

. . . Fire Protection by Computer Design

EASTERN FIRE PROTECTION
170 KITTY HAWK AVE
AUBURN, ME 04210
207-784-1507

Job Name : 43 Cumberland Ave.
Drawing : 1 of 2
Location : Portland
Remote Area : 7
Contract : 4962
Data File : bsmt floor calc.WXF

HYDRAULIC CALCULATIONS
for

Project name: 43 Cumberland Ave.
Location: Portland
Drawing no: 1 of 2
Date: 12/21/12

Design

Remote area number: 7
Remote area location: Basement
Occupancy classification: Light Hazard
Density: .1 - Gpm/SqFt
Area of application: 950 - SqFt
Coverage per sprinkler: 120 - SqFt
Type of sprinklers calculated: Brass Upright TY-FRB K=5.6 200 TY3131
No. of sprinklers calculated: 10
In-rack demand: - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 136.785 - GPM @ 32.5003 - Psi
Type of system: Wet
Volume of dry or preaction system: - Gal

Water supply information

Date: 7/16/12
Location: Sheridan St.
Source: Portland Water District

Name of contractor: EASTERN FIRE PROTECTION
Address: 170 KITTY HAWK AVE / / AUBURN, ME 04210
Phone number: 207-784-1507
Name of designer: Robert Peters
Authority having jurisdiction: State Fire Marshal
Notes: (Include peaking information or gridded systems here.)
Reomte area reduced per NFPA 13 (2010) section 11.2.3.2.3.1

Water Supply Curve (C)

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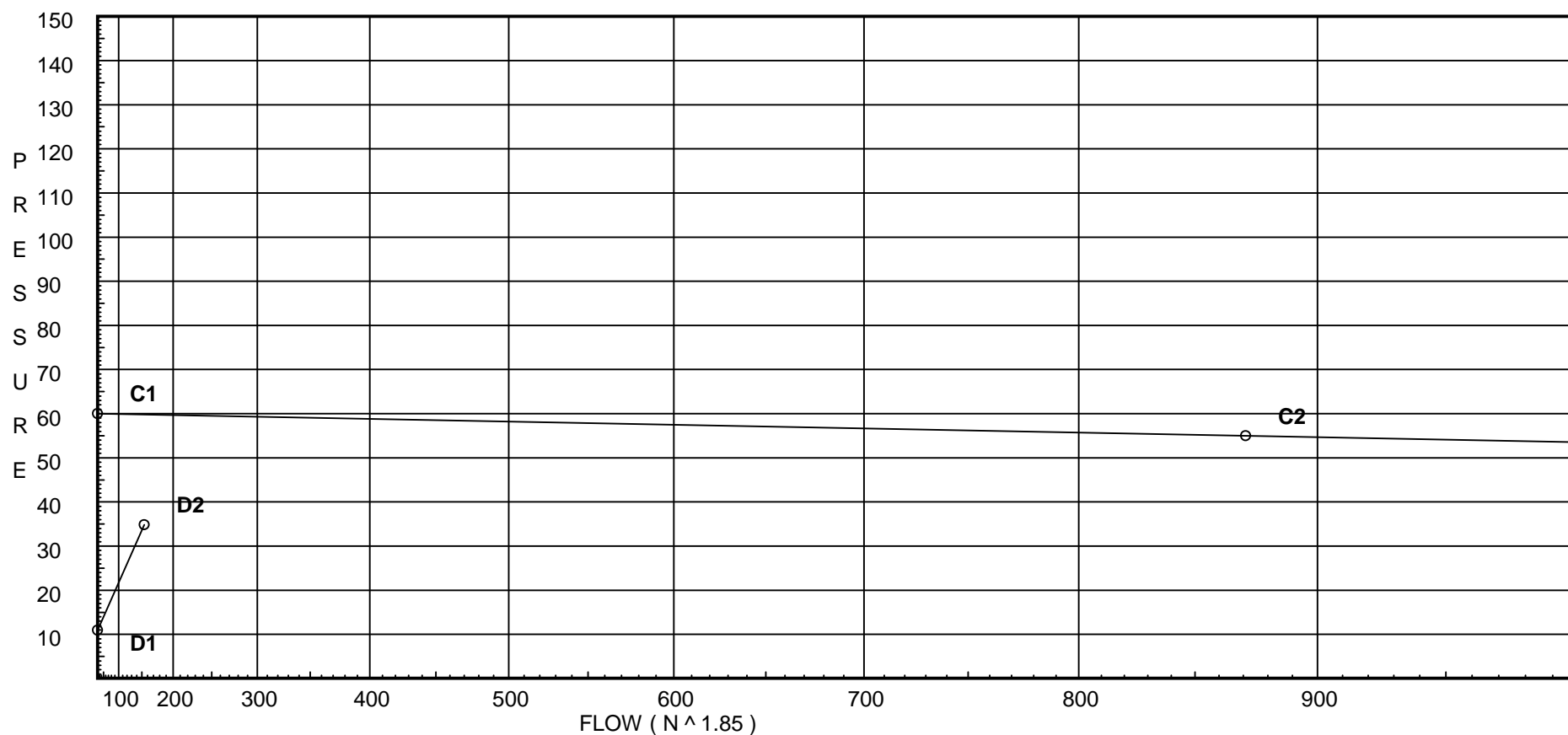
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City Water Supply:

C1 - Static Pressure : 60
C2 - Residual Pressure: 55
C2 - Residual Flow : 871

Demand:

D1 - Elevation : 10.936
D2 - System Flow : 154.068
D2 - System Pressure : 34.842
Hose (Demand) :
D3 - System Demand : 154.068
Safety Margin : 24.955



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
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
Zaa	Ames 2000B	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.

Flow Summary - NFPA 2007

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
TEST	60.0	55	871.0	59.797	154.07	34.842

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
LIN	0.0	4.9	7.0	12.96	
7	107.25	5.6	7.0	14.82	
8	107.25	5.6	7.01	14.83	
9	107.25	5.6	7.08	14.9	
10	107.25	5.6	7.65	15.49	
11	107.25	5.6	7.9	15.74	
12	107.25	5.6	7.51	15.35	
13	107.25	5.6	7.53	15.37	
14	107.25	5.6	7.84	15.68	
15	107.25	5.6	7.97	15.81	
16	107.25	5.6	8.25	16.08	
N	107.083		10.27		
O	106.753		11.2		
U	107.083		9.86		
V	106.753		10.0		
TOR	106.753		12.42		
BFP	103.0		17.67		
BASE	100.0		26.67		
TEST	82.0		34.84		

Final Calculations - Hazen-Williams - 2007

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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	*****
LIN to DRP	0 0	4.90	12.96 12.96	1 1.101	1E 0.0 0.0	3.825 0.0 4.825	150 0.0305	7.000 0.0 0.147			
DRP			0.0 12.96					7.147		K Factor =	4.85
7 to 8	107.250 107.250	5.60	14.82 14.82	2 2.157	0.0 0.0 0.0	6.000 0.0 6.000	120 0.0022	7.000 0.0 0.013		Vel =	1.30
8 to 9	107.250 107.250	5.60	14.83 29.65	2 2.157	0.0 0.0 0.0	8.250 0.0 8.250	120 0.0081	7.013 0.0 0.067		Vel =	2.60
9 to 10	107.250 107.250	5.60	14.90 44.55	2 2.157	4E 0.0 0.0	24.613 0.0 33.613	120 0.0171	7.080 0.0 0.575		Vel =	3.91
10 to 11	107.250 107.250	5.60	15.49 60.04	2 2.157	0.0 0.0 0.0	8.250 0.0 8.250	120 0.0297	7.655 0.0 0.245		Vel =	5.27
11 to N	107.250 107.083	5.60	15.74 75.78	2 2.157	2E 1T 0.0	12.307 12.307 50.197	120 0.0457	7.900 0.072 2.295		Vel =	6.65
N			0.0 75.78					10.267		K Factor =	23.65
12 to 13	107.250 107.250	5.60	15.35 15.35	2 2.157	0.0 0.0 0.0	9.000 0.0 9.000	120 0.0024	7.510 0.0 0.022		Vel =	1.35
13 to 14	107.250 107.250	5.60	15.37 30.72	2 2.157	4E 0.0 0.0	24.613 0.0 36.030	120 0.0086	7.532 0.0 0.309		Vel =	2.70
14 to 15	107.250 107.250	5.60	15.68 46.4	2 2.157	0.0 0.0 0.0	7.000 0.0 7.000	120 0.0186	7.841 0.0 0.130		Vel =	4.07
15 to 16	107.250 107.250	5.60	15.81 62.21	2 2.157	0.0 0.0 0.0	8.667 0.0 8.667	120 0.0317	7.971 0.0 0.275		Vel =	5.46
16 to V	107.250 106.753	5.60	16.08 78.29	2 2.157	1T 0.0 0.0	12.307 0.0 31.724	120 0.0485	8.246 0.215 1.540		Vel =	6.87
V			0.0 78.29					10.001		K Factor =	24.76
N to O	107.083 106.753		75.78 75.78	2 2.157	1T 0.0 0.0	12.307 0.0 17.307	120 0.0457	10.267 0.143 0.791		Vel =	6.65
O to TOR	106.753 106.753		78.29 154.07	2 2.157	1E 0.0 0.0	6.153 0.0 7.153	120 0.1699	11.201 0.0 1.215		Vel =	13.53
TOR			0.0 154.07					12.416		K Factor =	43.72
U to V	107.083 106.753		0.0 0.0	2 2.157	2T 4E 0.0	24.613 24.613 98.226	120 0 0	9.858 0.143 0.0		Vel =	0

Final Calculations - Hazen-Williams - 2007

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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	*****
V to O	106.753 106.753		78.29 78.29	2 2.067	1E 1T 5.0 10.0 0.0	5.083 15.000 20.083	120 0.0598	10.001 0.0 1.200			
O			0.0 78.29					11.201		K Factor = 23.39	
TOR to BFP	106.753 103		154.07 154.07	2 2.067	1Fsp 0.0 0.0	3.000 0.0 3.000	120 0.2090	12.416 4.625 0.627		* Fixed loss = 3 Vel = 14.73	
BFP to BASE	103 100		0.0 154.07	2 2.067	1Zaa 1E 0.0 5.0 0.0	3.167 5.000 8.167	120 0.2090	17.668 7.299 1.707		* Fixed loss = 6 Vel = 14.73	
BASE to TEST	100 82		0.0 154.07	4 4.1	1E 1T 1G 14.534 29.067 2.907	20.000 46.508 66.508	140 0.0056	26.674 7.796 0.372		Vel = 3.74	
TEST			0.0 154.07					34.842		K Factor = 26.10	