

... Fire Protection by Computer Design

Residential Fire Protection
64 Daggett Hill Rd.
Greene, ME 04236
(207)946-343

Job Name : 185 FORE STREET BLDG
Building : WOOD STRUCTURE
Location : 4TH FLOOR- TRUSS CONCEALED SPACE
System : 1
Contract : C16011
Data File : 185 FORE ST-HYD CALC-4TH FLR UPR.WXF

Hydraulic Design Information Sheet

Name - 185 FORE STREET BLDG Date - 4/28/16
 Location - 4TH FLOOR- TRUSS CONCEALED SPACE
 Building - WOOD STRUCTURE System No. - 1
 Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - C16011
 Calculated By - T. PRAY Drawing No. - 1 OF 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 1'-0"
 Occupancy - CONCEALED SPACE/ LIGHT HAZARD

S (X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve

S Other
 T Specific Ruling Made By Date

M	Area of Sprinkler Operation	- 931	System Type	Sprinkler/Nozzle
	Density	- .1	() Wet	Make VIKING
D	Area Per Sprinkler	- 130	() Dry	Model VK300
E	Elevation at Highest Outlet	- 70.375	() Deluge	Size 1/2"
S	Hose Allowance - Inside	- 100	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance	-	() Other	Temp.Rat.200
G	Hose Allowance - Outside	- 0		

N Note

Calculation Flow Required - 305.74 Press Required - 83.81 AT TEST
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 10-26-2012		Cap. -
T	Time of Test - N/A	Rated Cap.-	Elev.-
E	Static Press - 97	@ Press -	
R	Residual Press - 93	Elev. -	Well
	Flow - 1481		Proof Flow
S	Elevation - 24.5		

P Location - HYDRANTS LOCATED ON NEWBURY AND HANCOCK STREETS, SEE PLOT PLAN

L Source of Information - PORTLAND WATER DISTRICT

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse

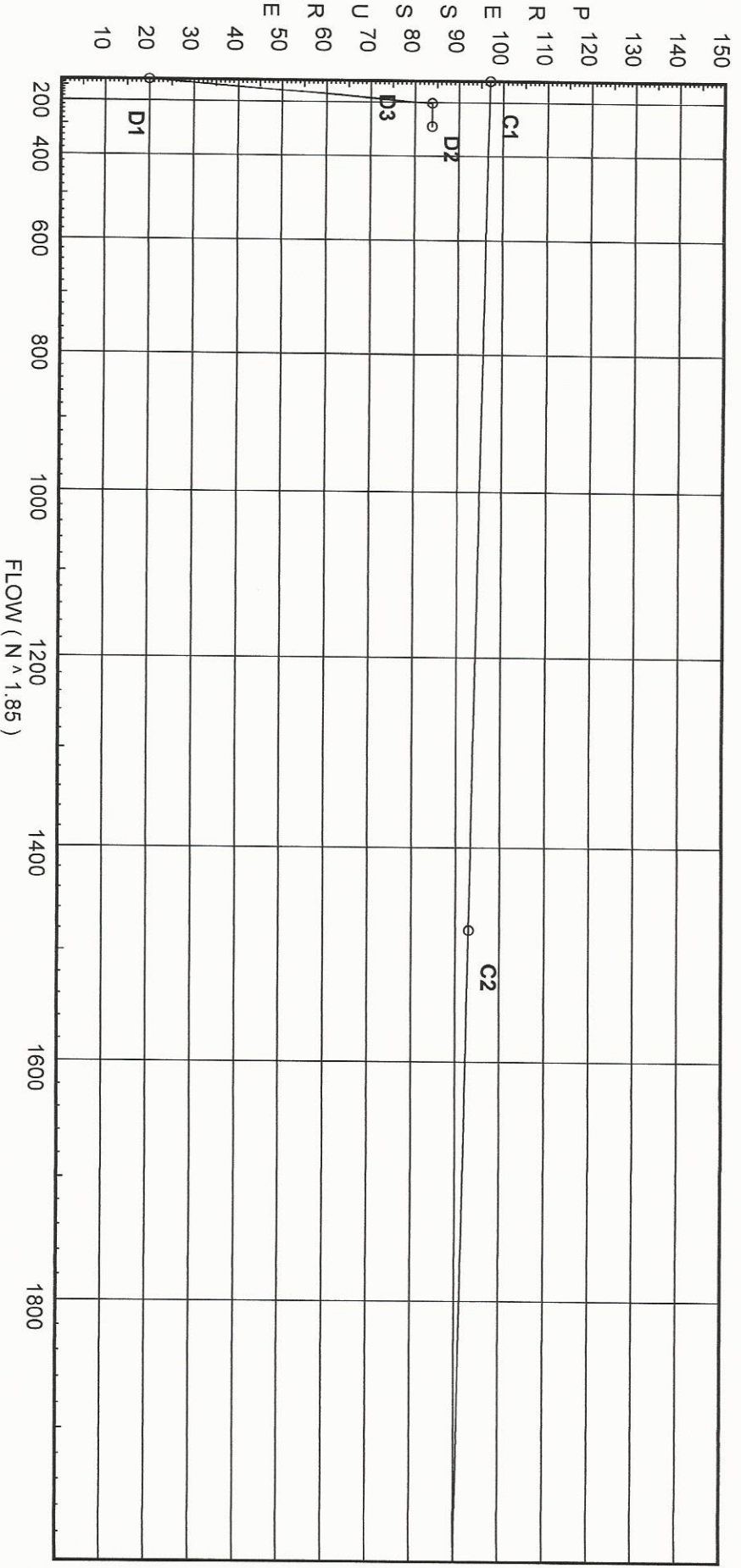
E Horizontal Barriers Provided:

Water Supply Curve (C)

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City Water Supply:
 C1 - Static Pressure : 97
 C2 - Residual Pressure: 93
 C2 - Residual Flow : 1481

Demand:
 D1 - Elevation : 19.868
 D2 - System Flow : 205.74
 D2 - System Pressure : 83.814
 Hose (Adj City) :
 Hose (Demand) : 100
 D3 - System Demand : 305.74
 Safety Margin : 12.970



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
F 45' Elbow	1	1	1	1	2	2	3	3	3	4	5	7	9	11	13	17	19	21	24	28
G Generic Gate Valve	0	0	0	0	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
I 90' Grnd-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
J 90'Tee-Branch Grv Vic #20	0	0	4.5	6	8	8.5	10.8	13	17	16	21	25	33	41	50	65	78	88	98	120
L Long Turn Elbow	1	1	2	2	2	3	4	5	5	6	8	9	13	16	18	24	27	30	34	40
S Generic Swing Check Valve	4	5	5	7	9	11	14	16	19	22	27	32	45	55	65	76	87	98	109	130
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

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	70.375	5.6	7.0	na	14.82	0.1	130	7.0
30	70.375		7.15	na				
2	70.375	5.6	7.75	na	15.59	0.1	130	7.0
31	70.375		8.31	na				
3	70.375	5.6	11.14	na	18.69	0.1	130	7.0
4	70.375	5.6	13.95	na	20.91	0.1	130	7.0
5	70.375	5.6	8.65	na	16.47	0.1	130	7.0
32	70.375		8.83	na				
6	70.375	5.6	9.56	na	17.31	0.1	130	7.0
33	70.375		10.24	na				
7	70.375	5.6	13.68	na	20.71	0.1	130	7.0
63	70.375		14.02	na				
64	70.375		17.17	na				
8	70.375	5.6	17.69	na	23.55	0.1	130	7.0
9	70.375	5.6	9.59	na	17.34	0.1	130	7.0
10	70.375	5.6	10.79	na	18.4	0.1	130	7.0
11	70.375	5.6	15.36	na	21.95	0.1	130	7.0
65	70.375		18.76	na				
66	70.375		35.6	na				
67	70.375		47.16	na				
HV1	63.0		50.64	na	50.0			
HV2	70.375		48.14	na	50.0			
83	32.17		70.2	na				
84	32.17		72.82	na				
TOR	32.17		75.27	na				
BOR	24.5		83.54	na				
TEST	24.5		83.81	na				

The maximum velocity is 19.62 and it occurs in the pipe between nodes 64 and 8

Final Calculations - Hazen-Williams

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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 to 30	14.82	1.049 120		0.0	2.000	7.000 0.0			K Factor = 5.60	
30 to 2	14.82	0.0745		0.0	2.000	0.149			Vel = 5.50	
30 to 2	0.0	1.049 120		0.0	8.000	7.149 0.0				
2 to 31	14.82	0.0748		0.0	8.000	0.598			Vel = 5.50	
2 to 31	15.58	1.049 120		0.0	2.000	7.747 0.0			K Factor = 5.60	
31 to 3	30.4	0.2825		0.0	2.000	0.565			Vel = 11.29	
31 to 3	0.0	1.049 120		0.0	10.000	8.312 0.0				
3 to 63	30.4	0.2824		0.0	10.000	2.824			Vel = 11.29	
3 to 63	18.69	1.38 120	1T	6.0	10.000	11.136 0.0			K Factor = 5.60	
	49.09	0.1802		0.0	16.000	2.883			Vel = 10.53	
	0.0									
	49.09					14.019			K Factor = 13.11	
4 to 63	20.91	1.049 120		0.0	0.500	13.949 0.0			K Factor = 5.60	
	20.91	0.1400		0.0	0.500	0.070			Vel = 7.76	
	0.0									
	20.91					14.019			K Factor = 5.58	
5 to 32	16.47	1.049 120		0.0	2.000	8.650 0.0			K Factor = 5.60	
32 to 6	16.47	0.0905		0.0	2.000	0.181			Vel = 6.11	
32 to 6	0.0	1.049 120		0.0	8.000	8.831 0.0				
6 to 33	16.47	0.0909		0.0	8.000	0.727			Vel = 6.11	
6 to 33	17.31	1.049 120		0.0	2.000	9.558 0.0			K Factor = 5.60	
	33.78	0.3435		0.0	2.000	0.687			Vel = 12.54	
33 to 7	0.0	1.049 120		0.0	10.000	10.245 0.0				
7 to 64	33.78	0.3432		0.0	10.000	3.432			Vel = 12.54	
7 to 64	20.71	1.38 120	1T	6.0	10.000	13.677 0.0			K Factor = 5.60	
	54.49	0.2186		0.0	16.000	3.497			Vel = 11.69	
	0.0									
	54.49					17.174			K Factor = 13.15	
63 to 64	70.01	1.38 120		0.0	9.080	14.019 0.0				
64 to 8	70.01	0.3475		0.0	9.080	3.155			Vel = 15.02	
64 to 8	54.49	1.61 120		0.0	1.080	17.174 0.0				
8 to 8	124.5	0.4759		0.0	1.080	0.514			Vel = 19.62	
8 to 65	23.55	2.067 120		0.0	5.540	17.688 0.0			K Factor = 5.60	
	148.05	0.1942		0.0	5.540	1.076			Vel = 14.16	

Final Calculations - Standard

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 148.05					18.764		K Factor = 34.18	
9 to 10	17.34	1.049 120		0.0 0.0	12.000 0.0	9.592 0.0		K Factor = 5.60	
10 to 11	17.34	0.1000		0.0	12.000	1.200		Vel = 6.44	
10 to 11	18.40	1.049 120		0.0 0.0	12.000 0.0	10.792 0.0		K Factor = 5.60	
11 to 65	35.74	0.3809		0.0	12.000	4.571		Vel = 13.27	
11 to 65	21.95	1.38 120	1T	6.0 0.0	8.000 6.000	15.363 0.0		K Factor = 5.60	
65 to 66	57.69	0.2429		0.0	14.000	3.401		Vel = 12.37	
65 to 66	148.05	2.157 120	1J	10.461 0.0	47.580 10.461	18.764 0.0			
66 to 67	205.74	0.2900		0.0	58.041	16.834		Vel = 18.06	
66 to 67	0.0	2.157 120	1I 1F	4.307 2.461	7.250 32.612	35.598 0.0			
67 to HV1	205.74	0.2900	1S 1T	13.537 12.307	39.862	11.561		Vel = 18.06	
67 to HV1	0.0	3.26 120		0.0 0.0	7.380 0.0	47.159 3.194			
HV1 to HV2	205.74	0.0389		0.0	7.380	0.287		Vel = 7.91	
HV1 to HV2	50.00	3.26 120		0.0 0.0	12.000 0.0	50.640 -3.194		Qa = 50	
HV2 to 83	255.74	0.0580		0.0	12.000	0.696		Vel = 9.83	
HV2 to 83	50.00	3.26 120	1I 1J	6.72 17.471	44.000 24.191	48.142 16.547		Qa = 50	
83 to 84	305.74	0.0807		0.0	68.191	5.506		Vel = 11.75	
83 to 84	0.0	3.26 120	1J	17.471 0.0	15.040 17.471	70.195 0.0			
84 to TOR	305.74	0.0808		0.0	32.511	2.626		Vel = 11.75	
84 to TOR	0.0	3.26 120	2I	13.44 0.0	16.920 13.440	72.821 0.0			
TOR to BOR	305.74	0.0808		0.0	30.360	2.452		Vel = 11.75	
TOR to BOR	0.0	3.26 120	1F	4.032 0.0	7.670 4.032	75.273 7.322		* Fixed loss = 4	
BOR to TEST	305.74	0.0808		0.0	11.702	0.945		Vel = 11.75	
BOR to TEST	0.0	6.16 140	1L 1G	12.911 4.304	40.000 60.252	83.540 0.0			
TEST	305.74	0.0027	1T	43.037	100.252	0.274		Vel = 3.29	
	0.0 305.74					83.814		K Factor = 33.40	