property-by-property or structure-by-structure visual inspections from the municipal right of way to determine if roof leaders and sump outlets are discharging onto the surface. Notices could be sent to owners where there is evidence of roof leaders heading into the ground and not discharging onto ground surface. Follow-up visits by the Chief Building Official with the owner would confirm the removal of any direct connections.

5. Public Awareness Campaign

   The municipality could begin a public awareness campaign with the goal of encouraging ratepayers to reduce and/or eliminate illegal stormwater connections to the sanitary system. A Public Education program could inform residents of the negative impacts of sump pump, foundation drain, and downspout connections. The public should be made aware that direct connections from sump pumps and roof leaders to the sanitary system consume valuable treatment capacity and contribute to hydraulic stress of the WTTP. In many cases, homeowners may be unaware that direct connections are problematic. While the long term effectiveness of this measure may be uncertain, the municipality should consider this measure over the short term to mitigate hydraulic stress and prolong the operational life of the current WWTP

   Direct storm connections to a sanitary outlet from private property are not permitted under the Ontario Building Code. The municipality may authorize inspections of sanitary connections and order disconnections, if required. The challenge with disconnections is that the owner may comply at the time of inspection, but over time the direct connections may be re-established by the current or future homeowner.

   Sump pump discharge to sanitary sewer is often the result of not having reasonable alternatives such as ditches, storm sewers etc. Remedies for private property infiltration sources that focus on the identification and removal of direct connections are likely to be unsuccessful in the long run unless redirection of these connections onto landscaped surfaces allows the water to reach storm sewers in the municipal right of way as opposed to the sanitary network. Such redirection would decrease peak flows significantly, buffering the impacts of rainfall events and would direct rainfall into the stormwater system. The effectiveness would strongly depend on local grade conditions. Therefore, development and implementation of a stormwater management program to divert stormwater and sump pump discharges from the

sanitary sewage collection system is recommended, providing home owners with alternative disposal locations thereby reducing incentive to connect sump pumps to sanitary sewers.

6. Stormwater System Assessment

The disconnection of possible sump pumps and roof drains from the sanitary sewer system and redirection to the storm water system will result in increased demand on the storm system. A review of the storm system capacity should be undertaken to confirm the available capacity where those new loads occur.

Prepared by:
Jp2g Consultants Inc.
Engineers · Planners · Project Managers

Neil Caldwell, P.Eng., PMP
Civil Engineer
Chief Executive Officer

Andrew MacDonald, P.Eng
Mechanical Engineer

For Clerk's use only, if required:

Recorded Vote Requested By:

Cameron	Y	N
Foster	Y	N
Halpenny	Y	N
Molloy	Y	N
Struthers	Y	N

Resolution Number: R - - 20

Date: September 11, 2020

Moved by: Cameron Foster Halpenny Molloy

Seconded by: Cameron Foster Halpenny Molloy

Be it hereby resolved that: By-law 45-2020, being a by-law to appoint Shawn Merriman as Deputy Chief Building Official for the Village of Merrickville-Wolford, be read a first and second time, and that By-law 45-2020 be read a third and final time and passed.

Carried / Defeated

_____

J. Douglas Struthers, Mayor

THE CORPORATION OF THE VILLAGE OF MERRICKVILLE-WOLFORD

BY-LAW 45-2020

BEING A BY-LAW TO APPOINT DEPUTY CHIEF BUILDING OFFICIAL

WHEREAS section 5(3) of the Municipal Act, 2001 states that municipal power, including a municipality's capacity, rights, powers and privileges, shall be exercised by by-law, unless the municipality is specifically authorized to do otherwise;

AND WHEREAS Section 3(2) of the Ontario Building Code Act, 1992, S.O. 1992, c. 23, as amended, states that the council of each municipality shall appoint a chief building official and such inspectors as are necessary for the enforcement of this Act in the areas in which the municipality has jurisdiction;

AND WHEREAS it is deemed in the best interests of the Village of Merrickville-Wolford to appoint a Deputy Chief Building Official to carry out the enforcement of the Ontario Building Code Act, 1992, S.O. 1992, c. 23, as amended;

NOW THEREFORE the Council of the Corporation of the Village of Merrickville-Wolford hereby enacts as follows:

1. Shawn Merriman is hereby appointed as Deputy Chief Building Official for the Village of Merrickville-Wolford to act on behalf of the Chief Building Official in his absence and shall perform the duties of the Chief Building Official as set out in the Building Code Act, 1992, S.C. 1992, c. 23, as amended.

2. This by-law shall come into force and take effect immediately upon the final passing thereof.

Read a first, second and third time and passed on the 11th day of September, 2020.

_____
J. Douglas Struthers, Mayor

_____
Doug Robertson, CAO/Clerk

For Clerk's use only, if required:

Recorded Vote Requested By:

Cameron	Y	N
Foster	Y	N
Halpenny	Y	N
Molloy	Y	N
Struthers	Y	N

Resolution Number: R - - 20

Date: September 11, 2020

Moved by: Cameron Foster Halpenny Molloy

Seconded by: Cameron Foster Halpenny Molloy

Be it hereby resolved that: By-law 46-2020, being a by-law to confirm the proceedings of the special Council meeting of September 11, 2020, be read a first and second time, and that By-law 46-2020 be read a third and final time and passed.

Carried / Defeated

_____

J. Douglas Struthers, Mayor

THE CORPORATION OF THE VILLAGE OF MERRICKVILLE-WOLFORD

BY-LAW 46-2020

BEING A BY-LAW TO CONFIRM THE PROCEEDINGS OF THE COUNCIL OF THE CORPORATION OF THE VILLAGE OF MERRICKVILLE-WOLFORD AT ITS MEETING HELD ON SEPTEMBER 11, 2020

WHEREAS section 5(3) of the Municipal Act, 2001 states that municipal power, including a municipality's capacity, rights, powers and privileges, shall be exercised by by-law, unless the municipality is specifically authorized to do otherwise;

AND WHEREAS it is deemed prudent that the proceedings of the Council of the Corporation of the Village of Merrickville-Wolford (hereinafter referred to as "Council") at its meeting held on September 11, 2020 be confirmed and adopted by by-law;

NOW THEREFORE the Council of the Corporation of the Village of Merrickville-Wolford hereby enacts as follows:

1. The proceedings and actions of Council at its meeting held on September 11, 2020 and each recommendation, report, and motion considered by Council at the said meeting, and other actions passed and taken by Council at the said meeting are hereby adopted, ratified and confirmed.

2. The Mayor or his or her designate and the proper officials of the Village of Merrickville-Wolford are hereby authorized and directed to do all things necessary to give effect to the said action or to obtain approvals where required and, except where otherwise provided, the Mayor and Clerk are hereby directed to execute all documents necessary in that regard, and the Clerk is hereby authorized and directed to affix the Corporate Seal of the Municipality to all such documents.

This by-law shall come into force and take effect immediately upon the final passing thereof.

Read a first, second and third time and passed on the 11th day of September, 2020.

_____
J. Douglas Struthers, Mayor

_____
Doug Robertson, CAO/Clerk

For Clerk's use only, if required:

Recorded Vote Requested By:

Cameron	Y	N
Foster	Y	N
Halpenny	Y	N
Molloy	Y	N
Struthers	Y	N

Resolution Number: R - - 20

Date: September 11, 2020

Moved by: Cameron Foster Halpenny Molloy

Seconded by: Cameron Foster Halpenny Molloy

Be it hereby resolved that:

This special meeting of the Council of the Corporation of the Village of Merrickville-Wolford does now adjourn at until the next special meeting of Council on September 14, 2020 at 6:00 p.m. or until the call of the Mayor subject to need.

Carried / Defeated

_____

J. Douglas Struthers, Mayor