

JUNIPER VILLAGE BUILDING 200

1208 North Main Steet
Lillington, North Carolina

Hydraulic Calculations

Wayne Automatic Fire Sprinklers Job Number: 1020001



Wayne Automatic Fire Sprinklers, Inc.
4370 Motorsport Drive, Concord NC 28027 - 8977

LOCATION: JUNIPER VILLAGE APTS
PARKER LANE & NORTH MAIN ST

DATE: 3-20-24

TEST MADE BY: P JAMES

TIME: 8:30 AM

REPRESENTATIVE OF: LILLINGTON FIRE DEPT.

WITNESS: JAMES Jammy Re

STATE PURPOSE OF TEST:

CONSUMPTION RATE DURING TEST:

IF PUMPS AFFECT TEST, INDICATE PUMPS OPERATING:

FLOW HYDRANTS: #224 A1 A2 #225 FLOW A3 A4

Size Nozzle: 2.5"

Pilot Reading: 40 psi

Discharge Coefficient: .9 Total GPM

GPM: 1060

STATIC P 80 psi RESIDUAL B 68 psi

PROJECTED RESULTS: At 20 psi Residual gpm, or At psi Residual gpm

REMARKS:

LOCATION MAP: Show line sizes and distance to next cross connected line. Show valves and Hydrant branch size. Indicate North. Show flowing hydrants - Label A1, A2, A3, A4. Show location of Static and Residual - Label B.

Indicate B. Hydrant: Sprinkler: Other (Identify):



Hydraulic Calculations

Wayne Automatic
Fire Sprinklers, Inc.
4370 Motorsport Drive
Concord, NC 28027
704-782-3032

Job Name : Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1
Sheet Number : FP2.2
Location : Building 200
Design Area : Design Area 2.1
Contract : 102001
Data File : Building 200- 3rd Floor - Unit B2 - Common DA 2.1.WXF

HYDRAULIC CALCULATIONS
for

Project name: Juniper Villiage
Location: Building 200
Drawing no: FP2.2
Date: 4-5-2024

Design

Remote area number: Design Area 2.1
Remote area location: Building 200 - 3rd Floor - Unit B2 -Common Area
Occupancy classification: NFPA 13R
Density: .05 - Gpm/SqFt
Area of application: 4 Sprinklers - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: Reliable Mod. F1 Res 44 Residential HSW
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: - GPM
Total water required (including hose streams): 168.7 - GPM @ 68.6 - Psi
Type of system: Wet Residential NFPA 13R
Volume of dry or preaction system: - Gal

Water supply information

Date: 1-18-2023
Location: Parker Lane and North Main Street Hydrant #224
Source: Lillington Fire Department

Name of contractor: Wayne Automatic Fire Sprinklers
Address: 4370 Motorsport Drive / Concord, NC
Phone number: 407-877-5514
Name of designer: Donald Hawkins
Authority having jurisdiction: Town of Lillington
Notes: (Include peaking information for gridded systems here.)
(1) Finished floor elevation is 169. For clarity the finished floor elevation on the hydraulic calculations is shown as 0'-0".
(2) A domestic demand of 103 was added at node point DD1 as required by NFPA 13R Section 9.6.

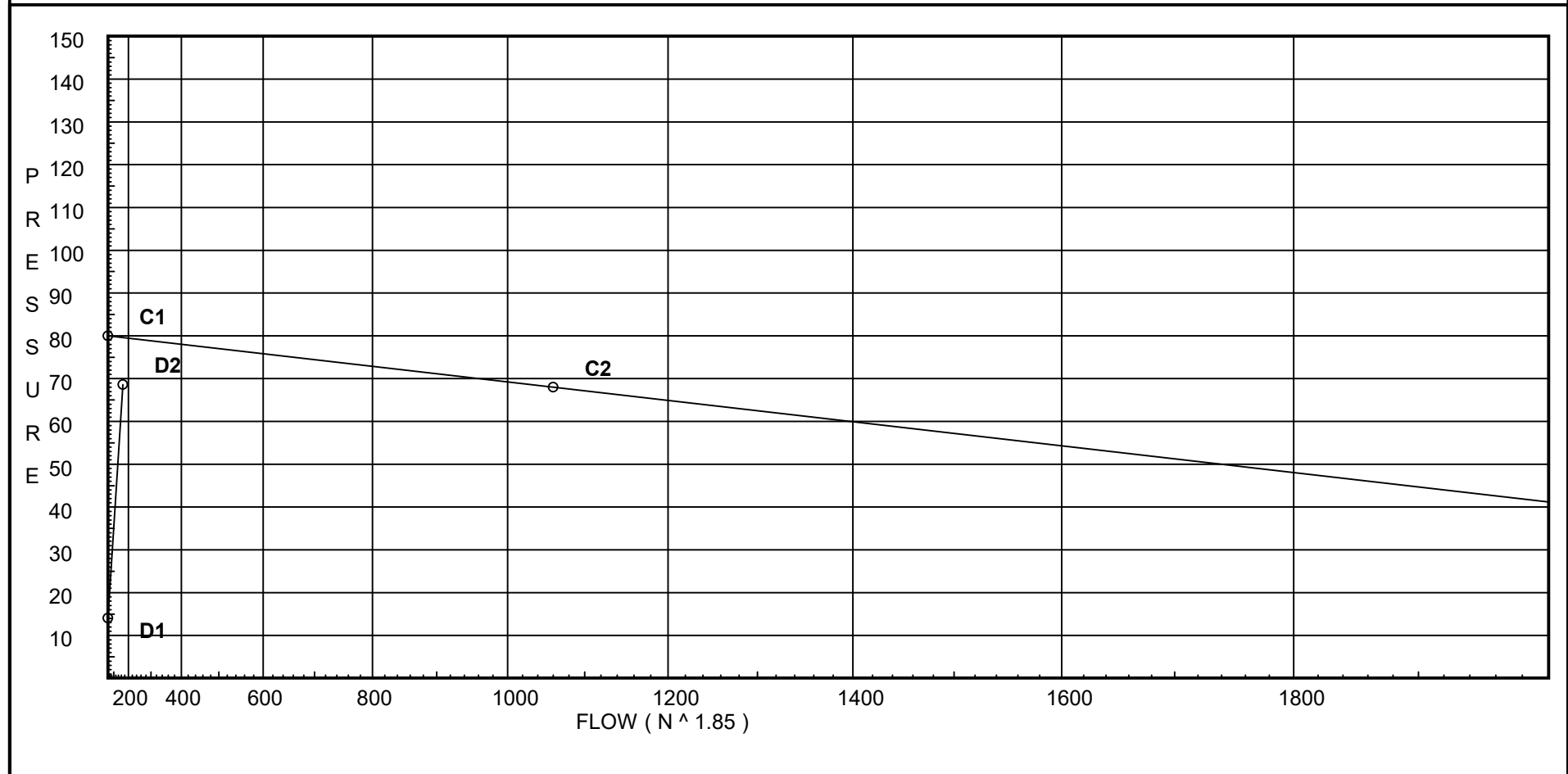
Water Supply Curve C

Wayne Automatic
Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1

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City Water Supply:
C1 - Static Pressure : 80
C2 - Residual Pressure: 68
C2 - Residual Flow : 1060

Demand:
D1 - Elevation : 14.076
D2 - System Flow : 168.751
D2 - System Pressure : 68.641
Hose (Demand) :
D3 - System Demand : 168.751
Safety Margin : 10.958



Fittings Used Summary

Wayne Automatic
 Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1

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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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
L	NFPA 13 Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	NFPA 13 Tee Branch	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U*	CPVC 90' Elbow Tyco	0	4	5	6	7	9	12	13	0	0	0	0	0	0	0	0	0	0	0	0
V*	CPVC Tee Branch Tyco	0	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zai	Ames 4000SS	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.

Pressure / Flow Summary - STANDARD

Wayne Automatic
 Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
A1	27.5	4.4	13.3	na	16.05	0.05	256	13.3
A2	27.5	4.4	15.19	na	17.15	0.05	256	13.3
A3	27.5	4.4	13.9	na	16.41	0.05	256	13.3
A4	27.5	4.4	13.47	na	16.15	0.05	256	13.3
11	19.25		18.58	na				
16	19.25		20.14	na				
62	19.25		21.66	na				
12	19.25		20.69	na				
17	19.25		22.12	na				
13	19.25		19.26	na				
14	19.25		18.77	na				
26	19.25		19.48	na				
18	19.25		20.82	na				
63	19.25		22.66	na				
27	19.25		25.16	na				
28	19.25		30.92	na				
203	19.25		33.66	na				
204	19.25		34.53	na				
202	19.25		37.52	na				
102	9.25		44.97	na				
101	9.25		45.32	na				
100	9.25		48.33	na				
103	9.25		49.35	na				
TR	1.0		54.97	na				
BR	-3.0		57.2	na				
UG2	-3.0		57.21	na				
BFS2	2.0		55.07	na				
BFD2	2.0		65.03	na				
DD2	-3.0		67.22	na	103.0			
M1	-3.0		67.68	na				
M2	-3.0		67.68	na				
M3	-3.0		67.67	na				
M4	-3.0		67.66	na				
M5	-3.0		67.67	na				
CC1	-10.0		70.73	na				
CC2	-10.0		70.73	na				
TEST	-5.0		68.64	na				

The maximum velocity is 17.75 and it occurs in the pipe between nodes 17 and 203

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A1 to 11	16.05 16.05	0.874 150.0 0.1393	U	4.0 0.0 0.0	8.250 4.000 12.250	13.300 3.573 1.707			K Factor = 4.40 Vel = 8.58	
	0.0 16.05						18.580		K Factor = 3.72	
A2 to 12	17.15 17.15	0.874 150.0 0.1576	U	4.0 0.0 0.0	8.250 4.000 12.250	15.189 3.573 1.930			K Factor = 4.40 Vel = 9.17	
	0.0 17.15						20.692		K Factor = 3.77	
A3 to 13	16.41 16.41	0.874 150.0 0.1452	U	4.0 0.0 0.0	8.250 4.000 12.250	13.904 3.573 1.779			K Factor = 4.40 Vel = 8.78	
	0.0 16.41						19.256		K Factor = 3.74	
A4 to 14	16.15 16.15	0.874 150.0 0.1410	U	4.0 0.0 0.0	8.250 4.000 12.250	13.472 3.573 1.727			K Factor = 4.40 Vel = 8.64	
	0.0 16.15						18.772		K Factor = 3.73	
11 to 16	16.05 16.05	0.874 150.0 0.1394	V	3.0 0.0 0.0	8.170 3.000 11.170	18.580 0.0 1.557			Vel = 8.58	
16 to 62	0.0 16.05	0.874 150.0 0.1394		0.0 0.0 0.0	10.920 0.0 10.920	20.137 0.0 1.522			Vel = 8.58	
62 to 17	0.0 16.05	0.874 150.0 0.1393		0.0 0.0 0.0	3.330 0.0 3.330	21.659 0.0 0.464			Vel = 8.58	
	0.0 16.05						22.123		K Factor = 3.41	
12 to 17	17.15 17.15	0.874 150.0 0.1576	U V	4.0 3.0 0.0	2.080 7.000 9.080	20.692 0.0 1.431			Vel = 9.17	
17 to 203	16.04 33.19	0.874 150.0 0.5348	V	3.0 0.0 0.0	18.580 3.000 21.580	22.123 0.0 11.541			Vel = 17.75	
	0.0 33.19						33.664		K Factor = 5.72	
13 to 18	16.41 16.41	0.874 150.0 0.1452	U V	4.0 3.0 0.0	3.750 7.000 10.750	19.256 0.0 1.561			Vel = 8.78	
	0.0 16.41						20.817		K Factor = 3.60	
14 to 26	16.15 16.15	0.874 150.0 0.1412	V	3.0 0.0 0.0	2.000 3.000 5.000	18.772 0.0 0.706			Vel = 8.64	

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
26 to 18	0.0 16.15	0.874 150.0 0.1409	V	3.0 0.0 0.0	6.500 3.000 9.500	19.478 0.0 1.339			Vel = 8.64	
18 to 63	16.41 32.56	0.874 150.0 0.5159		0.0 0.0 0.0	3.580 0.0 3.580	20.817 0.0 1.847			Vel = 17.41	
63 to 27	0.0 32.56	0.874 150.0 0.5159		0.0 0.0 0.0	4.830 0.0 4.830	22.664 0.0 2.492			Vel = 17.41	
27 to 28	0.0 32.56	0.874 150.0 0.5159		0.0 0.0 0.0	11.170 0.0 11.170	25.156 0.0 5.763			Vel = 17.41	
28 to 204	0.0 32.56	0.874 150.0 0.5160	V	3.0 0.0 0.0	4.000 3.000 7.000	30.919 0.0 3.612			Vel = 17.41	
	0.0 32.56					34.531			K Factor = 5.54	
203 to 204	33.19 33.19	1.394 150.0 0.0550		0.0 0.0 0.0	15.750 0.0 15.750	33.664 0.0 0.867			Vel = 6.98	
204 to 202	32.56 65.75	1.394 150.0 0.1949	U	6.0 0.0 0.0	9.330 6.000 15.330	34.531 0.0 2.988			Vel = 13.82	
	0.0 65.75					37.519			K Factor = 10.73	
202 to 102	65.75 65.75	1.394 150.0 0.1950	V	6.0 0.0 0.0	10.000 6.000 16.000	37.519 4.331 3.120			Vel = 13.82	
	0.0 65.75					44.970			K Factor = 9.80	
102 to 101	65.75 65.75	2.003 150.0 0.0334		0.0 0.0 0.0	10.580 0.0 10.580	44.970 0.0 0.353			Vel = 6.69	
101 to 100	0.0 65.75	2.003 150.0 0.0334	V	10.0 0.0 0.0	80.250 10.000 90.250	45.323 0.0 3.011			Vel = 6.69	
100 to 103	0.0 65.75	2.003 150.0 0.0334		0.0 0.0 0.0	30.420 0.0 30.420	48.334 0.0 1.015			Vel = 6.69	
103 to TR	0.0 65.75	2.003 150.0 0.0334	5U	45.0 0.0 0.0	16.500 45.000 61.500	49.349 3.573 2.052			Vel = 6.69	
	0.0 65.75					54.974			K Factor = 8.87	
TR to BR	65.75 65.75	2.003 150.0 0.0334	Z	6.482 0.0 0.0	8.250 6.482 14.732	54.974 1.732 0.492			Vel = 6.69	
BR to UG2	0.0 65.75	4.28 140.0 0.0009	L	10.75 0.0 0.0	4.000 10.750 14.750	57.198 0.0 0.014			Vel = 1.47	

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village - Building 200 - 3rd Floor - Unit B2 - Common - DA 2.1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 65.75					57.212		K Factor = 8.69	
UG2 to BFS2	65.75	4.24 150.0	G L	3.889 11.667	7.080 15.556	57.212 -2.166			
BFS2 to BFS2	65.75	0.0009		0.0	22.636	0.020		Vel = 1.49	
BFS2 to BFD2	0.0 65.75	4.026 120.0	Zai	0.0 0.0	10.000 0.0	55.066 9.950		** Fixed Loss = 9.95	
BFD2 to DD2	65.75	0.0017		0.0	10.000	0.017		Vel = 1.66	
BFD2 to DD2	0.0 65.75	4.24 150.0	L	11.667 0.0	12.580 11.667	65.033 2.166			
DD2 to M4	103.00 168.75	4.24 150.0	G T	3.889 38.891	46.080 42.780	67.219 0.0		Qa = 103.00	
	0.0 168.75					88.860 0.440		Vel = 3.83	
	0.0 168.75					67.659		K Factor = 20.52	
M1 to M2	-61.54	7.98 150.0		0.0 0.0	31.580 0.0	67.678 0.0			
M2 to M3	-61.54	0.0		0.0	31.580	-0.001		Vel = 0.39	
M2 to M3	0.0	7.98 150.0	2F	27.183 0.0	193.580 27.182	67.677 0.0			
M3 to M4	-61.54	0.0		0.0	220.762	-0.007		Vel = 0.39	
M3 to M4	0.0	7.98 150.0	F	13.591 0.0	287.750 13.592	67.670 0.0			
M4 to M5	-61.54 107.21	0.0 0.0001		0.0	301.342	-0.011		Vel = 0.39	
M4 to M5	168.75	7.98 150.0	T	52.855 0.0	76.670 52.855	67.659 0.0			
M5 to M1	107.21	0.0		0.0	129.525	0.013		Vel = 0.69	
M5 to M1	0.0	11.68 150.0	F	17.661 0.0	422.000 17.661	67.672 0.0			
M1 to CC1	107.21	0.0		0.0	439.661	0.006		Vel = 0.32	
M1 to CC1	61.54	11.68 150.0	T G	81.513 8.151	372.830 89.664	67.678 3.032			
CC1 to CC2	168.75	0.0		0.0	462.494	0.017		Vel = 0.51	
CC1 to CC2	0.0	19.76 150.0		0.0 0.0	321.000 0.0	70.727 0.0			
CC2 to TEST	168.75	0.0		0.0	321.000	0.001		Vel = 0.18	
CC2 to TEST	0.0	6.08 140.0	G L	4.038 12.115	65.000 16.153	70.728 -2.166			
	168.75	0.0010		0.0	81.153	0.079		Vel = 1.86	
	0.0 168.75					68.641		K Factor = 20.37	



Hydraulic Calculations

Wayne Automatic
Fire Sprinklers, Inc.
4370 Motorsport Drive
Concord, NC 28027
704-782-3032

Job Name : Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2
Sheet Number : FP 2.2
Location : Building 200
Design Area : Design Area 2.2
Contract : 102001
Data File : Building 200- 3rd Floor - Corridor - DA 2.2.WXF

HYDRAULIC CALCULATIONS
for

Project name: Juniper Village
Location: Building 200
Drawing no: FP 2.2
Date: 4-5-2024

Design

Remote area number: Design Area 2.2
Remote area location: Building 200 - 3rd Floor - Corridor
Occupancy classification: NFPA 13R
Density: .10 - Gpm/SqFt
Area of application: 4 Sprinklers - SqFt
Coverage per sprinkler: 122 - SqFt
Type of sprinklers calculated: Reliable Mod. F3QR Quick Response HSW
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: - GPM
Total water required (including hose streams): 165.3 - GPM @ 46.2 - Psi
Type of system: Wet Residential NFPA 13R
Volume of dry or preaction system: - Gal

Water supply information

Date: 1-18-2023
Location: Parker Lane and North Main Street - Hydrant #224
Source: Lillington Fire Department

Name of contractor: Wayne Automatic Fire Sprinklers
Address: 4370 Motorsport Drive / Concord, NC
Phone number: 704-782-3032
Name of designer: Donald Hawkins
Authority having jurisdiction: Town of Lillington
Notes: (Include peaking information for gridded systems here.)
(1) Finished floor elevation is 136'. For clarity the finished floor elevation on the hydraulic calculations is shown as 0'-0".
(2) A domestic demand of 103 was added at node point DD2 as required by NFPA 13R Section 9.6.

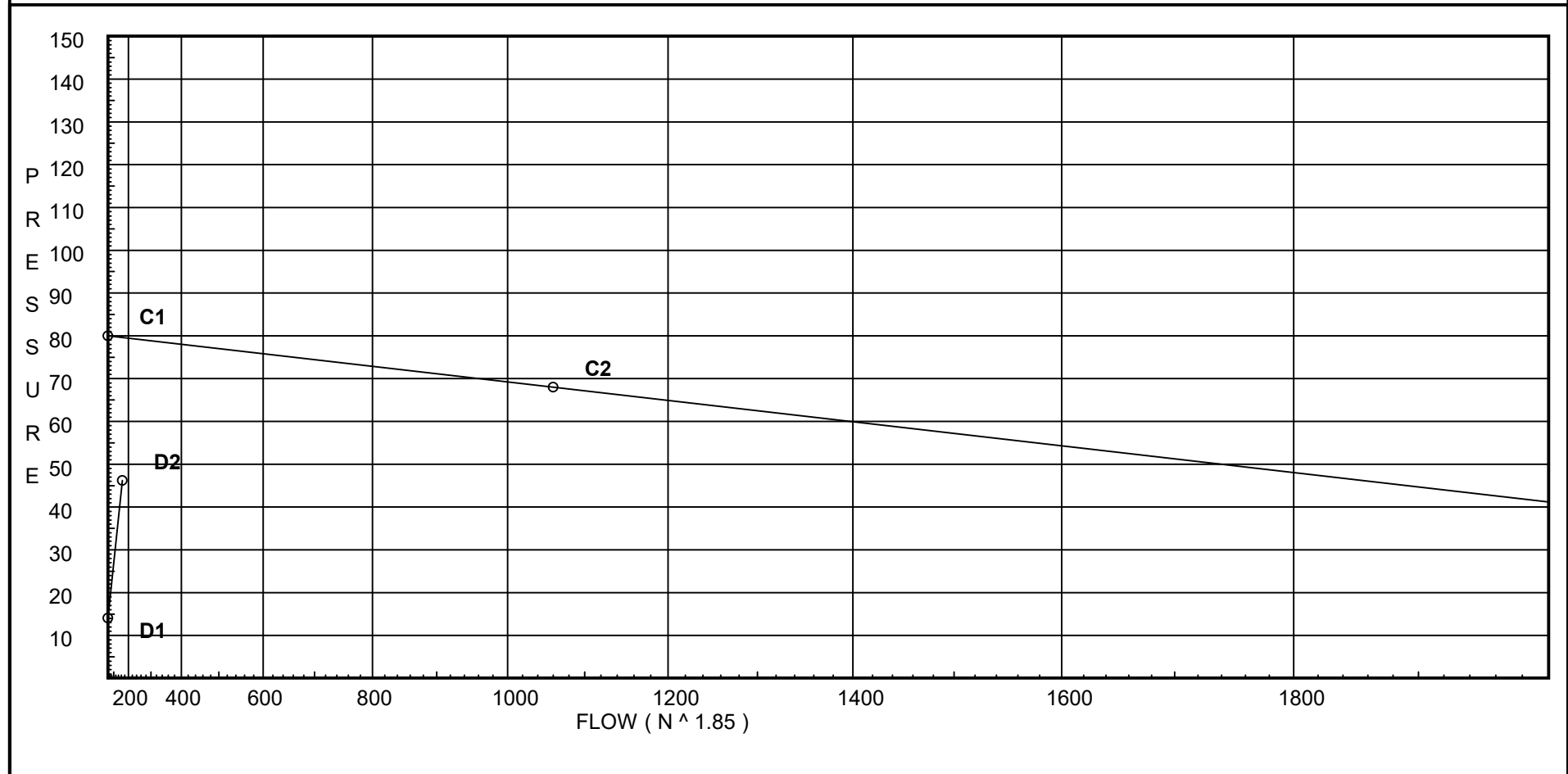
Water Supply Curve C

Wayne Automatic
Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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City Water Supply:
C1 - Static Pressure : 80
C2 - Residual Pressure: 68
C2 - Residual Flow : 1060

Demand:
D1 - Elevation : 14.076
D2 - System Flow : 165.294
D2 - System Pressure : 46.194
Hose (Demand) :
D3 - System Demand : 165.294
Safety Margin : 33.420



Fittings Used Summary

Wayne Automatic
 Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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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
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
L	NFPA 13 Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	NFPA 13 Tee Branch	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U*	CPVC 90' Elbow Tyco	0	4	5	6	7	9	12	13	0	0	0	0	0	0	0	0	0	0	0	0
V*	CPVC Tee Branch Tyco	0	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zai	Ames 4000SS	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.

Pressure / Flow Summary - STANDARD

Wayne Automatic
Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
B1	27.5	5.6	7.4	na	15.23	0.1	122	7.0
B2	27.5	5.6	8.72	na	16.54	0.1	122	7.0
B3	27.5	5.6	7.0	na	14.82	0.1	122	7.0
B4	27.5	5.6	7.87	na	15.71	0.1	122	7.0
21	19.25		13.18	na				
25	19.25		15.19	na				
22	19.25		14.86	na				
36	19.25		17.36	na				
23	19.25		12.05	na				
27	19.25		14.54	na				
24	19.25		13.08	na				
28	19.25		15.88	na				
204	19.25		19.09	na				
201	19.25		19.76	na				
205	19.25		19.21	na				
206	19.25		19.59	na				
207	19.25		20.07	na				
200	19.25		21.64	na				
202	19.25		19.81	na				
102	9.25		24.3	na				
101	9.25		24.39	na				
100	9.25		26.14	na				
103	9.25		27.06	na				
TR	1.0		32.48	na				
BR	-3.0		34.66	na				
UG2	-3.0		34.67	na				
BFS2	2.0		32.53	na				
BFD2	2.0		42.61	na				
DD2	-3.0		44.79	na	103.0			
M1	-3.0		45.24	na				
M2	-3.0		45.23	na				
M3	-3.0		45.23	na				
M4	-3.0		45.22	na				
M5	-3.0		45.23	na				
CC1	-10.0		48.28	na				
CC2	-10.0		48.28	na				
TEST	-5.0		46.19	na				

The maximum velocity is 16.32 and it occurs in the pipe between nodes 28 and 204

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
B1 to 21	15.23	0.874 150.0 0.1266	V U	3.0 4.0 0.0	10.420 7.000 17.420	7.398 3.573 2.205			K Factor = 5.60	
	0.0 15.23						13.176		K Factor = 4.20	
B2 to 22	16.54	0.874 150.0 0.1474	V U	3.0 4.0 0.0	10.420 7.000 17.420	8.722 3.573 2.567			K Factor = 5.60	
	0.0 16.54						14.862		K Factor = 4.29	
B3 to 23	14.82	0.874 150.0 0.1202	U	4.0 0.0 0.0	8.250 4.000 12.250	7.000 3.573 1.473			K Factor = 5.60	
	0.0 14.82						12.046		K Factor = 4.27	
B4 to 24	15.71	0.874 150.0 0.1340	U	4.0 0.0 0.0	8.250 4.000 12.250	7.868 3.573 1.641			K Factor = 5.60	
	0.0 15.71						13.082		K Factor = 4.34	
21 to 25	15.23	0.874 150.0 0.1266	2V	6.0 0.0 0.0	9.920 6.000 15.920	13.176 0.0 2.015				Vel = 8.14
25 to 205	0.0 15.23	0.874 150.0 0.1266	V	3.0 0.0 0.0	28.750 3.000 31.750	15.191 0.0 4.019				Vel = 8.14
	0.0 15.23						19.210		K Factor = 3.47	
22 to 36	16.54	0.874 150.0 0.1474	U V	4.0 3.0 0.0	9.920 7.000 16.920	14.862 0.0 2.494				Vel = 8.85
36 to 205	0.0 16.54	0.874 150.0 0.1474	V	3.0 0.0 0.0	9.580 3.000 12.580	17.356 0.0 1.854				Vel = 8.85
	0.0 16.54						19.210		K Factor = 3.77	
23 to 27	14.82	0.874 150.0 0.1202	U 2V	4.0 6.0 0.0	10.750 10.000 20.750	12.046 0.0 2.495				Vel = 7.93
27 to 28	0.0 14.82	0.874 150.0 0.1202		0.0 0.0 0.0	11.170 0.0 11.170	14.541 0.0 1.343				Vel = 7.93
	0.0 14.82						15.884		K Factor = 3.72	
24 to 28	15.71	0.874 150.0 0.1339	U 2V	4.0 6.0 0.0	10.920 10.000 20.920	13.082 0.0 2.802				Vel = 8.40

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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 Date 4-5-2024

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
28 to 204	14.81 30.52	0.874 150.0 0.4580	V	3.0 0.0 0.0	4.000 3.000 7.000	15.884 0.0 3.206				Vel = 16.32
	0.0 30.52						19.090			K Factor = 6.99
204 to 202	30.52 30.52	1.394 150.0 0.0471	U	6.0 0.0 0.0	9.330 6.000 15.330	19.090 0.0 0.722				Vel = 6.42
	0.0 30.52						19.812			K Factor = 6.86
201 to 205	-18.45 -18.45	1.101 150.0 -0.0586		0.0 0.0 0.0	9.420 0.0 9.420	19.762 0.0 -0.552				Vel = 6.22
205 to 206	31.77 13.32	1.101 150.0 0.0320		0.0 0.0 0.0	12.000 0.0 12.000	19.210 0.0 0.384				Vel = 4.49
206 to 207	0.0 13.32	1.101 150.0 0.0321		0.0 0.0 0.0	14.750 0.0 14.750	19.594 0.0 0.473				Vel = 4.49
207 to 200	0.0 13.32	1.101 150.0 0.0321	U	5.0 0.0 0.0	44.160 5.000 49.160	20.067 0.0 1.576				Vel = 4.49
	0.0 13.32						21.643			K Factor = 2.86
200 to 100	13.32 13.32	1.394 150.0 0.0101	V	6.0 0.0 0.0	10.000 6.000 16.000	21.643 4.331 0.162				Vel = 2.80
	0.0 13.32						26.136			K Factor = 2.61
201 to 101	18.45 18.45	1.394 150.0 0.0186	V	6.0 0.0 0.0	10.000 6.000 16.000	19.762 4.331 0.297				Vel = 3.88
	0.0 18.45						24.390			K Factor = 3.74
202 to 102	30.52 30.52	2.003 150.0 0.0081	V	10.0 0.0 0.0	10.000 10.000 20.000	19.812 4.331 0.162				Vel = 3.11
	0.0 30.52						24.305			K Factor = 6.19
102 to 101	30.52 30.52	2.003 150.0 0.0080		0.0 0.0 0.0	10.580 0.0 10.580	24.305 0.0 0.085				Vel = 3.11
101 to 100	18.46 48.98	2.003 150.0 0.0193	V	10.0 0.0 0.0	80.250 10.000 90.250	24.390 0.0 1.746				Vel = 4.99
100 to 103	13.31 62.29	2.003 150.0 0.0302		0.0 0.0 0.0	30.420 0.0 30.420	26.136 0.0 0.919				Vel = 6.34

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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 Date 4-5-2024

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
103 to TR	0.0 62.29	2.003 150.0 0.0302	5U	45.0 0.0 0.0	16.500 45.000 61.500	27.055 3.573 1.857				Vel = 6.34
	0.0 62.29						32.485			K Factor = 10.93
TR to BR	62.29 62.29	2.003 150.0 0.0302	Z	6.482 0.0 0.0	8.250 6.482 14.732	32.485 1.732 0.445				Vel = 6.34
BR to UG2	0.0 62.29	4.28 140.0 0.0009	L	10.75 0.0 0.0	4.000 10.750 14.750	34.662 0.0 0.013				Vel = 1.39
	0.0 62.29						34.675			K Factor = 10.58
UG2 to BFS2	62.29 62.29	4.24 150.0 0.0008	G L	3.889 11.667 0.0	7.080 15.556 22.636	34.675 -2.166 0.018				Vel = 1.42
BFS2 to BFD2	0.0 62.29	4.026 120.0 0.0015	Zai	0.0 0.0 0.0	10.000 0.0 10.000	32.527 10.067 0.015				* * Fixed Loss = 10.067 Vel = 1.57
BFD2 to DD2	0.0 62.29	4.24 150.0 0.0007	L	11.667 0.0 0.0	12.580 11.667 24.247	42.609 2.166 0.018				Vel = 1.42
DD2 to M4	103.00 165.29	4.24 150.0 0.0048	G T	3.889 38.891 0.0	46.080 42.780 88.860	44.793 0.0 0.423				Qa = 103.00 Vel = 3.76
	0.0 165.29						45.216			K Factor = 24.58
M1 to M2	-60.28 -60.28	7.98 150.0 0.0		0.0 0.0 0.0	31.580 0.0 31.580	45.235 0.0 -0.001				Vel = 0.39
M2 to M3	0.0 -60.28	7.98 150.0 0.0	2F	27.183 0.0 0.0	193.580 27.182 220.762	45.234 0.0 -0.007				Vel = 0.39
M3 to M4	0.0 -60.28	7.98 150.0 0.0	F	13.591 0.0 0.0	287.750 13.592 301.342	45.227 0.0 -0.011				Vel = 0.39
M4 to M5	165.29 105.01	7.98 150.0 0.0001	T	52.855 0.0 0.0	76.670 52.855 129.525	45.216 0.0 0.013				Vel = 0.67
M5 to M1	0.0 105.01	11.68 150.0 0.0	F	17.661 0.0 0.0	422.000 17.661 439.661	45.229 0.0 0.006				Vel = 0.31
M1 to CC1	60.28 165.29	11.68 150.0 0.0	T G	81.513 8.151 0.0	372.830 89.664 462.494	45.235 3.032 0.016				Vel = 0.49
CC1 to CC2	0.0 165.29	19.76 150.0 0.0		0.0 0.0 0.0	321.000 0.0 321.000	48.283 0.0 0.001				Vel = 0.17

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village- Building 200 - 3rd Floor - Corridor - DA 2.2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
CC2	0.0	6.08	G	4.038	65.000	48.284			
to		140.0	L	12.115	16.153	-2.166			
TEST	165.29	0.0009		0.0	81.153	0.076		Vel = 1.83	
	0.0								
	165.29					46.194		K Factor = 24.32	



Hydraulic Calculations

Wayne Automatic
Fire Sprinklers, Inc.
4370 Motorsport Drive
Concord, NC 28027
704-782-3032

Job Name : Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3
Sheet Number : FP2.1
Location : Building 200
Design Area : Design Area 2.3
Contract : 102001
Data File : Building 200- 2nd Floor - Unit C- Common DA 2.3.WXF

HYDRAULIC CALCULATIONS
for

Project name: Juniper Villiage
Location: Building 200
Drawing no: FP2.1
Date: 4-5-2024

Design

Remote area number: Design Area 2.3
Remote area location: Building 200 - 2nd Floor - Unit C Common Area
Occupancy classification: NFPA 13R
Density: .05 - Gpm/SqFt
Area of application: 4 Sprinklers - SqFt
Coverage per sprinkler: 256, 400 - SqFt
Type of sprinklers calculated: Reliable Mod. F1 Res 49 Residential Pendants
No. of sprinklers calculated: 3
In-rack demand: - GPM
Hose streams: - GPM
Total water required (including hose streams): 152.9 - GPM @ 51.1 - Psi
Type of system: Wet Residential NFPA 13R
Volume of dry or preaction system: - Gal

Water supply information

Date: 1-18-2023
Location: Parker Lane and North Main Street Hydrant #224
Source: Lillington Fire Department

Name of contractor: Wayne Automatic Fire Sprinklers
Address: 4370 Motorsport Drive / Concord, NC
Phone number: 704-782-3032
Name of designer: Donald Hawkins
Authority having jurisdiction: Town of Lillington
Notes: (Include peaking information for gridded systems here.)
(1) Finished floor elevation is 169. For clarity the finished floor elevation on the hydraulic calculations is shown as 0'-0".
(2) A domestic demand of 103 was added at node point DD2 as required by NFPA 13R Section 9.6.

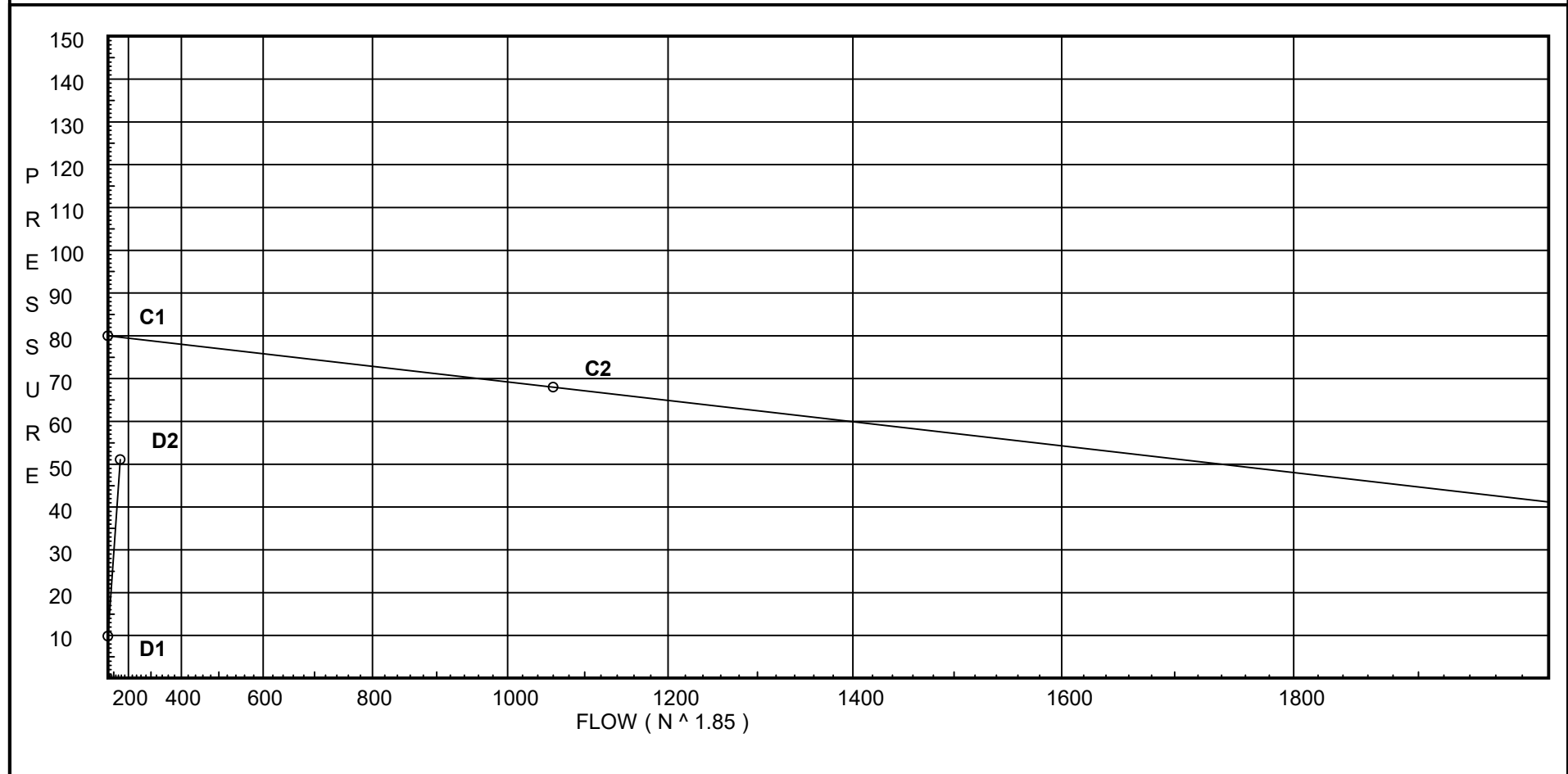
Water Supply Curve C

Wayne Automatic
Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3

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Date 4-5-2024

City Water Supply:
C1 - Static Pressure : 80
C2 - Residual Pressure: 68
C2 - Residual Flow : 1060

Demand:
D1 - Elevation : 9.853
D2 - System Flow : 152.949
D2 - System Pressure : 51.085
Hose (Demand) :
D3 - System Demand : 152.949
Safety Margin : 28.581



Fittings Used Summary

Wayne Automatic
 Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3

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 Date 4-5-2024

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
L	NFPA 13 Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	NFPA 13 Tee Branch	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U*	CPVC 90' Elbow Tyco	0	4	5	6	7	9	12	13	0	0	0	0	0	0	0	0	0	0	0	0
V*	CPVC Tee Branch Tyco	0	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zai	Ames 4000SS	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.

Pressure / Flow Summary - STANDARD

Wayne Automatic
 Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3

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 Date 4-5-2024

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
F1	17.75	4.9	8.56	na	14.34	0.05	256	7.0
F2	17.75	4.9	10.12	na	15.59	0.05	256	7.0
F3	17.75	4.9	16.7	na	20.02	0.05	400	16.7
61	19.25		8.54	na				
16	19.25		8.83	na				
62	19.25		10.06	na				
17	19.25		11.58	na				
63	19.25		17.0	na				
27	19.25		18.01	na				
28	19.25		20.35	na				
203	19.25		21.11	na				
204	19.25		21.82	na				
202	19.25		23.62	na				
102	9.25		29.83	na				
101	9.25		30.04	na				
100	9.25		31.85	na				
103	9.25		32.46	na				
TR	1.0		37.27	na				
BR	-3.0		39.3	na				
UG2	-3.0		39.3	na				
BFS2	2.0		37.15	na				
BFD2	2.0		47.58	na				
DD2	-3.0		49.76	na	103.0			
M1	-3.0		50.14	na				
M2	-3.0		50.14	na				
M3	-3.0		50.13	na				
M4	-3.0		50.12	na				
M5	-3.0		50.13	na				
CC1	-10.0		53.18	na				
CC2	-10.0		53.19	na				
TEST	-5.0		51.09	na				

The maximum velocity is 16 and it occurs in the pipe between nodes 62 and 17

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3

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 Date 4-5-2024

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
F1 to 61	14.34 14.34	0.874 150.0 0.1133	U	4.0 0.0 0.0	1.500 4.000 5.500	8.562 -0.650 0.623			K Factor = 4.90 Vel = 7.67	
	0.0 14.34					8.535			K Factor = 4.91	
F2 to 62	15.59 15.59	0.874 150.0 0.1322	V	3.0 0.0 0.0	1.500 3.000 4.500	10.118 -0.650 0.595			K Factor = 4.90 Vel = 8.34	
	0.0 15.59					10.063			K Factor = 4.91	
F3 to 63	20.02 20.02	0.874 150.0 0.2100	V	3.0 0.0 0.0	1.500 3.000 4.500	16.700 -0.650 0.945			K Factor = 4.90 Vel = 10.71	
	0.0 20.02					16.995			K Factor = 4.86	
61 to 16	14.34 14.34	0.874 150.0 0.1132		0.0 0.0 0.0	2.580 0.0 2.580	8.535 0.0 0.292			Vel = 7.67	
16 to 62	0.0 14.34	0.874 150.0 0.1132		0.0 0.0 0.0	10.920 0.0 10.920	8.827 0.0 1.236			Vel = 7.67	
62 to 17	15.58 29.92	0.874 150.0 0.4416		0.0 0.0 0.0	3.440 0.0 3.440	10.063 0.0 1.519			Vel = 16.00	
17 to 203	0.0 29.92	0.874 150.0 0.4414	V	3.0 0.0 0.0	18.580 3.000 21.580	11.582 0.0 9.526			Vel = 16.00	
	0.0 29.92					21.108			K Factor = 6.51	
63 to 27	20.02 20.02	0.874 150.0 0.2099		0.0 0.0 0.0	4.830 0.0 4.830	16.995 0.0 1.014			Vel = 10.71	
27 to 28	0.0 20.02	0.874 150.0 0.2099		0.0 0.0 0.0	11.170 0.0 11.170	18.009 0.0 2.345			Vel = 10.71	
28 to 204	0.0 20.02	0.874 150.0 0.2100	V	3.0 0.0 0.0	4.000 3.000 7.000	20.354 0.0 1.470			Vel = 10.71	
	0.0 20.02					21.824			K Factor = 4.29	
203 to 204	29.92 29.92	1.394 150.0 0.0455		0.0 0.0 0.0	15.750 0.0 15.750	21.108 0.0 0.716			Vel = 6.29	
204 to 202	20.03 49.95	1.394 150.0 0.1172	U	6.0 0.0 0.0	9.330 6.000 15.330	21.824 0.0 1.797			Vel = 10.50	
	0.0 49.95					23.621			K Factor = 10.28	

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3

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 Date 4-5-2024

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
202 to 102	49.95	1.394 150.0 0.1172	V	6.0 0.0 0.0	10.000 6.000 16.000	23.621 4.331 1.876				Vel = 10.50
	0.0 49.95						29.828			K Factor = 9.15
102 to 101	49.95	2.003 150.0 0.0200		0.0 0.0 0.0	10.580 0.0 10.580	29.828 0.0 0.212				Vel = 5.09
101 to 100	0.0 49.95	2.003 150.0 0.0201	V	10.0 0.0 0.0	80.250 10.000 90.250	30.040 0.0 1.811				Vel = 5.09
100 to 103	0.0 49.95	2.003 150.0 0.0201		0.0 0.0 0.0	30.420 0.0 30.420	31.851 0.0 0.610				Vel = 5.09
103 to TR	0.0 49.95	2.003 150.0 0.0201	5U	45.0 0.0 0.0	16.500 45.000 61.500	32.461 3.573 1.234				Vel = 5.09
	0.0 49.95						37.268			K Factor = 8.18
TR to BR	49.95	2.003 150.0 0.0202	Z	6.482 0.0 0.0	8.250 6.482 14.732	37.268 1.732 0.297				Vel = 5.09
BR to UG2	0.0 49.95	4.28 140.0 0.0005	L	10.75 0.0 0.0	4.000 10.750 14.750	39.297 0.0 0.008				Vel = 1.11
	0.0 49.95						39.305			K Factor = 7.97
UG2 to BFS2	49.95	4.24 150.0 0.0005	G L	3.889 11.667 0.0	7.080 15.556 22.636	39.305 -2.166 0.012				Vel = 1.13
BFS2 to BFD2	0.0 49.95	4.026 120.0 0.0010	Zai	0.0 0.0 0.0	10.000 0.0 10.000	37.151 10.417 0.010				* * Fixed Loss = 10.417 Vel = 1.26
BFD2 to DD2	0.0 49.95	4.24 150.0 0.0005	L	11.667 0.0 0.0	12.580 11.667 24.247	47.578 2.166 0.012				Vel = 1.13
DD2 to M4	103.00 152.95	4.24 150.0 0.0041	G T	3.889 38.891 0.0	46.080 42.780 88.860	49.756 0.0 0.367				Qa = 103.00 Vel = 3.48
	0.0 152.95						50.123			K Factor = 21.60
M1 to M2	-55.78	7.98 150.0 0.0		0.0 0.0 0.0	31.580 0.0 31.580	50.139 0.0 -0.001				Vel = 0.36
M2 to M3	0.0 -55.78	7.98 150.0 0.0	2F	27.183 0.0 0.0	193.580 27.182 220.762	50.138 0.0 -0.006				Vel = 0.36

Final Calculations - Hazen-Williams

Wayne Automatic
 Juniper Village - Building 200 - 2nd Floor - Unit C - Common - DA 2.3

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 Date 4-5-2024

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
M3 to M4	0.0 -55.78	7.98 150.0 0.0	F	13.591 0.0 0.0	287.750 13.592 301.342	50.132 0.0 -0.009		Vel = 0.36	
M4 to M5	152.95 97.17	7.98 150.0 0.0001	T	52.855 0.0 0.0	76.670 52.855 129.525	50.123 0.0 0.010		Vel = 0.62	
M5 to M1	0.0 97.17	11.68 150.0 0.0	F	17.661 0.0 0.0	422.000 17.661 439.661	50.133 0.0 0.006		Vel = 0.29	
M1 to CC1	55.78 152.95	11.68 150.0 0.0	T G	81.513 8.151 0.0	372.830 89.664 462.494	50.139 3.032 0.013		Vel = 0.46	
CC1 to CC2	0.0 152.95	19.76 150.0 0.0		0.0 0.0 0.0	321.000 0.0 321.000	53.184 0.0 0.001		Vel = 0.16	
CC2 to TEST	0.0 152.95	6.08 140.0 0.0008	G L	4.038 12.115 0.0	65.000 16.153 81.153	53.185 -2.166 0.066		Vel = 1.69	
	0.0 152.95					51.085		K Factor = 21.40	



Hydraulic Calculations

Wayne Automatic
Fire Sprinklers, Inc.
4370 Motorsport Drive
Concord, NC 28027
704-782-3032

Job Name : Juniper Village- Building 200 - 3rd Floor - Unit B - Common - DA 2.4
Sheet Number : FP 2.2
Location : Building 200
Design Area : Design Area 2.4
Contract : 102001
Data File : Building 200- 3rd Floor - Unit B - Common - DA 2.4.WXF

HYDRAULIC CALCULATIONS
for

Project name: Juniper Village
Location: Building 200
Drawing no: FP 2.2
Date: 4-5-2024

Design

Remote area number: Design Area 2.4
Remote area location: Building 200 - 3rd Floor - Unit B - Commons
Occupancy classification: NFPA 13R
Density: .10 - Gpm/SqFt
Area of application: 4 Sprinklers - SqFt
Coverage per sprinkler: 122, 87 - SqFt
Type of sprinklers calculated: Reliable Mod. F3QR Quick Response HSW
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: - GPM
Total water required (including hose streams): 174.8 - GPM @ 65.5 - Psi
Type of system: Wet Residential NFPA 13R
Volume of dry or preaction system: - Gal

Water supply information

Date: 1-18-2023
Location: Parker Lane and North Main Street - Hydrant #224
Source: Lillington Fire Department

Name of contractor: Wayne Automatic Fire Sprinklers
Address: 4370 Motorsport Drive / Concord, NC
Phone number: 407-877-5514
Name of designer: Donald Hawkins
Authority having jurisdiction: Town of Lillington
Notes: (Include peaking information for gridded systems here.)
(1) Finished floor elevation is 136'. For clarity the finished floor elevation on the hydraulic calculations is shown as 0'-0".
(2) A domestic demand of 103 was added at node point DD2 as required by NFPA 13R Section 9.6.

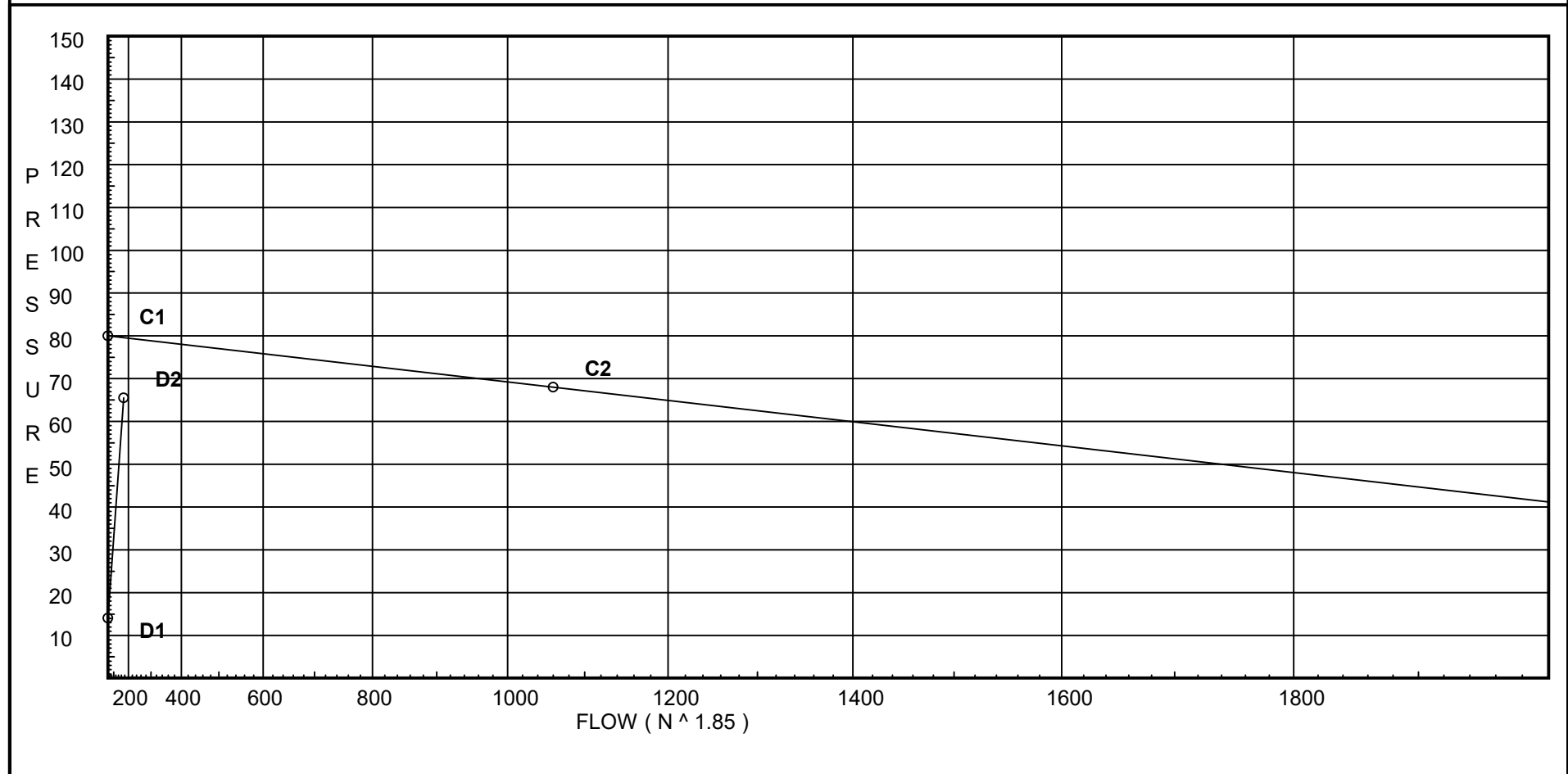
Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 80
C2 - Residual Pressure: 68
C2 - Residual Flow : 1060

Demand:
D1 - Elevation : 14.076
D2 - System Flow : 174.794
D2 - System Pressure : 65.524
Hose (Demand) :
D3 - System Demand : 174.794
Safety Margin : 14.048



Fittings Used Summary

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Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
F	NFPA 13 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
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
L	NFPA 13 Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
T	NFPA 13 Tee Branch	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U*	CPVC 90' Elbow Tyco	0	4	5	6	7	9	12	13	0	0	0	0	0	0	0	0	0	0	0	0
V*	CPVC Tee Branch Tyco	0	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zai	Ames 4000SS	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.

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
H1	27.5	4.4	13.3	na	16.05	0.05	256	13.3
H2	27.5	4.4	19.49	na	19.43	0.05	256	13.3
H3	27.5	4.4	15.73	na	17.45	0.05	256	13.3
H4	27.5	4.4	18.4	na	18.87	0.05	256	13.3
82	19.25		25.5	na				
85	19.25		27.6	na				
81	19.25		18.58	na				
83	19.25		21.29	na				
86	19.25		22.23	na				
84	19.25		24.28	na				
25	19.25		26.38	na				
201	19.25		34.93	na				
205	19.25		32.35	na				
206	19.25		31.24	na				
207	19.25		31.52	na				
200	19.25		38.31	na				
101	9.25		43.37	na				
100	9.25		44.71	na				
103	9.25		45.91	na				
TR	1.0		51.9	na				
BR	-3.0		54.21	na				
UG2	-3.0		54.22	na				
BFS2	2.0		52.08	na				
BFD2	2.0		61.88	na				
DD2	-3.0		64.07	na	103.0			
M1	-3.0		64.56	na				
M2	-3.0		64.55	na				
M3	-3.0		64.55	na				
M4	-3.0		64.53	na				
M5	-3.0		64.55	na				
CC1	-10.0		67.6	na				
CC2	-10.0		67.61	na				
TEST	-5.0		65.52	na				

The maximum velocity is 17.91 and it occurs in the pipe between nodes 86 and 206

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H1 to 81	16.05 16.05	0.874 150.0 0.1393	U	4.0 0.0 0.0	8.250 4.000 12.250	13.300 3.573 1.707			K Factor = 4.40 Vel = 8.58	
	0.0 16.05						18.580		K Factor = 3.72	
H2 to 82	19.43 19.43	0.874 150.0 0.1985	U	4.0 0.0 0.0	8.250 4.000 12.250	19.492 3.573 2.432			K Factor = 4.40 Vel = 10.39	
	0.0 19.43						25.497		K Factor = 3.85	
H3 to 83	17.45 17.45	0.874 150.0 0.1628	U	4.0 0.0 0.0	8.250 4.000 12.250	15.725 3.573 1.994			K Factor = 4.40 Vel = 9.33	
	0.0 17.45						21.292		K Factor = 3.78	
H4 to 84	18.87 18.87	0.874 150.0 0.1882	U	4.0 0.0 0.0	8.250 4.000 12.250	18.398 3.573 2.305			K Factor = 4.40 Vel = 10.09	
	0.0 18.87						24.276		K Factor = 3.83	
82 to 85	19.43 19.43	0.874 150.0 0.1985	V	3.0 0.0 0.0	7.580 3.000 10.580	25.497 0.0 2.100			Vel = 10.39	
85 to 207	0.0 19.43	0.874 150.0 0.1985	V	3.0 0.0 0.0	16.750 3.000 19.750	27.597 0.0 3.920			Vel = 10.39	
	0.0 19.43						31.517		K Factor = 3.46	
81 to 86	16.05 16.05	0.874 150.0 0.1394	V	3.0 0.0 0.0	23.170 3.000 26.170	18.580 0.0 3.648			Vel = 8.58	
	0.0 16.05						22.228		K Factor = 3.40	
83 to 86	17.45 17.45	0.874 150.0 0.1628	V	3.0 0.0 0.0	2.750 3.000 5.750	21.292 0.0 0.936			Vel = 9.33	
86 to 206	16.04 33.49	0.874 150.0 0.5437	V	3.0 0.0 0.0	13.580 3.000 16.580	22.228 0.0 9.015			Vel = 17.91	
	0.0 33.49						31.243		K Factor = 5.99	
84 to 25	18.87 18.87	0.874 150.0 0.1882	2V	6.0 0.0 0.0	5.170 6.000 11.170	24.276 0.0 2.102			Vel = 10.09	
25 to 205	0.0 18.87	0.874 150.0 0.1882	V	3.0 0.0 0.0	28.750 3.000 31.750	26.378 0.0 5.974			Vel = 10.09	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftn'g's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 18.87					32.352		K Factor = 3.32	
201 to 205	-42.46	1.101 150.0 -0.2739	0.0	9.420	34.932	0.0			
205 to 206	-42.46	1.101 150.0 -0.0924	0.0	12.000	32.352	0.0		Vel = 14.31	
206 to 207	-23.59	1.101 150.0 0.0186	0.0	12.000	31.243	0.0		Vel = 7.95	
207 to 200	33.49	1.101 150.0 0.1382	0.0	14.750	31.243	0.0		Vel = 3.34	
	19.43	1.101 150.0 0.1382	U 5.0	44.170	31.517	0.0			Vel = 9.88
	29.33	1.101 150.0 0.1382	V 5.0	10.000	38.310	0.0		K Factor = 4.74	
200 to 100	29.33	1.101 150.0 0.1382	0.0	5.000	38.310	4.331			Vel = 9.88
	0.0 29.33					44.714		K Factor = 4.39	
201 to 101	42.46	1.101 150.0 0.2740	V 5.0	10.000	34.932	4.331			Vel = 14.31
	0.0 42.46					43.373		K Factor = 6.45	
101 to 100	42.46	2.003 150.0 0.0149	V 10.0	80.250	43.373	0.0			Vel = 4.32
100 to 103	42.46	2.003 150.0 0.0393	0.0	90.250	44.714	1.341			Vel = 7.31
103 to TR	29.33	2.003 150.0 0.0393	0.0	30.420	44.714	0.0			Vel = 7.31
	0.0 71.79		5U 45.0	16.500	45.908	3.573			Vel = 7.31
	71.79	2.003 150.0 0.0392	0.0	45.000	51.896	2.415		K Factor = 9.97	
TR to BR	71.79	2.003 150.0 0.0392	Z 6.482	8.250	51.896	1.732			Vel = 7.31
BR to UG2	71.79	4.28 140.0 0.0012	L 10.75	4.000	54.206	0.0			Vel = 1.60
	0.0 71.79					54.223		K Factor = 9.75	
UG2 to BFS2	71.79	4.24 150.0 0.0010	G 3.889 L 11.667	7.080	54.223	-2.166			Vel = 1.63
	71.79	4.24 150.0 0.0010	0.0	22.636	54.223	0.023			Vel = 1.63

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BFS2 to BFD2	0.0 71.79	4.026 120.0 0.0020	Zai	0.0 0.0 0.0	10.000 0.0 10.000	52.080 9.775 0.020			* * Fixed Loss = 9.775 Vel = 1.81	
BFD2 to DD2	0.0 71.79	4.24 150.0 0.0010	L	11.667 0.0 0.0	12.580 11.667 24.247	61.875 2.166 0.024			Vel = 1.63	
DD2 to M4	103.00 174.79	4.24 150.0 0.0053	G T	3.889 38.891 0.0	46.080 42.780 88.860	64.065 0.0 0.469			Qa = 103.00 Vel = 3.97	
	0.0 174.79					64.534			K Factor = 21.76	
M1 to M2	-63.75 -63.75	7.98 150.0 0.0		0.0 0.0 0.0	31.580 0.0 31.580	64.555 0.0 -0.001			Vel = 0.41	
M2 to M3	0.0 -63.75	7.98 150.0 0.0	2F	27.183 0.0 0.0	193.580 27.182 220.762	64.554 0.0 -0.008			Vel = 0.41	
M3 to M4	0.0 -63.75	7.98 150.0 0.0	F	13.591 0.0 0.0	287.750 13.592 301.342	64.546 0.0 -0.012			Vel = 0.41	
M4 to M5	174.80 111.05	7.98 150.0 0.0001	T	52.855 0.0 0.0	76.670 52.855 129.525	64.534 0.0 0.014			Vel = 0.71	
M5 to M1	0.0 111.05	11.68 150.0 0.0	F	17.661 0.0 0.0	422.000 17.661 439.661	64.548 0.0 0.007			Vel = 0.33	
M1 to CC1	63.74 174.79	11.68 150.0 0.0	T G	81.513 8.151 0.0	372.830 89.664 462.494	64.555 3.032 0.018			Vel = 0.52	
CC1 to CC2	0.0 174.79	19.76 150.0 0.0		0.0 0.0 0.0	321.000 0.0 321.000	67.605 0.0 0.001			Vel = 0.18	
CC2 to TEST	0.0 174.79	6.08 140.0 0.0010	G L	4.038 12.115 0.0	65.000 16.153 81.153	67.606 -2.166 0.084			Vel = 1.93	
	0.0 174.79					65.524			K Factor = 21.59	