



Hydraulic Calculations by HydraCALC

JAYHAWK FIRE SPRINKLER CO. INC
12030 S. HEDGE LANE TERRACE
OLATHE, KS 66061
913-422-3770
785-232-0975

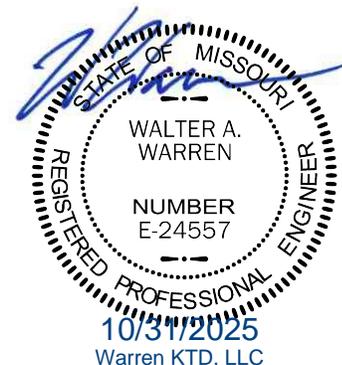
Job Name : 20935M - HCA Lee's Summit ER Expansion
Drawing : FP1 & FP2
Location : 2100 SE Blue Parkway
Remote Area : 1
Contract : 20935M
Data File : 20935M - HCA Lee's Summit ER Expansion Area 1.WXF

HYDRAULIC CALCULATIONS
for

JOB NAME 20935M - HCA Lee's Summit ER Expansion
Location 2100 SE Blue Parkway
Drawing # FP1 & FP2
Contract # 20935M
Date 10/30/2025

DESIGN

Remote area # 1
Remote area location EXAM ROOM, CORRIDOR, NURSES STATION
Occupancy classification LIGHT HAZARD
Density .10 - Gpm/SqFt
Area of application 1163 - SqFt
Coverage/sprinkler VARIES - SqFt
Type of sprinkler calculated V2708 & V3802
Sprinklers calculated 10
In-rack demand NA - GPM
Hose streams 150 - GPM
Total water required (including hose streams) 319.105 - GPM @ 53.4321 - Psi
Type of system WET
Volume of system (dry or pre-action) NA - Gal



WATER SUPPLY INFORMATION

Test date 08-29-2025
Location ONSITE
Source of info LEE'S SUMMIT WATER DEPT.

CONTRACTOR INFO JAYHAWK FIRE SPRINKLER CO. INC
Address 12030 S. HEDGE LANE TERRACE / OLATHE, KS 66061 / 913-422-377
Phone # 785-232-0975
Name of designer TJA
Authority having jurisdiction CITY OF LEE'S SUMMIT
NOTES: NA

text1(35) - invisible

Water Supply Curve

JAYHAWK FIRE SPRINKLER CO. INC
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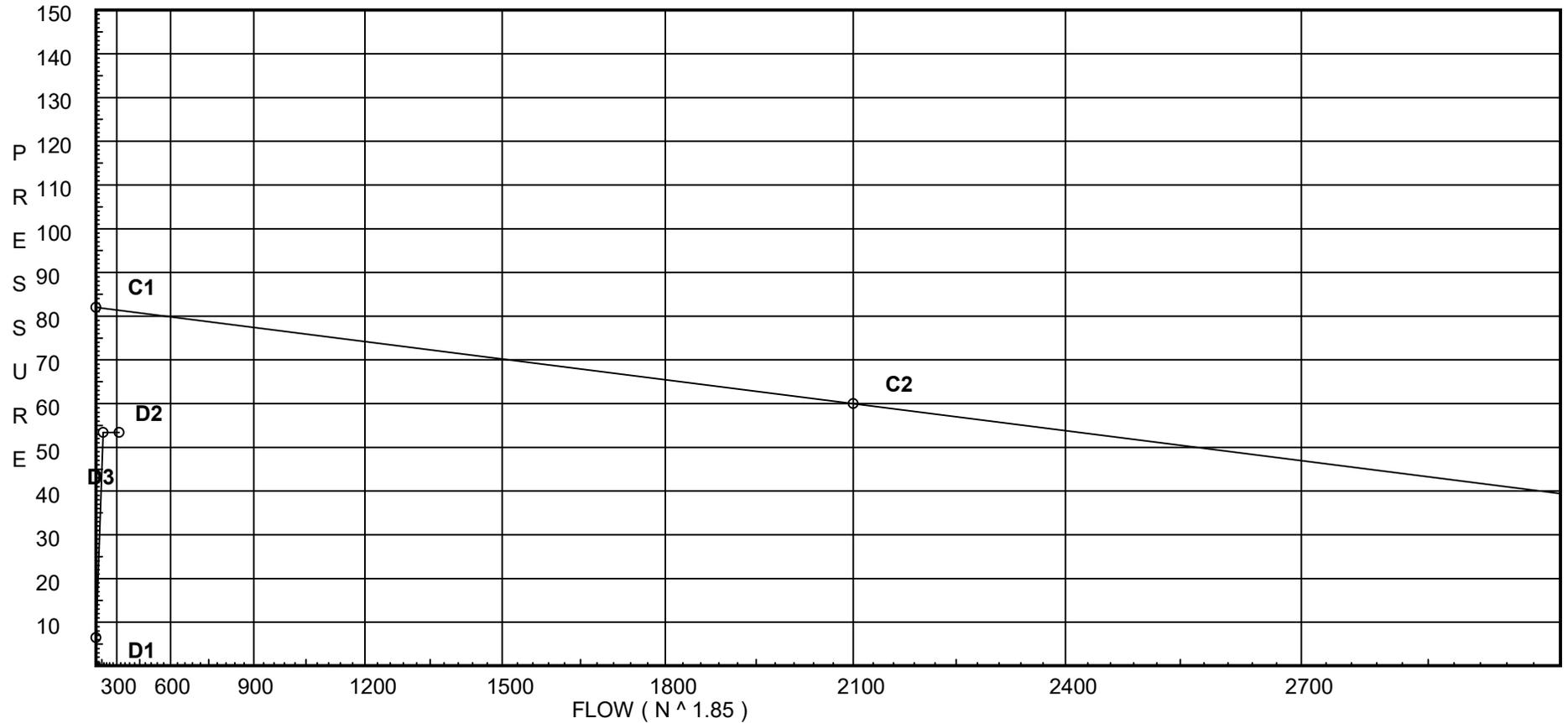
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City Water Supply:

C1 - Static Pressure : 82
C2 - Residual Pressure: 60
C2 - Residual Flow : 2100

Demand:

D1 - Elevation : 6.496
D2 - System Flow : 169.105
D2 - System Pressure : 53.432
Hose (Demand) : 150
D3 - System Demand : 319.105
Safety Margin : 27.894



Fittings Used Summary

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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	
A	Alarm Rel E1 & E3							7.7	21.5		17		27	29								
B	NFPA 13 Butterfly Valve	0	0	0	0	0	6	7	10	0	12	9	10	12	19	21	0	0	0	0	0	0
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																				
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
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	
Zca	Colt C200 Horz 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.

Flow Summary - NFPA

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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	82.0	60	2100.0	81.326	319.1	53.432

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>
DP02	109.0	5.6	7.0	14.82	0.1 141
EQ02	110.0		6.79		
DP03	109.0	5.6	7.0	14.82	0.1 139
EQ03	110.0		6.79		
DP01	109.0	5.6	7.0	14.82	0.1 80
EQ01	110.0		6.79		
DP04	109.0	5.6	7.0	14.82	0.1 140
EQ04	110.0		6.79		
DP05	109.0	5.6	7.0	14.82	0.1 100
EQ05	110.0		6.79		
1	110.0	5.69	6.79	14.82	K=K @ EQ01
2	109.67		7.67		
3	109.67		7.87		
4	109.67		8.67		
5	109.67		10.39		
6	109.67		12.49		
7	109.67		12.91		
8	109.67		14.34		
9	109.67		38.83		
10	109.5		40.73		
TOR	101.0		45.16		
BOR	95.0		47.8	150.0	
HOSE	95.0		47.91		
BFP	95.0		47.93		
UG1	95.0		53.26		
TEST	95.0		53.43		
12	110.0	5.69	7.1	15.15	K=K @ EQ02
13	110.0	5.69	7.84	15.92	K=K @ EQ02
14	110.0	5.69	9.44	17.46	K=K @ EQ02
15	110.0	5.69	8.13	16.21	K=K @ EQ03
16	109.67		9.09		
17	109.67		9.39		
18	109.67		10.41		
19	110.0	5.69	8.49	16.57	K=K @ EQ04
20	110.0	5.69	9.44	17.47	K=K @ EQ04
21	110.0	5.69	11.56	19.33	K=K @ EQ04
22	109.67		12.7		
23	110.0	5.69	9.95	17.94	K=K @ EQ05
24	109.67		11.12		
25	109.67		11.48		
26	110.0	5.69	10.29	18.23	K=K @ EQ05

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
DP02 to EQ02	109 110	5.60	14.82 14.82	1 1.049	E 2.0	1.000 2.000 3.000	120 0.0747	7.000 -0.433 0.224		Vel = 5.50	
EQ02			0.0 14.82					6.791		K Factor = 5.69	
DP03 to EQ03	109 110	5.60	14.82 14.82	1 1.049	E 2.0	1.000 2.000 3.000	120 0.0747	7.000 -0.433 0.224		Vel = 5.50	
EQ03			0.0 14.82					6.791		K Factor = 5.69	
DP01 to EQ01	109 110	5.60	14.82 14.82	1 1.049	E 2.0	1.000 2.000 3.000	120 0.0747	7.000 -0.433 0.224		Vel = 5.50	
EQ01			0.0 14.82					6.791		K Factor = 5.69	
DP04 to EQ04	109 110	5.60	14.82 14.82	1 1.049	E 2.0	1.000 2.000 3.000	120 0.0747	7.000 -0.433 0.224		Vel = 5.50	
EQ04			0.0 14.82					6.791		K Factor = 5.69	
DP05 to EQ05	109 110	5.60	14.82 14.82	1 1.049	E 2.0	1.000 2.000 3.000	120 0.0747	7.000 -0.433 0.224		Vel = 5.50	
EQ05			0.0 14.82					6.791		K Factor = 5.69	
1 to 2	110 109.67	5.69	14.82 14.82	1 1.049	E T 5.0	2.910 7.000 9.910	120 0.0747	6.791 0.143 0.740		K = K @ EQ01 Vel = 5.50	
2 to 3	109.67 109.67		0.0 14.82	1.25 1.38		9.840 9.840	120 0.0197	7.674 0.0 0.194		Vel = 3.18	
3 to 4	109.67 109.67		15.15 29.97	1.25 1.38		11.060 11.060	120 0.0722	7.868 0.0 0.799		Vel = 6.43	
4 to 5	109.67 109.67		15.92 45.89	1.25 1.38		10.820 10.820	120 0.1591	8.667 0.0 1.722		Vel = 9.84	
5 to 6	109.67 109.67		17.46 63.35	1.25 1.38	T	6.0 1.280 6.000 7.280	120 0.2889	10.389 0.0 2.103		Vel = 13.59	
6 to 7	109.67 109.67		0.0 63.35	2 2.157		12.800 12.800	120 0.0328	12.492 0.0 0.420		Vel = 5.56	
7 to 8	109.67 109.67		69.58 132.93	2 2.157		11.050 11.050	120 0.1292	12.912 0.0 1.428		Vel = 11.67	
8 to 9	109.67 109.67		36.17 169.1	2 2.157	6E B Fsp	36.92 7.384 0.0 106.494	120 0.2018	14.340 3.000 21.489		** Fixed Loss = 3 Vel = 14.85	

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv	Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
9 to 10	109.67 109.5		0.0 169.1	4 4.26	4E T	52.668 26.334	169.770 79.002 248.772	120 0.0073	38.829 0.074 1.825			Vel = 3.81
10 to TOR	109.5 101		0.0 169.1	6 6.357	13E T B	228.836 37.72 12.573	438.430 279.129 717.559	120 0.0010	40.728 3.681 0.750			Vel = 1.71
TOR to BOR	101 95		0.0 169.1	6 6.357	A	33.948	9.000 33.948 42.948	120 0.0010	45.159 2.599 0.044			Vel = 1.71
BOR to HOSE	95 95	H150	150.00 319.1	8 8.27	2E	56.936	100.000 56.936 156.936	140 0.0007	47.802 0.0 0.111			Vel = 1.91
HOSE to BFP	95 95		0.0 319.1	8 8.27			25.000 25.000	140 0.0007	47.913 0.0 0.018			Vel = 1.91
BFP to UG1	95 95		0.0 319.1	10 10.28	T Zca G	75.336 0.0 7.534	25.000 82.870 107.870	140 0.0003	47.931 5.302 0.027		** Fixed Loss = 5.302	Vel = 1.23
UG1 to TEST	95 95		0.0 319.1	12 12.34	T G 5E	93.767 9.377 210.976	1400.000 314.120 1714.120	140 0.0001	53.260 0.0 0.172			Vel = 0.86
TEST			0.0 319.10						53.432			K Factor = 43.65
12 to 3	110 109.67	5.69	15.15 15.15	1 1.049	E T	2.0 5.0	1.000 7.000 8.000	120 0.0779	7.102 0.143 0.623			K = K @ EQ02 Vel = 5.62
3			0.0 15.15						7.868			K Factor = 5.40
13 to 4	110 109.67	5.69	15.92 15.92	1 1.049	E T	2.0 5.0	1.000 7.000 8.000	120 0.0853	7.842 0.143 0.682			K = K @ EQ02 Vel = 5.91
4			0.0 15.92						8.667			K Factor = 5.41
14 to 5	110 109.67	5.69	17.46 17.46	1 1.049	E T	2.0 5.0	1.000 7.000 8.000	120 0.1013	9.436 0.143 0.810			K = K @ EQ02 Vel = 6.48
5			0.0 17.46						10.389			K Factor = 5.42
15 to 16	110 109.67	5.69	16.21 16.21	1 1.049	E T	2.0 5.0	2.300 7.000 9.300	120 0.0883	8.131 0.143 0.821			K = K @ EQ03 Vel = 6.02
16 to 17	109.67 109.67		0.0 16.21	1.25 1.38			12.550 12.550	120 0.0232	9.095 0.0 0.291			Vel = 3.48
17 to 18	109.67 109.67		16.57 32.78	1.25 1.38			12.000 12.000	120 0.0854	9.386 0.0 1.025			Vel = 7.03

Final Calculations : Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqiv Len	Pipe Ftngs Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
18 to 7	109.67 109.67		17.47 50.25	1.25 1.38	T 6.0	7.290 6.000 13.290	120 0.1882	10.411 0.0 2.501		Vel = 10.78	
7			0.0 50.25					12.912		K Factor = 13.98	
19 to 17	110 109.67	5.69	16.57 16.57	1 1.049	E T 2.0 5.0	1.160 7.000 8.160	120 0.0918	8.494 0.143 0.749		K = K @ EQ04 Vel = 6.15	
17			0.0 16.57					9.386		K Factor = 5.41	
20 to 18	110 109.67	5.69	17.47 17.47	1 1.049	E T 2.0 5.0	1.160 7.000 8.160	120 0.1013	9.441 0.143 0.827		K = K @ EQ04 Vel = 6.49	
18			0.0 17.47					10.411		K Factor = 5.41	
21 to 22	110 109.67	5.69	19.33 19.33	1 1.049	E T 2.0 5.0	1.160 7.000 8.160	120 0.1222	11.556 0.143 0.997		K = K @ EQ04 Vel = 7.18	
22 to 7	109.67 109.67		0.0 19.33	1.25 1.38	T 6.0	0.710 6.000 6.710	120 0.0322	12.696 0.0 0.216		Vel = 4.15	
7			0.0 19.33					12.912		K Factor = 5.38	
23 to 24	110 109.67	5.69	17.94 17.94	1 1.049	E T 2.0 5.0	2.600 7.000 9.600	120 0.1064	9.954 0.143 1.021		K = K @ EQ05 Vel = 6.66	
24 to 25	109.67 109.67		0.0 17.94	1.25 1.38		13.000 13.000	120 0.0280	11.118 0.0 0.364		Vel = 3.85	
25 to 8	109.67 109.67		18.23 36.17	1.25 1.38	T 6.0	21.900 6.000 27.900	120 0.1024	11.482 0.0 2.858		Vel = 7.76	
8			0.0 36.17					14.340		K Factor = 9.55	
26 to 25	110 109.67	5.69	18.23 18.23	1 1.049	E T 2.0 5.0	2.600 7.000 9.600	120 0.1097	10.286 0.143 1.053		K = K @ EQ05 Vel = 6.77	
25			0.0 18.23					11.482		K Factor = 5.38	