

. . . Fire Protection by Computer Design

Sprinkler Systems Inc.
2-4 Avon Street
P. O. Box 1285
Lewiston, Maine 04243
207-782-0104

Job Name : SMITH HOUSE SPURWINK
Building :
Location : 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
System : 1 OF 1
Contract : 16-136
Data File : 16136SMITHHOUSESPURWINKA1.WXF

Hydraulic Design Information Sheet

Name - SMITH HOUSE SPURWINK Date - 12-7-2016
 Location - 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
 Building - System No. - 1 OF 1
 Contractor - PC CONSTRUCTION Contract No. - 16-136
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - RESIDENTIAL - LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

M	Area of Sprinkler Operation	- LRG ROOM	System Type	Sprinkler/Nozzle
	Density	- .10	(X) Wet	Make RELIABLE
D	Area Per Sprinkler	- 148.16	() Dry	Model F1FR56
E	Elevation at Highest Outlet	- 126.833	() Deluge	Size 1/2 X 1/2
S	Hose Allowance - Inside	-	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.155 DEG
G	Hose Allowance - Outside	- 100		

N Note DESIGN AREA #1

Calculation Flow Required - 355.217 Press Required - 67.555 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 10-17-2014		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 79	@ Press -	
R	Residual Press - 75	Elev. -	Well
S	Flow - 1491		Proof Flow
U	Elevation - 97.0		

P Location - ON INDUSTRIAL WAY, APPROXIMATELY 1610' AWAY FROM THE BUILDING

L Source of Information - PORTLAND WATER DISTRICT

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

E Horizontal Barriers Provided:

Fittings Used Summary

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	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

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	7.0	na	14.82	0.1	148.162	7.0
TYP1	0.0	5.6	7.0	na	14.82	0.1	148.162	7.0
1	126.833	5.6	7.0	na	14.82	0.1	148.162	7.0
2	118.833	5.6	11.31	na	18.83	0.1	148.162	7.0
3	126.833	5.6	7.02	na	14.84	0.1	148.162	7.0
4	118.833	5.6	11.33	na	18.85	0.1	148.162	7.0
5	126.833	5.6	7.09	na	14.91	0.1	148.162	7.0
6	118.833	5.6	11.41	na	18.92	0.1	148.162	7.0
7	126.833	5.6	7.24	na	15.07	0.1	148.162	7.0
8	118.833	5.6	11.58	na	19.06	0.1	148.162	7.0
A	116.417		15.25	na				
B	116.417		15.28	na				
C	116.417		15.38	na				
D	116.417		15.6	na				
E	107.5		22.12	na				
F	107.5		23.14	na				
9	126.833	5.6	7.7	na	15.54	0.1	148.162	7.0
10	118.833	5.6	12.09	na	19.47	0.1	148.162	7.0
11	126.833	5.6	7.72	na	15.56	0.1	148.162	7.0
12	118.833	5.6	12.12	na	19.49	0.1	148.162	7.0
13	126.833	5.6	7.8	na	15.64	0.1	148.162	7.0
14	118.833	5.6	12.2	na	19.56	0.1	148.162	7.0
15	126.833	5.6	7.96	na	15.8	0.1	148.162	7.0
16	118.833	5.6	12.38	na	19.71	0.1	148.162	7.0
H	116.417		16.26	na				
I	116.417		16.29	na				
J	116.417		16.4	na				
K	116.417		16.63	na				
L	107.5		23.33	na				
M	107.5		24.43	na				
G	107.5		24.62	na				
N	107.5		26.05	na				
17	116.583	5.6	23.86	na	27.35	0.1	148.162	7.0
PP	116.583		24.79	na				
18	117.417	K = K @ DROP	22.53	na	25.83			
S	117.417		23.73	na				
P	116.583		26.48	na				
19	117.417	K = K @ DRP1	23.37	na	25.94			
T	117.417		24.58	na				
Q	16.583		70.66	na				
R	118.625		31.99	na				
U	118.625		33.6	na				
V	118.625		40.29	na				
W	118.625		41.44	na				
X	118.625		41.63	na				
Y	118.625		42.17	na				
Z	118.625		45.08	na				
RT	107.333		57.54	na				
TOV	105.0		61.8	na				
RB	101.0		67.56	na				
X1	101.0		68.2	na	100.0			
X2	97.0		70.26	na				
TEST	97.0		70.59	na				

The maximum velocity is 13.65 and it occurs in the pipe between nodes Q and R

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TYP to DROP	14.82	1.049 120.0 0.0747	T 5.0 0.0 0.0	0.500 5.000 5.500	7.000 0.0 0.411			K Factor = 5.60 Vel = 5.50	
	0.0 14.82				7.411			K Factor = 5.44	
TYP1 to DRP1	14.82	1.049 120.0 0.0746	E 2.0 T 5.0 0.0	1.333 7.000 8.333	7.000 0.0 0.622			K Factor = 5.60 Vel = 5.50	
	0.0 14.82				7.622			K Factor = 5.37	
1 to 2	14.82	1.049 120.0 0.0746	0.0 0.0 0.0	11.333 0.0 11.333	7.000 3.465 0.846			K Factor = 5.60 Vel = 5.50	
2 to A	18.83	1.049 120.0 0.3408	T 5.0 0.0 0.0	3.500 5.000 8.500	11.311 1.046 2.897			K Factor = 5.60 Vel = 12.49	
	0.0 33.65				15.254			K Factor = 8.62	
3 to 4	14.84	1.049 120.0 0.0748	0.0 0.0 0.0	11.333 0.0 11.333	7.020 3.465 0.848			K Factor = 5.60 Vel = 5.51	
4 to B	18.85	1.049 120.0 0.3415	T 5.0 0.0 0.0	3.500 5.000 8.500	11.333 1.046 2.903			K Factor = 5.60 Vel = 12.51	
	0.0 33.69				15.282			K Factor = 8.62	
5 to 6	14.91	1.049 120.0 0.0755	0.0 0.0 0.0	11.333 0.0 11.333	7.091 3.465 0.856			K Factor = 5.60 Vel = 5.53	
6 to C	18.92	1.049 120.0 0.3442	T 5.0 0.0 0.0	3.500 5.000 8.500	11.412 1.046 2.926			K Factor = 5.60 Vel = 12.56	
	0.0 33.83				15.384			K Factor = 8.63	
7 to 8	15.07	1.049 120.0 0.0771	0.0 0.0 0.0	11.333 0.0 11.333	7.242 3.465 0.874			K Factor = 5.60 Vel = 5.59	
8 to D	19.06	1.049 120.0 0.3498	T 5.0 0.0 0.0	3.500 5.000 8.500	11.581 1.046 2.973			K Factor = 5.60 Vel = 12.67	
	0.0 34.13				15.600			K Factor = 8.64	
A to B	33.65	2.635 120.0 0.0038	0.0 0.0 0.0	7.333 0.0 7.333	15.254 0.0 0.028			Vel = 1.98	
B to C	33.69	2.635 120.0 0.0139	0.0 0.0 0.0	7.333 0.0 7.333	15.282 0.0 0.102			Vel = 3.96	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
C	33.83	2.635		7.333	15.384				
to D	101.17	120.0 0.0295		0.0 7.333	0.0 0.216			Vel = 5.95	
D	34.13	2.635	3E	24.711	28.083	15.600			
to E	135.3	120.0 0.0504		0.0 52.794	24.711 2.660	3.862		Vel = 7.96	
E	0.0	2.635		0.0	20.292	22.122			
to F	135.3	120.0 0.0504		0.0 20.292	0.0 1.022	0.0		Vel = 7.96	
F	0.0	2.635	E	8.237	4.542	23.144			
to G	135.3	120.0 0.0504	T	16.474	24.711	0.0		Vel = 7.96	
	0.0								
	135.30					24.618		K Factor = 27.27	
9	15.54	1.049		0.0	11.333	7.704		K Factor = 5.60	
to 10	15.54	120.0 0.0816		0.0 0.0	11.333	3.465		Vel = 5.77	
10	19.48	1.049	T	5.0	3.500	12.094		K Factor = 5.60	
to H	35.02	120.0 0.3668		0.0 0.0	5.000	1.046		Vel = 13.00	
	0.0								
	35.02					16.258		K Factor = 8.69	
11	15.56	1.049		0.0	11.333	7.725		K Factor = 5.60	
to 12	15.56	120.0 0.0818		0.0 0.0	11.333	3.465		Vel = 5.78	
12	19.50	1.049	T	5.0	3.500	12.117		K Factor = 5.60	
to I	35.06	120.0 0.3676		0.0 0.0	5.000	1.046		Vel = 13.02	
	0.0								
	35.06					16.288		K Factor = 8.69	
13	15.64	1.049		0.0	11.333	7.802		K Factor = 5.60	
to 14	15.64	120.0 0.0825		0.0 0.0	11.333	3.465		Vel = 5.81	
14	19.56	1.049	T	5.0	3.500	12.202		K Factor = 5.60	
to J	35.2	120.0 0.3705		0.0 0.0	5.000	1.046		Vel = 13.07	
	0.0								
	35.20					16.397		K Factor = 8.69	
15	15.80	1.049		0.0	11.333	7.965		K Factor = 5.60	
to 16	15.8	120.0 0.0842		0.0 0.0	11.333	3.465		Vel = 5.87	
16	19.71	1.049	T	5.0	3.500	12.384		K Factor = 5.60	
to K	35.51	120.0 0.3765		0.0 0.0	5.000	1.046		Vel = 13.18	
	0.0								
	35.51					16.630		K Factor = 8.71	
H	35.02	2.635		0.0	7.333	16.258			
to I	35.02	120.0 0.0041		0.0 0.0	7.333	0.0		Vel = 2.06	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
I to J	35.06	2.635 120.0		0.0	7.333	16.288 0.0				
J to K	70.08	0.0149		0.0	7.333	0.109		Vel = 4.12		
J to K	35.20	2.635 120.0		0.0	7.333	16.397 0.0				
K to L	105.28	0.0318		0.0	7.333	0.233		Vel = 6.19		
K to L	35.51	2.635 120.0	3E	24.711	27.583	16.630 3.862				
L to M	140.79	0.0542		0.0	52.294	2.836		Vel = 8.28		
L to M	0.0	2.635 120.0		0.0	20.292	23.328 0.0				
M to G	140.79	0.0542		0.0	20.292	1.100		Vel = 8.28		
M to G	0.0	2.635 120.0		0.0	3.500	24.428 0.0				
G to N	140.79	0.0543		0.0	3.500	0.190		Vel = 8.28		
G to N	0.0					24.618		K Factor = 28.38		
G to N	276.09	3.26 120.0	T	20.159	1.250	24.618 0.0				
N to PP	276.09	0.0669		0.0	21.409	1.432		Vel = 10.61		
N to PP	0.0	3.26 120.0	E T	9.408 20.159	10.417 29.567	26.050 -3.934				
PP to PP	276.09	0.0669		0.0	39.984	2.674		Vel = 10.61		
PP to PP	0.0					24.790		K Factor = 55.45		
17 to PP	27.35	1.049 120.0	E	2.0	2.000	23.861 0.0		K Factor = 5.60		
PP to PP	27.35	0.2322		0.0	4.000	0.929		Vel = 10.15		
PP to PP	0.0					24.790		K Factor = 5.49		
PP to P	303.44	3.26 120.0	E	9.408	11.875	24.790 0.0				
P to P	303.44	0.0796		0.0	21.283	1.695		Vel = 11.66		
P to P	0.0					26.485		K Factor = 58.96		
18 to S	25.83	1.049 120.0		0.0	5.750	22.528 0.0		K Factor @ node DROP		
S to P	25.83	0.2090		0.0	5.750	1.202		Vel = 9.59		
S to P	0.0	1.049 120.0	E T	2.0 5.0	4.458 7.000	23.730 0.361				
P to P	25.83	0.2089		0.0	11.458	2.394		Vel = 9.59		
P to P	0.0					26.485		K Factor = 5.02		
P to Q	329.28	3.26 120.0		0.0	9.375	26.485 43.310				
Q to Q	329.28	0.0926		0.0	9.375	0.868		Vel = 12.66		
Q to Q	0.0					70.663		K Factor = 39.17		

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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	*****
19 to T	25.94	1.049 120.0		0.0	5.750	23.368			K Factor @ node DRP1	
	25.94	0.2106		0.0	5.750	1.211			Vel = 9.63	
T to Q	0.0	1.049 120.0	E T	2.0 5.0	4.458 7.000	24.579 43.671				
	25.94	0.2106		0.0	11.458	2.413			Vel = 9.63	
	0.0 25.94					70.663			K Factor = 3.09	
Q to R	355.22	3.26 120.0	E T	9.408 20.159	22.209 29.567	70.663 -44.194				
	355.22	0.1066		0.0	51.776	5.518			Vel = 13.65	
R to U	0.0	3.26 120.0		0.0	15.125	31.987				
	355.22	0.1066		0.0	15.125	1.612			Vel = 13.65	
U to V	0.0	3.26 120.0	2E	18.815 0.0	43.917 18.815	33.599 0.0				
	355.22	0.1066		0.0	62.732	6.687			Vel = 13.65	
V to W	0.0	3.26 120.0		0.0	10.792	40.286				
	355.22	0.1066		0.0	10.792	1.150			Vel = 13.65	
W to X	0.0	3.26 120.0		0.0	1.792	41.436				
	355.22	0.1066		0.0	1.792	0.191			Vel = 13.65	
X to Y	0.0	3.26 120.0		0.0	5.083	41.627				
	355.22	0.1066		0.0	5.083	0.542			Vel = 13.65	
Y to Z	0.0	3.26 120.0	T	20.159 0.0	7.167 20.159	42.169 0.0				
	355.22	0.1066		0.0	27.326	2.912			Vel = 13.65	
Z to RT	0.0	3.26 120.0	2E	18.815 0.0	52.167 18.815	45.081 4.891				
	355.22	0.1066		0.0	70.982	7.565			Vel = 13.65	
RT to TOV	0.0	3.26 120.0	Fsp	0.0 0.0	2.333 0.0	57.537 4.010			** Fixed Loss = 3	
	355.22	0.1067		0.0	2.333	0.249			Vel = 13.65	
TOV to RB	0.0	3.26 120.0	Zac	0.0 0.0	4.000 0.0	61.796 5.332			** Fixed Loss = 3.6	
	355.22	0.1068		0.0	4.000	0.427			Vel = 13.65	
RB to X1	0.0	6.16 140.0	E G	20.084 4.304	110.000 67.425	67.555 0.0				
	355.22	0.0036	T	43.037	177.425	0.641			Vel = 3.82	
X1 to X2	100.00	12.34 140.0	2T	187.534 0.0	1510.000 187.534	68.196 1.732			Qa = 100	
	455.22	0.0002		0.0	1697.534	0.330			Vel = 1.22	
X2 to TEST	0.0	6.16 140.0	T	43.037 0.0	15.000 43.037	70.258 0.0				
	455.22	0.0057		0.0	58.037	0.332			Vel = 4.90	
	0.0									

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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	*****
	455.22				70.590		K Factor =	54.18	

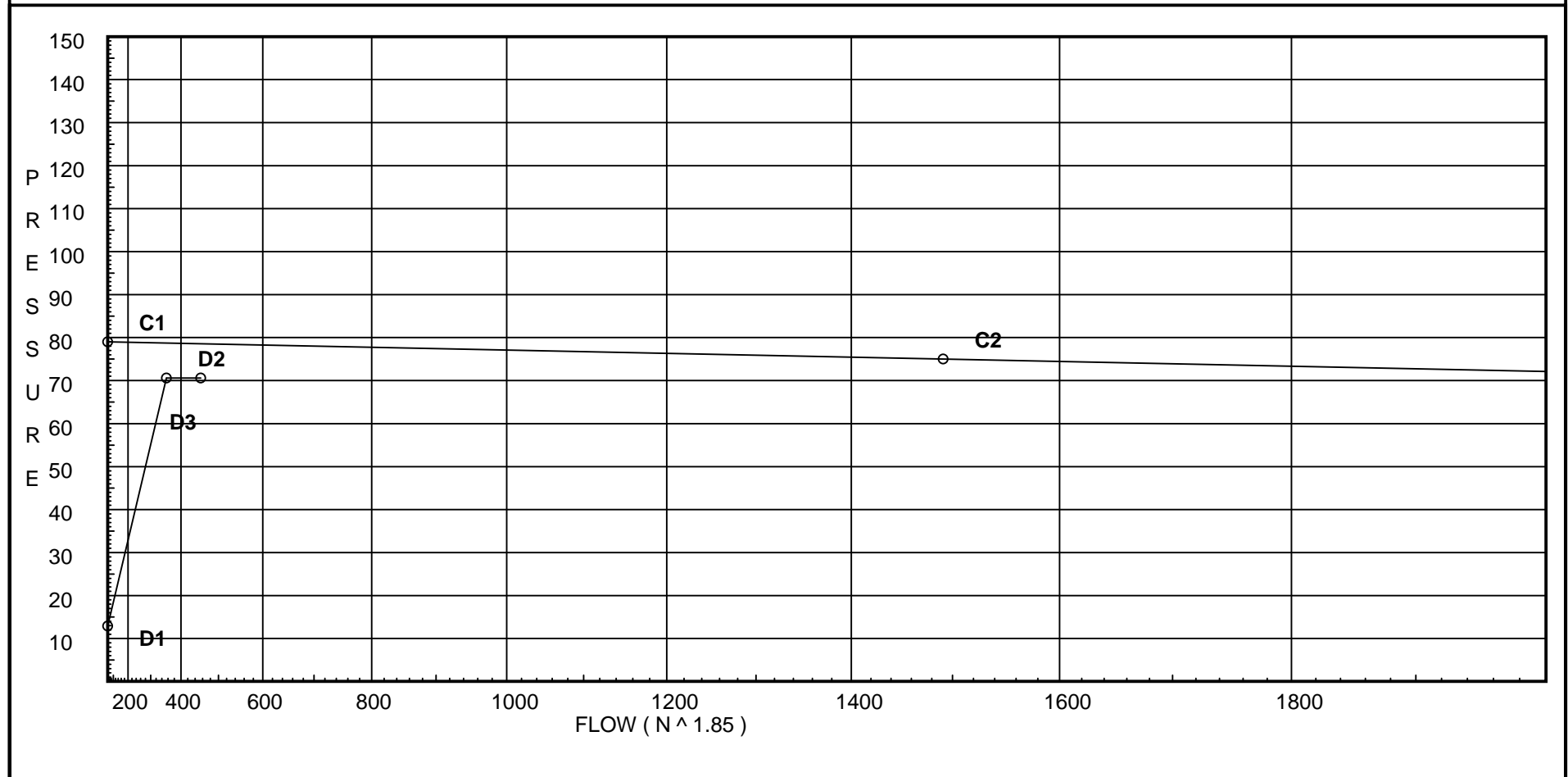
Water Supply Curve C

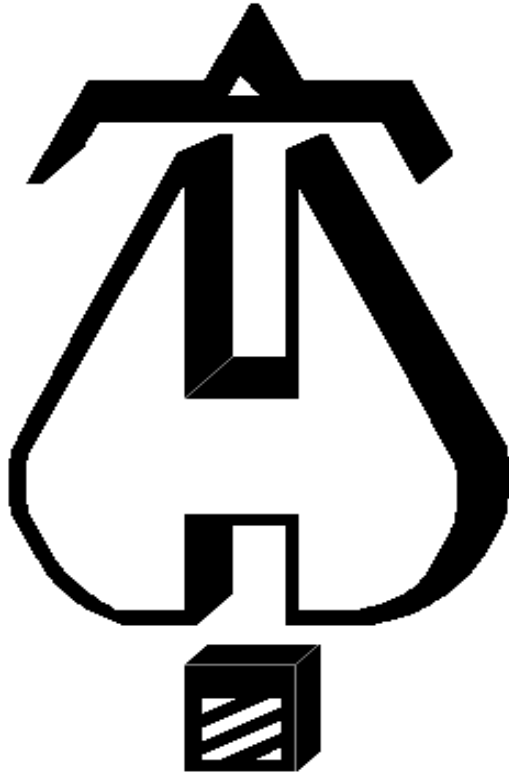
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SMITH HOUSE SPURWINK

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City Water Supply:
C1 - Static Pressure : 79
C2 - Residual Pressure: 75
C2 - Residual Flow : 1491

Demand:
D1 - Elevation : 12.921
D2 - System Flow : 355.217
D2 - System Pressure : 70.590
Hose (Demand) : 100
D3 - System Demand : 455.217
Safety Margin : 7.965





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2-4 Avon Street
P. O. Box 1285
Lewiston, Maine 04243
207-782-0104

Job Name : SMITH HOUSE SPURWINK
Building :
Location : 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
System : 1 OF 1
Contract : 16-136
Data File : 16136SMITHHOUSESPURWINKA2.WXF

Hydraulic Design Information Sheet

Name - SMITH HOUSE SPURWINK Date - 12-7-2016
 Location - 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
 Building - System No. - 1 OF 1
 Contractor - PC CONSTRUCTION Contract No. - 16-136
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - RESIDENTIAL - LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

Area of Sprinkler Operation	System Type	Sprinkler/Nozzle
Density - .10	(X) Wet	Make RELIABLE
Area Per Sprinkler - 163.34	() Dry	Model F1FR56
Elevation at Highest Outlet - 126.667	() Deluge	Size 1/2 X 1/2
Hose Allowance - Inside -	() Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	() Other	Temp.Rat.155 DEG
Hose Allowance - Outside - 100		

N Note DESIGN AREA #2 - 3RD FLOOR LIVING AREA

Calculation Flow Required - 125.881 Press Required - 38.930 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
A Date of Test - 10-17-2014		Cap. -
T Time of Test -	Rated Cap.-	Elev.-
E Static Press - 79	@ Press -	
R Residual Press - 75	Elev. -	Well
Flow - 1491		Proof Flow
S Elevation - 97.0		

U Location - ON INDUSTRIAL WAY, APPROXIMATELY 1610' AWAY FROM THE BUILDING

P Source of Information - PORTLAND WATER DISTRICT

Commodity	Class	Location
Storage Ht.	Area	Aisle W.
Storage Method:	%	Palletized % Rack
() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S R () Double Row	() Slave Pallet	() Solid Shelf () Non
T A () Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

G Horizontal Barriers Provided:

Fittings Used Summary

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	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

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TYP	0.0	5.6	8.51	na	16.33	0.1	163.34	8.508
TYP1	0.0	5.6	8.51	na	16.33	0.1	163.34	8.508
TYP2	0.0	5.6	8.51	na	16.33	0.1	163.34	8.508
TYP3	0.0	5.6	8.51	na	16.33	0.1	163.34	8.508
21	126.667	K = K @ DROP	9.27	na	16.33			
22	126.667	K = K @ DRP1	10.19	na	17.11			
AA	126.667		12.85	na				
23	126.667	K = K @ DROP	11.34	na	18.07			
AB	126.667		12.87	na				
AC	126.667		12.98	na				
24	126.667	K = K @ DRP2	13.03	na	19.32			
25	126.667	K = K @ DROP	9.88	na	16.87			
26	126.667	K = K @ DROP	11.04	na	17.83			
AE	126.667		13.2	na				
27	126.667	K = K @ DRP3	14.79	na	20.36			
R	118.625		23.1	na				
U	118.625		23.34	na				
V	118.625		24.32	na				
W	118.625		24.49	na				
X	118.625		24.52	na				
Y	118.625		24.6	na				
Z	118.625		25.02	na				
RT	107.333		31.02	na				
TOV	105.0		35.07	na				
RB	101.0		38.93	na				
X1	101.0		39.02	na	100.0			
X2	97.0		40.85	na				
TEST	97.0		40.94	na				

The maximum velocity is 12.88 and it occurs in the pipe between nodes 26 and AE

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
TYP to DROP	16.33 16.33	1.049 120.0 0.0895	E T 0.0	2.0 5.0 0.0	1.500 7.000 8.500	8.508 0.0 0.761		K Factor = 5.60 Vel = 6.06	
	0.0 16.33					9.269		K Factor = 5.36	
TYP1 to DRP1	16.33 16.33	1.049 120.0 0.0895	E T 0.0	2.0 5.0 0.0	1.750 7.000 8.750	8.508 0.0 0.783		K Factor = 5.60 Vel = 6.06	
	0.0 16.33					9.291		K Factor = 5.36	
TYP2 to DRP2	16.33 16.33	1.049 120.0 0.0894	E T 0.0	2.0 5.0 0.0	2.000 7.000 9.000	8.508 0.0 0.805		K Factor = 5.60 Vel = 6.06	
	0.0 16.33					9.313		K Factor = 5.35	
TYP3 to DRP3	16.33 16.33	1.049 120.0 0.0895	E T 0.0	2.0 5.0 0.0	4.333 7.000 11.333	8.508 0.0 1.014		K Factor = 5.60 Vel = 6.06	
	0.0 16.33					9.522		K Factor = 5.29	
21 to 22	16.33 16.33	1.049 120.0 0.0894		0.0 0.0 0.0	10.333 0.0 10.333	9.269 0.0 0.924		K Factor @ node DROP Vel = 6.06	
22 to AA	17.11 33.44	1.049 120.0 0.3369	T 0.0 0.0	5.0 0.0 0.0	2.875 5.000 7.875	10.193 0.0 2.653		K Factor @ node DRP1 Vel = 12.41	
AA to AB	0.0 33.44	2.157 120.0 0.0100		0.0 0.0 0.0	2.792 0.0 2.792	12.846 0.0 0.028		Vel = 2.94	
	0.0 33.44					12.874		K Factor = 9.32	
23 to AB	18.07 18.07	1.049 120.0 0.1078	T 0.0 0.0	5.0 0.0 0.0	9.209 5.000 14.209	11.342 0.0 1.532		K Factor @ node DROP Vel = 6.71	
	0.0 18.07					12.874		K Factor = 5.04	
AB to AC	51.51 51.51	2.157 120.0 0.0223		0.0 0.0 0.0	4.709 0.0 4.709	12.874 0.0 0.105		Vel = 4.52	
AC to 24	0.0 51.51	2.157 120.0 0.0225		0.0 0.0 0.0	2.042 0.0 2.042	12.979 0.0 0.046		Vel = 4.52	
24 to AE	19.32 70.83	2.157 120.0 0.0404		0.0 0.0 0.0	4.458 0.0 4.458	13.025 0.0 0.180		K Factor @ node DRP2 Vel = 6.22	
	0.0 70.83					13.205		K Factor = 19.49	
25 to 26	16.87 16.87	1.049 120.0 0.0950		0.0 0.0 0.0	12.209 0.0 12.209	9.882 0.0 1.160		K Factor @ node DROP Vel = 6.26	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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 AE	17.82 34.69	1.049 120.0 0.3605	T	5.0 0.0 0.0	1.000 5.000 6.000	11.042 0.0 2.163			K Factor @ node DROP	
	0.0 34.69						13.205		K Factor = 9.55	
AE to 27	105.52 105.52	2.157 120.0 0.0843	E	6.153 0.0 0.0	12.625 6.153 18.778	13.205 0.0 1.583			Vel = 9.26	
27 to R	20.36 125.88	2.157 120.0 0.1169	2E T	12.307 12.307 0.0	16.709 24.614 41.323	14.788 3.483 4.830			K Factor @ node DRP3	
R to U	0.0 125.88	3.26 120.0 0.0157		0.0 0.0 0.0	15.125 0.0 15.125	23.101 0.0 0.237			Vel = 4.84	
U to V	0.0 125.88	3.26 120.0 0.0156	2E	18.815 0.0 0.0	43.917 18.815 62.732	23.338 0.0 0.981			Vel = 4.84	
V to W	0.0 125.88	3.26 120.0 0.0157		0.0 0.0 0.0	10.792 0.0 10.792	24.319 0.0 0.169			Vel = 4.84	
W to X	0.0 125.88	3.26 120.0 0.0156		0.0 0.0 0.0	1.792 0.0 1.792	24.488 0.0 0.028			Vel = 4.84	
X to Y	0.0 125.88	3.26 120.0 0.0155		0.0 0.0 0.0	5.083 0.0 5.083	24.516 0.0 0.079			Vel = 4.84	
Y to Z	0.0 125.88	3.26 120.0 0.0156	T	20.159 0.0 0.0	7.167 20.159 27.326	24.595 0.0 0.427			Vel = 4.84	
Z to RT	0.0 125.88	3.26 120.0 0.0156	2E	18.815 0.0 0.0	52.167 18.815 70.982	25.022 4.891 1.110			Vel = 4.84	
RT to TOV	0.0 125.88	3.26 120.0 0.0159	Fsp	0.0 0.0 0.0	2.333 0.0 2.333	31.023 4.010 0.037			** Fixed Loss = 3	Vel = 4.84
TOV to RB	0.0 125.88	3.26 120.0 0.0158	Zac	0.0 0.0 0.0	4.000 0.0 4.000	35.070 3.797 0.063			** Fixed Loss = 2.065	Vel = 4.84
RB to X1	0.0 125.88	6.16 140.0 0.0005	E G T	20.084 4.304 43.037	110.000 67.425 177.425	38.930 0.0 0.094			Vel = 1.36	
X1 to X2	100.00 225.88	12.34 140.0 0.0001	2T	187.534 0.0 0.0	1510.000 187.534 1697.534	39.024 1.732 0.090			Qa = 100	Vel = 0.61
X2 to TEST	0.0 225.88	6.16 140.0 0.0016	T	43.037 0.0 0.0	15.000 43.037 58.037	40.846 0.0 0.091			Vel = 2.43	
	0.0									

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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	*****
	225.88				40.937		K Factor =	35.30	

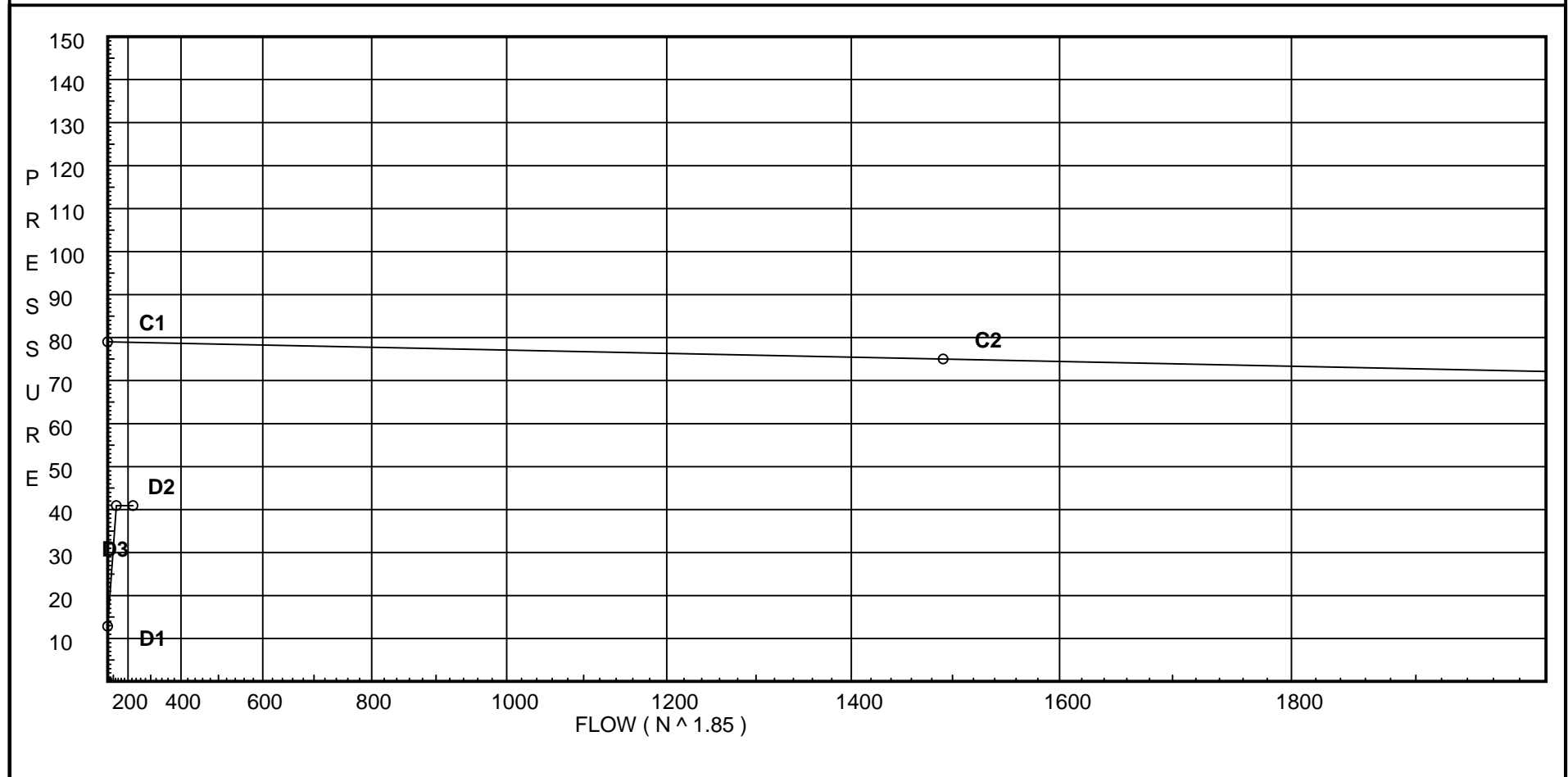
Water Supply Curve C

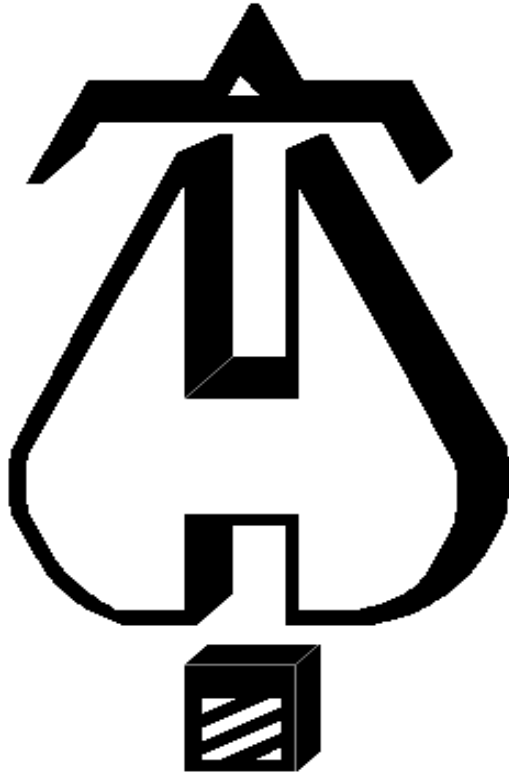
Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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City Water Supply:
C1 - Static Pressure : 79
C2 - Residual Pressure: 75
C2 - Residual Flow : 1491

Demand:
D1 - Elevation : 12.849
D2 - System Flow : 125.881
D2 - System Pressure : 40.937
Hose (Demand) : 100
D3 - System Demand : 225.881
Safety Margin : 37.941





. . . Fire Protection by Computer Design

Sprinkler Systems Inc.
2-4 Avon Street
P. O. Box 1285
Lewiston, Maine 04243
207-782-0104

Job Name : SMITH HOUSE SPURWINK
Building :
Location : 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
System : 1 OF 1
Contract : 16-136
Data File : 16136SMITHHOUSESPURWINKA3.WXF

Hydraulic Design Information Sheet

Name - SMITH HOUSE SPURWINK Date - 12-7-2016
 Location - 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
 Building - System No. - 1 OF 1
 Contractor - PC CONSTRUCTION Contract No. - 16-136
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - ROOF SPACE - LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E

M	Area of Sprinkler Operation - 5 HD CALC	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make TYCO
D	Area Per Sprinkler - 250	() Dry	Model TY3182
E	Elevation at Highest Outlet - 134.75	() Deluge	Size 1/2 X 1/2
S	Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.212 DEG
G	Hose Allowance - Outside - 100		

N

Note DESIGN AREA #3 - ROOF SPACE OVER 3RD FLOOR

Calculation Flow Required - 126.088 Press Required - 53.940 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 10-17-2014		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 79	@ Press -	
R	Residual Press - 75	Elev. -	Well
	Flow - 1491		Proof Flow
S	Elevation - 97.0		

U

P Location - ON INDUSTRIAL WAY, APPROXIMATELY 1610' AWAY FROM THE BUILDING

P

L Source of Information - PORTLAND WATER DISTRICT

Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method: Solid Piled	% Palletized	% Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

O

R	K	Flue Spacing	Clearance:Storage to Ceiling
A		Longitudinal	Transverse

G

E Horizontal Barriers Provided:

Fittings Used Summary

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	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

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
31	134.75	5.6	20.0	na	25.04	0.1	250	20.0
32	134.75	5.6	20.04	na	25.07	0.1	250	20.0
33	134.75	5.6	20.16	na	25.15	0.1	250	20.0
34	134.75	5.6	20.58	na	25.4	0.1	250	20.0
35	134.75	5.6	20.62	na	25.43	0.1	250	20.0
ACT	134.75		20.92	na				
AC	126.667		26.81	na				
24	126.667		27.05	na				
25	126.667		27.57	na				
26	126.667		27.57	na				
AE	126.667		27.57	na				
27	126.667		29.77	na				
R	118.625		38.1	na				
U	118.625		38.34	na				
V	118.625		39.32	na				
W	118.625		39.49	na				
X	118.625		39.52	na				
Y	118.625		39.6	na				
Z	118.625		40.03	na				
RT	107.333		46.03	na				
TOV	105.0		50.08	na				
RB	101.0		53.94	na				
X1	101.0		54.03	na	100.0			
X2	97.0		55.86	na				
TEST	97.0		55.95	na				

The maximum velocity is 11.07 and it occurs in the pipe between nodes ACT and AC

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Date 12-7-2016

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
31 to 32	25.04	2.157 120.0		0.0	6.000	20.000			K Factor = 5.60	
32 to 33	25.04	0.0058		0.0	6.000	0.035			Vel = 2.20	
32 to 33	25.07	2.157 120.0		0.0	6.000	20.035			K Factor = 5.60	
33 to ACT	50.11	0.0213		0.0	6.000	0.128			Vel = 4.40	
33 to ACT	25.15	2.157 120.0	T	12.307	4.458	20.163			K Factor = 5.60	
33 to ACT	75.26	0.0451		0.0	16.765	0.756			Vel = 6.61	
	0.0									
	75.26					20.919			K Factor = 16.45	
34 to 35	25.40	2.157 120.0		0.0	6.000	20.581			K Factor = 5.60	
35 to ACT	25.4	0.0060		0.0	6.000	0.036			Vel = 2.23	
35 to ACT	25.43	2.157 120.0	T	12.307	1.542	20.617			K Factor = 5.60	
35 to ACT	50.83	0.0218		0.0	13.849	0.302			Vel = 4.46	
	0.0									
	50.83					20.919			K Factor = 11.11	
ACT to AC	126.09	2.157 120.0	T	12.307	8.083	20.919				
ACT to AC	126.09	0.1173		0.0	20.390	3.501			Vel = 11.07	
AC to 24	0.0	2.157 120.0		0.0	2.042	26.811				
AC to 24	126.09	0.1170		0.0	2.042	0.239			Vel = 11.07	
24 to AE	0.0	2.157 120.0		0.0	4.458	27.050				
24 to AE	126.09	0.1173		0.0	4.458	0.523			Vel = 11.07	
	0.0									
	126.09					27.573			K Factor = 24.01	
25 to 26	0.0	1.049 120.0		0.0	12.209	27.573				
26 to AE	0.0	0.0		0.0	12.209	0.0			Vel = 0	
26 to AE	0.0	1.049 120.0	T	5.0	1.000	27.573				
26 to AE	0.0	0.0		0.0	5.000	0.0			Vel = 0	
	0.0									
	0.0					27.573			K Factor = 0	
AE to 27	126.09	2.157 120.0	E	6.153	12.625	27.573				
AE to 27	126.09	0.1172		0.0	6.153	0.0			Vel = 11.07	
27 to R	0.0	2.157 120.0	2E T	12.307 12.307	16.709 24.614	29.774 3.483				
27 to R	126.09	0.1172		0.0	41.323	4.844			Vel = 11.07	
R to U	0.0	3.26 120.0		0.0	15.125	38.101				
R to U	126.09	0.0157		0.0	0.0	0.0			Vel = 4.85	
U to V	0.0	3.26 120.0	2E	18.815	43.917	38.339				
U to V	126.09	0.0157		0.0	18.815	0.0			Vel = 4.85	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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	*****
V	0.0	3.26		0.0	10.792	39.323				
to		120.0		0.0	0.0	0.0				
W	126.09	0.0157		0.0	10.792	0.169		Vel =	4.85	
W	0.0	3.26		0.0	1.792	39.492				
to		120.0		0.0	0.0	0.0				
X	126.09	0.0156		0.0	1.792	0.028		Vel =	4.85	
X	0.0	3.26		0.0	5.083	39.520				
to		120.0		0.0	0.0	0.0				
Y	126.09	0.0157		0.0	5.083	0.080		Vel =	4.85	
Y	0.0	3.26	T	20.159	7.167	39.600				
to		120.0		0.0	20.159	0.0				
Z	126.09	0.0157		0.0	27.326	0.428		Vel =	4.85	
Z	0.0	3.26	2E	18.815	52.167	40.028				
to		120.0		0.0	18.815	4.891				
RT	126.09	0.0157		0.0	70.982	1.114		Vel =	4.85	
RT	0.0	3.26	Fsp	0.0	2.333	46.033				
to		120.0		0.0	0.0	4.010		** Fixed Loss =	3	
TOV	126.09	0.0159		0.0	2.333	0.037		Vel =	4.85	
TOV	0.0	3.26	Zac	0.0	4.000	50.080				
to		120.0		0.0	0.0	3.797		** Fixed Loss =	2.065	
RB	126.09	0.0158		0.0	4.000	0.063		Vel =	4.85	
RB	0.0	6.16	E	20.084	110.000	53.940				
to		140.0	G	4.304	67.425	0.0				
X1	126.09	0.0005	T	43.037	177.425	0.094		Vel =	1.36	
X1	100.00	12.34	2T	187.534	1510.000	54.034		Qa =	100	
to		140.0		0.0	187.534	1.732				
X2	226.09	0.0001		0.0	1697.534	0.091		Vel =	0.61	
X2	0.0	6.16	T	43.037	15.000	55.857				
to		140.0		0.0	43.037	0.0				
TEST	226.09	0.0016		0.0	58.037	0.091		Vel =	2.43	
	0.0									
	226.09					55.948		K Factor =	30.23	

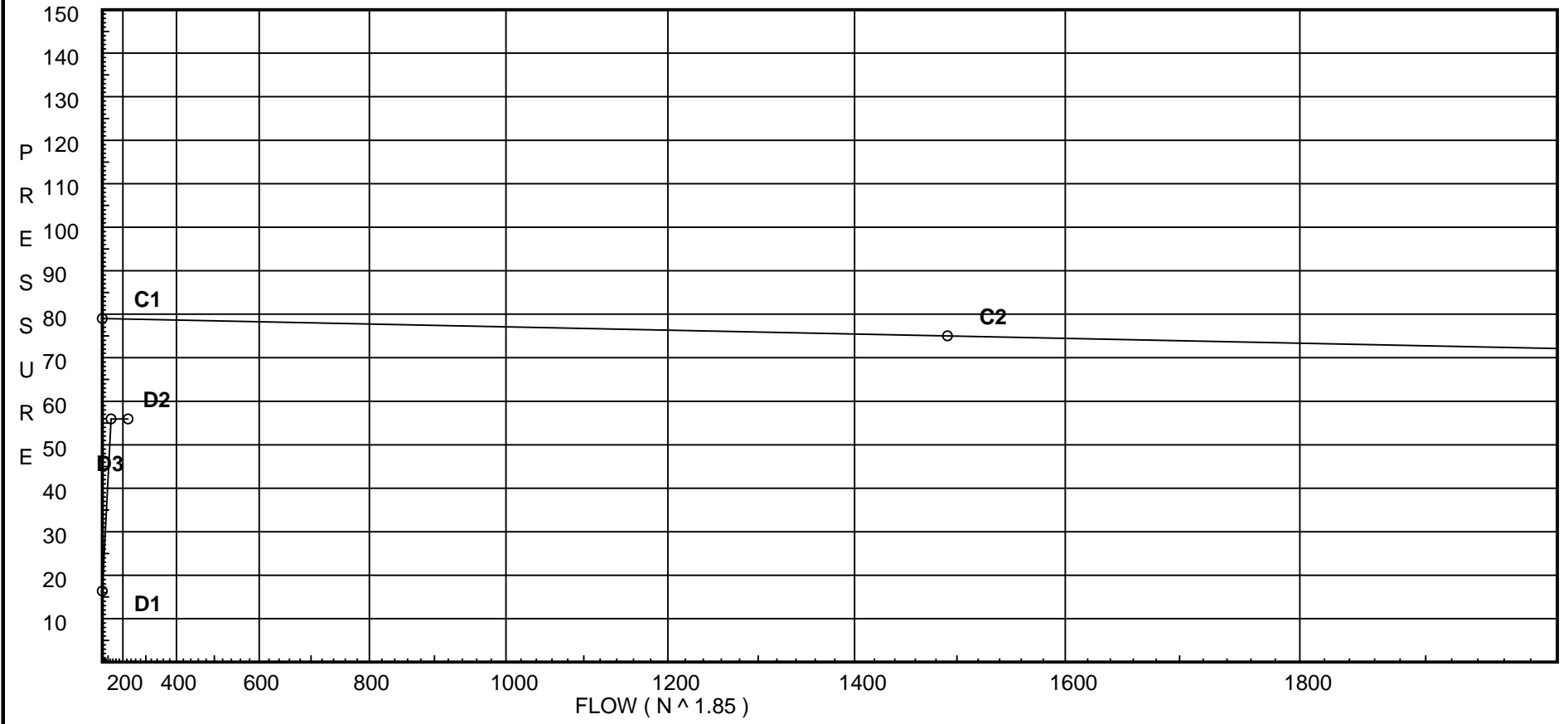
Water Supply Curve C

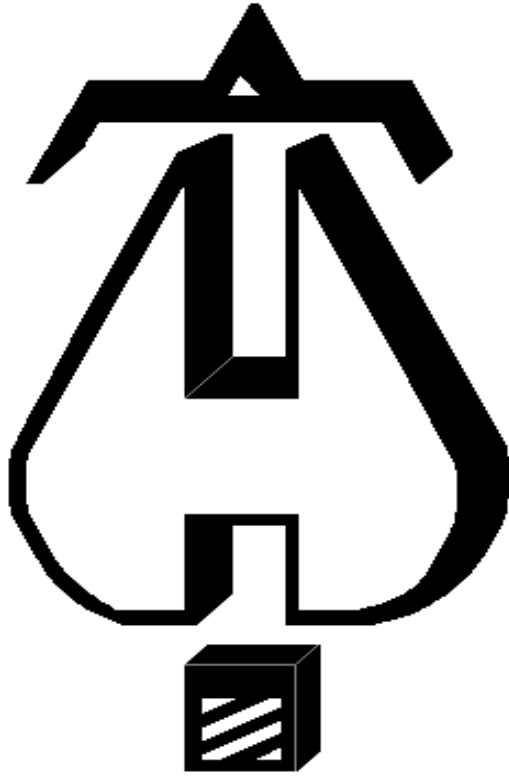
Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Date 12-7-2016

City Water Supply:
C1 - Static Pressure : 79
C2 - Residual Pressure: 75
C2 - Residual Flow : 1491

Demand:
D1 - Elevation : 16.350
D2 - System Flow : 126.088
D2 - System Pressure : 55.948
Hose (Demand) : 100
D3 - System Demand : 226.088
Safety Margin : 22.930





. . . Fire Protection by Computer Design

Sprinkler Systems Inc.
2-4 Avon Street
P. O. Box 1285
Lewiston, Maine 04243
207-782-0104

Job Name : SMITH HOUSE SPURWINK
Building :
Location : 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
System : 1 OF 1
Contract : 16-136
Data File : 16136SMITHHOUSESPURWINKA4.WXF

Hydraulic Design Information Sheet

Name - SMITH HOUSE SPURWINK Date - 12-7-2016
 Location - 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
 Building - System No. - 1 OF 1
 Contractor - PC CONSTRUCTION Contract No. - 16-136
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - ROOF SPACE - LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

E

M	Area of Sprinkler Operation - 5 HD CALC	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make TYCO
D	Area Per Sprinkler - 250	() Dry	Model TY3182
E	Elevation at Highest Outlet - 126.209	() Deluge	Size 1/2 X 1/2
S	Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.212 DEG
G	Hose Allowance - Outside - 100		

N

Note DESIGN AREA #4 - ROOF SPACE OVER 2ND FLOOR

Calculation Flow Required - 126.169 Press Required - 43.375 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 10-17-2014	Rated Cap.-	Cap. -
T	Time of Test -	@ Press -	Elev.-
E	Static Press - 79	Elev. -	Well
R	Residual Press - 75		Proof Flow
	Flow - 1491		
S	Elevation - 97.0		

U

P Location - ON INDUSTRIAL WAY, APPROXIMATELY 1610' AWAY FROM THE BUILDING

P

L Source of Information - PORTLAND WATER DISTRICT

Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method: Solid Piled	% Palletized	% Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row	() Open Shelf	

O

R	K	Flue Spacing	Clearance:Storage to Ceiling
A		Longitudinal	Transverse

G

E Horizontal Barriers Provided:

Fittings Used Summary

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	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

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
36	126.209	5.6	20.0	na	25.04	0.1	250	20.0
37	126.209	5.6	20.04	na	25.07	0.1	250	20.0
38	126.209	5.6	20.16	na	25.15	0.1	250	20.0
39	126.209	5.6	20.43	na	25.31	0.1	250	20.0
40	126.209	5.6	20.9	na	25.6	0.1	250	20.0
XT	126.209		23.33	na				
X	118.625		28.95	na				
Y	118.625		29.03	na				
Z	118.625		29.46	na				
RT	107.333		35.47	na				
TOV	105.0		39.51	na				
RB	101.0		43.37	na				
X1	101.0		43.47	na	100.0			
X2	97.0		45.29	na				
TEST	97.0		45.38	na				

The maximum velocity is 11.08 and it occurs in the pipe between nodes 40 and XT

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
36 to 37	25.04	2.157 120.0		6.000 0.0	20.000 0.0			K Factor = 5.60	
37 to 38	25.04	0.0058		6.000	0.035			Vel = 2.20	
37 to 38	25.07	2.157 120.0		6.000 0.0	20.035 0.0			K Factor = 5.60	
38 to 39	50.11	0.0213		6.000	0.128			Vel = 4.40	
38 to 39	25.15	2.157 120.0		6.000 0.0	20.163 0.0			K Factor = 5.60	
39 to 40	75.26	0.0452		6.000	0.271			Vel = 6.61	
39 to 40	25.31	2.157 120.0		6.000 0.0	20.434 0.0			K Factor = 5.60	
40 to XT	100.57	0.0772		6.000	0.463			Vel = 8.83	
40 to XT	25.60	2.157 120.0	T	12.307 0.0	8.458 12.307	20.897 0.0		K Factor = 5.60	
XT to X	126.17	0.1174		0.0	20.765	2.437		Vel = 11.08	
XT to X	0.0	2.157 120.0	T	12.307 0.0	7.583 12.307	23.334 3.285			
X to Y	126.17	0.1173		0.0	19.890	2.334		Vel = 11.08	
X to Y	0.0	3.26 120.0		0.0 0.0	5.083 0.0	28.953 0.0			
Y to Z	126.17	0.0157		0.0	5.083	0.080		Vel = 4.85	
Y to Z	0.0	3.26 120.0	T	20.159 0.0	7.167 20.159	29.033 0.0			
Z to RT	126.17	0.0157		0.0	27.326	0.429		Vel = 4.85	
Z to RT	0.0	3.26 120.0	2E	18.815 0.0	52.167 18.815	29.462 4.891			
RT to TOV	126.17	0.0157		0.0	70.982	1.114		Vel = 4.85	
RT to TOV	0.0	3.26 120.0	Fsp	0.0 0.0	2.333 0.0	35.467 4.010		** Fixed Loss = 3	
TOV to RB	126.17	0.0159		0.0	2.333	0.037		Vel = 4.85	
TOV to RB	0.0	3.26 120.0	Zac	0.0 0.0	4.000 0.0	39.514 3.797		** Fixed Loss = 2.065	
RB to X1	126.17	0.0160		0.0	4.000	0.064		Vel = 4.85	
RB to X1	0.0	6.16 140.0	E G	20.084 4.304	110.000 67.425	43.375 0.0			
X1 to X2	126.17	0.0005		0.0	43.037	0.094		Vel = 1.36	
X1 to X2	100.00	12.34 140.0	2T	187.534 0.0	1510.000 187.534	43.469 1.732		Qa = 100	
X2 to TEST	226.17	0.0001		0.0	1697.534	0.091		Vel = 0.61	
X2 to TEST	0.0	6.16 140.0	T	43.037 0.0	15.000 43.037	45.292 0.0			
TEST	226.17	0.0016		0.0	58.037	0.091		Vel = 2.43	
	0.0 226.17					45.383		K Factor = 33.57	

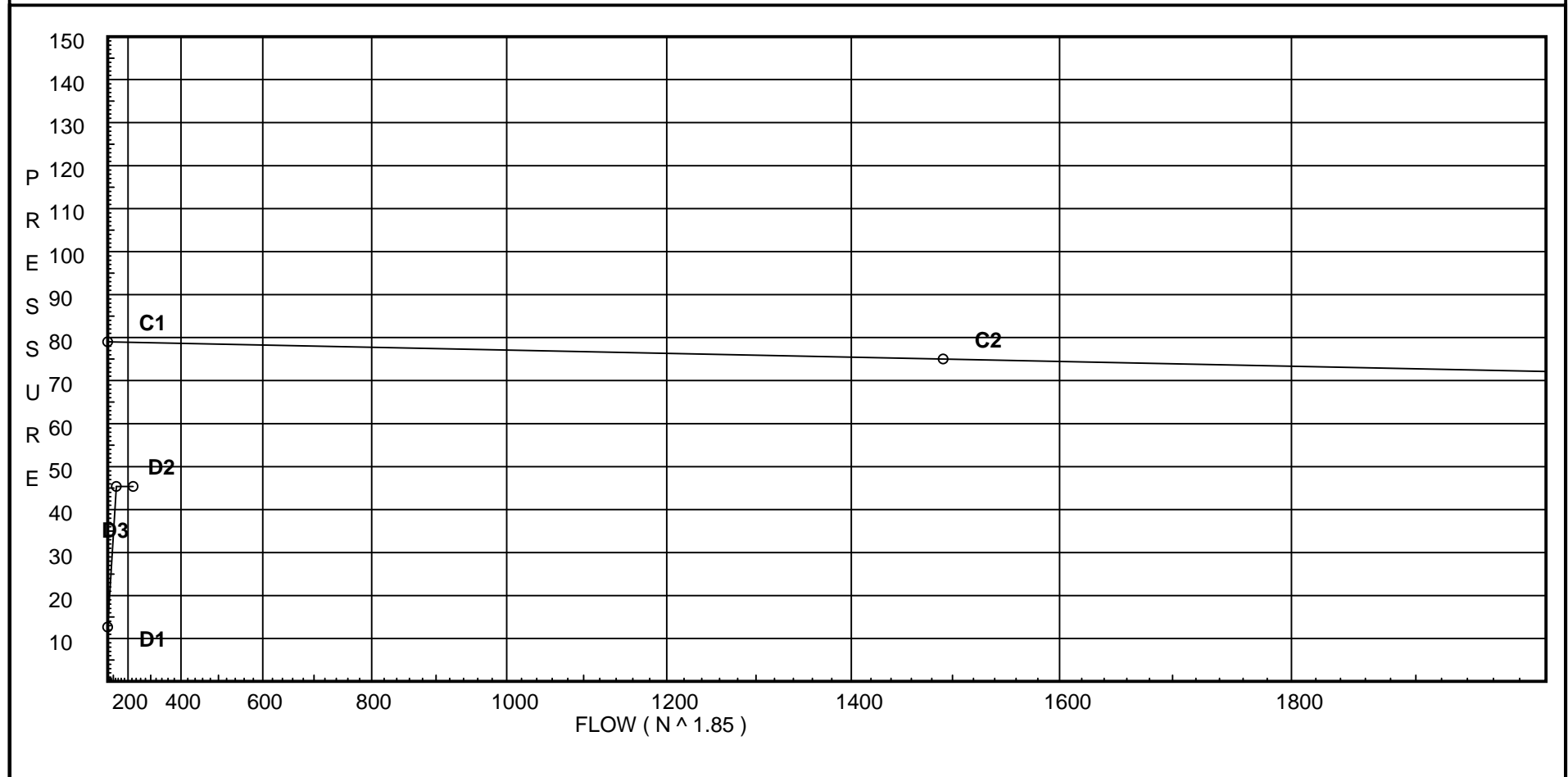
Water Supply Curve C

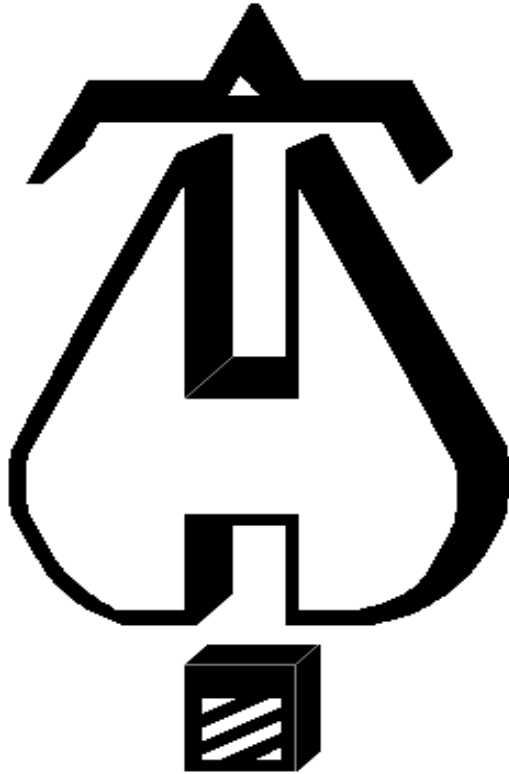
Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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City Water Supply:
C1 - Static Pressure : 79
C2 - Residual Pressure: 75
C2 - Residual Flow : 1491

Demand:
D1 - Elevation : 12.650
D2 - System Flow : 126.169
D2 - System Pressure : 45.383
Hose (Demand) : 100
D3 - System Demand : 226.169
Safety Margin : 33.495





. . . Fire Protection by Computer Design

Sprinkler Systems Inc.
2-4 Avon Street
P. O. Box 1285
Lewiston, Maine 04243
207-782-0104

Job Name : SMITH HOUSE SPURWINK
Building :
Location : 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
System : 1 OF 1
Contract : 16-136
Data File : 16136SMITHHOUSESPURWINKA5.WXF

Hydraulic Design Information Sheet

Name - SMITH HOUSE SPURWINK Date - 12-7-2016
 Location - 899 RIVERSIDE STREET, PORTLAND, MAINE 04103
 Building - System No. - 1 OF 1
 Contractor - PC CONSTRUCTION Contract No. - 16-136
 Calculated By - SCOTT E. GARLAND Drawing No. - 1,2 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - VARIES
 Occupancy - BASEMENT - ORDINARY HAZARD GP 2

S (X) NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 (X) 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other

T Specific Ruling Made By Date

Specific Ruling	Made By	Date
M Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
Density - .20	(X) Wet	Make RELIABLE
D Area Per Sprinkler - 130	() Dry	Model F1FR56
E Elevation at Highest Outlet - 107.333	() Deluge	Size 1/2 X 1/2
S Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I Rack Sprinkler Allowance -	() Other	Temp.Rat.200 DEG
G Hose Allowance - Outside - 250		

N

Note DESIGN AREA #5 - BASEMENT

Calculation Flow Required - 271.684 Press Required - 38.571 AT BASE OF RISER
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
A Date of Test - 10-17-2014		Cap. -
T Time of Test -	Rated Cap.-	Elev.-
E Static Press - 79	@ Press -	
R Residual Press - 75	Elev. -	Well
Flow - 1491		Proof Flow
S Elevation - 97.0		

U

P Location - ON INDUSTRIAL WAY, APPROXIMATELY 1610' AWAY FROM THE BUILDING

P

L Source of Information - PORTLAND WATER DISTRICT

Y

Commodity	Class	Location
Storage Ht.	Area	Aisle W.
Storage Method:	%	Palletized % Rack
() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S R () Double Row	() Slave Pallet	() Solid Shelf () Non
T A () Mult. Row		() Open Shelf

O C

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

G

E Horizontal Barriers Provided:

Fittings Used Summary

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Date 12-7-2016

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
E	NFPA 13 90' Standard Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Fsp	Flow Switch Potter VSR	Fitting generates a Fixed Loss Based on Flow																			
G	NFPA 13 Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	NFPA 13 90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Zac	Ames 2000SS	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

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
51	107.333	5.6	23.3	na	27.03	0.2	130	21.556
52	107.333	5.6	23.78	na	27.31	0.2	130	21.556
53	107.333	5.6	23.78	na	27.31	0.2	130	21.556
54	107.333	5.6	24.27	na	27.59	0.2	130	21.556
55	107.333	5.6	21.56	na	26.0	0.2	130	21.556
56	107.333	5.6	21.92	na	26.22	0.2	130	21.556
57	107.333	5.6	23.22	na	26.98	0.2	130	21.556
58	107.333	5.6	23.52	na	27.16	0.2	130	21.556
59	107.333	5.6	23.91	na	27.38	0.2	130	21.556
60	107.333	5.6	26.29	na	28.71	0.2	130	21.556
BA	107.333		26.23	na				
BC	107.333		26.37	na				
BD	107.333		26.88	na				
RT	107.333		29.99	na				
TOV	105.0		34.15	na				
RB	101.0		38.57	na				
X1	101.0		38.96	na	250.0			
X2	97.0		41.12	na				
TEST	97.0		41.54	na				

The maximum velocity is 15.56 and it occurs in the pipe between nodes 57 and BC

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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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	*****
51 to 52	27.03	1.442 120.0		0.0 0.0	10.000 0.0	23.297 0.0			K Factor = 5.60	
52 to BA	27.03	0.0483		0.0	10.000	0.483			Vel = 5.31	
52 to BA	27.31	1.442 120.0	T	7.432 0.0	6.500 7.432	23.780 0.0			K Factor = 5.60	
	54.34	0.1756		0.0	13.932	2.446			Vel = 10.68	
	0.0 54.34					26.226			K Factor = 10.61	
53 to 54	27.31	1.442 120.0		0.0 0.0	10.000 0.0	23.778 0.0			K Factor = 5.60	
54 to BA	27.31	0.0492		0.0	10.000	0.492			Vel = 5.37	
54 to BA	27.59	1.442 120.0	T	7.432 0.0	3.500 7.432	24.270 0.0			K Factor = 5.60	
	54.9	0.1789		0.0	10.932	1.956			Vel = 10.79	
	0.0 54.90					26.226			K Factor = 10.72	
55 to 56	26.00	1.442 120.0		0.0 0.0	8.000 0.0	21.556 0.0			K Factor = 5.60	
56 to 57	26.0	0.0449		0.0	8.000	0.359			Vel = 5.11	
56 to 57	26.22	1.442 120.0		0.0 0.0	8.000 0.0	21.915 0.0			K Factor = 5.60	
57 to BC	52.22	0.1631		0.0	8.000	1.305			Vel = 10.26	
57 to BC	26.98	1.442 120.0	T	7.432 0.0	1.500 7.432	23.220 0.0			K Factor = 5.60	
	79.2	0.3524		0.0	8.932	3.148			Vel = 15.56	
	0.0 79.20					26.368			K Factor = 15.42	
58 to 59	27.16	1.442 120.0		0.0 0.0	8.000 0.0	23.517 0.0			K Factor = 5.60	
59 to BC	27.16	0.0486		0.0	8.000	0.389			Vel = 5.34	
59 to BC	27.38	1.442 120.0	T	7.432 0.0	6.500 7.432	23.906 0.0			K Factor = 5.60	
	54.54	0.1767		0.0	13.932	2.462			Vel = 10.71	
	0.0 54.54					26.368			K Factor = 10.62	
60 to BD	28.71	1.442 120.0	T	7.432 0.0	3.500 7.432	26.291 0.0			K Factor = 5.60	
	28.71	0.0540		0.0	10.932	0.590			Vel = 5.64	
	0.0 28.71					26.881			K Factor = 5.54	
BA to BC	109.23	3.26 120.0		0.0 0.0	11.875 0.0	26.226 0.0				
BC to BD	109.23	0.0120		0.0	11.875	0.142			Vel = 4.20	
BC to BD	133.74	3.26 120.0		0.0 0.0	9.709 0.0	26.368 0.0				
BD to RT	242.97	0.0528		0.0	9.709	0.513			Vel = 9.34	
BD to RT	28.71	3.26 120.0	E T	9.408 20.159	18.292 29.567	26.881 0.0				
	271.68	0.0649		0.0	47.859	3.106			Vel = 10.44	

Final Calculations - Hazen-Williams

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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Date 12-7-2016

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
RT to TOV	0.0 271.68	3.26 120.0 0.0652	Fsp 0.0 0.0	0.0 0.0 2.333	29.987 4.010 0.152			** Fixed Loss = 3 Vel = 10.44	
TOV to RB	0.0 271.68	3.26 120.0 0.0650	Zac 0.0 0.0	0.0 0.0 4.000	34.149 4.162 0.260			** Fixed Loss = 2.43 Vel = 10.44	
RB to X1	0.0 271.68	6.16 140.0 0.0022	E G T	20.084 4.304 43.037	110.000 67.425 177.425	38.571 0.0 0.391		Vel = 2.92	
X1 to X2	250.00 521.68	12.34 140.0 0.0002	2T 0.0	187.534 0.0 1697.534	1510.000 1.732 0.424	38.962		Qa = 250 Vel = 1.40	
X2 to TEST	0.0 521.68	6.16 140.0 0.0074	T 0.0	43.037 0.0 58.037	15.000 43.037 0.427	41.118 0.0		Vel = 5.62	
	0.0 521.68					41.545		K Factor = 80.94	

Water Supply Curve C

Sprinkler Systems Inc.
SMITH HOUSE SPURWINK

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City Water Supply:
C1 - Static Pressure : 79
C2 - Residual Pressure: 75
C2 - Residual Flow : 1491

Demand:
D1 - Elevation : 4.475
D2 - System Flow : 271.684
D2 - System Pressure : 41.545
Hose (Demand) : 250
D3 - System Demand : 521.684
Safety Margin : 36.882

