

Hydraulic Calculations for

Project: Homewood Suites
3500 South Meridian
Puyallup, WA. 98373

Drawing no.: FS-10
Date: 5/6/2024

Design

Remote area number: Area 9
Remote area location: Attic
Occupancy classification: Light Hazard
Density: 0.10 gpm./ft.2
Area of application: Entire Area
Coverage per sprinkler: 100 sq.ft. maximum
Type of sprinklers calculated: Upright
No. of sprinklers calculated: 10
In rack demand: 0 gpm.
Hose streams: 100 gpm. outside + 0 gpm. inside
Total water required (including hose streams): 278.94 gpm at 37.99 psi [13.86 psi safety margin]
Type of system: dry pipe
Volume of dry or preaction system:

Water Supply Information

Date: 01-26-2024
Location: 3601 9th Street Southwest
Source: Fruitland Mutual Water Company

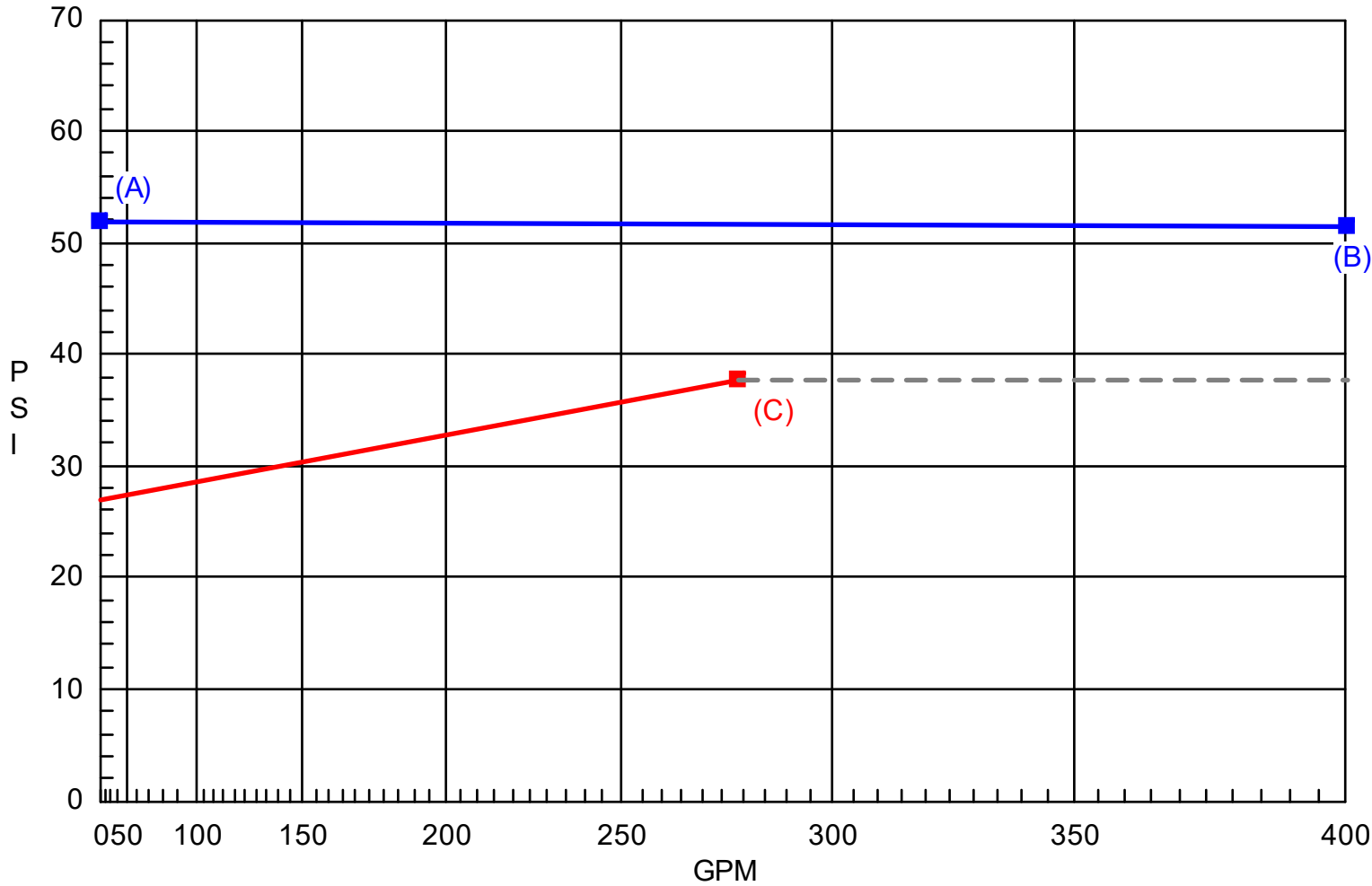
Contractor: Discount Fire Protection, LLC.
4 Red Bluff Court
Mansfield, TX. 76063

Name of designer: Timothy McBride
Authority having jurisdiction:

Notes

Pdev at node BOR to SOP - 3" AMEs 3000SS Backflow Preventer

Hydraulic Demand Graph



Water Source:
A) 52 psi Static
B) 400 gpm at 51.69 psi

Demand at Source:
C) 278.9 gpm at 37.99 psi

Supply Analysis

Node at	Static Pressure [psi]	Residual Pressure [psi]	Flow [gpm]	Available Pressure [psi]	Total Demand [gpm]	Required Pressure [psi]
CTY	52.0	51.0	754.0	51.84	278.94	37.99

Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	37.986	-278.936
M01	-4.000	ref	39.787	100.000
JP1	54.500	ref	31.907	0.000
J01	59.250	ref	17.619	0.000
J02	59.250	ref	13.493	0.000
J03	59.250	ref	10.936	0.000
J04	59.250	ref	9.948	0.000
J05	59.250	ref	9.724	0.000
J06	59.250	ref	9.726	0.000
J07	59.250	ref	10.018	0.000
J08	59.250	ref	11.109	0.000
J09	59.250	ref	13.069	0.000
J10	59.250	ref	17.029	0.000
JP2	54.500	ref	36.880	0.000
JP3	54.500	ref	64.884	0.000
JP4	54.500	ref	82.884	0.000
JP5	54.500	ref	89.456	0.000
JP6	54.500	ref	91.382	0.000
JP7	13.667	ref	114.594	0.000
TR3	5.000	ref	129.721	0.000
BR3	2.000	ref	133.943	0.000
BR2	2.000	ref	134.270	0.000
BR1	2.000	ref	134.300	0.000
SOP	2.000	ref	34.722	0.000
BOR	2.000	ref	37.154	0.000
901	60.250	K=5.60	16.197	22.538
902	60.250	K=5.60	12.294	19.635
903	60.250	K=5.60	9.877	17.600
904	60.250	K=5.60	8.944	16.748
905	63.750	K=5.60	7.032	14.850
906	63.750	K=5.60	7.034	14.852
907	63.750	K=5.60	7.299	15.129
908	63.750	K=5.60	8.294	16.127
909	60.250	K=5.60	11.893	19.312
910	60.250	K=5.60	15.639	22.146

Pipe Information

negative pipe flow (Q) indicates flow is from node 2 towards node 1

Node 1	Elev [ft]	K-factor	Discharge & Flow [gpm]	Nom i.d. [in]	Fittings num & length [ft]	L [ft] F [ft] T [ft]	C factor psi/ft	total (Pt) elev (Pe) frict (Pf)	Notes
JP1	54.500		q= 0.000 Q= 90.396	1.25 1.452	2E=5.486 1T=5.486	9.083 10.971 20.055	C=100	Pt= 31.907 Pe= 2.057 Pf= 12.231	Mat="1-ALXL"
J01	59.250								
J01	59.250		q= 0.000 Q= 67.858	1.25 1.452		11.500 0.000 11.500	C=100	Pt= 17.619 Pe= 0.000 Pf= 4.126	Mat="1-ALXL"
J02	59.250								
J02	59.250		q= 0.000 Q= 48.223	1.25 1.452	1E=2.743	10.667 2.743 13.410	C=100	Pt= 13.493 Pe= 0.000 Pf= 2.557	Mat="1-ALXL"
J03	59.250								
J03	59.250		q= 0.000 Q= 30.623	1.25 1.452		12.000 0.000 12.000	C=100	Pt= 10.936 Pe= 0.000 Pf= 0.988	Mat="1-ALXL"
J04	59.250								
J04	59.250		q= 0.000 Q= 13.876	1.25 1.452	1E=2.743	9.000 2.743 11.743	C=100	Pt= 9.948 Pe= 0.000 Pf= 0.224	Mat="1-ALXL"
J05	59.250								
J05	59.250		q= 0.000 Q= -0.974	1.25 1.452	1E=2.743	10.250 2.743 12.993	C=100	Pt= 9.724 Pe= 0.000 Pf= -0.002	Mat="1-ALXL"
J06	59.250								
J06	59.250		q= 0.000 Q= -15.826	1.25 1.452		12.000 0.000 12.000	C=100	Pt= 9.726 Pe= 0.000 Pf= -0.291	Mat="1-ALXL"
J07	59.250								
J07	59.250		q= 0.000 Q= -30.955	1.25 1.452	1E=2.743	10.250 2.743 12.993	C=100	Pt= 10.018 Pe= 0.000 Pf= -1.091	Mat="1-ALXL"
J08	59.250								
J08	59.250		q= 0.000 Q= -47.083	1.25 1.452	1E=2.743	8.000 2.743 10.743	C=100	Pt= 11.109 Pe= 0.000 Pf= -1.960	Mat="1-ALXL"
J09	59.250								
J09	59.250		q= 0.000 Q= -66.395	1.25 1.452	1E=2.743	8.750 2.743 11.493	C=100	Pt= 13.069 Pe= 0.000 Pf= -3.960	Mat="1-ALXL"
J10	59.250								
J10	59.250		q= 0.000 Q= -88.540	1.25 1.452	1T=5.486	24.833 5.486 30.319	C=100	Pt= 17.029 Pe= -2.057 Pf= -17.795	Mat="1-ALXL"
JP2	54.500								
901	60.250	5.6	q= 22.538 Q= -22.538	1 1.104	1T=4.577	1.000 4.577 5.577	C=100	Pt= 16.197 Pe= -0.433 Pf= -0.989	Mat="1-ALXL"
J01	59.250								
902	60.250	5.6	q= 19.635 Q= -19.635	1 1.104	1T=4.577	1.000 4.577 5.577	C=100	Pt= 12.294 Pe= -0.433 Pf= -0.766	Mat="1-ALXL"
J02	59.250								
903	60.250	5.6	q= 17.600 Q= -17.600	1 1.104	1T=4.577	1.000 4.577 5.577	C=100	Pt= 9.877 Pe= -0.433 Pf= -0.626	Mat="1-ALXL"
J03	59.250								
904	60.250	5.6	q= 16.748 Q= -16.748	1 1.104	1T=4.577	1.000 4.577 5.577	C=100	Pt= 8.944 Pe= -0.433 Pf= -0.571	Mat="1-ALXL"
J04	59.250								

Pipe Information, cont.

Node 1	Elev [ft]	K-factor	Discharge & Flow [gpm]	Nom i.d. [in]	Fittings num & length [ft]	L [ft] F [ft] T [ft]	C factor psi/ft	total (Pt) elev (Pe) frict (Pf)	Notes
905	63.750	5.6	q= 14.850 Q= -14.850	1 1.104	1T=4.577	4.500 4.577		Pt= 7.032 Pe= -1.948	Mat="1-ALXL"
J05	59.250					9.077	0.082	Pf= -0.744	
906	63.750	5.6	q= 14.852 Q= -14.852	1 1.104	1T=4.577	4.500 4.577		Pt= 7.034 Pe= -1.948	Mat="1-ALXL"
J06	59.250					9.077	0.082	Pf= -0.744	
907	63.750	5.6	q= 15.129 Q= -15.129	1 1.104	1T=4.577	4.500 4.577		Pt= 7.299 Pe= -1.948	Mat="1-ALXL"
J07	59.250					9.077	0.085	Pf= -0.770	
908	63.750	5.6	q= 16.127 Q= -16.127	1 1.104	1T=4.577	4.500 4.577		Pt= 8.294 Pe= -1.948	Mat="1-ALXL"
J08	59.250					9.077	0.095	Pf= -0.867	
909	60.250	5.6	q= 19.312 Q= -19.312	1 1.104	1T=4.577	1.000 4.577		Pt= 11.893 Pe= -0.433	Mat="1-ALXL"
J09	59.250					5.577	0.133	Pf= -0.743	
910	60.250	5.6	q= 22.146 Q= -22.146	1 1.104	1T=4.577	1.000 4.577		Pt= 15.639 Pe= -0.433	Mat="1-ALXL"
J10	59.250					5.577	0.172	Pf= -0.957	
JP1	54.500		q= 0.000 Q= -90.396	2 2.154		55.667 0.000		Pt= 31.907 Pe= 0.000	Mat="1-ALXL"
JP2	54.500					55.667	0.089	Pf= -4.974	
JP2	54.500		q= 0.000 Q= -178.936	2 2.154	1E=4.362	84.250 4.362		Pt= 36.880 Pe= 0.000	Mat="1-ALXL"
JP3	54.500					88.612	0.316	Pf= -28.004	
JP3	54.500		q= 0.000 Q= -178.936	2.5 2.635		152.000 0.000		Pt= 64.884 Pe= 0.000	Mat="1-AL10"
JP4	54.500					152.000	0.118	Pf= -18.000	
JP4	54.500		q= 0.000 Q= -178.936	2.5 2.635		55.500 0.000		Pt= 82.884 Pe= 0.000	Mat="1-AL10"
JP5	54.500					55.500	0.118	Pf= -6.572	
JP5	54.500		q= 0.000 Q= -178.936	2.5 2.635	2E=11.758	4.500 11.758		Pt= 89.456 Pe= 0.000	Mat="1-AL10"
JP6	54.500					16.258	0.118	Pf= -1.925	
JP6	54.500		q= 0.000 Q= -178.936	2.5 2.635	1E=5.879	40.833 5.879		Pt= 91.382 Pe= -17.681	Mat="1-AL10"
JP7	13.667					46.712	0.118	Pf= -5.532	
JP7	13.667		q= 0.000 Q= -178.936	2.5 2.635	3E=17.636	78.417 17.636		Pt=114.594 Pe= -3.753	Mat="1-AL10"
TR3	5.000					96.053	0.118	Pf= -11.375	
TR3	5.000		q= 0.000 Q= -178.936	2.5 2.635	1T=16.474 1D=5.491	3.000 31.576		Pt=129.721 Pe= -1.299	Mat="1-WL10"
BR3	2.000				1B=9.610	34.576	0.085	Pf= -2.922	
BR3	2.000		q= 0.000 Q= -178.936	3 3.26	1E=9.408	1.500 9.408		Pt=133.943 Pe= 0.000	Mat="1-WL10"
BR2	2.000					10.908	0.03	Pf= -0.327	

Pipe Information, cont.

Node 1	Elev	Discharge & Flow	Nom i.d.	Fittings num & length	L [ft]	C factor	total elev (Pe)	Notes
Node 2	[ft]	[gpm]	[in]	[ft]	F [ft]	psi/ft	frict (Pf)	
BR2	2.000	Q= 0.000 Q=-178.936	3 3.26		1.000		Pt=134.270 Pe= 0.000	Mat="1-WL10"
BR1	2.000				1.000	0.03	Pf= -0.030	
BR1	2.000	Q= 0.000 Q=-178.936	3 3.26	2G=2.688 1C=21.503	6.500 33.599	C=120	Pt=134.300 Pe= 0.000	Mat="1-WL10" Pdev=100.78 psi
SOP	2.000			1E=9.408	40.099	0.03	Pf= -1.202	
SOP	2.000	Q= 0.000 Q=-178.936	3 3.26	1E=9.408	5.000		Pt= 34.722 Pe= 0.000	Mat="1-WL10" Pdev=-2.0 psi
BOR	2.000				14.408	0.03	Pf= -0.432	
BOR	2.000	Q= 0.000 Q=-178.936	6 6.065	1E=14.000	10.000		Pt= 37.154 Pe= -2.598	Mat="S40"
M01	-4.000				24.000	0.001	Pf= -0.035	
M01	-4.000	Q= 100.000 Q=-278.936	6 6.08	1G=4.588 1E=21.411	96.000 71.880	C=150	Pt= 39.787 Pe= 2.165	Mat="1-PVC"
CTY	1.000			1T=45.881	167.880	0.002	Pf= -0.364	

Material Codes

<u>Pipe Material</u>	<u>Fittings</u>
S40 - Schedule 40 Steel	B - Butterfly Valve
1-PVC - PVC C900 Underround Pipe	C - Check Valve
1-AL10 - Allied Tube schedule 10	D - Dry Valve
1-ALXL - Allied Tube XL	E - Standard 90 degree elbow
1-WL10 - Wheatland's schedule 10	G - Gate Valve
	T - Tee - Flow turn 90 degrees