Hydraulic Calculations
for

Project: Homewood Suites
5233 Katella Avenue
Cypress, CA. 90630
Drawing no.: FS-4
Date: 3/3/2024

Design

Remote area number:	Area 8
Remote area location:	1st Floor Pool
Occupancy classification:	light hazard
Density:	0.10 gpm./ft.2
Area of application:	900 sq.ft.
Coverage per sprinkler:	156 sq.ft. maximum
Type of sprinklers calculated:	Concealed Pendent
No. of sprinklers calculated:	7
In rack demand:	0 gpm.
Hose streams:	100 gpm. outside + 0 gpm. inside
Total water required (including hose streams):	224.6 gpm at -49.02 psi [100.91 psi safety margin]
Type of system:	wet pipe
Volume of dry or preaction system:	

Water Supply Information

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

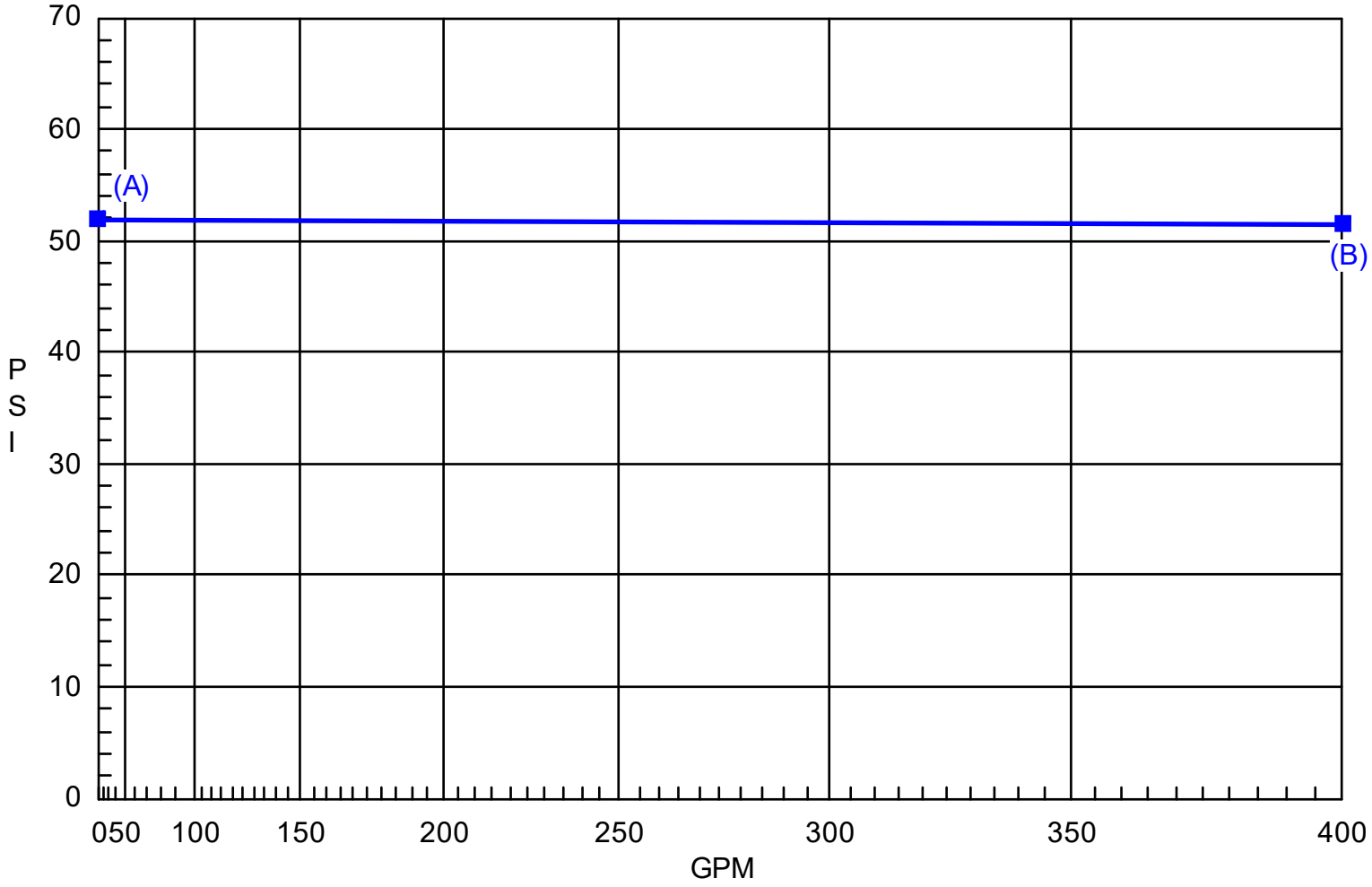
Contractor: Discount Fire Protection, LLC.
4 Red Bluff Court
Mansfield, TX. 76063

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) 224.6 gpm at -49.02 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	51.89	224.6	-49.02

Node Analysis

Node Tag	Elev [ft]	Type	Pressure [psi]	Discharge [gpm]
CTY	1.000	source	-49.015	-224.597
H01	13.000	ref	6.905	0.000
H02	13.000	ref	7.546	0.000
H03	13.000	ref	9.958	0.000
HP1	13.000	ref	18.797	0.000
H04	13.000	ref	7.083	0.000
H05	13.000	ref	7.736	0.000
H06	13.000	ref	10.171	0.000
HP2	13.000	ref	19.067	0.000
H07	13.000	ref	17.839	0.000
HP3	13.000	ref	20.046	0.000
HP4	13.000	ref	22.332	0.000
HP5	13.000	ref	28.565	0.000
HP6	13.000	ref	31.296	0.000
TR1	13.000	ref	34.921	0.000
BR1	2.000	ref	49.295	0.000
SOP	2.000	ref	-51.931	0.000
BOR	2.000	ref	-49.710	0.000
M01	-4.000	ref	-47.094	100.000
801	9.333	K=5.60	7.760	15.600
802	9.333	K=5.60	8.514	16.340
803	9.333	K=5.60	10.776	18.383
804	9.333	K=5.60	7.923	15.763
805	9.833	K=5.60	8.511	16.337
806	9.833	K=5.60	10.799	18.403
807	9.833	K=5.60	18.018	23.771

Pipe Information

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

Node 1 Node 2	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
801	9.333	5.6	q= 15.600	1	1PE=13.388	3.667		Pt= 7.760	Mat="1-CPVC"
			Q= -15.600	1.101		13.388	C=150	Pe= 1.588	
H01	13.000					17.054	0.043	Pf= -0.733	
H01	13.000		q= 0.000	1	1PTS=1.913	13.000		Pt= 6.905	Mat="1-CPVC"
			Q= -15.600	1.101		1.913	C=150	Pe= 0.000	
H02	13.000					14.913	0.043	Pf= -0.641	
H02	13.000		q= 0.000	1	1PTS=1.913	13.000		Pt= 7.546	Mat="1-CPVC"
			Q= -31.940	1.101		1.913	C=150	Pe= 0.000	
H03	13.000					14.913	0.162	Pf= -2.412	
H03	13.000		q= 0.000	1	1PTR=9.563	14.000		Pt= 9.958	Mat="1-CPVC"
			Q= -50.323	1.101		9.563	C=150	Pe= 0.000	
HP1	13.000					23.563	0.375	Pf= -8.838	
802	9.333	5.6	q= 16.340	1	1PTR=9.563	3.667		Pt= 8.514	Mat="1-CPVC"
			Q= -16.340	1.101		9.563	C=150	Pe= 1.588	
H02	13.000					13.229	0.047	Pf= -0.619	
803	9.333	5.6	q= 18.383	1	1PTR=9.563	3.667		Pt= 10.776	Mat="1-CPVC"
			Q= -18.383	1.101		9.563	C=150	Pe= 1.588	
H03	13.000					13.229	0.058	Pf= -0.770	
804	9.333	5.6	q= 15.763	1	1PE=13.388	3.667		Pt= 7.923	Mat="1-CPVC"
			Q= -15.763	1.101		13.388	C=150	Pe= 1.588	
H04	13.000					17.054	0.044	Pf= -0.747	
H04	13.000		q= 0.000	1	1PTS=1.913	13.000		Pt= 7.083	Mat="1-CPVC"
			Q= -15.763	1.101		1.913	C=150	Pe= 0.000	
H05	13.000					14.913	0.044	Pf= -0.653	
H05	13.000		q= 0.000	1	1PTS=1.913	13.000		Pt= 7.736	Mat="1-CPVC"
			Q= -32.100	1.101		1.913	C=150	Pe= 0.000	
H06	13.000					14.913	0.163	Pf= -2.435	
H06	13.000		q= 0.000	1	1PTR=9.563	14.000		Pt= 10.171	Mat="1-CPVC"
			Q= -50.503	1.101		9.563	C=150	Pe= 0.000	
HP2	13.000					23.563	0.378	Pf= -8.897	
805	9.833	5.6	q= 16.337	1	1PTR=9.563	3.167		Pt= 8.511	Mat="1-CPVC"
			Q= -16.337	1.101		9.563	C=150	Pe= 1.371	
H05	13.000					12.729	0.047	Pf= -0.596	
806	9.833	5.6	q= 18.403	1	1PTR=9.563	3.167		Pt= 10.799	Mat="1-CPVC"
			Q= -18.403	1.101		9.563	C=150	Pe= 1.371	
H06	13.000					12.729	0.058	Pf= -0.743	
807	9.833	5.6	q= 23.771	1	1PTR=9.563	3.167		Pt= 18.018	Mat="1-CPVC"
			Q= -23.771	1.101		9.563	C=150	Pe= 1.371	
H07	13.000					12.729	0.094	Pf= -1.192	
H07	13.000		q= 0.000	1	1PTR=9.563	14.000		Pt= 17.839	Mat="1-CPVC"
			Q= -23.771	1.101		9.563	C=150	Pe= 0.000	
HP3	13.000					23.563	0.094	Pf= -2.207	
HP1	13.000		q= 0.000	2	1PTS=1.296	12.000		Pt= 18.797	Mat="1-CPVC"
			Q= -50.323	2.003		1.296	C=150	Pe= 0.000	
HP2	13.000					13.296	0.02	Pf= -0.271	

Pipe Information, cont.

Node 1 Node 2	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
HP2	13.000		q= 0.000	2	1PTS=1.296	12.000		Pt= 19.067	Mat="1-CPVC"
			Q=-100.827	2.003		1.296	C=150	Pe= 0.000	
HP3	13.000					13.296	0.074	Pf= -0.978	
HP3	13.000		q= 0.000	2		21.000		Pt= 20.046	Mat="1-CPVC"
			Q=-124.597	2.003		0.000	C=150	Pe= 0.000	
HP4	13.000					21.000	0.109	Pf= -2.286	
HP4	13.000		q= 0.000	2	2PTR=25.929	31.333		Pt= 22.332	Mat="1-CPVC"
			Q=-124.597	2.003		25.929	C=150	Pe= 0.000	
HP5	13.000					57.263	0.109	Pf= -6.234	
HP5	13.000		q= 0.000	2		25.083		Pt= 28.565	Mat="1-CPVC"
			Q=-124.597	2.003		0.000	C=150	Pe= 0.000	
HP6	13.000					25.083	0.109	Pf= -2.731	
HP6	13.000		q= 0.000	2	1PTR=12.965	20.333		Pt= 31.296	Mat="1-CPVC"
			Q=-124.597	2.003		12.965	C=150	Pe= 0.000	
TR1	13.000					33.298	0.109	Pf= -3.625	
TR1	13.000		q= 0.000	2	1C=13.416	12.000		Pt= 34.921	Mat="1-WLML"
			Q=-124.597	2.153	1B=7.318	45.125	C=120	Pe= -4.763	Pdev=-3.0 psi
BR1	2.000				2T=24.392	57.125	0.116	Pf= -6.611	
BR1	2.000		q= 0.000	3	2G=2.688	6.500		Pt= 49.295	Mat="1-WL10"
			Q=-124.597	3.26	1C=21.503	33.599	C=120	Pe= 0.000	Pdev=101.84 psi
SOP	2.000				1E=9.408	40.099	0.015	Pf= -0.615	
SOP	2.000		q= 0.000	3	1E=9.408	5.000		Pt=-51.931	Mat="1-WL10"
			Q=-124.597	3.26		9.408	C=120	Pe= 0.000	Pdev=-2.0 psi
BOR	2.000					14.408	0.015	Pf= -0.221	
BOR	2.000		q= 0.000	6	1E=14.000	10.000		Pt=-49.710	Mat="S40"
			Q=-124.597	6.065		14.000	C=120	Pe= -2.598	
M01	-4.000					24.000	0.001	Pf= -0.018	
M01	-4.000		q= 100.000	6	1G=4.588	96.000		Pt=-47.094	Mat="1-PVC"
			Q=-224.597	6.08	1E=21.411	71.880	C=150	Pe= 2.165	
CTY	1.000				1T=45.881	167.880	0.001	Pf= -0.244	

Material Codes

Pipe Material

S40 - Schedule 40 Steel
1-PVC - PVC C900 Underround Pipe
1-CPVC - Blazemaster
1-WL10 - Wheatland's schedule 10
1-WLML - Wheatland's MLT

Fittings

B - Butterfly Valve
C - Check Valve
E - Standard 90 degree elbow
G - Gate Valve
T - Tee - Flow turn 90 degrees
PE - CPVC 90 degree elbow
PTR - CPVC Tee - Flow turn 90 degree
PTS - CPVC Tee - Flow straight thru path