

# Fawcettville Subdivision

## SERVICING REPORT

Prepared For:  
**Hilden Homes**

October 2023

CREATING QUALITY SOLUTIONS TOGETHER



# **FAWCETTVILLE SUBDIVISION SERVICING REPORT**

PROJECT NO. 17533-1

**Prepared For:**

Hilden Homes

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## 1 Introduction

Ainley Group was retained by Hilden Homes to complete a Servicing Report to support Draft Plan Approval for a proposed residential development located within the Town of Picton, Ontario. The purpose of the report is to summarize the servicing requirements for the proposed development and summarize reports prepared to support the application. The following services have been considered in this report:

- Grading
- Stormwater Management
- Water Distribution System
- Sanitary and Storm Sewer Collection Systems
- Utility Distributions

The subject site is included in the East Picton projected development area. Review of the *Master Servicing for Water, Sanitary, Stormwater System and Road Intersections in East Picton* report and the *Picton Main Street Sewage Pumping Station Expansion and Associated Sanitary Sewers Addendum Report* by RVA dated June 1, 2017 and August 4, 2023, respectively, was undertaken in the preparation of this report. The County staff were also consulted with to understand the implementation and scheduling of the proposed recommendations in these reports.

## 2 Site Description

### 2.1 Existing Conditions

The property is situated on part of Lot 64, Township of Hallowell in the County of Prince Edward. The parcel of land is approximately 5.49 hectares (13.56 acres). The property is currently vacant comprised mostly of grassed land and treed land in the southern portion. The property is bounded by residential homes to the southeast, forested land to the south, and agricultural lands to the north and west.

The site topography gently slopes to the south.

A site location plan is attached to this report as **Figure 1**.

### 2.2 Proposed Conditions

The property is to be developed with the following:

- Thirty-one (31) single detached lots,
- Fifty-four (54) townhouse residential units,
- One (1) stormwater management facility.

A proposed development plan is attached to this report as **Figure 2**.

## 3 Water Distribution System

The proposed development will be serviced by the municipal water distribution system. There is an existing 200mm PVC watermain, located within the right-of-way of Fawcett Avenue, and a

300mm PVC watermain located underneath the Millennium Trail. It is proposed to connect to both these watermains to create a loop in the system.

The 2017 Master Servicing report confirmed that the existing water treatment plant would be sufficient to accommodate the full build out of the Picton East development area. Some of the proposed watermain expansion recommendations, including the 300mm watermain to the east of the site within the Millennium Trail right of way (Phase 1 of watermain upgrades), have been completed. Based on the findings of the report the water distribution system in place shall be sufficient to meet the domestic and fire demands for the proposed development.

## 4 Water Demand Evaluation

### 4.1 Domestic Water Demand

An evaluation of the anticipated water demand was performed using the guidelines set out in the Ministry of the Environment publication 'Design Guidelines for Drinking Water Systems, 2008'.

The anticipated demand for the proposed development are;

- Average Day – 1.03 l/s,
- Maximum Day – 4.84 l/s,
- Minimum Hour – 0.19 l/s,
- Peak Hour – 7.31 l/s.

Supporting calculations are provided in **Appendix B**.

### 4.2 Fire Flow

Fire flow requirements have been evaluated based on the Fire Underwriters Survey 'Water Supply for Public Protection (2020)'.

The resulting Fire Flow + Maximum Day requirement for the proposed development has been determined to be 122.0 l/s for the single-family residential units.

Supporting calculations are provided in **Appendix B**.

### 4.3 Transient Pressure

The proposed 200 mm diameter PVC Class 235 (DR 18) pipe has been designed by the manufacturer to withstand long-term pressures of up to 235 psi, and short-term pressures of 376 psi. Short-term and long-term pressures were analyzed as shown in **Table 1** below. A water column of 0.6 m/s was used to determine the surge pressure.

Category	Analysis	Pressure (psi)
	Working pressure (Max. operating) =	65.4
	Allowable long-term pressure = Pressure Class	235 psi

<b>Long-Term Pressure Rating</b>	<b>Check:</b>	<b>PC 235 psi &gt; WP 65.4psi</b>
<b>Short-Term Pressure Rating</b>	1 fps (0.3m/s) = 17.4 psi Velocity Change = 2 fps (0.6 m/s) Occasional surge pressure = 2 x 17.4	34.8 psi
	Total pressure = 34.8 + 65.4	100.2 psi
	Allowable short-term rating (STR) = 1.6 x Pressure Class = 1.6 x 235	376 psi
	<b>Check:</b>	<b>STR 376 psi &gt; 100.2 psi</b>

## 5 Hydraulic Evaluation

The MOE Design Guidelines for Drinking Water Systems (2008) state that the normal operating pressures in the water distribution system should be approximately 50 to 70 psi. The maximum pressure in the system should not exceed 100 psi, and the minimum pressure in the system should be no lower than 40 psi; however, in the case of fire flows, the pressure may drop to a level no lower than 20 psi.

An EPANET model was created to model the watermain pressures for the development. The water source used in the model is based on the hydrant testing carried out at Fawcett Avenue and on the Millennium Trail in proximity to the subject site (**Appendix A**). Inputs into the model included the hydrant pressure and flow data; pipe lengths, friction factors, and diameters; pipe junction elevations; and demand flows. The data input into the model are included in **Appendix C** along with the output generated from the model. The model node used to test the normal demand and peak hour demand flows was node 5. To test the normal demand plus fire demand flow, node 5 was used which was considered to be located in the “worst case” position, as it is located at a high elevation and a far distance from the main watermain.

The model shows that during Maximum Day Flows (normal demand conditions), the minimum pressure in the system will be 65.4 psi (45.99 m head), whereas, during the Maximum Day + Fire Flow demand, the pressure at the fire flow node was determined to be 42.25 psi (29.71 m head). Peak hour flow was modeled and the pressure in the system will be 65.33 psi (45.95m head). Two other flows were analyzed for quality control/confidence checks: 1) at 100 l/s, the pressure at node 5 will be 49.40 psi (34.74 m head), and 2) the flow that will cause 20 psi pressure (14.06 m head) at node 5 was determined to be 175.45 l/s.

Supporting calculations are included in **Appendix C**. As such, the EPANET model shows that the watermain pressures conform to the guidelines for normal operating pressures and fire flow pressures.

## 6 Grading

The preliminary grading plan demonstrates the grading objectives of the roads and lots within the proposed development. Site grading will be finalized in detailed engineering. The following factors were considered in preparation of the preliminary grading plan:

- Matching existing elevations at property limits.
- Maintaining a minimum cover of 1.5m (frost coverage) over the sanitary sewer at the required slopes necessary for gravitational flow to the main in Fawcett Avenue.
- Stormwater outfall to the proposed SWM facility in the northeast portion of the property with outfall as per the recommendations of the East-Picton Master Servicing report.

## 7 Stormwater Management

The subject site lies within Quinte Conservation Authority's regulatory area, as such the stormwater management requirements are subject to the Quinte Conservation Regional Event (100-year design storm). Quality control is subject to a 'level 1' treatment and quantity control measures are required to ensure post-development discharge rates do not exceed pre-development rates.

A Stormwater Management Report has been prepared to support the application. The report outlines how quality and quantity control has been provided for the site.

## 8 Sanitary Collection System

The proposed sanitary collection system is proposed to be a standard gravitational design at a minimum depth of 1.5m. The sewer will be designed in accordance with municipal standards.

An existing 200mm PVC sanitary is located within the right-of-way of Fawcett Avenue. Based on our review of the background reports and communication with municipal staff, the existing sanitary sewers on Fawcett Avenue have sufficient capacity to accommodate the proposed development. However, there are portions of the existing downstream sanitary system that are aging and/or undersized to accommodate the full build-out of Picton East. Operation staff have indicated that some of the downstream sewers periodically experience surcharging.

The Main Street Pumping Station is currently out for tender and the tender for upgrades to the sewer system downstream of the subject site is anticipated to be released in fall 2024. An updated Master Servicing Plan is underway and expected to be completed in the beginning of 2024. The development application and approval process for the subject site will proceed in conjunction with the proposed municipal sewer works. Therefore, it is expected that sufficient downstream capacity will be provided prior to the construction of the subject site.

## 9 Utility Distributions

The electrical, telephone, gas, and cable services for the proposed development will be installed within a joint utility trench. All electrical, telephone, gas, and cable services will be designed by the various agencies and installed in accordance with their specifications.

## 10 Conclusions

- Eighty-five (85) residential units are proposed within the development.

- The development will be accessed from Fawcett Avenue.
- Stormwater management for quality and quantity control is required.
- The site will be serviced by the municipal water distribution system.
- The site will be serviced by a gravity sanitary collection system directing effluent to the municipal sewer system and ultimately the municipal wastewater treatment facility.
- Natural gas, electrical, telephone, and cable utilities will be designed in accordance with the distributor's specifications and incorporated into the detailed design of the development.

PATH&FILE NAME:K:\Projects\17533 - Fawcettville Subdivision\17533-1 Project\Drawing\\_civil\Exhibits\17533-1 - Key Map.dwg



SITE LOCATION

ONTARIO LAKE





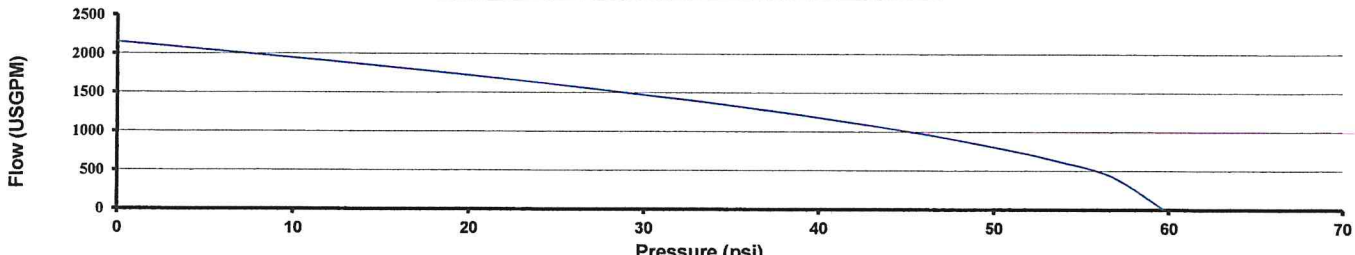

**FAWCETTVILLE SUBDIVISION  
COUNTY OF PRINCE EDWARD  
PICTON, ON**



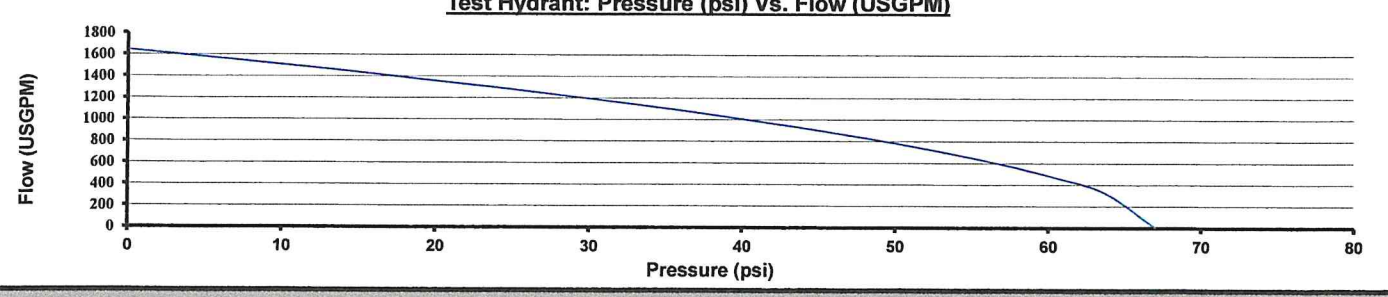

**KEY MAP**

Consultant File No. **17533-1**

Drawing No. **FIGURE 1**

## Appendix A: Fire Hydrant Test Flow Data

DS4: Fire Flow Testing						
Document Type:		Datasheet				
Category:		Drinking Water				
Date of Fire Flow Testing						
Field Operator(s)		Jeff Brooks - Jesse thomas				
Facility Operator(s)		Cal Camplin				
Notification to Facility Operator:		Y - <input checked="" type="checkbox"/>	N - <input type="checkbox"/>	Initial:		Signature: 
DWS Information						
High Lift Pump (HLP) On or Off?:		On <input type="checkbox"/>	Off - <input checked="" type="checkbox"/>	Verified By (Initial):	JB	
High Level Reservoir (HLR) Level (m):		2.85		Verified By (Initial):	JB	
Bloomfield Tower Level (m):		5.21		Verified By (Initial):	JB	
Test Hydrant Information						
Hydrant Number:		New - first hydrant northeast of Fawcettville hydrant and stub				
Location:		Millenium Trail west of Fawcettville				
Test Number:		1				
N.F.P.A. Colour Code:		Blue				
Static Pressure:		59.73				
Residual Pressure:		36.72				
Validation: Pressure Drop Greater Than 25%?		Y/N:	N	Actual Value:	23.0	
Logger S/N:		43180737				
Flow Hydrant Information						
Hydrant No.	Ports Flowed No.	Logger No.	Outlet Dia. (in.)	Coefficient (~0.9)	Pitot Gauge Reading (psi)	Flow (USGPM)
F	2	206362	2.5	0.9	21.03	1288
<b>Total Flow (USGPM)</b>						1288
Test Hydrant Available Flow						
Test Hydrant at 20 psi		1730	USGPM	1430	IGPM	
Test Hydrant at 10 psi		1953	USGPM	1614	IGPM	
Test Hydrant: Pressure (psi) Vs. Flow (USGPM)						
						
Comments/Discrepancies/Diagram						
Existing Colour Coding:		New = not rated				
Recommended Colour Coding		BLUE				
Acknowledgement						
Operator Overseeing Fire Flow Testing (Print):		Jeff Brooks				
Signature:						
Date:		July 26 2023				

DS4: Fire Flow Testing						
Document Type:		Datasheet				
Category:		Drinking Water				
Date of Fire Flow Testing						
Field Operator(s)		Jeff Brooks - Jesse thomas				
Facility Operator(s)		Cal Camplin				
Notification to Facility Operator:		Y - <input checked="" type="checkbox"/>	N - <input type="checkbox"/>	Initial:		Signature: 
DWS Information						
High Lift Pump (HLP) On or Off?:		On <input type="checkbox"/>	Off - <input checked="" type="checkbox"/>	Verified By (Initial):	JB	
High Level Reservoir (HLR) Level (m):		2.78		Verified By (Initial):	JB	
Bloomfield Tower Level (m):		5.18		Verified By (Initial):	JB	
Test Hydrant Information						
Hydrant Number:		1017				
Location:		2nd St Fawcettville				
Test Number:		3				
N.F.P.A. Colour Code:		Green				
Static Pressure:		67.01				
Residual Pressure:		36.33				
Validation: Pressure Drop Greater Than 25%?		Y/N:	Y	Actual Value:	30.7	
Logger S/N:		43180737				
Flow Hydrant Information						
Hydrant No.	Ports Flowed No.	Logger No.	Outlet Dia. (in.)	Coefficient (~0.9)	Pitot Gauge Reading (psi)	Flow (USGPM)
1016	2	206362	2.5	0.9	14.81	1081
					<b>Total Flow (USGPM)</b>	1081
Test Hydrant Available Flow						
Test Hydrant at 20 psi		1361	USGPM	1125	IGPM	
Test Hydrant at 10 psi		1511	USGPM	1248	IGPM	
Test Hydrant: Pressure (psi) Vs. Flow (USGPM)						
						
Comments/Discrepancies/Diagram						
Existing Colour Coding:		ORANGE				
Recommended Colour Coding		GREEN				
Acknowledgement						
Operator Overseeing Fire Flow Testing (Print):		Jeff Brooks				
Signature:						
Date:		JULY 26 2023				

Prince Edward County - WPX

Private FFT Ainley Group - Hilden Homes

Total Vol. (m3)

22

Date

26-Jul-23

TEST INFORMATION				TEST HYDRANT INFORMATION				FLOW HYDRANT(S) INFORMATION				TOTAL	Comments							
Date	Time	Test #	Map #	WO#	TEST	Static	Residual	% Drop	@ 20 PSI	Colour	Hyd	Ports	Pitot	(USGPM)	Hyd	Ports	Pitot	(USGPM)	Total (GPM)	
26-Jul-23	10:23	1	WPX	1	NEF	59.73	36.72	38.5	1730.3	BLUE	F	2	21.0	1288					0	1288 NEF - N.E Fawcettville F - Fawcettville
26-Jul-23	11:00	3	WPX	1	1016	67.91	36.33	46.5	1354.1	GREEN	1017	2	14.8	1081					0	1081 ↑ Test 1 hydrants new, not PEC identified

## **Appendix B: Water Demand Calculations**

**17533-1 - Fawcettville - Fire Flows**

Date: Aug 30 2023

Prepared by: Connor Kennedy

Reviewed by:

**Site Plan**

Block	Parameter	Value	Note
	Floor Area of Building (m2)	130	
	Number of Storeys	2	
	Total Area, A (m2)	260	Total floor area of unit including all storeys
	Coefficient for Type of Construction, C	1.5	Assumption: Ordinary construction C=1.0 (Water Supply for Public Fire Protection 2020 Pg 20)
	Fire Flow	5321	$F=220C(A^{0.5})$
	Fire Flow (Rounded)	5000	
	Occupancy Class	Limited Combustible	Low Fire Hazard (Water Supply for Public Fire Protection 2020 pg 24)
	Charge	-15%	For residential buildings, an occupancy charge of -15% should be used. (Ottawa Design Guidelines Technical Bulletin ISTB-2018-02)
	Occupancy Decrease	-750	Decrease in Fire Flow
	Fire Flow	4250	Revised Fire Flow
	Sprinkler Protection	Yes	Yes/No
	Sprinkler Credit	0%	Percentage - 30% credit for conforming to NFPA sprinkler standards, 10% - water supply is standard for both sprinkler system and fire dept hose lines, 10% - fully supervised
	Sprinkler FF Reduction	0	
	<b>Exposures</b>		Water Supply for Public Fire Protection 2020 pg 30
	West Exposure (m)	5	Distance to nearest building (estimated)
	Charge	20%	
	North Exposure (m)	29.1	Distance to nearest building
	Charge	10%	
	East Exposure (m)	5	Distance to nearest building
	Charge	20%	
	South Exposure (m)	29.1	Distance to nearest building
	Charge	10%	
	Total Exposure Charge	60%	
	Increase in Fire Flow for Exposures	2550	
	Fire Flow (L/min)	6800	Revised Fire Flow + Exposure Increase - Sprinkler Credit
	Fire Flow, rounded to nearest 1000 (L/min)	7000	
	<b>Fire Flow (L/s)</b>	<b>117</b>	
	<b>Fire Flow (L/s)</b>	<b>122</b>	
	<b>Max Available (L/s)</b>	<b>175</b>	

# Fawcettville Subdivision

## Evaluation of Water Demand

### Population

#units	85
pop/unit	3
# people	255

assumed

### Average Day Flow

L/cap*d	350
ADF	89250 l/d
	<b>1.03 l/s</b>

assumed

### Maximum Day Flow

factor	4.69
L/cap*d	350
MDF	418582.5 l/d
	<b>4.84 l/s</b>

MOE Table 3.3

### Minimum Hour

factor	0.18
ADF	1.03 l/d
	<b>0.19 l/s</b>

MOE Table 3.3

### Peak Hour

factor	7.08
ADF	1.03 l/d
	<b>7.31 l/s</b>

MOE Table 3.3

## **Appendix C: Hydraulic Calculations**

## Confidence Check: 20 PSI

Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Pressure m
Junc 1	93	0	28.27
Junc 2	95.5	0	19.63
Junc 3	95	0	20.05
Junc 4	96	0	18.30
Junc 5	96.5	175.45	14.06
Junc 6	96	0	18.71
Junc 9	97.95	0	17.29
Junc 10	96.25	0	18.38
Resvr 7	95.5	#N/A	0.00
Resvr 8	100.5	#N/A	0.00

## Confidence Check: 100 LPS

Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Pressure m
Junc 1	93	0	42.03
Junc 2	95.5	0	37.35
Junc 3	95	0	37.83
Junc 4	96	0	36.56
Junc 5	96.5	100	34.74
Junc 6	96	0	36.70
Junc 9	97.95	0	34.94
Junc 10	96.25	0	36.42
Resvr 7	95.5	#N/A	0.00
Resvr 8	100.5	#N/A	0.00

### **Pump Curve - Hydrant 1017 - Second Street**

<b>Flow (L/s)</b>	<b>Head (m)</b>
0	47.125
85.87	14.06
95.329	7.032

Equation: Head = 48.45-0.02109(Flow)<sup>1.86</sup>

### **Pump Curve - First hydrant northeast of Fawcettville hydrant and stub**

<b>Flow (L/s)</b>	<b>Head (m)</b>
0	42
109.146	14.06
123.2152	7.032

Equation: Head = 48.45-0.02109(Flow)<sup>1.86</sup>

# Links

Network Table - Links

Link ID	Length m	Diameter mm	Roughness
Pipe 1	235	200	120
Pipe 2	50	200	120
Pipe 3	225	200	120
Pipe 4	50	200	120
Pipe 5	225	200	120
Pipe 6	52	200	120
Pipe 8	52	200	120
Pipe 9	10	200	120
Pump 7	#N/A	#N/A	#N/A
Pump 10	#N/A	#N/A	#N/A

# Max Day + Fire Flow

Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Pressure m
Junc 1	93	0	38.68
Junc 2	95.5	0	33.04
Junc 3	95	0	33.51
Junc 4	96	0	32.12
Junc 5	96.5	122	29.71
Junc 6	96	0	32.33
Junc 9	97.95	0	30.65
Junc 10	96.25	0	32.04
Resvr 7	95.5	#N/A	0.00
Resvr 8	100.5	#N/A	0.00

# Max Day

Network Table - Nodes

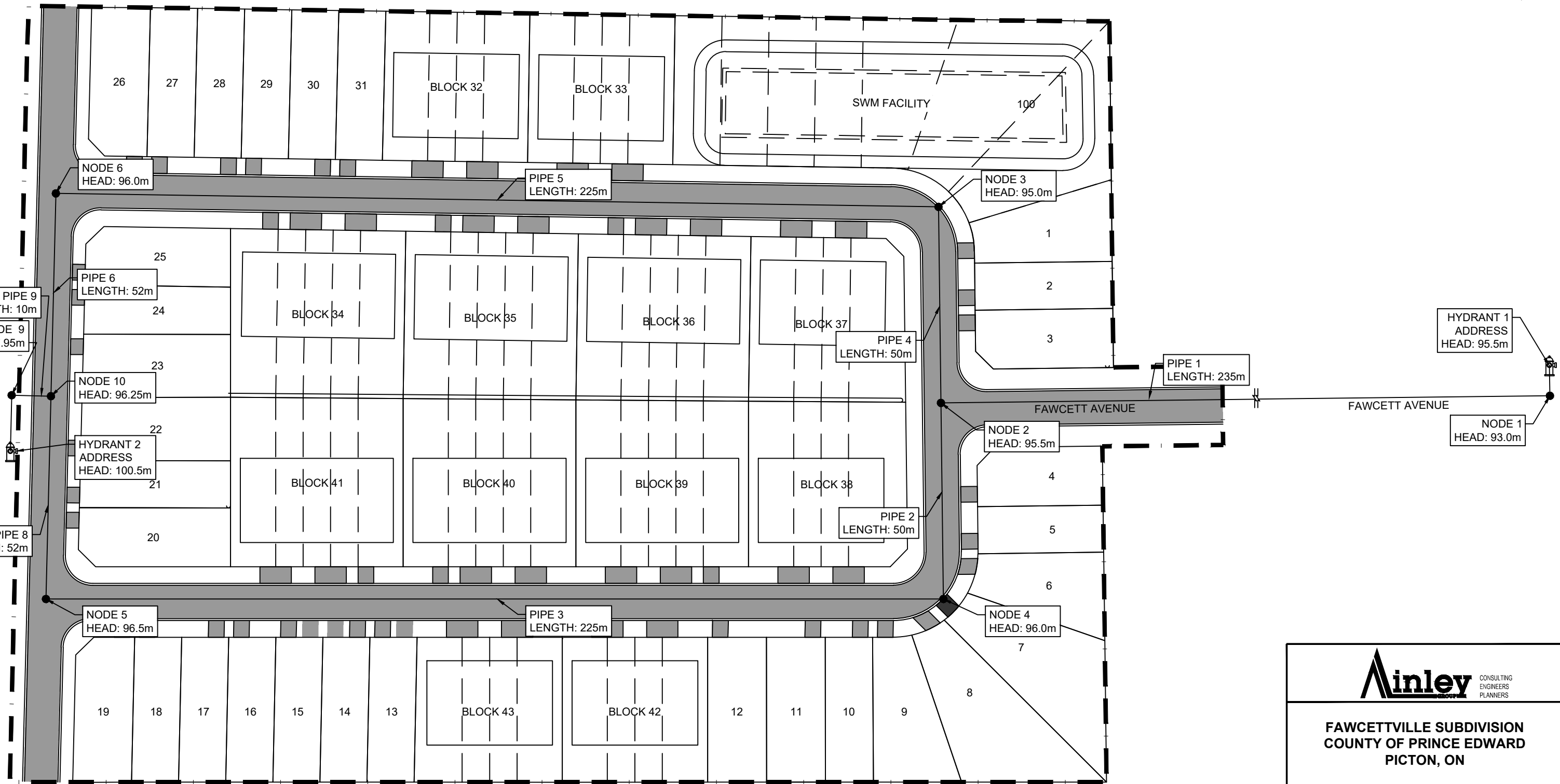
Node ID	Elevation m	Base Demand LPS	Pressure m
Junc 1	93	0	49.53
Junc 2	95.5	0	47.00
Junc 3	95	0	47.50
Junc 4	96	0	46.50
Junc 5	96.5	4.84	45.99
Junc 6	96	0	46.49
Junc 9	97.95	0	44.54
Junc 10	96.25	0	46.24
Resvr 7	95.5	#N/A	0.00
Resvr 8	100.5	#N/A	0.00

# Peak Hour

Network Table - Nodes

Node ID	Elevation m	Base Demand LPS	Pressure m
Junc 1	93	0	49.50
Junc 2	95.5	0	46.97
Junc 3	95	0	47.47
Junc 4	96	0	46.46
Junc 5	96.5	7.31	45.95
Junc 6	96	0	46.46
Junc 9	97.95	0	44.51
Junc 10	96.25	0	46.21
Resvr 7	95.5	#N/A	0.00
Resvr 8	100.5	#N/A	0.00

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**FAWCETTVILLE SUBDIVISION**  
COUNTY OF PRINCE EDWARD  
PICTON, ON

**WATERMAIN NETWORK PLAN**  
SCALE: 1:1000 (11x17)

Consultant File No.	Drawing No.
<b>17533-1</b>	<b>WM</b>