

Hydraulic Calculations

for

Project Name: D-Bat - Town Centre

Location: 540 NE Town Centre Blvd, Lee's Summit, Missouri,

Drawing Name: DBats

Calculation Date: 11/14/2022

Design

Remote Area Number: 1

Occupancy Classification: Ordinary Group II

Density 0.20 gpm/ft²

Area of Application: 1500 ft² (Actual 1652 ft²)

Coverage per Sprinkler: 130 ft²

Type of sprinklers calculated: Upright

No. of sprinklers calculated: 15

No. of nozzles calculated: 0

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 0.0 gpm at Node: 1 Type: Allowance at Source

250.00 at Node: 24 Type: Hydrant

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 669.43 @ 66.258

(Safety Margin = 6.703)

Type of System: Wet

Volume of Dry/PreAction/Antifreeze/OtherAgent N/A

Name of Contractor:

Address:

Phone Number:

Name of designer: VE

Authority Having Jurisdiction: Owner

Notes:

Automatic peaking results

Left: N/A

Right: N/A





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**1145 NW 850th Rd
Odessa, MO 64076**

**WOSB (Woman-Owned Small Business)
Missouri Certified WBE #11165**

Hydrant Flow Test Report

D-Bat-Town Centre Lot 1

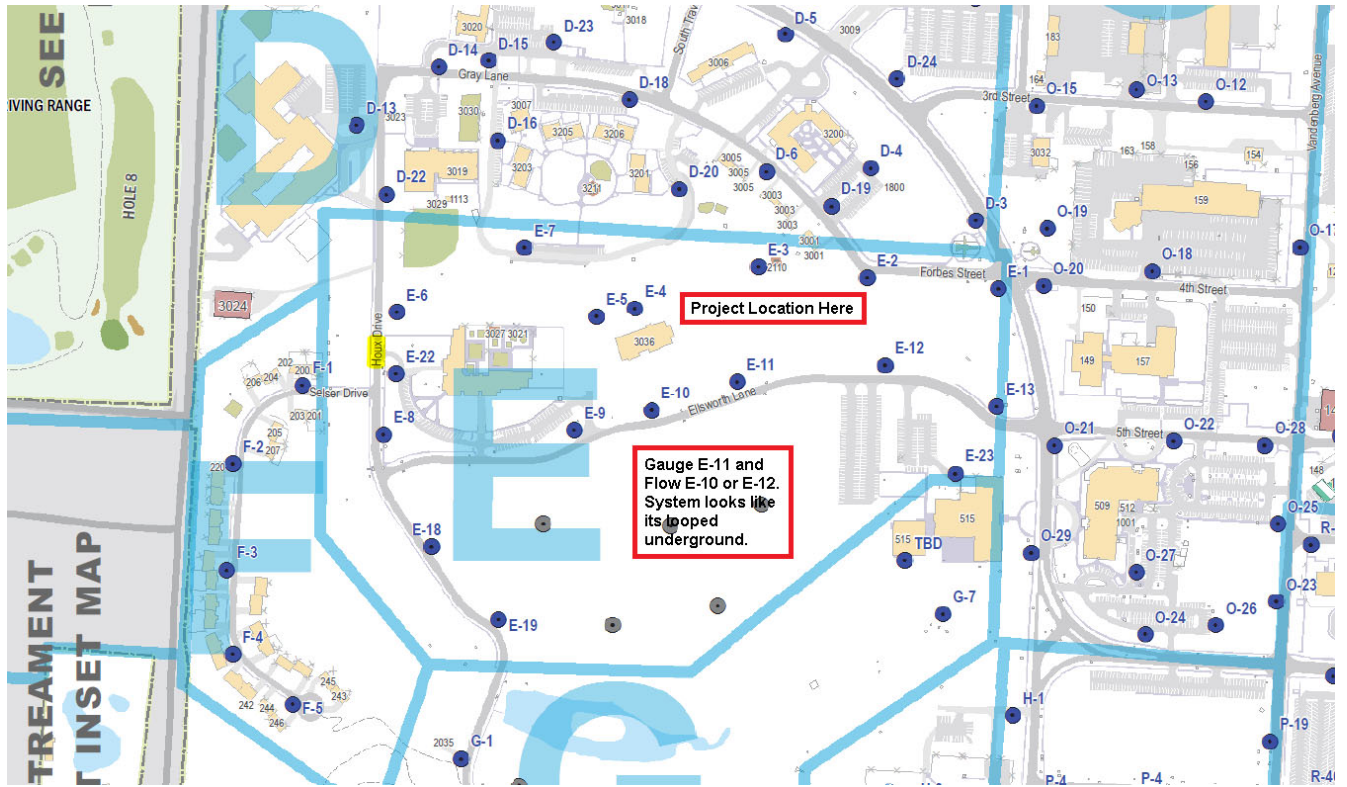
540 NE Town Centre Blvd

Lee's Summit, MO

October 6, 2022, 1:50 pm

Test hydrant: East of building site
Flow hydrant: #14 (Sheet C1.2)
Static: 78 psi
Residual: 62 psi
Flowing: 1250 gpm @ 60psi

David Kendrick
24/7 Fire Protection, LLC

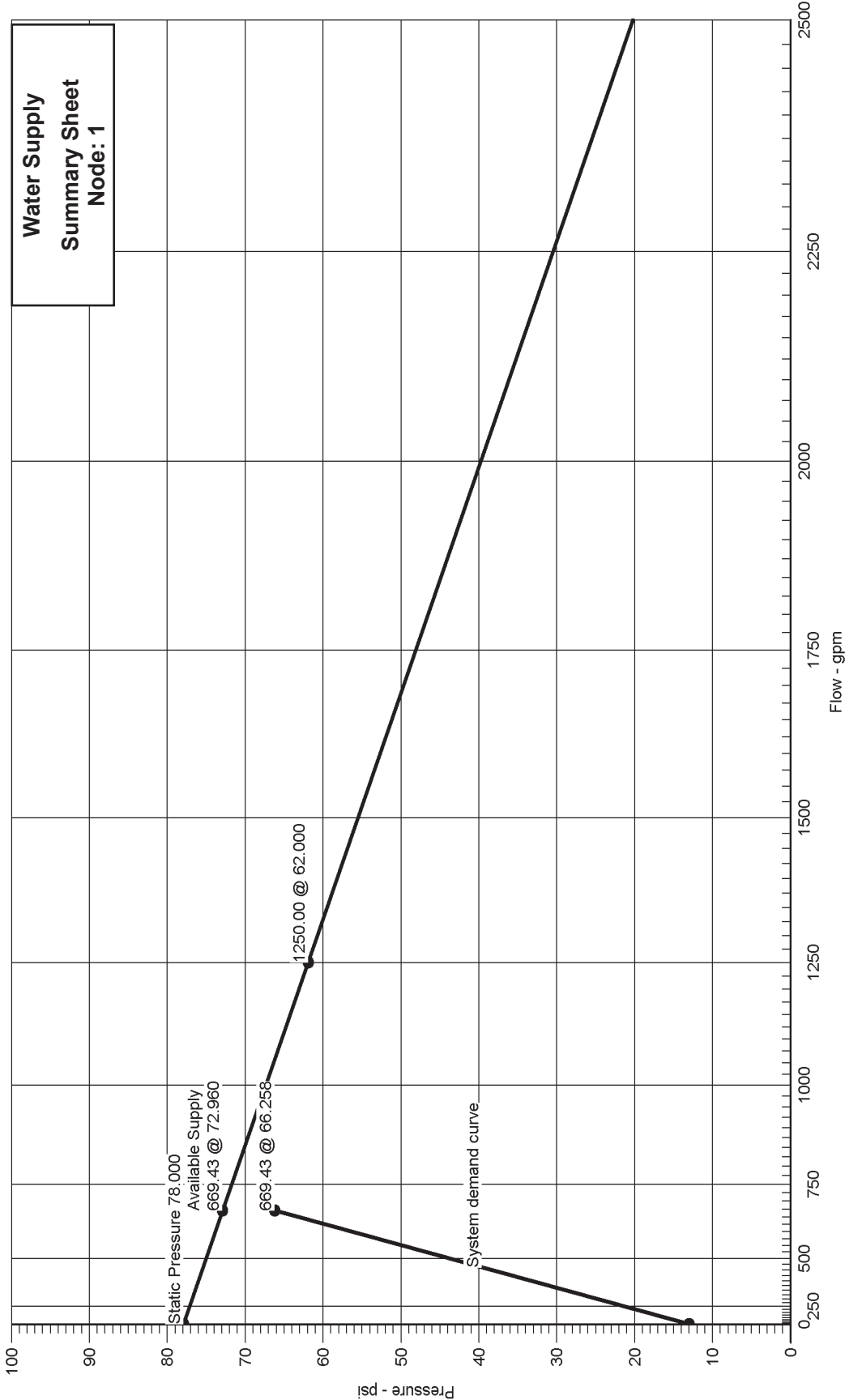


Hydraulic Graph

Job Name: D-Bat - Town Centre
Remote Area Number: 1

N 1.85

Date: 11/14/2022





Summary Of Outflowing Devices

Job Number: 1

Report Description: Ordinary Group II (1)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hydrant	24	250.00	250.00	0	60.633			
Sprinkler	563	28.26	20.00	5.6	25.466			
Sprinkler	564	28.33	20.00	5.6	25.588			
Sprinkler	573	28.04	26.00	5.6	25.076			
Sprinkler	574	28.11	26.00	5.6	25.201			
Sprinkler	578	31.23	26.00	5.6	31.102			
Sprinkler	590	28.01	26.00	5.6	25.010			
Sprinkler	591	28.08	26.00	5.6	25.138			
Sprinkler	599	30.38	26.00	5.6	29.422			
Sprinkler	600	27.16	26.00	5.6	23.517			
Sprinkler	601	27.23	26.00	5.6	23.649			
Sprinkler	614	26.30	26.00	5.6	22.061			
Sprinkler	615	26.38	26.00	5.6	22.186			
Sprinkler	619	29.85	26.00	5.6	28.418			
Sprinkler	628	26.07	26.00	5.6	21.679			
➡ Sprinkler	629	26.00	26.00	5.6	21.556			

➡ Most Demanding Sprinkler Data

Supply Analysis							
Node	Name	Static (psi)	Residual (psi)	@ Flow (gpm)	Available (psi)	@ Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	78.000	62.000	1250.00	72.960	669.43	66.258
Node Analysis							
Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes		
1	-5-0	Supply	66.258	669.43			
24	3-0	Hydrant	60.633	250.00			
563	23-5	Sprinkler	25.466	28.26			
564	23-5	Sprinkler	25.588	28.33			
573	23-10	Sprinkler	25.076	28.04			
574	23-10	Sprinkler	25.201	28.11			
578	23-11½	Sprinkler	31.102	31.23			
590	24-2	Sprinkler	25.010	28.01			
591	24-2	Sprinkler	25.138	28.08			
599	24-6	Sprinkler	29.422	30.38			
600	24-6	Sprinkler	23.517	27.16			
601	24-6	Sprinkler	23.649	27.23			
614	24-10	Sprinkler	22.061	26.30			
615	24-10	Sprinkler	22.186	26.38			
619	25-0½	Sprinkler	28.418	29.85			
628	25-2	Sprinkler	21.679	26.07			
629	25-2	Sprinkler	21.556	26.00			
4	22-4½		43.351				
5	21-4½		33.301				

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
8	1-0	Gauge	60.714		
26	-5-0		64.249		
40	-5-0		66.258		
84	21-4½		36.181		
85	21-4½		36.379		
88	21-4½		36.649		
105	19-2½		35.440		
106	19-2½		35.534		
107	19-2½		35.871		
108	19-2½		36.370		
109	19-2½		37.250		
110	19-2½		37.371		
111	19-2½		37.491		
112	19-2½		37.511		
113	19-2½		37.516		
118	19-2½		36.777		
119	19-2½		37.061		
120	19-2½		37.447		
206	24-5½		31.032		
208	24-5½		35.062		
215	24-5½		26.193		
216	24-5½		26.339		
217	24-5½		36.616		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
218	24-5½		36.382		
221	24-5½		36.065		
234	22-4½		37.253		
235	22-4½		37.013		
236	22-4½		36.993		
237	22-4½		36.987		
239	22-4½		33.808		
240	22-4½		34.008		
241	22-4½		34.484		
243	22-4½		36.055		
246	22-4½		38.125		
248	22-4½		37.948		
249	22-4½		37.726		
251	22-4½		37.442		
252	22-4½		37.132		
253	22-4½		37.056		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
629	25-2	5.6	26.00	1¼	(See Notes)	8-0	120	21.556	Route 1 Sprinkler
614	24-10		26.00	1.4420			0.044894	0.146	
						8-0		0.359	
614	24-10	5.6	26.30	1¼	(See Notes)	8-0	120	22.061	Sprinkler
							0.163593	0.146	
600	24-6		52.30	1.4420		8-0		1.310	
600	24-6	5.6	27.16	1¼	(See Notes)	0-11½	120	23.517	Sprinkler, T(6-6½)
						6-6½	0.354622	0.018	
215	24-5½		79.46	1.4420		7-6		2.658	
215	24-5½		39.28	1¼	(See Notes)	2-1	140	26.193	Flow (q) from Route 3 PO(9-10½)
						9-10½	0.560590	0.904	
239	22-4½		118.74	1.4420		11-11½		6.711	
239	22-4½			3		14-3	120	33.808	
							0.014037		
240	22-4½		118.74	3.2600		14-3		0.200	
240	22-4½		119.26	3		9-4½	120	34.008	Flow (q) from Route 2
							0.050809		
241	22-4½		238.00	3.2600		9-4½		0.476	
241	22-4½		70.36	3		19-1½	120	34.484	Flow (q) from Route 9
							0.082041		
243	22-4½		308.36	3.2600		19-1½		1.570	
243	22-4½		11.50	3	(See Notes)	6-1½	120	36.055	Flow (q) from Route 5 fT(17-5½)
						17-5½	0.087789	0.000	
246	22-4½		319.85	3.2600		23-7		2.070	
246	22-4½		99.58	3	(See Notes)	22-7½	120	38.125	Flow (q) from Route 13 2fE(6-8½)
						13-5½	0.144944		
4	22-4½		419.43	3.2600		36-0½		5.226	
4	22-4½			3	(See Notes)	20-10½	120	43.351	f, CV(21-6), BV(13-5½)
						34-11½	0.144944	9.199	
346	1-2		419.43	3.2600		55-10		8.092	
346	1-2			6	(See Notes)	0-0	140	60.641	BOR
							0.004474	0.072	
8	1-0		419.43	6.2800		0-0		0.000	

Pipe Information										
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.	
					Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)		
						Total (Foot)		Friction(Pf)		
8	1-0			6	(See Notes)	161-7	140	60.714	3LtE(14-2), GV(4-8½)	
26	-5-0		419.43	6.2800		47-3½	0.004474	2.601		
						208-10½		0.934		
26	-5-0		250.00	6	(See Notes)	89-9½	140	64.249	Flow (q) from Route 12 BFP, GV(4-8½), T(47-3½), C(4 7-3½)	
40	-5-0		669.43	6.2800		99-3½	0.010624			
						189-1		2.009		
40	-5-0			12	(See Notes)	0-0	140	66.258	Water Supply	
1	-5-0		669.43	12.4600			0.000378			
						0-0		0.000		
			0.00					66.258	Hose Allowance At Source	
1			669.43							Total(Pt) Route 1
628	25-2	5.6	26.07	1¼	(See Notes)	8-0	120	21.679	•••••Route 2••••• Sprinkler	
615	24-10		26.07	1.4420			0.045132	0.146		
						8-0		0.361		
615	24-10	5.6	26.38	1¼	(See Notes)	8-0	120	22.186	Sprinkler	
601	24-6		52.45	1.4420			0.164455	0.146		
						8-0		1.317		
601	24-6	5.6	27.23	1¼	(See Notes)	0-11½	120	23.649	Sprinkler, T(6-6½)	
216	24-5½		79.68	1.4420			0.356480	0.018		
						7-6		2.672		
216	24-5½		39.57	1¼	(See Notes)	2-1	140	26.339	Flow (q) from Route 6 PO(9-10½)	
240	22-4½		119.26	1.4420			9-10½	0.904		
						11-11½	6.765			
								34.008	Total(Pt) Route 2	
590	24-2	5.6	11.27	1¼	(See Notes)	7-0½	120	25.010	•••••Route 3••••• Sprinkler,, Flow (q) from Route 4 T(6-6½)	
215	24-5½		39.28	1.4420			0.096319	-0.125		
						13-7		1.308		
								26.193	Total(Pt) Route 3	
573	23-10	5.6	28.04	1¼	(See Notes)	8-0	120	25.076	•••••Route 4••••• Sprinkler	
590	24-2		11.27	1.4420			0.009569	-0.142		
						8-0		0.077		
								25.010	Total(Pt) Route 4	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
573	23-10	5.6	28.04	1¼	(See Notes)	10-4½	120	25.076	***** Route 5 ***** Sprinkler
563	23-5		16.77	1.4420			0.019943	0.184	
						10-4½		0.207	
563	23-5	5.6	28.26	1¼	(See Notes)	49-6½	120	25.466	Sprinkler, T(6-6½)
						6-6½	0.124003	0.880	
5	21-4½		45.03	1.4420		56-1		6.955	
5	21-4½			1¼	(See Notes)	2-2	120	33.301	PO(7-5)
						7-5	0.124003	0.946	
105	19-2½		45.03	1.4420		9-7½		1.192	
105	19-2½			2½		14-3	120	35.440	
							0.006583		
106	19-2½		45.03	2.6350		14-3		0.094	
106	19-2½		44.94	2½		14-3	120	35.534	Flow (q) from Route 8
							0.023689		
107	19-2½		89.97	2.6350		14-3		0.338	
107	19-2½		21.10	2½		14-3	120	35.871	Flow (q) from Route 11
							0.034980		
108	19-2½		111.07	2.6350		14-3		0.498	
108	19-2½			1¼	(See Notes)	77-2	120	36.370	PO(7-5) 2T(6-6½)
						20-6	0.009919	-2.277	
208	24-5½		11.50	1.4420		97-8		0.969	
208	24-5½			1¼	(See Notes)	2-1	140	35.062	PO(9-10½)
						9-10½	0.007458	0.904	
243	22-4½		11.50	1.4420		11-11½		0.089	
								36.055	Total(Pt) Route 5
591	24-2	5.6	11.49	1¼	(See Notes)	7-0½	120	25.138	***** Route 6 ***** Sprinkler,, Flow (q) from Route 7 T(6-6½)
						6-6½	0.097648	-0.125	
216	24-5½		39.57	1.4420		13-7		1.326	
								26.339	Total(Pt) Route 6
574	23-10	5.6	28.11	1¼	(See Notes)	8-0	120	25.201	***** Route 7 ***** Sprinkler
							0.009918	-0.142	
591	24-2		11.49	1.4420		8-0		0.079	
								25.138	Total(Pt) Route 7

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
574	23-10	5.6	28.11	1¼	(See Notes)	10-4½	120	25.201	Route 8..... Sprinkler
564	23-5		16.62	1.4420			0.019612	0.184	
						10-4½		0.203	
564	23-5	5.6	28.33	1¼	(See Notes)	51-9	120	25.588	Sprinkler, T(6-6½), PO(7-5)
						13-11½	0.123579	1.826	
106	19-2½		44.94	1.4420		65-8½		8.120	
								35.534	Total(Pt) Route 8
619	25-0½	5.6	29.85	1¼	(See Notes)	13-3	120	28.418	Route 9..... Sprinkler
599	24-6		29.85	1.4420			0.057972	0.235	
						13-3		0.769	
599	24-6	5.6	30.38	1¼	(See Notes)	0-11½	120	29.422	Sprinkler, T(6-6½)
206	24-5½		60.23	1.4420		6-6½	0.212388	0.017	
						7-6		1.592	
206	24-5½		10.13	1¼	(See Notes)	2-1	140	31.032	Flow (q) from Route 10 PO(9-10½)
						9-10½	0.212907	0.904	
241	22-4½		70.36	1.4420		11-11½		2.549	
								34.484	Total(Pt) Route 9
578	23-11½	5.6	31.23	1¼	(See Notes)	12-3½	120	31.102	Route 10..... Sprinkler, T(6-6½)
206	24-5½		10.13	1.4420		6-6½	0.007851	-0.218	
						18-10		0.148	
								31.032	Total(Pt) Route 10
578	23-11½	5.6	31.23	1¼	(See Notes)	69-8½	120	31.102	Route 11..... Sprinkler, 2E(2-7), T(6-6½), PO(7-5)
						19-1½	0.030507	2.059	
107	19-2½		21.10	1.4420		88-10½		2.711	
								35.871	Total(Pt) Route 11
24	3-0		250.00	6	(See Notes)	19-11½	140	60.633	Route 12..... Hydrant, LtE(14-2), GV(4-8½), T(47-3½)
26	-5-0		250.00	6.2800		66-2½	0.001718	3.468	
						86-1½		0.148	
								64.249	Total(Pt) Route 12
234	22-4½		53.75 + 13.22	2½		13-9	120	37.253	Route 13..... Flow (q) from Route 14 and 22
							0.013720		
251	22-4½		66.97	2.6350		13-9		0.189	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
251	22-4½		15.07	2½		14-3	120	37.442	Flow (q) from Route 21
249	22-4½		82.04	2.6350			0.019970		
						14-3		0.285	
249	22-4½		17.54	2½		7-9	120	37.726	Flow (q) from Route 20
248	22-4½		99.58	2.6350			0.028579		
						7-9		0.221	
248	22-4½			3	(See Notes)	0-0	120	37.948	ft(17-5½)
246	22-4½		99.58	3.2600		17-5½	0.010136	0.000	
						17-5½		0.177	
								38.125	Total(Pt) Route 13
120	19-2½		41.85	1¼	(See Notes)	2-2	120	37.447	 Route 14 PO(7-5), Flow (q) from Route 19 T(6-6½)
88	21-4½		11.01	1.4420		13-11½	0.009160	-0.946	
						16-2		0.148	
88	21-4½			1¼	(See Notes)	74-11½	120	36.649	T(6-6½)
221	24-5½		11.01	1.4420		6-6½	0.009160	-1.330	
						81-6		0.747	
221	24-5½			1¼	(See Notes)	2-1	120	36.065	PO(7-5)
253	22-4½		11.01	1.4420		7-5	0.009160	0.904	
						9-6		0.087	
253	22-4½		30.84	2½		13-3	120	37.056	Flow (q) from Route 15
252	22-4½		41.85	2.6350			0.005749		
						13-3		0.076	
252	22-4½		11.90	2½		13-3	120	37.132	Flow (q) from Route 18
234	22-4½		53.75	2.6350			0.009135		
						13-3		0.121	
								37.253	Total(Pt) Route 14
120	19-2½		41.85	2½		13-3	120	37.447	 Route 15 Flow (q) from Route 19
111	19-2½		30.84	2.6350			0.003268	0.000	
						13-3		0.043	
111	19-2½			1¼	(See Notes)	79-3	120	37.491	PO(7-5) 2T(6-6½), PO(7-5)
235	22-4½		10.47	1.4420		27-11	0.008352	-1.373	
						107-2		0.895	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
235	22-4½		20.36	2½		13-3	120	37.013	Flow (q) from Route 16
253	22-4½		30.84	2.6350			0.003268		
						13-3		0.043	
								37.056	Total(Pt) Route 15
111	19-2½		10.47	2½		13-3	120	37.491	••••• Route 16 ••••• Flow (q) from Route 15
112	19-2½		20.36	2.6350			0.001517		
						13-3		0.020	
112	19-2½			1¼	(See Notes)	79-3	120	37.511	PO(7-5) 2T(6-6½), PO(7-5)
236	22-4½		10.22	1.4420		27-11	0.007977	-1.373	
						107-2		0.855	
236	22-4½		10.15	2½		13-3	120	36.993	Flow (q) from Route 17
235	22-4½		20.36	2.6350			0.001517		
						13-3		0.020	
								37.013	Total(Pt) Route 16
112	19-2½		10.22	2½		13-3	120	37.511	••••• Route 17 ••••• Flow (q) from Route 16
113	19-2½		10.15	2.6350			0.000418		
						13-3		0.006	
113	19-2½			1¼	(See Notes)	79-3	120	37.516	PO(7-5) 2T(6-6½), PO(7-5)
237	22-4½		10.15	1.4420		27-11	0.007873	-1.373	
						107-2		0.844	
237	22-4½			2½		13-3	120	36.987	
236	22-4½		10.15	2.6350			0.000418		
						13-3		0.006	
								36.993	Total(Pt) Route 17
110	19-2½		53.75	1¼	(See Notes)	79-3	120	37.371	••••• Route 18 ••••• PO(7-5), Flow (q) from Route 23 2T(6-6½), PO(7-5)
252	22-4½		11.90	1.4420		27-11	0.010581	-1.373	
						107-2		1.134	
								37.132	Total(Pt) Route 18
110	19-2½		53.75	2½		13-3	120	37.371	••••• Route 19 ••••• Flow (q) from Route 23
120	19-2½		41.85	2.6350			0.005749	-0.000	
						13-3		0.076	
								37.447	Total(Pt) Route 19

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
					Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID				Total (Foot)	
118	19-2½		99.58	1¼	(See Notes)	2-2	120	36.777	***** Route 20 ***** PO(7-5), Flow (q) from Route 24 T(6-6½)
84	21-4½		17.54	1.4420		13-11½	0.021672	-0.946	
						16-2		0.350	
84	21-4½			1¼	(See Notes)	74-11½	120	36.181	T(6-6½)
217	24-5½		17.54	1.4420		6-6½	0.021672	-1.330	
						81-6		1.766	
217	24-5½			1¼	(See Notes)	2-1	120	36.616	PO(7-5)
249	22-4½		17.54	1.4420		7-5	0.021672	0.904	
						9-6		0.206	
								37.726	Total(Pt) Route 20
118	19-2½		99.58	2½		14-3	120	36.777	***** Route 21 ***** Flow (q) from Route 24
119	19-2½		82.04	2.6350			0.019970		
						14-3		0.285	
119	19-2½			1¼	(See Notes)	2-2	120	37.061	PO(7-5) T(6-6½)
85	21-4½		15.07	1.4420		13-11½	0.016361	-0.946	
						16-2		0.264	
85	21-4½			1¼	(See Notes)	74-11½	120	36.379	T(6-6½)
218	24-5½		15.07	1.4420		6-6½	0.016361	-1.330	
						81-6		1.333	
218	24-5½			1¼	(See Notes)	2-1	120	36.382	PO(7-5)
251	22-4½		15.07	1.4420		7-5	0.016361	0.904	
						9-6		0.156	
								37.442	Total(Pt) Route 21
119	19-2½		15.07	2½		13-9	120	37.061	***** Route 22 ***** Flow (q) from Route 21
109	19-2½		66.97	2.6350			0.013720	0.000	
						13-9		0.189	
109	19-2½			1¼	(See Notes)	79-3	120	37.250	PO(7-5) 2T(6-6½), PO(7-5)
234	22-4½		13.22	1.4420		27-11	0.012840	-1.373	
						107-2		1.376	
								37.253	Total(Pt) Route 22
109	19-2½		13.22	2½		13-3	120	37.250	***** Route 23 ***** Flow (q) from Route 22
110	19-2½		53.75	2.6350			0.009135		
						13-3		0.121	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)			
								37.371	Total(Pt) Route 23
108	19-2½		11.50	2½		14-3	120	36.370	••••• Route 24 ••••• Flow (q) from Route 5
							0.028579	-0.000	
118	19-2½		99.58	2.6350		14-3		0.407	
								36.777	Total(Pt) Route 24

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				

Hydraulic Calculations

for

Project Name: D-Bat - Town Centre

Location: 540 NE Town Centre Blvd, Lee's Summit, Missouri,

Drawing Name: DBats

Calculation Date: 11/14/2022

Design

Remote Area Number: 2

Occupancy Classification: Light Hazard

Density 0.10 gpm/ft²

Area of Application: 1500 ft² (Actual 1625 ft²)

Coverage per Sprinkler: 190 ft²

Type of sprinklers calculated: Upright

No. of sprinklers calculated: 9

No. of nozzles calculated: 0

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 0.0 gpm at Node: 1 Type: Allowance at Source

250.00 at Node: 24 Type: Hydrant

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 425.88 @ 33.927

(Safety Margin = 41.890)

Type of System: Wet

Volume of Dry/PreAction/Antifreeze/OtherAgent N/A

Name of Contractor:

Address: ,

Phone Number:

Name of designer: VE

Authority Having Jurisdiction: Owner

Notes:

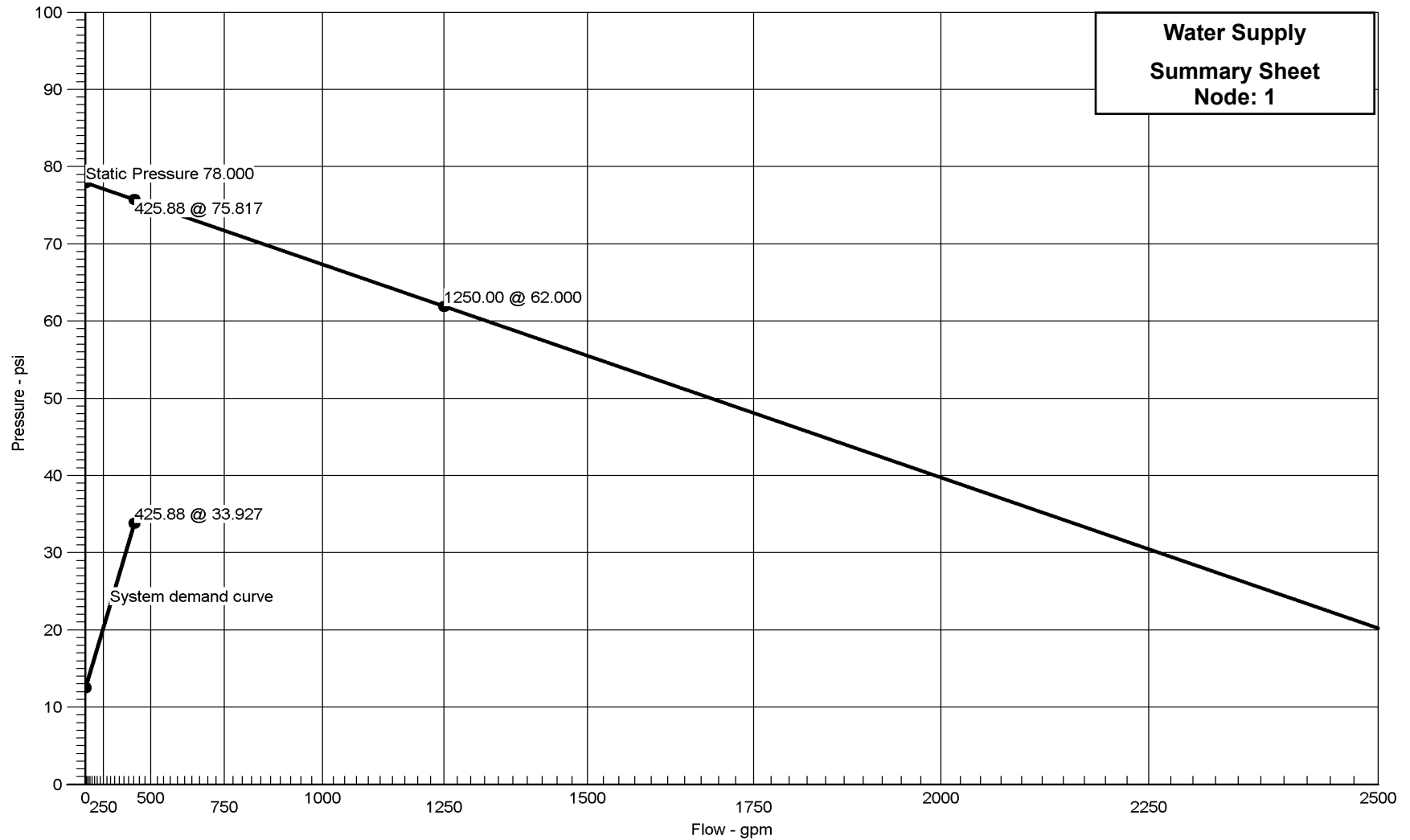
Automatic peaking results Left: 33.350 Right: 33.696

Hydraulic Graph

Job Name: D-Bat - Town Centre
Remote Area Number: 2

N 1.85

Date: 11/14/2022





Summary Of Outflowing Devices

Job Number: 1

Report Description: Light Hazard (2)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hydrant	24	250.00	250.00	0	29.441			
Sprinkler	546	21.85	19.00	5.6	15.224			
Sprinkler	547	19.62	19.00	5.6	12.276			
Sprinkler	548	19.58	19.00	5.6	12.224			
Sprinkler	559	19.23	19.00	5.6	11.789			
Sprinkler	560	19.19	19.00	5.6	11.737			
Sprinkler	571	19.04	19.00	5.6	11.564			
⇒ Sprinkler	572	19.00	19.00	5.6	11.511			
Sprinkler	584	19.21	19.00	5.6	11.768			
Sprinkler	585	19.17	19.00	5.6	11.713			

⇒ Most Demanding Sprinkler Data

Supply Analysis							
Node	Name	Static (psi)	Residual (psi)	@ Flow (gpm)	Available (psi)	@ Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	78.000	62.000	1250.00	75.817	425.88	33.927
Node Analysis							
Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes		
1	-5-0	Supply	33.927	425.88			
24	3-0	Hydrant	29.441	250.00			
546	22-4	Sprinkler	15.224	21.85			
547	22-4	Sprinkler	12.276	19.62			
548	22-4	Sprinkler	12.224	19.58			
559	22-10½	Sprinkler	11.789	19.23			
560	22-10½	Sprinkler	11.737	19.19			
571	23-5	Sprinkler	11.564	19.04			
572	23-5	Sprinkler	11.511	19.00			
584	23-11½	Sprinkler	11.768	19.21			
585	23-11½	Sprinkler	11.713	19.17			
4	22-4½		19.377				
5	21-4½		17.602				
8	1-0	Gauge	30.269				
26	-5-0		33.057				
40	-5-0		33.927				
84	21-4½		17.337				
85	21-4½		17.117				
88	21-4½		16.355				

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
105	19-2½		18.362		
106	19-2½		18.353		
107	19-2½		18.321		
108	19-2½		18.256		
109	19-2½		17.771		
110	19-2½		17.542		
111	19-2½		17.010		
112	19-2½		16.804		
113	19-2½		16.747		
118	19-2½		18.140		
119	19-2½		17.974		
120	19-2½		17.286		
206	24-5½		17.228		
208	24-5½		17.242		
215	24-5½		17.212		
216	24-5½		17.215		
217	24-5½		16.731		
218	24-5½		16.235		
221	24-5½		15.105		
234	22-4½		16.748		
235	22-4½		15.691		
236	22-4½		15.424		
237	22-4½		15.350		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
239	22-4½		18.220		
240	22-4½		18.223		
241	22-4½		18.231		
243	22-4½		18.262		
246	22-4½		18.330		
248	22-4½		18.058		
249	22-4½		17.719		
251	22-4½		17.191		
252	22-4½		16.367		
253	22-4½		16.018		
346	1-2		30.197		

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
572	23-5	5.6	19.00	1¼	(See Notes)	13-4	120	11.511	Route 1..... Sprinkler
585	23-11½		21.96	1.4420			0.032844	-0.237	
						13-4		0.438	
585	23-11½	5.6	19.17	1¼	(See Notes)	14-1½	120	11.713	Sprinkler, T(6-6½), PO(7-5)
237	22-4½		41.12	1.4420		13-11½	0.104850	0.690	
						28-1½		2.948	
237	22-4½			2½		13-3	120	15.350	
236	22-4½		41.12	2.6350			0.005566		
						13-3		0.074	
236	22-4½		41.26	2½		13-3	120	15.424	Flow (q) from Route 2
235	22-4½		82.39	2.6350			0.020127		
						13-3		0.267	
235	22-4½		9.63	2½		13-3	120	15.691	Flow (q) from Route 7
253	22-4½		92.02	2.6350			0.024695		
						13-3		0.327	
253	22-4½		3.29	2½		13-3	120	16.018	Flow (q) from Route 4
252	22-4½		95.30	2.6350			0.026352		
						13-3		0.349	
252	22-4½		4.64	2½		13-3	120	16.367	Flow (q) from Route 10
234	22-4½		99.94	2.6350			0.028772		
						13-3		0.381	
234	22-4½		6.30	2½		13-9	120	16.748	Flow (q) from Route 11
251	22-4½		106.24	2.6350			0.032219		
						13-9		0.443	
251	22-4½		8.36	2½		14-3	120	17.191	Flow (q) from Route 12
249	22-4½		114.61	2.6350			0.037067		
						14-3		0.528	
249	22-4½		10.83	2½		7-9	120	17.719	Flow (q) from Route 13
248	22-4½		125.44	2.6350			0.043809		
						7-9		0.339	
248	22-4½			3	(See Notes)	0-0	120	18.058	fT(17-5½)
246	22-4½		125.44	3.2600		17-5½	0.015538	0.000	
						17-5½		0.271	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
246	22-4½		50.44	3	(See Notes)	22-7½	120	18.330	Flow (q) from Route 14 2fE(6-8½)
4	22-4½		175.88	3.2600		13-5½	0.029036		
						36-0½		1.047	
4	22-4½			3	(See Notes)	20-10½	120	19.377	f, CV(21-6), BV(13-5½)
346	1-2		175.88	3.2600		34-11½	0.029036	9.199	
						55-10		1.621	
346	1-2			6	(See Notes)	0-0	140	30.197	BOR
							0.000896	0.072	
8	1-0		175.88	6.2800		0-0		0.000	
8	1-0			6	(See Notes)	161-7	140	30.269	3LtE(14-2), GV(4-8½)
						47-3½	0.000896	2.601	
26	-5-0		175.88	6.2800		208-10½		0.187	
26	-5-0		250.00	6	(See Notes)	89-9½	140	33.057	Flow (q) from Route 9 BFP, GV(4-8½), T(47-3½), C(4 7-3½)
						99-3½	0.004602		
40	-5-0		425.88	6.2800		189-1		0.870	
40	-5-0			12	(See Notes)	0-0	140	33.927	Water Supply
							0.000164		
1	-5-0		425.88	12.4600		0-0		0.000	
			0.00					33.927	Hose Allowance At Source
1			425.88						
571	23-5	5.6	19.04	1¼	(See Notes)	13-4	120	11.564	••••• Route 2 ••••• Sprinkler
							0.033100	-0.237	
584	23-11½		22.05	1.4420		13-4		0.442	
584	23-11½	5.6	19.21	1¼	(See Notes)	14-1½	120	11.768	Sprinkler, T(6-6½), PO(7-5)
						13-11½	0.105501	0.690	
236	22-4½		41.26	1.4420		28-1½		2.966	
								15.424	Total(Pt) Route 2
560	22-10½	5.6	19.19	1¼	(See Notes)	13-3½	120	11.737	••••• Route 3 ••••• Sprinkler
							0.000805	-0.236	
572	23-5		2.96	1.4420		13-3½		0.011	
								11.511	Total(Pt) Route 3

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
560	22-10½	5.6	19.19	1¼	(See Notes)	13-4	120	11.737	***** Route 4 ***** Sprinkler
548	22-4		16.23	1.4420			0.018768	0.237	
						13-4		0.250	
548	22-4	5.6	19.58	1¼	(See Notes)	25-1	120	12.224	Sprinkler, T(6-6½), PO(7-5)
113	19-2½		35.81	1.4420		13-11½	0.081154	1.353	
						39-1		3.170	
113	19-2½			2½		13-3	120	16.747	
112	19-2½		35.81	2.6350			0.004308		
						13-3		0.057	
112	19-2½		35.84	2½		13-3	120	16.804	Flow (q) from Route 6
111	19-2½		71.65	2.6350			0.015544		
						13-3		0.206	
111	19-2½		12.22	2½		13-3	120	17.010	Flow (q) from Route 8
120	19-2½		83.86	2.6350			0.020800	-0.000	
						13-3		0.276	
120	19-2½			1¼	(See Notes)	2-2	120	17.286	PO(7-5) T(6-6½)
88	21-4½		3.29	1.4420		13-11½	0.000978	-0.946	
						16-2		0.016	
88	21-4½			1¼	(See Notes)	74-11½	120	16.355	T(6-6½)
221	24-5½		3.29	1.4420		6-6½	0.000978	-1.330	
						81-6		0.080	
221	24-5½			1¼	(See Notes)	2-1	120	15.105	PO(7-5)
253	22-4½		3.29	1.4420		7-5	0.000978	0.904	
						9-6		0.009	
								16.018	Total(Pt) Route 4
559	22-10½	5.6	19.23	1¼	(See Notes)	13-3½	120	11.789	***** Route 5 ***** Sprinkler
571	23-5		3.01	1.4420			0.000830	-0.236	
						13-3½		0.011	
								11.564	Total(Pt) Route 5
559	22-10½	5.6	19.23	1¼	(See Notes)	13-4	120	11.789	***** Route 6 ***** Sprinkler
547	22-4		16.22	1.4420			0.018752	0.237	
						13-4		0.250	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
					Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID				Total (Foot)	
547	22-4	5.6	19.62	1¼	(See Notes)	25-1	120	12.276	
112	19-2½		35.84	1.4420		13-11½	0.081296	1.353	
						39-1		3.176	
								16.804	Total(Pt) Route 6
546	22-4	5.6	21.85	1¼	(See Notes)	54-1½	120	15.224	••••• Route 7 ••••• Sprinkler, T(6-6½), PO(7-5)
235	22-4½		9.63	1.4420		13-11½	0.007151	-0.020	
						68-1		0.487	
								15.691	Total(Pt) Route 7
546	22-4	5.6	21.85	1¼	(See Notes)	25-1	120	15.224	••••• Route 8 ••••• Sprinkler, T(6-6½), PO(7-5)
111	19-2½		12.22	1.4420		13-11½	0.011103	1.353	
						39-1		0.434	
								17.010	Total(Pt) Route 8
24	3-0		250.00	6	(See Notes)	19-11½	140	29.441	••••• Route 9 ••••• Hydrant, LtE(14-2), GV(4-8½), T(47-3½)
26	-5-0		250.00	6.2800		66-2½	0.001718	3.468	
						86-1½		0.148	
								33.057	Total(Pt) Route 9
120	19-2½		3.29	2½		13-3	120	17.286	••••• Route 10 ••••• Flow (q) from Route 4
110	19-2½		80.58	2.6350			0.019317	0.000	
						13-3		0.256	
110	19-2½			1¼	(See Notes)	79-3	120	17.542	PO(7-5) 2T(6-6½), PO(7-5)
252	22-4½		4.64	1.4420		27-11	0.001848	-1.373	
						107-2		0.198	
								16.367	Total(Pt) Route 10
110	19-2½		4.64	2½		13-3	120	17.542	••••• Route 11 ••••• Flow (q) from Route 10
109	19-2½		75.94	2.6350			0.017312		
						13-3		0.229	
109	19-2½			1¼	(See Notes)	79-3	120	17.771	PO(7-5) 2T(6-6½), PO(7-5)
234	22-4½		6.30	1.4420		27-11	0.003265	-1.373	
						107-2		0.350	
								16.748	Total(Pt) Route 11
109	19-2½		6.30	2½		13-9	120	17.771	••••• Route 12 ••••• Flow (q) from Route 11
119	19-2½		69.64	2.6350			0.014747	-0.000	
						13-9		0.203	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
						Total (Foot)		Friction(Pf)	
119	19-2½			1¼	(See Notes)	2-2	120	17.974	PO(7-5) T(6-6½)
85	21-4½		8.36	1.4420		13-11½	0.005507	-0.946	
						16-2		0.089	
85	21-4½			1¼	(See Notes)	74-11½	120	17.117	T(6-6½)
218	24-5½		8.36	1.4420		6-6½	0.005507	-1.330	
						81-6		0.449	
218	24-5½			1¼	(See Notes)	2-1	120	16.235	PO(7-5)
251	22-4½		8.36	1.4420		7-5	0.005507	0.904	
						9-6		0.052	
								17.191	Total(Pt) Route 12
119	19-2½		8.36	2½		14-3	120	17.974	 Route 13 Flow (q) from Route 12
118	19-2½		61.27	2.6350			0.011639		
						14-3		0.166	
118	19-2½			1¼	(See Notes)	2-2	120	18.140	PO(7-5) T(6-6½)
84	21-4½		10.83	1.4420		13-11½	0.008888	-0.946	
						16-2		0.144	
84	21-4½			1¼	(See Notes)	74-11½	120	17.337	T(6-6½)
217	24-5½		10.83	1.4420		6-6½	0.008888	-1.330	
						81-6		0.724	
217	24-5½			1¼	(See Notes)	2-1	120	16.731	PO(7-5)
249	22-4½		10.83	1.4420		7-5	0.008888	0.904	
						9-6		0.085	
								17.719	Total(Pt) Route 13
118	19-2½		10.83	2½		14-3	120	18.140	 Route 14 Flow (q) from Route 13
108	19-2½		50.44	2.6350			0.008121	0.000	
						14-3		0.116	
108	19-2½			1¼	(See Notes)	77-2	120	18.256	PO(7-5) 2T(6-6½)
208	24-5½		13.27	1.4420		20-6	0.012934	-2.277	
						97-8		1.263	
208	24-5½			1¼	(See Notes)	2-1	140	17.242	PO(9-10½)
243	22-4½		13.27	1.4420		9-10½	0.009724	0.904	
						11-11½		0.116	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
						Fitting (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)	
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	
243	22-4½		37.17	3	(See Notes)	6-1½	120	18.262	Flow (q) from Route 15 ft(17-5½)
246	22-4½		50.44	3.2600		17-5½	0.002880	0.000	
						23-7		0.068	
								18.330	Total(Pt) Route 14
108	19-2½		13.27	2½		14-3	120	18.256	***** Route 15 ***** Flow (q) from Route 14
107	19-2½		37.17	2.6350			0.004617		
						14-3		0.066	
107	19-2½			1¼	(See Notes)	82-0½	120	18.321	PO(7-5) 2T(6-6½), 2E(2-7)
206	24-5½		12.15	1.4420		25-8	0.010988	-2.277	
						107-8		1.183	
206	24-5½			1¼	(See Notes)	2-1	140	17.228	PO(9-10½)
241	22-4½		12.15	1.4420		9-10½	0.008262	0.904	
						11-11½		0.099	
241	22-4½		25.02	3		19-1½	120	18.231	Flow (q) from Route 16
243	22-4½		37.17	3.2600			0.001638		
						19-1½		0.031	
								18.262	Total(Pt) Route 15
107	19-2½		12.15	2½		14-3	120	18.321	***** Route 16 ***** Flow (q) from Route 15
106	19-2½		25.02	2.6350			0.002220		
						14-3		0.032	
106	19-2½			1¼	(See Notes)	77-2	120	18.353	PO(7-5) 2T(6-6½)
216	24-5½		12.54	1.4420		20-6	0.011657	-2.277	
						97-8		1.138	
216	24-5½			1¼	(See Notes)	2-1	140	17.215	PO(9-10½)
240	22-4½		12.54	1.4420		9-10½	0.008765	0.904	
						11-11½		0.105	
240	22-4½		12.48	3		9-4½	120	18.223	Flow (q) from Route 17
241	22-4½		25.02	3.2600			0.000787		
						9-4½		0.007	
								18.231	Total(Pt) Route 16
106	19-2½		12.54	2½		14-3	120	18.353	***** Route 17 ***** Flow (q) from Route 16
105	19-2½		12.48	2.6350			0.000613		
						14-3		0.009	

Pipe Information									
Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
					Equiv. Length (Foot)	Pf Friction Loss Per Unit (psi)	Elev(Pe)		
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID				Friction(Pf)	
105	19-2½			1¼	(See Notes)	2-2	120	18.362	
5	21-4½		12.48	1.4420		13-11½	0.011546	-0.946	
						16-2		0.186	
5	21-4½			1¼	(See Notes)	74-11½	120	17.602	
215	24-5½		12.48	1.4420		6-6½	0.011546	-1.330	
						81-6		0.941	
215	24-5½			1¼	(See Notes)	2-1	140	17.212	
239	22-4½		12.48	1.4420		9-10½	0.008681	0.904	
						11-11½		0.104	
239	22-4½			3		14-3	120	18.220	
240	22-4½		12.48	3.2600			0.000217		
						14-3		0.003	
								18.223	Total(Pt) Route 17

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV	Alarm Valve	AngV	Angle Valve	b	Bushing
BaIV	Ball Valve	BFP	Backflow Preventer	BV	Butterfly Valve
C	Cross Flow Turn 90°	cplg	Coupling	Cr	Cross Run
CV	Check Valve	DelV	Deluge Valve	DPV	Dry Pipe Valve
E	90° Elbow	EE	45° Elbow	Ee1	11¼° Elbow
Ee2	22½° Elbow	f	Flow Device	fd	Flex Drop
FDC	Fire Department Connection	fE	90° FireLock(TM) Elbow	fEE	45° FireLock(TM) Elbow
flg	Flange	FN	Floating Node	fT	FireLock(TM) Tee
g	Gauge	GloV	Globe Valve	GV	Gate Valve
Ho	Hose	Hose	Hose	HV	Hose Valve
Hyd	Hydrant	LtE	Long Turn Elbow	mecT	Mechanical Tee
Noz	Nozzle	P1	Pump In	P2	Pump Out
PIV	Post Indicating Valve	PO	Pipe Outlet	PrV	Pressure Relief Valve
PRV	Pressure Reducing Valve	red	Reducer/Adapter	S	Supply
sCV	Swing Check Valve	SFx	Seismic Flex	Spr	Sprinkler
St	Strainer	T	Tee Flow Turn 90°	Tr	Tee Run
U	Union	WirF	Wirsbo	WMV	Water Meter Valve
Z	Cap				