

**. . . Fire Protection by Computer Design**

Residential Fire Protection  
64 Daggett Hill Rd.  
Greene, ME 04236  
946-3473

Job Name : 33 HAMPSHIRE ST APT BLDG  
Building : WOOD STRUCTURE  
Location : 4TH FLOOR- RESIDENTIAL SIDEWALLS  
System : 1  
Contract : 18002  
Data File : 33 HAMPSHIRE ST APT-HYD CALC- 4TH FLR SIDEWALLS.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 33 HAMPSHIRE STREET APT'S Date - 2/12/2018  
Location - 4TH FLOOR- RESIDENTIAL SIDEWALLS  
Building - WOOD STRUCTURE System No. - 1  
Contractor - RESIDENTIAL FIRE PROTECTION Contract No. - 18002  
Calculated By - T. PRAY Drawing No. - 1 OF 1  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 8'-4"  
OCCUPANCY - APARTMENT

S Type of Calculation: ( )NFPA 13 Residential (X)NFPA 13R ( )NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 ( )2 ( )4 (X)3  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 13 Gpm System Type  
Listed Pres. at Start Point - 10.6 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 VIKING Model VK486  
I Elevation at Highest Outlet - 38.37'Feet Size 7/16" K-Factor 4.0  
G Note: Temperature Rating 155  
N

Calculation Gpm Required 90.15 Psi Required 41.2 At Test  
Summary C-Factor Used: Overhead 150 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 10-4-2016 Rated Cap. Cap.  
T Time of Test - N/A @ Psi Elev.  
E Static (Psi) - 95 Elev.  
R Residual (Psi) - 91 Other Well  
Flow (Gpm) - 1519 Proof Flow Gpm  
S Elevation - 0.0'

P Location: HYDRANTS ARE LOCATED NEAREST TO SITE, SEE PLOT PLAN

L Source of Information: PORTLAND WATER DISTRICT  
Y

# Water Supply Curve (C)

Residential Fire Protection  
33 HAMPSHIRE ST APT BLDG

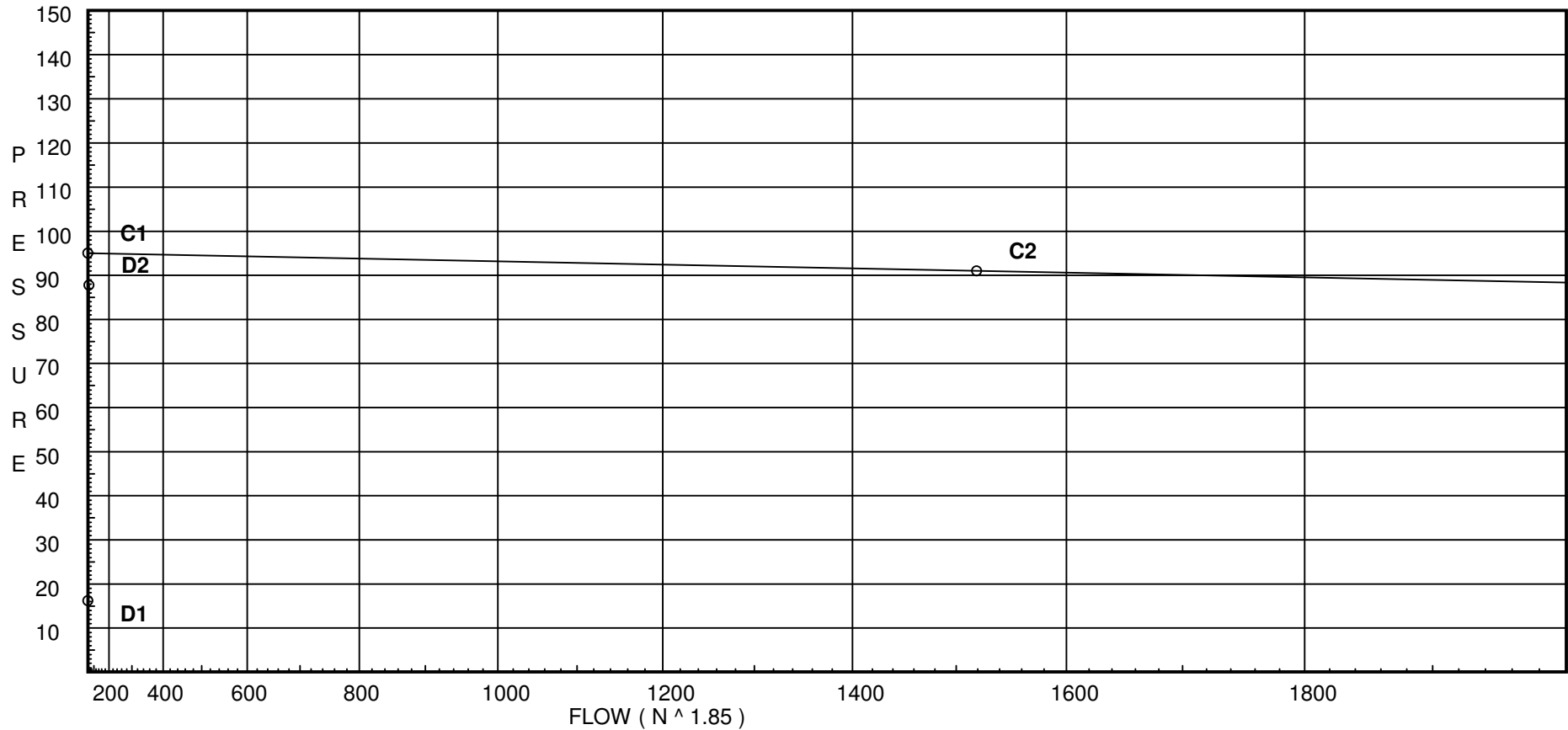
Page 2  
Date 2/8/2018

### City Water Supply:

C1 - Static Pressure : 95  
C2 - Residual Pressure: 91  
C2 - Residual Flow : 1519

### Demand:

D1 - Elevation : 16.185  
D2 - System Flow : 41.2016  
D2 - System Pressure : 87.738  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : \_\_\_\_\_  
D3 - System Demand : 41.2016  
Safety Margin : 7.257



# Fittings Used Summary

Residential Fire Protection  
33 HAMPSHIRE ST APT BLDG

Page 3  
Date 2/8/2018

## Fitting Legend

Abbrev.	Name	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
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
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	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
N	CPVC 90'El Harvel-Spears	7	7	7	8	9	11	12	13	0	0	0	0	0	0	0	0	0	0	0	0
O	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
R	CPVC Coupling Tee - Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
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

Residential Fire Protection  
33 HAMPSHIRE ST APT BLDG

Page 4  
Date 2/8/2018

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	38.37	4	10.6	na	13.02	0.0508	256	10.6
2	38.37	4	12.52	na	14.15	0.0508	256	10.6
20	37.87		12.9	na				
3	38.37	4	12.3	na	14.03	0.0508	256	10.6
21	28.96		21.05	na				
22	18.46		34.9	na				
23	8.25		54.6	na				
24	0.0		64.13	na				
70	-1.42		75.94	na				
53A	-0.71		77.53	na				
71	-1.42		77.43	na				
71A	-1.42		77.83	na				
72	-1.42		79.27	na				
73	-1.42		79.66	na				
74	-0.71		79.49	na				
75	-1.42		80.77	na				
76	-1.42		81.24	na				
TOR	-1.42		82.49	na				
BOR	-4.62		90.15	na				
TEST	1.0		87.74	na				

The maximum velocity is 15.29 and it occurs in the pipe between nodes 24 and 70

# Final Calculations - Hazen-Williams

Residential Fire Protection  
33 HAMPSHIRE ST APT BLDG

Page 5  
Date 2/8/2018

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 20	13.02  13.02	0.874 150 0.0947	2N 1O	14.0 3.0 0.0	5.000 17.000 22.000	10.600 0.217 2.083			K Factor = 4.00  Vel = 6.96	
	0.0 13.02						12.900		K Factor = 3.63	
2 to 20	14.15  14.15	0.874 150 0.1100	1R	1.0 0.0 0.0	0.500 1.000 1.500	12.518 0.217 0.165			K Factor = 4.00  Vel = 7.57	
20 to 21	13.03  27.18	1.101 150 0.1200	3N 1R	21.0 1.0 0.0	13.790 22.000 35.790	12.900 3.859 4.294			Vel = 9.16	
	0.0 27.18						21.053		K Factor = 5.92	
3 to 21	14.03  14.03	0.874 150 0.1087	3N 1O	21.0 3.0 0.0	19.090 24.000 43.090	12.296 4.075 4.682			K Factor = 4.00  Vel = 7.50	
21 to 22	27.17  41.2	1.101 150 0.2591	2N 1O	14.0 5.0 0.0	16.880 19.000 35.880	21.053 4.548 9.296			Vel = 13.88	
22 to 23	0.0  41.2	1.101 150 0.2591	3N 2O 1R	21.0 10.0 1.0	26.970 32.000 58.970	34.897 4.422 15.279			Vel = 13.88	
23 to 24	0.0  41.2	1.101 150 0.2591	1N 1O	7.0 5.0 0.0	11.000 12.000 23.000	54.598 3.573 5.959			Vel = 13.88	
24 to 70	0.0  41.2	1.049 120 0.4955	5E	10.0 0.0 0.0	12.590 10.000 22.590	64.130 0.615 11.194			Vel = 15.29	
70 to 71	0.0  41.2	1.38 120 0.1303		0.0 0.0 0.0	11.420 0.0 11.420	75.939 0.0 1.488			Vel = 8.84	
	0.0 41.20						77.427		K Factor = 4.68	
53A to 71A	0.0  0.0	1.049 120 -0.0001	1E 1T	2.0 5.0 0.0	4.580 7.000 11.580	77.527 0.308 -0.001			Vel = 0	
	0.0 0.0						77.834		K Factor = 0	
71 to 71A	41.20  41.2	1.38 120 0.1302		0.0 0.0 0.0	3.125 0.0 3.125	77.427 0.0 0.407			Vel = 8.84	
71A to 72	0.0  41.2	1.61 120 0.0615	2E	8.0 0.0 0.0	15.290 8.000 23.290	77.834 0.0 1.433			Vel = 6.49	
72 to 73	0.0  41.2	1.61 120 0.0615		0.0 0.0 0.0	6.330 0.0 6.330	79.267 0.0 0.389			Vel = 6.49	
73 to 74	0.0  41.2	1.61 120 0.0618		0.0 0.0 0.0	2.250 0.0 2.250	79.656 -0.308 0.139			Vel = 6.49	

# Final Calculations - Standard

Residential Fire Protection  
33 HAMPSHIRE ST APT BLDG

Page 6  
Date 2/8/2018

Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
74	0.0	1.61	1E 4.0	3.920	79.487				
to		120	1T 8.0	12.000	0.308				
75	41.2	0.0615	0.0	15.920	0.979		Vel = 6.49		
75	0.0	1.61	0.0	7.500	80.774				
to		120	0.0	0.0	0.0				
76	41.2	0.0616	0.0	7.500	0.462		Vel = 6.49		
76	0.0	1.61	2I 8.0	12.330	81.236				
to		120	0.0	8.000	0.0				
TOR	41.2	0.0615	0.0	20.330	1.250		Vel = 6.49		
TOR	0.0	2.067	2I 7.0	6.080	82.486				
to		120	1F 2.0	9.000	7.386		* Fixed loss = 6		
BOR	41.2	0.0182	0.0	15.080	0.275		Vel = 3.94		
BOR	0.0	4.1	1G 2.907	20.000	90.147				
to		140	1T 29.067	31.974	-2.434				
TEST	41.2	0.0005	0.0	51.974	0.025		Vel = 1.00		
	0.0								
	41.20				87.738		K Factor = 4.40		