WATER ENGINEERING REPORT

For

Trailside Estates at Somers
Town of Somers, New York

October 23, 2025

STATE OF NEW YORK
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1.0 INTRODUCTION

The applicant, Parkview B & G, LLC is proposing to construct an 81-unit townhouse community and community center on two parcels totaling 56.8± acres in the Town of Somers. The townhouse units will consist of (58) three-bedroom units and (23) two-bedroom units. The community center will be dedicated to the Town of Somers. The tax parcels are identified as 4.20-1-12 and 15.08-1-4, located in the PH, R40 and R80 zoning districts. Access to the property is proposed through the Somers Realty Planned Hamlet via Reynolds Drive. The site is located on the south side of US Route 6 and between the Somers Realty Planned Hamlet and the North County Trailway.

The project site is located within the Amawalk Shenorock Water District. A 10” diameter DIP water main extension down Reynolds Drive is proposed which will connect to the existing watermain on Clayton Boulevard. The project will be serviced by public water by a water main extension from the existing terminus in the Planned Hamlet, down Reynolds Drive and onto the subject parcel. Separate domestic and fire water service lines are proposed to connect from the watermain extension on the subject parcel to the proposed community center. Fire sprinkler systems are not proposed for the townhouse development. Fire protection will be provided by fire hydrants located throughout the townhouse development.

Sewer service will be provided by an onsite sewer collection and conveyance system which will connect to the terminal manhole in Hoyt Street which was reviewed and approved by the Town and WCDOH as part of the Somers Realty Phase 3 subdivision.

2.0 PROJECT DESIGN FLOWS AND ANTICIPATED FLOWS TO BE INCLUDED IN THE DISTRICT

The project domestic maximum daily water demand used for design is anticipated to be the same as the maximum daily wastewater demand. As such the design maximum daily water flows for the proposed project, are based on the hydraulic loading rates given in the New York State Department of Environmental Conservation (NYSDEC) publication *Design Standards for Intermediate Sized Wastewater Treatment Works – 2014* (DEC 2014). The design maximum daily water demand is a conservative design flow on which the water infrastructure will be designed. This value does not represent the average daily demand which is expected to be less.

The following table calculates the maximum daily domestic demand / flow rate in gallons per day (gpd) that will be used for design in the proposed project.

Table 1: Project Design Maximum Daily Flow Rate

	Proposed Use	Hydraulic Loading Rate	Design Maximum Daily Domestic Flow (gpd)
Residential Townhomes	58 – Three Bedroom	330 gpd/dwelling	19,140
	23 – Two Bedroom	220 gpd/dwelling	5,060
Town Community Center	450 Visitors	4 gpd/visitor	1,800
Total			**26,000**

For preliminary purposes, an estimate of 1,800 gpd was calculated for the proposed community center to be dedicated to the Town of Somers. The design flow was calculated based on an assumed maximum number of visitors on a peak day. It is anticipated that the peak use for the proposed community center will be during the weekend with the use of the sports arena. The maximum 450 visitors per day assumes six 1-hour practices during a single day including 50 kids per practice along with half of the parents using the facilities either during practice or while dropping off/picking up their kids. As the project advances an actual maximum daily flow for the community center will be established based on discussions with the Town on anticipated use.

The anticipated design average daily flows for the project is expected to be significantly less than the design maximum daily design flow. The design maximum daily flows represent conservative flows to ensure that the proposed water works are designed with an ample factor of safety. The anticipated actual flows are based on occupancy rates and measured data for water use. Statistical data (obtained from *Rutgers University, Center for Urban Policy Research*, *Residential Demographic Multipliers*, June 2006) for the average number of occupants in a single-family attached dwelling which are owner-occupied (based on number of bedrooms) was used to calculate the expected number of residents anticipated for the project as shown in the table below. Data from the American Water Works Association (AWWA) Water Conservation Division Subcommittee Report, Water Conservation Measurement Metrics Guidance Report, dated January 2010 shows that the average in home water use is 69.3 gpd per person. This number is reduced to 43.5 gpd per person when water saving fixtures are used, which is the case for this project.

Table 2: Design Average Daily Flow

Proposed Use	Occupancy Rate	Total Anticipated Residents	Water Use Per Resident (gpd)	Water Use (gpd)
Town Community Center	-	-	-	1,800
58 –Three Bedroom Townhomes	3.08 people/unit	179	43.5	7,787
23 – Two Bedroom Townhomes	2.16 people/unit	50	43.5	2,175
			Total Anticipated Water Use (gpd)	**11,762**

As demonstrated above, through the use of water saving fixtures as required by current building code, a design maximum flow of 26,000 gpd is proposed for the project, while the actual anticipated flows are 11,762 gpd.

Although the anticipated average daily flow for the project is lower than the design maximum daily flows, the design maximum daily flows are used for the design of the system. This provides an additional factor of safety in the proposed design.

The peak hourly flow for the domestic water is calculated using a peaking factor that is based on the populations of the subject project. The *Recommended Standards for Wastewater Facilities – 2014* was used to determine a peaking factor of four:

<u>Peak Hourly Flow</u>

26,000 gpd ÷ 24 hr/day ÷ 60 min/hr = 18 gallons per minute (gpm)
Peak Hourly Flow = 18 gpm x 4 = **72 gpm**

The requirements for fire water demand were preliminarily established for the project. Based on similar projects, a preliminary fire sprinkler water demand of 200 gpm is anticipated for the community center. As previously stated, the townhomes will not be sprinklered, therefore fire protection will be provided by onsite fire hydrants throughout the development. For pressure and watermain sizing calculations a sprinkler demand 200 gpm and a hose stream allowance of 500 gpm will be used. This results in a peak combined flow of:

<u>Peak Combined Flow</u>

72 gpm + 200 gpm + 500 gpm = **772 gpm**

3.0 PROPOSED CONNECTION TO THE AMAWALK SHENOROCK WATER DISTRICT

The project is located within the Amawalk Shenorock Water District. The Amawalk Shenorock Water District is reported to be approved to use up to 550,000 gpd. Based on review of the 2022 Water Quality Report the Amawalk Shenorock Water District treated 105 million gallons during the year 2022. This equates to an average daily flow of just under 290,000 gpd. As such, there is adequate water supply for the project.

As part of the Somers Realty Master Plan Findings Statement, Somers Realty was required to provide a hydropneumatic emergency water supply system. As part of the Somers Realty Phase 3 subdivision approval, Somers Realty entered into an agreement with the Town to fund the construction of a water main between the Hidden Meadow at Somers project and Mahopac Avenue. Separately the

Hidden Meadow at Somers project, Westchester County and the Town of Somers entered into an Intermunicipal Developer Agreement (IMDA) to allow for the construction of several public improvements funded by the County, but administered by the Town. One of the Hidden Meadow at Somers project components that was recently constructed under a Town contract is the extension of the water main in Windsor Road to the portion of the water main extension funded by Somers Realty. This allowed for the emergency water supply required by the Phase 3 approval.

As part of designing the Somers Realty funded water main extension, Woodard and Curran, PC modeled the current flow and pressure within the Amawalk-Shenorock Water District, incorporating 15 gpm of design flow associated with future developments within the Planned Hamlet, 51 gpm of peak flow from AvalonBay, and 10 gpm for Hidden Meadow. Since the Woodard and Curran report was first generated, The Crossroads at Baldwin Place, Hidden Meadow, and additional lots in the Planned Hamlet have been constructed. Hydrant flow testing has been performed to confirm available flows and pressures. The hydrant flow test data can be found in Appendix A.

Recommended Standards for Water Works (RSWW) provides minimum pressure requirements for distribution systems. For domestic water a minimum pressure of 35 psi at the highest service connection is required and 20 psi must be maintained at the highest service connection during fire flow conditions.

4.0 PROPOSED WATER SERVICE CONNECTIONS

A 10” diameter DIP water main extension down Reynolds Drive was reviewed and approved by the Town and WCDOH as part of the Somers Realty Phase 3 subdivision. The project will be serviced by public water by a water main extension from Reynolds Drive onto the subject parcel.

An 8” diameter Class 52 DIP water main is proposed to connect to the 10” DIP water main along Reynolds Drive (not yet constructed) and extend along the proposed roadways on the subject parcel. Separate domestic and fire service lines will be provided for the proposed community center from the 8” DIP water main. The proposed townhomes will be serviced by individual connections to the 8” DIP water main for domestic water and fire protection will be provided by onsite fire hydrants located throughout the development for the proposed townhomes.

Fire hydrants are proposed onsite along the proposed roadways in such a manner that no building is more than 500’ from a hydrant. All hydrants will be manufactured by Mueller as required by the Town. Fire hydrants will be painted yellow per Town standards. In addition, a flushing hydrant is proposed at the dead ends of the water main extension on the subject parcel for flushing the mains.

Restrained joint connections will be provided at all pipe bends through the use of Mega-lug fittings, or approved equal. In addition, thrust blocks will be provided at all vertical and horizontal bends. Upon completion of the water main and service line installation pressure testing and disinfection will be performed in accordance with AWWA standards. Details for the construction, testing and disinfection of the proposed water main / water service lines have been provided on the project drawings.

Recommended Standards for Water Works (RSWW) provides minimum pressure requirements for distribution systems. For domestic water a minimum pressure of 35 psi at the highest service connection is required and 20 psi must be maintained at the highest service connection during fire flow conditions. Hydrant flow testing for the existing water main along Clayton Boulevard was performed by the Town of Somers Water and Sewer Department on October 7, 2025. See Appendix A attached for the flow data obtained from the testing. The flowed hydrant measured is located on the east corner of the Hoyt Street intersection to the northeast of the project site and the residual hydrant is located on the east corner of the Halstead Street intersection to the northeast of the project site. A static pressure of 75 psi was measured at the residual hydrant and during the flow test a residual pressure of 50 psi was witnessed with a flow rate of 949 gpm. The test results from the hydrants along Clayton Boulevard will be used in the calculations below.

4.1 Static Pressures

The static pressure at the first-floor elevation (FFE) of the highest building will be calculated in relation to the elevation of the hydrant flow testing static pressure available:

Static Pressure at residual hydrant	= 75 psi
Approximate Elevation of residual hydrant	= 574' ±
First Floor Elevation of highest Townhome (FFE):	= 629' ±
Static Head Change = Residual Hydrant - FFE = 574 - 629 =	= -55' ±

Static Pressure Change (SPC) = Static Head Change / 2.31 ft/psi
SPCB = -55' / 2.31 ft/psi = = -23.8 psi

Static Pressure at FFE = 75 psi + (-23.8 psi) = = 51.2 psi

4.2 Domestic Flow Calculation:

The equation below is taken from AWWA M17. The equation is used to calculate flow available at different pressures or difference in the residual pressure that would result from different flow rates. Here the equation is used to calculate the residual pressure at the observation hydrant for the peak combined flow, using the pressures and flow rates measuring during the flow test. The available pressure was calculated for 2 separate design flows; (1) peak domestic flow, (2) combined peak domestic and fire flow for the project.

$Q_R = Q_F * h_r^{0.54} / h_f^{0.54}$

Where:

Q_R = peak combined flow (gpm)
Q_F = flow from hydrant during test (949 gpm)
h_r = the difference in pressure between the static pressure measured at the observation hydrant and the residual pressure at the total combined flow
h_f = the difference between the static pressure and residual pressure measured at the observation hydrant during the flow test, (25 psi)

Peak Domestic Flow

$72 \text{ gpm} = 949 \text{ gpm} * h_r^{0.54} / 25\text{psi}^{0.54}$

$h_r = 0.2$ psi

This results in a residual pressure of 74.8 psi at the residual pressure hydrant.

Calculations of the head loss in the watermains under domestic peak hourly flow (72 gpm) were performed to evaluate the pressure at the highest FFE during the respective flow conditions. These calculations can be found in Appendix B. The calculations are based on a 10" diameter watermain along Clayton Boulevard and Reynolds Drive and an 8" diameter watermain through the project site.

Calculated Residual Pressure at residual hydrant	74.8 psi
Loss of Static Pressure at FFE of Proposed Building	-23.8 psi
Friction loss of pressure through 10" DIP Water Main	0.1 ft (0.0 psi)
Friction loss of pressure through 8" DIP Water Main	0.2 ft (0.1 psi)
Residual pressure at FFE of Proposed Building during Domestic Peak Hourly Flow:	50.9 psi

As noted above, the 50.9 psi pressure under peak hourly flow conditions exceeds the RSWW requirement of 35 psi for peak hourly domestic flow conditions.

4.3 Fire Flow Calculation:

Using the same equation for flow calculations used above, the difference in pressure for the combined peak and domestic fire flow was calculated below:

Combined Peak Domestic and Fire Flow

$$772 \text{ gpm} = 949 \text{ gpm} * h_r^{0.54} / 25\text{psi}^{0.54}$$

$$h_r = 17.1 \text{ psi}$$

This results in a residual pressure of 57.9 psi at the residual pressure hydrant.

Calculations of the head loss in the watermains under peak combined flow were performed to evaluate the pressure at the highest FFE during the respective flow conditions. These calculations can be found in Appendix B. The calculations are based on a 10" diameter watermain along Clayton Boulevard and Reynolds Drive and an 8" diameter watermain through the project site.

Calculated Residual Pressure at residual hydrant	57.9 psi
Loss of Static Pressure at FFE of Proposed Building	-23.8 psi
Friction loss of pressure through 10" DIP Water Main	8 ft (3.5 psi)
Friction loss of pressure through 8" DIP Water Main	14 ft (6.1 psi)
Residual pressure at FFE of Proposed Building during Combined Peak Hourly Flow:	24.5 psi

As noted above, the 24.5 psi pressure exceeds the RSWW requirement of 20 psi for fire flow conditions.

APPENDIX A

Hydrant Flow Test

Figure 3.

Flow Test Report

Location Clayton Blvd. @ Hoyt & Halstead Date 10/7/25

Test Made by SCWD Time 10:15 A M

Representative of

Witness Fred McQuillan

State Purpose of Test Insite retest / Somers Commons valve chamber open to flow from Meadow Park Rd.

Consumption Rate During Test N/A

If Pumps Affect Test, Indicate Pumps Operating N/A

Flow Hydrants A_1 #238 Static PSI 75 Residual PSI 45

Size Nozzle 2.5"

Pitot Reading 32 Total gpm

gpm

Static B #237 75 psi Residual B 50 psi

Projected results:

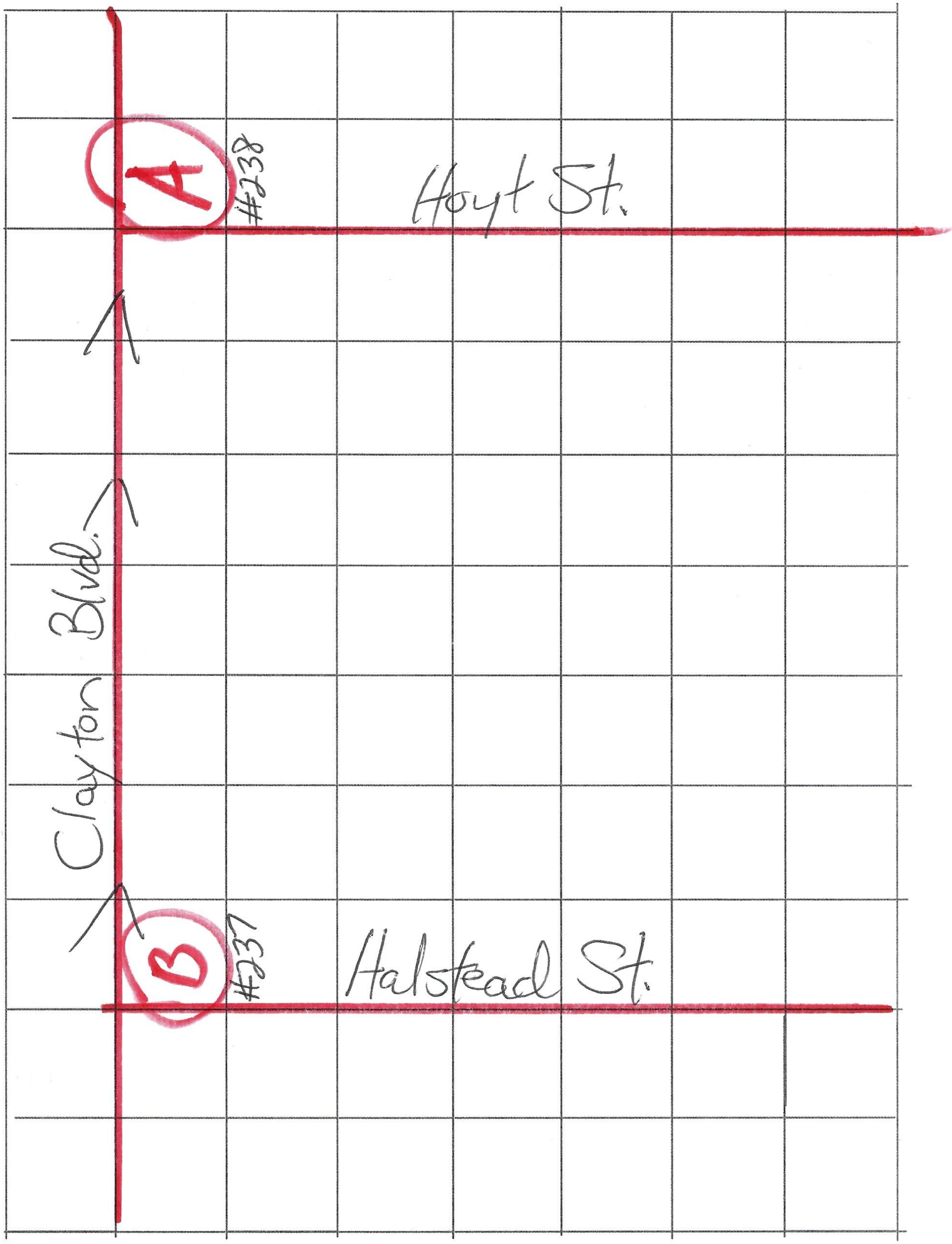
at 20 psi Residual _____ gpm; or at _____ psi Residual _____ gpm

Remarks

Location Map: Show line sizes and distance to next cross connected line. Show valves and hydrant branch size. Indicate North. Show flowing hydrants—label A_1, A_2, A_3. Show location of Static and Residual—label B.

Indicate B Hydrant ✓ Sprinkler _____ Other (identify) _____

Flow Test Map



City: Baldwin Place

		Formula: $Q=(29.83(C(d^2)p^{0.5}))$						Formula: $AFF=Q(((S-20)^{0.54}/((S-R)^{0.54})))$					
Test No.	Location	Q (total gallons flowing)	29.83	Coefficient C = .9	diameter (d) of outlet flowed in inches	Number of outlets flowing	Pitot (p)	Available Fire Flow (AFF)	Total Gallons Flowing	Static (S)	Residual (R)	Test Date	Witnessed By
1	Clayton Blvd.	**949**	29.83	0.9	2.5	1	32	**1,317**	949	75	45	10/7/2025	FM
2		**0**	29.83	0.9	2.5	1		-	0				
3		**0**	29.83	0.9	2.5	1		-	0				
4		**0**	29.83	0.9	2.5	1		-	0				
5		**0**	29.83	0.9	2.5	1		-	0				
6		**0**	29.83	0.9	2.5	1		-	0				
7		**0**	29.83	0.9	2.5	1		-	0				
8		**0**	29.83	0.9	2.5	1		-	0				
9		**0**	29.83	0.9	2.5	1		-	0				
10		**0**	29.83	0.9	2.5	1		-	0				
11		**0**	29.83	0.9	2.5	1		-	0				
12		**0**	29.83	0.9	2.5	1		-	0				
13		**0**	29.83	0.9	2.5	1		-	0				
14		**0**	29.83	0.9	2.5	1		-	0				
15		**0**	29.83	0.9	2.5	1		-	0				
16		**0**	29.83	0.9	2.5	1		-	0				
17		**0**	29.83	0.9	2.5	1		-	0				
18		**0**	29.83	0.9	2.5	1		-	0				
19		**0**	29.83	0.9	2.5	1		-	0				
20		**0**	29.83	0.9	2.5	1		-	0				
21		**0**	29.83	0.9	2.5	1		-	0				
22		**0**	29.83	0.9	2.5	1		-	0				
23		**0**	29.83	0.9	2.5	1		-	0				
24		**0**	29.83	0.9	2.5	1		-	0				
25		**0**	29.83	0.9	2.5	1		-	0				
26		**0**	29.83	0.9	2.5	1		-	0				
27		**0**	29.83	0.9	2.5	1		-	0				
28		**0**	29.83	0.9	2.5	1		-	0				
29		**0**	29.83	0.9	2.5	1		-	0				
30		**0**	29.83	0.9	2.5	1		-	0				

APPENDIX B

Head Loss Calculations

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Trailside Estates at Somers
Domestic Peak Hourly Flow Friction Headloss

Loss in 10" Watermain

	C	115	Roughness coefficient for ductile iron pipe
	d	10 in	Diameter of Pipe
	L	1560 ft	Length of Pipe
	Q	72 gpm	Flow Rate
	V	0.3 ft/s	Velocity
	L_e	80 ft	Equivalent length to account for losses in valves and bends
	L_t	1640 ft	Total Length = L + L_e
Head Loss in Watermain		-0.1 ft	$HL = \dfrac{10.44(L_t)(Q^{1.85})}{(C^{1.85})(d^{4.87})}$

Loss in 8" Watermain to highest FFE

	C	115	Roughness coefficient for ductile iron pipe
	d	8 in	Diameter of Pipe
	L	960 ft	Length of Pipe
	Q	72 gpm	Flow Rate
	V	0.5 ft/s	Velocity
	L_e	50 ft	Equivalent length to account for losses in valves and bends
	L_t	1010 ft	Total Length = L + L_e
Head Loss in Watermain		-0.2 ft	$HL = \dfrac{10.44(L_t)(Q^{1.85})}{(C^{1.85})(d^{4.87})}$

Note:
This is the most restrictive condition on the 8" water main.

INSITE
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Trailside Estates at Somers
Combined Peak Hourly Flow Friction Headloss

Loss in 10" Watermain

	C	115		Roughness coefficient for ductile iron pipe
	d	10	in	Diameter of Pipe
	L	1560	ft	Length of Pipe
	Q	772	gpm	Flow Rate
	V	3.2	ft/s	Velocity
	L_e	80	ft	Equivalent length to account for losses in valves and bends
	L_t	1640	ft	Total Length = $L + L_e$
Head Loss in Watermain		-8	ft	$HL = \dfrac{10.44(L_t)(Q^{1.85})}{(C^{1.85})(d^{4.87})}$

Loss in 8" Watermain to highest FFE

	C	115		Roughness coefficient for ductile iron pipe
	d	8	in	Diameter of Pipe
	L	960	ft	Length of Pipe
	Q	772	gpm	Flow Rate
	V	4.9	ft/s	Velocity
	L_e	50	ft	Equivalent length to account for losses in valves and bends
	L_t	1010	ft	Total Length = $L + L_e$
Head Loss in Watermain		-14	ft	$HL = \dfrac{10.44(L_t)(Q^{1.85})}{(C^{1.85})(d^{4.87})}$

Note:
This is the most restrictive condition on the 8" water main.