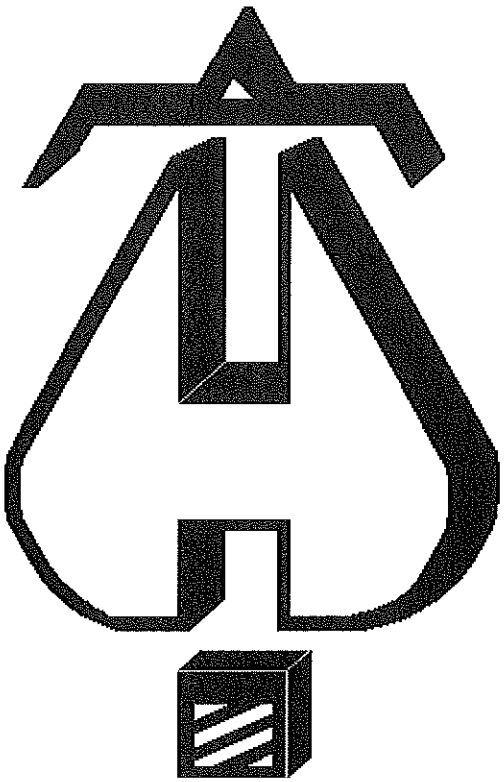


. . . Fire Protection by Computer Design

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	:	4th 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. - 2 of 2
Construction: (x) Combustible ( ) Non-Combustible Ceiling Height varies
OCCUPANCY - residential

SYSTEM DESIGN

Type of Calculation: ( )NFPA 13 Residential (x)NFPA 13R ( )NFPA 13D
Number of Sprinklers Flowing: ( )1 ( )2 (x)4 ( )
( )Other
( )Specific Ruling Made by Date

DESIGN

Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7 Psi (x) Wet ( ) Dry
MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
Domestic Flow Added - Gpm Sprinkler or Nozzle
Additional Flow Added - Gpm Make Tyco Model LF-II
Elevation at Highest Outlet - 146.75Feet Size 1/2 K-Factor 4.9
Note: Temperature Rating 155

Calculation Summary: Gpm Required 57.35 Psi Required 54.52 At Test
C-Factor Used: Overhead 150 Underground 150

WATER SUPPLY

Water Flow Test:
Date of Test - 7/16/12
Time of Test - 12:30 pm
Static (Psi) - 60
Residual (Psi) - 55
Flow (Gpm) - 871
Elevation - 82

Pump Data:
Rated Cap.
@ Psi
Elev.
Other

Tank or Reservoir:
Cap.
Elev.

Well
Proof Flow Gpm

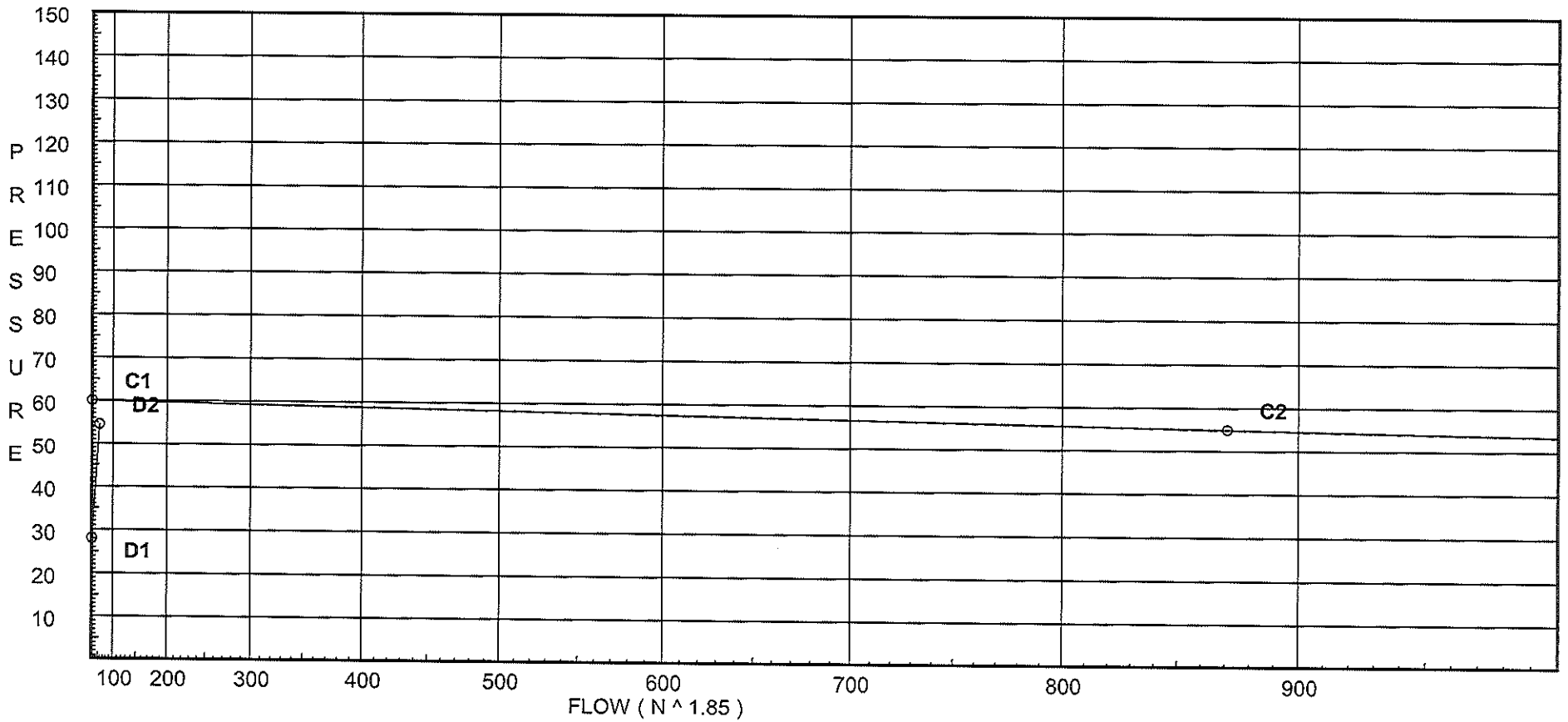
Location: Sheridan St.

Source of Information: Portland Water District

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

Demand:

D1 - Elevation	:	28.043
D2 - System Flow	:	57.352
D2 - System Pressure	:	54.523
Hose (Demand)	:	
D3 - System Demand	:	57.352
Safety Margin	:	5.444



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.

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
TEST	60.0	55	871.0	59.967	57.35	54.523

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
LIN	0.0	4.9	7.0	12.96	
4TH	0.0		70.7		
1	146.75	4.85	7.49	13.27	K=K @ DRP
3	146.75	4.85	7.23	13.04	K=K @ DRP
4	146.75	4.85	7.15	12.96	K=K @ DRP
A	146.75		7.63		
B	146.75		7.71		
C	146.75		8.0		
F	146.75		9.33		
2	146.75	4.85	13.9	18.08	K=K @ DRP
D1	146.75		14.29		
D	146.75		14.47		
E	146.75		14.82		
3RD	0.0		70.7		
G	136.75		14.77		
H	136.75		16.85		
P	136.75		19.41		
Q	136.75		20.28		
2ND	0.0		70.7		
I	127.083		21.91		
J	127.083		23.5		
R	127.083		24.62		
S	127.083		25.02		
1ST	0.0		70.7		
K	117.083		28.38		
T	117.083		29.49		
GRND	0.0		70.7		
L	107.083		32.93		
M	107.083		33.29		
N	107.083		34.07		
O	106.753		34.44		
U	107.083		33.87		
V	106.753		34.37		
TOR	106.753		34.64		
BFP	103.0		39.37		
BASE	100.0		46.67		
TEST	82.0		54.52		

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	0	4.90	12.96	1	1E	3.825	1.000	150	7.000	
to						0.0	3.825		0.0	
DRP	0		12.96	1.101		0.0	4.825	0.0305	0.147	Vel = 4.37
			0.0							
DRP			12.96						7.147	K Factor = 4.85
1	146.750	4.85	13.27	1	1T	9.563	6.417	150	7.490	K = K @ DRP
to						0.0	9.562		0.0	
C	146.750		13.27	1.101		0.0	15.979	0.0319	0.509	Vel = 4.47
			0.0							
C			13.27						7.999	K Factor = 4.69
3	146.750	4.85	13.04	1	1T	9.563	6.083	150	7.227	K = K @ DRP
to						0.0	9.562		0.0	
B	146.750		13.04	1.101		0.0	15.645	0.0309	0.483	Vel = 4.39
			0.0							
B			13.04						7.710	K Factor = 4.70
4	146.750	4.85	12.96	1	1T	9.563	6.417	150	7.147	K = K @ DRP
to						0.0	9.562		0.0	
A	146.750		12.96	1.101		0.0	15.979	0.0305	0.488	Vel = 4.37
A	146.750		0.0	1.25		0.0	7.750	150	7.635	
to						0.0	0.0		0.0	
B	146.750		12.96	1.394		0.0	7.750	0.0097	0.075	Vel = 2.72
B	146.750		13.04	1.25		0.0	8.250	150	7.710	
to						0.0	0.0		0.0	
C	146.750		26.0	1.394		0.0	8.250	0.0350	0.289	Vel = 5.47
C	146.750		13.27	1.25	1T	9.523	8.250	150	7.999	
to						0.0	9.523		0.0	
F	146.750		39.27	1.394		0.0	17.773	0.0751	1.335	Vel = 8.26
F	146.750		0.0	1.25	1E	4.762	10.000	150	9.334	
to						0.0	4.761		4.331	
G	136.750		39.27	1.394		0.0	14.761	0.0751	1.109	Vel = 8.26
			0.0							
G			39.27						14.774	K Factor = 10.22
2	146.750	4.85	18.08	1	1E	3.825	3.000	150	13.900	K = K @ DRP
to						0.0	3.825		0.0	
D1	146.750		18.08	1.101		0.0	6.825	0.0566	0.386	Vel = 6.09
D1	146.750		0.0	1.25	1E	4.762	5.750	150	14.286	
to						0.0	4.761		0.0	
D	146.750		18.08	1.394		0.0	10.511	0.0179	0.188	Vel = 3.80
D	146.750		0.0	1.25	1E	4.762	5.000	150	14.474	
to					1T	9.523	14.284		0.0	
E	146.750		18.08	1.394		0.0	19.284	0.0178	0.344	Vel = 3.80
E	146.750		0.0	1.25	1E	4.762	10.000	150	14.818	
to						0.0	4.761		4.331	
P	136.75		18.08	1.394		0.0	14.761	0.0180	0.265	Vel = 3.80
			0.0							
P			18.08						19.414	K Factor = 4.10
G	136.750		39.27	1.5	3T	34.968	12.833	150	14.774	
to					1E	5.828	40.796		0.0	
H	136.75		39.27	1.598		0.0	53.629	0.0386	2.072	Vel = 6.28

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	******
H	136.75		0.0	1.5	1T	11.656	10.917	150	16.846			
to						0.0	11.656		4.187			
I	127.083		39.27	1.598		0.0	22.573	0.0386	0.872	Vel = 6.28		
			0.0									
I			39.27						21.905	K Factor = 8.39		
P	136.75		18.08	1.25	1E	4.762	15.167	150	19.414			
to					3T	28.57	33.330		0.0			
Q	136.750		18.08	1.394		0.0	48.497	0.0179	0.867	Vel = 3.80		
Q	136.750		0.0	1.5	1E	5.828	10.917	150	20.281			
to						0.0	5.828		4.187			
R	127.083		18.08	1.598		0.0	16.745	0.0092	0.154	Vel = 2.89		
			0.0									
R			18.08						24.622	K Factor = 3.64		
I	127.083		39.27	1.5	1E	4.0	16.417	120	21.905			
to					1T	8.0	12.000		0.0			
J	127.083		39.27	1.61		0.0	28.417	0.0563	1.600	Vel = 6.19		
J	127.083		0.0	1.5		0.0	9.750	120	23.505			
to						0.0	0.0		4.331			
K	117.083		39.27	1.61		0.0	9.750	0.0563	0.549	Vel = 6.19		
			0.0									
K			39.27						28.385	K Factor = 7.37		
R	127.083		18.08	1.5	4E	16.0	14.000	120	24.622			
to						0.0	16.000		0.0			
S	127.083		18.08	1.61		0.0	30.000	0.0134	0.402	Vel = 2.85		
S	127.083		0.0	1.5		0.0	9.750	120	25.024			
to						0.0	0.0		4.331			
T	117.083		18.08	1.61		0.0	9.750	0.0134	0.131	Vel = 2.85		
			0.0									
T			18.08						29.486	K Factor = 3.33		
K	117.083		39.27	2	1E	6.153	10.000	120	28.385			
to						0.0	6.153		4.331			
L	107.083		39.27	2.157		0.0	16.153	0.0136	0.219	Vel = 3.45		
			0.0									
L			39.27						32.935	K Factor = 6.84		
T	117.083		18.08	2	1E	6.153	10.000	120	29.486			
to						0.0	6.153		4.331			
U	107.083		18.08	2.157		0.0	16.153	0.0032	0.052	Vel = 1.59		
			0.0									
U			18.08						33.869	K Factor = 3.11		
L	107.083		39.27	2	1E	6.153	7.500	120	32.935			
to					1T	12.307	18.460		0.0			
M	107.083		39.27	2.157		0.0	25.960	0.0135	0.351	Vel = 3.45		
M	107.083		0.0	2	2E	12.307	33.000	120	33.286			
to					1T	12.307	24.614		0.0			
N	107.083		39.27	2.157		0.0	57.614	0.0136	0.781	Vel = 3.45		
N	107.083		0.0	2	1T	12.307	5.000	120	34.067			
to						0.0	12.307		0.143			
O	106.753		39.27	2.157		0.0	17.307	0.0135	0.234	Vel = 3.45		

EASTERN FIRE PROTECTION
43 Cumberland Ave.

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	******
O	106.753		18.08	2	1E	6.153	1.000	120	34.444			
to						0.0	6.153		0.0			
TOR	106.753		57.35	2.157		0.0	7.153	0.0274	0.196	Vel = 5.04		
			0.0									
TOR			57.35						34.640	K Factor = 9.74		
U	107.083		18.08	2	3T	36.92	49.000	120	33.869			
to					4E	24.613	61.533		0.143			
V	106.753		18.08	2.157		0.0	110.533	0.0032	0.356	Vel = 1.59		
V	106.753		0.0	2	1E	6.153	5.083	120	34.368			
to					1T	12.307	18.460		0.0			
O	106.753		18.08	2.157		0.0	23.543	0.0032	0.076	Vel = 1.59		
			0.0									
O			18.08						34.444	K Factor = 3.08		
TOR	106.753		57.35	2	1Fsp	0.0	3.000	120	34.640			
to						0.0	0.0		4.625	* Fixed loss = 3		
BFP	103		57.35	2.067		0.0	3.000	0.0337	0.101	Vel = 5.48		
BFP	103		0.0	2	1Zaa	0.0	3.167	120	39.366			
to					1E	5.0	5.000		7.027	* Fixed loss = 5.728		
BASE	100		57.35	2.067		0.0	8.167	0.0335	0.274	Vel = 5.48		
BASE	100		0.0	4	1E	14.534	20.000	140	46.667			
to					1T	29.067	46.508		7.796			
TEST	82		57.35	4.1	1G	2.907	66.508	0.0009	0.060	Vel = 1.39		
			0.0									
TEST			57.35						54.523	K Factor = 7.77		