

. . . Fire Protection by Computer Design

Eastern Fire Protection
170 Kitty Hawk Ave.
P.O. Box 1390
Auburn, Maine, 04211
207-784-1507

Job Name : MARGINAL WAY #5378 BUILDING A
Drawing : 1 OF 1
Location : KENNEBEC ST., PORTLAND, MAINE
Remote Area : BUILDING A
Contract : 5378
Data File : MARGINAL WAY #5378 BUILDING A.WXF

HYDRAULIC CALCULATIONS
for

Project name: MARGINAL WAY #5378 BUILDING A
Location: KENNEBEC ST., PORTLAND, MAINE
Drawing no: 1 OF 1
Date: 10/29/15

Design

Remote area number: BUILDING A
Remote area location: TENANT SPACE 5, BUILDING A
Occupancy classification: ORDINARY HAZARD II
Density: .2 - Gpm/SqFt
Area of application: 1086 - SqFt
Coverage per sprinkler: 117 - SqFt
Type of sprinklers calculated: RELIABLE F1FR 3/4" K=8.0
No. of sprinklers calculated: 10
In-rack demand: - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 501.198 - GPM @ 56.56 - Psi
Type of system: WET
Volume of dry or preaction system: NA - Gal

Water supply information

Date: 09/13/2011
Location: HYDRANT LOCATED ON KENNEBEC STREET
Source: PORTLAND WATER DISTRICT

Name of contractor: Eastern Fire Protection
Address: 170 Kitty Hawk Ave. / P.O. Box 1390 / Auburn, Maine, 04211
Phone number: 207-784-1507
Name of designer: WAF
Authority having jurisdiction: STATE FIRE MARSHAL
Notes: (Include peaking information or gridded systems here.)
REMOTE AREA REDUCED PER NFPA 13 (2007)SECTION 11.2.3.2.3.1

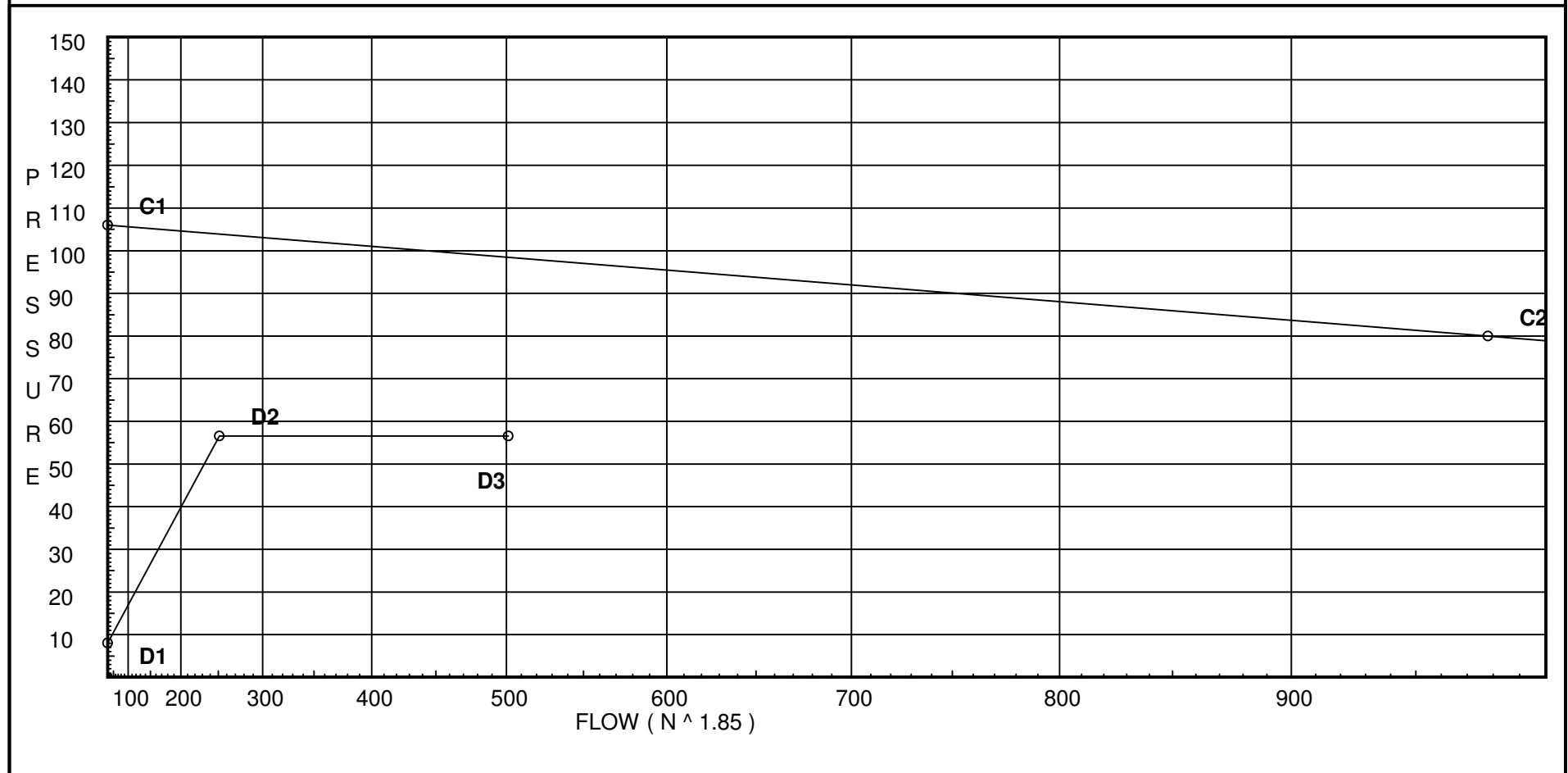
Water Supply Curve C

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City Water Supply:
C1 - Static Pressure : 106
C2 - Residual Pressure: 80
C2 - Residual Flow : 978

Demand:
D1 - Elevation : 8.082
D2 - System Flow : 251.198
D2 - System Pressure : 56.561
Hose (Demand) : 250
D3 - System Demand : 501.198
Safety Margin : 41.890



Fittings Used Summary

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Fitting Legend		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
Abbrev.	Name																				
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
I	90' Grvd-Vic Elbow #10	0	0	2	3	4	3.5	6	5	8	7	8.5	10	13	17	20	23	25	33	36	40
L	NFPA 13 Long Turn Elbow	0.5	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
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
Zcb	Colt C200 Vert Butt	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.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	106.0	80	978.0	98.451	501.2	56.561

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
S1	0.0	8	8.56	23.4	
100	128.66	7.59	9.51	23.4	K=K @ D1
101	128.66	7.59	9.68	23.6	K=K @ D1
102	128.66	7.59	10.22	24.25	K=K @ D1
103	128.66	7.59	11.36	25.57	K=K @ D1
104	128.66	7.59	13.71	28.09	K=K @ D1
105	128.66	7.59	9.72	23.66	K=K @ D1
106	128.66	7.59	9.89	23.86	K=K @ D1
107	128.66	7.59	10.44	24.52	K=K @ D1
108	128.66	7.59	11.61	25.85	K=K @ D1
109	128.66	7.59	14.0	28.39	K=K @ D1
A	126.91		30.86		
B	126.91		31.39		
TOR	126.91		40.23		
BASE	113.33		54.56		
TEST	110.0		56.56	250.0	

Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
S1 to D1	0 0	8.00	23.40 23.4	1 1.049	T 0.0 0.0	5.0 0.0 5.000 5.500	120 0.1740	8.556 0.0 0.957		Vel = 8.69	
D1			0.0 23.40					9.513		K Factor = 7.59	
100 to 101	128.660 128.660	7.59	23.40 23.4	1.5 1.682	0.0 0.0 0.0	9.540 0.0 9.540	120 0.0174	9.513 0.0 0.166		K = K @ D1 Vel = 3.38	
101 to 102	128.660 128.660	7.59	23.60 47.0	1.5 1.682	0.0 0.0 0.0	8.460 0.0 8.460	120 0.0635	9.679 0.0 0.537		K = K @ D1 Vel = 6.79	
102 to 103	128.660 128.660	7.59	24.25 71.25	1.5 1.682	0.0 0.0 0.0	8.370 0.0 8.370	120 0.1369	10.216 0.0 1.146		K = K @ D1 Vel = 10.29	
103 to 104	128.660 128.660	7.59	25.58 96.83	1.5 1.682	0.0 0.0 0.0	9.710 0.0 9.710	120 0.2415	11.362 0.0 2.345		K = K @ D1 Vel = 13.98	
104 to A	128.660 126.910	7.59	28.09 124.92	1.5 1.682	2T 0.0 0.0	19.799 0.0 42.379	22.580 19.799 0.3869	120 0.758 16.398		K = K @ D1 Vel = 18.04	
A			0.0 124.92					30.863		K Factor = 22.49	
105 to 106	128.660 128.660	7.59	23.66 23.66	1.5 1.682	0.0 0.0 0.0	9.540 0.0 9.540	120 0.0178	9.723 0.0 0.170		K = K @ D1 Vel = 3.42	
106 to 107	128.660 128.660	7.59	23.86 47.52	1.5 1.682	0.0 0.0 0.0	8.460 0.0 8.460	120 0.0648	9.893 0.0 0.548		K = K @ D1 Vel = 6.86	
107 to 108	128.660 128.660	7.59	24.52 72.04	1.5 1.682	0.0 0.0 0.0	8.370 0.0 8.370	120 0.1398	10.441 0.0 1.170		K = K @ D1 Vel = 10.40	
108 to 109	128.660 128.660	7.59	25.85 97.89	1.5 1.682	0.0 0.0 0.0	9.710 0.0 9.710	120 0.2464	11.611 0.0 2.393		K = K @ D1 Vel = 14.13	
109 to B	128.660 126.910	7.59	28.39 126.28	1.5 1.682	2T 0.0 0.0	19.799 0.0 42.129	22.330 19.799 0.3948	120 0.758 16.632		K = K @ D1 Vel = 18.23	
B			0.0 126.28					31.394		K Factor = 22.54	
A to B	126.910 126.910		124.92 124.92	2.5 2.635	0.0 0.0 0.0	12.210 0.0 12.210	120 0.0435	30.863 0.0 0.531		Vel = 7.35	
B to TOR	126.910 126.910		126.28 251.2	2.5 2.635	2l 0.0 0.0	16.474 0.0 55.814	39.340 16.474 0.1583	120 0.0 8.835		Vel = 14.78	

Final Calculations - Hazen-Williams

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Node1 to Node2	Elev1 Elev2	K Fact	Qa Qt	Nom Act	Fitting or Eqv. Ln.	Pipe Ftng's Total	CFact Pf/Ft	Pt Pe Pf	*****	Notes	*****
TOR	126.910		0.0	2.5	Zcb	0.0	13.580	120	40.229		
to						0.0	0.0		12.177	* * Fixed Loss = 6.295	
BASE	113.330		251.2	2.635		0.0	13.580	0.1582	2.149	Vel = 14.78	
BASE	113.330		0.0	6	G	4.304	210.000	140	54.555		
to					3L	38.734	86.075		1.442		
TEST	110		251.2	6.16	T	43.037	296.075	0.0019	0.564	Vel = 2.70	
			250.00							Qa = 250.00	
TEST			501.20						56.561	K Factor = 66.64	