

HILLSIDE GROVE

FIRE FLOW

DESIGN REPORT

FOR

Meritage Homes
5337 Millenia Lakes Blvd, Ste. 235
Orlando, Florida 32839
Phone: (407) 284-4152

PREPARED BY:



Connelly & Wicker | PrimeAE

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DATE: SEP 10, 2025
CWI Project No.: 24-01-0079

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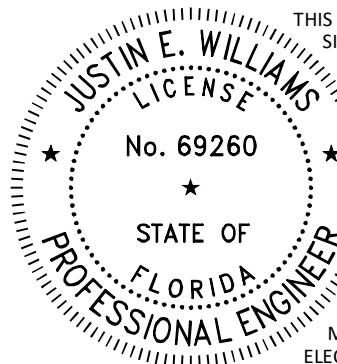
HILLSIDE GROVE

Index Sheet

Table of Contents

Pages

1	Cover Sheet	1
2	Index Sheet	2
3	Project Summary	3
4	Demand Summary Table	4 - 5
5	Pump Curve Data	6 - 7
5	WaterCad Network Preview	8 - 10
6	WaterCad Simulation Results	
	Hydrant Report	11 - 12
	Junction Report	13 - 14
	Pipe Report	15 - 18
	Pump Definition Report	19
	Pump Definition Detailed Report	20 - 23
	Reservoir Report	24
7	Appendix	
	Pressure Test Email	A-1



THIS ITEM HAS BEEN DIGITALLY
SIGNED AND SEALED BY
JUSTIN E. WILLIAMS

**Justin E
Williams**

Digitally signed by Justin E
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Date: 2025.09.23 10:38:44 -
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Prepared under the direction of

Justin Williams, P.E.

PE # 69260

PROJECT SUMMARY

THE PROJECT

Hillside Groves is a 375.2-acre residential home project located north of State Road 19 and southwest of W. Central Ave. and S. Florida Ave. in Howey in the Hills, Lake County, Florida. It is situated in Section 35, Township 20S, Range 25E.

Hillside Groves is a large PUD with supporting roads and infrastructure. At buildout the project is proposed to include 638 units. The purpose of this report is to demonstrate the potable water system for phase 2-4 is designed to meet the potable water demand for the proposed development. Phase 1 was already permitted.

WATER MAIN DESIGN

The Average Daily Flow (ADF) is calculated based on an average daily flow of 350 gallons per day per residential unit. A peaking factor of 2.06 is used for Maximum Daily Flow (MDF) and a peaking factor of 4.11 is used for Peak Hour Flow (PHF).

Fire protection regulations require that the water mains be designed to meet the needs of the greater of either: peak hour flow or maximum day + fire flow. The greater for this development is maximum day + fire flow. Howey in the Hills Land Development Code Section 8.05.02 requires fire flow design provide 500 gpm at 20 psi.

CONNECTION CONDITION

The project has two connection points. One connection point will be to a 12" water main on Number 2 Road. The second connection point will be a 12" water main on State Road 19. The connection points are modeled as pumps with pump curves matching the measured conditions during a fire flow test performed by Howey in the Hills Utility. Refer to the flow test results included in the appendix of this calculation booklet.

DESIGN ANALYSIS

The modeling for this system was accomplished using Bentley OpenFlows WaterCAD 2024.

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HILLSIDE GROVE

Designed By: Justin Williams

Date: 7/30/2025

Demand Summary Table

Project No: 24-01-0079

Calculate Average Daily Flow

Junction. No. J-	Description	DU Units	Flow / Unit GPD	Avg Daily GPD	Avg Daily GPM	Max Day GPM	Peak Hour GPM
3	Single Family (2.5 Bedrooms)	18	350	6300	4.4	9.00	18.00
4	Single Family (2.5 Bedrooms)	16	350	5600	3.9	8.00	16.00
13	Single Family (2.5 Bedrooms)	2	350	700	0.5	1.00	2.00
14	Single Family (2.5 Bedrooms)	12	350	4200	2.9	6.00	12.00
15	Single Family (2.5 Bedrooms)	3	350	1050	0.7	1.50	3.00
16	Single Family (2.5 Bedrooms)	2	350	700	0.5	1.00	2.00
18	Single Family (2.5 Bedrooms)	18	350	6300	4.4	9.00	18.00
19	Single Family (2.5 Bedrooms)	17	350	5950	4.1	8.50	17.00
20	Single Family (2.5 Bedrooms)	18	350	6300	4.4	9.00	18.00
21	Single Family (2.5 Bedrooms)	15	350	5250	3.6	7.50	15.00
22	Single Family (2.5 Bedrooms)	10	350	3500	2.4	5.00	10.00
23	Single Family (2.5 Bedrooms)	12	350	4200	2.9	6.00	12.00
24	Single Family (2.5 Bedrooms)	8	350	2800	1.9	4.00	8.00
25	Single Family (2.5 Bedrooms)	9	350	3150	2.2	4.50	9.00
26	Single Family (2.5 Bedrooms)	14	350	4900	3.4	7.00	14.00
27	Single Family (2.5 Bedrooms)	18	350	6300	4.4	9.00	18.00
28	Single Family (2.5 Bedrooms)	13	350	4550	3.2	6.50	13.00
29	Single Family (2.5 Bedrooms)	7	350	2450	1.7	3.50	7.00
30	Single Family (2.5 Bedrooms)	2	350	700	0.5	1.00	2.00
31	Single Family (2.5 Bedrooms)	11	350	3850	2.7	5.50	11.00
32	Single Family (2.5 Bedrooms)	17	350	5950	4.1	8.50	17.00
33	Single Family (2.5 Bedrooms)	12	350	4200	2.9	6.00	12.00
34	Single Family (2.5 Bedrooms)	3	350	1050	0.7	1.50	3.00
35	Single Family (2.5 Bedrooms)	34	350	11900	8.3	17.00	34.00
36	Single Family (2.5 Bedrooms)	20	350	7000	4.9	10.00	20.00
37	Single Family (2.5 Bedrooms)	4	350	1400	1.0	2.00	4.00
38	Single Family (2.5 Bedrooms)	35	350	12250	8.5	17.50	35.00
39	Single Family (2.5 Bedrooms)	14	350	4900	3.4	7.00	14.00
40	Single Family (2.5 Bedrooms)	15	350	5250	3.6	7.50	15.00
41	Single Family (2.5 Bedrooms)	9	350	3150	2.2	4.50	9.00
42	Single Family (2.5 Bedrooms)	10	350	3500	2.4	5.00	10.00
43	Single Family (2.5 Bedrooms)	8	350	2800	1.9	4.00	8.00
44	Single Family (2.5 Bedrooms)	6	350	2100	1.5	3.00	6.00
45	Single Family (2.5 Bedrooms)	16	350	5600	3.9	8.00	16.00
47	Single Family (2.5 Bedrooms)	4	350	1400	1.0	2.00	4.00
48	Single Family (2.5 Bedrooms)	10	350	3500	2.4	5.00	10.00
49	Single Family (2.5 Bedrooms)	5	350	1750	1.2	2.50	5.00
50	Single Family (2.5 Bedrooms)	4	350	1400	1.0	2.00	4.00
51	Single Family (2.5 Bedrooms)	5	350	1750	1.2	2.50	5.00
52	Single Family (2.5 Bedrooms)	11	350	3850	2.7	5.50	11.00
53	Single Family (2.5 Bedrooms)	3	350	1050	0.7	1.50	3.00
54	Single Family (2.5 Bedrooms)	5	350	1750	1.2	2.50	5.00
55	Single Family (2.5 Bedrooms)	4	350	1400	1.0	2.00	4.00
56	Single Family (2.5 Bedrooms)	10	350	3500	2.4	5.00	10.00
SUBTOTAL		489		171150	119	244.50	489.0

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HILLSIDE GROVE

Designed By: Justin Williams

Date: 7/30/2025

Demand Summary Table

Project No: 24-01-0079

Calculate Average Daily Flow

Junction. No. J-	Description	DU Units	Flow / Unit GPD	Avg Daily GPD	Avg Daily GPM	Max Day GPM	Peak Hour GPM
57	Single Family (2.5 Bedrooms)	12	350	4200	2.9	6.00	12.00
58	Single Family (2.5 Bedrooms)	13	350	4550	3.2	6.50	13.00
59	Single Family (2.5 Bedrooms)	13	350	4550	3.2	6.50	13.00
60	Single Family (2.5 Bedrooms)	14	350	4900	3.4	7.00	14.00
61	Single Family (2.5 Bedrooms)	18	350	6300	4.4	9.00	18.00
62	Single Family (2.5 Bedrooms)	13	350	4550	3.2	6.50	13.00
63	Single Family (2.5 Bedrooms)	8	350	2800	1.9	4.00	8.00
64	Single Family (2.5 Bedrooms)	1	350	350	0.2	0.50	1.00
65	Single Family (2.5 Bedrooms)	1	350	350	0.2	0.50	1.00
66	Single Family (2.5 Bedrooms)	12	350	4200	2.9	6.00	12.00
67	Single Family (2.5 Bedrooms)	4	350	1400	1.0	2.00	4.00
68	Single Family (2.5 Bedrooms)	14	350	4900	3.4	7.00	14.00
69	Single Family (2.5 Bedrooms)	9	350	3150	2.2	4.50	9.00
70	Single Family (2.5 Bedrooms)	10	350	3500	2.4	5.00	10.00
71	Single Family (2.5 Bedrooms)	7	350	2450	1.7	3.50	7.00
SUBTOTAL		149		52150	36	74.5	149.0

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HILLSIDE GROVE

Pump Curve Data No. 2 Rd.

Fire Flow Test		
Static (Head Psi)	75	
Fire (Head Psi)	20	
Residual (Head Psi)	30	
Design Head (Psi)	40	
Flow (Gpm)	750	
Fire Flow (Gpm)	836	
Design Head (ft)	173.1	
Max Operating Head (ft)	46.2	
Fire Flow (Gpm)	655	
Approximate Flow (Gpm) at 20 PSI	836	
Pump Curve Data	Discharge (Gpm)	Head (Ft)
Shutoff	0.0	173.1
Design	655	92.3
Flow at Test	750	69.2
Max Operating	836	46.2

Notes:

1. Fire Flow Test information and data provided by Howey in the Hills Utility Supervisor via email dated April 28, 2022.
2. Test taken on Central Avenue in front of Citrus Plant. Static Press = 75 psi, Measured Flow = 750 GPM
Residual Press = 60 psi.

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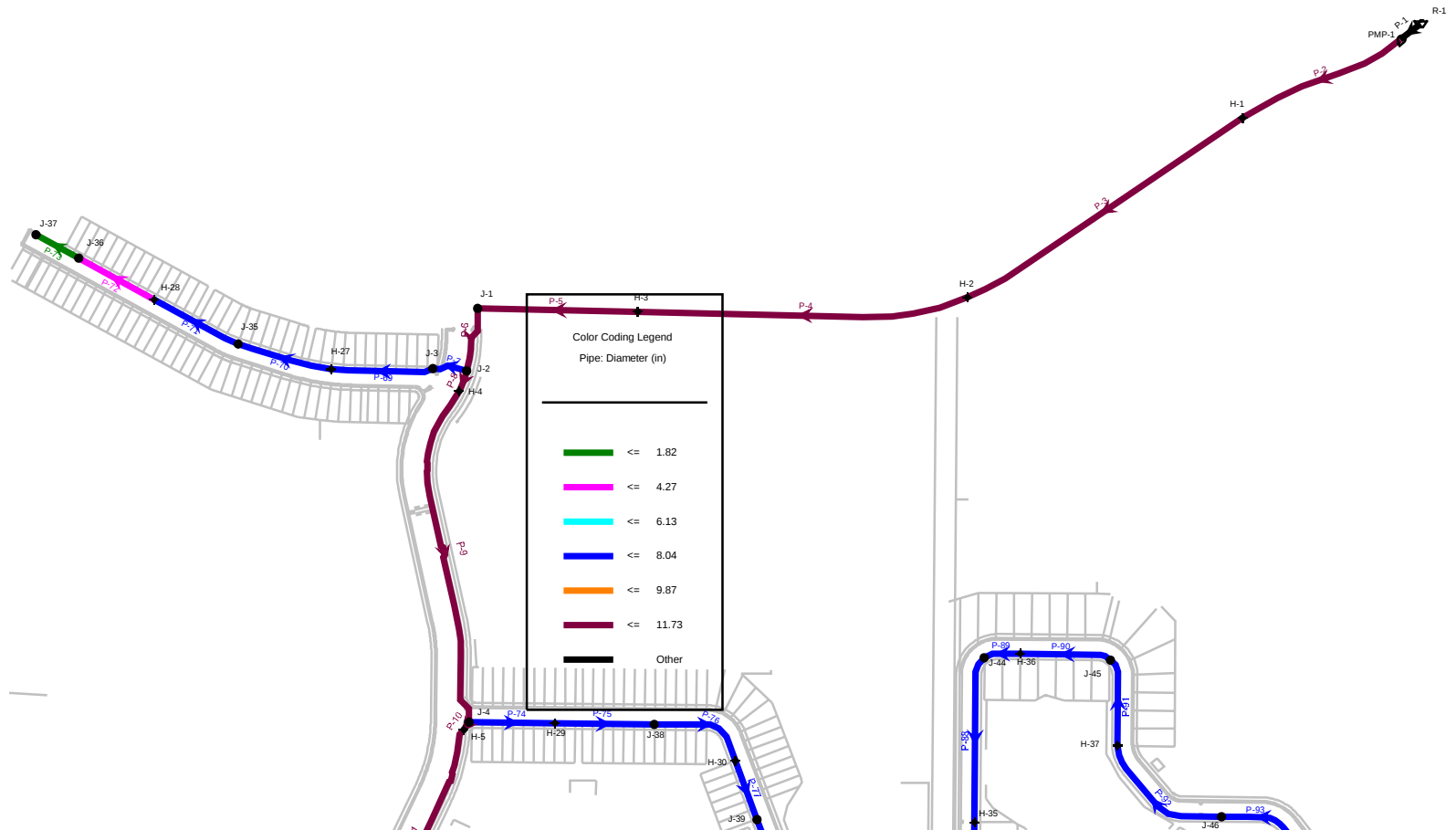
Pump Curve Data South FL Rd.

Fire Flow Test		
Static (Head Psi)	70	
Fire (Head Psi)	20	
Residual (Head Psi)	60	
Design Head (Psi)	40	
Flow (Gpm)	1250	
Fire Flow (Gpm)	2981	
Design Head (ft)	161.5	
Max Operating Head (ft)	46.2	
Fire Flow (Gpm)	2262	
Approximate Flow (Gpm) at 20 PSI	2981	
Pump Curve Data		
	Discharge (Gpm)	Head (Ft)
Shutoff	0.0	161.5
Design	2262	92.3
Flow at Test	1250	138.5
Max Operating	2981	46.2

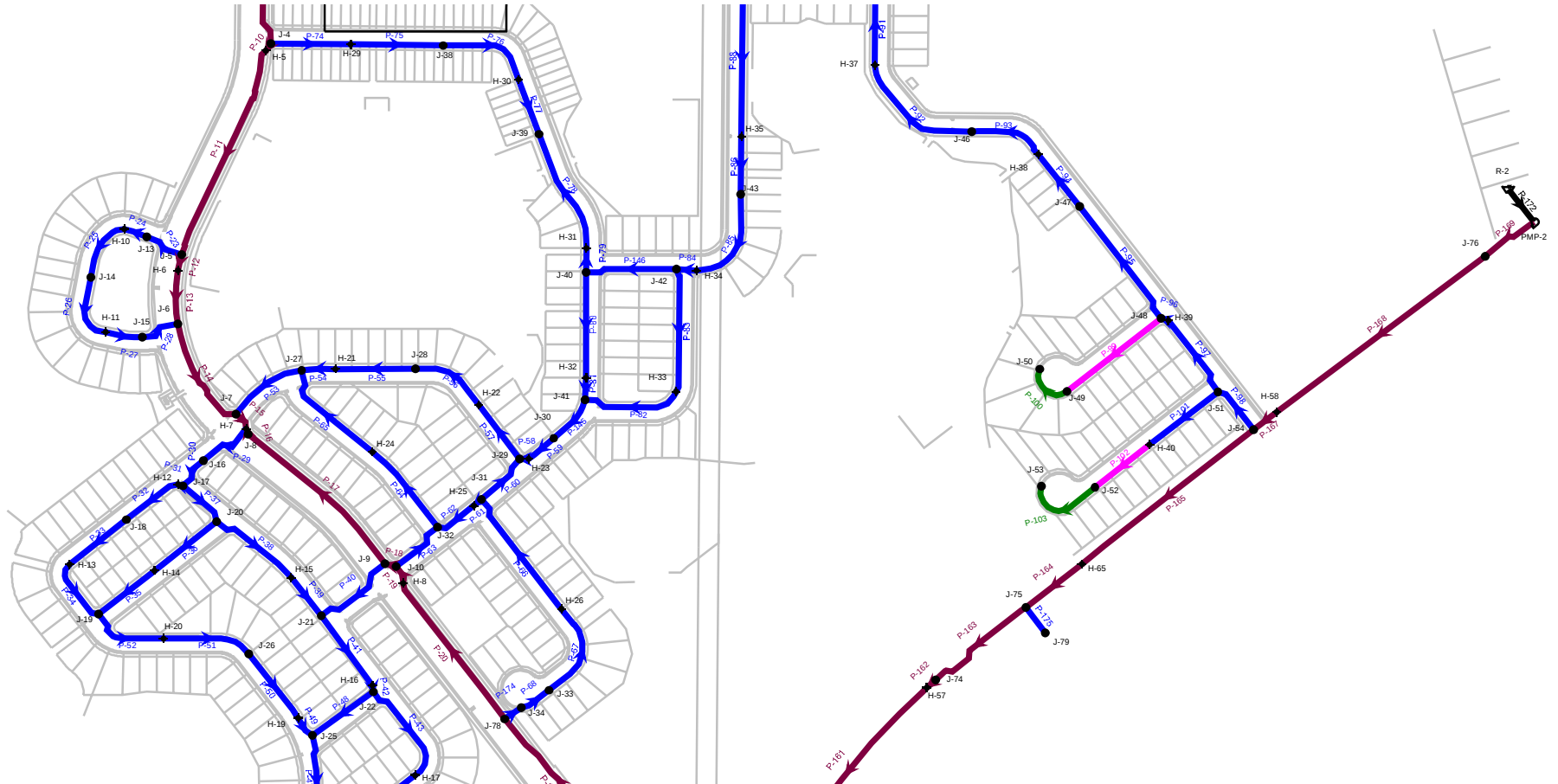
Notes:

1. Fire Flow Test information and data provided by Howey in the Hills Utility Supervisor via email dated April 28, 2022.
2. Test taken on South Florida Avenue and State Road 19. Static Press = 70 psi, Measured Flow = 1250 GPM
Residual Press = 60 psi.

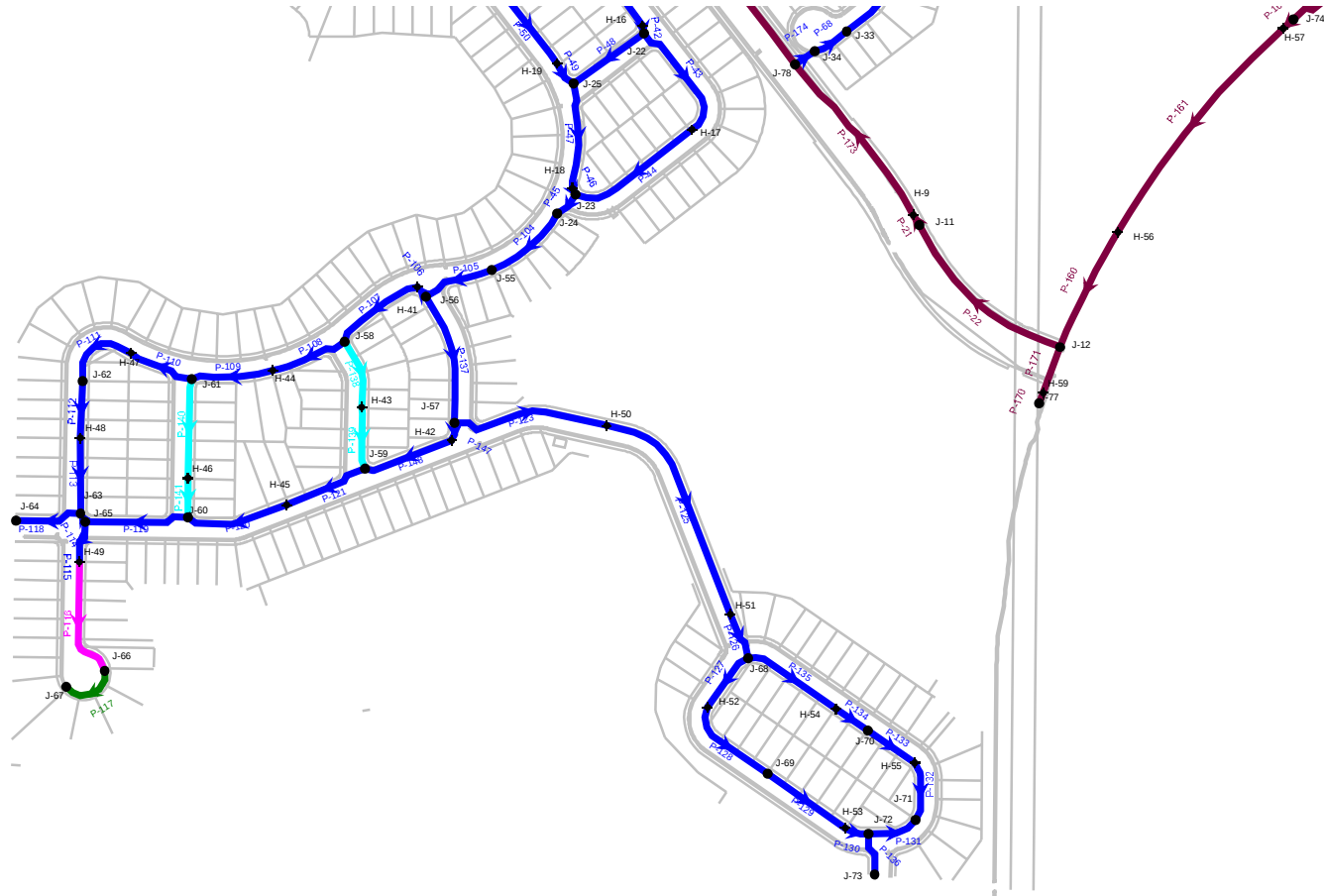
Scenario: Base



Scenario: Base



Scenario: Base



FlexTable: Hydrant Table

Label	Elevation (ft)	Pressure (psi)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Residual) (psi)	Satisfies Fire Flow Constraints?
H-1	83.80	73.4	500.00	2,570.59	20.0	True
H-2	85.20	72.8	500.00	2,606.30	20.0	True
H-3	84.50	73.1	500.00	2,674.81	20.0	True
H-4	87.50	71.8	500.00	2,694.85	20.0	True
H-5	86.90	72.0	500.00	2,800.95	20.0	True
H-6	87.10	71.9	500.00	2,820.49	20.0	True
H-7	87.00	72.0	500.00	2,857.50	20.0	True
H-8	86.40	72.2	500.00	2,884.58	20.0	True
H-9	87.70	71.7	500.00	2,922.62	20.0	True
H-10	87.00	72.0	500.00	2,663.67	20.0	True
H-11	87.00	72.0	500.00	2,651.72	20.0	True
H-12	87.60	71.7	500.00	2,592.55	20.0	True
H-13	87.40	71.8	500.00	2,510.35	20.0	True
H-14	88.60	71.3	500.00	2,514.26	20.0	True
H-15	88.10	71.5	500.00	2,571.04	20.0	True
H-16	90.00	70.7	500.00	2,440.81	20.0	True
H-17	96.70	67.7	500.00	2,220.06	20.0	True
H-18	93.60	69.1	500.00	2,256.22	20.0	True
H-19	92.60	69.5	500.00	2,356.32	20.0	True
H-20	88.80	71.2	500.00	2,436.20	20.0	True
H-21	86.90	72.0	500.00	2,714.89	20.0	True
H-22	86.10	72.4	500.00	2,700.48	20.0	True
H-23	85.30	72.7	500.00	2,791.19	20.0	True
H-24	87.00	72.0	500.00	2,689.32	20.0	True
H-25	86.10	72.4	500.00	2,810.42	20.0	True
H-26	89.40	71.0	500.00	2,664.58	20.0	True
H-27	86.50	72.2	500.00	2,226.92	20.0	True
H-28	87.70	71.7	500.00	1,898.43	20.0	True
H-29	86.60	72.2	500.00	2,654.10	20.0	True
H-30	86.90	72.0	500.00	2,570.09	20.0	True
H-31	87.70	71.7	500.00	2,648.13	20.0	True
H-32	87.50	71.8	500.00	2,684.88	20.0	True
H-33	87.80	71.6	500.00	2,601.15	20.0	True
H-34	89.30	71.0	500.00	2,608.57	20.0	True
H-35	86.80	72.1	500.00	2,501.34	20.0	True
H-36	86.40	72.3	500.00	2,435.91	20.0	True
H-37	86.40	72.3	500.00	2,430.19	20.0	True
H-38	87.00	72.0	500.00	2,491.35	20.0	True
H-39	90.50	70.5	500.00	2,667.72	20.0	True
H-40	88.50	71.4	500.00	2,477.83	20.0	True
H-41	89.70	70.7	500.00	1,831.65	20.0	True
H-42	88.70	71.2	500.00	1,782.53	20.0	True
H-43	88.60	71.2	500.00	1,711.34	20.0	True
H-44	87.00	71.9	500.00	1,763.88	20.0	True
H-45	88.10	71.4	500.00	1,744.02	20.0	True
H-46	87.30	71.8	500.00	1,674.92	20.0	True
H-47	86.60	72.1	500.00	1,716.55	20.0	True
H-48	86.50	72.1	500.00	1,697.81	20.0	True

FlexTable: Hydrant Table

Label	Elevation (ft)	Pressure (psi)	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Pressure (Calculated Residual) (psi)	Satisfies Fire Flow Constraints?
H-49	90.20	70.5	500.00	1,626.50	20.0	True
H-50	86.30	72.2	500.00	1,631.00	20.0	True
H-51	86.00	72.3	500.00	1,462.80	20.0	True
H-52	86.90	71.9	500.00	1,389.05	20.0	True
H-53	87.90	71.5	500.00	1,360.84	20.0	True
H-54	87.50	71.7	500.00	1,377.00	20.0	True
H-55	87.20	71.8	500.00	1,368.40	20.0	True
H-56	86.60	72.2	500.00	3,004.41	20.0	True
H-57	86.70	72.2	500.00	3,067.02	20.0	True
H-58	89.50	71.0	500.00	3,251.72	20.0	True
H-59	84.00	73.3	500.00	2,974.76	20.0	True
H-65	88.30	71.5	500.00	3,125.30	20.0	True

FlexTable: Junction Table

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Pressure (Residual Lower Limit) (psi)
J-1	0.00	86.20	253.44	72.4	167.24	20.0
J-2	0.00	87.20	253.43	71.9	166.23	20.0
J-3	9.00	87.10	253.42	72.0	166.32	20.0
J-4	8.00	86.70	253.40	72.1	166.70	20.0
J-5	0.00	86.80	253.39	72.1	166.59	20.0
J-6	0.00	86.90	253.39	72.0	166.49	20.0
J-7	0.00	86.60	253.38	72.2	166.78	20.0
J-8	0.00	87.00	253.38	72.0	166.38	20.0
J-9	0.00	87.00	253.38	72.0	166.38	20.0
J-10	0.00	87.00	253.39	72.0	166.39	20.0
J-11	0.00	87.70	253.44	71.7	165.74	20.0
J-12	0.00	86.40	253.47	72.3	167.07	20.0
J-13	1.00	86.60	253.39	72.2	166.79	20.0
J-14	6.00	87.60	253.39	71.7	165.79	20.0
J-15	1.50	86.60	253.39	72.2	166.79	20.0
J-16	1.00	87.20	253.36	71.9	166.16	20.0
J-17	0.00	87.60	253.34	71.7	165.74	20.0
J-18	9.00	88.20	253.34	71.4	165.14	20.0
J-19	8.50	87.90	253.33	71.6	165.43	20.0
J-20	9.00	88.30	253.34	71.4	165.04	20.0
J-21	7.50	87.50	253.34	71.7	165.84	20.0
J-22	5.00	90.80	253.30	70.3	162.50	20.0
J-23	6.00	93.50	253.27	69.1	159.77	20.0
J-24	4.00	93.70	253.25	69.0	159.55	20.0
J-25	4.50	92.80	253.29	69.4	160.49	20.0
J-26	7.00	90.70	253.31	70.4	162.61	20.0
J-27	9.00	87.20	253.38	71.9	166.18	20.0
J-28	6.50	86.50	253.38	72.2	166.88	20.0
J-29	3.50	85.30	253.39	72.7	168.09	20.0
J-30	1.00	85.70	253.39	72.6	167.69	20.0
J-31	5.50	86.10	253.39	72.4	167.29	20.0
J-32	8.50	85.70	253.39	72.5	167.69	20.0
J-33	6.00	91.30	253.40	70.1	162.10	20.0
J-34	1.50	91.90	253.40	69.9	161.50	20.0
J-35	17.00	86.90	253.41	72.0	166.51	20.0
J-36	10.00	87.40	253.38	71.8	165.98	20.0
J-37	2.00	87.90	253.35	71.6	165.45	20.0
J-38	17.50	87.10	253.39	71.9	166.29	20.0
J-39	7.00	88.00	253.39	71.6	165.39	20.0
J-40	7.50	87.90	253.39	71.6	165.49	20.0
J-41	4.50	87.00	253.39	72.0	166.39	20.0
J-42	5.00	88.70	253.39	71.3	164.69	20.0
J-43	4.00	87.70	253.40	71.7	165.70	20.0
J-44	3.00	86.90	253.43	72.0	166.53	20.0
J-45	8.00	87.40	253.44	71.8	166.04	20.0
J-46	0.00	87.10	253.48	72.0	166.38	20.0
J-47	2.00	87.90	253.51	71.7	165.61	20.0
J-48	5.00	90.30	253.54	70.6	163.24	20.0

FlexTable: Junction Table

Label	Demand (gpm)	Elevation (ft)	Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Pressure (Residual Lower Limit) (psi)
J-49	2.50	89.60	253.53	70.9	163.93	20.0
J-50	2.00	90.10	253.50	70.7	163.40	20.0
J-51	2.50	89.30	253.57	71.1	164.27	20.0
J-52	5.50	87.80	253.56	71.7	165.76	20.0
J-53	1.50	88.70	253.53	71.3	164.83	20.0
J-54	2.50	88.90	253.59	71.3	164.69	20.0
J-55	2.00	91.70	253.22	69.9	161.52	20.0
J-56	5.00	89.90	253.18	70.6	163.28	20.0
J-57	6.00	88.50	253.17	71.2	164.67	20.0
J-58	6.50	88.10	253.17	71.4	165.07	20.0
J-59	6.50	88.90	253.17	71.1	164.27	20.0
J-60	7.00	87.90	253.16	71.5	165.26	20.0
J-61	9.00	86.00	253.16	72.3	167.16	20.0
J-62	6.50	87.70	253.16	71.6	165.46	20.0
J-63	4.00	89.60	253.16	70.8	163.56	20.0
J-64	0.50	90.70	253.16	70.3	162.46	20.0
J-65	0.50	89.70	253.16	70.7	163.46	20.0
J-66	6.00	91.90	253.15	69.8	161.25	20.0
J-67	2.00	92.00	253.11	69.7	161.11	20.0
J-68	7.00	86.10	253.15	72.3	167.05	20.0
J-69	4.50	87.00	253.15	71.9	166.15	20.0
J-70	5.00	87.50	253.15	71.7	165.65	20.0
J-71	3.50	87.90	253.15	71.5	165.25	20.0
J-72	0.00	87.60	253.15	71.6	165.55	20.0
J-73	0.00	87.50	253.15	71.7	165.65	20.0
J-74	0.00	87.50	253.53	71.8	166.03	20.0
J-75	0.00	88.10	253.55	71.6	165.45	20.0
J-76	0.00	93.00	253.71	69.5	160.71	20.0
J-77	0.00	84.00	253.47	73.3	169.47	20.0
J-78	0.00	91.80	253.41	69.9	161.61	20.0
J-79	0.00	82.20	253.55	74.1	171.35	20.0

FlexTable: Pipe Table

Label	Diameter (in)	Has User Defined Length?	Length (Scaled) (ft)	Material	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)	Minor Loss Coefficient (Unified)	Headloss (Friction) (ft)	Headloss (Minor) (ft)	Headloss (ft)
P-1	999.00	True	72	PVC	140.0	120.41	0.00	0.000	0.00	0.00	0.00
P-2	11.73	False	497	PVC	140.0	120.41	0.36	0.780	0.02	0.00	0.03
P-3	11.73	False	921	PVC	140.0	120.41	0.36	0.740	0.05	0.00	0.05
P-4	11.73	False	932	PVC	140.0	120.41	0.36	0.740	0.05	0.00	0.05
P-5	11.73	False	449	PVC	140.0	120.41	0.36	0.740	0.02	0.00	0.02
P-6	11.73	False	183	PVC	140.0	120.41	0.36	1.180	0.01	0.00	0.01
P-7	8.04	False	100	PVC	140.0	38.00	0.24	2.070	0.00	0.00	0.01
P-8	11.73	False	61	PVC	140.0	82.41	0.24	0.740	0.00	0.00	0.00
P-9	11.73	False	976	PVC	140.0	82.41	0.24	3.580	0.02	0.00	0.03
P-10	11.73	False	26	PVC	140.0	52.34	0.16	0.550	0.00	0.00	0.00
P-11	11.73	False	672	PVC	140.0	52.34	0.16	3.770	0.01	0.00	0.01
P-12	11.73	False	49	PVC	140.0	41.57	0.12	0.390	0.00	0.00	0.00
P-13	11.73	False	162	PVC	140.0	41.57	0.12	0.390	0.00	0.00	0.00
P-14	11.73	False	347	PVC	140.0	43.84	0.13	2.380	0.00	0.00	0.00
P-15	11.73	False	57	PVC	140.0	50.66	0.15	0.550	0.00	0.00	0.00
P-16	11.73	False	18	PVC	140.0	18.53	0.06	0.350	0.00	0.00	0.00
P-17	11.73	False	569	PVC	140.0	18.53	0.06	0.980	0.00	0.00	0.00
P-18	11.73	False	35	PVC	140.0	92.35	0.27	0.750	0.00	0.00	0.00
P-19	11.73	False	58	PVC	140.0	92.53	0.27	0.940	0.00	0.00	0.00
P-20	11.73	False	512	PVC	140.0	92.53	0.27	1.930	0.02	0.00	0.02
P-21	11.73	False	31	PVC	140.0	125.99	0.37	0.390	0.00	0.00	0.00
P-22	11.73	False	499	PVC	140.0	125.99	0.37	1.480	0.03	0.00	0.03
P-23	8.04	False	123	PVC	140.0	10.77	0.07	2.070	0.00	0.00	0.00
P-24	8.04	False	72	PVC	140.0	9.77	0.06	0.050	0.00	0.00	0.00
P-25	8.04	False	191	PVC	140.0	9.77	0.06	1.190	0.00	0.00	0.00
P-26	8.04	False	205	PVC	140.0	3.77	0.02	0.400	0.00	0.00	0.00
P-27	8.04	False	112	PVC	140.0	3.77	0.02	0.350	0.00	0.00	0.00
P-28	8.04	False	125	PVC	140.0	2.27	0.01	2.070	0.00	0.00	0.00
P-29	8.04	False	173	PVC	140.0	69.18	0.44	2.320	0.02	0.01	0.03
P-30	8.04	False	105	PVC	140.0	68.18	0.43	0.790	0.01	0.00	0.01
P-31	8.04	False	17	PVC	140.0	33.74	0.21	1.480	0.00	0.00	0.00
P-32	8.04	False	190	PVC	140.0	33.74	0.21	0.590	0.01	0.00	0.01
P-33	8.04	False	217	PVC	140.0	24.74	0.16	0.390	0.00	0.00	0.00
P-34	8.04	False	199	PVC	140.0	24.74	0.16	1.190	0.00	0.00	0.00
P-35	8.04	False	213	PVC	140.0	24.45	0.15	1.670	0.00	0.00	0.00
P-36	8.04	False	238	PVC	140.0	24.45	0.15	1.720	0.00	0.00	0.00
P-37	8.04	False	152	PVC	140.0	34.44	0.22	2.460	0.00	0.00	0.01
P-38	8.04	False	288	PVC	140.0	0.99	0.01	1.140	0.00	0.00	0.00
P-39	8.04	False	146	PVC	140.0	0.99	0.01	1.670	0.00	0.00	0.00
P-40	8.04	False	265	PVC	140.0	73.82	0.47	4.140	0.03	0.01	0.05
P-41	8.04	False	260	PVC	140.0	67.31	0.43	2.070	0.03	0.01	0.03
P-42	8.04	False	20	PVC	140.0	67.31	0.43	0.590	0.00	0.00	0.00
P-43	8.04	False	328	PVC	140.0	38.53	0.24	1.540	0.01	0.00	0.01
P-44	8.04	False	364	PVC	140.0	38.53	0.24	0.940	0.01	0.00	0.01
P-45	8.04	False	70	PVC	140.0	85.50	0.54	2.070	0.01	0.01	0.02
P-46	8.04	False	18	PVC	140.0	52.97	0.33	0.740	0.00	0.00	0.00
P-47	8.04	False	277	PVC	140.0	52.97	0.33	1.340	0.02	0.00	0.02
P-48	8.04	False	225	PVC	140.0	23.78	0.15	3.390	0.00	0.00	0.00
P-49	8.04	False	69	PVC	140.0	33.69	0.21	1.140	0.00	0.00	0.00

FlexTable: Pipe Table

Label	Diameter (in)	Has User Defined Length?	Length (Scaled) (ft)	Material	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)	Minor Loss Coefficient (Unified)	Headloss (Friction) (ft)	Headloss (Minor) (ft)	Headloss (ft)
P-50	8.04	False	244	PVC	140.0	33.69	0.21	0.390	0.01	0.00	0.01
P-51	8.04	False	272	PVC	140.0	40.69	0.26	0.250	0.01	0.00	0.01
P-52	8.04	False	236	PVC	140.0	40.69	0.26	1.440	0.01	0.00	0.01
P-53	8.04	False	245	PVC	140.0	6.82	0.04	2.210	0.00	0.00	0.00
P-54	8.04	False	101	PVC	140.0	7.24	0.05	0.790	0.00	0.00	0.00
P-55	8.04	False	241	PVC	140.0	7.24	0.05	0.500	0.00	0.00	0.00
P-56	8.04	False	237	PVC	140.0	13.74	0.09	0.100	0.00	0.00	0.00
P-57	8.04	False	203	PVC	140.0	13.74	0.09	1.670	0.00	0.00	0.00
P-58	8.04	False	27	PVC	140.0	13.68	0.09	0.940	0.00	0.00	0.00
P-59	8.04	False	98	PVC	140.0	13.68	0.09	0.200	0.00	0.00	0.00
P-60	8.04	False	171	PVC	140.0	3.56	0.02	1.530	0.00	0.00	0.00
P-61	8.04	False	30	PVC	140.0	16.89	0.11	0.390	0.00	0.00	0.00
P-62	8.04	False	133	PVC	140.0	16.89	0.11	1.530	0.00	0.00	0.00
P-63	8.04	False	180	PVC	140.0	0.19	0.00	2.460	0.00	0.00	0.00
P-64	8.04	False	300	PVC	140.0	8.58	0.05	1.720	0.00	0.00	0.00
P-65	8.04	False	349	PVC	140.0	8.58	0.05	2.370	0.00	0.00	0.00
P-66	8.04	False	414	PVC	140.0	25.95	0.16	2.070	0.01	0.00	0.01
P-67	8.04	False	307	PVC	140.0	25.95	0.16	0.970	0.01	0.00	0.01
P-68	8.04	False	99	PVC	140.0	31.95	0.20	0.370	0.00	0.00	0.00
P-69	8.04	False	287	PVC	140.0	29.00	0.18	0.000	0.01	0.00	0.01
P-70	8.04	False	271	PVC	140.0	29.00	0.18	0.000	0.01	0.00	0.01
P-71	8.04	False	266	PVC	140.0	12.00	0.08	0.000	0.00	0.00	0.00
P-72	4.27	False	241	PVC	140.0	12.00	0.27	0.370	0.02	0.00	0.02
P-73	1.82	False	138	PVC	140.0	2.00	0.25	0.370	0.03	0.00	0.03
P-74	8.04	False	240	PVC	140.0	22.07	0.14	1.670	0.00	0.00	0.00
P-75	8.04	False	278	PVC	140.0	22.07	0.14	0.000	0.00	0.00	0.00
P-76	8.04	False	287	PVC	140.0	4.57	0.03	0.690	0.00	0.00	0.00
P-77	8.04	False	176	PVC	140.0	4.57	0.03	0.000	0.00	0.00	0.00
P-78	8.04	False	379	PVC	140.0	2.43	0.02	0.300	0.00	0.00	0.00
P-79	8.04	False	72	PVC	140.0	2.43	0.02	0.740	0.00	0.00	0.00
P-80	8.04	False	317	PVC	140.0	6.80	0.04	0.000	0.00	0.00	0.00
P-81	8.04	False	67	PVC	140.0	6.80	0.04	0.740	0.00	0.00	0.00
P-82	8.04	False	302	PVC	140.0	12.38	0.08	2.370	0.00	0.00	0.00
P-83	8.04	False	372	PVC	140.0	12.38	0.08	0.490	0.00	0.00	0.00
P-84	8.04	False	61	PVC	140.0	34.10	0.22	0.790	0.00	0.00	0.00
P-85	8.04	False	309	PVC	140.0	34.10	0.22	0.400	0.01	0.00	0.01
P-86	8.04	False	173	PVC	140.0	38.10	0.24	0.390	0.01	0.00	0.01
P-88	8.04	False	468	PVC	140.0	38.10	0.24	0.200	0.02	0.00	0.02
P-89	8.04	False	104	PVC	140.0	41.10	0.26	0.200	0.00	0.00	0.00
P-90	8.04	False	258	PVC	140.0	41.10	0.26	0.200	0.01	0.00	0.01
P-91	8.04	False	246	PVC	140.0	49.10	0.31	0.590	0.01	0.00	0.02
P-92	8.04	False	394	PVC	140.0	49.10	0.31	0.300	0.02	0.00	0.02
P-93	8.04	False	229	PVC	140.0	49.10	0.31	0.800	0.01	0.00	0.01
P-94	8.04	False	200	PVC	140.0	49.10	0.31	0.400	0.01	0.00	0.01
P-95	8.04	False	421	PVC	140.0	51.10	0.32	1.140	0.03	0.00	0.03
P-96	8.04	False	23	PVC	140.0	60.60	0.38	0.590	0.00	0.00	0.00
P-97	8.04	False	267	PVC	140.0	60.60	0.38	1.340	0.02	0.00	0.03
P-98	8.04	False	160	PVC	140.0	70.10	0.44	2.460	0.02	0.01	0.03
P-99	4.27	False	358	PVC	140.0	4.50	0.10	1.670	0.01	0.00	0.01

FlexTable: Pipe Table

Label	Diameter (in)	Has User Defined Length?	Length (Scaled) (ft)	Material	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)	Minor Loss Coefficient (Unified)	Headloss (Friction) (ft)	Headloss (Minor) (ft)	Headloss (ft)
P-100	1.82	False	142	PVC	140.0	2.00	0.25	0.370	0.03	0.00	0.03
P-101	8.04	False	260	PVC	140.0	7.00	0.04	1.670	0.00	0.00	0.00
P-102	4.27	False	208	PVC	140.0	7.00	0.16	0.370	0.01	0.00	0.01
P-103	1.82	False	237	PVC	140.0	1.50	0.18	0.370	0.03	0.00	0.03
P-104	8.04	False	230	PVC	140.0	81.50	0.52	0.000	0.03	0.00	0.03
P-105	8.04	False	190	PVC	140.0	79.50	0.50	2.070	0.03	0.01	0.04
P-106	8.04	False	34	PVC	140.0	36.53	0.23	0.840	0.00	0.00	0.00
P-107	8.04	False	246	PVC	140.0	36.53	0.23	1.340	0.01	0.00	0.01
P-108	8.04	False	205	PVC	140.0	21.64	0.14	0.790	0.00	0.00	0.00
P-109	8.04	False	215	PVC	140.0	21.64	0.14	1.140	0.00	0.00	0.00
P-110	8.04	False	176	PVC	140.0	9.86	0.06	0.790	0.00	0.00	0.00
P-111	8.04	False	204	PVC	140.0	9.86	0.06	0.600	0.00	0.00	0.00
P-112	8.04	False	148	PVC	140.0	3.36	0.02	0.000	0.00	0.00	0.00
P-113	8.04	False	197	PVC	140.0	3.36	0.02	0.350	0.00	0.00	0.00
P-114	8.04	False	25	PVC	140.0	1.14	0.01	1.140	0.00	0.00	0.00
P-115	8.04	False	110	PVC	140.0	8.00	0.05	0.790	0.00	0.00	0.00
P-116	4.27	False	318	PVC	140.0	8.00	0.18	1.020	0.01	0.00	0.01
P-117	1.82	False	149	PVC	140.0	2.00	0.25	0.370	0.03	0.00	0.03
P-118	8.04	False	176	PVC	140.0	0.50	0.00	2.460	0.00	0.00	0.00
P-119	8.04	False	273	PVC	140.0	9.64	0.06	2.460	0.00	0.00	0.00
P-120	8.04	False	271	PVC	140.0	13.86	0.09	1.240	0.00	0.00	0.00
P-121	8.04	False	229	PVC	140.0	13.86	0.09	0.790	0.00	0.00	0.00
P-123	8.04	False	416	PVC	140.0	20.00	0.13	2.020	0.00	0.00	0.01
P-125	8.04	False	625	PVC	140.0	20.00	0.13	0.640	0.01	0.00	0.01
P-126	8.04	False	126	PVC	140.0	20.00	0.13	2.070	0.00	0.00	0.00
P-127	8.04	False	168	PVC	140.0	6.22	0.04	0.590	0.00	0.00	0.00
P-128	8.04	False	255	PVC	140.0	6.22	0.04	0.400	0.00	0.00	0.00
P-129	8.04	False	247	PVC	140.0	1.72	0.01	0.000	0.00	0.00	0.00
P-130	8.04	False	63	PVC	140.0	1.72	0.01	0.540	0.00	0.00	0.00
P-131	8.04	False	136	PVC	140.0	1.72	0.01	1.040	0.00	0.00	0.00
P-132	8.04	False	154	PVC	140.0	1.78	0.01	0.300	0.00	0.00	0.00
P-133	8.04	False	149	PVC	140.0	1.78	0.01	0.050	0.00	0.00	0.00
P-134	8.04	False	99	PVC	140.0	6.78	0.04	0.000	0.00	0.00	0.00
P-135	8.04	False	270	PVC	140.0	6.78	0.04	0.940	0.00	0.00	0.00
P-136	8.04	False	113	PVC	140.0	0.00	0.00	2.460	0.00	0.00	0.00
P-137	8.04	False	345	PVC	140.0	37.97	0.24	0.740	0.01	0.00	0.01
P-138	6.13	False	182	PVC	140.0	8.40	0.09	1.820	0.00	0.00	0.00
P-139	6.13	False	162	PVC	140.0	8.40	0.09	1.770	0.00	0.00	0.00
P-140	6.13	False	258	PVC	140.0	2.78	0.03	1.720	0.00	0.00	0.00
P-141	6.13	False	102	PVC	140.0	2.78	0.03	1.670	0.00	0.00	0.00
P-145	8.04	False	152	PVC	140.0	14.68	0.09	0.590	0.00	0.00	0.00
P-146	8.04	False	275	PVC	140.0	16.73	0.11	3.210	0.00	0.00	0.00
P-147	8.04	False	48	PVC	140.0	11.97	0.08	0.690	0.00	0.00	0.00
P-148	8.04	False	240	PVC	140.0	11.97	0.08	1.140	0.00	0.00	0.00
P-160	11.73	False	336	PVC	140.0	125.99	0.37	0.350	0.02	0.00	0.02
P-161	11.73	False	685	PVC	140.0	125.99	0.37	0.390	0.04	0.00	0.04
P-162	11.73	False	36	PVC	140.0	125.99	0.37	0.350	0.00	0.00	0.00
P-163	11.73	False	363	PVC	140.0	125.99	0.37	0.800	0.02	0.00	0.02
P-164	11.73	False	213	PVC	140.0	125.99	0.37	0.000	0.01	0.00	0.01

FlexTable: Pipe Table

Label	Diameter (in)	Has User Defined Length?	Length (Scaled) (ft)	Material	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)	Minor Loss Coefficient (Unified)	Headloss (Friction) (ft)	Headloss (Minor) (ft)	Headloss (ft)
P-165	11.73	False	655	PVC	140.0	125.99	0.37	0.000	0.03	0.00	0.03
P-167	11.73	False	88	PVC	140.0	198.59	0.59	0.740	0.01	0.00	0.01
P-168	11.73	False	783	PVC	140.0	198.59	0.59	0.740	0.10	0.00	0.10
P-169	11.73	False	184	PVC	140.0	198.59	0.59	0.000	0.02	0.00	0.02
P-170	11.73	False	30	PVC	140.0	0.00	0.00	0.390	0.00	0.00	0.00
P-171	11.73	False	127	PVC	140.0	0.00	0.00	0.390	0.00	0.00	0.00
P-172	999.00	True	125	PVC	140.0	198.59	0.00	0.000	0.00	0.00	0.00
P-173	11.73	False	500	PVC	140.0	125.99	0.37	0.980	0.03	0.00	0.03
P-174	8.04	False	61	PVC	140.0	33.45	0.21	0.000	0.00	0.00	0.00
P-175	8.04	False	96	PVC	140.0	0.00	0.00	0.000	0.00	0.00	0.00

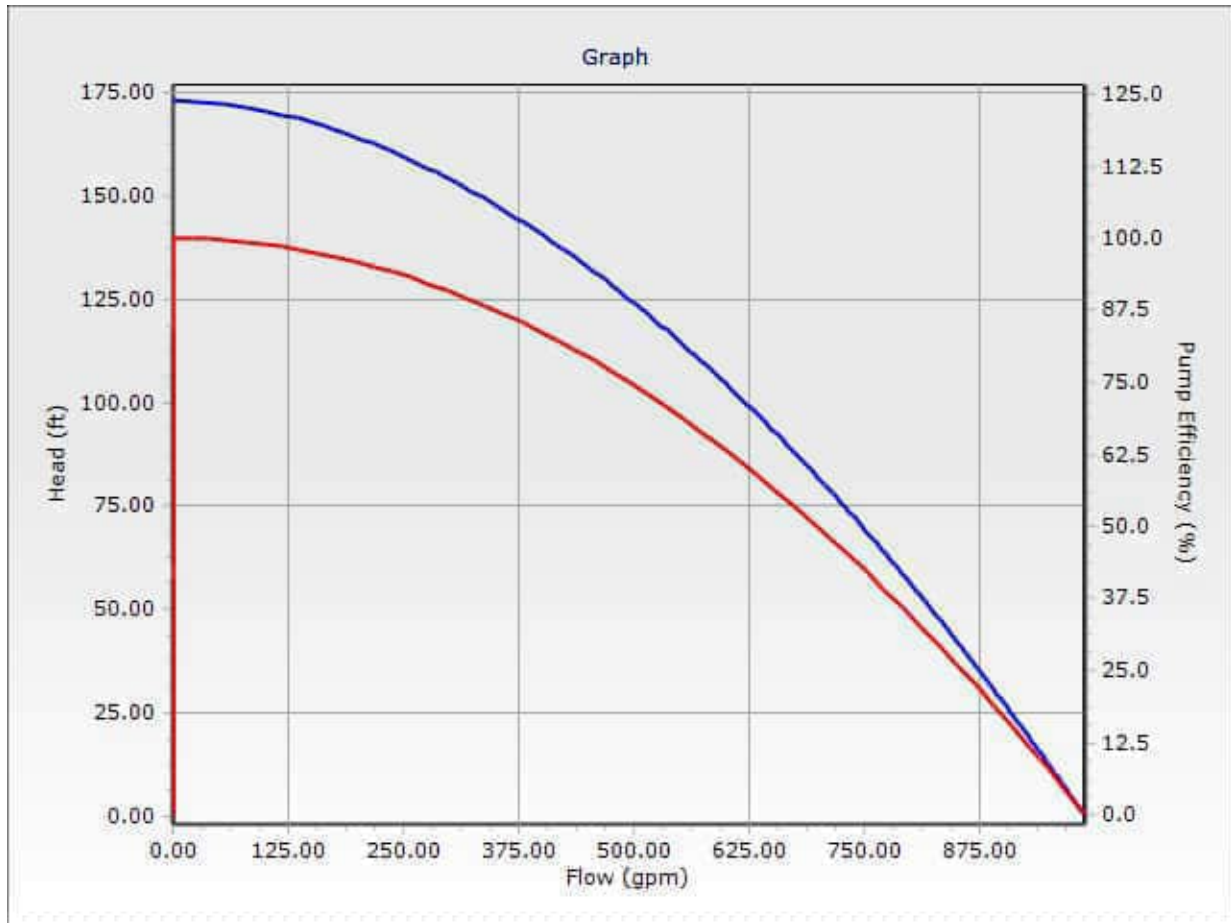
FlexTable: Pump Table

Label	Pump Definition	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	No 2 Rd at Mare Ave	84.00	84.00	253.58	120.41	169.58
PMP-2	South FL at SR19	93.00	93.00	253.73	198.59	160.73

Pump Definition Detailed Report: No 2 Rd at Mare Ave

Element Details			
ID	259	Notes	
Label	No 2 Rd at Mare Ave		
Pump Definition Type			
Pump Definition Type	Standard (3 Point)	Design Head	92.30 ft
Shutoff Flow	0.00 gpm	Maximum Operating Flow	836.00 gpm
Shutoff Head	173.10 ft	Maximum Operating Head	46.20 ft
Design Flow	655.00 gpm		
Pump Efficiency Type			
Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0.00 gpm		
Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

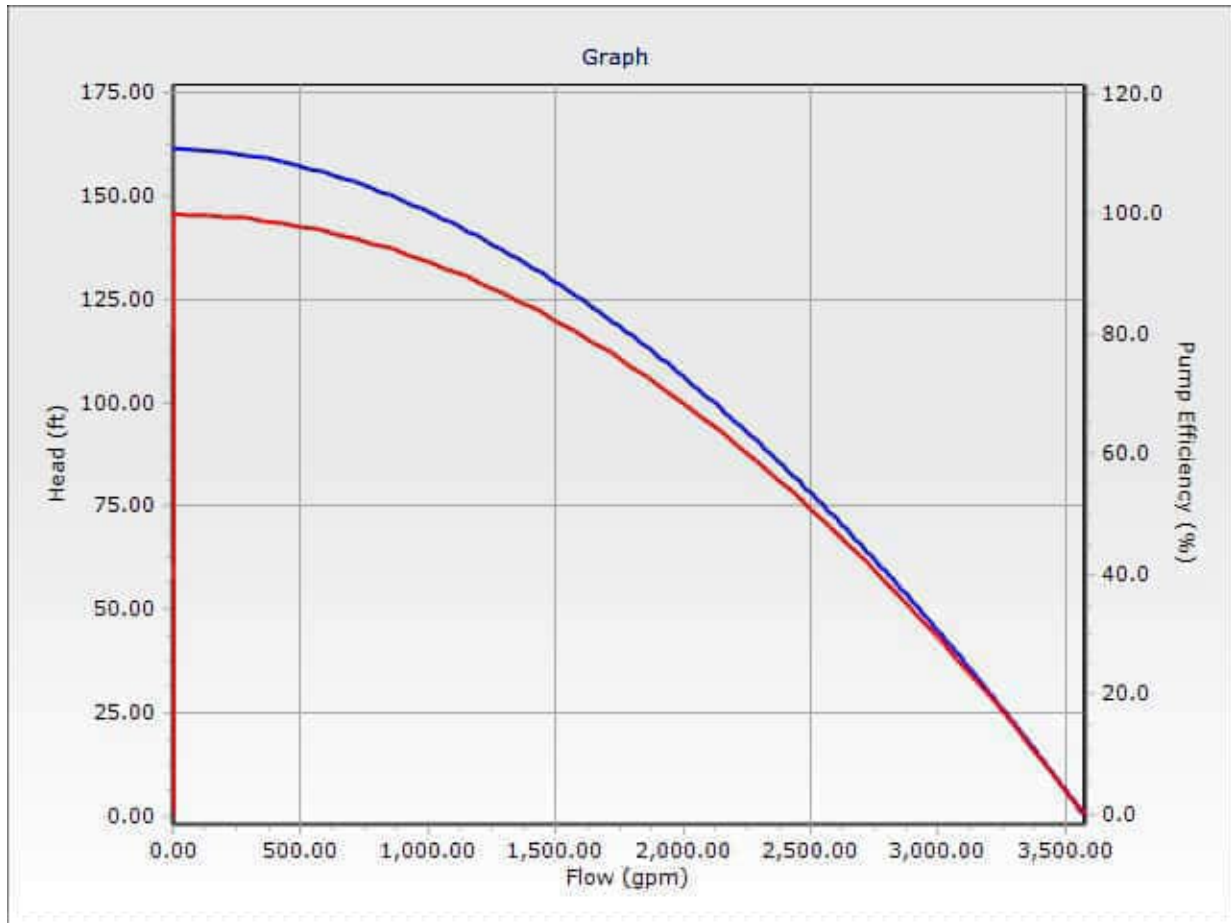
Pump Definition Detailed Report: No 2 Rd at Mare Ave



Pump Definition Detailed Report: South FL at SR19

Element Details			
ID	787	Notes	
Label	South FL at SR19		
Pump Definition Type			
Pump Definition Type	Standard (3 Point)	Design Head	92.30 ft
Shutoff Flow	0.00 gpm	Maximum Operating Flow	2,981.00 gpm
Shutoff Head	161.50 ft	Maximum Operating Head	46.20 ft
Design Flow	2,262.00 gpm		
Pump Efficiency Type			
Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0.00 gpm		
Transient (Physical)			
Inertia (Pump and Motor)	0.000 lb·ft²	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

Pump Definition Detailed Report: South FL at SR19



FlexTable: Reservoir Table

Label	Elevation (ft)	Flow (Out net) (gpm)
R-1	84.00	120.41
R-2	93.00	198.59

APPENDIX

Ryan Blaida

From: James Southall <jsouthall@howey.org>
Sent: Thursday, April 28, 2022 1:34 PM
To: Ryan Blaida
Cc: Don Griffey
Subject: Re: The Reserve at Howey

[EXTERNAL EMAIL]

Good Afternoon Ryan,

Per your request I had 3 hydrants retested,

Corner of Mare Hydrant
Static Pressure - 75
GPM - 750
Residual Pressure - 20

Central Ave in front of Citrus Plant
Static Pressure - 75
GPM - 750
Residual Pressure - 30

South Florida and State Road 19
Static Pressure - 70
GPM - 1250
Residual Pressure - 60

The static 20 psi on the Mare Hydrant could be low due to that being the dead end of that line at the Hydrant on the 6-inch main. From there it is reduced down to 2-inch line that feed the homes on Marilyn Ave.

If you have any other questions please feel free to reach out to me.

Thank you
JJ Southall
Utility Supervisor
Howey in the Hills

From: Ryan Blaida <rblaida@zwieng.com>
Sent: Monday, April 25, 2022 2:05 PM
To: James Southall <jsouthall@howey.org>
Cc: Don Griffey <dag@griffeyengineering.com>
Subject: RE: The Reserve at Howey