

Job Name : Discovery Pet Spa

Address : 1921 NE Trails Edge Blvd. - Lee's Summit, MO

Date : 6/26/2025

Sprinkler Contractor : Goal Fire Protection, LLC

Area Info :

Area Design : Per NFPA-13, 2016

System Type : Wet System

Design Criteria :

Density: **0.10** gpm/sq. ft. Operating Area: **1050** sq. ft.
Max. Area Per Sprinkler: **130** Total Sprinklers Operating: **9** Sprinkler K Factor: **5.6**
Outside Hose Allowance: **100**

Calculation Summary :

GPM Required : 137.32	PSI Required : 37.40	@ Base of Riser
GPM Required : 237.32	PSI Required : 38.28	@ Connection to City Main

Area Safety Margin: 75.2 PSI 66 %

Water Supply :

Flow Test :

Date : 6-3-2025

Static : 115 PSI

Residual : 70 PSI

Flow : 1501 GPM

Elevation : Same as F.F.

Location of Flow Test : Looped City Main

Source of Flow Test : Goal Fire Protection

Notes :

7-2-2025



WATER FLOW TEST REPORT



Property Name: Discovery Park

City, State: Lee's Summit, MO

Conducted by: Wyatt Porter

HYDRANT # & LOCATION Ramp

DATE: 6/3/2025

WITNESS BY N/A

DAY OR WEEK:

TIME OF DAY: 8:30

WEATHER: Cloudy

WATER SUPPLIED BY:

PURPOSE OF TEST: Annual Inspection & Flow Rate

DATA

FLOW HYDRANT(S)

	A1	A2	A3
SIZE OPENING:	2.5	0	0
COEFFICIENT:	0.9	0	0
PITOT READING:	80	0	0
GPM:	1501	0	0

TOTAL FLOW DURING TEST: 1501 GPM

STATIC READING: 115 PSI

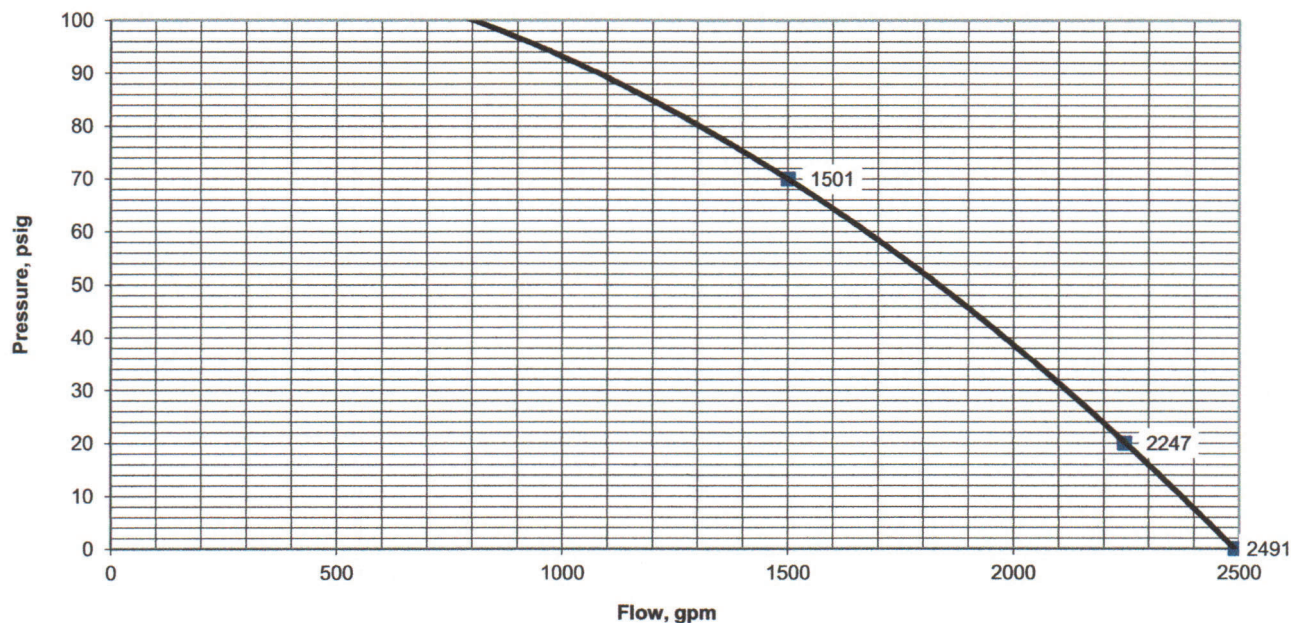
RESIDUAL: 70 PSI

RESULTS: AT 20 PSI RESIDUAL 2247 GPM

AT 0 PSI 2491 GPM

ESTIMATED CONSUMPTION: 1501 GAL.

REMARKS: Coefficient Per NFPA 291 (Smooth & Rounded Hydrant Butt = 0.90) (Square & Sharp Hydrant Butt = 0.80)
(Square Butt Projecting Into Hydrant Barrell 0.70) (Smooth & Rounded Hydrant Butt **FM GLOBAL** = 0.80)

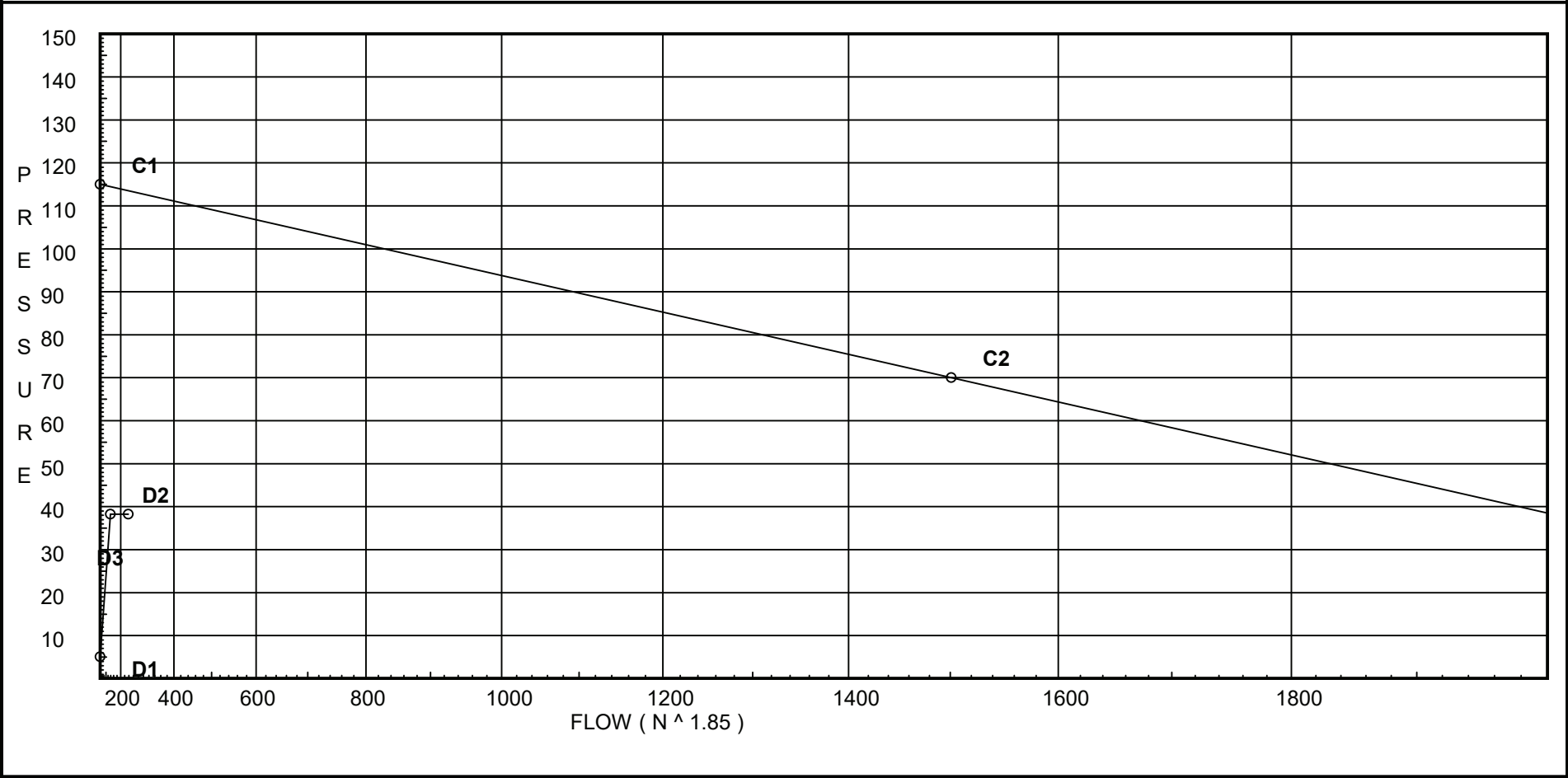


Water Supply Curve

Discovery Pet Spa

City Water Supply:
C1 - Static Pressure : 115
C2 - Residual Pressure: 70
C2 - Residual Flow : 1501

Demand:
D1 - Elevation : 5.089
D2 - System Flow : 137.324
D2 - System Pressure : 38.280
Hose (Demand) : 100
D3 - System Demand : 237.324
Safety Margin : 75.237



Fittings Used Summary

Discovery Pet Spa

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zcb	Colt C200 Vert Butt	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with *. The fittings marked with a * show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a * will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

Discovery Pet Spa

SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	115.0	70	1501.0	113.516	237.32	38.28

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>	
SP01	12.75	5.6	7.0	14.82	0.1	130
EQ01	11.75		7.88			
B1	11.75		11.11			
H101	11.75	5.28	8.22	15.13	K=K @ EQ01	
H102	11.75	5.28	7.92	14.85	K=K @ EQ01	
H103	11.75	5.28	7.88	14.82	K=K @ EQ01	
H104	11.75	5.28	7.93	14.86	K=K @ EQ01	
H105	11.75	5.28	8.25	15.15	K=K @ EQ01	
B2	11.75		11.26			
H106	11.75	5.28	8.89	15.74	K=K @ EQ01	
H107	11.75	5.28	8.69	15.56	K=K @ EQ01	
H108	11.75	5.28	8.68	15.55	K=K @ EQ01	
H109	11.75	5.28	8.81	15.66	K=K @ EQ01	
B3	11.75		11.73			
B4	11.75		12.04			
B5	11.75		12.29			
B6	11.75		12.43			
B7	11.75		12.48			
A1	11.75		11.93			
A2	11.75		12.07			
A3	11.75		12.51			
A4	11.75		12.99			
A5	11.75		13.71			
A6	11.75		14.59			
A7	11.75		15.83			
A8	11.75		17.36			
TOR	11.75		22.43			
BFP	11.75		27.4			
UG	1.0		37.41			
HOSE	0.0		38.27	100.0		
TEST	0.0		38.28			

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
SP01 to EQ01	12.75 11.75	5.60	14.82 14.82	1 1.049	T 5.0	1.000 5.000 6.000	120 0.0747	7.000 0.433 0.448		Vel = 5.50	
EQ01			0.0 14.82					7.881		K Factor = 5.28	
B1 to H101	11.75 11.75		-36.81 -36.81	1.25 1.442	T 7.432	26.350 7.432 33.782	120 -0.0854	11.109 0.0 -2.885		Vel = 7.23	
H101 to H102	11.75 11.75	5.28	15.13 -21.68	1.25 1.442		9.500 9.500	120 -0.0321	8.224 0.0 -0.305		K = K @ EQ01 Vel = 4.26	
H102 to H103	11.75 11.75	5.28	14.86 -6.82	1.25 1.442		10.000 10.000	120 -0.0038	7.919 0.0 -0.038		K = K @ EQ01 Vel = 1.34	
H103 to H104	11.75 11.75	5.28	14.81 7.99	1.25 1.442		9.000 9.000	120 0.0051	7.881 0.0 0.046		K = K @ EQ01 Vel = 1.57	
H104 to H105	11.75 11.75	5.28	14.86 22.85	1.25 1.442		9.000 9.000	120 0.0353	7.927 0.0 0.318		K = K @ EQ01 Vel = 4.49	
H105 to A1	11.75 11.75	5.28	15.16 38.01	1.25 1.442	T 7.432	33.180 7.432 40.612	120 0.0906	8.245 0.0 3.680		K = K @ EQ01 Vel = 7.47	
A1			0.0 38.01					11.925		K Factor = 11.01	
B2 to H106	11.75 11.75		-33.08 -33.08	1.25 1.442	T 7.432	26.350 7.432 33.782	120 -0.0701	11.257 0.0 -2.368		Vel = 6.50	
H106 to H107	11.75 11.75	5.28	15.74 -17.34	1.25 1.442		9.500 9.500	120 -0.0212	8.889 0.0 -0.201		K = K @ EQ01 Vel = 3.41	
H107 to H108	11.75 11.75	5.28	15.55 -1.79	1.25 1.442		10.000 10.000	120 -0.0003	8.688 0.0 -0.003		K = K @ EQ01 Vel = 0.35	
H108 to H109	11.75 11.75	5.28	15.56 13.77	1.25 1.442		9.000 9.000	120 0.0138	8.685 0.0 0.124		K = K @ EQ01 Vel = 2.71	
H109 to A2	11.75 11.75	5.28	15.66 29.43	1.25 1.442	2E T 7.432	42.930 7.432 57.794	120 0.0565	8.809 0.0 3.264		K = K @ EQ01 Vel = 5.78	
A2			0.0 29.43					12.073		K Factor = 8.47	
B3 to A3	11.75 11.75		9.18 9.18	1.25 1.442	2T 2E 14.864 7.432	97.780 22.296 120.076	120 0.0065	11.729 0.0 0.786		Vel = 1.80	
A3			0.0 9.18					12.515		K Factor = 2.59	
B4 to A4	11.75 11.75		10.18 10.18	1.25 1.442	2T 2E 14.864 7.432	97.770 22.296 120.066	120 0.0079	12.038 0.0 0.952		Vel = 2.00	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
A4			0.0 10.18						12.990		K Factor = 2.82	
B5 to A5	11.75 11.75		13.16 13.16	1.25 1.442	2T	14.864	97.040 14.864 111.904	120 0.0127	12.288 0.0 1.426		Vel = 2.59	
A5			0.0 13.16						13.714		K Factor = 3.55	
B6 to A6	11.75 11.75		16.48 16.48	1.25 1.442	2T	14.864	97.040 14.864 111.904	120 0.0193	12.430 0.0 2.162		Vel = 3.24	
A6			0.0 16.48						14.592		K Factor = 4.31	
B7 to A7	11.75 11.75		20.88 20.88	1.25 1.442	2T	14.864	97.040 14.864 111.904	120 0.0299	12.482 0.0 3.349		Vel = 4.10	
A7			0.0 20.88						15.831		K Factor = 5.25	
B1 to B2	11.75 11.75		36.81 36.81	2 2.157			12.300 12.300	120 0.0120	11.109 0.0 0.148		Vel = 3.23	
B2 to B3	11.75 11.75		33.08 69.89	2 2.157			12.000 12.000	120 0.0393	11.257 0.0 0.472		Vel = 6.14	
B3 to B4	11.75 11.75		-9.18 60.71	2 2.157			10.190 10.190	120 0.0303	11.729 0.0 0.309		Vel = 5.33	
B4 to B5	11.75 11.75		-10.19 50.52	2 2.157			11.590 11.590	120 0.0216	12.038 0.0 0.250		Vel = 4.44	
B5 to B6	11.75 11.75		-13.16 37.36	2 2.157			11.500 11.500	120 0.0123	12.288 0.0 0.142		Vel = 3.28	
B6 to B7	11.75 11.75		-16.48 20.88	2 2.157			12.250 12.250	120 0.0042	12.430 0.0 0.052		Vel = 1.83	
B7			0.0 20.88						12.482		K Factor = 5.91	
A1 to A2	11.75 11.75		38.01 38.01	2 2.157			11.550 11.550	120 0.0128	11.925 0.0 0.148		Vel = 3.34	
A2 to A3	11.75 11.75		29.43 67.44	2 2.157			12.000 12.000	120 0.0368	12.073 0.0 0.442		Vel = 5.92	
A3 to A4	11.75 11.75		9.18 76.62	2 2.157			10.190 10.190	120 0.0466	12.515 0.0 0.475		Vel = 6.73	
A4 to A5	11.75 11.75		10.18 86.8	2 2.157			12.330 12.330	120 0.0587	12.990 0.0 0.724		Vel = 7.62	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Equiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
A5 to A6	11.75 11.75		13.16 99.96	2 2.157		11.500 11.500	120 0.0763	13.714 0.0 0.878		Vel = 8.78	
A6 to A7	11.75 11.75		16.48 116.44	2 2.157		12.250 12.250	120 0.1011	14.592 0.0 1.239		Vel = 10.22	
A7 to A8	11.75 11.75		20.88 137.32	2 2.157	E 6.153	4.970 6.153 11.123	120 0.1373	15.831 0.0 1.527		Vel = 12.06	
A8 to TOR	11.75 11.75		0.0 137.32	2 2.157	E 6.153	30.810 6.153 36.963	120 0.1373	17.358 0.0 5.075		Vel = 12.06	
TOR			0.0 137.32					22.433		K Factor = 28.99	
TOR to BFP	11.75 11.75		137.32 137.32	2 2.157	E Fsp 0.0	8.150 6.153 14.303	120 0.1372	22.433 3.000 1.963		** Fixed Loss = 3 Vel = 12.06	
BFP to UG	11.75 1		0.0 137.32	2.5 2.635	Zcb 0.0	2.600 2.600	120 0.0519	27.396 9.876 0.135		** Fixed Loss = 5.22 Vel = 8.08	
UG to HOSE	1 0		0.0 137.32	4 4.1	E 14.534	80.000 14.534 94.534	140 0.0045	37.407 0.433 0.427		Vel = 3.34	
HOSE to TEST	0 0	H100	100.00 237.32	4 4.1		1.000 1.000	140 0.0130	38.267 0.0 0.013		Vel = 5.77	
TEST			0.0 237.32					38.280		K Factor = 38.36	

AutoPeaking Summary

Auto Peaking Summary - List of Pipes for Area Calculated

Left			Right		
Side			Side		
From	To	Length	From	To	Length
H105	A1	33.180	B1	H101	26.350
H109	A2	42.930	B2	H106	26.350
H105	A1	33.180	B1	H101	26.350
H109	A2	42.930	B2	H106	26.350

Flow		Safety	Pressure
Required		Margin	Differential
Left	9.000	236.981	75.403 -0.167
Area Calculated		237.324	75.237 0.000
Right	9.000	237.554	75.252 -0.015

Typical Distance Between Heads = 9.000

Split Point Used in Worst Area Peaked = H103

Split Point Used in Area Calculated = H103