

... Fire Protection by Computer Design

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

Job Name : 43 Cumberland Ave.
Drawing : Wood Construction
Location : Portland, ME
Remote Area : Wet
Contract : 4962
Data File : 2nd floor calc.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 43 Cumberland Ave. Date - 12/21/12
Location - Portland, ME
Building - Wood Construction System No. - Wet
Contractor - EFP Contract No. - 4962
Calculated By - Robert Peters Drawing No. - 1 of 2
Construction: (x) Combustible () Non-Combustible Ceiling Height 8'-8"
OCCUPANCY - residential

S Type of Calculation: ()NFPA 13 Residential (x)NFPA 13R ()NFPA 13D
Y Number of Sprinklers Flowing: ()1 (x)2 ()4 ()
S ()Other
T ()Specific Ruling Made by Date
E
M Listed Flow at Start Point - 16 Gpm System Type
Listed Pres. at Start Point - 13.2 Psi (x) Wet () Dry
D MAXIMUM LISTED SPACING 16 x 16 () Deluge () PreAction
E Domestic Flow Added - Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make Tyco Model LF-II
I Elevation at Highest Outlet - 146.75Feet Size 1/2 K-Factor 4.4
G Note: Temperature Rating 155
N

Calculation Gpm Required 32.22 Psi Required 43.96 At Test
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 7/16/12 Rated Cap. Cap.
T Time of Test - 12:30 pm @ Psi Elev.
E Static (Psi) - 60 Elev.
R Residual (Psi) - 55 Other Well
Flow (Gpm) - 871 Proof Flow Gpm
S Elevation - 82

P Location: Sheridan St.

P
L Source of Information: Portland Water District
Y

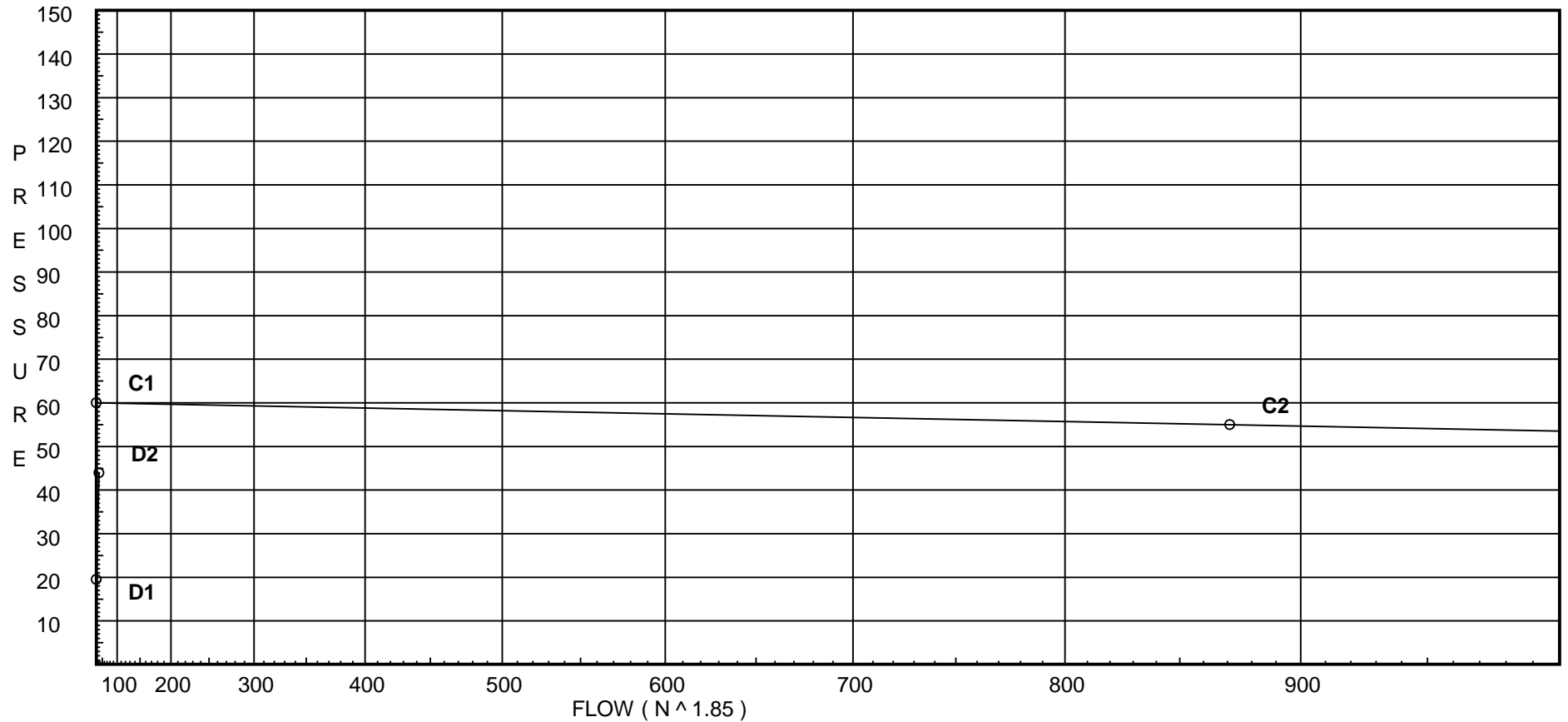
Water Supply Curve (C)

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City Water Supply:
C1 - Static Pressure : 60
C2 - Residual Pressure: 55
C2 - Residual Flow : 871

Demand:
D1 - Elevation : 19.490
D2 - System Flow : 32.22
D2 - System Pressure : 43.961
Hose (Demand) : _____
D3 - System Demand : 32.22
Safety Margin : 16.028



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	1	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.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	60.0	55	871.0	59.989	32.22	43.961

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
LIN	0.0	4.9	7.0	12.96	
5	127.0	4.4	13.61	16.23	
I	127.0		13.7		
6	127.0	4.4	13.2	15.99	
W	127.0		13.72		
J	127.0		14.77		
K	117.083		19.46		
T	117.083		20.35		
L	107.083		23.92		
M	107.083		24.18		
N	107.083		24.52		
O	106.753		24.83		
U	107.083		24.68		
V	106.753		24.83		
TOR	106.753		24.89		
BFP	103.0		29.55		
BASE	100.0		36.14		
TEST	82.0		43.96		

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	3.825 0.0 0.0	1.000 3.825 4.825	150 0.0305	7.000 0.0 0.147			Vel = 4.37
DRP			0.0 12.96						7.147		K Factor = 4.85	
5 to I	127 127	4.40	16.23 16.23	1.25 1.38		0.0 0.0 0.0	3.825 0.0 3.825	120 0.0233	13.612 0.0 0.089			Vel = 3.48
I to W	127 127		0.0 16.23	1.5 1.61		0.0 0.0 0.0	1.333 0.0 1.333	120 0.0113	13.701 0.0 0.015			Vel = 2.56
W			0.0 16.23						13.716		K Factor = 4.38	
6 to W	127 127	4.40	15.99 15.99	1 1.049	1T	5.0 0.0 0.0	1.000 5.000 6.000	120 0.0860	13.200 0.0 0.516			Vel = 5.94
W to J	127 127		16.23 32.22	1.5 1.61	1E 1T	4.0 8.0 0.0	15.000 12.000 27.000	120 0.0390	13.716 0.0 1.054			Vel = 5.08
J to K	127 117.083		0.0 32.22	1.5 1.61		0.0 0.0 0.0	10.000 0.0 10.000	120 0.0390	14.770 4.295 0.390			Vel = 5.08
K to L	117.083 107.083		0.0 32.22	2 2.067	1E	5.0 0.0 0.0	6.153 5.000 11.153	120 0.0116	19.455 4.331 0.129			Vel = 3.08
L			0.0 32.22						23.915		K Factor = 6.59	
T to U	117.083 107.083		0.0 0.0	2 2.067	1E	5.0 0.0 0.0	6.153 5.000 11.153	120 0	20.354 4.331 0.0			Vel = 0
U			0.0 0.0						24.685		K Factor = 0	
L to M	107.083 107.083		32.22 32.22	2 2.067	1E 1T	5.0 10.0 0.0	7.500 15.000 22.500	120 0.0116	23.915 0.0 0.260			Vel = 3.08
M to N	107.083 107.083		0.0 32.22	2 2.157	2E 1T	12.307 12.307 0.0	12.307 24.614 36.921	120 0.0094	24.175 0.0 0.347			Vel = 2.83
N to O	107.083 106.753		0.0 32.22	2 2.157	1T	12.307 0.0 0.0	5.000 12.307 17.307	120 0.0094	24.522 0.143 0.163			Vel = 2.83
O to TOR	106.753 106.753		0.0 32.22	2 2.157	1E	6.153 0.0 0.0	1.000 6.153 7.153	120 0.0094	24.828 0.0 0.067			Vel = 2.83
TOR			0.0 32.22						24.895		K Factor = 6.46	
U to V	107.083 106.753		0.0 0.0	2 2.067	2T 4E	20.0 20.0 0.0	49.000 40.000 89.000	120 0	24.685 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		0.0 0.0	2 2.067	1E 1T 5.0 10.0	5.083 15.000 20.083	120 0	24.828 0.0 0.0		Vel = 0	
O			0.0 0.0					24.828		K Factor = 0	
TOR to BFP	106.753 103		32.22 32.22	2 2.067	1Fsp 0.0 0.0	3.000 0.0 3.000	120 0.0117	24.895 4.625 0.035		* Fixed loss = 3 Vel = 3.08	
BFP to BASE	103 100		0.0 32.22	2 2.067	1Zaa 1E 0.0 5.0	3.167 5.000 8.167	120 0.0115	29.555 6.495 0.094		* Fixed loss = 5.196 Vel = 3.08	
BASE to TEST	100 82		0.0 32.22	4 4.1	1E 1T 14.534 29.067 1G 2.907	20.000 46.508 66.508	140 0.0003	36.144 7.796 0.021		Vel = 0.78	
TEST			0.0 32.22					43.961		K Factor = 4.86	