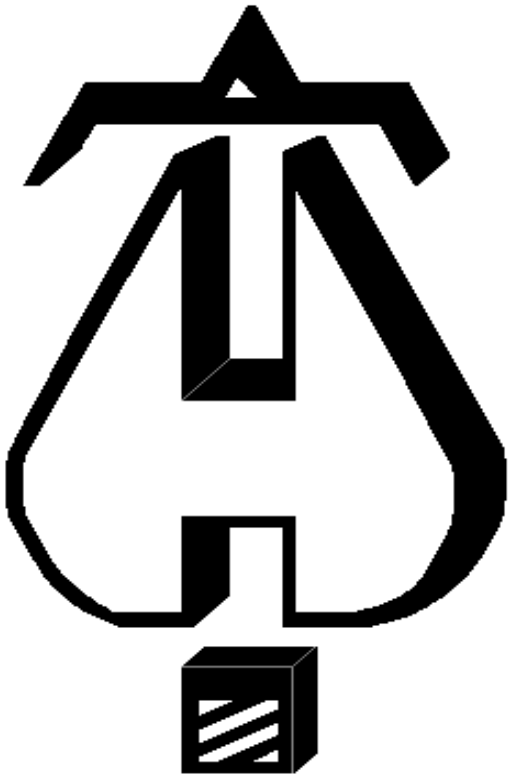


. . . Fire Protection by Computer Design

ALTERNATIVE SPRINKLER
39 JACKSON RD.
POLAND SPRING, ME
04274
207-838-8930

Job Name : 98 WASHINGTON AVE 4TH FL CALC
Building : FP-01
Location : 4TH FLOOR BED ROOM
System : #2
Contract :
Data File : 98 WAHSINGTON AVE 4TH FL CALC.WXF

HYDRAULIC CALCULATIONS
for

Project name: 98 WASHINGTON AVE 4TH FL CALC
Location: 4TH FLOOR BED ROOM
Drawing no: FP-01
Date: 12-2-15

Design

Remote area number: #2
Remote area location: 4TH FLOOR BEDROOM
Occupancy classification: LIGHT HAZARD
Density: .05 - Gpm/SqFt
Area of application: 180 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: RELIABLE RES 44 HSW
No. of sprinklers calculated: 4
In-rack demand: - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 169.91 - GPM@ 79.8641 - Psi
Type of system: NFPA 13 WET SYSTEM
Volume of dry or preaction system: N/A - Gal

Water supply information

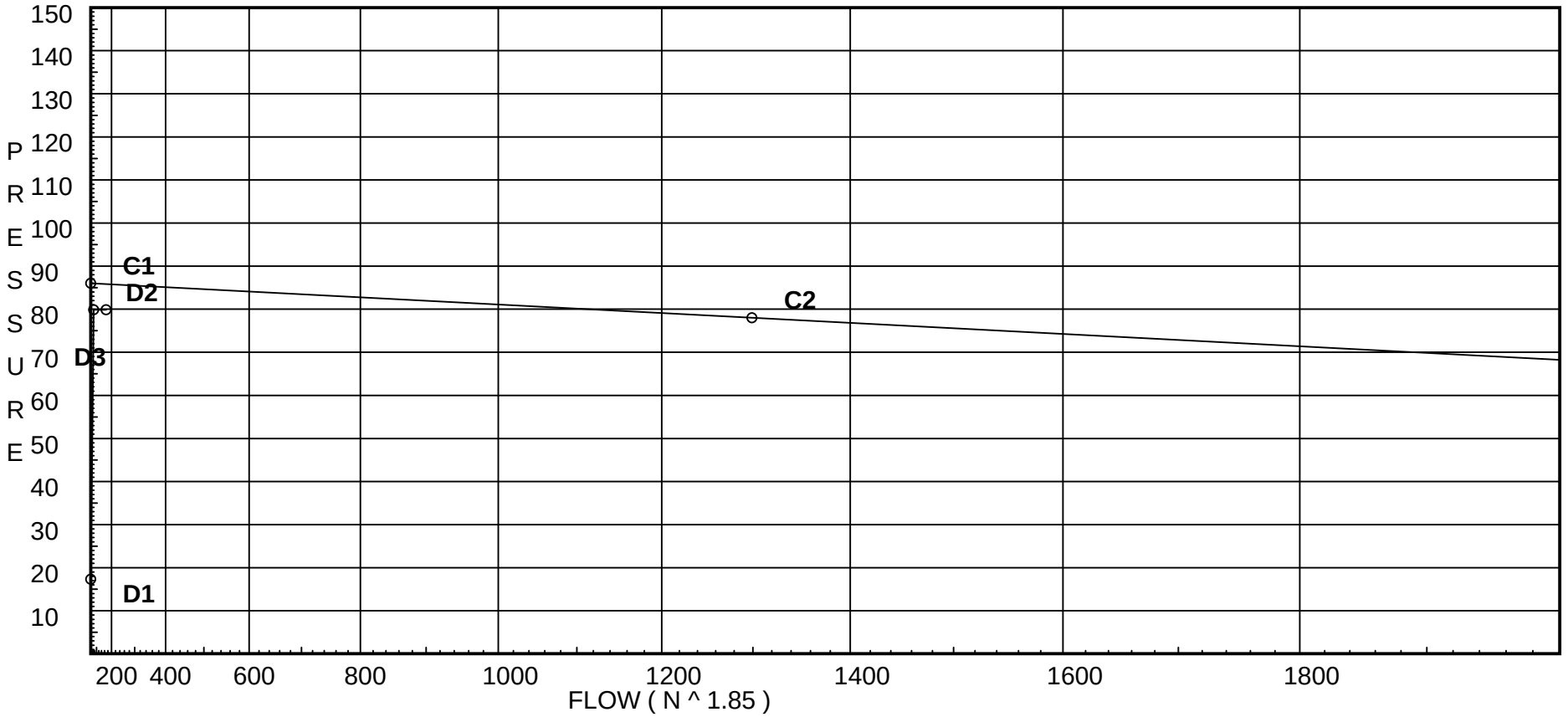
Date: 5-23-15
Location: WASHINGTON AVE
Source: PORTLAND WATER DEPT.

Name of contractor: ALTERNATIVE SPRINKLER
Address: 39 JACKSON RD. / POLAND SPRING, ME / 04274
Phone number: 207-838-8930
Name of designer: TIM FORTIN
Authority having jurisdiction: STATE OF MAINE / CITY OF PORTLAND
Notes: (Include peaking information or gridded systems here.)

City Water Supply:
- C1 - Static Pressure : 86
- C2 - Residual Pressure: 78
- C2 - Residual Flow : 1299

Demand:

D1 - Elevation	:	17.324
D2 - System Flow	:	69.91
D2 - System Pressure	:	79.864
Hose (Adj City)	:	
Hose (Demand)	:	100
D3 - System Demand	:	169.91
Safety Margin	:	5.950



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	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	90' Flow Thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zik	Wilkins 950XL	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.

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	40.0	4.4	13.3	na	16.05	0.05	256	13.3
3	40.0	4.4	13.38	na	16.1	0.05	256	13.3
2	40.0		13.86	na				
5	40.0	4.4	16.41	na	17.83	0.05	256	13.3
4	40.0		16.99	na				
6	40.0	4.4	20.54	na	19.94	0.05	256	13.3
7	40.0		21.73	na				
8	40.0		21.95	na				
9	40.0		24.45	na				
10	32.0		32.76	na				
11	32.0		35.19	na				
12	32.0		42.47	na				
13	24.0		48.55	na				
14	24.0		51.66	na				
15	24.0		54.28	na				
16	16.0		58.85	na				
17	16.0		61.47	na				
TOR	8.0		66.63	na				
BOR	8.0		73.52	na				
UG	1.0		79.43	na				
TEST	0.0		79.86	na	100.0			

The maximum velocity is 18.55 and it occurs in the pipe between nodes 4 and 8

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
1	16.05	1.049	1T	5.0	1.500	13.300		K Factor = 4.40
to		120.0		0.0	5.000	0.0		
2	16.05	0.0866		0.0	6.500	0.563		Vel = 5.96
	0.0							
	16.05					13.863		K Factor = 4.31
3	16.10	1.049	1T	5.0	0.500	13.384		K Factor = 4.40
to		120.0		0.0	5.000	0.0		
2	16.1	0.0871		0.0	5.500	0.479		Vel = 5.98
2	16.04	1.049	2E	4.0	6.000	13.863		
to		120.0		0.0	4.000	0.0		
4	32.14	0.3130		0.0	10.000	3.130		Vel = 11.93
	0.0							
	32.14					16.993		K Factor = 7.80
5	17.83	1.049	1T	5.0	0.500	16.415		K Factor = 4.40
to		120.0		0.0	5.000	0.0		
4	17.83	0.1051		0.0	5.500	0.578		Vel = 6.62
4	32.14	1.049	1T	5.0	2.000	16.993		
to		120.0		0.0	5.000	0.0		
8	49.97	0.7081		0.0	7.000	4.957		Vel = 18.55
	0.0							
	49.97					21.950		K Factor = 10.67
6	19.94	1.049	1E	2.0	7.200	20.538		K Factor = 4.40
to		120.0		0.0	2.000	0.0		
7	19.94	0.1293		0.0	9.200	1.190		Vel = 7.40
7	0.0	1.38	1T	6.0	0.500	21.728		
to		120.0		0.0	6.000	0.0		
8	19.94	0.0342		0.0	6.500	0.222		Vel = 4.28
	0.0							
	19.94					21.950		K Factor = 4.26
8	69.91	1.38	1E	3.0	4.200	21.950		
to		120.0		0.0	3.000	0.0		
9	69.91	0.3465		0.0	7.200	2.495		Vel = 15.00
9	0.0	1.38	1T	6.0	8.000	24.445		
to		120.0		0.0	6.000	3.465		
10	69.91	0.3466		0.0	14.000	4.853		Vel = 15.00
10	0.0	1.38	1T	6.0	1.000	32.763		
to		120.0		0.0	6.000	0.0		
11	69.91	0.3466		0.0	7.000	2.426		Vel = 15.00
11	0.0	1.38	1T	6.0	15.000	35.189		
to		120.0		0.0	6.000	0.0		
12	69.91	0.3466		0.0	21.000	7.279		Vel = 15.00

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
12	0.0	1.61	1T	8.0	8.000	42.468		
to		120.0		0.0	8.000	3.465		
13	69.91	0.1636		0.0	16.000	2.617		Vel = 11.02
13	0.0	1.61	1T	8.0	7.000	48.550		
to		120.0	1E	4.0	12.000	0.0		
14	69.91	0.1636		0.0	19.000	3.109		Vel = 11.02
14	0.0	1.61	1T	8.0	8.000	51.659		
to		120.0		0.0	8.000	0.0		
15	69.91	0.1636		0.0	16.000	2.618		Vel = 11.02
15	0.0	1.61	1E	4.0	2.800	54.277		
to		120.0		0.0	4.000	3.465		
16	69.91	0.1635		0.0	6.800	1.112		Vel = 11.02
16	0.0	1.61	1T	8.0	8.000	58.854		
to		120.0		0.0	8.000	0.0		
17	69.91	0.1636		0.0	16.000	2.618		Vel = 11.02
17	0.0	2.067	1T	10.0	25.000	61.472		
to		120.0		0.0	10.000	3.465		
TOR	69.91	0.0485		0.0	35.000	1.696		Vel = 6.68
TOR	0.0	2.067	1G	1.0	7.000	66.633		
to		120.0	1Z	5.0	6.000	6.259		* Fixed loss = 6.259
BOR	69.91	0.0484	1Zik	0.0	13.000	0.629		Vel = 6.68
BOR	0.0	1.917	1E	3.464	30.000	73.521		
to		120.0	1T	6.929	11.086	3.032		
UG	69.91	0.0699	1G	0.693	41.086	2.873		Vel = 7.77
UG	0.0	11.938	1E	27.0	400.000	79.426		
to		120.0	1T	60.0	87.000	0.433		
TEST	69.91	0.0		0.0	487.000	0.005		Vel = 0.20
	100.00							Qa = 100.00
	169.91					79.864		K Factor = 19.01