Hydraulic Calculations

for

Project Name: 4th Lane Flats: (2276)

Location: 1309 4th Ave Lane NE, Lot 9 Block 1 Thompson Addition, Kasson, MN 55944

Drawing Name: 4th Lane Flats

Calculation Date: 8/26/2025

Design

Remote Area Number:	1 - SW Garage
Remote Area Location:	Main Floor Southwest - Garage
Occupancy Classification:	Ordinary Group II
Density	0.20gpm/ft²
Area of Application:	1500ft² (Actual 979ft²)
Type of sprinklers calculated:	Upright
No. of sprinklers calculated:	8
No. of nozzles calculated:	0

In-rack Demand:	N/A gpm	at Node:	N/A		
Hose Streams:	0.0 gpm	at Node:	46	Type:	Allowance at Source
	250.00	at Node:	9	Type:	Hydrant

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 46: 476.88 @ 45.498 (Safety Margin = 9.470)

Type of System: Wet

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

for Node: 46 Date: 07/15/25

Location:

Source: KASSON WATER DEPT.

Name of Contractor: PYE-BARKER FIRE & SAFETY

Address: 10661 NASSAU ST. NE, SUITE 400 BLAINE, MN 55449

Phone Number:

Name of designer: Zachary Hartwig

Authority Having Jurisdiction: :

Notes:

Automatic peaking results Left: 45.498 Right: 45.498

Summary Notes:

Water Supply at Node 46

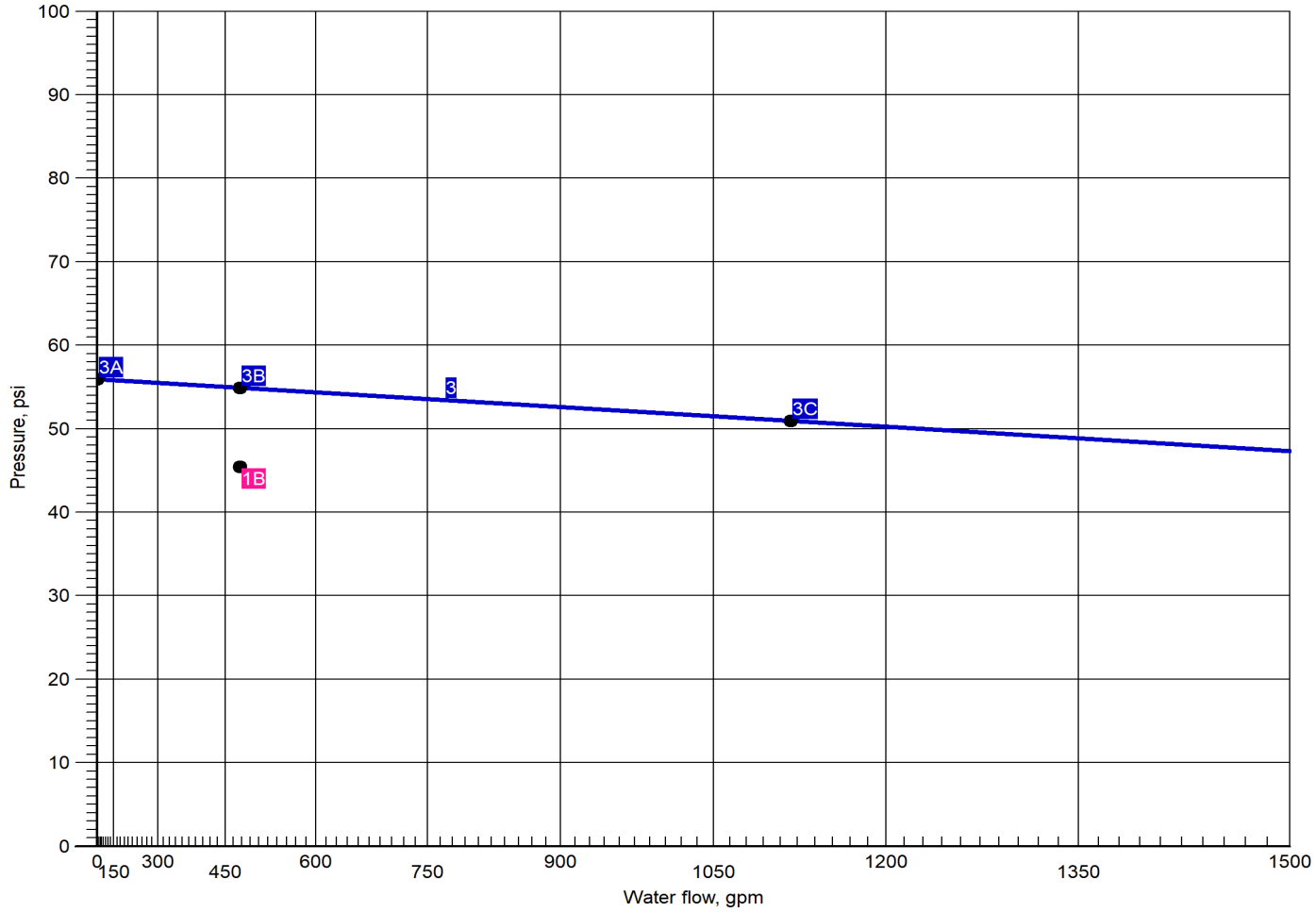
1 System Demand
3 Available Water Supply

Job Name: 4th Lane Flats

Job Number: 2276 - 4th Lane Flats

Report Description: Ordinary Group II (1 - SW Garage)

Remote Area Number: 1 - SW Garage



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 45.498 @ 476.88	Available Flow @ 20 PSI: 3249.30
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 45.498 @ 476.88	
3	3A	Available Static Pressure at Water Supply at Node 46: 56.000	
	3B	Available Residual Pressure at System Demand: 54.968 @ 476.88	
	3C	Available Residual Pressure & Flow at Water Supply at Node 46: 51.000 @ 1119.00	

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hydrant	9	250.00	250.00	0	41.192			
Sprinkler	**101**	**26.00**	**26.00**	**8**	**10.563**			
Sprinkler	102	26.37	26.00	8	10.862			
Sprinkler	103	27.66	26.00	8	11.956			
Sprinkler	104	26.03	26.00	8	10.585			
Sprinkler	105	26.39	26.00	8	10.886			
Sprinkler	106	27.69	26.00	8	11.982			
Sprinkler	107	33.21	24.30	8	17.236			
Sprinkler	108	33.52	24.30	8	17.558			

Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
46	Water Supply	56.000	51.000	1119.00	54.968	476.88	45.498

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
9	0'-0	Hydrant	41.192	250.00	
46	-8'-6	Supply	45.498	476.88	
101	8'-4	Sprinkler	10.563	26.00	
102	8'-4	Sprinkler	10.862	26.37	
103	8'-4	Sprinkler	11.956	27.66	
104	8'-4	Sprinkler	10.585	26.03	
105	8'-4	Sprinkler	10.886	26.39	
106	8'-4	Sprinkler	11.982	27.69	
107	8'-4	Sprinkler	17.236	33.21	
108	8'-4	Sprinkler	17.558	33.52	
3	8'-4		32.098	0.00	
4	8'-4		28.378	0.00	
5	8'-4		28.437	0.00	
6	8'-4		29.484	0.00	
7	5'-11		34.670	0.00	
25	5'-1	Gauge	35.031	0.00	BOR
26	2'-6		40.151	0.00	
42	8'-4		32.108	0.00	

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
43	8'-4		32.307	0.00	
44	8'-4		31.836	0.00	
47	-5'-0		43.961	0.00	
48	-5'-0		43.539	0.00	

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
101	8'-4	8	26.00	1½	(See Notes)	14'-1½	120	10.563	• • • • • **Route 1** • • • • • Sprinkler
102	8'-4		26.00	1.6820		14'-1½	0.021212	0.300	
102	8'-4	8	26.37	1½	(See Notes)	14'-1½	120	10.862	Sprinkler
103	8'-4		52.37	1.6820		14'-1½	0.077468	1.094	
103	8'-4	8	27.66	1½	(See Notes)	86'-10	120	11.956	Sprinkler,
4	8'-4		80.03	1.6820		9'-11 96'-8½	0.169779	16.422	PO(9'-11)
4	8'-4			3		8'-8	120	28.378	
5	8'-4		80.03	3.2600		8'-8	0.006765	0.059	
5	8'-4		80.12	3	(See Notes)	13'-4	120	28.437	Flow (q) from Route 2
6	8'-4		160.14	3.2600		29'-7 42'-11	0.024413	0.000 1.047	3fE(6'-8½), E(9'-5)
6	8'-4		66.73	3	(See Notes)	23'-8	120	29.484	Flow (q) from Route 3
44	8'-4		226.88	3.2600		26'-10½ 50'-7	0.046505	0.000 2.352	4fE(6'-8½)
44	8'-4			3		10'-11	120	31.836	
43	8'-4		217.89	3.2600		10'-11	0.043153	0.472	
43	8'-4		8.99	3	(See Notes)	5'-6½	120	32.307	Flow (q) from Route 5
7	5'-11		226.88	3.2600		22'-10 28'-4½	0.046505	1.043 1.320	E(9'-5), 2f(-0.000), BV(13'-5½)
7	5'-11			4	(See Notes)	0'-0	120	34.670	
25	5'-1		226.88	4.2600		0'-0	0.012637	0.361 0.000	BOR
25	5'-1			4	(See Notes)	0'-0	120	35.031	
26	2'-6		226.88	4.2600		0'-0	0.012637	1.120 4.000	BFP(-4.000)
26	2'-6			6	(See Notes)	25'-7½	140	40.151	
48	-5'-0		226.88	6.2800		69'-4 94'-11½	0.001435	3.251 0.136	E(22'-1), T(47'-3½)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
48	-5'-0		250.00	8	(See Notes)	245'-1½	140	43.539	Flow (q) from Route 4
						59'-4½	0.001384		C(59'-4½)
47	-5'-0		476.88	8.3900		304'-6		0.421	
47	-5'-0			6	(See Notes)	3'-6	140	43.961	
							0.005673	1.517	Water Supply
46	-8'-6		476.88	6.2800		3'-6		0.020	
			0.00					45.498	Hose Allowance At Source
46			476.88						Total(Pt) Route 1
104	8'-4	8	26.03	1½	(See Notes)	14'-1½	120	10.585	• • • • • **Route 2** • • • • • Sprinkler
							0.021255		
105	8'-4		26.03	1.6820		14'-1½		0.300	
105	8'-4	8	26.39	1½	(See Notes)	14'-1½	120	10.886	Sprinkler
							0.077624		
106	8'-4		52.42	1.6820		14'-1½		1.096	
106	8'-4	8	27.69	1½	(See Notes)	86'-10	120	11.982	Sprinkler,
						9'-11	0.170119		
5	8'-4		80.12	1.6820		96'-8½		16.455	PO(9'-11)
								28.437	Total(Pt) Route 2
107	8'-4	8	33.21	1½	(See Notes)	9'-7½	120	17.236	• • • • • **Route 3** • • • • • Sprinkler
							0.033366		
108	8'-4		33.21	1.6820		9'-7½		0.321	
108	8'-4	8	33.52	1½	(See Notes)	88'-5	120	17.558	Sprinkler,
						9'-11	0.121319		
6	8'-4		66.73	1.6820		98'-3½		11.927	PO(9'-11)
								29.484	Total(Pt) Route 3
9	0'-0		250.00	6	(See Notes)	30'-4½	140	41.192	• • • • • **Route 4** • • • • • Hydrant,
						74'-1	0.001718	2.168	
48	-5'-0		250.00	6.2800		104'-5½		0.179	E(22'-1), GV(4'-8½), T(47'-3½)
								43.539	Total(Pt) Route 4
44	8'-4			1½	(See Notes)	48'-8½	120	31.836	• • • • • **Route 5** • • • • • PO(9'-11)
						39'-7	0.002975		
3	8'-4		8.99	1.6820		88'-4		0.263	4E(4'-11½), PO(9'-11)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
3	8'-4			2		10'-10	120	32.098	
42	8'-4		8.99	2.1570		10'-10	0.000886	0.010	
42	8'-4			1½	(See Notes)	47'-1½	120	32.108	PO(9'-11)
43	8'-4		8.99	1.6820		19'-9½ 66'-11	0.002975	0.199	PO(9'-11)
								32.307	Total(Pt) Route 5

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

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

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
BalV	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: 4th Lane Flats: (2276)

Location: 1309 4th Ave Lane NE, Lot 9 Block 1 Thompson Addition, Kasson, MN 55944

Drawing Name: 4th Lane Flats

Calculation Date: 8/26/2025

Design

Remote Area Number:	2 - NW Garage
Remote Area Location:	Main Floor Northwest - Garage
Occupancy Classification:	Ordinary Group II
Density	0.20gpm/ft²
Area of Application:	1500ft² (Actual 909ft²)
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:	46	Type:	Allowance at Source
	250.00	at Node:	9	Type:	Hydrant

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 46: 498.20 @ 45.162 (Safety Margin = 9.719)

Type of System: Wet

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

for Node: 46 Date: 07/15/25

Location:

Source: KASSON WATER DEPT.

Name of Contractor: PYE-BARKER FIRE & SAFETY

Address: 10661 NASSAU ST. NE, SUITE 400 BLAINE, MN 55449

Phone Number:

Name of designer: Zachary Hartwig

Authority Having Jurisdiction: :

Notes:

Automatic peaking results Left: N/A Right: N/A

Summary Notes:

Water Supply at Node 46

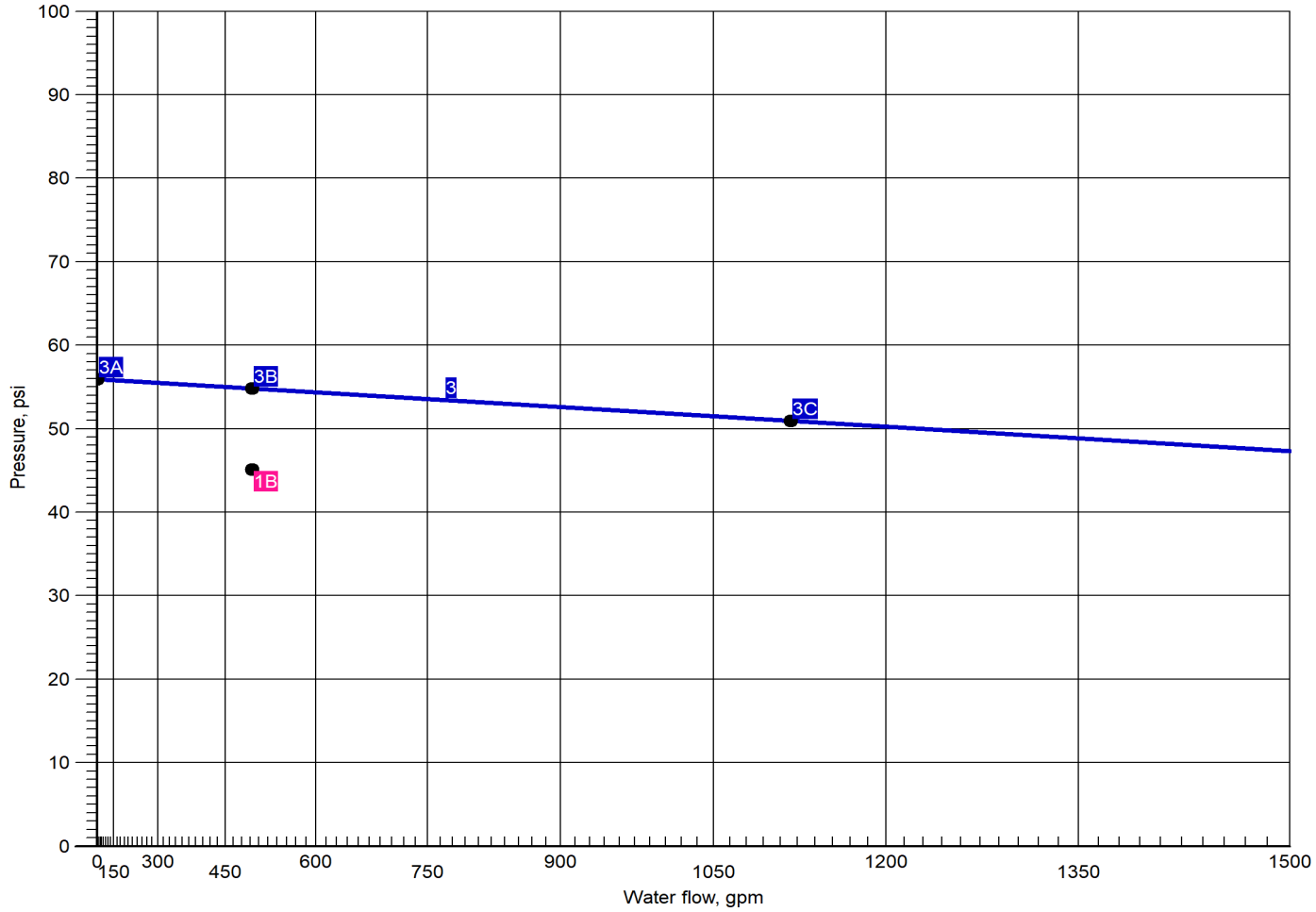
1 System Demand
3 Available Water Supply

Job Name: 4th Lane Flats

Job Number: 2276 - 4th Lane Flats

Report Description: Ordinary Group II (2 - NW Garage)

Remote Area Number: 2 - NW Garage



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 45.162 @ 498.20	Available Flow @ 20 PSI: 3249.30
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 45.162 @ 498.20	
3	3A	Available Static Pressure at Water Supply at Node 46: 56.000	
	3B	Available Residual Pressure at System Demand: 54.881 @ 498.20	
	3C	Available Residual Pressure & Flow at Water Supply at Node 46: 51.000 @ 1119.00	

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hydrant	9	250.00	250.00	0	40.819			
Sprinkler	201	25.58	25.00	8	10.225			
Sprinkler	**202**	**25.00**	**25.00**	**8**	**9.766**			
Sprinkler	203	30.71	24.30	8	14.736			
Sprinkler	204	25.83	25.00	8	10.423			
Sprinkler	205	25.24	25.00	8	9.956			
Sprinkler	206	31.00	24.30	8	15.014			
Sprinkler	207	26.71	25.00	8	11.145			
Sprinkler	208	26.10	25.00	8	10.647			
Sprinkler	209	32.03	24.30	8	16.026			

Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
46	Water Supply	56.000	51.000	1119.00	54.881	498.20	45.162

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
9	0'-0	Hydrant	40.819	250.00	
46	-8'-6	Supply	45.162	498.20	
201	8'-4	Sprinkler	10.225	25.58	
202	8'-4	Sprinkler	9.766	25.00	
203	8'-4	Sprinkler	14.736	30.71	
204	8'-4	Sprinkler	10.423	25.83	
205	8'-4	Sprinkler	9.956	25.24	
206	8'-4	Sprinkler	15.014	31.00	
207	8'-4	Sprinkler	11.145	26.71	
208	8'-4	Sprinkler	10.647	26.10	
209	8'-4	Sprinkler	16.026	32.03	
1	8'-4		13.068	0.00	
2	8'-4		13.670	0.00	
3	8'-4		19.070	0.00	
7	5'-11		34.272	0.00	
25	5'-1	Gauge	34.634	0.00	BOR
26	2'-6		39.753	0.00	
42	8'-4		19.650	0.00	

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
43	8'-4		31.671	0.00	
44	8'-4		31.387	0.00	
45	8'-4		31.043	0.00	
47	-5'-0		43.623	0.00	
48	-5'-0		43.166	0.00	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
202	8'-4	8	25.00	1½	(See Notes)	9'-7½	120	9.766	• • • • • **Route 1** • • • • • Sprinkler
205	8'-4		25.00	1.6820		9'-7½	0.019727	0.190	
205	8'-4	8	25.24	1½	(See Notes)	9'-7½	120	9.956	Sprinkler
208	8'-4		50.24	1.6820		9'-7½	0.071756	0.691	
208	8'-4	8	26.10	1½	(See Notes)	5'-8 9'-11	120	10.647	Sprinkler, PO(9'-11)
1	8'-4		76.35	1.6820		15'-6½	0.155609	2.421	
1	8'-4			2		13'-0	120	13.068	
2	8'-4		76.35	2.1570		13'-0	0.046340	0.602	
2	8'-4		78.12	2	(See Notes)	19'-4 12'-3½	120	13.670	Flow (q) from Route 2 2E(6'-2)
3	8'-4		154.46	2.1570		31'-7½	0.170657	5.400	
3	8'-4			2		10'-10	120	19.070	
42	8'-4		82.51	2.1570		10'-10	0.053500	0.580	
42	8'-4			1½	(See Notes)	47'-1½ 19'-9½	120	19.650	PO(9'-11) PO(9'-11)
43	8'-4		82.51	1.6820		66'-11	0.179651	12.021	
43	8'-4		165.69	3	(See Notes)	5'-6½ 22'-10	120	31.671 1.043	Flow (q) from Route 3 E(9'-5), 2f(-0.000), BV(13'-5½)
7	5'-11		248.20	3.2600		28'-4½	0.054911	1.558	
7	5'-11			4	(See Notes)	0'-0	120	34.272	
25	5'-1		248.20	4.2600		0'-0	0.014921	0.361 0.000	BOR
25	5'-1			4	(See Notes)	0'-0	120	34.634	
26	2'-6		248.20	4.2600		0'-0	0.014921	1.120 4.000	BFP(-4.000)
26	2'-6			6	(See Notes)	25'-7½ 69'-4	140	39.753 3.251	
48	-5'-0		248.20	6.2800		94'-11½	0.001695	0.161	E(22'-1), T(47'-3½)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length); Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.)
48	-5'-0		250.00	8	(See Notes)	245'-1½	140	43.166	Flow (q) from Route 4
						59'-4½	0.001501		
47	-5'-0		498.20	8.3900		304'-6		0.457	C(59'-4½)
47	-5'-0			6	(See Notes)	3'-6	140	43.623	
							0.006151	1.517	
46	-8'-6		498.20	6.2800		3'-6		0.022	Water Supply
			0.00					45.162	Hose Allowance At Source
46			498.20						Total(Pt) Route 1
201	8'-4	8	25.58	1½	(See Notes)	9'-7½	120	10.225	• • • • • **Route 2** • • • • • Sprinkler
							0.020584		
204	8'-4		25.58	1.6820		9'-7½		0.198	
204	8'-4	8	25.83	1½	(See Notes)	9'-7½	120	10.423	Sprinkler
							0.074870		
207	8'-4		51.41	1.6820		9'-7½		0.721	
207	8'-4	8	26.71	1½	(See Notes)	5'-8	120	11.145	Sprinkler,
						9'-11	0.162350		
2	8'-4		78.12	1.6820		15'-6½		2.525	PO(9'-11)
								13.670	Total(Pt) Route 2
203	8'-4	8	30.71	1½	(See Notes)	9'-7½	120	14.736	• • • • • **Route 3** • • • • • Sprinkler
							0.028864		
206	8'-4		30.71	1.6820		9'-7½		0.278	
206	8'-4	8	31.00	1½	(See Notes)	9'-7½	120	15.014	Sprinkler
							0.104961		
209	8'-4		61.71	1.6820		9'-7½		1.011	
209	8'-4	8	32.03	1½	(See Notes)	56'-1½	120	16.026	Sprinkler,
						9'-11	0.227456		
45	8'-4		93.73	1.6820		66'-0½		15.017	PO(9'-11)
45	8'-4			3	(See Notes)	11'-0	120	31.043	
						26'-10½	0.009064	-0.000	
44	8'-4		93.73	3.2600		37'-11		0.343	4fE(6'-8½)
44	8'-4		71.95	3		10'-11	120	31.387	Flow (q) from Route 5
							0.025999		
43	8'-4		165.69	3.2600		10'-11		0.284	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes: Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
								31.671	Total(Pt) Route 3
9	0'-0		250.00	6	(See Notes)	30'-4½	140	40.819	• • • • • **Route 4** • • • • •
						74'-1	0.001718	2.168	Hydrant,
48	-5'-0		250.00	6.2800		104'-5½		0.179	E(22'-1), GV(4'-8½), T(47'-3½)
								43.166	Total(Pt) Route 4
3	8'-4			1½	(See Notes)	48'-8½	120	19.070	• • • • • **Route 5** • • • • •
						39'-7	0.139443		PO(9'-11)
44	8'-4		71.95	1.6820		88'-4		12.317	4E(4'-11½), PO(9'-11)
								31.387	Total(Pt) Route 5

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

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

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
BalV	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: 4th Lane Flats: (2276)

Location: 1309 4th Ave Lane NE, Lot 9 Block 1 Thompson Addition, Kasson, MN 55944

Drawing Name: 4th Lane Flats

Calculation Date: 9/12/2025

Design

Remote Area Number:	3 - 1st Corridor
Remote Area Location:	1st Floor - Corridor
Occupancy Classification:	Light Hazard
Density	0.10gpm/ft²
Area of Application:	1500ft² (Actual 544ft²)
Type of sprinklers calculated:	Sidewall
No. of sprinklers calculated:	3
No. of nozzles calculated:	0

In-rack Demand:	N/A gpm	at Node:	N/A		
Hose Streams:	0.0 gpm	at Node:	46	Type:	Allowance at Source
	140.00	at Node:	21	Type:	Hose

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 46: 209.31 @ 45.444 (Safety Margin = 10.331)

Type of System: Wet

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

for Node: 46 Date: 07/15/25

Location:

Source: KASSON WATER DEPT.

Name of Contractor: PYE-BARKER FIRE & SAFETY

Address: 10661 NASSAU ST. NE, SUITE 400 BLAINE, MN 55449

Phone Number:

Name of designer: Zachary Hartwig

Authority Having Jurisdiction: :

Notes:

Automatic peaking results Left: N/A Right: N/A

Summary Notes:

Water Supply at Node 46

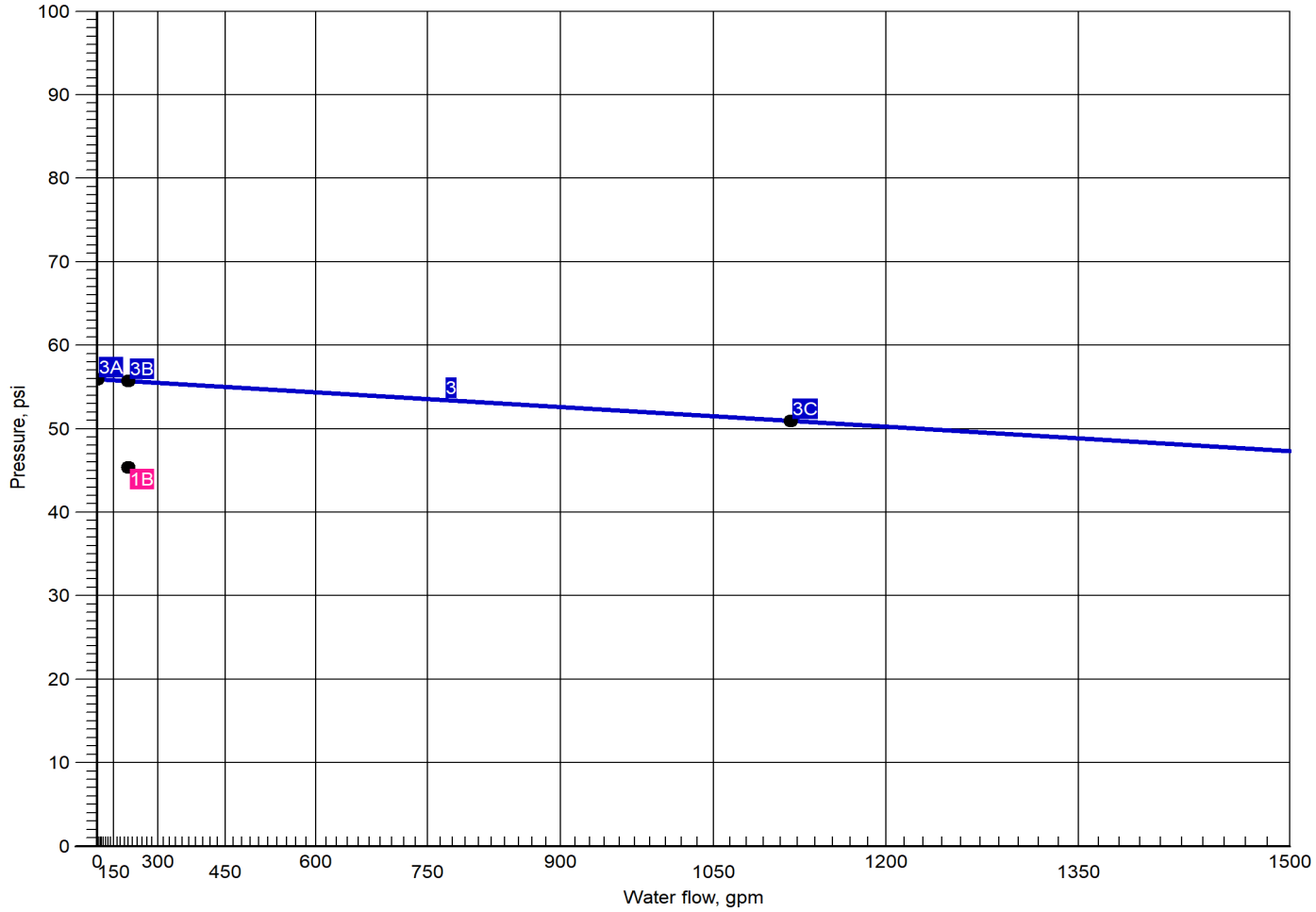
1 System Demand
3 Available Water Supply

Job Name: 4th Lane Flats

Job Number: 2276 - 4th Lane Flats

Report Description: Light Hazard (3 - 1st Corridor)

Remote Area Number: 3 - 1st Corridor



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 45.444 @ 209.31	Available Flow @ 20 PSI: 3249.30
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 45.444 @ 209.31	
3	3A	Available Static Pressure at Water Supply at Node 46: 56.000	
	3B	Available Residual Pressure at System Demand: 55.775 @ 209.31	
	3C	Available Residual Pressure & Flow at Water Supply at Node 46: 51.000 @ 1119.00	

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hose	21	140.00	140.00	0	40.766			
Sprinkler	301	23.19	23.00	5.6	17.155			
Sprinkler	**302**	**23.00**	**23.00**	**5.6**	**16.869**			
Sprinkler	303	23.12	23.00	5.6	17.042			

Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
46	Water Supply	56.000	51.000	1119.00	55.775	209.31	45.444

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
21	1'-8	Hose	40.766	140.00	Hose(48'-10)
46	-8'-6	Supply	45.444	209.31	
301	18'-6	Sprinkler	17.155	23.19	
302	18'-6	Sprinkler	16.869	23.00	
303	18'-6	Sprinkler	17.042	23.12	
19	1'-8		40.823	0.00	
23	20'-0		25.869	0.00	
25	5'-1	Gauge	32.717	0.00	BOR
26	2'-6		40.461	0.00	
27	20'-0		24.737	0.00	
28	20'-0		25.351	0.00	
29	20'-0		25.031	0.00	
30	20'-0		24.762	0.00	
39	20'-0		24.874	0.00	
40	20'-0		24.851	0.00	
41	20'-0		18.417	0.00	
47	-5'-0		43.922	0.00	
48	-5'-0		43.830	0.00	

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
50	20'-0		18.093	0.00	
51	20'-0		18.192	0.00	
52	20'-0		17.763	0.00	
53	20'-0		18.470	0.00	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
302	18'-6	5.6	23.00	1	(See Notes)	9'-3½	150	16.869	• • • • • **Route 1** • • • • •
50	20'-0		23.00	1.1010		12'-0 21'-3½	0.088117	-0.650 1.875	Sprinkler, E(7'-0), T(5'-0)
50	20'-0			1	(See Notes)	105'-3½	150	18.093	
39	20'-0		18.93	1.1010		5'-0 110'-3½	0.061476	6.780	T(5'-0)
39	20'-0		14.23	2	(See Notes)	6'-9	150	24.874	Flow (q) from Route 2
29	20'-0		33.17	2.0030		10'-0 16'-9	0.009408	0.158	T(10'-0)
29	20'-0		36.14	2		8'-8	150	25.031	Flow (q) from Route 3
28	20'-0		69.31	2.0030		8'-8	0.036786	0.000 0.319	
28	20'-0			2	(See Notes)	1'-1	120	25.351	
23	20'-0		69.31	2.1570		12'-3½ 13'-4½	0.038752	-0.000 0.519	2f(-0.000), PO(12'-3½)
23	20'-0			4	(See Notes)	93'-6½	120	25.869	
25	5'-1		69.31	4.2600		176'-5½ 270'-0	0.001409	6.467 0.380	5E(13'-2), 2BV(15'-9½), 2PO(26'-4), T(26'-4), BOR
25	5'-1			4	(See Notes)	0'-0	120	32.717	
26	2'-6		69.31	4.2600		0'-0	0.001409	1.120 6.625	BFP(-6.625)
26	2'-6			6		0'-0	140	40.461	
19	1'-8		69.31	6.2800		0'-0	0.000160	0.361 0.000	
19	1'-8		140.00	6	(See Notes)	25'-7½	140	40.823	Flow (q) from Route 4
48	-5'-0		209.31	6.2800		69'-4 94'-11½	0.001237	2.890 0.117	E(22'-1), T(47'-3½)
48	-5'-0			8	(See Notes)	245'-1½	140	43.830	
47	-5'-0		209.31	8.3900		59'-4½ 304'-6	0.000302	0.092	C(59'-4½)
47	-5'-0			6	(See Notes)	3'-6	140	43.922	
46	-8'-6		209.31	6.2800		3'-6	0.001237	1.517 0.004	Water Supply

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length); Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.)
			0.00					45.444	Hose Allowance At Source
46			209.31						Total(Pt) Route 1
303	18'-6	5.6	23.12	1	(See Notes)	3'-5	150	17.042	• • • • • **Route 2** • • • • • Sprinkler,
						12'-0	0.088953	-0.650	
52	20'-0		23.12	1.1010		15'-5		1.372	E(7'-0), T(5'-0)
52	20'-0			1	(See Notes)	15'-0½	150	17.763	
						7'-0	0.019463		
51	20'-0		10.17	1.1010		22'-0½		0.429	E(7'-0)
51	20'-0		4.07	1	(See Notes)	143'-7	150	18.192	Flow (q) from Route 6
						40'-0	0.036272		
40	20'-0		14.23	1.1010		183'-7		6.659	5E(7'-0), T(5'-0)
40	20'-0			2		11'-8½	150	24.851	
							0.001967		
39	20'-0		14.23	2.0030		11'-8½		0.023	
								24.874	Total(Pt) Route 2
301	18'-6	5.6	23.19	1	(See Notes)	9'-4½	150	17.155	• • • • • **Route 3** • • • • • Sprinkler,
						12'-0	0.089499	-0.650	
41	20'-0		23.19	1.1010		21'-4½		1.913	E(7'-0), T(5'-0)
41	20'-0			1	(See Notes)	77'-4½	150	18.417	
						5'-0	0.077018		
30	20'-0		21.39	1.1010		82'-4½		6.344	T(5'-0)
30	20'-0		14.76	2	(See Notes)	14'-5½	150	24.762	Flow (q) from Route 5
						10'-0	0.011030		
29	20'-0		36.14	2.0030		24'-5½		0.270	T(10'-0)
								25.031	Total(Pt) Route 3
21	1'-8		140.00	6	(See Notes)	0'-0	140	40.766	• • • • • **Route 4** • • • • • Hose(48'-10)
						96'-1½	0.000588	-0.000	
19	1'-8		140.00	6.2800		96'-1½		0.056	T(47'-3½)
								40.823	Total(Pt) Route 4
52	20'-0		10.17	1	(See Notes)	18'-3	150	17.763	• • • • • **Route 5** • • • • • Flow (q) from Route 2
						5'-0	0.030449	-0.001	
53	20'-0		12.95	1.1010		23'-3		0.708	T(5'-0)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length); Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.)
53	20'-0		1.81	1	(See Notes)	151'-7	150	18.470	Flow (q) from Route 7
						10'-0	0.038779	0.001	
27	20'-0		14.76	1.1010		161'-7		6.266	2T(5'-0)
27	20'-0			2		11'-8	150	24.737	
							0.002103		
30	20'-0		14.76	2.0030		11'-8		0.025	
								24.762	Total(Pt) Route 5
50	20'-0		18.93	1	(See Notes)	22'-6½	150	18.093	• • • • • **Route 6** • • • • •
						5'-0	0.003573		Flow (q) from Route 1
51	20'-0		4.07	1.1010		27'-6½		0.098	T(5'-0)
								18.192	Total(Pt) Route 6
41	20'-0		21.39	1	(See Notes)	62'-6½	150	18.417	• • • • • **Route 7** • • • • •
						5'-0	0.000798	-0.001	Flow (q) from Route 3
53	20'-0		1.81	1.1010		67'-6½		0.054	C(5'-0)
								18.470	Total(Pt) Route 7

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

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

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
BalV	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: 4th Lane Flats: (2276)

Location: 1309 4th Ave Lane NE, Lot 9 Block 1 Thompson Addition, Kasson, MN 55944

Drawing Name: 4th Lane Flats

Calculation Date: 9/12/2025

Design

Remote Area Number:	4 - 1st Unit E
Remote Area Location:	1st Floor South - Unit E
Occupancy Classification:	Residential
Density	0.05gpm/ft²
Area of Application:	900ft² (Actual 392ft²)
Type of sprinklers calculated:	Pendent
No. of sprinklers calculated:	3
No. of nozzles calculated:	0

In-rack Demand:	N/A gpm	at Node:	N/A		
Hose Streams:	0.0 gpm	at Node:	46	Type:	Allowance at Source
	140.00	at Node:	21	Type:	Hose

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 46: 192.69 @ 42.704 (Safety Margin = 13.103)

Type of System: Wet

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

for Node: 46 Date: 07/15/25

Location:

Source: KASSON WATER DEPT.

Name of Contractor: PYE-BARKER FIRE & SAFETY

Address: 10661 NASSAU ST. NE, SUITE 400 BLAINE, MN 55449

Phone Number:

Name of designer: Zachary Hartwig

Authority Having Jurisdiction: :

Notes:

Automatic peaking results Left: 38.663 Right: 38.106

Summary Notes:

Water Supply at Node 46

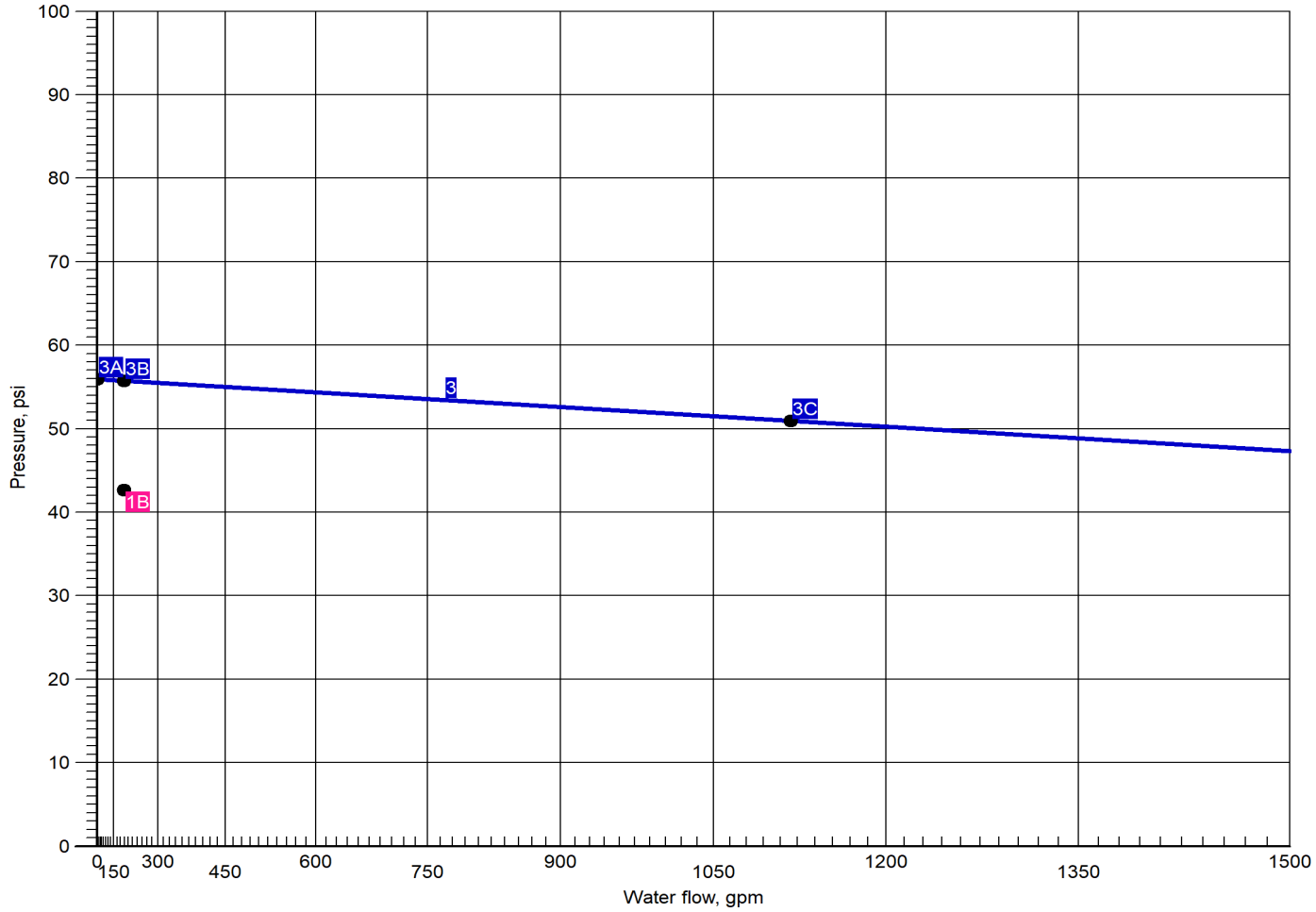
1 System Demand
3 Available Water Supply

Job Name: 4th Lane Flats

Job Number: 2276 - 4th Lane Flats

Report Description: Residential (4 - 1st Unit E)

Remote Area Number: 4 - 1st Unit E



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 42.704 @ 192.69	Available Flow @ 20 PSI: 3249.30
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 42.704 @ 192.69	
3	3A	Available Static Pressure at Water Supply at Node 46: 56.000	
	3B	Available Residual Pressure at System Demand: 55.807 @ 192.69	
	3C	Available Residual Pressure & Flow at Water Supply at Node 46: 51.000 @ 1119.00	

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hose	21	140.00	140.00	0	38.057			
Sprinkler	**401**	**17.00**	**17.00**	**4.9**	**12.037**			
Sprinkler	402	17.46	17.00	4.9	12.698			
Sprinkler	403	18.22	17.00	4.9	13.833			

⇨ Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
46	Water Supply	56.000	51.000	1119.00	55.807	192.69	42.704

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
21	1'-8	Hose	38.057	140.00	Hose(48'-10)
46	-8'-6	Supply	42.704	192.69	
401	18'-6	Sprinkler	12.037	17.00	
402	18'-6	Sprinkler	12.698	17.46	
403	18'-6	Sprinkler	13.833	18.22	
19	1'-8		38.113	0.00	
23	20'-0		22.982	0.00	
24	20'-0		12.874	0.00	
25	5'-1	Gauge	29.678	0.00	BOR
26	2'-6		37.752	0.00	
27	20'-0		22.233	0.00	
28	20'-0		22.670	0.00	
29	20'-0		22.478	0.00	
30	20'-0		22.262	0.00	
39	20'-0		22.412	0.00	
40	20'-0		22.401	0.00	
47	-5'-0		41.183	0.00	
48	-5'-0		41.104	0.00	

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
51	20'-0		19.256	0.00	
53	20'-0		15.616	0.00	
675	20'-0		15.600	0.00	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
401	18'-6	4.9	17.00	1	(See Notes)	15'-6½	150	12.037	• • • • • **Route 1** • • • • •
24	20'-0		17.00	1.1010		14'-0 29'-6½	0.050373	-0.650 1.487	Sprinkler, 2E(7'-0)
24	20'-0		17.46	1	(See Notes)	9'-9	150	12.874	Flow (q) from Route 2
53	20'-0		34.46	1.1010		5'-0 14'-9	0.186170	-0.001 2.743	C(5'-0)
53	20'-0			1	(See Notes)	139'-11	150	15.616	C(5'-0)
30	20'-0		15.86	1.1010		10'-0 149'-11	0.044326	0.001 6.645	T(5'-0)
30	20'-0		16.14	2	(See Notes)	14'-5½	150	22.262	Flow (q) from Route 3
29	20'-0		32.01	2.0030		10'-0 24'-5½	0.008808	 0.215	T(10'-0)
29	20'-0		20.68	2		8'-8	150	22.478	Flow (q) from Route 5
28	20'-0		52.69	2.0030		 8'-8	0.022147	0.000 0.192	
28	20'-0			2	(See Notes)	1'-1	120	22.670	
23	20'-0		52.69	2.1570		12'-3½ 13'-4½	0.023331	-0.000 0.312	2f(-0.000), PO(12'-3½)
23	20'-0			4	(See Notes)	93'-6½	120	22.982	
25	5'-1		52.69	4.2600		176'-5½ 270'-0	0.000848	6.467 0.229	5E(13'-2), 2BV(15'-9½), 2PO(26'-4), T(26'-4), BOR
25	5'-1			4	(See Notes)	0'-0	120	29.678	
26	2'-6		52.69	4.2600		 0'-0	0.000848	1.120 6.954	BFP(-6.954)
26	2'-6			6		0'-0	140	37.752	
19	1'-8		52.69	6.2800		 0'-0	0.000096	0.361 0.000	
19	1'-8		140.00	6	(See Notes)	25'-7½	140	38.113	Flow (q) from Route 4
48	-5'-0		192.69	6.2800		69'-4 94'-11½	0.001061	2.890 0.101	E(22'-1), T(47'-3½)
48	-5'-0			8	(See Notes)	245'-1½	140	41.104	
47	-5'-0		192.69	8.3900		59'-4½ 304'-6	0.000259	 0.079	C(59'-4½)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes (Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.)
47	-5'-0			6	(See Notes)	3'-6	140	41.183	
46	-8'-6		192.69	6.2800		3'-6	0.001061	1.517 0.004	Water Supply
			0.00					42.704	Hose Allowance At Source
46			192.69						Total(Pt) Route 1
402	18'-6	4.9	17.46	1	(See Notes)	3'-7½	150	12.698	• • • • • **Route 2** • • • • •
24	20'-0		17.46	1.1010		12'-0 15'-7½	0.052926	-0.650 0.826	Sprinkler, E(7'-0), T(5'-0)
								12.874	Total(Pt) Route 2
403	18'-6	4.9	18.22	1	(See Notes)	18'-2	150	13.833	• • • • • **Route 3** • • • • •
675	20'-0		18.22	1.1010		24'-0 42'-2	0.057291	-0.650 2.417	Sprinkler, 2E(7'-0), 2T(5'-0)
675	20'-0			1	(See Notes)	139'-11	150	15.600	
27	20'-0		16.14	1.1010		5'-0 144'-11	0.045775	6.633	T(5'-0)
27	20'-0			2		11'-8	150	22.233	
30	20'-0		16.14	2.0030		11'-8	0.002483	0.029	
								22.262	Total(Pt) Route 3
21	1'-8		140.00	6	(See Notes)	0'-0	140	38.057	• • • • • **Route 4** • • • • •
19	1'-8		140.00	6.2800		96'-1½ 96'-1½	0.000588	-0.000 0.056	Hose(48'-10) T(47'-3½)
								38.113	Total(Pt) Route 4
675	20'-0			1	(See Notes)	11'-8	150	15.600	• • • • • **Route 5** • • • • •
53	20'-0		2.08	1.1010		5'-0 16'-8	0.001035	-0.001 0.017	T(5'-0)
53	20'-0		15.86	1	(See Notes)	33'-3½	150	15.616	Flow (q) from Route 1
51	20'-0		20.68	1.1010		17'-0 50'-3½	0.072369	0.001 3.639	2T(5'-0), E(7'-0)
51	20'-0			1	(See Notes)	127'-10	150	19.256	
39	20'-0		11.32	1.1010		5'-0 132'-10	0.023758	3.156	T(5'-0)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
39	20'-0		9.35	2	(See Notes)	6'-9	150	22.412	Flow (q) from Route 6
						10'-0	0.003925		
29	20'-0		20.68	2.0030		16'-9		0.066	T(10'-0)
								22.478	Total(Pt) Route 5
51	20'-0			1	(See Notes)	143'-7	150	19.256	• • • • • **Route 6** • • • • •
						45'-0	0.016678		T(5'-0)
40	20'-0		9.35	1.1010		188'-7		3.145	5E(7'-0), T(5'-0)
40	20'-0			2		11'-8½	150	22.401	
							0.000905		
39	20'-0		9.35	2.0030		11'-8½		0.011	
								22.412	Total(Pt) Route 6

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

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

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
BalV	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: 4th Lane Flats: (2276)

Location: 1309 4th Ave Lane NE, Lot 9 Block 1 Thompson Addition, Kasson, MN 55944

Drawing Name: 4th Lane Flats

Calculation Date: 9/12/2025

Design

Remote Area Number:	5 - 3rd Floor Corridor
Remote Area Location:	3rd Floor Corridor
Occupancy Classification:	Residential
Density	0.05gpm/ft²
Area of Application:	900ft² (Actual 383ft²)
Type of sprinklers calculated:	Sidewall
No. of sprinklers calculated:	4
No. of nozzles calculated:	0

In-rack Demand:	N/A gpm	at Node:	N/A		
Hose Streams:	0.0 gpm	at Node:	46	Type:	Allowance at Source
	140.00	at Node:	21	Type:	Hose

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 46: 192.61 @ 48.609 (Safety Margin = 7.198)

Type of System: Wet

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

for Node: 46 Date: 07/15/25

Location:

Source: KASSON WATER DEPT.

Name of Contractor: PYE-BARKER FIRE & SAFETY

Address: 10661 NASSAU ST. NE, SUITE 400 BLAINE, MN 55449

Phone Number:

Name of designer: Zachary Hartwig

Authority Having Jurisdiction: :

Notes:

Automatic peaking results Left: N/A Right: N/A

Summary Notes:

Water Supply at Node 46

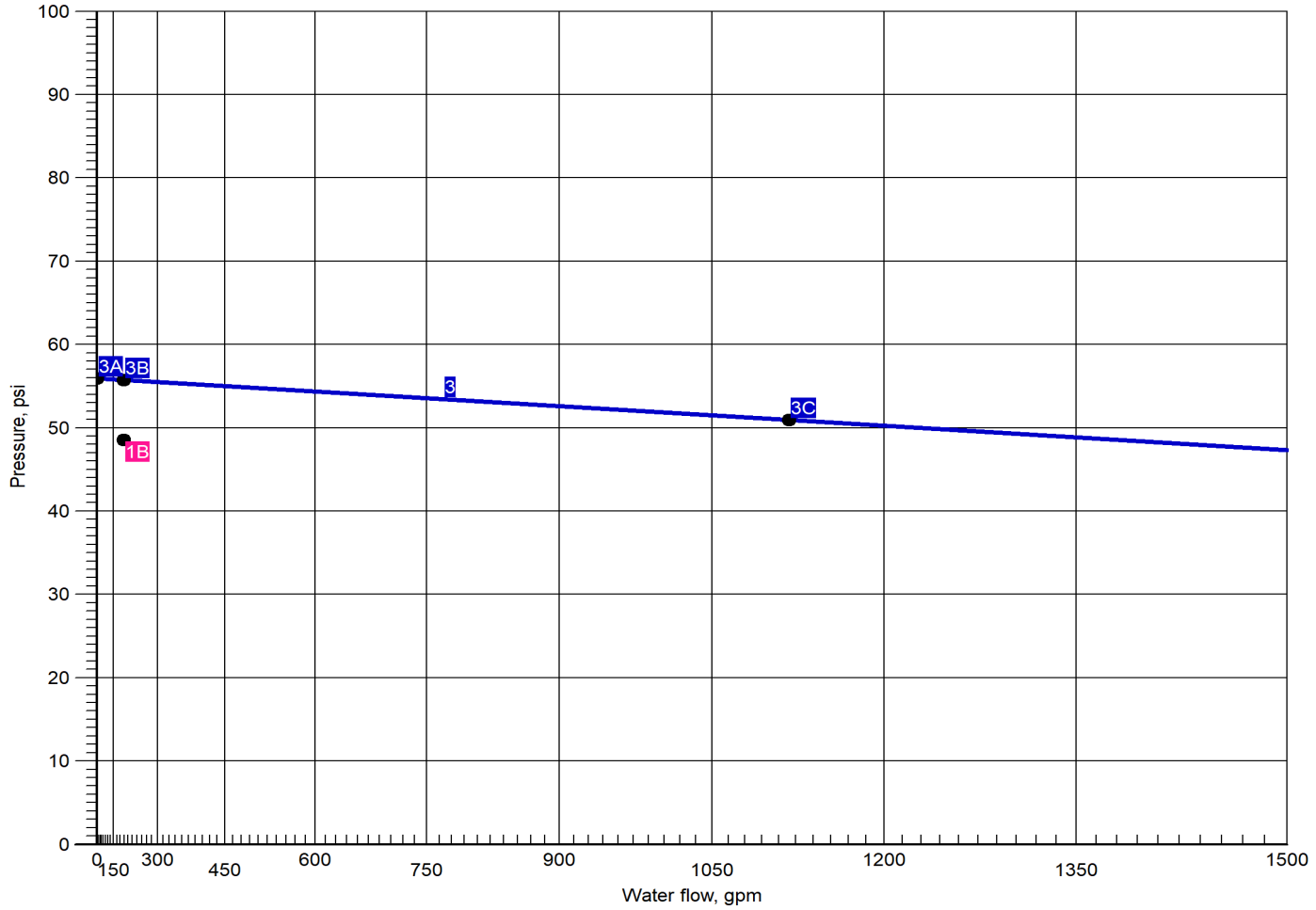
1 System Demand
3 Available Water Supply

Job Name: 4th Lane Flats

Job Number: 2276 - 4th Lane Flats

Report Description: Residential (5 - 3rd Floor Corridor)

Remote Area Number: 5 - 3rd Floor Corridor



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 48.609 @ 192.61	Available Flow @ 20 PSI: 3249.30
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 48.609 @ 192.61	
3	3A	Available Static Pressure at Water Supply at Node 46: 56.000	
	3B	Available Residual Pressure at System Demand: 55.807 @ 192.61	
	3C	Available Residual Pressure & Flow at Water Supply at Node 46: 51.000 @ 1119.00	

Summary Of Outflowing Devices

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hose	21	140.00	140.00	0	43.962			
Sprinkler	501	13.07	13.00	4	10.670			
Sprinkler	**502**	**13.00**	**13.00**	**4**	**10.563**			
Sprinkler	503	13.08	13.00	4	10.696			
Sprinkler	504	13.46	13.00	4	11.326			

Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @ Flow (gpm)		Available (psi) @ Total Demand (gpm)		Required Pressure (psi)
46	Water Supply	56.000	51.000	1119.00	55.807	192.61	48.609

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
21	1'-8	Hose	43.962	140.00	Hose(48'-10)
46	-8'-6	Supply	48.609	192.61	
501	41'-9½	Sprinkler	10.670	13.07	
502	41'-9½	Sprinkler	10.563	13.00	
503	41'-9½	Sprinkler	10.696	13.08	
504	41'-9½	Sprinkler	11.326	13.46	
8	29'-9½		24.633	0.00	
10	29'-9½		24.197	0.00	
11	31'-2		22.822	0.00	
12	31'-2		22.831	0.00	
13	31'-2		22.893	0.00	
14	31'-2		22.661	0.00	
15	31'-2		15.999	0.00	
16	31'-2		15.885	0.00	
18	31'-2		20.047	0.00	
19	1'-8		44.018	0.00	
20	31'-2		22.638	0.00	
22	31'-2		16.026	0.00	

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
25	5'-1	Gauge	35.582	0.00	BOR
26	2'-6		43.657	0.00	
47	-5'-0		47.088	0.00	
48	-5'-0		47.009	0.00	
49	31'-2		16.916	0.00	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
502	41'-9½	4	13.00	1	(See Notes)	18'-4	150	10.563	• • • • • **Route 1** • • • • • Sprinkler,
16	31'-2		13.00	1.1010		5'-0 23'-4	0.030666	4.606 0.716	C(5'-0)
16	31'-2			1		15'-0	150	15.885	
15	31'-2		6.13	1.1010		15'-0	0.007630	0.114	
15	31'-2		13.07	1	(See Notes)	100'-7½	150	15.999	Flow (q) from Route 2
14	31'-2		19.19	1.1010		5'-0 105'-7½	0.063060	6.662	T(5'-0)
14	31'-2		14.10	2	(See Notes)	14'-5½	150	22.661	Flow (q) from Route 3
13	31'-2		33.30	2.0030		10'-0 24'-5½	0.009477	0.232	T(10'-0)
13	31'-2		19.31	2	(See Notes)	10'-0½	150	22.893	Flow (q) from Route 4
10	29'-9½		52.61	2.0030		22'-0 32'-0½	0.022088	0.596 0.708	cplg(1'-0), T(10'-0), E(11'-0)
10	29'-9½			2	(See Notes)	1'-1	120	24.197	
8	29'-9½		52.61	2.0030		12'-0 13'-1	0.033376	-0.000 0.437	2cplg(1'-0), 2f(-0.000), PO(10'-0)
8	29'-9½			4	(See Notes)	103'-4	120	24.633	
25	5'-1		52.61	4.2600		176'-5½ 279'-9½	0.000846	10.712 0.237	5E(13'-2), 2BV(15'-9½), 2PO(26'-4), T(26'-4), BOR
25	5'-1			4	(See Notes)	0'-0	120	35.582	
26	2'-6		52.61	4.2600		0'-0	0.000846	1.120 6.955	BFP(-6.955)
26	2'-6			6		0'-0	140	43.657	
19	1'-8		52.61	6.2800		0'-0	0.000096	0.361 0.000	
19	1'-8		140.00	6	(See Notes)	25'-7½	140	44.018	Flow (q) from Route 5
48	-5'-0		192.61	6.2800		69'-4 94'-11½	0.001060	2.890 0.101	E(22'-1), T(47'-3½)
48	-5'-0			8	(See Notes)	245'-1½	140	47.009	
47	-5'-0		192.61	8.3900		59'-4½ 304'-6	0.000259	0.079	C(59'-4½)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
47	-5'-0			6	(See Notes)	3'-6	140	47.088	
							0.001060	1.517	
46	-8'-6		192.61	6.2800		3'-6		0.004	Water Supply
			0.00					48.609	Hose Allowance At Source
46			192.61						Total(Pt) Route 1
501	41'-9½	4	13.07	1	(See Notes)	18'-4	150	10.670	• • • • • **Route 2** • • • • •
						5'-0	0.030955	4.606	Sprinkler,
15	31'-2		13.07	1.1010		23'-4		0.723	T(5'-0)
								15.999	Total(Pt) Route 2
503	41'-9½	4	13.08	1	(See Notes)	18'-4	150	10.696	• • • • • **Route 3** • • • • •
						5'-0	0.031024	4.606	Sprinkler,
22	31'-2		13.08	1.1010		23'-4		0.724	T(5'-0)
22	31'-2		6.87	1	(See Notes)	8'-1½	150	16.026	Flow (q) from Route 6
						5'-0	0.067745		
49	31'-2		19.95	1.1010		13'-1½		0.890	C(5'-0)
49	31'-2			1	(See Notes)	150'-6	150	16.916	
						10'-0	0.035654		
20	31'-2		14.10	1.1010		160'-6		5.722	2T(5'-0)
20	31'-2			2		11'-8	150	22.638	
							0.001934		
14	31'-2		14.10	2.0030		11'-8		0.023	
								22.661	Total(Pt) Route 3
504	41'-9½	4	13.46	1	(See Notes)	20'-0½	150	11.326	• • • • • **Route 4** • • • • •
						10'-0	0.032712	4.606	Sprinkler,
49	31'-2		13.46	1.1010		30'-0½		0.983	T(5'-0), C(5'-0)
49	31'-2		14.10	1	(See Notes)	32'-1	150	16.916	Flow (q) from Route 3
						17'-0	0.063771		
18	31'-2		19.31	1.1010		49'-1		3.131	2T(5'-0), E(7'-0)
18	31'-2			1	(See Notes)	127'-10	150	20.047	
						5'-0	0.020963		
12	31'-2		10.58	1.1010		132'-10		2.785	T(5'-0)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
12	31'-2		8.73	2	(See Notes)	6'-9	150	22.831	Flow (q) from Route 7
						11'-0	0.003459		
13	31'-2		19.31	2.0030		17'-9		0.061	cplg(1'-0), T(10'-0)
								22.893	Total(Pt) Route 4
21	1'-8		140.00	6	(See Notes)	0'-0	140	43.962	• • • • • **Route 5** • • • • •
						96'-1½	0.000588	-0.000	Hose(48'-10)
19	1'-8		140.00	6.2800		96'-1½		0.056	T(47'-3½)
								44.018	Total(Pt) Route 5
16	31'-2		6.13	1		15'-0	150	15.885	• • • • • **Route 6** • • • • •
							0.009427		Flow (q) from Route 1
22	31'-2		6.87	1.1010		15'-0		0.141	
								16.026	Total(Pt) Route 6
18	31'-2			1	(See Notes)	144'-1½	150	20.047	• • • • • **Route 7** • • • • •
						45'-0	0.014673		T(5'-0)
11	31'-2		8.73	1.1010		189'-1½		2.775	5E(7'-0), T(5'-0)
11	31'-2			2		11'-8½	150	22.822	
							0.000796		
12	31'-2		8.73	2.0030		11'-8½		0.009	
								22.831	Total(Pt) Route 7

Job Name: 4th Lane Flats
Remote Area Number: 5 - 3rd Floor Corridor

Date: 9/12/2025

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

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

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
BalV	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: 4th Lane Flats: (2276)

Location: 1309 4th Ave Lane NE, Lot 9 Block 1 Thompson Addition, Kasson, MN 55944

Drawing Name: 4th Lane Flats

Calculation Date: 9/12/2025

Design

Remote Area Number:	6 - 3rd Unit E
Remote Area Location:	3rd Floor South - Unit E
Occupancy Classification:	Residential
Density	0.05gpm/ft²
Area of Application:	900ft² (Actual 392ft²)
Type of sprinklers calculated:	Sidewall
No. of sprinklers calculated:	3
No. of nozzles calculated:	0

In-rack Demand:	N/A gpm	at Node:	N/A		
Hose Streams:	0.0 gpm	at Node:	46	Type:	Allowance at Source
	140.00	at Node:	21	Type:	Hose

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 46: 180.23 @ 46.480 (Safety Margin = 9.350)

Type of System: Wet

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

for Node: 46 Date: 07/15/25

Location:

Source: KASSON WATER DEPT.

Name of Contractor: PYE-BARKER FIRE & SAFETY

Address: 10661 NASSAU ST. NE, SUITE 400 BLAINE, MN 55449

Phone Number:

Name of designer: Zachary Hartwig

Authority Having Jurisdiction: :

Notes:

Automatic peaking results Left: N/A Right: N/A

Summary Notes:

Water Supply at Node 46

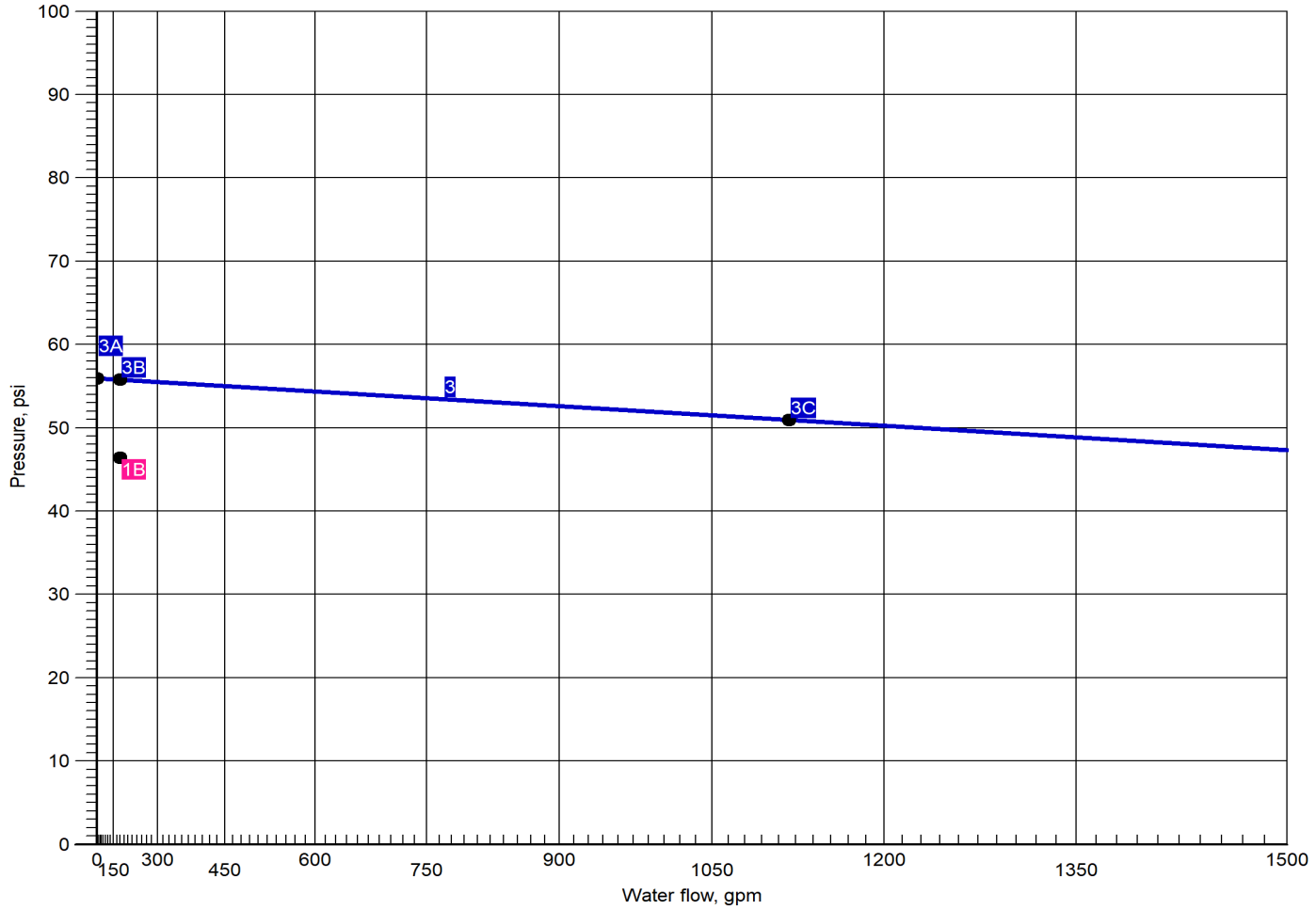
1 System Demand
3 Available Water Supply

Job Name: 4th Lane Flats

Job Number: 2276

Report Description: Residential (6 - 3rd Unit E)

Remote Area Number: 6 - 3rd Unit E



Curve	Data Point	Hydraulic Calculation Results	Additional Data
1	1B	Required Pressure at System Demand: 46.480 @ 180.23	Available Flow @ 20 PSI: 3249.30
	1C	Required Pressure at System Demand (Including Hose Allowance at Source): 46.480 @ 180.23	
3	3A	Available Static Pressure at Water Supply at Node 46: 56.000	
	3B	Available Residual Pressure at System Demand: 55.829 @ 180.23	
	3C	Available Residual Pressure & Flow at Water Supply at Node 46: 51.000 @ 1119.00	

Summary Of Outflowing Devices

Job Number: 2276
Report Description: Residential (6 - 3rd Unit E)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)			
Hose	21	140.00	140.00	0	41.854			
Sprinkler	**601**	**13.00**	**13.00**	**4**	**10.563**			
Sprinkler	602	13.13	13.00	4	10.771			
Sprinkler	603	14.10	13.00	4	12.429			

Most Demanding Sprinkler Data

Supply Analysis

Node	Name	Static (psi)	Residual (psi) @ Flow (gpm)		Available (psi) @ Total Demand (gpm)		Required Pressure (psi)
46	Water Supply	56.000	51.000	1119.00	55.829	180.23	46.480

Node Analysis

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
21	1'-8	Hose	41.854	140.00	Hose(48'-10)
46	-8'-6	Supply	46.480	180.23	
601	41'-9½	Sprinkler	10.563	13.00	
602	41'-9½	Sprinkler	10.771	13.13	
603	41'-9½	Sprinkler	12.429	14.10	
8	29'-9½		23.567	0.00	
10	29'-9½		23.301	0.00	
11	31'-2		22.225	0.00	
12	31'-2		22.231	0.00	
13	31'-2		22.274	0.00	
14	31'-2		22.143	0.00	
17	31'-2		16.226	0.00	
18	31'-2		20.309	0.00	
19	1'-8		41.910	0.00	
20	31'-2		22.126	0.00	
25	5'-1	Gauge	34.423	0.00	BOR
26	2'-6		41.549	0.00	
47	-5'-0		44.959	0.00	

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
48	-5'-0		44.889	0.00	
49	31'-2		18.147	0.00	
1137	31'-2		18.134	0.00	

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
601	41'-9½	4	13.00	1	(See Notes)	27'-5½	150	10.563	• • • • • **Route 1** • • • • •
						7'-0	0.030666	4.606	Sprinkler,
17	31'-2		13.00	1.1010		34'-5½		1.057	E(7'-0)
17	31'-2		13.13	1	(See Notes)	12'-2½	150	16.226	Flow (q) from Route 2
						5'-0	0.111561		
49	31'-2		26.13	1.1010		17'-2½		1.921	C(5'-0)
49	31'-2			1	(See Notes)	138'-9½	150	18.147	C(5'-0)
						10'-0	0.026862		
14	31'-2		12.10	1.1010		148'-9½		3.997	T(5'-0)
14	31'-2		12.32	2	(See Notes)	14'-5½	150	22.143	Flow (q) from Route 3
						10'-0	0.005340		
13	31'-2		24.42	2.0030		24'-5½		0.131	T(10'-0)
13	31'-2		15.81	2	(See Notes)	10'-0½	150	22.274	Flow (q) from Route 5
						22'-0	0.013446	0.596	
10	29'-9½		40.23	2.0030		32'-0½		0.431	cplg(1'-0), T(10'-0), E(11'-0)
10	29'-9½			2	(See Notes)	1'-1	120	23.301	
						12'-0	0.020318	-0.000	
8	29'-9½		40.23	2.0030		13'-1		0.266	2cplg(1'-0), 2f(-0.000), PO(10'-0)
8	29'-9½			4	(See Notes)	103'-4	120	23.567	
						176'-5½	0.000515	10.712	
25	5'-1		40.23	4.2600		279'-9½		0.144	5E(13'-2), 2BV(15'-9½), 2PO(26'-4), T(26'-4), BOR
25	5'-1			4	(See Notes)	0'-0	120	34.423	
							0.000515	1.120	
26	2'-6		40.23	4.2600		0'-0		6.007	BFP(-6.007)
26	2'-6			6		0'-0	140	41.549	
							0.000058	0.361	
19	1'-8		40.23	6.2800		0'-0		0.000	
19	1'-8		140.00	6	(See Notes)	25'-7½	140	41.910	Flow (q) from Route 4
						69'-4	0.000938	2.890	
48	-5'-0		180.23	6.2800		94'-11½		0.089	E(22'-1), T(47'-3½)
48	-5'-0			8	(See Notes)	245'-1½	140	44.889	
						59'-4½	0.000229		
47	-5'-0		180.23	8.3900		304'-6		0.070	C(59'-4½)

Pipe Information

Node 1 / Node 2	Elev 1 (Foot) / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
47	-5'-0			6	(See Notes)	3'-6	140	44.959	
46	-8'-6		180.23	6.2800		3'-6	0.000938	1.517 0.003	Water Supply
			0.00					46.480	Hose Allowance At Source
46			180.23						Total(Pt) Route 1
602	41'-9½	4	13.13	1	(See Notes)	22'-2	150	10.771	• • • • • **Route 2** • • • • •
17	31'-2		13.13	1.1010		5'-0 27'-2	0.031227	4.606 0.848	Sprinkler, T(5'-0)
								16.226	Total(Pt) Route 2
603	41'-9½	4	14.10	1	(See Notes)	25'-10	150	12.429	• • • • • **Route 3** • • • • •
1137	31'-2		14.10	1.1010		5'-0 30'-10	0.035648	4.606 1.098	Sprinkler, T(5'-0)
1137	31'-2			1	(See Notes)	138'-9½	150	18.134	
20	31'-2		12.32	1.1010		5'-0 143'-9½	0.027764	3.992	T(5'-0)
20	31'-2			2		11'-8	150	22.126	
14	31'-2		12.32	2.0030		11'-8	0.001506	0.018	
								22.143	Total(Pt) Route 3
21	1'-8		140.00	6	(See Notes)	0'-0	140	41.854	• • • • • **Route 4** • • • • •
19	1'-8		140.00	6.2800		96'-1½ 96'-1½	0.000588	-0.000 0.056	Hose(48'-10) T(47'-3½)
								41.910	Total(Pt) Route 4
1137	31'-2			1	(See Notes)	11'-8½	150	18.134	• • • • • **Route 5** • • • • •
49	31'-2		1.78	1.1010		5'-0 16'-8½	0.000776	0.013	T(5'-0)
49	31'-2		12.10	1	(See Notes)	32'-1	150	18.147	Flow (q) from Route 1
18	31'-2		15.81	1.1010		17'-0 49'-1	0.044036	2.162	2T(5'-0), E(7'-0)
18	31'-2			1	(See Notes)	127'-10	150	20.309	
12	31'-2		8.66	1.1010		5'-0 132'-10	0.014475	1.923	T(5'-0)

Pipe Information

Node 1 / Node 2	Elev 1 / Elev 2 (Foot)	K-Factor	Flow added this step (q) / Total Flow (Q)	Nominal ID / Actual ID	Fittings & Devices / Equiv. Length (Foot)	Length (Foot) / Fitting (Foot) / Total (Foot)	C Factor / Pf Friction Loss Per Unit (psi)	Total(Pt) / Elev(Pe) / Friction(Pf)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value.
12	31'-2		7.14	2	(See Notes)	6'-9	150	22.231	Flow (q) from Route 6
13	31'-2		15.81	2.0030		11'-0 17'-9	0.002388	0.042	cplg(1'-0), T(10'-0)
								22.274	Total(Pt) Route 5
18	31'-2			1	(See Notes)	144'-1½	150	20.309	• • • • • **Route 6** • • • • •
11	31'-2		7.14	1.1010		45'-0 189'-1½	0.010132	1.916	T(5'-0) 5E(7'-0), T(5'-0)
11	31'-2			2		11'-8½	150	22.225	
12	31'-2		7.14	2.0030		11'-8½	0.000550	0.006	
								22.231	Total(Pt) Route 6

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

(Actual Inside Diameter / Schedule 40 Steel Pipe Inside Diameter) 4.87 = Factor

C Value Multiplier

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
BalV	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				